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Faculty of Nursing, Tanta University

Address:

Email: vd_research@nursing.tanta.edu.eg

Email: sahar.abdelgawad@nursing.tanta.edu.eg

Diabetes Mellitus Risk Reduction among Pre-diabetics: Sustained Integrated Theory Based Nursing Intervention **Hassnaa Eid Shaban Mosa[1], Hanady Sh. Shehata[2], Eman Ahmed Elkaluby[3], Badria Mahrous Abdelhameed Mohammed[4,5]** [1] Assistant professor of Medical Surgical Nursing, Faculty of Nursing, Menoufia University, Egypt. [2] Assistant professor of Family and Community Health Nursing, Faculty of Nursing, Menoufia University, Egypt. [3] Assistant professor of Community Health Nursing, Faculty of Nursing, Alexandria University, Egypt. [4] Lecture of Medical Surgical Nursing, Faculty of Nursing, Menoufia University, Egypt [5]Assistant professor of Medical-Surgical Nursing, Albaha University, Faculty of Applied Medical Sciences, Saudi Arabia .	
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The association between Servant Leadership, Career Adaptability and Job Embeddedness among Staff Nurses at Main Mansoura University Hospital **[1]Reda Shehata Elsayed , [2] Asmaa Moustafa Abdel-Ghani** [1] Assistant Professor, Nursing Administration, Faculty of Nursing, Mansoura University [2] Lecturer, Nursing Administration, Faculty of Nursing, Mansoura University	
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Association between Perceived Social Support, Attitude and Depression among Menopausal Women

Reda M. Hables[1], Amal A Abd El Nabi Moussa [2]

[1] Assistant professor of Obstetrics and Gynecology Nursing, Faculty of Nursing, Alexandria University, Egypt , College of Applied Medical Science ,University of Hafr Albatin

[2] Assistant professor of Psychiatric Nursing and Mental Health, Nursing, Faculty of Nursing, Damanhour University, Egypt.

Abstract

Aging is an important fact to consider from the woman's health perspective. One of the most significant stages of aging is menopause, in which involves physical, psychological, and social changes in life. **Aim of the study:** explore the association between perceived social support, depression and attitudes among menopausal women. **Setting:** the study was conducted in gynecologic outpatient clinic affiliated to National Medical Institute in Damanhour City, El-Beheira Governorate. **Subjects:** A convenience sample of 250 menopausal women was recruited in the study. **Tools**: four tools were used to collect the data: Basic Data, Structured Interview Schedule, Multidimensional Scale of Perceived Social Support, The Beck Depression Inventory, and Attitudes towards Menopause Scale (ATMS). **Findings :** the study revealed that, statistical significant positive relationship was found between perceived social support and attitude toward menopause (P=0.005). While, statistical significant negative relationship was found between perceived social support and depression (P= 0.002). **Conclusion:** social support plays a significant role in alleviating feeling of depression and improving women's attitude toward menopausal changes. **Recommendations:** the nurses should be assess attitude and levels of depression among menopausal women periodically. Educational programs should be carried out for women's families to provide them with information regarding the importance of social support for women during menopause.

Keywords: Menopause, social support, depression and attitude.

Introduction

Women pass through a series of different stages in her life starting from birth till death, each stage is characterized by multiple challenges, fears, concerns and problems. Some of these stages carry positive things, while others do not. Menopause is considered one of the most stressful and irritating stage in women's life [(1)]. It is defined as the permanent cessation of menstruation due to loss of ovarian follicular activity and is recognized to have occurred after 12 consecutive months of amenorrhea. (International Menopause Society. It signifies the end of the reproductive period and transition to the post-reproductive one which begins on average at ages 40-45 years and lasts until about 65 years of age [(2)].

Women experience a number of changes and complaints due to declining levels of estrogen; including cycle disorders, vasomotor symptoms (hot flashes and night sweats), vaginal dryness and dyspareunia, urogenital atrophy, tensions, headache, insomnia, lack of energy, fluid retention, back pain, difficulty concentration, confusion, and cognitive decline [(3)]. In addition, minor mood problems as feeling of anxiety, depression and/or irritability are common during this period. In some women, these symptoms may progress to a more severe mood disorder known as major depression Several studies have shown that during the transition to menopause, the risk of depression increases [(4] showed that women in the menopausal period have a 1.9 times higher risk of depression development. Moreover, several women also experience a profound sense of loss at menopause (e.g. loss of maternal role, youth or beauty) which may lead them to feel that life has lost its purpose [(5)].

The above mentioned physical and psychological changes are considered problems tied to a normal and expected period of transition, adding to this women' attitude toward this period. Attitude toward menopause is an important aspect that is difficult to ask and measure. It determines how

women interpret the physical and psychological manifestation and their understanding of menopause as a life event [6]. Attitude regarding the menopause and its transitional period may differ from one female population to another and determined by the beliefs, expectations and sociocultural perspectives of the society. Subsequently, this attitude affect women' lifestyle in the menopausal period [More specifically, if the attitude is positive can result in a healthy healing response, but, if it is negative can be problematic and require adequate support and intervention from health care providers as well as women' family. For these reasons, adequate and strong social support can help women to gain positive attitude and to address the grief of the losses experienced during this climacteric period [7].

Social support is defined as the perception or experience that one is loved and cared for by others, esteemed and valued, and part of a social network of mutual assistance and obligations [15]. It may come from husband, relatives, friends, coworkers, and social and community ties. On the same respect, perceived social support is the individuals' understanding of love and the support that they receive from all surrounding [8]. Social support can come in the form of tangible assistance provided by others when needed which includes appraisal of different situations, effective coping strategies, and emotional support. It also considered an essential element that help women to reduce the amount of stress experienced during menopause as well as to help in better adaptation with this stressful period On the same line, Sadat et al (2009) analyzed the relationship between perceived social support and depression in menopausal women, they reported that social support is a protective factor for depression caused by menopause and women with less family support have been found to have more severe mental health problems and irritability during the period of menopause [9].

Significance of study

Considering the importance of menopause and its unpleasant effects on women's health, and despite the fact that offering women various treatment options to improve their quality of life is important, it is also imperative to know their attitudes and feelings during the menopausal period, the symptoms they experience and what factors have influencing them. So that, this study sought to analyze the association between perceived social support, depression and pre-existing attitudes toward menopause.

Aim of the study

Explore the association between perceived social support, attitude and depression among menopausal women.

Research question:

What are the association between perceived social support, attitude and depression among menopausal women?

Material and Methods

Research designs

An explanatory descriptive research design was used in this study.

Setting

The study was conducted in gynecologic outpatient clinic affiliated to National Medical Institute in Damanhour City, El-Beheira Governorate.

Subjects

A convenience sample of 250 menopausal women was recruited in the study. The sample size was estimated using EPi-Info created by World Health Organization and Center for Disease Control and Prevention, Atlanta, Georgia, USA version 2002; 95% confidence interval, limit of precision of 5%, with a design effect of 1.0, the calculated sample size was 250 participants.

Inclusion criteria

Women who aged 45 to 60 years old, free from medical or psychiatric disease or major life stressors in the last 3 months and willing to participate were included in the study.

Tools: Four tools were used to collect the necessary data.

Tool I: Basic Data Structured Interview Schedule

This tool was developed by the researchers. It entailed the following two parts:

First part: entails women socio-demographic characteristics as; age, level of education, occupation, marital status, & family type.

Second part: include menstrual and menopausal history as; age of menarche, amount, rhythm, duration, & onset of menopause).

Tool II: **Multidimensional Scale of Perceived Social Support**

The scale was developed by (Zamid 2016) [10] to assess subjective perceived support from three sources (family, friends and significant others). It consists of 25 questions on a Likert-type scale

ranging from strongly disagree (1 point) to strongly agree (7 points). The total score are between 25 and 175. The obtained scores regarding perceived social support are categorized into 3 groups. The points in the range of 25 - 75 are considered as low, 76 - 125 as moderate, and 126 - 175 as high levels of perceived social support.

Tool III: The Beck Depression Inventory.

The scale was developed by Beck et al (1974) [11] . The aim of the scale is not to diagnose depression but to objectively determine the severity of depression symptoms. The scale consists of 21 questions divided into 3 parts: cognitive, physical, and emotional signs. Each question is given a score (0 - 3), and the total score of the scale ranges from 0 to 63. A score between 0 to 13 denotes little or no signs of depression, between 14 to19 indicate low levels of depression, between 20 to 28 average levels of depression, and between 29 to 63 signify high levels of depression.

Tool IV: Attitudes towards Menopause Scale

An attitude towards Menopause Scale (ATMS) was developed by (Singla M**,** 2016) [12] to evaluate attitudes towards menopause of women who are experiencing menopause. The questioner consist of 20 items**,** there were 18 negative and 2 positive items on the scale. For positive items, "I definitely don't agree" rated a score of 0 points; "I don't agree answer" scored 1 points; "I am not sure" answer scored 2 points; "I agree" answer scored 3 points; "I definitely agree" answer scored 4 points. The score of negative items of the scale were reversed. The highest score of the scale was 80 and the lowest score was zero. The cut of point of the scale was 40 points. Women who received 40 points or higher have a positive attitude.

- Approval of the responsible authorities was obtained through official letter from the
- Faculty of Nursing Damanhour University to the Director of National Medical Institute in Damanhour City, El-Beheira Governorate to obtain permission to conduct the study and collect the necessary data.
- Tool (I) was developed by the researchers based on extensive review of recent relevant literature. Tools (II- III-IV) were adapted and translated into Arabic language.
- Tools **(**II- III-IV**)** were tested for content validity by a jury of five experts in the fields of obstetric and gynecologic nursing as well as psychiatric nursing and mental health. The recommended modifications were done and the last form was finalized after proving validity.
- Tools' reliability was checked by Cronbach's alpha test and the result was highly reliable (0.823, 0.870 & 0.852 for tools II- III-IV respectively)
- Women attending gynecologic outpatient clinic were interviewed by the researchers before examination. Each woman was individually interviewed, the researchers introduce themselves to the woman, greet her, explain the purpose of the study and make sure that the woman meet the study criteria. Then start to apply tools of the study. The duration of each interview ranged between 20-25 minutes. The data collection consumed 3 months, from the beginning of February 2019 till the end of May 2019.

Pilot study

A pilot study was carried out on 10% of menopausal women (excluded from the study subjects) from the previously mentioned settings to assure feasibility of the study, clarity and applicability of the tools and to identify obstacles that might interfere with the process of data collection. The pilot study revealed no modifications required.

Ethical consideration

For each recruited subject an informed oral consent was obtained after explaining the purpose of the study. In addition, her anonymity, privacy, and confidentiality of her data were assured as well as volunteer involvement and right to refuse participation in the study were emphasized.

Statistical analysis

Latest version of the statistical software package SPSS (Version-21) was used. The collected data was revised, categorized, coded, computerized, tabulated and analyzed. Descriptive statistics and multivariate analysis were used to identify and compare between different variables. Significance was adopted at $p < 0.05$ for interpretation of results of tests of significance.

Results

Table (1): shows the distribution of the study subjects according to their socio-demographic characteristics. In relation to age, the total subjects mean age was 47.3± 5.8 years with nearly one half of them(49.6 %) being in the age group ranging from 45 to less than 50 years. Concerning marital status, more than one half

(52.00%) were married compared to only 13.2% who were single, while, divorced and widowed had nearly the same percent (17.6% & 17.2% respectively). As regards the occupation, more than two thirds of study subjects (71.2 %) were unemployed compared to only 28.8 % who were employed. In relation to income, 42.8% confirmed that income was not enough, however, around one quarter 26.8% declared that income more than enough. As for level of education, around one half of studied subjects (46.8 %) had primary and preparatory level of education. On the same line, 43.6 % of them their husband also had primary and preparatory level of education. Regarding family type, around two thirds (61.6 %) had extended family, while, 38.4% had nuclear family.

Table (2) presents the distribution of the study subjects according to menstrual and menopausal history**.** It was found that, the majority of the study subjects (80%) had menarche at age less than 14 year. More than two thirds of them was reported duration of menstruation less than 5 days and had history of dysmenorrhea (72% & 74% respectively). As regard interval of menstruation, 60% of participants had interval ranging from 21 to less than 35 days. Also, more than one half of them (52.8 %) reported that menopausal changes and symptoms occurred between age 45 to less than 50 years old.

Figure (1) illustrates the distribution of the study subjects according to level of perceived social support. It can be observed that, those who had high level of perceived social support represented by the highest percent followed by subjects with moderate level of perceived social support and finally, the lowest percent was for low level of perceived social support.

Table (3) presents the distribution of the study subjects according to attitude toward menopause. The table clarifies that less than one fifths (15.2%) of the study subject had reported negative attitude toward menopause. While 84.8% had positive attitude

Table (4) shows the distribution of the study subjects according to levels of depression. It can be noted that, only 10.0 % of the study subject were suffering from high level of depression, nevertheless, 40.0% of them not reporting any symptoms of depression.

Table (5) illustrates the distribution of the study subjects according to correlation between socio-demographic characteristics and their level of perceived social support. In relation to age, it was found that, 71.9% of the study subjects who were in the age group ranging from 45 to less than 50 had high level of perceived social support with statistical significant difference (P=0.05). Also, a statistical significant relationship was found between marital status and level of perceived social support in which more than one half of the studied subjects (57.6 %) who were married had high level of perceived social support (P=0.003).

In addition, the table shows that a statistical significant relationship was found between level of education and social support (P=0.059), where about one half of study subjects (49.6%) who had university level of education reported high level of perceived social support.

Regarding occupation, 70.5 % of the studied subjects who were employed had high level of perceived social support with statistical significant differences (P=0.003). Furthermore, 64.7% of studied subjects who lived in extended family had high level of perceived social support with statistical significant differences (P= 0.013).

Finally, there is no statistical significant differences were proved between income and husband' education with level of perceived social support (P=0.93&P= 0.285 respectively)

Table (6) displays the correlation between the study subjects' menstrual characteristics and their level of perceived social support. It is obvious from the table that, a statistical significant difference was found (P= 0.054) between duration of menopause and level of perceived social support in which 50.4 % of those who had a duration of menopause ranged from five to less than ten years had high level of perceived social support.

The table also shows that, a highly statistical significant relationship (P= 0.001) was found between the study subject history of dysmenorrhea and their level of perceived social support. In which, more than one half (57.6 %) of subjects who had history of dysmenorrhea had high level of perceived social support.

On the other hand, no statistical significant relationship were found between age at menarche, duration of menstruation and interval of menstruation with level of perceived social support. (P=0.169, 0.147, 0.107 respectively)

Table (7) illustrates the correlation between study subjects' attitude toward menopause and their level of perceived social support. There is a statistical significant correlation (P= 0.005) between study subject attitude toward menopause and their level of perceived social

support. Where 88.5% of those who had positive attitude toward menopause had high level of perceived social support.

Table (8) presents the correlation between the study subjects' level of depression and their level of perceived social support. According to this table, a statistical significant correlation was present (P= 0.002) between study subjects' level of depression and their level of

Table (1): Distribution of the study subjects according to their socio-demographic characteristics.

Socio-demographic characteristics.	N= 250	%
Age		
• 45- >50	124	49.6
• 50->55	44	17.6
• ≤ 55	82	32.8
Range	**41 – 58**	
Mean ±S.D.	**47.3± 55.8**	
Marital Status		
• Single	33	13.2
• Married	130	52.00
• Divorced	44	17.6
• Widowed	43	17.2
Occupation		
• Employed	72	28.
• Unemployed	178	71.2
Income		
• Not enough	107	42.8
• Enough	76	30.4
• More than enough	67	26.8
Level of Education		
• Illiterate	53	21.2
• Primary& Preparatory	74	46.8
• Secondary education	37	14.8
• University	86	17.2
Family type		
• Nuclear	96	38.4
• Extended	154	61.6
Level of education for Husband		
• Illiterate	36	14.4
• Primary& Preparatory	109	43.6
• Secondary education	48	19.2
• University	57	22.8

Table (2) Distribution of the study subjects according to menstrual and menopausal history

Menstrual history	Frequency	(%)
Age at menarche		
• >14 • <14	200 50	80 20
Duration of Menstruation		
• > 5days • < 5days	180 70	72 28
Interval of Menstruation(Days)		
• >21 • 21- >35 • ≤ 35	33 150 67	13.2 60 26.8
Age at Menopause (years)		
• 45- >50 • 50- >55 • ≤ 55	138 84 34	52.8 33.6 13.6
History of dysmenorrhea		
• Yes • No	185 65	74 26

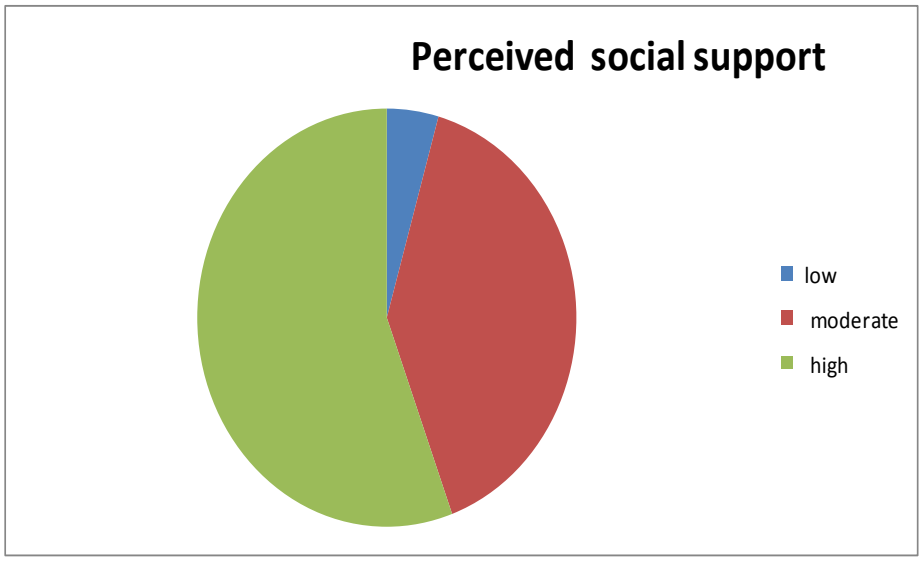

Figure (1) Distribution of the study subjects according to level of perceived social support.

Table (3) Distribution of the study subjects according to attitude toward menopause.

Attitude toward menopause	Frequency	(%)
Positive	212	84.8
Negative	38	15.2
Total	250	100

Table (4) Distribution of the study subjects according to levels of depression.

Level of depressed mood	Frequency	(%)
None	100	40.0
Low	57	22.8
Moderate	68	27.2
High	25	10.0
Total	200	100%

Table (5) Distribution of the study subjects according to correlation between socio-demographic characteristics and their level of perceived social support.

Socio-demographic characteristics	Perceived social support						p
	Mild (no=11)		Moderate (no=100)		High (no=139)		
	No	%	No	%	No	%	
Age in years							X=4.65 0. 05*
45- >50	3	27.3	21	21	122	71.9	
50->55	2	18.2	20	20	22	15.9	
≤ 55	6	54.5	59	59	17	12.2	
Marital status							X= 12.9 0.003*
• Single	2	18.2	11	11	20	14.4	
• Married	5	45.4	45	45	80	57.6	
• Divorced	1	9.1	21	21	22	15.8	
• Widow	3	22.3	23	23	17	12.2	
Level of education							X= 4.15 0.059*
• Illiterate	1	9.1	23	23	29	20.9	
• Primary& Preparatory	6	54.5	20	20	21	15.5	
• Secondary education	2	18.2	42	42	20	14.4	
• University	2	18.2	15	15	69	49.6	
Income							X= 6.60 0.93
• Not enough	7	63.6	51	51	49	35.3	
• Enough	2	18.2	24	24	50	35.9	
• More than enough	2	18.2	25	25	40	28.8	
Occupation							X= 8.95 0.003*
• Unemployed	6	54.5	25	25	41	29.5	
• Employed	5	45.5	75	75	98	70.5	
Family type							
• Nuclear	9	81.8	38	38	49	35.3	X 4.65 0.013*
• Extended	2	18.2	62	62	90	64.7	
Level of education for husband							X=1.98 0.285
• Illiterate	5	45.4	16	16	15	10.8	
• Primary& Preparatory	2	18.2	57	57	50	35.9	
• Secondary education	4	36.4	10	10	34	24.5	
• University	0	0	17	17	40	28.8	

Table (6) Correlation between the study subjects'menstrual characteristics and their level of perceived social support.

Menstrual characteristics	Perceived social support						p
	Mild (no=11)		Moderate (no=100)		High (no=139)		
	No	%	No	%	No	%	
Age at menarche							
• **>14**	9	81.8	90	90	101	72.6	X= 5.02
• **< 14**	2	18.2	10	10	38	27.4	0.169
Duration of Menstruation							
• **> 5days**	8	72.7	85	85	87	62.6	X= 3.83
• **< 5days**	3	27.3	15	15	52	37.4	0.147
Interval of Menstruation(Days)							
• **>21**	2	18.2	26	26	10	7.1	X=3.54
• **21 - > 35**	4	36.4	54	54	70	50.4	0.107
• **< 35**	5	45.4	20	20	59	42.5	
Duration menopause (years)							X= 2.21
• >1- >5	5	45.4	23	23	10	7.1	0.054*
• 5->10	4	36.4	54	54	70	50.4	
• ≤ 10	2	18.2	20	20	59	42.5	
History of dysmenorrhea							X= 22.1
• No	5	45.5	32	32	59	42.4	
• Yes	6	54.5	68	68	80	57.6	0.001*

Table (7) Correlation between the study subjects' attitude toward menopause and their level of perceived social support.

Attitude	Perceived social support						P
	Mild (no=11)		Moderate (no=100)		High (no=139)		
	No	%	No	%	No	%	
Positive	**9**	**81.8**	**80**	**80**	**123**	**88.5**	**X= 7.67**
Negative	**2**	**18.2**	**20**	**20**	**16**	**11.5**	**0.005***

Table (8) Correlation between the study subjects level of depression and their level of perceived social support.

Level of depression	Perceived social support						p
	Mild (no=11)		Moderate (no=100)		High (no=139)		
	No	%	No	%	No	%	
None	1	9	60	60	23.7	33	**X=** 18.1
Low	3	27.1	15	15	41.0	57	**0.002***
Moderate	2	18.9	23	23	28.6	40	
High	5	45	2	2	6	9	

Discussion

Menopause is a critical period and a universal event in women's life. It is the permanent cessation of menses as a result of the irreversible loss of a number of ovarian functions including ovulation and estrogen production. During this time, women experience a number of physiological, psychological and sexual problems. In addition, feelings of loss, sadness and depression may occur during menopause. Social support would have a more positive effect on women during this sensitive period, where it can improve the menopausal women's quality of life [(13)]. The present study aimed to explore the association between perceived social support, depression and attitudes among menopausal women.

Regarding the perceived social support, the current study revealed that more than one half of the study subjects had high level of perceived social support. The possible explanation for this result may be the nature of the living environment of the current study subjects, where they lived at rural areas of El-Beheira Governorate. It is well known that, rural people are characterized by strong ties, close relationship with each others and availability of different types of social support. At this community, women feel that they are not alone and they can receive a variety of social support from many different sources as family, neighbors, and many other people within her reach. In this respect, a qualitative study was conducted on menopause experiences of women in rural areas and found that, the main sources of social support were friends, families and other women. The participants were also assured by the bonds with their mothers, sisters, female friends and women from generation past. Through these bonds women can share experience and gaining different perspectives about their experiences This result go on line with brennans (2018) [(14)] who found that 60% of women in this period of life perceived high level of social support from families, friends and the family member act as first social resources for the women.

In relation to attitude toward menopause. The current study revealed that the majority of study subjects had positive attitude toward menopause. This result could be attributed to what it is commonly known about Egyptian women that they are characterized by high resilience, high tolerance and high faith which may be result from religious beliefs. These inherited beliefs are source of guidance and support for all people in all stages of their life and provide peace in mind by renewing hope and increase self-worth, self-confidence, self-control, and help people to accept their problems and faster recovery from stress. From this point of view, the Egyptian women completely know that each stage in their life have specific goals must be achieved and have different challenges. Also, they know that their life is about a series of stages all of us pass through it. So, they try to accept and live each stage with its advantages and disadvantages and try to feel satisfied with each one**.**

This result is consistant with Jassim et al (2008) [(15)] who found that only 17% of the women had negative attitudes toward menopause. Where women cultures viewed and accept menopause as a natural process, and 40% of them thought it to be a good experience in her phase of life. Also, Bahri et al, (2016) [(16)] reported that, the women's' attitudes toward menopause generally ranging from neutral to positive. On the contrary, Erbil (2016) [17)]. found that women in communities have negative attitude toward menopause. They considered it as unpleasant event and always associated with problems such as: one feels old, unwell sensation, depression, and stress. In addition to that, women thought that menopause affects marital relationship negatively [(17)].

Speaking of the third main result, the current study revealed that 10 % of the study subjects had high level of depression. This result is consistant with the traditional psychological view that stated the "empty nest syndrome" leads to feelings of loss and sadness. In addition to the biological effects of hormonal fluctuations on mood, as well as decrease level of estrogen may also lead to depression, anxiety and insomnia during this period [(18)].

Regarding significant relationship between perceived social support and age of women. The present study found that more than two thirds of the study subjects who had high level of perceived social support aged from 45 to less than 50 year. The explanation for this result may be that, the young age women are still living with their husbands and children in the same home which give her support and assistance when need. Also, women may be still working not retired and receive much support

from her colleagues. On the other hand, women with old age may live alone after her children leaving the home and transfer to their own life that may be far from their mothers. In addition, their husbands might be dead or became extremely ill and need a lot of help and support. All of this affects the quantity and quality of social support received by the women after menopause. This result agree with the studies of Erbil (2018) and Najafabadi (2015) [19]. who found a significant relationship between perceived social support and age of women and women at age 50 or under have high score of perceived social support than elderly women([19].

As for marital status, the present study found a significant relationship between perceived social support and marital status of women. Where more than one half of subjects who had high level of perceived social support were married. This may be due to the presence of husbands and their supportive role with their wives. Definitely, husbands play a significant role in women's life and considered the first and main support in times of stress and complain and their roles might be intensified when they are knowledgeable about the process of menopause and its negative effect on the women.

This result go on line with the study of sixum (2016) [20] who reported that marital status and relation with husband play an important role in dealing with menopause process. Husbands who demonstrated support for their wives during menopause significantly impacted their wives' health in a positive manner. Indeed, the quality of the marital relationship was also a parameter of women's health. Studies have shown that a woman's marriage and relationship with her husband play an essential role in dealing with complaints of this period [34,35]

Concerning level of education, a statistical significant relationship was proved between perceived social support and women level of education. About one half of the studied subjects who had high level of perceived social support had university education. This result could be explained by the fact that, menopausal women with higher education will have a good knowledge of physical and psychological changes that occur so that it will emerge a healthy behavior that affects the quality of life. In addition, education and good knowledge will lead to self efficacy to be able to manage the state of self during the menopause period. This result go on line with the study of Astari (2014) [21]. who found that women with high educational levels have better understanding of social support not only compatibility but also given the liberal nature of social support and learn how to deal and cope with any stress and menopausal symptoms [21].

Another significant relationship was found between job status of women and perceived social support**, w**here working women had higher level of perceived social support. Actually, in the working environment women have the chance to make different social groups, friendships, and have many colleagues with different ages, experiences and education. All of these social networks can provide information, help, and emotional support for women during time of emotional crisis like menopause. In addition, the great opportunity is available for women to ventilate their negative emotions toward menopause and to express her concerns with trusted and confidential persons in the work. It is well documented in the literature that, women who work can make social adjustments and reach to self actualization stage. This is in turn has a positive impact on women's psychological status and improve quality of life [22].

This result is concordant with the study of Ford (2015) [23] who found that, working women have low stress, more opportunities to fulfill their need for approval, appreciation, and support that increase acceptance for this stage of life and become more aware about the changes. Working statues also helps in maintaining a positive self –esteem in menopausal women. While, non working has limited range of friend, social life, they have to rely only on their husbands or family members for constant approval and appreciation. The present finding is relatively consistent with the study of Nazarpour et al, (2016) [24]they found that housewives experience the menopause associated vasomotor symptoms more than working women. They also added that working women have more communication with other people that is why they suffer from mild symptoms. [24]

In relation to type of family, the study findings showed that around two thirds of menopausal women who live in extended family have high level of perceived social support. Generally speaking, in extended families there is a large

and wide social network that provides a lot of support from many different persons (mother, father, grandmother, and grandfather….etc). This support has a positive effect on psychological status, reduce depression and improve quality of life in menopausal women. This finding is in accordance with Marzieh (2018) who stated that social support from the family can give a positive role in improving women's mental condition [(25)].

As regards duration of menopause, the current study revealed a significant relationship between duration of menopause and perceived social support. More than one half of the study subject who had a duration of menopause ranged from five to less than ten years had high level of perceived social support. This may be attributed to the availability of a wide range of social network around menopausal women that involve many different sources of social support that could help in better coping. The last main and basic proved result of this study is the presence of statistical significant relationships between perceived social support, attitude toward menopause and level of depression. Where, higher level of perceived social support predict positive attitude toward menopause and alleviate symptoms of depression among our study subjects. As mentioned before, social support plays an important role in improving attitude and can be a protective factor for depression caused by menopause. Moreover, social support can act as a safeguard in stressful periods like menopause and decrease the negative effects on physical and mental health. In addition, satisfaction with social support can plays a critical role in providing positive emotions which subsequently affect positively on women's' attitude. [(24)]

Conclusion

Social support plays a significant role in alleviating feeling of depression and improving women's attitude toward menopause .

Recommendations

- The nurse provide effective support for menopausal women to cope and determination regarding with the effects of menopause in creative and dynamic ways.
- These measures are essential to ensuring effective support for menopausal women.

Periodic check should be done for menopausal women to assess their attitude and levels of depression.

- Psychological counseling by nurses should be provided to menopausal women through gynecological clinic to help them better coping with this irritating period.

providing follow up care.

- An educational training programs should be carried out for women's families to provide them with essential information regarding menopause.

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Abeer Elsayed Berma[1], Huda Gaber Hamza[2]

[1]Assistant professor of Psychiatric Nursing and Mental Health, Faculty of Nursing, Port Said University,Egypt

[2] Lecturer of Psychiatric Nursing and Mental Health, Faculty of Nursing, Port Said University, Egypt

Abstract

Background: Psychiatric constituencies are stressful environments. Resilience can help psychiatric nurses manage with their occupational stress. Resilience is positive adaptations to nurses stress management capacity as well as optimistic life orientation, they will become more productive, creative, and supported. **Aim:** The study intended to evaluate the effect of resilience program to enhance optimism level among nurses caring for clients with psychiatric disorders **Subjects and Method:** One- group quasi-experimental design with pre-post evaluation was used. The study sample consisted of twenty nurses working in the psychiatric health and addiction treatment hospital in Port Said City. The data was collected through the two tools include the ego resilience scale and revised life orientation test were assessed before the education program and immediately after finishing the program. **The results** revealed that there was a statistical significant improvement between high level of resilience in pre/ post program. Also found that, optimism and resilience share a positive relation after the intervention with marital status, educational level and experience in psychiatric nursing. A statistically significant positive correlation between nurses levels of resilience with optimisms in the post program. **Conclusion:** The program had "great positive effect" on increasing the level of optimism among nurses accomplished the educational session, who caring for psychiatric patients. **Recommendations:** The findings of the study clearly show that resilience program is effective to boost resilience and optimism.

Keywords: Psychiatric nurses, Resilience, Optimism, **Caring psychiatric patient.**

Introduction

Mental health nurses work in challenging and potentially stressful environments. Consumer, family, and/or staff relationships, as well as the work environment and organization, can all be sources of stress. Burnout and poor physical and mental wellbeing can result from the cumulative effects of stress and specialized challenges for mental health nurses(1).Patients with psychiatric diseases present to psychiatric facilities with psychological crises or behavioral disorders, needing the skills of a professional nurse who is sensitive, aware, attentive, and prepared to deal with the unpredictability of clinical situations (2). Despite these obstacles, resilience enables nurses to adapt to their work environment while keeping a healthy and stable mental state (3).

Healthcare professionals in fields such as medicine, nursing, psychology, and social work have a higher risk of acquiring burnout symptoms or mental illnesses. Resilience-building training programs may be beneficial to this population (4). A process of positive adaptation to stress and adversity is referred to as resilience(1).Nurses who really are resilient are better equipped to cope with work stress and its negative consequences. Increasing nurses' resilience in order to live in today's challenging work environment is a critical issue in the twenty-first century (5).Individual strengths linked to resilience and positive life orientation, such as emotional stability, and realistic optimism, which fostered through resilience intervention (6).

Optimism is a generalized belief that a person will achieve favorable outcomes when confronted with a challenge. This expectation practically encompasses every major area of a person's existence. Optimism is associated with a number of psychological traits that can affect one's self-efficacy (7).Optimists think that dreams can be actually realized, while pessimists are worried for the future(8). Optimism appears to be an individual difference variable that represents how optimistic people are really about their expectations in the future(9). Optimism is linked to better resilience among individuals (10).

Resilience is one of the positive characteristics associated with an optimistic explanatory style (11).Resilient nurses are reflective, optimistic and socially competent; they also have high problem-solving capabilities and a sense of purpose(12).As a result, optimism is thought to predict a higher level of distress tolerance as well as resistance to challenging working situations (13). In other words, in stressful situations, optimism tends to be associated with resilience(9).

Significance of the study:

Mental nurses are more likely to experience stress because they operate in close proximity to psychiatric patients in a high-stress environment and under difficult working conditions [(14)]. Resilience is a positive adaptation to nurses stress management capacity and optimistic life orientation[(15)].As a result, being optimistic and proactive can help nurses build a positive outlook on life, enhance overall health, survive better and with less stress, and acquire effective coping skills. So the aim provided in the current study is to evaluate the effect of resilience program to enhance optimism level among nurses considerate for patients with psychiatric conditions, so that they can be helpful to themselves and to their clients in abroad way.

Aim of the study:

This study concerned with evaluating the effect of resilience program to enhance optimism level among nurses caring for patients with psychiatric conditions.

Specific objectives:

1. Measure the levels of resilience among nurses.
2. Measures levels of optimism among nurses.
3. Construct, implement and evaluate the effect of an of resilience program to enhance optimism level among nurses caring for patients with psychiatric conditions.

Research Hypotheses

Based on the goals of the research the following hypotheses have been tested.

1. The post-test scores for the level of resilience among nurses who attended resilience program will be higher than their pre-test scores.
2. The post-test scores for the level of optimism among nurses who attended resilience program will be higher than their pre-test scores.

Subjects and Method

Study Design

A quasi-experimental (pre/post-test) design was used to determine the effect of educational program about resilience on optimism for nurses in Port Said Psychiatric Health Hospital.

Study Setting

The present study was implemented in Port Said Psychiatric Health Hospital. This hospital is linked to General Secretariat of Mental Health and Addiction Treatment (GSMHAT), Ministry of Health and provides care to psychiatric and substance abuse patients. That hospital composed of five in-patient psychiatric units including one unit is men's department for substance abuse, two units for male and two units for female's patients. Additionally, one unit for children, and finally the outpatient clinic.

Study Subjects

The study subjects comprised a convenient sample of twenty nurses working in Port Said Mental Health Hospital. The subjects of this consider were chosen agreeing to the taking after criteria; nurses who provide a direct care to patients with psychiatric disorders and who agree to participate in the study. The overall numbers of nurses who work at the hospital were eight nineteen nurses.

Sample Size

Sample size will be determined according to the following equation:

$N = (Za)\ 2\ X\ p\ q\ /\ d2$ [(16)].

Where

N = sample size.

Za = the value of standard normal distribution for type I error probability for the sided test and equals 1.96.

p = prevalence of resilience = 8.632% [(17)].

q = 1- p

d2 = the accuracy of estimate

So, according to the calculations, the sample size = 20 nurses.

Tools for Data Collection

The Ego Resilience Scale and The Revised Life Orientation Test, along with a personal data questionnaire were used to collect data for this study.

The Ego Resilience Scale(ER89)

It was established by Block & Kremen (1996)[(18)] in English language and translated in to Arabic language by **Al-Khatib & Al-Helou** (2007)[(19)]. This scale measures ego resilience.The Arabic version of ER89 showed validity and worthy internal consistency, using Cronbach's alpha $\alpha = 0.968$. Validity was done by an expert panel who decided that the scale was valid [(19)].

For scoring system, The ER89 consisted of 14 statements. Each statement has four choices and a graduated scale of (1-4) representing the following

categories, does not apply at all (1), applies little (2), sometimes applies(3), and applies a lot (4). The score is between14-56 and with higher scores indicating greater ego resilience.With scores from 14 to 22 denoting low resilience, from 23 to 34 donating moderate resilience, while from 35 to 56 indicating high level.

1) The Revised Life Orientation Test (LOT-R)

It was established by Scheier et al., (1996)[20] in English language. The LOT-R measures the level of dispositional optimism of an individual.

Intended for scoring system, The LOT-R consisted of 10 items.This five-point Likert-type scale (0, strongly disagree to 4, strongly agree) consists of three positively worded items that assess optimism (1, 4, and 10 Items) and three reversed-scored items (3, 7, and 9 Items) that measure pessimism. In addition, four filler items (2, 5, 6, and8) were included that disguise the underlying purpose of the test. Scores range from zero to 24.Higher scores indicate greater optimism and lower scores indicate lower optimism, often referred to as pessimism. High scores indicated an optimistic overall outlook on life. With scores from zero to 13 denoting low optimism, from 14 to 18 donating moderate optimism, while from 19 to 24 indicating high level.

Additionally, Personal Data Questionnaire was utilized, this structured interview questionnaire established by the researchers in Arabic linguistic, which was collected from nurses. It contained personal features as nurse's age, gender, marital status, number of children, level of education, income and number of years in psychiatric nursing.

Tool validity and reliability

For the current study, the LOT-R scale **(Tool 2)** was transformed into Arabic language. The two chief phases of translation comprising forward and backward were done. Two bilingual specialists did the forward translation, and then the Arabic version of the LOT-R was then translated back into an English language by two other linguistic experts who were uninformed of the original version. Then, the researchers revised these translations and compared them with the original version to assure the accuracy of translation and eliminate any dissimilarity.

As well, a final Arabic version was confirmed by a panel of experts who decided that the translated tool was valid. A panel encompassed one professor and three assistant professors from Psychiatric Nursing and Mental Health department, one professor from Medical Surgical Nursing department, and two assistant professors from Nursing Administration department, Faculty of Nursing, Port Said University. They were demanded to conveytheir views concerning construction, lucidity, significance, and inclusiveness of the transformed tool. Grounded on their appraisal, the required modifications were done accordingly. The stage of evidencing validity of the translated tool continued for two months.

Reliability of an Arabic version of the LOT-R scale was proven by Cronbach's alpha coefficient. An Arabic version was proved to be reliableas Cronbach's alpha was satisfactory as$\alpha = 0.78$. The period of ascertaining reliability persisted for one week.

Pilot Study

In preparation for the actual study, a pilot study was implemented on 10 % of the studied nurses. It was done in order to ascertain the significance, clarity and practicability of the used study tools, and to estimate the time required to fill in the study tools. The nurses who encompassed the pilot study were excluded from the chief study sample to assure the stability of the result. Built on the findings of the pilot study, no changes were done to the study tools; the study tools were simple and perfect. The pilot study was implemented in the first of January 2021 for one week.

Field Work

Preparation, data collection, implementation and evaluation of a program persisted for nine months since the first of February to the end of July 2021. The study moved out through four stages Assessment, Development of the educational program, implementation and evaluation as follow:

I) Phase one: - Assessment phase (pretest)

Before starting-up the program design and planning, the study tools were constructed, tested and refined then applied to nurses to assess their knowledge and skills about resilience. Collected data was analyzed to obtain a baseline information about nurses' knowledge and skills in resilience. Filling of the tools ranged from 15 to 20 minutes.

II) Phase two: - Development of the educational program

Educational program was established by the investigators based on reviewing of the recent related literatures and the result of phase one. The program content was developed, the content stressed mainly on (theoretical knowledge about resilience and several skills that help to promote resilience and optimism of nursing in caring patients with psychiatric conditions.

- Training sessions were held by researchers included lectures, discussions and group participation, and role-playing, at the end of every session, the participants' questions were answered, and the beginning of the next sessions was complemented by a review of the topics of the previous session. Multimedia facilities such as computers, film, and software players (PowerPoint) were used to provide training and prevent tiredness in the participants.
- The program was tested for its validity after translation by three linguistic experts.
- The program was developed on small group basis. The subjects encompassed six subgroups. Each sub group composed of three-four nurses. Each sub group attended eight sessions; these sessions were scheduled as two sessions per week for duration of four weeks (Wednesday& Thursday). The time for each session was about (60-90 m).

III) Phase three: - Implementation of education Program.

The researchers divided the implementation phase of the program into eight sessions:

Session	Goals	Educational Program Content
1	The nurse was able to : Acknowledge with the generalities and content of the program	Introducing the members and getting to recognize the workshop facilitators; getting acquainted with the objectives and framework of the Program; expressing the guidelines and regulations of the meetings.
2	Identify the meaning and concepts of resilience (by providing definition, explanation, example).	Definition of resilience; introducing the characteristics of resilient individuals; explaining the aspects related to resilience; familiarity with the ways of creating resilience; presenting group tasks (in groups of three-four Nurses)
3	Enlarge self-awareness of one's abilities	Assessment of homework, awareness of one's abilities and elimination or reduction of irrational beliefs; facilitating the aspects and barriers to self-awareness, expression of the nurses' experiences (answers, and questions; group discussion)
4	Strengthen self-esteem	A clear understanding of self-esteem; explaining the causes and issues influencing self-esteem; understanding the importance and impact of self-esteem in life; identifying strengths and weaknesses
5	Utilize therapeutic communication	Discussion of the nurse's experience (problems) faced throughout work with patients and other professional staff in mental hospital. Scenario to qualified nurses when deal effectively with patients and use effective caring behaviour skills. (group discussion, and role play)
6	Explore different support factors	The concept of optimism and the role of optimistic thinking in resilience; teaching positive thinking social support system; individual responsibility and role acceptance
7	Initiate adaptive coping strategy	Training exercises were done to support nurses to manage with stress. It covered the topic "Deep breathing exercise" and "progressive relaxation technique explanation steps of these exercises

		(practical practice, and role play).
8	Share their feedback about the program	The investigators analysis the topics covered by the group and feedback from the individuals About the program. At the end of the program for all subgroup, printed booklet of the educational program was given to all studied nurses.

During implementation of the program, as a general

- The investigators were the initiator, provider and reassure of exchange knowledge, problems, stressors between studied nurses and investigators, and encouraged exploration of their issues and responses. They also acted as a group leader who operated as a facilitator, teacher, and trainer.
- The investigators allowed nurses to think critically and give wide range of their own responses to the situations and analyze each one.
- All over the sessions, the investigators were motivating the nurses to share in the discussion, and emotionally reward by positive comments and appreciation.
- Each session the investigators provided the nurses the planned to mention positive changes that acquired from the previous sessions.

IV)Phase four (Evaluation phase)

- This alarmed with the evaluation of the implemented educational Program. The tool of the study was reapplied twice on all study subjects on an individual basis immediately after implementation of the educational program.
- After completion of post-test, the studied nurses were thanked for the time and effort they generously offered. Also, a printed booklet which included all information delivered in the program to use as reference in the future was presented to each participant.

Ethical Considerations

The dean of the Faculty of Nursing sent an official letter to the GSMHAT, demanding his permission and cooperation to implement the study, afterwards clarifying the intention of the study. Consequently, official letters directed from GSMHAT to the director of Port Said Psychiatric Health Hospital requesting his permission to conduct the study.

An informed consent was obtained from the studied nurses after complete description of the purpose and nature of the study. Confidentiality of the collected data and anonymity were strictly maintained through a code number affixed to each studied adolescent questionnaire. Voluntary participation of the studied nurses was confirmed as they were well-informed that they have the freedom to withdraw from study at any phase. Finally, the process of data collection and program implementation were not disturbing the harmony of the work of the above-mentioned setting.

Statistical analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0. (Armonk, NY: IBM Corp). Qualitative data were defined using number and percent. The Shapiro-Wilk test was used to verify the normality of distribution. Quantitative data were described using mean and standard deviation. Significance of the attained results was judged at the 5% level. Chi-square test was used for categorical variables, to compare between different group. Fisher's Exact or Monte Carlo correction was used for chi-square when more than 20% of the cells have expected count less than 5. Marginal Homogeneity Test was used to analyze the significance between the different stages. Paired t-test was used for normally distributed quantitative variables, to compare among two periods.

Limitations of the study

It was the first time to apply a program in psychiatric hospital and the permission was gained with difficulty. Also it was difficult to collect all the nurses together at the same time to attend the session of the program due to working circumstances. Such limitation was overcome by implementing the program for nurses at appropriate time for the researchers and the nurses. The study

did not reveal data about the amount of patient and nurse interaction and did not provide information about patient's outcomes from the inter-relationships.

Results

Figure1,denotes percentage distribution of the levels of optimism among nurses pre\post program. It indicates the improvement of nurses' optimism. As, the scores in the post program tend to increased compared to preprogram especially in the highest level of nurses' optimism which reached 65% in the immediate post-test. Nonetheless, the optimism levels were significantly higher than the pre-program levels among studied nurses.

Figure2, shows percentage distribution of the studied nurses according to levels of resilience. It shows that there was a significant improvement between high level of resilience in pre-program and post- program phase.

Table 1, puzzles out the relation between personal characteristics and levels of optimisms among the studied nurses pre\ post program. The study results reveal that, there was a statistically significant relation between optimism levels and personal characteristics of the studied nurses comprising marital status, educational level and experience in psychiatric nursing after the program at $p \leq 0.05$.

The table also considers that, Married and the secondary technical school nurses had the highest percent change in the score of highest level of optimisms after the program.

Table 2,displays the relation between personal characteristics and levels of resilience of the studied nurses before\ after program. It was established that, a statistical significant relations were revealed between nurses' resilience level after the program and marital status, educational level and experience in psychiatric nursing as ($p=0.031^{*}$,$p=0.032^{*}$, $p=0.005^{*}$) at $p \leq 0.05$.

The table additionally illustrates that married and the secondary technical school nurses had the highest percent change in the score of highest level of resilience compared to pre- program.

Table 3, submits correlation between total mean scores of resilience and optimism and pessimism among the studied nurses pre\ post program. As described in the table, there was a statistically significant positive correlation between nurses' levels of resilience with optimism at the post program at $p \leq 0.05$.

Whereas there was a statistically significant negative correlation between nurses' levels of resilience with pessimism at the post program at $p \leq 0.05$.

Table 4,revealsmultivariate linear regression for factor affecting optimism among the studied nurses, as remarked, the strong factor affecting optimism among the studied nurses was marital status asp=0.853 followed by resilience intervention, years of experience and educational level at $p \leq 0.05$.

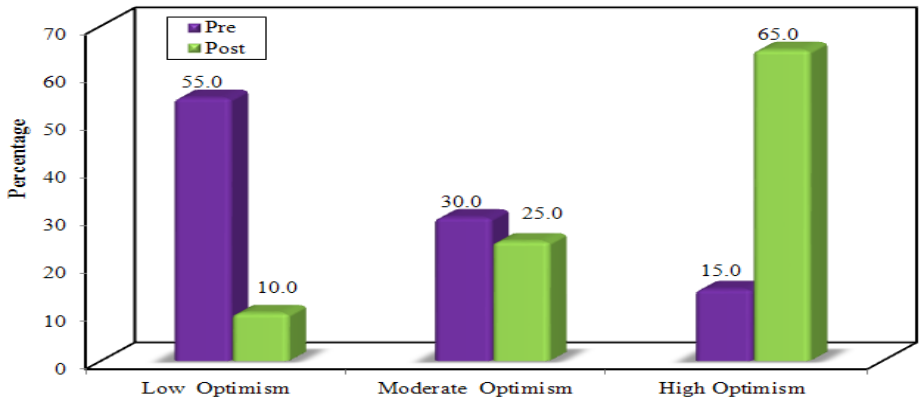

Figure (1): Percentage distribution of the studied nurse's pre and post program according to optimism level (n = 20)

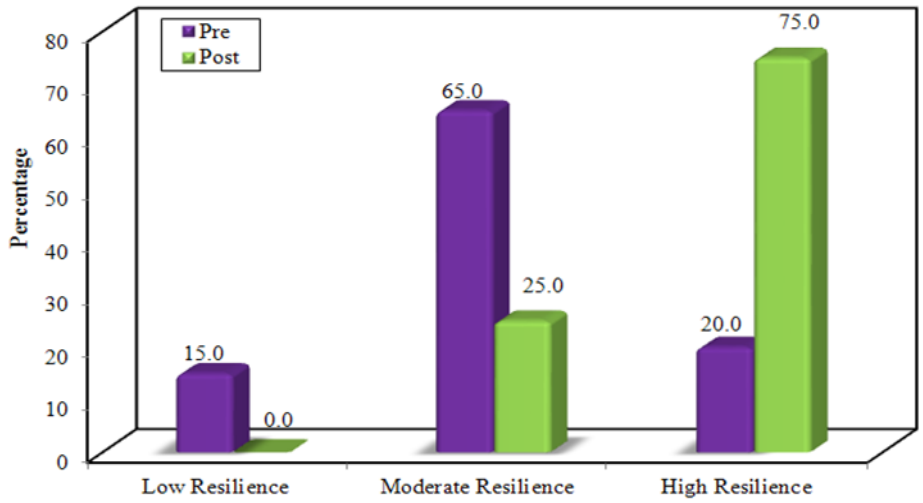

Figure (2):percentage distribution of the studied nurses according to levels of resilience (n = 20)

Table (1): Relation between personal characteristics and levels of optimisms of the studied nursespre\ post program (n = 20)

Personal characteristics	Levels of optimisms of the studied nurse's											
	Pre						Post					
	Low optimism (n = 11)		Moderate optimism (n = 6)		High optimism (n = 3)		Low optimism (n = 2)		Moderate optimism (n = 5)		High optimism (n = 13)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Age (years)												
20 – <40	9	81.8	6	100.0	3	100.0	2	100.0	4	80.0	12	92.3
40 – <60	2	18.2	0	0.0	0	0.0	0	0.0	1	20.0	1	7.7
χ^2 (^{MC}p)	1.327 (0.660)						1.414 (0.588)					
Gender												
Male	3	27.3	2	33.3	0	0.0	1	50.0	1	20.0	3	23.1
Female	8	72.7	4	66.7	3	100.0	1	50.0	4	80.0	10	76.9
χ^2 (^{MC}p)	1.049 (0.811)						1.181 (0.774)					
Marital status												
Single	5	45.5	1	16.7	1	33.3	2	100.0	5	100.0	0	0.0
Married	6	54.5	5	83.3	2	66.7	0	0.0	0	0.0	13	100.0
χ^2 (^{MC}p)	1.458 (0.686)						19.930*(<0.001*)					
Number of children												
Non	4	36.4	2	33.3	1	33.3	2	100.0	2	40.0	3	23.1
1 – 2	6	54.5	2	33.3	1	33.3	0	0.0	2	40.0	7	53.8
3 – 4	1	9.1	2	33.3	1	33.3	0	0.0	1	20.0	3	23.1
χ^2 (^{MC}p)	2.567 (0.802)						3.792 (0.410)					
Education level												
Secondary technical school	8	72.7	5	83.3	3	100.0	1	50.0	2	40.0	13	100.0
Faculty of nursing	3	27.3	1	16.7	0	0.0	1	50.0	3	60.0	0	0.0
χ^2 (^{MC}p)	0.873(1.000)						9.098*(0.007*)					
Income /month												
Sufficient	2	18.2	1	16.7	0	0.0	0	0.0	1	20.0	2	15.4
In sufficient	9	81.8	5	83.3	3	100.0	2	100.0	4	80.0	11	84.6
χ^2 (^{MC}p)	0.630(1.000)						0.717(1.000)					
Years of												

experience in psychiatry department												
1 – <5	1	9.1	3	50.0	2	66.7	0	0.0	0	0.0	6	46.2
5 – <10	6	54.5	2	33.3	1	33.3	1	50.0	2	40.0	6	46.2
≥10	4	36.4	1	16.7	0	0.0	1	50.0	3	60.0	1	7.7
χ^2 (^{MC}p)	**5.299 (0.249)**						7.238*(0.047*)					

χ^2: **Chi square test** MC: **Monte Carlo**
p: p value for comparing between different categories
*: Statistically significant at $p \leq 0.05$

Table (2): Relation between personal characteristics and levels of resilience of the studied nursespre\ post program (n = 20)

Personal characteristics	Levels of resilience of the studied nurses									
	Pre						Post			
	Low (n = 3)		Moderate (n = 13)		High (n = 4)		Moderate (n = 5)		High (n = 15)	
	No.	%	No.	%	No.	%	No.	%	No.	%
Age (years)										
20 – <40	3	100.0	11	84.6	4	100.0	4	80.0	14	93.3
40 – <60	0	.0	2	15.4	0	.0	1	20.0	1	6.7
χ^2 (p)	0.867(^{MC}p=1.000)						0.741(^{FE}p=0.447)			
Gender										
Male	0	0.0	5	38.5	0	0.0	2	40.0	3	20.0
Female	3	100.0	8	61.5	4	100.0	3	60.0	12	80.0
χ^2 (p)	2.596 (^{MC}p=0.255)						0.800(^{FE}p=0.560)			
Marital status										
Single	2	66.7	4	30.8	1	25.0	4	80.0	3	20.0
Married	1	33.3	9	69.2	3	75.0	1	20.0	12	80.0
χ^2 (p)	1.634 (^{MC}p=0.632)						5.934* (^{FE}p=0.031*)			
Number of children										
Non	0	0.0	5	38.5	2	50.0	2	40.0	5	33.3
1 – 2	2	66.7	7	53.8	0	.0	3	60.0	6	40.0
3 – 4	1	33.3	1	7.7	2	50.0	0	.0	4	26.7
χ^2 (^{MC}p)	6.857 (0.085)						1.486 (0.654)			
Education level										
Secondary technical school	2	66.7	10	76.9	4	100.0	2	40.0	14	93.3
Faculty of nursing	1	33.3	3	23.1	0	0.0	3	60.0	1	6.7
χ^2 (p)	1.397 (^{MC}p=0.585)						6.667* (^{FE}p=0.032*)			
Income /month										
Sufficient	1	33.3	1	7.7	1	25.0	0	0.0	3	20.0
In sufficient	2	66.7	12	92.3	3	75.0	5	100.0	12	80.0
χ^2 (p)	2.367 (^{MC}p=0.271)						1.176(^{FE}p=0.539)			
Years of experience in psychiatry department										
1 – <5	1	33.3	3	23.1	2	50.0	0	0.0	6	40.0
5 – <10	1	33.3	6	46.2	2	50.0	1	20.0	8	53.3
≥10	1	33.3	4	30.8	0	0.0	4	80.0	1	6.7
χ^2 (^{MC}p)	2.479 (0.836)						8.754*(0.005*)			

χ^2: **Chi square test** MC: **Monte Carlo** FE**: Fisher Exact**
p: p value for comparing between different categories
*: Statistically significant at $p \leq 0.05$

Table (3): Correlation between total mean scores of resilience and optimism and pessimismamong the studied nurses pre\ post program (n = 20)

		Optimism		Pessimism	
		Pre	Post	Pre	Post
Resilience	R	0.266	0.502*	0.082	-0.567*
	P	0.258	0.024*	0.732	0.009*

r: Pearson coefficient *: Statistically significant at $p \leq 0.05$

Table (4): Multivariate Linear regression for analyses predicting optimism among the studied nurses

	B	Beta	t	P	95% C.I	
					L.L	U.L
Resilience	-0.034	-0.045	0.189	0.853	-0.423	0.354
Years of experience in psychiatry department	-2.460	-0.162	0.608	0.552	-11.090	6.169
Marital status	20.203	0.855	3.941*	0.001*	9.277	31.129
Education level	4.828	0.171	0.732	0.475	-9.228	18.884

$\mathbf{R^2}$=0.671,**F** =7.642*, **p** =0.001*B: Unstandardized Coefficients
Beta: Standardized Coefficients CI: Confidence interval
LL: Lower limit UL: Upper Limit
*: Statistically significant at $p \leq 0.05$

Discussion

Nurses employed in psychiatric hospital are in stimulating and a hypothetically high tension. Resilience is a positive adaptation to a nurse's capacity to manage stress and maintain mental health [17]. So, being optimistic can help nurses establish a positive attitude on life, enhance overall health, live longer and with less stress, and learn effective coping skills [21]. Given the importance of this issue, and the belief that improvement in this area could be achieved, the present study was conducted to evaluate the effect of resilience intervention to enhance optimism level in the midst of nurses helpful for patients with psychiatric conditions.

The results indicated that the distribution of optimism levels before the program is less than one-quarter of the studied nurses had a high level of optimism and improved before/after program to two-thirds of nurses had high levels of optimism. This means that the program had the greatest positive effect on increasing optimism levels in the studied nurses. These results supported our hypothesis. The interpretation might be that the method and type of educational content delivered, including familiarity with internal and external support aspects, enhancement of self-esteem, awareness of one's abilities, improvement of coping skills with worry, and stress, as well as the exercises provided, were very effective. This interpretation is supported by Souri & Hasanirad (2011) [22] where clarified that optimism and resilience seems to go together with each other in adverse events. It means that there is an interactive relationship between these two variables; resilience results in optimism and optimism leads to resilience. In this line of reasoning, it is important to enhance nurses' resilience in order to have good expectations about their future.

This result went on the same line with the study approved by Bhatti et al., (2020)[6]who revealed that, the resilience intervention successfully increased their levels of optimism in their life-orientation by widening their vision to perceive possibilities and alternative explanations for the

challenges they face on a daily basis. The current results were in agreement with a study in Egypt which demonstrated that before the training, less than one-third of the studied nurses had a high level of optimism, which improved to two-thirds of nurses with high levels of optimism in the post program [23]. Psychological care for front-line nurses, in particular, is considered as a key public mental health issue [24].

People learn how to control work-related stress during the resilience training process, and resilient strategies can be accessed by changing thought processes. As a result, they serve as a protective buffer against stressful life situations [25]. In this study, the resilience among nurses earlier and later the program was also measured, which point to the positive effect of resilience training on the high level of resilience in these nurses. The boost in resilience abilities could be linked to the studied nurses' ability to improve self-esteem, therapeutic communication, and optimism. As a result, the studied nurses were willing to improve their resilience in helpful for psychiatric patients and to respond effectively to the resilience program.This is in congruence with the previous Systematic review findings of workplace resilience programs in which education was shown to improve people's resilience, mental health and well-being, as well as their work performance (26).

Similar to the foregoing current study results, a study in Egypt performed 8 sessions resilience educational program aiming to promote the resilience among nurses caring for patients with psychiatric disorders and showed that the studied psychiatric nurses had a moderate resilience mean score before the intervention, but a high resilience mean score had achieved after the program [17]. Also,Janzarik et al., (2022) [27]determine the effects of a group intervention to promote resilience in nursing professionals and stated that resilience and other resilience-related outcome measures showed considerable improvements. Additionally,Boardman (2016) [28]; in his study withnursing students revealed after participating in a resilience training program, overall resiliency score improved.The authors conclude that there is a clear need and practical relevance for mental health promotion interventions for psychiatric nurses.In disagreement with this, a study carried out in the Continental United States which examining the impact of care provider support program on resiliency, coping, and compassion fatigue in military health care providers and found that care provider support program (CPSP) training had no effect on resiliency or coping skills [29]. The variation appears to be due to changes in the study population, the length and number of training sessions employed, measuring tools, sample size, and different training methods used.

Nurse case management requires optimism and resilience in order to achieve successful work-related adjustments [30]. The existing study findings revealed a statistically significant positive correlation between nurse's total mean scores of resilience and optimism at the post program. This result may be due to that, more stress resiliency and coping techniques have been reported to be associated with optimism [31]. This interpretation is supported by Bhatti et al., (2020) [6] who illustrated that internal strength that promotes positive changes through and after distress and actively seeks meaning and purpose in life is referred to as resilience. This supports the premise that a human's ability to respond positively to adversity is known as resilience [32].In this light, it is critical to promote nurses' optimism in order to improve their chances of dealing with obstacles in a more adaptable manner.

Similar finding have been previously interpretedin Iran by Falavarjani& Yeh (2019) (13) who studied optimism and misery tolerance in the social modification of nurses: examining resilience as a mediator and gender as a moderator and reported that nurses who are optimistic and have a high level of distress tolerance are substantially more likely to report more resilience. This is congruent with Maheshwari & Jutta (2020) (11) who signified that during the challenging time of the epidemic, there was a large positive correlation between optimism and resilience among university students. Also He et al., (2013) (33) revealed that in burn patients, there is a significant relation between dispositional optimism and psychological resilience and subjective well-being.

Close to those in the present study were reported in an Indian study among nurses performed during COVID- 19 pandemic indicated that

nursing teachers and administrators had better levels of psychological preparedness, self-efficacy, resilience, and optimism than students [34]. Additionally, Malik (2013) [35] concluded in his study of hope, optimism, and workplace resilience, he discovered that an optimistic explanatory style is linked to a variety of positive traits, including resilience. Meanwhile, Khodabakhshi-Koolaee et al., (2019) [36] who did a study to assess the relationship among optimism and humor with resilience in female nurses of hospitals in Isfahan, Iran and stated that between optimism and resilience, there was a significant negative association.

The present study has also revealed that statistical significant relations were revealed between nurses' resilience level after the program and marital status, educational level and experience in psychiatric nursing. As married and the secondary technical school nurses had the highest percent change in the score of highest level of resilience compared to pre- program. The interpretation might be that higher education linked with greater autonomy and critical reflective practices, characteristics that may aid nurses in dealing with professional challenges [37].These results are in agreement with Gandhi et al., (2021) [34] who emphasized that, the resilience of young, single nurses with a lower degree of education was significantly lower. Additionally, Manomenidis et al., (2019) [38] illustrated that the strongest predictors of nurse resilience were educational level, anxiety, and overall usage of mental preparation techniques, particularly resilient nurses having a higher educational level.

The situation is similar to a study in Iran, where Dehvan et al., (2018) [39] investigate the relationship of mental health with resilience among psychiatric nurses and reported that the mean resilience score was associated with marital status in a substantial way. The years of operating room experience and nurse resilience have statistically significant correlations as emphasized by Gillespie et al., (2009) [40]. In disagreement with this Ni et al., (2015) [41] found there was no significant association between education levels and resilience among participant.

Marital status was associated with optimism and optimism was related to well-being [42].Lastly, the strong factor affecting optimism among the studied nurses was marital status followed by resilience intervention, years of experience and educational level. These results may be related to the experienced and married nurses were able to recognize the ability to bounce back or recover quickly from change, misfortune, and unmet expectations. It has further increased their understanding on the subject of how to identify pessimistic and terrible thinking styles that runs in the mind without any definite proof. On the same line, a study in Bulgaria found that marital status as a predictor of optimism and time perspective in individuals [43]. Also**,** another study results illustrated that there was a relation between marital status and feelings of optimism [44].

The results of the study also indicated that resilience significantly predict optimism level among psychiatric nurses. This means that nurses who face adversity in a more adaptive way will have good expectations about their future. In this respect, Bhatti et al., (2020) [6] indicated that, resilience training that focuses on emotional and social competencies might help people feel more optimistic. Moreover, Maheshwari & Jutta. (2020) [11] mentioned that, to improve resilience, one must think more positively and optimistically. Therefore, Ching & Cheung (2021) [45] recommended that, Universities and clinical mentors should work together to create resilience in their health-care students and assist them in their personal and professional development throughout their careers.

Conclusion

In deduction, grounded on the present study results, it can be decided that it is of great importance to conduct continuous and regular in-service training program for nurses in order to improve resilience. The outcomes suggest the marital status, resilience intervention, educational level and years of experience as a predictive dimension of the optimism among nurses. The program had "great positive effect" on increasing the level of optimism among nurses accomplished the educational session, who caring for psychiatric patients.

Recommendations

Built on the discoveries of the contemporary study, the subsequent recommendations are proposed:

- Responsible health authorities in the mental health field should encourage nurses to attend

continuing education in the form of workshops, discussions and updated review about resilience.

- Provide nurses with educational materials such as recent psychological books and periodicals in an Arabic language.
- Provide adequate budget allocation every year for establishing training programs concerned with promoting nurse's professional resilience.

- Future research should also take patients' contributions into consideration and focus on patient outcomes in the light of improving nurse's resilience and optimism.

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Effect of Kangaroo Mother Care versus Hammock Positioning on Physiological Indices and Behavioral Organization among Preterm Neonates: A Humanized Nursing Approach

Nagwa Ibrahim Hamad[1], Gehan Maher Khamis[2], Zohour Ibrahim Rashwan [3]

[1]Lecturer of Pediatric Nursing Department, Faculty of Nursing, Alexandria University, Egypt.
[2]Assistant professor of Pediatric Nursing Department, Faculty of Nursing, Alexandria University, Egypt.
[3]Assistant professor in Nursing Department, College of Health and Sport Sciences, University of Bahrain, Zallaq, Bahrain.

Correspondence: Nagwa I. Hamad. Department of Pediatric Nursing, Faculty of Nursing, Alexandria University, Egypt. **Email**: Nagwa.Ibrahim@alexu.edu.eg

Abstract:

Background: Preterm neonates are forced into extrauterine existence before the attainment of full development. Supportive developmental measures as kangaroo care and hammock positioning make preterm neonates feel as if they are in the womb, which promote their serenity, relaxation and deep sleep state. **Aim of the present study** was to investigate the comparative effect of kangaroo mother care versus hammock positioning on physiological indices and behavioral organization among preterm neonates. **Subjects and method:** A quasi-experimental, pre-posttests, research design was carried out at Neonatal Intensive Care Unit of Smouha Specialized University Hospital for Children in Alexandria, Egypt. A sample of 90 preterm neonates were randomly assigned into three equal groups. **Results**: A remarkable decline in preterm neonates' mean behavioral state was noticed after applying kangaroo mother care compared to hammock positioning group with significant statistical difference (P<0.001). Hence, majority of preterm neonates were in a sleepy state after receiving kangaroo care compared to nearly two-thirds of the hammock positioning group and about one-third of the control group with significant statistical difference (p<0.001). Moreover, kangaroo mother care and hammock positioning were effective in stabilizing the preterm neonates' physiological indices compared to the control group. **Conclusion and recommendations**: Both kangaroo mother care and hammock positioning were proved to be promising in enhancing the preterm neonates' physiological stability and behavioral organization; however, kangaroo care revealed a superior effect over hammock positioning. Accordingly, there is an immense need to incorporate supportive developmental measures into care protocols of neonatal intensive care units.

Keywords: Behavioral organization, Hammock positioning, Kangaroo mother care, Physiological indices, Preterm neonates.

Introduction

Prematurity is one of the significant high-risk problems affecting neonates as they are forced into extrauterine existence before attaining full-body systems' development. [(1)] Preterm neonates' life is threatened because their capability to maintain homeostasis and function at an optimum level is impaired. Prematurity is defined as all births that occur before 37 completed weeks of gestation. [(2)] Globally, the estimated preterm birth rate was 10.6%, equating to 14.84 million live preterm births in 2014. [(3)] In the United States (2019), the rate of preterm birth increased for the fifth straight year to 10.23%. [(4)] Whereas in Egypt (2017), Preterm birth complications accounts for 38% of neonatal deaths. [(5)]

In the last decades, advances in medical care have amplified the survival of neonates born preterm. Nevertheless, they have demanding tasks during the transitional period from intrauterine to extrauterine life. [(6)] They attempt to stabilize autonomic, sensory, and motor functions to conserve energy. Moreover, they utilize a wide range of behavioral states to avoid internal disorganization while interacting with the environment. [(7)] In this regard, preterm neonates require a supportive atmosphere as Neonatal Intensive Care Unit (NICU) to sustain their physiologic and neurobehavioral stability besides enhancing continuous development as if they are still in mothers' uterus. [(8)] However, they are quickly exhausted from continuous exposure to various external stimulus as excessive manipulations, bright lights, intense noise, painful procedures, and maternal separation. [(9)] These stimulations can trigger their clinical instability leading to further physiological, psychological, and behavioral sequelae. [(10)] So, the application of developmental supportive measures such as

Kangaroo Mother Care (KMC) and Hammock Positioning (HP) could be incorporated into the NICU care protocols to alleviate stress and enhance the neurobehavioral development among these vulnerable populations. [11, 12]

Kangaroo mother care was first established in Bogota, Columbia, where incubators shortage was compensated by keeping the preterm neonates warm in a natural incubator by skin-to-skin contact with mothers. [13] This alternative method entails holding naked preterm neonates in a prone upright position with flexed arms and legs as froglike while the head is turned sideways. Direct skin-to-skin contact between the neonate and mothers' bare breast is maintained in addition to covering the neonate's back with a blanket or mothers' clothing. [14] Early, prolonged and continuous KMC helps in improving the cerebral blood flow of preterm neonates; thus, it might promote brain development. [15] Furthermore, it improves behavioral organization and regular sleeping patterns, shortens duration to attain full enteral feeding, and thereby initiates exclusive breastfeeding earlier. [16] Concerning physiological indices, KMC boosts the neonates' body temperature by direct contact with the mother's skin. [17] It also guards against bradycardia, decreases apneic episodes, contributes to regular breathing patterns, and stabilizes the transcutaneous oxygen level. [11,18] Generally, KMC improves growth and development, enhances maternal-neonatal bonding, and contributes to better survival among preterm neonates. [19]

Hammock positioning is another simple innovative intervention for preterm neonates who require prolonged hospitalization in NICUs. [20] It refers to the placement of neonate in a fabric cotton blanket (hammock) that is fixed by ropes, passed through the circular openings of the incubator, and tied above it. Hammock positioning simulates the intrauterine position by keeping the neonate in a flexed posture. [20] It intends to promote the preterm neonates' containment, vestibular stimulus, sensory integration, and behavioral reorganization. So, such a position positively influences the sleep-wake cycle as well as reduces the noxious sensory stimulus and energy expenditure. [21] Moreover, it can minimize postural abnormalities and asymmetries related to prematurity. [12] So, it can be considered a strategy to humanize the care provided for preterm neonates. [20]

Neonatal nurses need to be well-versed with updated knowledge and skills to provide competent care for preterm neonates and respond to their cues rather than provide scheduled interventions. [22] Furthermore, neonatal nurses would better adopt evidence-based practices that focus on decreasing the neonates' stress as well as promoting their self-regulation and containment. They also play a crucial role in empowering mothers to participate in the care provided for their neonates. This will facilitate the gradual and smooth transition from conventional to continuous developmental care. [23] In this context, this study builds on and extends existing research to determine whether KMC or HP affect the physiological indices and behavioral organization of preterm neonates.

Aim of the present study

This study aimed to investigate the effect of kangaroo mother care versus hammock positioning on physiological indices and behavioral organization among preterm neonates

Research Hypotheses

- Preterm neonates who receive KMC exhibit more stable physiological indices and behavioral organization state than those who do not .
- Preterm neonates who receive HP exhibit more stable physiological indices and behavioral organization state than those who do not .
- Preterm neonates who receive KMC exhibit more stable physiological indices and behavioral organization state than those who receive HP.

Subject & Method

Design: A quasi-experimental, pre-posttests research design was used.

Setting: The study was carried out in the NICU of Smouha Specialized University Hospital for Children in Alexandria, Egypt. The unit is classified into three levels. Level I which deals with feeder and grower neonates, while neonates with some health problems of prematurity and respiratory assistance such as continuous positive airway pressure can be treated in level II. Whereas neonates who have complex disorders and receive intravenous fluids can be handled in level III. This study was conducted at Level I which includes 15 incubators and cribs.

Tools

Two tools were used for data collection.

Tool I: Neonates' Physiological Indices Assessment Tool

The researchers developed this tool after a review of relevant literature to assess Physiological Parameters of preterm neonates as Heart Rate (HR), Respiratory Rate (RR), oxygen saturation (SpO_2), and temperature. Characteristics and clinical data of preterm neonates such as; age, sex, gestational age, birth weight, current weight, mode of delivery, and diagnosis were attached to this tool.

Tool II: Anderson Behavioral State Scale

This scale was adopted from Anderson et al. (1990) to assess the behavioral organization of preterm neonates. [23] Neonates' behavioral states are assessed by observing their respiratory regularity, opening or closing of the eyes, limb and trunk activity, and the intensity of crying. Based on the observations, the scale will differentiate 12 behavioral states, including; regular quiet sleep (1), irregular quiet sleep (2), active sleep (3), very active sleep (4), drowsy (5), alert inactivity (6), quite awake (7), active awake (8), very active awake (9), fussing (10), crying (11) and hard crying (12). Scores from 1 to 5 indicate that the neonate is sleeping. Scores from 6 to 8 indicate that the neonate is awake and calm. Scores from 9 to 12 indicate that the neonate is in a state of restless activity or fussiness, which takes substantial energy. [23]

Participants:

Epi info program version 10 was used to estimate the sample size using the following parameters: population size of 99, Confidence coefficient of 97%, expected frequency of 50%, and acceptable error of 5%. The minimum sample size required was 82 preterm neonates. So, a convenient sample of 90 preterm neonates were included in this study, as illustrated in **Fig-1**. However, neonates who were attached to a mechanical ventilator or had pulmonary, cardiac, or neurological disorders such as intraventricular hemorrhage were excluded. Eligible neonates who fit the inclusion criteria and their guardians who agreed upon their participation were randomly assigned by researchers to three equal groups by simple random sampling technique using a random number generator program. Each group consisted of 30 preterm neonates as follows; the control group received the routine care of the NICU only. The second group received KMC in addition to the routine care whereas the third group were subjected to HP besides the routine care. Data were initially collected from the control group and then from the intervention groups (KMC and HP) alternately.

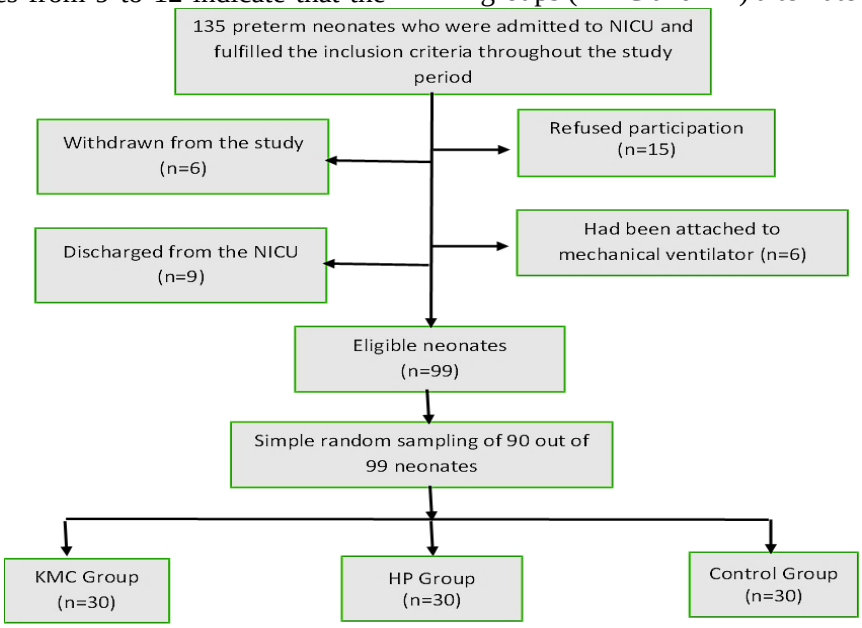

Fig-1: Flow chart of participants' recruitment process.

Ethical Considerations

An approval from the Ethical Research Committee review board of Faculty of Nursing, Alexandria University was obtained. Official permission for conducting the study was obtained from the director of the previously mentioned setting. The study protocol was approved and registered on U.S. National Library of ClinicalTrial.gov (NCT05165004). The researchers approached guardians of the neonates who matched the inclusion criteria. The aim of the study, benefits, and possible risk of participation were explained, and their free decision to voluntarily participate in the study was emphasized. The researchers also stressed their right to refuse participation or withdraw from the study. After their agreement, written informed consent was obtained from the neonates' guardians. Confidentiality of the obtained data was assured, and participants' anonymity was respected. Privacy also was maintained during the implementation of the study.

Method & Data collection

Tools I and II were tested for content validity by five experts in the field of Pediatric Nursing. A pilot study was conducted on nine neonates (10%) to test the research tools' clarity, feasibility, and applicability. These neonates were excluded from the total study subjects. The preterm neonates' characteristics and clinical data were extracted from their hospital records for the three groups. Baseline physiological indices and behavioral States were assessed and documented at a fixed time during the morning shift throughout three consecutive days of the study period for the three groups using tools I&II. Physiological indices were measured as follows; the HR and SpO_2 were monitored and documented with a multiparametric monitor by a sensor positioned on the outer side of neonate's foot. The RR was assessed by the researchers through visual inspection of the preterm neonate's chest and counting the respiratory cycles per minute. Body temperature was measured axillary by the researchers using the mercury temperature monitor.

The preterm neonates in **the control group** received the routine care of the NICU, which entails; encircling the neonate in a fetal position using a rolled towel inside the incubator.

Intervention groups:

For the kangaroo mother care group:

Researchers contacted the mother a day before applying KMC and advised her to take shower and abstain from using perfumes before attending to the NICU. On days of KMC application, the researchers asked the mother to remove the upper clothes in a private room and put on an open-front gown and mask. The mother was assisted to sit in a comfortable chair with a soft backrest and footrest to prevent fatigue. Then, the preterm neonate was carefully put naked except for the head and diaper area on the mothers' bare chest with flexed arms and legs as in froglike position, and the head was turned sideways. The researchers wrapped and secured the mother's gown and put a blanket on the neonates' back to ensure neonatal thermal insulation. The mother was instructed to support the neonate's bottom with the right hand while supporting the head and neck with the other hand.

For hammock positioning group:

Researchers made a hammock by using a rectangular cotton cloth with ropes that passed through the circular openings of the incubator and tied on the upper part of it. After one hour of feeding, the preterm neonate was placed in a supine fetal position in the hammock where the head was supported in a neutral midline position by using rolled towel without neck hyperflexion or hyperextension. Moreover, the spine of the preterm neonate was supported while arms and knees were flexed.

Kangaroo mother care and HP were performed in the morning shift for one hour from 10:00 am till 11:00 am on three consecutive days. Behavioral states of preterm neonates were assessed in the three groups three times during the intervention at fixed intervals in order to minimize the measurement errors due to fluctuations in their behavioral states. In case of incidental neonatal distress, the intervention was discontinued.

After applying KMC or HP, the preterm neonates were placed in the incubator as the routine NICU care. Finally, neonates' physiological indices and behavioral states in the three groups were recorded after 15 minutes from the intervention using tools I&II. Data were collected over 12 months

from March 2020 till the end of February 2021.

Data Analysis

The Statistical Package for Social Sciences (SPSS) version 23 was utilized for data analysis. **Descriptive statistics** included number, percentage, mean and standard deviation, were used to describe characteristics and clinical data, physiological indices, and behavioral States of preterm neonates. Kolmogorov-Smirnov test was used to check the normality of study variables, and it showed that they were not normally distributed. **In Analytical statistics**, a comparison between the neonates in the three study groups regarding their physiological indices was done by using Kruskal-Wallis tests. A Chi-square and Fisher Exact tests were used to compare between behavioural states of the three study groups. Comparison between the neonates in KMC and HP groups regarding their mean behavioral state was done by using Kruskal-Wallis tests. All of the statistical analyses were considered significant at $P < 0.05$.

Results

Table 1 illustrates preterm neonates' characteristics and clinical data. It was found that female preterm neonates constituted 56.70%, 56.70%, and 66.70% of the KMC, HP and control groups respectively. Moreover, 46.6% of preterm neonates in the KMC group were in the third week of life compared to 30.0% and 36.7% of HP and control groups. The weight of 60% of preterm neonates in the KMC and HP groups ranged from 2500 to less than 3000 grams compared to 50.0% of the control group. Furthermore, 53.3% of the KMC group and 46.7% of the HP group received oral feeding compared to 36.7% of the control group.

Table 2 reveals mean physiological indices of preterm neonates. A slight increase in the mean temperature among preterm neonates was observed after application of KMC and HP (36.80±0.12 ^{o}C and 36.61±0.13 ^{o}C respectively) compared to baseline temperature, which was 36.46±0.11 ^{o}C in each group. On the other hand, the mean temperature decreased among the control group from 36.80±0.12 ^{o}C to 36.52±0.12 ^{o}C. Regarding SpO_2, preterm neonates of the KMC group demonstrated more stabilized oxygen saturation after 1 hour of KMC (97.44±0.73) compared to 96.03±1.23 and 94.85±0.79 among HP and control groups, respectively. Concerning HR, it was decreased to 132.56±7.74 b/m after application of KMC compared to preterm neonates of HP and control groups) 138.19±4.47 b/m and 145.59±7.15 b/m, respectively). The RR also decreased among preterm neonates after one hour of KMC to 46.39±4.34 c/m compared to 49.09±5.63 c/m and 51.28±4.42 c/m among those in HP and control groups, respectively. There were statistical significant differences between the three groups regarding all physiological indices ($p<0.001$ for each).

Table 3 displays behavioral states of preterm neonates in the kangaroo mother care, hammock positioning, and control groups. The majority of preterm neonates in the KMC group (90%) were in a sleepy state after application of the intervention on the 1st day of the study period compared to 73.3% of the HP group and 53.3% of the control group. On the 2nd day of the study period, 80.0% of preterm neonates were in a sleepy state after one hour of KMC compared to 60.0% and 40.0% of HP and control groups, respectively. On the 3rd day of the study period, 66.7% of preterm neonates were in a sleepy state during the intervention of KMC compared to HP and control groups (46.7% and 43.3% respectively). After receiving one hour of KMC, it was observed that 83.3% of preterm neonates were in a sleepy state compared to 60.0% of the HP group and 30.0% of the control group. It is worth mentioning that none of the preterm neonates were in a restless activity and fussiness state after receiving KMC throughout the three days of the study period. Statistically significant differences were noticed between the three groups after the intervention in the three days ($p<0.001$)

Table 4 highlights comparison between mean behavioral states of kangaroo mother care and hammock positioning groups. Preterm neonates' mean behavioral state declined to 2.8±2.02 after KMC on the 1st day compared to 4.8±2.62 among preterm neonates who were placed in the hammock. On the 2nd of the study period, there was also decrease in the mean behavioral state of preterm neonates after receiving KMC (3.9±2.20) compared to HP group (5.2±2.78). Similarly, there was decrease in the mean behavioral state of preterm neonates during KMC on the 3rd day of the study period (4.53±2.21) compared to the HP group

(7.39±2.81) with significant statistically difference (P<0.001). A remarkable decline in preterm neonates' mean behavioral state was also noticed after applying KMC (3.03±2.25) compared to the HP group, which was 7.0±3.03. The differences between the two groups after applying the interventions were significant in the three days of the study period (p= 0.002, p<0.001, and p<0.001 respectively).

Table 1: Preterm Neonates' Characteristics and Clinical Data.

Characteristics and clinical data.		**KMC Group (n=30)**	**HP Group (n=30)**	**Control Group (n=30)**	**Significance**
Sex	Male	13(43.30)	13(43.30)	10(33.30)	X^2= 0.833 p=0.761
	Female	17(56.70)	17(56.70)	20(66.70)	
Age/ days	1-	0(.0)	1(3.3)	0(.0)	F^{ET}=4.65 p= 0.606
	7-	8(26.7)	12(40.0)	8(26.7)	
	14-	14(46.6)	9(30.0)	11(36.7)	
	21-28	8(26.7)	8(26.7)	11(36.7)	
	Mean±SD	17.27±5.681	15.57+6.004	17.9±6.194	$^{KW}\chi 2$ = 2.383 P=0.3.04
Current weight/ grams	1000-	2.0(6.7)	5(16.7)	7(23.3)	F^{ET}=3.55 p= 0.754
	1500-	8(26.7)	5(16.7)	8(26.7)	
	2000-	2(6.6)	2(6.6)	0(0.0)	
	2500-3000	18(60.0)	18(60.0)	15(50.0)	
Gestational age/months	Very Preterm	1 (3.3)	2 (6.7)	3 (10.0)	F^{ET}= 4.28 p= 0.373
	Moderate-Preterm	14 (46.7)	9 (30.0)	15 (50.0)	
	Late Preterm	15 (50.0)	19 (63.3)	12 (40.0)	
Birth weight	Normal birth weight	4(13.30)	4(13.30)	2(6.70)	F^{ET}=3.941 p= 0.702
	Low birth weight	15(50.00)	16(53.30)	13(43.30)	
	Very low birth weight	9(30.00)	6(20.0)	9(30.0)	
	Extremely low birth weight	2(6.70)	4(13.30)	6(20.0)	
Diagnosis*	Hyaline membrane disease	10(33.3)	6(20.0)	8(26.7)	F^{ET}=17.71 p= 0.369
	Hyperbilirubinemia	16(53.3)	10(33.3)	9(30.0)	
	Transient tachypnea of the newborn	14(46.7)	6(20.0)	13(43.30)	
	Congenital pneumonia	4(13.3)	2 (6.7)	4(13.3)	
	Small for gestational age	6(20.0)	4(13.3)	3 (10.0)	
	Neonatal sepsis	2(6.70)	3 (10.0)	4(13.3)	
Type of Feeding	Oral feeding	16(53.3)	14(46.7)	11(36.7)	X^2= 0.927 p=0.571
	Gavage feeding	10(33.3)	10(33.3)	10(33.3)	
	Total Parenteral Nutrition	4(13.3)	6(20.0)	9(30.0)	

X^2: Chi-square Test F^{ET}: Fisher Exact Test $^{KW}\chi 2$ = Kruskal-Wallis tests
***Significant at P≤0.05**

Table 2: Mean Physiological Indices of Preterm Neonates

Physiological Indices	Before Mean±SD			Significance	After Mean±SD			Significance
	KMC Group (n=30)	HP Group (n=30)	Control Group (n=30)		KMC Group (n=30)	HP Group (n=30)	Control Group (n=30)	
- Temperature	36.46±0.11	36.46±0.11	36.80±0.12	$^{KW}\chi 2$ =5.62, p= 0.06, df =2	36.80±0.12	36.61±0.13	36.52±0.12	$^{KW}\chi 2$ =41.13, p<0.001[a], df =2
- Oxygen saturation (SpO_2)	95.13±0.81	95.27±1.46	95.41±1.08	$^{KW}\chi 2$ =0.419, p= 0.811, df =2	97.44±0.73	96.03±1.23	94.85±0.79	$^{KW}\chi 2$ =50.86, p<0.001[a], df =2
- Heart rate (b/m)	145.07±9.93	140.83±5.40	144.97±7.99	$^{KW}\chi 2$ =3.87, p= 0.144, df =2	132.56±7.74	138.19±4.47	145.59±7.15	$^{KW}\chi 2$ =37.09, p<0.001[a], df =2
- Respiratory rate (c/m)	51.50±4.64	51.53±6.35	50.33±4.33	$^{KW}\chi 2$ =0.421, p= 0.810, df =2	46.39±4.34	49.09±5.63	51.28±4.42	$^{KW}\chi 2$ =16.92, p<0.001[a], df =2

$^{KW}\chi 2$ = Kruskal-Wallis tests *Significant at [a]P< 0.001

Table 3: Behavioral States of Preterm Neonates in the Kangaroo Mother Care, Hammock Positioning, and Control Groups

Behavioral States	Before			During			After		
	KMC Group (n=30)	HP Group (n=30)	Control Group (n=30)	KMC Group (n=30)	HP Group (n=30)	Control Group (n=30)	KMC Group (n=30)	HP Group (n=30)	Control Group (n=30)
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Day 1									
• Sleep state	14(46.7)	12(40.0)	17(56.7)	19(63.3)	16(53.3)	17(56.7)	27(90.0)	22 (73.3)	16(53.3)
• Awake and calm, State	12(40.0)	12(40.0)	11(36.7)	10(33.3)	9(30.0)	12(40.0)	3(10.0)	3 (10.0)	13(43.3)
• State of restless activity and fussiness	4(13.3)	6(20.0)	2(6.7)	1(3.3)	5(16.7)	1(3.3)	0(0.0)	5 (16.7)	1(3.3)
Significance	F^{ET}=2.90, p= 0.59			F^{ET}=4.37, p=0.37				F^{ET}=17.49	p<0.001[a]
Day 2									
• Sleep state	10(33.3)	10(33.3)	10(33.3)	17(56.7)	14(46.7)	12(40.0)	24(80.0)	18(60.0)	12(40.0)
• Awake and calm state	13(43.3)	11(36.7)	13(43.3)	10(33.3)	9(30.0)	12(40.0)	6(20.0)	7(23.3)	12(40.0)
• State of restless activity and fussiness	7(23.4)	9(30.0)	7(23.3)	3(10.0)	7(23.3)	6(20.0)	0(0.0)	5(16.7)	6 (20.0)
Significance	X^2=0.56, p=0.96			X^2= 2.96, p=0.56				F^{ET}= 15.51	p=0.003[b]
Day 3									
• Sleep state	16(53.4)	6(20.0)	12(40.0)	20(66.7)	14(46.7)	13(43.3)	25(83.3)	18(60.0)	9(30.0)
• Awake and calm state	7(23.3)	9(30.0)	8(26.7)	8(26.7)	9(30.0)	8(26.7)	5(16.7)	7(23.3)	6(20.0)
• State of restless activity and fussiness	7(23.3)	15(50.0)	10(33.3)	2(6.7)	7(23.3)	9(30.0)	0(0.0)	5(16.7)	15(50.0)
Significance	X^2= 7.78, p=0.100			X^2= 14.56, p=0.006[b]				X^2= 21.64, p<0.001[a]	

X^2: Chi-square Test F^{ET}: Fisher Exact Test *Significant at
[b] P≤0.05 [a]P< 0.001

Table 4: Comparison between Mean Behavioral States of Kangaroo Mother Care and Hammock Positioning Groups

	Before			During			After		
Neonates' Mean Behavioral State	**KMC Group (n=30)**	**HP Group (n=30)**	**Significance**	**KMC Group (n=30)**	**HP Group (n=30)**	**Significance**	**KMC Group (n=30)**	**HP Group (n=30)**	**Significance**
	Mean±SD	**Mean±SD**		**Mean±SD**	**Mean±SD**		**Mean±SD**	**Mean±SD**	
Day 1	6.03±2.50	6.63±2.44	Z^{MW}=-0.55 P= 0.58	4.12±2.15	5.46±2.39	Z^{MW}=-2.15 P= 0.032 [b]	2.8±2.02	4.8±2.62	Z^{MW}=-3.09 P= 0.002 [b]
Day 2	7.0±2.12	6.93±2.69	Z^{MW}=-0.41 P= 0.68	5.13±2.19	5.88±2.62	Z^{MW}=-1.07 P= 0.286	3.9±2.20	5.2±2.78	Z^{MW}=-3.53 P<0.001[a]
Day 3	6.43±2.34	8.57±2.92	Z^{MW}=-2.83 P= 0. 005[b]	4.53±2.21	7.39±2.81	Z^{MW}=-3.82 P<0.001 [a]	3.03±2.25	7.0±3.03	Z^{MW}=-4.622 P<0.001[a]

Z**: Mann Whitney Test** ⋆**Significant at** [b] **P≤0.05** [a]**P< 0.001**

Discussion

The premature infants in the NICU are exposed to an unfamiliar environment and subjected to repeated invasive procedures. [(25)] These various stressful procedures are associated with changes in their hemodynamic status and neurobehavioral organization, which trigger further clinical instability.[(26)] Thereafter, the application of developmentally supportive care provides a framework in which the neonatal environment and care processes are modified and structured to optimize the development and lessen the deleterious effects of prematurity.[(20)] It includes a broad category of nursing interventions such as positioning, sensory stimulation, and KMC which proved to be viable and promising for stress reduction and improvement of neurobehavioral development among such critically ill neonates. [(26, 27)]

Preterm neonates' responses to stimuli are non-specific and disorganized due to incomplete myelinization of the nervous system and the immature endogenous pain control systems that modulate pain. [(21)] Likewise, the environment of the NICU makes self-regulation of premature neonates extremely difficult. [(28)] Due to the diminished self-regulation of the autonomic nervous system, preterm neonates demonstrate disorganized behavior and amplified stress response, thus decreasing their ability to develop typically. [(29)] The current study results revealed that both KMC and HP yielded significant positive effects on behavioural organization among preterm neonates at the second and third days of the study period compared to the control group. Nevertheless, KMC revealed a superior effect compared to HP. Hence, most of the preterm neonates were sleepy after applying KMC in the three days of the study period, and none of them were in a state of restless activity and fussiness. The current study findings also demonstrated a significant decline in preterm neonates' mean behavioral score after applying one hour of KMC which denotes more stable and organized behaviors. The special effect of KMC could be explained in the light of specific facts. As soon as KMC begins, the oxytocin is released in the insular cortex, inducing a drop in stress hormones. This promotes calmness and relaxation of preterm neonates. [(30)] Simultaneously, KMC is associated with a substantial reduction in cortisol levels and autonomic reactivity. [(31)] Similarly, Bastani et al. (2017) and Kaffashi et al. (2013) reported that neonates who underwent KMC had experienced more organized sleep, leading to a more behavioral organization. [(32, 33)] Neu et al. (2013) also stated that preterm neonates who received KMC had better behavioral outcomes compared to the control group. [(34)]

Regarding HP, the positive effect of such intervention on the behavioral organization among preterm neonates in the present study could be attributed to the simulation of intrauterine containment and movement. Hence, it enables postural organization, harmonization of movements, as well as reduction of pain responses and energy expenditure. [(21)] Another explanation is that

HP provides a state of relaxation as most newborns evolve into a state of sleep that enhances brain maturity. [35] Hammock positioning also favors a more flexed posture and facilitates head alignment in relation to the body, contributing to proper neurobehavioral organization and development of preterm infants. [36] In this respect, Jesus et al. (2018) reported that preterm neonates who were positioned in hammocks evolved progressively into light or deep state of sleep. [20] Congruently, Sousa et al. (2021) cited that HP proved to be effective in reducing stress and improving the behavioral state of preterm neonates. [26]

Cardiopulmonary instabilities are common among preterm neonates due to their delayed development. [37] Kangaroo mother care and HP are humanized strategies that decrease stress associated with increased energy expenditure and cardio-pulmonary demands among preterm neonates. [12, 38] In this context, the current study results revealed that KMC and HP were effective in stabilizing the preterm neonates' physiological indices compared to the control group. Nevertheless, preterm neonates who received KMC demonstrated more stabilized SpO_2, RR, and HR. During KMC, the c-afferent nerves of the mother's and neonate's chest surfaces respond to the human touch and send the messages directly to the brain. Sequentially, oxytocin is released, which calms and stabilizes cardio-respiratory variables. Hence, the brain stem shifts from sympathetic control responsible for stress reaction and hyper-alertness to parasympathetic one responsible for relaxation and contentment. [39] Moreover, skin-to-skin contact with mothers is likely to be accompanied by less cry that means less stress, lower levels of cortisol, and more physiological stabilization. As well, placing the neonate in upright position, decreases the compression of the diaphragm, maximizes ventilation and perfusion resulting in improved respiratory function. [39] The current study results are consistent with Mohamed et al (2013), who concluded that KMC could effectively, and positively promote premature neonates' biological stability than those cared for by conventional care. [40] Similarly, Sarparast et al. (2015) reported that respiratory rate was significantly decreased to more stabilized level during KMC. [41] Cho et al. (2016), in contrast, stated that there were no significant differences between preterm neonates who received KMC and the control group regarding physiological parameters. [11]

In terms of the effect of HP on physiological indices, the current findings might be ascribed to a reduction in newborn cervical hyperflexion, which reduces the likelihood of apnea and a drop in SpO_2. [20] Hammock positioning also provides greater stability of the rib cage and more space for the diaphragmatic muscle fiber, which enhances its action. [12] Pereira et al. (2018) claimed that HP promotes a better relaxation of neonates, thus lowers the HR and RR to more stabilized levels. [38] Similarly, Costa et al. (2017) reported a statistically significant reduction of the heart and respiratory rates after HP. [36] On the contrary, Sousa et al. (2021) found no significant differences between HP and other study groups regarding HR or SpO_2. [26] Chiu et al. (2014) also did not identify any changes in SpO_2 among neonates who were placed in a hammock and those positioned in a crib. [30]

Maintaining a neutral thermal environment is a critical component of preterm neonates' nursing care, whether in the delivery room or during the subsequent care. [42] The present study illustrated an increment in the mean temperature after one hour of KMC relative to baseline temperature whereas the mean temperature of the control group declined. Heat conduction from mothers' warm bare chest to the preterm neonate's naked skin is sufficiently high to compensate for the heat loss. [43] Additionally, covering the preterm neonate's back with a blanket eliminates convective and radiative heat loss. [44] Correspondingly, Pramila and Vijay (2014) argued that early kangaroo care had a favorable effect on extrauterine temperature of low-birth-weight neonates as the assumed flexed position is more efficient in conserving heat by reducing the exposed skin area to the surrounding atmosphere. [45]

As a consequence of the advantages of KMC and HP in terms of cardio-pulmonary parameter stability and behavioral organization, it is thought that these interventions for preterm neonates have both short- and long-term benefits. Thus, it reduces stress, promotes relaxation, increases

muscle tone, as well as enhances breathing mechanics and gastric function. Besides, it has long term consequences on brain growth. (46)

Conclusion

Developmental supportive care represents a revolution in how nursing interventions are delivered in the NICU by stressing the humanity of the preterm neonates' care to achieve the greatest outcomes. In that sense, Both KMC and HP were proved to be promising in enhancing the preterm neonates' physiological stability and behavioral organization; however, KMC revealed a superior effect over HP.

Recommendations

In order to foster the behavioral stability of preterm newborns, there is an immense need to incorporate supportive developmental measures such as KMC and HP into NICUs protocol of care. Moreover, instructional programs are worthy of being conducted for NICU nurses and parents to increase their awareness regarding the benefits of such measures and mothers' capacity to engage in the care of their hospitalized preterm neonates.

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Conflict of Interest

The authors declare no conflict of interest concerning the research, authorship, and publication.

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Effect of High Fidelity Simulation on Intern Students' Competency regarding Clinical Guidelines for Active Management of the Third Stage of Labor

Shimaa Mohamed Hashem[1], Eman Ahmed El-Kholy[2] , Toha Ali El -Sayed Abo-Hatab[3]

[1,2,3]Lecturer of Maternal and Neonatal Health Nursing, Faculty of Nursing, Tanta University, Tanta, Egypt

Abstract

Background: The third stage of labor is a critical period, thus using high fidelity simulation to enhance intern students' competency through implementing the clinical guidelines for active management of the third stage of labor is essential for preventing its serious complications mainly postpartum hemorrhage. **The aim of this study:** Was to determine the effect of high fidelity simulation on intern students' competency regarding clinical guidelines for active management of the third stage of labor. **Subjects and Method:** The study was carried out at Objective Structure Clinical Examination (OSCE) skills laboratory at Faculty of Nursing, Tanta University. A convenient sample consists of 50 intern nursing students who were trained at labor unit, obstetric department, Tanta university hospital and fulfilling the inclusive criteria. **Three tools** were used to collect the data: **Tool (I): A structured interview schedule** included three parts: **Part (a)** Socio demographic characteristics of the intern nursing students, **part (b)** Intern students' knowledge regarding the third stage of labor, and **part (c)** Intern students' knowledge regarding clinical guidelines for active management of the third stage of labor. **Tool (II): Intern students' practice observational checklist** contained seven sequential steps of clinical guidelines for active management of the third stage of labor**. Tool (III): Modified Self-Confidence Measurement Scale** included 7 items that measured how confident intern nursing students felt about the skills they performed during simulation training program. **Conclusion**: Based on the findings of the present study, it can be concluded that high fidelity simulation training significantly improved the intern students' knowledge, practice as well as the self-confidence regarding clinical guidelines for active management of the third stage of labor. **Therefore, the study recommended** that providing pre-service and in-service training programs using high fidelity simulation especially for newly appointed intern nurses is crucial to improve their knowledge and practices as well as the self-confidence.

Keywords: High Fidelity Simulation, Competency, Clinical Guidelines, Active Management of Third Stage of Labor.

Introduction

Third stage of labor is the period between delivery of the newborn and delivery of the placenta and membranes. It is the shortest stage that lasting between 15 to 20 minutes and has three phases which are; uterine contractions, placental separation and expulsion. It is the most dangerous and risky period as if the uterus not contracts well and the placenta fails to separate within 30 minutes after childbirth, profuse postpartum hemorrhage will occur[(1,2)]. Postpartum hemorrhage is an obstetric emergency, life threatening condition and the main direct cause of maternal morbidity and mortality. It complicates more than 10 % of all births and responsible for 27.1% of all maternal deaths all over the world in 2020[(3)]. In Egypt (2021), an estimated of 20 % of maternal deaths were related to postpartum hemorrhage[(4)].

Understanding the nature and physiological changes of the third stage of labor as well as applying the clinical guidelines for active management of the third stage of labor are essential for preventing the serious complications especially postpartum hemorrhage[(5)]. This accommodate with the recommendations of World Health Organization (WHO), National Institute for Health and Care Excellence (NICE), the International Federation of Gynecologists and Obstetricians (FIGO) and the International Confederation of Midwives (ICM)[(6-8)].

The clinical guidelines for active management of the third stage of labor are feasible and inexpensive interventions that can help to save millions of women's lives especially in developing countries. High quality evidence based practice

reported that 10% of all maternal deaths were prevented with timely, effective and full use of clinical guidelines for active management of third stage of labor. This reduces the incidence of postpartum hemorrhage, the need for blood transfusion, and the use of therapeutic utero tonics during the third stage of labor, improving women's health and reducing maternal mortality that is central to the 2030 agenda for sustainable development strategy[9,10].

The clinical guidelines are prophylactic interventions composed of a package of the three main components of active management of the third stage of labor. These include administration of a utero-tonic drug (10 international unit intramuscularly of oxytocin is the drug of choice) within 1 minute after birth of newborn, and ruling out the presence of another fetus. Then, clamping and cutting the cord after cessation of its pulsation or approximately from 2-3 minutes after birth of the newborn. This is followed by applying controlled cord traction (CCT) for placental delivery[6,11].

These previous steps are implemented alongside with the provision of immediate neonatal assessment of breathing, performing resuscitation if needed and applying maternal–fetal skin-to-skin contact. Following delivery of the placenta and membranes, uterine massage is applied immediately and every 15 minutes for 2 hours until it becomes firm. Finally, the genitalia should be inspected carefully and the amount of blood loss should be estimated[8,12] .

Maternity nurses are the frontlines health care providers who are responsible for improving women's health and saving their lives[13]. Nowadays, improving the competency of different nursing categories is an urgent need especially for the nursing interns as they have the theoretical knowledge, but finding difficulty to transfer and correlate that knowledge into practice. Additionally, they become stressful, fearful, and straggle when facing real patient in clinical setting if they were not well prepared[14,15].

Nursing competency is the ability to perform a task with desirable outcomes. It is the ability of the students to integrate their skills and knowledge into the clinical practice. This competency can grow through integrating their knowledge, skills, personal experience, critical thinking and judgment in order to practice effectively[16,17]. Therefore, the trainers should follow innovative education techniques to strengthen the intern students' practical and communication skills before the onset of their clinical engagement. One of the main methods that should be used for improving the competency in nursing practical training is clinical simulation[18].

Simulation training is a participant-centered alternative to the traditional teaching methods, which are critical to optimize patient safety and quality. It refers to the activities that mimic the real clinical environment by emerging the nursing procedures, decision making and critical thinking through techniques such as role playing, interactive videos or mannequins[19]. Simulation training can fill the gap between theory and practice. Subsequently, provides an opportunity for the nursing intern students to improve their cognitive, psychomotor, problem-solving, communication and management skills as well as increases their self-confidence while dealing with emergency situations[20].

Simulation can be used at different levels and models (low, moderate and high). High-fidelity simulations are highly technical, life like human mannequins that breath, talk, have heart and lung sounds and are used to replicate evidence based clinical scenarios for training purposes. Previous research studies concluded that using high fidelity simulation is very effective in improving nursing students' learning outcomes. On the other hand literatures didn't focus on the effectiveness of using high fidelity simulation of reactive labor which is associated with emergency and life threatening situations to reduce maternal morbidity and mortality rate [21-23]. Thus, it is very important to determine the effect of high fidelity simulation on intern students' competency regarding clinical guidelines for active management of the third stage of labor.

Aim of the study

The aim of this study was to determine the effect of high fidelity simulation on intern students'

competency regarding clinical guidelines for active management of the third stage of labor.

Operational definition: Nursing competency in this study refers to knowledge, practice and self-confidence of intern nursing students.

Subjects and Method

Research design

A quasi experimental study design was utilized in this study.

Setting

The study was conducted at the Objective Structure Clinical Examination (OSCE) skills laboratory of Faculty of Nursing, Tanta University for training of intern nursing students on clinical guidelines for active management of the third stage of labor by using high fidelity birthing simulator (Sim Mom).

Subjects

A convenient sample consisted of 50 intern nursing students who were trained at labor unit, obstetric department, Tanta university hospital over a period from the beginning of April to the end of September 2021. The studied intern nursing students were selected from the previously mentioned setting according to the following inclusion criteria:

- Male or female students.
- Willing to participate in the study.

Tools of data collection

To achieve the aim of the study three tools were used.

Tool (I): A structured interview schedule was developed by the researchers after review of relevant recent literatures to collect basic data about the study subjects[12-16]. It consisted of three main parts as follows:-

Part a

Socio demographic characteristics of the intern nursing students: included; age, sex, residence and telephone number.

Part b

Intern students' knowledge regarding the third stage of labor: It was developed by the researchers to assess students' knowledge regarding the third stage of labor including: definition and duration of the third stage of labor, signs of placental separation, mechanisms of placental delivery, importance of placental examination and complications of the third stage of labor.

Part c

Intern students' knowledge regarding clinical guidelines for active management of the third stage of labor: It was developed by the researchers and included students' knowledge regarding the clinical guidelines for active management of the third stage of labor such as: definition, importance and steps.

Knowledge total scoring system was categorized as follows: correct and complete answers were scored as (2), correct and incomplete answers were scored as (1) and incorrect answers or don't know were scored as zero (0).

The total score for knowledge was calculated as follows: high level of knowledge: 75-100%, moderate level of knowledge: 50- to less than 75% and low level of knowledge: less than 50%.

Tool (II): Intern students' practice observational checklist: This tool was adapted by the researchers guided by **Global Library of Women's Medicine**[24]**.** The practice observational checklist contained sequential steps of clinical guidelines for the active management of third stage of labor as follow: **step (1):** neonatal assessment, **step (2):** administration of a uterotonic drug, **step (3):** umbilical cord clamping and cutting, **step (4):** controlled cord traction, **step (5):** placental examination, **step (6):** uterine massage, **step (7):** inspection of genitalia and blood loss estimation.

The observational checklist total scoring system was categorized as follows: correctly and completely done was scored as (3), correctly and incompletely done was scored as (2) and incorrect or not done was scored as (1).

The total score of practice was calculated as follows: satisfactory: 60 - 100% and unsatisfactory: less than 60%.

Tool (III): Modified Self-Confidence Measurement Scale: it was adopted from **Abd-Elhakm E. and El-Bana H. (2018)**[25]**.** It included 7 items that measured how confident intern nursing students felt about their skills during

simulation training program. These items were measured on a three-point Likert scale as follows: (2) for agree, (1) for disagree and (0) for strongly disagree. The total score was interpreted as (0 to 7) un-confidant and (8 to 21) confidant.

Methods

Approval

- An official permission from the dean of faculty of nursing to use the Objective Structure Clinical Examination (OSCE) skills laboratory of the faculty in training of the intern nursing students. Additionally, an official letter clarifying the purpose of the study was obtained from the Faculty of Nursing and submitted to the directors of the selected setting.

Development of the tools

-**Tool I** was developed by the researchers after the extensive review of the relevant and recent literatures[12-16]. Then it was validated by a jury of five experts in the field of obstetrics and gynecological nursing and the necessary modification was done. The face validity of the tool was calculated based on experts' opinion after calculating content validity index (%) of its items and it was 94.5%.

-**Tool II** was adapted from **Global Library of Women's Medicine** and **Maternity Guidelines Committee (2021)**.

-**Tool III** was adopted from **Abd Elhakm E. and El bana H (2018).**

-The reliability of the study tools (tool I and II) were tested using Cronbach's Alpha statistical test analysis, which indicate highly reliability 0.89, 0.86 respectively.

Ethical considerations:

-The purpose of the study was explained to the participant then, their informed consent was obtained.

-Confidentiality and privacy was put into consideration regarding the data collection as well as the intern nursing students' rights to withdraw at any time if desire. The researchers were assured that the nature of the study did not cause any harm for the entire sample and the data will only be used for the purpose of the study.

A pilot study

-A pilot study was carried out on 10% of the total sample (5) intern nursing students who were excluded from the main study to ascertain the feasibility, applicability, relevance and content validity of the tools as well as to detect any problem peculiar to the statements.

Data collection: data was collected from all intern nursing students who were trained at obstetric department of Tanta University hospital over a period of six months from the beginning of April to September 2021.

The program was conducted through four phases

I. Pre assessment phase

-The intern nursing students who agreed to participate in the study were assessed before implementation of the program, in the presence of the researchers for their socio-demographic characteristics, knowledge regarding the third stage of labor and clinical guidelines for active management of the third stage of labor by a self-report individually using **Tool (I**).

-The researchers observed intern students' practices and skills regarding clinical guidelines for active management of the third stage of labor using **Tool (II)**.

-Finally **Tool (III)** was used to assess the intern students' self-confidence regarding their practices and skills about clinical guidelines for active management of the third stage of labor using the high fidelity simulation.

II. Planning phase

-This program aimed to improve the intern nursing students' competency (knowledge, practice and self- confidence) regarding clinical guidelines for active management of the third stage of labor using the high fidelity simulation. The high fidelity simulation training program included two main parts:

-Part (1) (theoretical part): was prepared based on the aim of the training program and the intern nursing students' pre-assessment needs. It was developed by the researchers after reviewing the recent relevant literatures[12-16]. It included two sections; **section one** covered knowledge about definition and duration of the third stage of labor, mechanisms of placental delivery, importance of placental examination, signs of placental separation and complications of third stage of the labor, while **section two** contained the definition, importance and steps of clinical guidelines for active management of the third stage of labor.

-Part (2) (clinical part): included high fidelity simulator (SimMom): It is a birthing simulator, representing a full term pregnant adult woman and providing an impactful simulation toolkit which can be used to cover all stages of labor. SimMom responds to clinical intervention, instructor control, and pre-programmed scenarios that allow students to practice the clinical guidelines for active management of third stage of labor through using the following simulator's accessories: Inflatable uterus, neonate, placenta attached to umbilical cord, blood tank with capacity of containing up 1500 ml of artificial blood and disposable materials (**collection bag**, oxytocin and 2cc syringe). The software for active management of the third stage of labor scenario was prepared by the researchers based on extensive review of recent and relevant literatures[18,19] and tested for content validity by a jury of 5 experts in the related field.

III. Implementation phase

-The intern nursing students were divided into ten subgroups; each group contained 5 interns for the purpose of the demonstration and re-demonstration.

-The high fidelity simulation training program was conducted 3 times/week for each subgroup at the Objective Structure Clinical Examination (OSCE) skills laboratory, Faculty of Nursing, Tanta University. It was implemented by the researchers through the following three sessions.

-First session: This session included a brief orientation about the SimMom birthing simulator and its accessories, the learning objectives of the high fidelity simulation training program, sessions and expectations of each session. This session took about thirty minutes.

-Second session: This session included basic knowledge about the third stage of labor covering definition and duration of the third stage of labor, mechanisms of placental delivery, importance of placental examination, signs of placental separation and complications of the third stage of labor as well as definition and importance of the clinical guidelines for active management of the third stage of labor. This session took about one hour.

-Third session: This session included explaining the steps of clinical guidelines for active management of the third stage of labor **as follow**: **step (1):** neonatal assessment, **step (2):** administration of a uterotonic drug, **step (3):** umbilical cord clamping and cutting, **step (4):** controlled cord traction, **step (5):** placental examination, **step (6):** uterine massage, **step (7):** inspection of genitalia and blood loss estimation.

-It was followed by simulation training with the pre prepared scenario that was applied for approximately 15 to 20 minutes for each student during this time the intern nursing student was able to apply the clinical guidelines for active management of the third stage of labor as well as re-demonstrate it by using high fidelity SimMom birthing simulator.

-Illustrated handout about the clinical guidelines for active management of the third stage of labor was distributed after implementation of the program as a reference. This session took about two hours.

IV.Evaluation phase

-Intern nursing students' competency (knowledge, practice and self-confidence) regarding clinical guidelines for active management of the third stage of labor was reassessed immediately and one month after implementation of the high fidelity simulation training program using **Tools (I, II and III)**.

-Comparison was done three times pre, immediately and one month post program to determine the effect of high fidelity simulation on intern students' competency regarding clinical guidelines for active management of the third stage of labor.

Statistical analysis of the data : Data were fed to the computer and analyzed using IBM SPSS software package version 20.0**. (**Armonk, NY: IBM Corp**)** Qualitative data were described using number and percent. Shapiro-Wilk test was used to verify the normality of distribution Quantitative data were described using range (minimum and maximum), mean and standard deviation, . Significance of the obtained results was judged at the 5% level.

The used tests were

1 - ANOVA with repeated measures: For normally distributed quantitative variables, to compare between more than two periods or stages.

2 - Pearson coefficient: To correlate between two normally distributed quantitative variables

3 - Friedman test: For abnormally distributed quantitative variables, to compare between more than two periods or stages and **Post Hoc Test** (**Dunn**'s**)** for pairwise comparisons
4 - Q: Cochran's test: For non-parametric test for binary response variable and Post Hoc Test (Dunn's) for pairwise comparisons

Results

Table (1): Clarifies the socio-demographic characteristics of the studied intern nursing students. It was observed that most of the studied students were female (80%) corresponding to only (20 %) of them were male with a mean age of 23.10 ± 0.97 years. It was also noticed that most of them (88%) were from rural areas.

Table (2): Illustrates the studied intern nursing students' knowledge about the third stage of labor pre, immediately and one month post simulation training program. Referring to definition and duration of the third stage of labor as well as signs of placental separation and the importance of placental examination, the table shows a convergent percent (52 %, 50%, 48% and 52 % respectively) of the studied students answered correctly and completely pre simulation training program. In relation to the mechanisms of placental delivery and the complications of third stage of labor, it was observed that only (8 % and 20 % respectively) of the studied students answered correctly and completely pre simulation training program. On the other hand, a progressive improvement in all knowledge aspects were obvious among the vast majority (98 %, 96 %, 100 %, 92 %, 98 % and 100 % respectively) of them immediately post stimulation training program. Furthermore one month later, sustained retention of knowledge was existed among (90 %, 88 %, 88 %, 86 %, 92 % and 90 % respectively), with a statistically significant difference (P <0.001).

Table (3): Illustrates the intern nursing students' knowledge about the clinical guidelines for active management of the third stage of labor pre, immediately and one month post simulation training program. It was noticed that only (4 %, 6% and 0% respectively) of the studied students answered correctly and completely pre simulation training program. Conversely, the vast majority (92%, 96% and 100 % respectively) of them gave correct and complete answers immediately after simulation training program. Likewise, one month later (86%, 88 % and 98% respectively) of them retained knowledge, with a statistically significant difference (P<0.001).

Figure (1): Reveals the total knowledge score level among the studied intern nursing students pre, immediately and one month post simulation training program. Although, (62%) of the studied students had low level of knowledge about the third stage of labor and the clinical guidelines for its active management pre simulation training program. Yet, (100 % and 98% respectively) of them had high level of knowledge immediately and one month post simulation training program with a statistically significant difference (P<0.001).

Table (4): Presents the intern students' level of practice about the clinical guidelines for active management of the third stage of labor pre, immediately and one month post simulation training program. It was observed that only (6% and 18% respectively) of the studied students had done the neonatal assessment and uterine massage correctly and completely pre simulation training program. Moreover, none of them (0%) had done the administration of a uterotonic drug, umbilical cord clamping and cutting, controlled cord traction, placental examination, inspection of genitalia and blood loss estimation correctly and completely pre simulation training program compared to (94 %, 96 %, 100 %, 96 %, 90 %, 92% and 92 % respectively) of them had done the neonatal assessment, administration of a uterotonic drug, umbilical cord clamping and cutting, controlled cord traction, placental examination, uterine massage, inspection of genitalia and blood loss estimation correctly and completely immediately after simulation training program. Furthermore, one month later, the percentages were increased to (96 %, 98 % and 96 % respectively) among the studied students regarding neonatal assessment, administration of uterotonic drug and uterine massage. On the other hand, the percentage remains the same (100%) regarding umbilical cord clamping and cutting, decreases to (92%, 86% and 86 % respectively) among them regarding controlled cord traction,

placental examination, inspection of genitalia and blood loss estimation with a statistically significant difference (P<0.001).

Figure (2): Portrays the total practice score level about clinical guidelines for active management of the third stage of labor among the studied intern nursing students pre, immediately and one month post simulation training program. Although (98%) of the studied students had unsatisfactory practice regarding the about clinical guidelines for active management of the third stage pre simulation training program. All of them (100 %) had satisfactory practice immediately as well as one month post simulation training program, with a statistically significant difference (P<0.001).

Table (5): Shows the percent distribution of the studied intern nursing students regarding their level of self-confidence about clinical guidelines for active management of the third stage of labor pre, immediately and one month post simulation training program. It was observed that, there was a highly statistical significant difference among the studied students' self-confidence between the pre, immediately and one month post simulation training program (p<0.001).

Figure (3): Displays a highly significant progress in all domains of self-confidence about clinical guidelines for active management of the third stage of labor among the studied intern nursing students pre, immediately and one month post simulation training program. Although, (70%) of the studied students were mainly unconfident pre simulation training program. Most of them (92 %) reported confident immediately after simulation training program, which was increased to (96 %) one month post simulation training program, with statistically significant difference (P<0.001).

Table (6): Demonstrates a highly significant positive correlation between total knowledge, practice and self-confidence scores among the studied intern nursing students pre, immediately and one month post simulation training program.

Table (1): Percent distribution of the studied intern nursing students according to their socio-demographic characteristics (N = 50).

Socio-demographic characteristics of the studied intern nursing students	No.	%
Sex		
Male	10	20.0
Female	40	80.0
Age		
Min. – Max.	**22.0 - 26.0**	
Mean ± SD.	**23.10 ± 0.97**	
Residence		
Rural	44	88.0
Urban	6	12.0

SD: **Standard deviation**

Table (2): Percent distribution of the studied intern students' knowledge level about the third stage of labor pre, immediately and one month post simulation training program (N = 50).

Intern students' knowledge about the third stage of labor	The studied intern students' pre and post simulation training program (n=50)						Test of Sig.	
	Pre-simulation training		Immediately post-simulation training		One month post-simulation training			
	N	%	N	%	N	%	Fr	P-value
1- Definition of third stage of labor:								
Incorrect and didn't know	14	28.0	0	0.0	0	0.0	39.215*	<0.001*
Correct and incomplete answers	10	20.0	1	2.0	5	10.0		
Correct and complete answers	26	52.0	49	98.0	45	90.0		
2-Duration of third stage of labor:								
Incorrect and didn't know	16	32.0	0	0.0	0	0.0	34.200*	<0.001*
Correct and incomplete answers	9	18.0	2	4.0	6	12.0		
Correct and complete answers	25	50.0	48	96.0	44	88.0		
3- Signs of placental separation:								
Incorrect and didn't know	13	26.0	0	0.0	0	0.0	41.674*	<0.001*
Correct and incomplete answers	13	26.0	0	0.0	6	12.0		
Correct and complete answers	24	48.0	50	100.0	44	88.0		
4- Mechanisms of placental delivery:								
Incorrect and didn't know.	33	66.0	0	0.0	0	0.0	78.329*	<0.001*
Correct and incomplete answers.	13	26.0	4	8.0	7	14.0		
Correct and complete answers.	4	8.0	46	92.0	43	86.0		
5- Importance of placental examination:								
Incorrect and didn't know.	14	28.0	0	0.0	0	0.0	36.077*	<0.001*
Correct and incomplete answers.	10	20.0	1	2.0	4	8.0		
Correct and complete answers.	26	52.0	49	98.0	46	92.0		
6- Complications of third stage of labor:								
Incorrect and didn't know.	13	26.0	0	0.0	0	0.0	75.984*	<0.001*
Correct and incomplete answers.	27	54.0	0	0.0	5	10.0		
Correct and complete answers.	10	20.0	50	100.0	45	90.0		

Fr: **Friedman test**

p: p value for comparing between the studied periods

*: Statistically significant at $p \leq 0.05$

Table (3): Percent distribution of the studied intern nursing students knowledge level about clinical guidelines for active management of third stage of labor pre, immediately and one month post simulation training program (N = 50).

Intern students' knowledge about clinical guidelines for active management of the third stage of labor	The studied intern students' pre and post simulation training program (n=50)						Test of Sig.	
	Pre-simulation training		Immediately post-simulation training		One month post-simulation training			
	N	%	N	%	N	%	Fr	P-value
1- Definition of clinical guidelines for active management of third stage of labor:								
Incorrect and didn't know	36	72.0	0	0.0	0	0.0	79.621*	<0.001*
Correct and incomplete answers	12	24.0	4	8.0	7	14.0		
Correct and complete answers	2	4.0	46	92.0	43	86.0		
2. Importance of clinical guidelines for active management of third stage of labor:								
Incorrect and didn't know	38	76.0	0	0.0	0	0.0	81.882*	<0.001*
Correct and incomplete answers	9	18.0	2	4.0	6	12.0		
Correct and complete answers	3	6.0	48	96.0	44	88.0		
3- Steps of clinical guidelines for active management of third stage of labor:								
Incorrect and didn't know	48	96.0	0	0.0	0	0.0	99.351*	<0.001*
Correct and incomplete answers	2	4.0	0	0.0	1	0.2		
Correct and complete answers	0	0.0	50	100.0	49	98.0		

Fr: **Friedman test**

p: p value for comparing between the studied periods

*: Statistically significant at $p \leq 0.05$

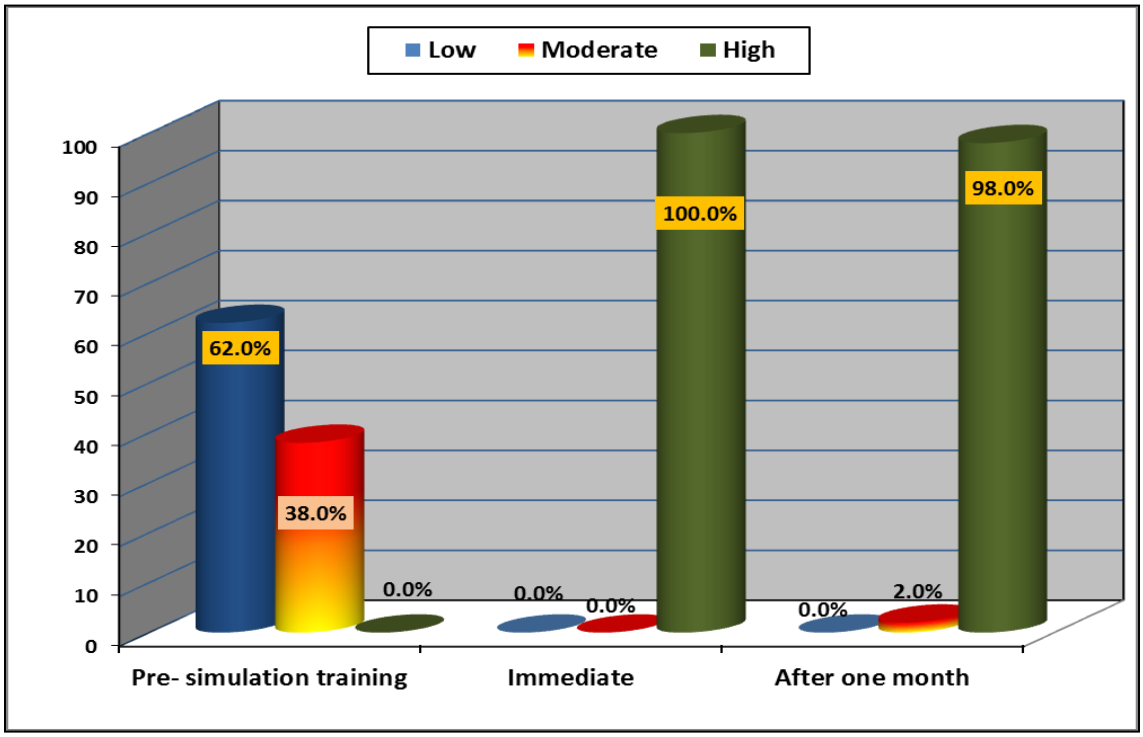

Figure (1): Total knowledge score level among the studied intern nursing students pre, immediately and one month post simulation training program (N = 50).

Table (4): Percent distribution of the studied intern nursing students regarding their level of practice about clinical guidelines for active management of the third stage of labor pre, immediately and one month post simulation training program (N = 50).

Intern students' level of practice about clinical guidelines for active management of the third stage of labor	The studied intern students' pre and post simulation training program (n=50)						Test of Sig.	
	Pre-simulation training		Immediately post- simulation training		One month post-simulation training			
	N	%	N	%	N	%	Fr	P-value
1. Neonatal Assessment:								
Incorrect or not done.	28	56.0	0	0.00	0	0.00	90.795*	<0.001*
Correct and incompetently done.	19	38.0	3	6.00	2	4.00		
Correct competently done.	3	6.0	47	94.0	48	96.00		
2. Administration of a uterotonic drug :								
Incorrect or not done.	35	70.0	0	0.0	0	0.0	98.052*	<0.001*
Correct and incompetently done.	15	30.0	2	4.0	1	2.0		
Correct Competently done.	0	0.0	48	96.0	49	98.0		
3. Umbilical cord clamping and cutting :								
Incorrect or not done.	26	52.0	0	0.00	0	0.00	100.000*	<0.001*
Correct and incompetently done.	24	48.0	0	0.00	0	0.00		

Correct Competently done.	0	0.0	50	100.0	50	100.0		
4. Controlled cord traction:								
Incorrect or not done.	38	76.0	0	0.0	0	0.0	94.929*	<0.001*
Correct and incompetently done.	12	24.0	2	4.0	4	8.0		
Correct competently done.	0	0.0	48	96.0	46	92.0		
5. Placenta examination:								
Incorrect or not done.	29	58.0	0	0.0	0	0.0	86.484*	<0.001*
Correct and incompetently done.	21	42.0	5	10.0	7	14.0		
Correct competently done.	0	0.0	45	90.0	43	86.0		
6. Uterine massage:								
Incorrect or not done.	15	30.0	0	0.0	0	0.0	69.725*	<0.001*
Correct and incompetently done.	26	52.0	4	8.0	2	4.0		
Correct Competently done.	9	18.0	46	92.0	48	96.0		
7. Inspection of genitalia and blood loss estimation:								
Incorrect or not done.	34	68.0	0	0.0	0	0.0	79.353*	<0.001*
Correct and incompetently done.	16	32.0	4	8.0	7	14.0		
Correct Competently done.	0	0.0	46	92.0	43	86.0		

Fr: **Friedman test** *: Statistically significant at $p \leq 0.05$

: p value for comparing between the studied perio

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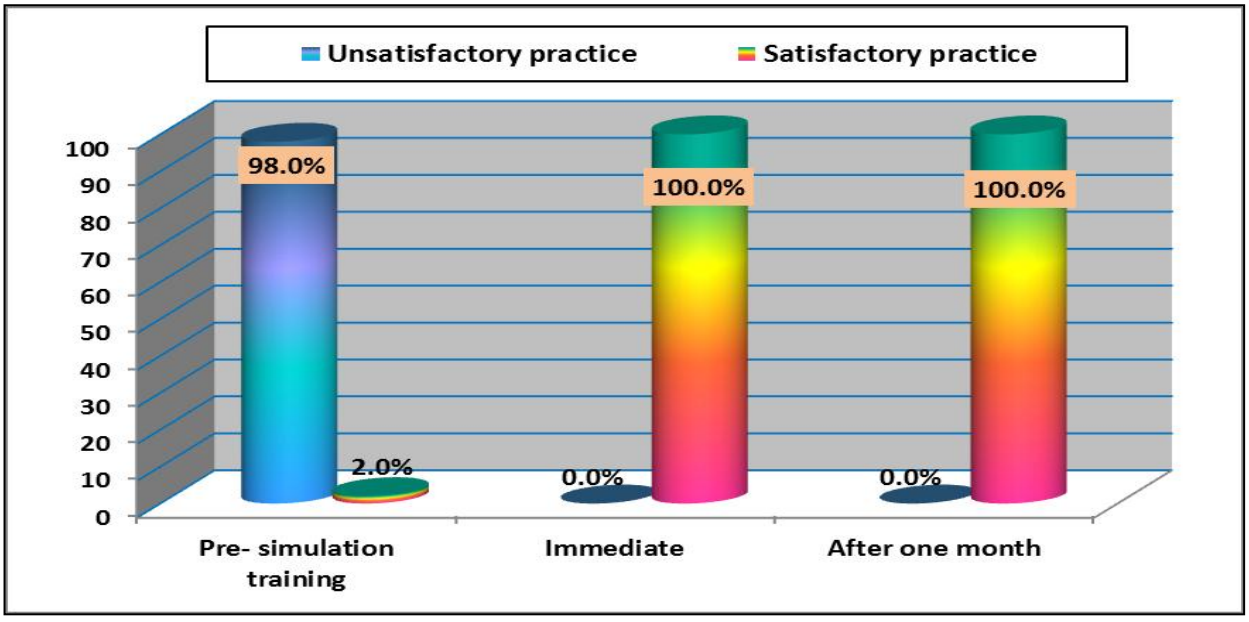

Figure (2): Total practice score level about clinical guidelines for active management of the third stage of labor among the studied intern nursing students pre, immediately and one month post simulation training program (N = 5

Table (5): Percent distribution of the studied intern nursing students regarding their level of self-confidence about clinical guidelines for active management of the third stage of labor pre, immediately and one month post simulation training program (n= 50).

Modified Self-confidence Measurement Scale	The studied intern students' pre and post simulation training program (n=50)						Test of Sig.	
	Pre-simulation training		Immediately post-simulation training		One month post-simulation training			
	N	%	N	%	N	%	Fr	P-value
1- I am confident that I am mastering the content of training activity:								
Strongly disagree	16	32.0	2	4.0	0	0.0	66.326*	<0.001*
Disagree	29	58.0	7	14.0	5	10.0		
Agree	5	10.0	41	82.0	45	90.0		
2- I am confident that the training covered critical content:								
Strongly disagree	10	20.0	1	2.0	0	0.0	63.372*	<0.001*
Disagree	32	64.0	4	8.0	3	6.0		
Agree	8	16.0	45	90.0	47	94.0		
3- I am confident that I am developing skills and obtaining the required knowledge:								
Strongly disagree	16	32.0	0	0.0	0	0.0	75.221*	<0.001*
Disagree	26	52.0	3	6.0	2	4.0		
Agree	8	16.0	47	94.0	48	96.0		
4- My instructors used helpful resources to teach this simulation:								
Strongly disagree	17	34.0	2	4.0	2	4.0	50.045*	<0.001*
Disagree	22	44.0	8	16.0	3	6.0		
Agree	11	22.0	40	80.0	45	90.0		
5-It is my responsibility as the student to learn what I need to know from this method of training :								
Strongly disagree	12	24.0	3	6.0	2	4.0	46.536*	<0.001*
Disagree	30	60.0	9	18.0	6	12.0		
Agree	8	16.0	38	76.0	42	84.0		
6- I know how to get help when I do not understand the concepts covered in the simulation:								
Strongly disagree	10	20.0	4	0.8	1	0.2	29.967*	<0.001*
Disagree	23	46.0	6	12.0	4	0.8		
Agree	17	34.0	40	80.0	45	90.0		
7- I know how to use simulation activities to learn critical aspects of these skills:								
Strongly disagree	20	40.0	3	6.0	1	2.0	69.887*	<0.001*
Disagree	25	50.0	3	6.0	3	6.0		
Agree	5	10.0	44	88.0	46	92.0		

Fr: **Friedman test** p: p value for comparing between the studied periods *Statistically significant at $p \leq 0.05$

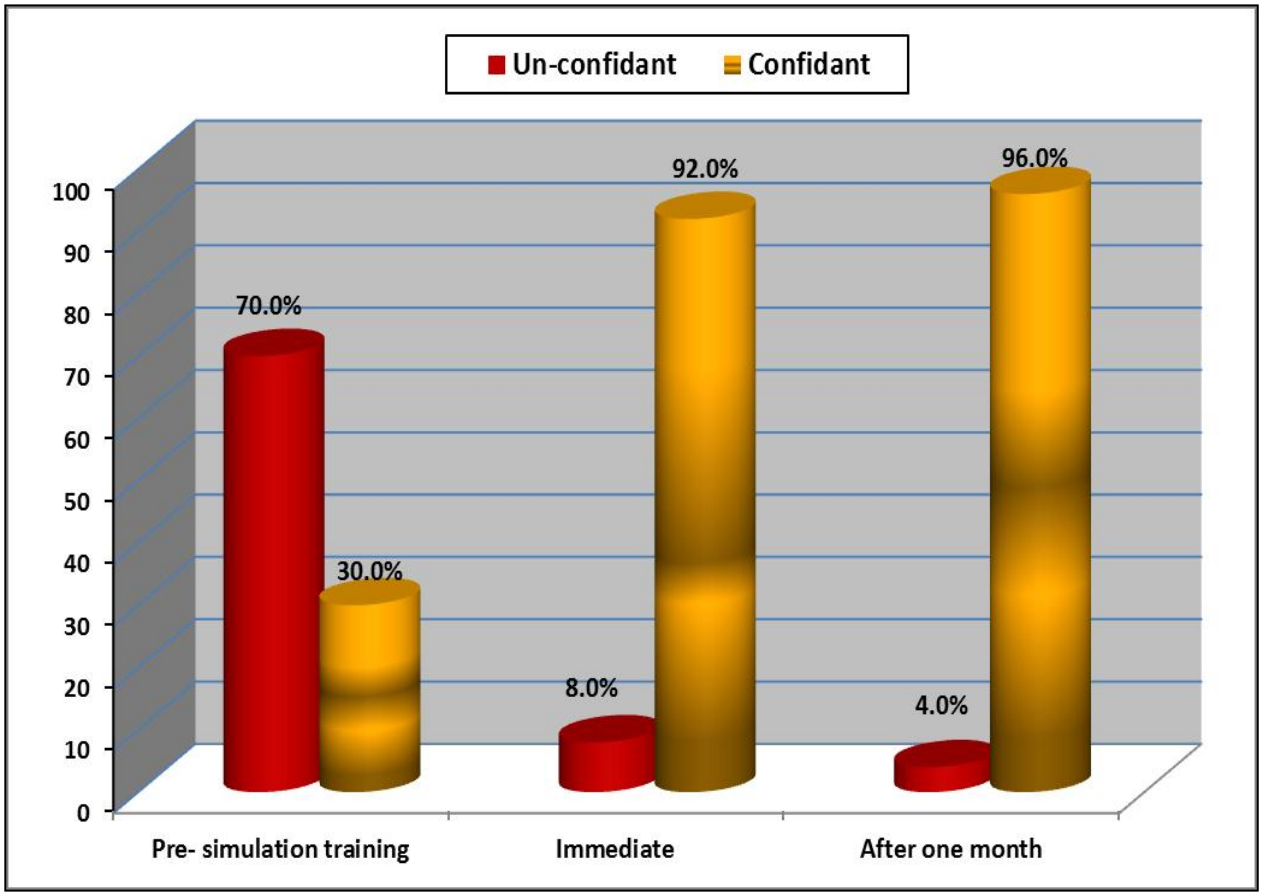

Figure (3): Total self- confidence score level about clinical guidelines for active management of third stage of labor among the studied intern nursing students pre, immediately and one month post simulation training program (n=50).

Table (6): Correlation between the total knowledge, total practice and total self-confidence pre, immediately and one month post simulation training program among studied intern nursing students (N = 50).

Correlations	The studied intern nursing students' pre and post simulation training (n=50)					
	Pre- simulation training		Immediately post-simulation training		One month post-simulation training	
	r	P	R	P	R	p
Knowledge Vs. Practice	0.282*	0.047*	0.476*	<0.001*	0.421*	0.002*
Knowledge Vs. Self-confidence	0.958*	<0.001*	0.903*	<0.001*	0.842*	<0.001*
Practice Vs. Self-confidence	0.329*	0.020*	0.639*	<0.001*	0.658*	<0.001*

r: Pearson coefficient

*: Statistically significant at $p \leq 0.05$

Discussion

Third stage of labor is considered as a critical period. When the uterus fails to contract effectively after birth, this will lead to postpartum hemorrhage, which is one of the top five causes of maternal mortality worldwide. Therefore, implementation of clinical guidelines for active management of the third stage of labor can be a lifesaving intervention. Main health care providers who are responsible for applying it are intern nursing students. Hence, strengthen their skills through effective training is essential. High fidelity simulation training provides a safe environment for intern nursing students to manage real life emergency situations, increase their ability to work under pressure as well as promote their self -confidence overtime.

The result of the current study declared that there was a statically significant difference between the intern nursing students' knowledge about the third stage of labor pre, immediately and one month post simulation training program. This result is in agreement with **Ibraheem E. et al., (2018)**[26] who investigated " Nursing care of the third and fourth stages of labor: protocol of care" and stated that there was a highly statistically significant difference between nurses knowledge regarding third stage of labor pre and post intervention. This agreement can be attributed to the effectiveness of the training for improving the nurses' knowledge.

At the same time, the findings of the present study reported that there was an evident increase in the intern nursing students' knowledge about the clinical guidelines for active management of the third stage of labor immediately and one month post simulation training program than pre-program. This finding was supported by **Angelina J. et al., (2021)**[27] who researched "The impact of low fidelity simulation on nurse competency in active management of third stage of labor", they concluded that overall knowledge on active management of third stage of labor was significantly improved after simulation training. This similarity can be supported by the literatures that emphases on the ability of simulation training program on bridging the gap between theory and clinical practice.

Concerning the total knowledge score level among the studied intern nursing students pre, immediately and one month post simulation training program, the present study revealed a significant sustainable improvement in the total knowledge score level immediately and one month post simulation training program compared to preprogram. This finding was matching with **Zaky N., (2017)**[28] who evaluated "Effect of a medium fidelity simulation based training on nurses' knowledge, performance and clinical judgment of postpartum hemorrhage management", she reported that there was astonishing significant improvement in the acquisition and retention of knowledge among the study group after implementation of simulation training. Additionally, **Mccoy T., (2018)**[29], endorsed the use of maternal and newborn high fidelity simulation to improve knowledge of undergraduate nursing students.

In the same line, **AbdElhakm E. and Elbana H., (2018)**[25], who elaborated "Effect of simulation based training on maternity nurses' performance and self-confidence regarding primary postpartum hemorrhage management", found that there was a highly statistically significant difference in knowledge between the pre and post intervention phases. Again, the present study findings were in agreement with **Pansuwan K. and Klankhajhon S., (2021)**[30] who studied "The effect of using simulation based learning on nursing performances of early postpartum hemorrhage in nursing student" and concluded that simulation based learning improve nursing students' knowledge. These findings evident that the nursing students' ability to retain sustainable knowledge improved by high fidelity simulation training.

As regard the total practice score level about clinical guidelines for active management of the third stage of labor among the studied intern nursing students pre, immediately and one month post simulation training program, the present study showed that there was a significant improvement in the total practice score level immediately and one month post simulation training program than pre-program. This finding was in accordance with **AbdElhakm E. and Elbana H., (2018)**[25], **Karadas M. and Terzioglu F., (2019)**[31], and **Hernandez E. etal., (2021)**[32], they reported that high fidelity simulation significantly improve nurses practice

regarding postpartum hemorrhage management from before to after simulation training. Moreover, **Pansuwan K. and Klankhajhon S., (2021)**[30] endorsed the use of simulation based learning on nursing performances of early postpartum hemorrhage in nursing student. In addition, **Changuiti O. etal., (2021)**[33], confirmed that high fidelity simulation significantly increased midwifery students practice. From the researchers point of view high fidelity simulation is a highly effective training method for improving nurses' practice as it put them in real situation.

Considering the total self- confidence score level about clinical guidelines for active management of the third stage of labor among the studied intern nursing students pre, immediately and one month post simulation training program, the present study displayed a highly significant progress in all domains of self-confidence among the studied intern nursing students immediately and one month post simulation training program compared to pre-program. This findings went hand in hand with **Abisogun E., (2018)**[34], and **AbdElhakm E. and Elbana H., (2018)**[25], who portrayed that there was a significant difference between nurses' self-confidence at pre and post simulation training. Similarly, **Yu J. et al., (2021)**[35], found that nursing students had a significantly higher self-confidence after high fidelity simulation based training program. The harmony of previous studies with the present study may be aroused from the fact that simulation based experience results in decreasing the associated fears of failure with actual patients.

On the subject of correlations between the total knowledge, total practice and total self-confidence pre, immediately and one month post simulation training program among studied intern nursing students. The current study demonstrated a highly significant positive correlation between total knowledge, practice and self-confidence scores among the studied intern nursing students. These findings were supported by **AbdElhakm E. and Elbana H., (2018)**[25], who reported that there was a highly significant positive correlation between total knowledge, practice and self-confidence scores among maternity nurses post simulation based training. In congruence with these findings **Bhutia S. et al., (2018)**[36], reported that there was a positive correlation between knowledge and practice of active management of third stage of labor among nursing students. From the researchers point of view these findings attributed to the ability of high fidelity simulation to put the students in real like situation, which allows demonstration and re-demonstration, subsequently increasing the competency of the students' practice that is required for developing self-confidence.

Conclusion

Based on the findings of the present study, it can be concluded that high fidelity simulation training significantly improve the intern nursing students' competency (knowledge, practice as well as the self-confidence) regarding clinical guidelines for active management of the third stage of labor.

Recommendations

- Implementation of high fidelity simulation training regarding clinical guidelines for active management of the third stage of labor among lager sample and other setting.
- Provide pre-service and in-service training programs using high fidelity simulation especially for newly appointed intern nurses to improve their knowledge and practices as well as the self-confidence.
- High fidelity simulation training as a method of education should be included in nursing curriculum to increase nurses' knowledge and practices as well as their self-confidence.

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The Effect of Educational Program on Knowledge and Commitment of Male Employees at Tanta University Regarding Prostate Cancer Screening

Ahmed Salem Abdel moniem El mezayen[1], Latifa Mahmoud Fouda[2], Hanan Abo El Gamelen Essa[3], Samira El Sayed El mezayen[4]

[1]Demonestrator, Community Health Nursing Department, Faculty of Nursing, Tanta University, Egypt.

[2],[3]Professor Community Health Nursing Department, Faculty of Nursing, Tanta University, Egypt.

[4] Assistant Professor, Community Health Nursing Department, Faculty of Nursing, Tanta University, Egypt.

Abstract

Background: Prostate cancer is increasingly becoming one of the most significant health problems facing men and the commonest cause of cancer-related death in men globally. Thus, screening has immense public health importance. **The aim of the study:** was to evaluate the effect of educational program on knowledge and commitment of male employees at Tanta University regarding prostate cancer screening. **Subjects and Method: Design**: A quasi-experimental research design was utilized. **Settings:** This study was conducted at the faculties of the medical campus (Faculty of Nursing, Medicine, Pharmacy, Dentistry, and Faculty of Science) at Tanta University. **Subjects:** Systematic random sample of 80 male employees, aged 40 to 60 years old who were free from prostate cancer, and willing to participate in the study were included. **Tools:** Two tools were used for data collection: **Tool (I)** A structured interview schedule which consisted of two parts**: Part I:** bio socio-demographic characteristics of studied employees. **Part II:** Knowledge about prostate cancer and prostate cancer screening. **Tool (II)** Commitment to prostate cancer screening. **Results:** The majority of studied employees had a low level of knowledge pre-program. Immediately after the program intervention most of them had a high level of knowledge. Meanwhile, two-thirds of them had a high level of knowledge one month after the program intervention. More than two-thirds of the studied employees had a low level of commitment to prostate cancer screening tests pre and immediately post-intervention. While less than two-thirds of them retain a high level of commitment one month after the program intervention. **Conclusion:** There was a significant improvement in the total level of knowledge and commitment to prostate cancer screening. **Recommendation**: An ongoing effort should be undertaken to raise awareness of the significance of prostate cancer and to eliminate screening barriers.

Key words: Prostate cancer, Screening tests, Employees, Commitment.

Introduction

In recent years, Prostate Cancer (PC) has gained the highlight as a public health problem influencing men. Besides being the second most diagnosed cancer type worldwide, prostate cancer is the leading cause of cancer mortality in developed and developing countries among the world's male population [(1)]. It is accounting for 1,414,259 new cases and causing 375, 304 deaths about (6.8%) of all deaths caused by cancer in men in 2020. Nearly 60% of all prostate cancers are diagnosed in men at the age of 65 and older. The average age of men at diagnosis is about 66[(2)].

In Egypt, according to the Global Cancer Observatory (GLOBOCAN) (2020) age-standardized incidence rate is (13.9) per 100,000 and the estimated prevalent cases (in the last 5 years) and deaths for all ages are (10,532) cases and (2227) deaths respectively. In Egypt, by 2040 the estimated number of incident cases and death of prostate cancer will be expected to rise to (9607) cases and (4978) deaths respectively. Also, the worldwide prostate cancer burden is expected to grow to almost (2,426, 825) million new cases and (739, 861) deaths by 2040 simply due to the growth and the aging of the population [(3)].

The exact cause of prostate cancer is not easy to determine. Major risk factors that are believed to affect one's chance of developing prostate cancer are increasing age, positive family history, and race. Other risk factors such as,

diet, obesity, smoking may have some connection to the pathogenesis of the disease [4]. The early detection of the disease in early stages can be an effective measure to reduce the mortality rate of the disease in asymptomatic men and provides an opportunity to create an effective and inexpensive therapeutic method for people [5].

Several less invasive tests are used for early detection of prostate cancer, such as a prostate specific-antigen (PSA) blood test and digital rectal exam (DRE). Imaging tests such as MRI and prostate biopsy, which refers to the removal of small pieces of the prostate, guided by trans-rectal ultrasound, for microscopic examination, are also can be used in the confirmation and for definite diagnosis of prostate cancer [6].

The time of screening tests is controversial while the American Cancer Society (ACS) advises receiving annual digital rectal exams (DREs) and prostate-specific antigen (PSA) tests, starting at age 45 years for at-risk groups comprising individuals with first degree relatives diagnosed with PC at an early age. Others should be screened annually from 50 years onwards. As for men over 75 years, the United States Preventive Services Task Force (USPSTF) recommended against PSA screening where the potential risks outweigh the benefits [7, 8].

Commitment is the degree to which people voluntarily integrate and collaborate with the healthcare provider in terms of instructions regarding timing and frequency of screening tests and return for the follow-up to ensure an improved health outcome. Good knowledge and understanding of a disease are generally associated with a more optimal healthcare-seeking commitment [9, 10].

Community health nurse (CHN) plays a vital role in the ongoing health screening of prostate cancer, data gathering, and monitoring practices. CHN has an opportunity to provide health education and counseling to men and interpret, share surveillance data with those who may be to use them in ways that decision-makers, the community and the public can understand [11].

Significance of the study:

Currently, prevention and early detection of prostate cancer have immense public health importance as the expected number of patients with prostate cancer has increased due to aging of the population [12]. Therefore, the current study aims to evaluate the effect of educational program on knowledge and commitment of male employees at Tanta University regarding prostate cancer screening.

Aim of the Study

Evaluate the effect of educational program on knowledge and commitment of male employees at Tanta University regarding prostate cancer screening.

Research hypothesis:

Knowledge and commitment of male employees at Tanta University are expected to be improved after application of education program regarding prostate cancer screening.

Subjects and method

Study design:

A quasi-experimental research design was utilized in this study.

Study setting:

This study was conducted at the faculties of the medical campus (Faculty of Nursing, Medicine, Pharmacy, Dentistry, and Faculty of Science) at Tanta University.

Subjects:

A systematic random sample of 80 male employees**,** working in the previously mentioned settings.

Inclusion criteria:

1. Men aged from 40 - 60 years.
2. Not having prostate cancer.
3. Accepted to participate in the research.

The proportional allocation technique was used to select about 50% of the total male employees who meet the inclusion criteria (164 employees). The sample size was estimated with the test of power analysis (95% confidence limit, 80% power of the study).

The sample was selected according to the following table:

Faculty	Total number of male employees	Number of male employees (40-60 years)	50% of total male employees (40-60 years)
Faculty of nursing	**27**	**12**	**6**
Faculty of Medicine	**77**	**45**	**22**
Faculty of Pharmacy	**71**	**47**	**23**
Faculty of Dentistry	**88**	**35**	**17**
Faculty of Science	**84**	**25**	**12**
Total	**347**	**164**	**80**

Tool of data collection

- Two tools were developed by the researcher to obtain the necessary data as follow:

Tool I: A structured interview schedule:

It was developed by the researcher based on the review of recent and related literatures [13, 14]. It was included the following parts:

Part 1: Biosocio-demographic characteristics of the studied employees:

It covered data about the employees' age, marital status, level of education, occupation, monthly income, and residence in addition to the past health history of prostate problems and family history of prostate cancer.

Part 2: Study subjects' knowledge about prostate cancer and prostate cancer screening:

This part was developed by the researcher to assess the subjects' knowledge about prostate cancer and its screening tests. It comprised of 16 questions that covered the following items: definition of prostate cancer, risk factors, signs and symptoms, complications, treatment and early detection, types of prostate cancer screening tests, and times of prostate cancer screening [15, 16].

Scoring system:

The knowledge score of the studied subjects regarding prostate cancer and its screening was calculated as the following: The subjects' response to knowledge questions was checked with a model key answer, which were prepared by the researcher. Complete and correct answers were taken score "two", incomplete correct answers were taken score "one" while incorrect / don't know answers was taken score "zero". It comprised of 16 questions. Then all correct answers were summed up. The total score of knowledge was 32, ranged from (0-32), and classified into:

- Low level of knowledge: < 60 % of the total score: < 19.2.
- Moderate level of knowledge: 60 % - < 75 % of the total score: 19.2 - < 24.
- High level of knowledge: ≥ 75 % of the total score: ≥ 24.

Tool II: Commitment of the study subjects to prostate cancer screening

It was developed by the researcher to assess the study subjects' commitment to prostate cancer screening and early detection measures such as screening practices, duration and type of screening tests, medical checkups, and compliance with treatment of prostate problems. It comprised of 8 questions. The total score of commitment was 8, ranged from (0-8).

Scoring system

The commitment score of the studied subjects' regarding prostate cancer screening was calculated as the following: The done procedure was given a score (one), while the not done (zero).

- Low commitment: < 60 % of the total score: < 4.8.
- Moderate commitment: 60 % - < 70 % of the total score: 4.8 - < 5.6.
- High commitment: ≥ 70 % of the total score: ≥ 5.6.

Method

The operation of this study was carried out as follows:

1- Obtaining approvals:

- An official permission was obtained from the ethical committee of the faculty of nursing, Tanta University on the proposal of the study before conducting it.
- An official permission to conduct the study was obtained from the Dean of the Faculty of Nursing and directed to the responsible authorities (Deans of the selected faculties) to obtain their approval and cooperation to carry out the study.

2- Ethical and legal considerations were considered all over the study phases as the following:

- Informed consent was obtained from all study subjects after providing the appropriate explanation about the purpose of the study.
- Each participant was informed that he has the right to withdraw from the study any time he wants.
- Nature of the study didn't cause any harm or pain to the entire sample.
- Assured the subjects about the privacy and confidentiality of collected data and explained that it was used only for study purpose.

3- Developing of the tools

- The study tools (I and II) were developed by the researcher based on the review of related literature [13-16].
- The developed tools were reviewed by the supervisors. Then the sheet was submitted to five experts in the field of community health nursing and public health & community medicine for testing its face and content validity. The validity of the questionnaire based on experts' opinions was calculated and found to be (97%). The reliability test was applied to the previous tools using Cronbach's Alpha test:
- For **tool I it was 0.802** for 34 items applied on 8 male employees.
- For **tool II it was 0.825** for 8 items applied on 8 male employees.
- For **the sheet in total it was 0.951** for 42 items applied on 8 male employees which indicates high reliability of the study tools.

4- The pilot study:

- A pilot study was carried out by the researcher on 8 employees which represent 10 % of all study subjects to ensure the clarity, applicability, and comprehension of the tools, identify obstacles that may be encountered during data collection and to determine the length of time needed to collect the data.
- According to the pilot study there were no modifications occurred after the pilot study so, those employees were included in the main study sample.

5- Developing the educational program

The following steps were adopted to develop the program.

I) Assessment phase: before running the program, employees were interviewed individually to initiate good rapport, the data were collected by the previously mentioned tools through interviewing each employee individually in his office to collect the baseline data about prostate cancer and its screening as a pre-intervention assessment.

II) Planning phase: An educational program was planned according to the employees' needs and literature review to carry out the program.

- The goal of the program was: to increase the male employees' knowledge about prostate cancer and promote their commitment to prostate cancer screening.

III) Implementation phase: the program consisted of two sessions provided for male employees at their faculties three days per week**.** The duration of each session was 45 minutes.

Session (1): Program orientation and general idea about prostate cancer

This session aimed to establish a relationship with the employees and orient them about the importance of the education program, its sessions and expectations of each session, pretest and clarification the definition, causes and risk factors, signs and symptoms, and complications of prostate cancer to increase awareness of employees about prostate cancer as a disease were done.

Session (2): Prostate cancer screening

This session aimed to was to increase the awareness of employees about types of prostate cancer screening tests, their recommendations and enable male employees to identify their role toward themselves, their peers, and their community in the early detection of prostate cancer.

- The program was carried out by the researcher. Employees were divided into 3 groups so that the number of employees in each educational session didn't exceed 8 employees; this was to ensure complete, consistent, and accurate knowledge about prostate cancer and its screening to the study participants.
- Implementation of the program was carried out in the conference room of each faculty.

- Lectures, group discussions were used as a teaching methods.
- Power point presentation, pictures, videos, booklet and brochure were used as teaching aids.
- Booklet was designed by the researcher and given to the employees to use them as a source of information in the future.
- The fieldwork of this study was done in 4 months starting from the beginning of November (2020) to the end of February (2021).

IV) Evaluation phase

- This phase aimed to evaluate the effectiveness of the educational program on employees' knowledge and commitment. The evaluation was conducted three times as follow:
- **First time (pretest):** before introducing prostate cancer screening education program for the employees using tools (I and II) to test their baseline data and practices of prostate cancer screening for early detection of prostate cancer.
- **Second time (immediate posttest):** Immediately after implementation of the education program using tools (I part II and tool II**)**.
- **Third time:** After one month of implementation of the education program using tools (I part II and tool II**)**.

6- Statistical analysis

- The collected data were organized, tabulated and statistically analyzed using SPSS software statistical computer package version 26. For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, the comparison was done using the Chi-square test (χ^2). For comparison between means of two variables in a group, paired-samples t-test was used. For comparison between means for variables during three periods of intervention in a group, or for more than two variables, the F-value of analysis of variance (ANOVA) was calculated. Correlation between variables was evaluated using Pearson and Spearman's correlation coefficient r. A significance was adopted at P<0.05 for interpretation of results of tests of significance. Also, highly significance was adopted at P<0.01 for interpretation of results of tests of significance [17].

Results

Table (I): represents the distribution of the studied employees according to their total knowledge about prostate cancer and its screening tests pre- and post- educational program. It illustrates that there were statistically significant differences related to knowledge levels of the studied employees regarding prostate cancer and its screening tests before, immediately, and after a month of implementing the educational program (P<0.001).

Table (2): represents the distribution of the studied employees according to their commitment regarding to prostate cancer screening. It shows that, there was a significant improvement in the commitment of the studied employees specifically related previous screening prostate cancer, type of screening tests conducted before, last screening, reasons for getting screened, and Intention to have a regular prostate cancer screening. The differences observed among pre, immediate and post educational intervention in relation to the studied employees' commitment in all previous mentioned items was statistically significant (P<0.001).

Table (3): represents the distribution of the studied employees according to their total commitment level regarding prostate cancer screening. It illustrates that there was a statistically significant difference related commitment levels of the studied employees regarding prostate cancer screening before, immediately and after a month of implementing the educational program (P<0.001).

Table (4): represents the relation between the mean score of commitment of studied employees and their socio-demographic characteristics. This table illustrated that there was a statistically significant relationship between the commitment of studied employees regarding prostate cancer screening and their income before, immediately, and after a month of implementing educational program. There was a statistically significant relationship between the commitment of studied employees regarding prostate cancer screening and their residence before and immediately after implementing the educational program.

Table (5): represents the correlation between studied employees' knowledge score and their commitment to prostate cancer screening tests pre and post-educational program. This table showed that there was a statistically significant positive correlations between the total knowledge of the studied employees and their total commitment to prostate cancer screening tests before, immediately, and after one month

of implementing educational program (P<0.05) respectively.

Table I: Distribution of the studied employees according to their total knowledge about prostate cancer and its screening tests throughout periods of study

Total knowledge level	The studied employees (n=80)						χ^2 P
	Pre		Immediately		Post 1 month		
	N	%	N	%	N	%	
Knowledge about prostate cancer							
▪ Low	74	92.5	2	2.5	9	11.3	**19.53**
▪ Moderate	6	7.5	4	5.0	18	22.5	**<0.001****
▪ High	0	0.0	74	92.5	53	66.3	
Range	**(0-6)**		**(5-9)**		**(3-9)**		**F=23.80**
Mean ± SD	**2.69±0.39**		**7.90±1.01**		**7.10±1.45**		**P=<0.001****
Knowledge about prostate cancer screening tests							
▪ Low	61	76.2	0	0.0	4	5.0	**75.32**
▪ Moderate	13	16.3	3	3.8	18	22.5	**<0.001****
▪ High	6	7.5	77	96.2	58	72.5	
Range	**(4-13)**		**(11-16)**		**(8-16)**		**F=49.13**
Mean ± SD	**7.90±1.29**		**14.10±1.37**		**12.52±1.73**		**P=<0.001****
Total knowledge level							
▪ Low	69	86.2	0	0.0	2	2.5	**19.86**
▪ Moderate	10	12.5	2	2.5	23	28.7	**<0.001****
▪ High	1	1.3	78	97.5	55	68.8	
Range	**(4-19)**		**(18-25)**		**(14-24)**		**F=47.73**
Mean ± SD	**10.59±1.59**		**22.00±1.65**		**19.62±2.37**		**P=<0.001****

** Highly significant at level P<0.001

Table 2: Distribution of the studied employees according to their commitment regarding to prostate cancer screening throughout periods of study

Commitment items	The studied employees (n=80)						χ^2 P
	Pre		Immediately		Post 1 month		
	N	%	N	%	N	%	
Previous Screening for prostate cancer							
No	56	70	56	70	30	37.5	**21.42**
Yes	24	30	24	30	50	62.5	**<0.001****
# Type of screening tests performed							
Prostate Specific Antigen (PSA)	11	44.0	11	44.0	37	74.0	
Digital Rectal Examination (DRE)	23	92.0	23	92.0	49	98.0	**15.26**
Prostate biopsy	2	8.0	2	8.0	3	6.0	**0.04***
Don't Remember	1	4.0	1	4.0	1	2.0	
Last screening							
A month ago	0	0.0	0	0.0	26	52.0	**36.98**
> 6 months	24	100.0	24	100.0	24	48.0	**<0.001****
# Reasons for getting screened							
Doctor Recommendation	0	0.0	0	0.0	10	20.0	
A routine examination	9	36.0	9	36.0	13	26.0	**16.01**
Worried about prostate cancer	16	64.0	16	64.0	23	46.0	**<0.001****
Symptoms emergence such difficulty urinating	20	80.0	20	80.0	24	48.0	
Prostate cancer in a family member/friend	1	4.0	1	4.0	1	2.0	
Result of screening							
Negative	24	100.0	24	100.0	44	88.0	**6.38**
Conducting another test to confirm first one.	0	0.0	0	0.0	6	12.0	**0.041***
# Reasons for not being screened							
Afraid of doing	19	33.9	6	10.7	10	33.3	
Very uncomfortable and embarrassing	18	32.1	7	12.5	15	50.0	
Don't know where to do	45	80.4	26	46.4	9	30.0	**21.45**
Don't know it and its importance	39	69.6	24	42.9	10	33.3	**<0.001****
Expensive	27	48.2	21	37.5	18	60.0	
Don't have time to perform	18	32.1	18	32.1	20	66.7	
Having medical checkup when feel any problem in genitourinary system							
No	56	70.0	56	70.0	30	37.5	**21.42**
Yes	24	30.0	24	30.0	50	62.5	**<0.001****
Intention to have a regular prostate cancer screening							
No	56	70.0	12	15.0	7	8.8	**84.59**
Yes	24	30.0	68	85.0	73	91.3	**<0.001****

More than one answer was chosen *Significant at level P<0.05

**Highly significant at level P<0.001

*Significant at level P<0.05

Table 3: Distribution of the studied employees according to their total commitment level regarding prostate cancer screening throughout periods of study

Total commitment level	The studied employees (n=80)						χ^2 P
	Pre		Immediately		Post 1 month		
	N	%	N	%	N	%	
▪ Low	55	68.8	55	68.8	30	37.5	**23.72**
▪ Moderate	1	1.3	1	1.3	0	0.0	**<0.001****
▪ High	24	30.0	24	30.0	50	62.5	
Range	**(0-7)**		**(0-7)**		**(0-7)**		**F=11.47**
Mean ± SD	**2.16±0.235**		**2.71±0.882**		**4.34±1.824**		**P=<0.001****

***** Significant at level P<0.05
** Highly significant at level P<0.001

Table 4: Relation between mean score of commitment of studied employees and their socio-demographic characteristics

Characteristics	The studied employees (n=80) Total commitment score		
	Pre	Immediately	Post 1 Month
Age (in years)			
▪ 40-	1.08±0.63	1.77±0.35	4.08±1.90
▪ 45-	1.86±0.09	2.41±0.77	3.59±0.90
▪ 50-	**3.18±1.66**	**3.73±1.13**	**5.55±1.30**
▪ ≥ 55	2.59±0.45	3.07±0.09	4.78±0.79
F , P	1.10 , 0.36	1.17 , 0.33	1.65 , 0.19
Educational level			
▪ Secondary	**2.33±0.33**	**2.88±0.95**	4.40±0.86
▪ High education and more	1.94±0.13	2.47±0.81	**4.41±0.76**
t , P	0.79 , 0.46	0.92 , 0.40	0.54 , 0.59
Marital status			
▪ Married	**2.31±0.29**	**2.84±0.93**	**4.44±0.81**
▪ Not married	0.00±0.00	2.00±0.00	1.53±0.72
t , P	0.79 , 0.50	0.81 , 0.49	1.30 , 0.28
Residence			
▪ Rural	**2.77±3.46**	**3.29±3.05**	**4.69±2.76**
▪ Urban	1.25±2.66	1.84±2.41	3.81±2.88
t , P	**4.43 , 0.04***	**5.10 , 0.03***	1.86 , 0.18
Income			
▪ Just enough	**3.26±0.50**	**3.70±0.10**	**4.87±1.77**
▪ Enough to be spared	0.00±0.00	0.50±0.71	3.50±0.54
▪ Not enough and borrow	0.00±0.00	0.80±0.41	3.28±0.69
F , P	**11.53 , <0.01****	**11.67 , <0.01****	**2.91 , 0.06***

* Significant at level P<0.05
** Highly significant at level P<0.01

Table 5: Correlation between studied employees' knowledge score and their commitment to prostate cancer screening tests throughout periods of study

	Total knowledge level					
	Pre		Immediately		Post 1 month	
	r	P	r	P	R	P
Total commitment level	**0.404**	**<0.01****	**0.268**	**0.016***	**0.357**	**0.031***

r: Pearson correlation' coefficient
* Significant at level P<0.05
** Highly significant at level P<0.01

Discussion

Prostate cancer is one of the major health problems in developing countries. It has a large impact on the quality of patient's life and their caregivers and imposes heavy costs on them. The disease is the second most common cancer and the second leading cause of cancer death among the world's male population. The high incidence of prostate cancer is important in the middle-aged and elderly. Prostate cancer doesn't cause symptoms in the early stage. When the symptoms appear; usually it has already run its course. So, understanding of the disease and its screening continue to be important areas for discussion among the men population for early detection of the disease [18].

Studies have found that a lack of knowledge about the disease and its screening tests serves as a barrier to effective cancer prevention and control [19, 20]. Dissemination of information via education programs about prostate cancer and its screening through different community settings can promote active engagement and commitment of men with screening [21].

As regard to the total level of knowledge, the results of the present study illustrated that there was a significant improvement in the total knowledge score of the studied employees throughout the study phases, where the mean scores of their knowledge increased from 10.59 ± 1.59 in pre-program intervention to 22.00 ± 4.1.65 immediate post-intervention and to 19.62 ± 2.37 one-month post-intervention (p<0.001). The majority of the studied employees had low knowledge scores about prostate cancer and its screening in pre-program intervention. Meanwhile, immediately after the program implementation, most of studied employees had a high level of knowledge while more than two-thirds of them retained a high level of knowledge one month after the program implementation **(Table I)**. This is in accordance with **Saleh et al. (2020)** [22] who conducted a study to assess prostate cancer-based interventions' efficacy on knowledge and adherence intention to a healthy lifestyle among men in Jordan and found that there was a significant improvement in the total knowledge score from pre-program to the post-program at (p<0.001), where the mean scores of their knowledge increased from 5.08±2.99 in pre-program to 8.7±2.422 post-program.

Also, this result is in agreement with **Awosan et al. (2018)** [23] who conducted a study to assess Knowledge of prostate cancer and screening practices among men in Sokoto, Nigeria and **Molazem et al. (2018)** [24] who conducted a study to determinate the effect of an educational program for prostate cancer prevention on knowledge and prostate-specific antigen (PSA) testing in men over 50 years old in community areas of Shiraz and reported that 64% of participants had poor knowledge about prostate cancer and its screening. This may be due to a lack of health education programs about prostate cancer and its screening and may be due to the lower level of education as three-quarters of the studied employees had a secondary degree of education.

Prostate cancer screening can aid in the identification of the disease at an early stage, and permit more effective treatment, all of which will increase survival rates, reduce risk of

death, and reduce the cost of care. It is believed that more than 69% of prostate cancer deaths could be prevented during the first five years through proper screening. Therefore, increasing knowledge about prostate cancer screening through educational program enhance commitment of men with prostate cancer screening tests [25].

In the context, , the present study revealed that, less than three quarters of studied employees mentioned that they didn't perform previous screening tests for prostate cancer or had medical checkup or have the intention to have a regular prostate cancer screening pre-program implementation **(Table 2)**. From the researcher point of view, these results explained as that participant were not aware of the screening methods and the time to do it as indicated by their total knowledge score. There are no schedules as to when men should go for prostate cancer screening like other cancers such as breast and cervical cancer, hence a very low screening uptake. This results are supported by **Nakwafila et al (2017)** [16] who conducted a study to examine knowledge and attitudes towards prostate cancer screening amongst men in Oshana region, Namibia who found that (41%) of participants had undergone prostate cancer screening tests. Also, **Gift et al. (2020)** [26] who conducted a study to assess knowledge, practice and attitude towards prostate cancer screening among male patients aged 40 years and above at Kitwe Teaching Hospital, Zambia. They found that only 13% of the participants were screened for prostate cancer in the last 2 years. From the researcher point of view, these results explained as that participant were not aware of the screening methods and the time to do it as indicated by their total knowledge score. There are no schedules as to when men should go for prostate cancer screening like other cancers such as breast and cervical cancer, hence a very low screening uptake.

Additionally, the present study is congruent with **Kinyao et al. (2018)** [27] who conducted a study to examine attitude, perceived risk and intention to screen for prostate cancer by adult men in Kenya and reported that about 50% of the participant didn't have the intention to have regular screening. From the researcher point of view, the low intention among studied employees may be due to their ignorance of seriousness of prostate cancer and perceived barriers such as cost and fear of screening. This implies that more effort needs to be made to increase awareness of prostate cancer magnitude and reduce its screening barriers.

Regarding the type of screening tests performed previously for most of the employees it was DRE which was done more than six months before the program by all the screened employees **(Table 2)**. This result is in agreement with **Gift et al. (2020)** [26] who found that (76.9%) of the previously screened participants mentioned that DRE was performed as a method of screening in the last 2 years. This result indicate that DRE is used in a wide scale as a diagnostic test for prostate problems.

Active recommendation to screen from health care providers, persuasion from their close social networks, and exposure to personal experience of cancer supported men's acceptance and willingness to undergo prostate cancer screening. Further, men believed that early detection could improve chances of survival, which was also a strong motivator to commit with screening tests [28]. Concerning to the reason for getting screened, the most common cause was the emergence of symptoms followed by worried about prostate cancer and all of them had negative results **(Table 2)**. This result is congruent with **Mbugua et al. (2021)** [19] who conducted a study to explore the barriers and facilitators to the uptake of prostate cancer screening among men aged 40–69 years in a rural community in Kenya and found that most of the participants reported that experience of symptoms, worried about prostate cancer were the main motivators for their prostate cancer screening.

Commitment of men with prostate cancer screening is highly dependent on their knowledge about PC and the benefits of early detection. However, some men refused or delayed prostate cancer screening because of many reasons. The most prominent reason is lacking of knowledge about the existence of prostate cancer screening facilities, as when and where to go for screening and fear of a diagnosis of PC. Also, the cost, low perception of self-vulnerability and sociocultural value regarding masculinity are other barriers hinder the commitment with prostate cancer screening. Therefore, cultural factors must be taken into account when counseling and educating men regarding prostate cancer screening. Also, male clinicians and male nurses should be involved in educational session for provision of culturally

acceptable screening services; hence raise commitment of men [18, 29].

Concerning the most obvious reason for not being screened in this study was ignorance of where to do (80.4%), don't know the screening and its importance (69.6%) and the expensiveness of screening tests (48.2%) **(Table 2)**.This result is in disagreement with **Awosan et al. (2018)** [23] who conducted a study to assess Knowledge of prostate cancer and screening practices among men in Sokoto, Nigeria and found that cost of screening and no health insurance cover were the main barriers mentioned by 80% of the respondents. Meanwhile, **Wachira (2018)** [30] who conducted a study to assess the knowledge, perception and uptake of prostate cancer screening among men attending Mathare North health center in Kenya, found that (64%) of respondents don't know the screening and its importance and were not aware of the existence of prostate cancer screening services. This result may be due to low levels of awareness and accessibility to screening services.

Concerning the total commitment score of the studied employees, pre and immediately post-intervention, more than two-thirds of the studied employees had a low level of commitment to prostate cancer screening tests. While slightly less than two-thirds of them reported a high level of commitment one month after the program implementation **(Table 3)**. This result is similar to the result of **Zare et al. (2016)** [31] who conducted a study to investigate the effect of Health Belief Model (HBM)-based education on knowledge and prostate cancer screening behaviors and found that the rate of participation in prostate cancer screening in the intervention group increased from 7.5% to 24% and 43.3% one month and three months after the intervention, respectively.

The present study also demonstrated that there was a significant improvement of the total commitment score of studied employees pre, immediate and one month post-program intervention, where the mean scores of their commitment increased from (2.16±0.235) pre-program intervention to (2.71±0.882) immediately post-intervention and (4.34±1.824) one month post- intervention. This difference was statistically significant ($P<0.001$) **(Table 3)**. This result is in agreement with **Jeihooni et al. (2019)** [18] who conducted a study to evaluate the effect of educational program based on PRECEDE model in promoting prostate cancer screening in a sample of Iranian men and reported that there was a significant improvement of the score of prostate cancer screening behavior of the experimental group 6 months after the intervention compared to pre-intervention. This indicates the great impact of knowledge about prostate cancer and its screening on the studied employees' commitment; hence, the effectiveness of the educational program.

Concerning the relation between the commitment of studied employees and their socio-demographic characteristics**.** This study revealed that employees whose aged 50 years, who are married, who live in rural resident and whose income is just enough more committed to prostate cancer screening than the others pre and one month post educational program implementation **(Table 4)**. This result is similar to **Ojewola et al. (2017)** [32] who found that men whose aged 51-60 and married more committed to prostate cancer screening. This may be due to the increase perceived susceptibility of studied employees to prostate cancer as men who perceive themselves at risk are more likely to commit screening. On the other hands, this result is in contrast with **Mbugua et al. (2020)** [33] who conducted a study to determine the intra- personal factors influencing uptake of prostate cancer screening among men aged 40-69 years in Kenya and found that participants who had high income are more committed with prostate cancer screening. This difference may be due to economic limitations of the rural communities and indicate to more efforts should be considered the provision of affordable or free screening services to men considered to be at risk of prostate cancer to enhance the commitment to prostate cancer screening.

Regarding the educational level, the studied employees who had a secondary education were more committed than the others pre-educational program. While highly educated employees committed to prostate cancer screening than the others one month post educational program **(Table 5)**. This result is congruent with **Mbugua et al. (2020)** [33] who found that participants who had secondary education were more compliance with prostate cancer screening than the others. This may be explained as the working place in the medical field of medical campus' faculties, enabling them with medical knowledge.

Regarding the correlation between studied employees' knowledge and their commitment to prostate cancer screening tests pre and post-educational program. The result of present study showed that there was statistically significant positive correlations between the total knowledge of the studied employees and their total commitment with prostate cancer screening tests before, immediately, and after one month of implementing the educational program (P<0.001) **(Table 5)**. This result is supported by **Tobias-Machado et al. (2013)** [34] who conducted a study in Brazil to assess the association between literacy, compliance with prostate cancer screening, and cancer aggressiveness and found that there were statistically significant positive correlations between literacy of the participants and their compliance with prostate cancer screening. This may be due to increase knowledge of studied employees about the risks and seriousness of prostate cancer leading to an increase in their commitment to its screening. This may reflect that the men who have poor knowledge about prostate cancer screening are at higher risk of being diagnosed with more advanced and aggressive prostate cancer due to poor commitment to screening recommendations and follow-up.

Also, this result is in the same line with **Rezaei et al. (2020)** [35] Who conducted a study in Tehran to determine the effect of educational program based on the theory of planned behavior on prostate cancer screening and found that there were statistically significant positive correlations between knowledge of the participants and their commitment to prostate cancer screening before and after 2 months of the educational program. This may be due to increase knowledge of studied employees about the risks and seriousness of prostate cancer leading to an increase in their commitment to its screening. This may show that low commitment to prostate cancer screening has been associated with poor knowledge about prostate cancer and the screening methods. Hence, leading to late diagnosis and increased prostate cancer mortality and morbidity.

Finally, Continuous effort should be made to increase studied employees' knowledge and commitment to prostate cancer screening. This can be achieved through the organization and implementation of the health education programs in hospitals, in out-patient clinics, and the public in the community. Raising awareness about prostate cancer screening can prevent and early detect the occurrence of new prostate cancer cases, prevent its serious consequences and as a result of that, the quality of life and productivity of the men population are improved.

Conclusion

Based on the findings of the current study, it was concluded that the educational program was effective and improve knowledge and commitment of the studied employees with prostate cancer screening. There was a significant improvement of the total level of knowledge related to prostate cancer and the total level of knowledge related to prostate cancer screening immediately and post one month after educational program implementation compared to pre implementation of the educational program as indicated by their mean score of knowledge. Also, there was a significant improvement in the total level of commitment with prostate cancer screening post one month after the educational program implementation than pre implementation of the educational program.

Recommendations

Based on the results of the present study the following recommendations were suggested:

1. An ongoing effort should be undertaken to raise awareness of the significance of prostate cancer and to eliminate screening barriers.
2. Health care professionals should devote more time and effort to educating and advising males about the nature of prostate cancer, its risks, importance, screening and early detection procedures, and tools.
3. The program might be established as part of a routine to test males in their forties and fifties who are at risk of getting prostate cancer.
4. Intervention actions aimed at increasing knowledge screening services, as well as ensuring screening services are widely available, must be stepped up.
5. Further research is necessary to measure the effect after the application of the prostate cancer educational program.

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Fostering Nursing Students' Academic Motivation and perceived learning in Psychiatric Nursing: The power of simulation based learning program

Samar Mabrook Elnehrawy [1], Shreen Mohamed Abo Elyazeed [2,] Souzan Abd Elmenem Abd Elghafar Harfush [3]

[1] Lecturer of psychiatric &Mental Health Nursing, Faculty of Nursing, Tanta University.

[2,3] Assistant professor of psychiatric &Mental Health Nursing, Faculty of Nursing, Tanta University.

Corresponding Author: Samar Mabrook Elnehrawy

Email : samar.mabrook@yahoo.com

Abstract

Background: Simulation is a good fit in a practice profession such as nursing. It provides virtual clinical experiences and environments rich in diversity and exposure, yet safe for experimentation and learning for mental health nursing students.**Aim of the study** : the aim of this study was to evaluate the effect of simulation on nursing Students' academic motivation and perceived learning in psychiatric nursing. **Setting:** The study was conducted at the Faculty of Nursing - Tanta University that is affiliated to the Ministry of Higher Education. **Subjects:**The study subjects were composed of all nursing students (250 students), enrolled in the psychiatric nursing course, during the first and second semester of the fourth academic year (2020-2021) at faculty of Nursing -Tanta University. The students were divided into two main groups; experimental group (150 students) and control group (100 students). **Design** a quasi-experimental design was utilized. **Tools: three tools were used;** perceived learning scale, a manual of academic motivation questionnaire, and simulation evaluation questionnaire. **Results**: there was a statistical significant improvement in the nursing student's academic motivation and perceived learning in the experimental group after simulation based learning program**. Conclusion:** clinical simulation has a salient effect on improving the students' academic motivation and perceived learning in psychiatric nursing. **Recommendation:** Variables such as students' online class interaction, their motivation to participate in the online class, course structure, and instructor facilitation and knowledge are important determinants of perceived student learning and motivation.

Key words: clinical simulation, perceived learning, academic motivation, psychiatric nursing, undergraduate nursing students

Introduction

Using of varied technology is currently more common in higher education. The mixed-reality experiences or simulations are seen as a way to provide learners with highly interactive, engaging, and multi-sensory learning experiences that support students through an experiential learning approach, besides providing an exciting and accessible form of learning environment can develop sense of confidence and motivation [1, 2]. However, due to the impact of COVID-19 pandemic, many of health educational institutions have moved the majority of their face-to-face classes to an online modality[3]. Consequently, examining ways in which online instruction can be used effectively has become a matter of significance for institutions who are interested in finding ways to enhance online learning through the use of varied forms of technology[4].

Teaching psychiatric and mental health nursing content to undergraduate students can be challenging because of fear of patients, anxiety, limitedunderstanding of mental illness, and stigma related to mental illness [5-8]**.** Therefore, psychiatric nursing has a low profile among undergraduate nursing students and has been one of the least desirable career choices in the field[9,10]. This lack of interest in mental health nursing has been attributed to anxiety related to working with patients with mental illness and feeling insufficiently prepared to perform this type of clinical work [11,12].

Simulation is a technique or device that attempts to create characteristics of the real-world situation[13]**.** Simulation-based education (SBE) refers to education programs and approaches allows the educator to control the learning environment through scheduling of practice, providing feedback, and minimizing or introducing environmental distractions [14, 15].

It has been used by nursing education for many purposes, including decreasing medication errors [16], building teamwork and communication skills among nurses staff [17], overcoming education challenges and increasing

patient safety [18], and helping students build collaboration [19]. Simulations additionally assist instructors in ensuring that students are prepared for similar situations in their careers [20, 21].

Simulations for psychiatry and mental health learning offer an opportunity for students to practice their nursing skills in a controlled environment. Specifically, psychiatry and mental health simulations are shown to be viable and effective practical learning mechanisms to enhance therapeutic communication skills, critical thinking, self-confidence, and risk assessment. In terms of mental health simulation, the most important learning objectives are for students to identify clinical symptoms and learn how to manage problematic symptoms of mentally ill patients. These symptoms are mostly subtle and demand careful observation of patients' facial expressions, speech, and behavior[11].

Using simulation in learning of psychiatric nursing enhances student motivation to progress in learning process. Motivation plays an important role in student achievement [22]. It is seen in the studies on motivation that it is one of the most important factors affecting learning [23,24,25] .It determines the initiation, direction, density, permanence and quality of behavior, especially goal-oriented behaviors [26].Academic motivation which especially represents individual motivation towards academic activities is closely related to the self-efficacy beliefs that students have about themselves [27], and a factor that affects student performance positively[28,29] tried to define academic motivation by listing the important features of individuals with high academic motivation as being enthusiastic about learning, enjoying learning-related activities, and beliefs about school. On the other hand, academic motivation is also defined as the enthusiasm of a student about participating in classes and learning activities, and the extent of attention and effort the student puts into different engagements [30]. Academic motivation plays an important role not only in the environments of face-to-face education but also online learning environments which center on the student.

Perceived learning is most utilized in education and distance education programs and it is a valid measure of the achievement of learning[31- 34]. **Stein and Wheaton (2002)** stated that perceived learning may be a better indicator of achievement than course achievements or final grades[35]. Perceived learning is the body beliefs and feelings related to current learning. Therefore it is a retrospective evaluation of the learning experience[36]. Students in class discussions and other related processes as well as the learning have an impact on perceived learning. Therefore, perceived learning should be used in distance education instead of test scores or the general point of achievement. Active students in discussions, interacting with the instructor and an effective design in online learning environments affect perceived learning positively [37].

Perceived learning is strongly associated with academic motivation and otherwise the academic motivations of online learning students play a role in their perceived learning [31]. **In a study by Wu and Hiltz (2004),Woolfolk (2000)** stated that motivation impacts the information acquired during the learning process and motivation is impacted by the prior knowledge and readiness for learning as well as its conditions[33,38]. Therefore perception of learning and motivation toward learning are important determents of academic achievement in educational process. Using simulation in educational practice offers alternatives tool for improving nurse student's perception toward their clinical experiences and increase their motivation to acquire new skills.

Aim of the study

The aim of this study was to evaluate the effect of simulation based learning program on nursing students' academic motivation and perceived learning in psychiatric nursing.

Research hypothesis

- Nursing students who learn through simulation based education program will expected to improve their academic motivation and their perceived learning psychiatric nursing.
- Study group who learn through simulation based education program expected to their academic motivation and perceived learning than control group who learn by traditional way.

Subjects and method

Design

A quasi experimental design was utilized in this study.

Setting

The study was conducted at the Faculty of Nursing-Tanta University that is affiliated to the Ministry of Higher Education.

Subjects

The study subjects were composed of all nursing students (250 students), enrolled in the psychiatric nursing course, during the first semester of the fourth academic year (2020-2021) at faculty of Nursing -Tanta University. The students were divided by using sampling random design into two main groups; experimental group (150 students) and control group (100 students).

Tools

Three tools were used to collect data of the present study.

Tool one: structure questionnaire for cognitive, affective, and psychomotor perception of learning: this tool was divided into two parts.

Part (1): socio-demographic data and past experiences of used new technology

It was developed by researchers to elicit information about sex, age, address, prior experiences about using of computer or smartphone. It was consisted of five items.

Part (2): cognitive, affective, and psychomotor (CAP) perceived learning scale This scale was developed by **Rovai AP et al (2009)**[39] to measure learning in the cognitive, affective, and psychomotor domains. This scale was used in the present study to measure students' learning perception before and after simulation based educational program. CAP scale consisted of nine (9) items divided on three subscales" cognitive (items1, 2, &5), affect (items 4, 6, &9), and psychomotor (items 3, 7, & 8). CAP scale has seven likert scale from zero (not at all) to 6 (very much) except items (2& 7) are reversed score. The total score was ranged from zero to 54, and score of each subscale was ranges from zero to 21. The higher score means higher perception of learning.

The level of learning perception was determined by the following scoring system:

<50% from total score means poor perception, 50- 75% refer to fair level of perception,>75 % good perception.

Tool two: A manual for the use of the motivationl straigies for learning questionnaire (MSLQ) : this tool developed by **Pintrich PR et al (1991)**[40], it is self- report questionnaire, was designed to measure academic motivation of university students, MSLQ was divided into two parts : motivations and learning strategies questionnaires. The present study used only the first part "motivational questionnaire, this part was consisted of 31 items on six subscales to measure six domains of motivations:

1- Intrinsic goal orientation (items; 1,16,22, 24)
2- Extrinsic goal orientation (items 7,11,13,30)
3- Task value (items 4, 10 ,17, 23, 26, 27)
4- Control of learning beliefs (items 2,9, 18, 25)
5- Self -efficacy for learning and performance (items 5, 6, 12, 20, 20, 21, 29, 31)
6- Test anxiety (items 3, 8, 14, 19, 28)

The items of MSLQ was rating on a seven point likert scale from (1) not at all true to(7) very true for me . The total score ranged from 31 to 217, the higher score of all items of MSLQ or eachsubscales means higher motivation of learning. The levels of learning motivation was determined by the following: <50% of total score means lower level of motivation, 50 % to 75% referred to moderate level of motivation,>75 % from total score donated to higher level of motivation.

Tool (3): Evaluation of simulation- based learning program (SBLP) questionnaire: It was developed by researchers and guided by the **Kidd. LI (2012)**[41]**.** This questionnaire was designed to evaluate the **SBLP** after implementation thoroughly study group. It consists of two parts:

Part one: educational effectiveness

This part involves items related the effectiveness of learning by applying **SBLP.** It consists of 11 items rating on six likert scale ranging from 1(not at all effective) to 6 (very effective), for example " To what extent, this program helping you for understanding psychiatric symptoms" . The total score ranged from 11 to 66. The higher score indicates effective education.

Part two: difficulties in technology

This part was used for assessing student's perceiving for degree of difficulties that experienced during application of **SBLP**, such as create a username and password, save the interaction, Log in and out of simulation session, download and uploading the videos or homework…..etc. The questionnaire was consisted 11 items rating on four likert scale ranging from 1 indicating no difficulties to 4 denoting very difficulties. The total score ranged from 11 to 44, the higher sore indicates very difficulties that faced by nursing students.

The scoring systems was determined by the following:

Obtained <50% from total score mean lower level, 50 % to 75% referred to moderate level, >75 % from total score donated to higher level.

Method

Administrative design

An official permission was obtained, to conduct the study, from head of department of Psychiatric Mental Health Nursing, and the Dean of Faculty of Nursing Tanta University after clarifying the purpose of the study.

Ethical consideration

- The study protocol approved by ethical committee in the Faculty of Nursing, Tanta University
- Informed consent was obtained from the participants after explanation of the purpose of the study.
- The participants was reassured about the confidentiality and the privacy of their obtained information.
- Respecting the right of the participants to withdraw at any time during the data collection period.
- Study subjects were informed that their evaluation of their academic clinical course was not affected by their participation in the present study.

The content of **The SBLP** was available for all students in of the fourth academic year (2020-2021) after final the data collection, and ending the present study. This was done for giving all students equal opportunities for benefits from those materials, and have the equal chances for improve learning achievement.

Preparation of tools

The study tools were translated into Arabic language, and the socio-demographic data sheet and tool three was developed by researchers. The tools were tested for internal validity by a jury composed of five experts in psychiatric nursing field.

Tools of the study were tested for reliability by testing them on10% of total numbers of nurses and Re-testing them by us Cronbach's alpha test (0.785, 0.64 and 0.881 respectively).

Pilot study: It was carried out on 20 students, they were selected randomly from list of students name who were enrolled in first academic year in the previously mentioned setting, the pilot study was done to ascertain clarity and applicability of the study tool one, and to identify obstacles that were faced during actual data collection. Accordingly, it was found that few words were difficult and confused, these words were modified. Following the pilot study, the tools were revised, reconstructed, and ready for use in the actual study.

The study tools were created on online questionnaire by using Google form, and accesses at

https://docs.google.com/forms/d/1Bxi46Dod5ZoK_CArveZSGiJTY_rojXY2-De_WyUf0cs/prefill

Actual Study

Initially, all participants (study and control group) sent an email link online questionnaire to complete the study tools before implemented the program, and the data was statically analyzed before applied the simulation program.

I-Designing and development phase

The design phase involve planning and structure of the simulation program, choosing the contents based on reviewing of related literature, results from the study tools before the simulation program and the past routinely questionnaire that applied yearly by faculty of nursing to measure students' evaluation about psychiatric nursing course, the researchers selected the common topics that carried false beliefs and misconceptions such as schizophrenia, ECT , seclusion and restrain of psychiatric patients, psychotropic drugs and most common disorder among youth people such as eating disorders, anxiety disorders.

The SBLP was designed according to Bloom's taxonomy, that following the cognitive, affective and psychomotor domains. The cognitive domain is related to knowledge, comprehension, application, analysis and evaluation of knowledge; the affective domain relates to feelings and attitude, concerning how students receive, respond, value a fact or phenomenon; and the psychomotor domain refers to capabilities and specific physical abilities, as well as the transformation of theory into practice using mechanisms of perception, response, and performance. Based on these three main domains, the learning objectives, method of teaching, learning activities that used by lectures and students were determined.

The researchers reviewed many of scientific videos that accessible on internet, through program named by Plotagon story downloaded from Google store. They selected some of them and made modification and redesigned through changing the hero voices and translated English language to Arabic, some scenes were cut and other were shortened, and paste some scenes together, and focused on the scenes that show psychiatric symptoms, additionally making some changes in heros' faces in the story, those modification were applied by using modern smartphone version , furthermore the researchers prepared interesting narrative story for telling before presentation scenes about psychiatric illness.

The maximum duration of each videos' scene was fifteen min except video restated to schizophrenia disorder the researcher guided by film of beautiful mind, and summarized 30 min.

Implementation phase

I-The SBLP for study group

Initially, all participants (study and control group) sent an email link online questionnaire to complete the study tools before implemented the program.

The SBL Pwas applied by using Microsoft office team program,it involved six sessions, two session per week, the duration of each session was one and half hours. The study group was divided into six small subgroups (25 students for each), each subgroup attended as the same time on line classrooms. The volunteers' clinical instructors and lectures were participated in the simulation sessions under supervising and guiding by the researchers. The schedule of learning sessions was short introduction about learning topic, followed by presentation video in form of separated scenes, between scenes, the discussion was simulated by open questions, the students stormed their brain for answering, the reaction and interaction between the lectures and students occurred for reaching to the best answer.

Before each session the students were asked for prepared the followed learning topic by reviewing of literature and prepared short Power Point for presentation, the duties were divided on the students, whereby three or four students were responsible about topic that planned on SBLP. those students given ten minutes for presentation their work, and the audience students encouraged for asked questions for clarification, those was applied before applied implemented designed videos in the planned schedule.

The program involved method of teaching such as: group discussion, brain storming, critical thinking, work group, self- learning, solving problems.

Learning Session of the SBLP was explained in the table (1)

Table (1): the sessions of simulated based educational program

Number of session	Topic	Videos	Learning objectives "cognitive, affect, and behavior domains
First	Introduction about simulation based education program	----------	1- State the purpose of the program. 2- Recognize main leaning topics, number of sessions, and duration of each session. 3-Perform written consent for participation in the program.
second	Schizophrenia	Film of beautiful mind	1- Recognized subtypes of Schizophrenia 2- Differentiate between different types of delusions & hallucination. 3- Discuss the important of trust relationship with psychiatric patients 4- Perform clinical assessment for patient with schizophrenia 5- Determine accurate nursing diagnosis. 6- Perform appropriate nursing intervention
Third	Anxiety disorders , & obsessive compulsive disorders	Four videos about specific phobia , social phobia, panic disorders, and obsessive compulsive disorders	1-Identify the main differential criteria between most types of anxiety disorders. 2- Describe sings & symptoms of anxiety disorders. 3- Demonstrate assessment of patient having OCD.
fourth	Eating disorders	Two videos about bulimia nervosa and Anorexia nervosa	1- - Define anorexia nervosa & bulimia nervosa. 2- Recognize signs & symptoms of anorexia nervosa and bulimia. 3- Demonstrate how to assess patients with eating disorders. 4- Explain treatment modalities to eating disorders. 5- Determine main nursing diagnosis 6- Apply appropriate interventions for patient with eating disorders
Fifth	ECT Electro-convulsive therapy & seclusion and restrain	Two videos about old and recent vision about ECT and videos about seclusion and restrain	1- Recognize the right concept about ECT. 2- Describe how to care of a patient with fits. 3- Demonstrate nursing care for patient undergoing ECT (Before, during, after ECT).
Sixth	Psychotropic medication	four videos about antipsychotic drugs, anti- anxiety drugs , ant convulsive drugs, anti- depressive drugs	1- Revise types of psychotropic drugs. 2- Recall description of the mechanism of action of all of psychotropic drugs. 3- Differentiate between signs & symptoms of extrapyramidal side effects. 4- Demonstrate how to give health education to patients and family about medication compliance

I-The traditional methods of teaching for control group

The control group has traditional method of teaching, where the researchers gave the same content in sex sessions, one hour for each, the researchers explained the same topics to all group in the class room (no=100 nurse students), and using PowerPoint for presentation. The researchers encourage discussion after explanation sub items of each learning topic, and clarified any confusion or misunderstanding..

III- Evaluation phase

At the end of the program the Study tools were sent through Google forms for both study and control groups on the students' Microsoft team official account.

Statistical analysis

The collected data was organized, tabulated, coded and statistically analyzed using the mean, standard deviation standard error, unpaired student t-test, the linear correlation coefficient, Analysis of variance [ANOVA] tests Paired t-test and chi-square by SPSS V19 (Statistical Package for Social Studies) created by IBM, Illinois, Chicago, USA. The level of significance was adopted at $p<0.05$.

Results

Table (1) shows the distribution of the studied subjects regarding their socio-demographic data. No statistically significant difference was found in relation to all socio-demographic data. The absence of any statistically significant difference between the studied groups can reflect that both groups were almost matched.

Figure (1) presents the comparison between the control and experimental group regarding their perceived learning before and after simulation based learning program. Before the simulation based learning program there is no statistical significant difference between the experimental and control group($\mathbf{X^2}$= 0.004 P=0.998). After the simulation based learning program the percentage of the studied students in the experimental group who had weak perceived learning dropped to 54.67% comparing to 45.33% in the control group. Likewise 13.33% had high level of perceived learning compared to only 4.67% in the control group with statistically significant difference between them ($\mathbf{X^2}$=68.008 P=0.001).

Figure (2) presents the comparison between the control and experimental group regarding their academic motivation before and after simulation based learning program. Before the simulation based learning program there is no statistical significant difference between the experimental and control group($\mathbf{X^2}$= 0.768 P=0.529). After the simulation based learning program the percentage of the studied students in the experimental group who had weak level of academic motivation dropped to 20% comparing to 29.33% in the control group . Likewise 46.67% had high level of academic motivation compared to only 13.33% in the control group with statistically significant difference between them ($\mathbf{X^2}$= 27.391 P=0.001).

Table (2) represents the mean score of academic motivation dimensions between experimental and control groups before and after the simulation based learning program. There is no statistically significant difference between control and experimental group regarding all academic motivation subscales and total mean score before the simulation based learning program. While after ,it can be noticed that there is a statistically significant improvement in the experimental group regarding total academic motivation mean score and all subscales namely ;Extrinsic goal orientation, Task value, Control of learning, Self- efficacy, Test anxiety **except** the dimension of intrinsic good of orientation ($p = 0.294$)

Table (3) illustrates the mean score of perceived learning subscales between experimental and control group before and after the simulation based learning program. There is no statistically significant difference between control and experimental groups regarding all perceived learning subscales and total mean score before the simulation based learning program. While after , it can be noticed that there is a statistically significant improvement in the experimental group regarding total perceived learning mean score and all subscales namely;cognitive learning, affective

learning and psychomotor learning (p = 0.001 for all)

Table (4) shows the total mean score of the student's perceived self-learning in the experimental and control group before and after the simulation based learning program. It can noticed that the mean score of perceived learning in the experimental group increased from 15.740 ± 2.470 pre intervention to 38.407±3.118post intervention with a statistically significant difference (p= 0.001) .For the control group there is a slightly statistically significant difference pre and post intervention (15.970 ± 2.067 and 18.080 ± 2.394 respectively)p= 0.0418

Table (5) shows the Total mean score of the student's academic motivation in the experimental and control group before and after the simulation based learning program. It be can noticed that the mean score of academic motivation in the experimental group increased from 147.053 ± 33.983 pre intervention to 174.947 ± 28.492 post intervention with a statistically significant difference (p= 0.001) .For the control group there is no statistically significant difference pre and post intervention (147.830 ± 39.266 and 141.960 ± 38.269 respectively) p =0.302

Figure (3) illustrates the student's evaluation of simulation in experimental group after the simulation based learning program. Regarding the student's perception about the effectiveness of education with simulation it noticed that half of the students (50%) reported that the simulation is effective in education and 36.67% reported it is highly effective and only (13.33%) reported it is week. There is a statistical significant difference in the students responses($\mathbf{X^2}$ = 31.00 p= <0.001). As regards the student's perception about the difficulties in using technology in simulation education it can observed that more than half of the students (52.67 %) reported there is no difficulties in using technology in simulation education while (26.67%) reported high difficulties and only (20.67%) reported average difficulties . There is a statistical significant difference in the students responses($\mathbf{X^2}$ = 26.040p= <0.001).

Table (6) illustrates the correlation between perceived learning and academic motivation in the experimental group after the simulation based learning program. There is a statistical significant correlation between academic motivation and all perceived learning subscales and total. It means improved motivation leads to improvement in cognitive, affective, psychomotor and total perceivedlearning (p=0.001).

Table (1) Distribution of the studied subjects in relation to their socio-demographic characteristics

Demographic and clinical characteristics	Groups		Chi-square	
	Control (100)	Experimental (150)		
	%	%	X^2	P-value
Age				
19-22	56.00	61.3	0.705	0.401
23-25	44.00	38.7		
Sex				
Female	62.00	56.7	0.708	0.389
Male	38.00	43.3		
Residence				
Urban	48.00	56.67	1.479	0.224
Rural	52.00	43.33		
Prior computer simulation experience:				
Yes	38.00	43.30	0.502	0.478
No	62.00	56.70		
What computer did you use to access simulation in this course?				
Home computer	75.00	76.67	0.023	0.879
Sipper	25.00	23.33		

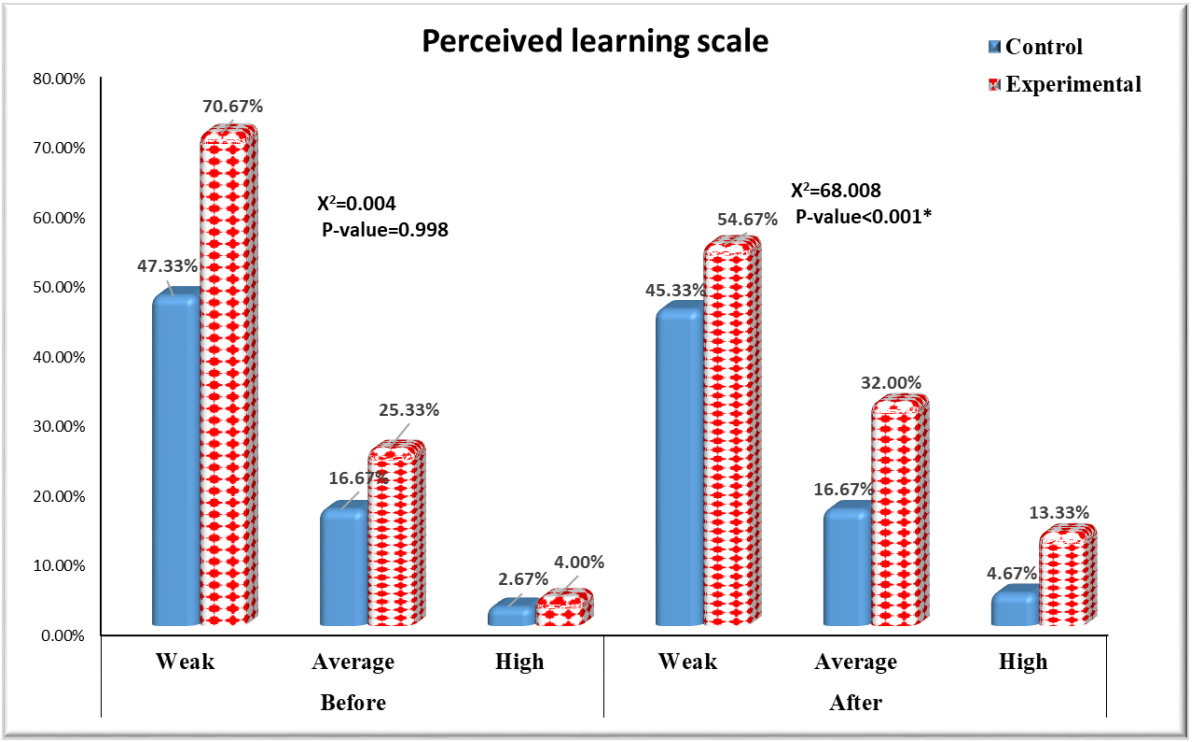

Figure (1) comparison between the control and experimental group regarding their perceived learning before and after simulation based learning program.

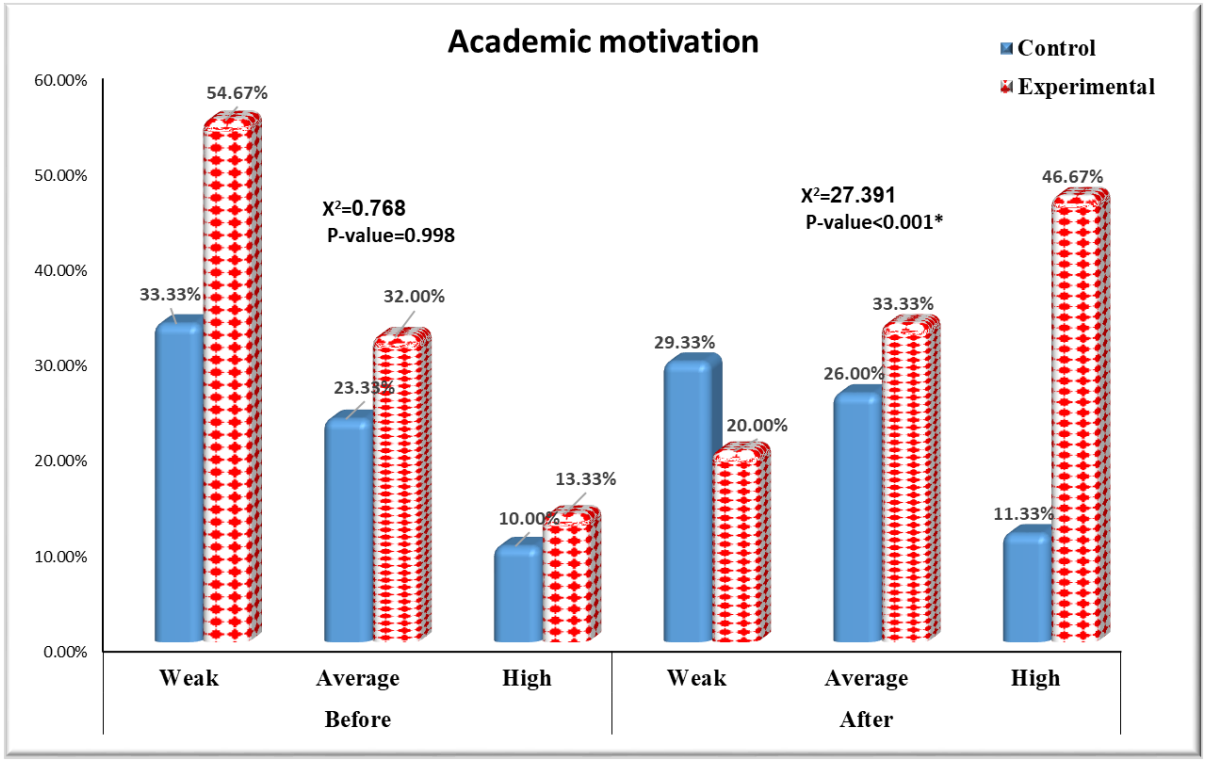

Figure (2) comparison between the control and experimental group regarding their academic motivation before and after simulation based learning program

Table (2): Mean scores' differences of academic motivation dimensions between experimental and control groups before and after the simulation based learning program

Academic motivation Scale	Before			After		
	Control	Experimental	t- test P value	Control	Experimental	t- test P value
	Mean score +SD	Mean score +SD		Mean score +SD	Mean score +SD	
I-subscale Intrinsic good of orientation	19.060 ±7.166	20.920±4.244	0.975 0.330	20.920 ±4.244	21.480 ±4.043	-1.052 0.294
Extrinsic goal orientation	21.470 ±6.702	21.253 ±6.670	0.251 0.802	29.240 ±10.401	23.093 ±3.924	-4.187 0.000*
Task value	30.240±10.384	31.227 ±8.592	-0.818 0.414	29.240±10.401	35.087±5.112	-5.902 0.000*
Control of learning	19.060 ±5.486	18.893 ±5.412	0.237 0.813	18.360 ±5.530	22.253±3.285	-6.976 0.000*
Self-efficacy	37.660±11.505	37.013 ±9.827	0.476 0.635	35.720 ±11.046	44.640±9.837	-6.684 0.000*
Test anxiety	20.340 ±6.631	20.487 ±5.996	-0.182 0.856	20.620 ±5.619	28.773 ±4.591	-12.565 0.000*
II-Total	147.830±39.266	147.053±33.983	0.166 0.868	141.960±38.269	174.947±28.492	7.803<0.001*

Table (3): Mean score of perceived learning subscales between experimental and control group before and after the simulation based learning program

Perceived learning scale	Before			After		
	Control	Experimental	t- test P value	Control	Experimental	t- test P value
	Mean score +SD	Mean score +SD		Mean score +SD	Mean score +SD	
Cognitive learning	5.860+1.271	6.660 +1.315	-1.775 0.115	6.500+1.322	7.800 +1.248	-7.880 <0.001*
Affective learning	5.050+0.783	6.107 +1.199	-1.972 0.092	6.030+1.159	7.940+1.238	-12.256 <0.001*
Psychomotor learning	5.060+1.127	6.000 +1.405	-1.597 0.248	6.150+1.250	7.667+1.379	-8.839 <0.001*
Total perceived learning	15.970±2.394	15.7402±.470	$X^{2=}$1.905 P=0.0597	18.080±2.394	38.407±3.118	$X^{2=}$60.664 P=<0.001*

Table (4)Total mean score of the student's perceived self-learning in the experimental and control groups before and after the simulation based learning program

Perceived self-learning		Control group	Experimental group
Before	Range	12 - 21	10 - 23
	Mean ± SD	15.970 ± 2.067	15.740 ± 2.470
After	Range	11 - 23	24 - 42
	Mean ± SD	18.080 ± 2.394	38.407 ± 3.118
Difference	Mean ± SD	-0.110 ± 3.038	19.667 ± 4.015
Percent of change		0.689	144.007
Paired T-test	T	-0.362	-59.999
	P-value	0.0418*	<0.001*

Table (5) Total means score of the student's academic motivation in the experimental and control group before and after the simulation based learning program

Academic motivation		Control group	Experimental group
Before	Range	61 - 211	61 - 211
	Mean±SD	147.830 ± 39.266	147.053 ± 33.983
After	Range	61 - 194	91 - 217
	Mean±SD	141.960 ± 38.269	174.947 ± 28.492
Difference	Mean±SD	5.870 ± 56.523	27.893 ± 41.643
Percent of change		-3.971	18.968
Paired T-test	T	1.039	-8.204
	P-value	0.302	<0.001*

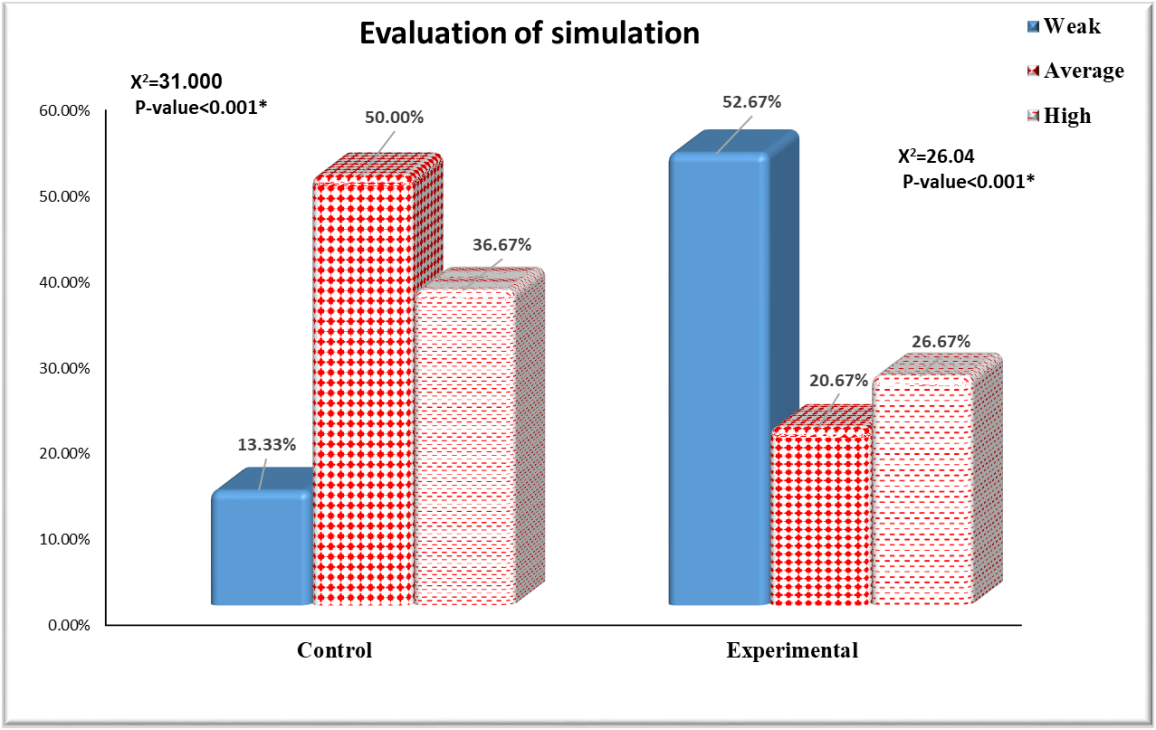

Figure (3) the student's evaluation of simulation in experimental group after the simulation based learning program

Table (6) correlation between perceived learning and academic motivation in the experimental group after the simulation based learning program

Perceived learning scale	**Academic motivation**	
	R	**P value**
Cognitive learning	0.842	<0.001*
Affective learning	0.738	<0.001*
Psychomotor learning	0.772	<0.001*
Tot al perceived learning	0.763	<0.001*

Discussion

The use of simulation in mental health education specifically has revealed overall promising findings. In health care education, Simulation refers to activities that mimic the reality of a clinical environment and that are designed for use in demonstrating procedures and promoting decision making and critical thinking.[42, 43]. Nursing students often express uncertainty about clinical placement in a mental health care setting. Simulation may provide an opportunity for students to explore clinical situations in mental health nursing before their clinical placement, thereby increasing the students' perceived learning and motivation in mental health nursing is mandatory.

Results of the present study showed that there was a statistical significant improvement in the student's perceived learning in the experimental group after clinical simulation. This may be attributed to several explanations; **firstly** the nursing students engaged positively in the sessions because the educational environment offer a diversity of learning opportunities that foster their engagement and learning. Supporting this explanation a study by **Reinke (2019)** concluded that students' perceptions of the classroom environment have been shown to influence their learning behaviors and the learning outcomes[44]. Similarly, **Konold et al (2018)**; **Hudson and Carrasco (2015)** reported that school climate that sustain key features of creativity, collaboration, active learning, and integrative thinking are associated with higher student learning outcomes[45,46].

Secondly, during the simulation videos, students are forced to confront specific problems that they must overcome during session. Students accordingly have to develop deep learning rather than just surface learning [47, 48]. Surface-learning students who just memorize information have difficulty solving the hard problems of the game; it is necessary to analyze information by "linking it to already known concepts and principles, and leads to long-term retention of concepts (i.e. longer memory) so that they can be used for problem-solving in unfamiliar contexts" [48]. Simulation-based learning can be an effective learning environment for increasing students' levels of deep learning, by critical thinking, problem-solving, decision-making, knowledge transfer and meta-analytic skills [49, 50, 51].

Thirdly; clinical simulations may prepare undergraduate nursing students for the clinical realities of mental health nursing by reducing levels of anxiety and fear consequently, their confidence and understanding of mental health nursing are boosted. **Finally;** the videos about the psychiatric disorders that created by the researcher with the program of Plotagon story provided students with an overview of the clinical context and challenges of daily life on a psychiatric ward. The nursing students in this study stated that these videos helped them to make the mental health clinical more clear and predictable and give them insight into the professional work that nurses do, thereby providing a good idea of what is expected when dealing with psychiatric patients. This also may reinforce their belief in themselves regarding their capability to meet the demands of the mental health clinical. All of these can contribute to enhance their perceived learning of mental health nursing.

These assumptions aresupported by recent research w hich suggested that simulations may enhance student learning by increasing satisfaction and confidence[52, 53, 54]. Additionally **Verkuyl et al (2017)** conducted a study on Canadian nursing students' experiences of using virtual gaming simulation to perform mental health and interpersonal violence assessments[55]. Students reported that virtual gaming simulation allowed them to learn and apply new knowledge while practicing assessment skills in a safe and realistic environment. Moreover, recent reviews of simulations with as preparation for mental health clinical placements have indicated that simulations may contribute to reducing anxiety levels, reducing/eliminating assumptions, thus increasing students' levels of self-confidence, self-awareness, and understanding of mental health nursing[5 , 56] . Furthermore, **Kunst et al., (2017**) concluding that students who participated in simulations in mental health nursing experienced significantly increased confidence, knowledge, and ability in mental health care[57].

There was also a statistical significant improvement in psychomotor, affective and cognitive learning subscales in the experimental group after the clinical simulation. Again, simulation entails the creation of a situation in the classroom that enables the participant to act naturally, therefore replicating an environment as close to the practice setting as possible in order to facilitate skills development. The students highlighted that the simulated experience provided both a safe and realistic environment in

which to learn. They had the freedom to manage situations independently, to not worry about making mistakes and to receive constructive feedback from lecturer immediately and correct them is conceptions. **Stroup (2014)** concluded that simulation is "effective in pointing out deficits in learning and facilitating the transfer of theoretical knowledge to clinical settings[58]. Furthermore, simulation can also aid in the development of metacognition, support self-regulation, and promote self-efficacy for students when delivered in a student-centered framework. Metacognition enables understanding, analysis, and regulation of one's cognition when engaged in learning. In the same direction several studies have shown that simulation supports psychomotor skill development and knowledge acquisition in nursing students [59,60,61].An increasing body of evidence justifies replacing clinical experience with simulation due to its effectiveness in developing clinical competency in students.

According to the current study results, there was a statistical significant improvement in the student's academic motivation in the experimental group after clinical simulation. Simulations are seen as a way to provide learners with highly interactive, engaging, and multi-sensory learning experiences that motivate the students. Literature shows that simulation training is a source of motivation on three crucial and closely linked points. Firstly, simulation training promotes learners' self-confidence , **Codeço et al. (2020),** found that simulation may reinforce the mastery of technical gestures and competences, and hence increase students' self-confidence. Secondly, simulation training promotes the feeling of competence[62]. **Kukko et al. (2020)** indicated that through simulation training, students become aware of their strengths and weaknesses, which increases their sense of competence[63]. After having experienced simulation training, students feel better trained [62]. Thirdly, simulation training may promote the sense of autonomy. Learners placed in the position of decision-makers increase their feeling of autonomy [64] and have a more active and more motivating learning experience. The theory of self-efficacy explains the linkage between the feelings of self-confidence, competence, and autonomy. Self-confidence increases the feeling of competence: the more self-confident learners are, the more they feel competent. A competent player sees it as legitimate to play a role in decision-making. Self-confidence thus promotes autonomy. In that sense, the interaction between the feelings of self-confidence, competence and autonomy is per se a source of motivation.

Consistent with this finding a study conducted by **Laroudie (2021)** concluded that Simulation training assigns the students an active role which is intended to strengthen their motivation[65].Additionally, **Burguillo, (2010)** found that simulation enhance student motivation, including competence, interest or curiosity, and efforts[66]. Moreover, **Vos Meijden Denessen (2011**) found that the students who learned in the simulation-based learning environment demonstrated statistically significantly higher levels of intrinsic motivation than those who learned in a traditional school environment[48].

There is also a statistical significant correlation between academic motivation and perceived learning. Motivation, as the name suggests, is what 'moves' us. It is the reason to do anything at all. Learning is self-initiated, but it must be aided by motives so that the learner will persist in the learning activity. A definite motive is valuable in all subjects, as motives make for readiness. The greater the readiness, the greater will be the attention given to the subjects on hand and the sooner will the desired result be achieved. Motivation of learning activities helps the students to concentrate on what he is doing, and thereby to gain satisfaction. Continuous motivation is needed to help learners concentrate on the lessons to be learned. In the same line, a study conducted by **Bolliger, Supanakorn, and Boggs (2010)** stated that motivation is an important factor to keep students satisfied in an online classroom setup[66]. Besides, students with high motivation will be more successful in the online learning environment than students with low motivation [67, 68, 69].

Regarding the student's perception about the effectiveness of education with simulation it was noticed that more than half of the students reported that the simulation is effective in education. similarly a study by **Kidd and colleagues (2012a**) in the United States measured the effectiveness of virtual simulation with 126 nursing students stated that students perceived virtual simulation to be a moderately effective tool for undergraduate mental health education[41].

Conclusion

The data obtained from current study confirmed that clinical simulation has a salient effect on improving the students' academic motivation and perceived learning in psychiatric nursing and those improved their education and prepared for qualified psychiatric nurses.

Recommendation

Based on the findings of the present study the following recommendation was suggested:

1- Educational staff should interested with students' perception and motivation toward learning especially in field of psychiatric nursing education
2- Studies should be directed toward used simulation by new technology in psychiatric education such as artificial intelligence and virtual reality.
3- self- learning and motivation in learning methods are important requirement for improved students' psychiatric nursing practices.

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Effect of Talent Management Training Program for Nursing Managers on Nurses Work Effectiveness

[1]Nadia Mohamed Ali Saleh, , [2]Nashwa Mahmoud Eldeep
[1]Assistant Professor of Nursing Administration, Faculty of Nursing, Sohag University
[2] Lecturer of Nursing Administration, Faculty of Nursing, Damanhour University
Corresponding author email: nadiasaleh15@yahoo.com
Phone number: 01091717835

Abstract

Background: On today´s competitive market, talent management is the basic driving force for the organization to be successful in the face of globalization; organizations are concerned with how to design the talent management strategy that fits the national context. **The study aimed to** evaluate the effect of a designed program of talent management for nursing managers on nurse's work effectiveness. **Subjects and Method: Research design**: A–Quasi-experimental design was used in the study. **Setting**: The study conducted at Sohag University Hospital which provides a health service at Upper Egypt. **Subjects:** Convenient sample consisted of (25) nursing managers and (235) nurses supervised by nursing managers under the current study. **Tools**: three tools were used: 1) Demographic data sheet 2) talent management questionnaire, and 3) Work effectiveness questionnaire. **Results:** About 72% of nursing managers had low level of talent management skill pre intervention, while 64% had high level post intervention and 60% of them had high level with follow up. About 72% of nurses had low level of work effectiveness pre intervention; while 68% had high level post intervention and 64.60% of them had high level with follow up. **Conclusion:** There are a highly statistically significant differences and positive correlation between all domains of talent management and work effectiveness at post intervention ($p<0.01$**). **Recommendations**: Improve the efficiency of nursing managers to ulilize available talents and experiences, and use different talent management strategies to retain competent employees

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Key Words: Nursing, Nurse Managers, Staff nurse, Talent management, Work effectiveness

Introduction

On today´s competitive market, talent management is the basic driving force for the organization to be successful in the face of globalization; organizations are concerned with how to design the talent management strategy that fits the national context [(1)] Creating the right employee experience is the key to good retention – a necessity for sustainable business and this is where the importance of talent management comes into play. Therefore, organizations are competing against each other to acquire and retain talents in order to maintain their operations and continue to grow [(2)].

Talent Management is not based only on improving the organization capability and flexibility, but this will provide tools and information about the organization growth, managing change, acquiring resources, and novel ideas to develop new services and products[(3)]. Talent management defined as the combination of various processes programs and cultural norms in order to attract develop, deploy and retain talent so that organization can achieve strategic objectives and meet future work needs [(4)]. Talent management is a set of practices that are implemented in organizations and refers to how organizations attract, select, develop and manage employees in an integrated and strategic way [(5)].

There are many benefits of talent management such as it is easier to deploy the right person in the right job with the help of a proper plan, it helps to take better professional decisions as when come to know who high potential employees are and can invest in their professional development by creating learning opportunities for them, and greatly affects organizational culture, how organization works and the status of the employees in it[(6)]. The key components of talent management which will tell us how to go about the process and which when implemented strategically, can give out the best results: knowing goal; attracting the right talent; retaining talent; performance management and development; and motivation[(7)].

To attract and retain top talent, today's companies are committing themselves to making fundamental changes to their performance management systems. Organizations realize that employee evaluation programs need to be adaptable to organization's unique culture, data-driven to provide key insights about people's performance, and their work effectiveness and based on a single interface to provide managers with the big picture about how their team members are doing – and feeling [(8)].

Studies have shown that the demand for talented employments in the coming years is going to increase, while the supply will drop. There is no doubt that technology and globalization have changed our lives, as they have led to increased competition on talent [(9)]. Thus, the potential growth of organizations worldwide depends on the ability of organizations to ensure that the right people with the right skills are in the right place at the right time, and focused on the right activities. For these reasons, talent management has been elevated to the top of strategic human resources management challenges, acquiring the highest priority across all organizations [(10)].

Effectiveness is defined as the degree to which something is successful in producing a desired result. An effective worker doesn't just attempt to complete their tasks as quickly as possible but works to come up with inventive solutions to problems and continually improve their performance to achieve the best results [(11)]. There are many elements for work effectiveness as; achieves results; communicates effectively; dependability / attendance; job / organizational knowledge; makes effective decisions; planning /organization; problem solving/judgment; productivity; takes responsibility [(12)].

Employee satisfaction and motivation towards achieving efficiency and effectiveness at work refer to the employee's prospects for the organization and the extent of giving him the opportunity to develop his talent and adhere to it and his approaches towards his service. Organizational work action effectiveness refers to setting goals and achieving them proficiently in a lively and vibrant environment [(13)]. The skills can develop in order to become more effective at work, and strategies and resources that can use to increase your effectiveness by; identify priorities; adopt a good attitude; and build essential skills as, time management and productivity, communication skills, stress management, and career development and learning [(14)].

The success of any organization depends strongly on having talented individuals. Talent management promotes workforce efficiency and productivity in work organization [(15)]. Recent trends in human resource management are continuously triggering the performance of the workforce as well as the production of the organizations. Organization performance is the organizations ability to attain its goals by using resources in an efficient and effective manner and the ability of organization to achieve its goals and objective. Talent management needs to be seen as essential for achieving the organization's goals and objectives and lead to high work effectiveness if its mange properly in a comprehensive way [(16)].

Significance of the study

Today's workers also think differently about work. One survey found that 87% of millennials rank career development and personal growth as the key criteria for staying at a job. Most astoundingly, people are job hopping like never before, only staying an average of 1.8 years at the biggest tech companies [(17)]. The field of talent management is lacking hard academic research to establish what constitutes effective talent management and how it can influence organization performance [(18)]. Also, most of talent management studies reviewed did not directly link talent management with the work effectiveness and therefore, there is a need to fill the existing research gap.

Talent management training program can benefit mainly the nurse mangers` abilities. This can be achieved through realization of the reasons for failure to attract and retain talented staff. Ultimately, corrective actions are taken after some of the policies that contribute to low morale of staff are eliminated, hence improve their services which eventually lead to improved work effectiveness [(19)].

Aim

Study aims to: evaluate the effect of a designed program about talent management for nursing managers on nurses' work effectiveness.

Specific Objectives

- Assess the nursing managers talent management level through program phases.
- Assess the nurses work effectiveness through program phases
- Evaluate the effect of talent management training program for nursing managers on nurse's work effectiveness.

Study hypothesis

There is an effect of talent management program for nursing managers on nurses' work effectiveness

Subjects and Methods

Design

A–Quasi-experimental design used in the study.

Setting

The study was conducted at medical units that include (general medical, tropical, coronary care, dermatology, intermediate care, neurological, cardiac catheter, and chest and dialysis units), surgical units that include (general surgical, vascular surgical, plastic surgical and urological surgical units) and general intensive care unit at Sohag University Hospital.

Subject

Convenient sample consisted of (25) nursing managers and (235) all nueses supervised by nursing managers under the current study.

Tools of data collections

Three tools used in the present study as following:

1. **Demographic data** for nursing managers and nurses to collect data about age, gender, year of experiences, marital state and attained previous program about talent management.
2. **Talent Management Questionnaire** which modified by the researchers based on the related literature [20]. It consisted of 31 items; classified into three dimensions used to measure talent management skills for nursing managers as following: Talent Attraction (10 items); Talent Development (10 items); and Talent Retention (11 items). Respond to all items with five points Likert Scale ranged from; Never satisfied = 1, to highly satisfied = 5.
   Scoring system participant responses distributed as follow: less than (50%) indicate low talent management skill; from (50 -70%) indicate moderate talent management skill, and (more than 70%) indicate high talent management skill.
3. **Work Effectiveness Questionnaire;** which modified by the researchers based on the related literature [21,11]. It consisted of 54 items. Classified into nine dimensions used to measure work effectiveness as follows: Achieves (6 items); Communicates effectively (9 items); Dependability/Attendance (5 items); Job/Organizational Knowledge (4 items); Makes Effective Decisions (6 items); Planning/Organization (5 items); Problem Solving/Judgment (9 items); Productivity (5 items); and Takes Responsibility (5 items). Respond to all items with five points Likert Scale ranged from strongly disagree = 1, to strongly agree = 5.
   Scoring system participant responses distributed as follow: less than (50%) indicate low work effectiveness; from (50 -70%) indicate moderate work effectiveness and ((more than 70%) indicate high work effectiveness.

Method

An official permission was obtained from the Directors of Sohag University Hospital and Nursing Director to conduct study.

Operational Design

A) Preparatory Phase

After reviewing the available literature concerning to the study topic, prepares, and translates the study tools. The draft of the questionnaire reviewed for face validity by taking experts opinions through a jury comprised by five experts in nursing administration from faculties of nursing, and accordingly the necessary modification done. This period of process was about three months from June 2019 to August 2019.

The educational program was developed at this phase and included aim and objectives of the training, concept of talent management and work effectiveness, definitions, importance and strategies of talent management.

B) Pilot Study

A pilot study was conducted to explore any obstacles or problems that may be encountered during data collection phase. It helps also in estimating time needed to fill the questionnaires form. It was carried out on 10% of nursing managers and nurses. The participants chosen for the pilot study were included in the study sample. The total period for collection of data in the pilot study takes about 10 days.

C) Reliability: was ensured by measuring internal consistency using Cronbach's Alpha Coefficients methods for the tools of the present study, it's were 0.86 for all statements of talent management questionnaire and 0.88 for all statements work effectiveness questionnaire.

D) Filed Work: Implementation of the training program: The data was collected by the researchers and the questionnaire sheets of talent management and job effectiveness were distributed to nursing managers and nurses as (pretest) before starting the program at morning shifts, then post immediately and 3 months after the program. Each nursing managers and nurses needed from 10 - 15 minutes to complete each sheet.

The program was implemented two times for two groups of nursing managers according to the working place of each group. The total time allocated for achieving the whole program to each group was 12 hours through two days (3 session's × 2hours for every day), one group per week. Each group was (12-13) nursing managers.

Different teaching and learning methods were used during the sessions which included; interactive lecture, group discussion, demonstration, brain storming, and work in small groups.

The program started at the mid of September 2021 and finished at the beginning of October 2021. **Follow up** phase started from mid of December 2021 with the first group who received the program was at mid-September 2021 to the end of December 20121 with the last group who received the program at the end of September 2021. The researchers contacted with them at their work place.

Ethical Consideration

An approval to conduct the proposed study was obtained from the Research and Ethics Committees at Faculty of Nursing, Sohag University. Also an official permission was obtained from Hospital Administrators and nursing managers. Each participant was informed about the nature and purpose of the study. The investigator emphasized that, participations in the study have completely voluntary and participants can withdraw from the study at any time, confidentiality and anonymity was assured through coding the data.

Statistical Analysis

Data collected from the studied sample was revised, coded, and entered using Personal Computer (PC). Computerized data entry and statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) version 22. Data were presented using descriptive statistics in the form of mean and S.D. The Wilcoxon test is a nonparametric test designed to evaluate the difference between two/three conditions where the samples are correlated. The test statistic Pearson's correlation coefficient assesses the statistical link, or association, between two continuous variables. No significant p value >0.05, Slight significant p value <0.05 High significant p value <0.01.

Results

As shown in **table (1)**, this study is conducted on 260 subjects. They are divided into two groups, (235) nurses and (25) nursing managers. Regarding their characteristics, the mean value (±SD) of age in the nurses is 26.27±4.03 years. While in the nursing managers are 31.76±3.99 years. More than two thirds of the nurses (65.95%) are females, whilst more than half of the nursing managers (52%) are males. The mean value of experience years in the nurses is 5.71±1.64 years, but it is 8.08±1.90 years in the nursing managers. More than half of the nurses (54.04%) are graduated from technical health institute however most of nursing managers (92%) have bachelor of nursing. No one in both groups attends training course previously.

Table (2) illustrates the talent management of the studied nursing managers. There is a highly statistically significant difference ($p<0.01^{**}$) between all domains as regard their pre, post and follow up of talent management. Regarding pre talent attraction, almost three quarters of them (72%) are low level; more than two thirds of them (64%) are high level with post and more than half

of them (56%) are high level with follow up. While 64% of them are low level as regards pre talent development but (72%) of them are high level with post and 68% of them are high level with follow up. As well pre talent retention, 76% of them are low level however (56%) are high level with post and (52%) are high level with follow up.

Figure (1) shows total talent management of the studied nursing managers. Almost three quarters of them (72%) have low level of talent management skill regards pre talent management, while more than two thirds of them (64%) have high level regards post talent management and, almost two thirds of them (60%) have high level regards follow up. A highly statistically significant differences (Wilcoxon test=24.908, p<0.01**) exists between the studied nursing managers regarding their pre, post and follow up and total talent management.

Table (3) reveals the work effectiveness of the studied nurses. There is a highly statistically significant difference (p<0.01**) between all domains as regards pre, post and follow up work effectiveness. Regarding pre achieves, more than two thirds of them (68.08%) are low level, while (67.23%) of them are high level with post, and (64.25%) of them are high level with follow up. As well communicating effectively, (67.65%) of them are low level with pre, (68.08%) of them are high level with post whilst (63.4%) of them are high level with follow up. As regard dependability/attendance, (68.93%) of them are low level with pre; almost three quarters of them (74.9%) of them are high level with post however (71.06%) of them are high with follow up. In addition job/organizational knowledge, (68.08%) of them are low with pre however (70.21%) of them are high with post and (68.51%) of them are high with follow up. Regarding making effective decisions, (67.23%) of them are low with pre, (72.34%) of them are high with post whilst (69.8%) of them are high with follow up. As regard planning/organization, (66.4%) of them are low with pre, (71.06%) are high with post but (68.08%) of them are high with follow up. As well problem solving/judgment, (67.23%) of them are low with pre, (71.91%) of them are high with post and (68.93%) of them are high with follow up. Moreover productivity, (68.93%) of them are low level with pre intervention, (72.8%) of them are high level with post intervention whilst (69.8%) of them are high level with follow up. And so taking responsibility, (70.21%) of them are low level with pre intervention, (72.8%) are high level with post intervention, but (65.10%) of them are high level with follow up.

Figure (2) represents total work effectiveness of the studied nurses. More than two thirds of them (72%) have low level of work effectiveness regards pre intervention, while more than two thirds of them (68%) have high regards post intervention and about two thirds of them (64.60%) have high level regards follow up. A highly statistically significant differences (Wilcoxon test=23.600, p<0.01**) found between the studied nurses regarding their pre, post and follow up for total work effectiveness.

Table (4) represents a highly statistically significant differences and positive correlation between talent development and talent attraction (r=0.711, p<0.01**). Also between talent retention and talent attraction (r=0.650, p<0.01**). And so between talent retention and talent development (r=0.789, p<0.01**).

As shown in **table (5),** there is a highly statistically significant differences and positive correlation (p<0.01**) between all domains as regard work effectiveness at post intervention except in Problem Solving/Judgment domain that there is a statistically significant difference and positive correlation with all other domains (p<0.05*).

Table (1): Distribution of studied participants according to demographic data (Nurses = 235 and nursing managers = 25)

Demographic data	Nurses (235)		Nursing managers (25)	
	No	%	No	%
Age				
21 – <30	187	79.6	10	40
30 - 40	40	17.0	14	56
> 40	2	0.85	1	4
Mean SD	**26.27±4.03**		**31.76±3.99**	
Gender				
Male	80	34.04	13	52
Female	155	65.95	12	48
Marital status				
Married	144	61.27	19	76
Not married	91	38.7	6	24
Experience				
1 - <5	127	54.04	0	0
5 – 10	74	31.5	21	84
>10	34	14.5	4	16
Mean SD	**5.71±1.64**		**8.08±1.90**	
Education level				
Diplome of nursing	58	24.7	0	0
Technical health institute	127	54.04	0	0
Bachelor of nursing	50	21.3	23	92
Postgraduate	0	0	2	8
Previous training course				
Yes	0	0	0	0
No	235	100	25	100

Table (2): Distribution of studied nursing managers according to their talent management domains (n=25).

Talant management domains	Pre intervention		Post intervention		Follow-up		Wilcoxon test P value
	No	%	No	%	No	%	
Talent Attraction: High Moderate Low	2 5 18	8 20 **72**	16 7 2	**64** 28 8	14 8 3	**56** 32 12	19.086 <0.01**
Mean SD	10.96±2.99		21.33 ± 4.2		18.54 ± 3.1		
Talent Development: High Moderate Low	3 6 16	12 24 64	18 5 2	72 20 8	17 4 4	68 16 16	17.554 <0.01**
Mean SD	10.96±2.99		23.08 ± 3.46		20.18 ± 3.7		
Talent Retention High Moderate Low	1 5 19	4 20 76	14 6 5	56 24 20	13 5 7	52 20 28	14.500 <0.01**
Mean SD	9.32 ± 2.80		19.20 ± 3.6		17.41 ± 2.9		

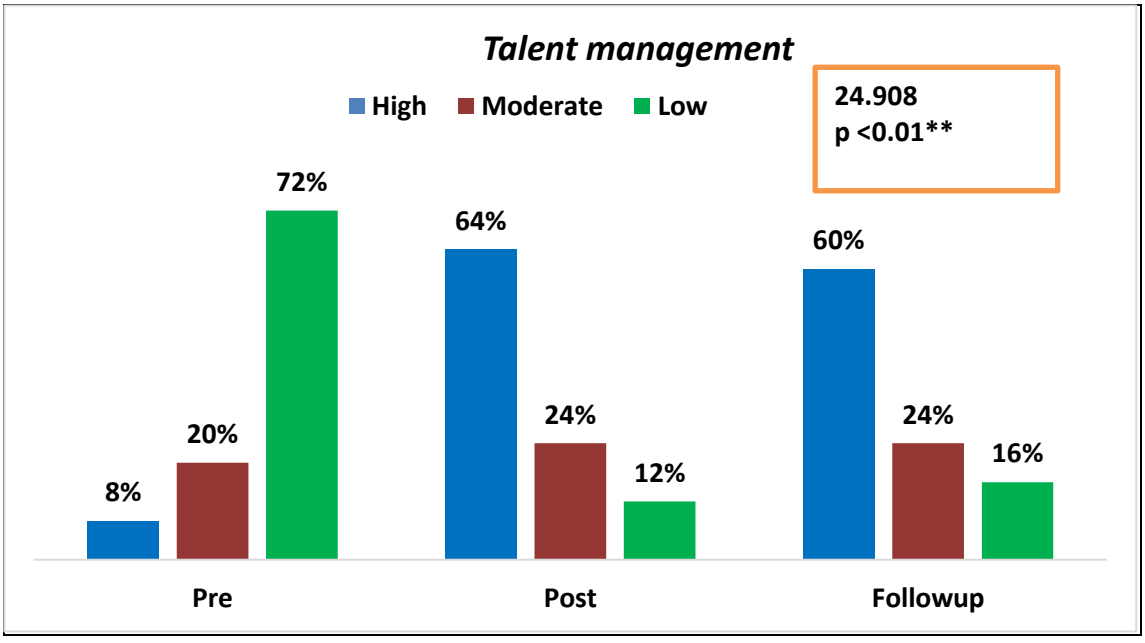

Figure (1): Distribution of studied nursing managers according to their total talent management (n=25)

Table (3): Distribution of studied nurses according to their work effectiveness domains (n=235)

Work effectiveness domains	Pre intervention		Post intervention		Follow-up		Wilcoxon test P value
	No	%	No	%	No	%	
Achieves:							
High	30	12.8	158	67.23	151	64.25	23.090
Moderate	45	19.14	59	25.10	61	25.95	<0.01**
Low	160	68.08	18	7.65	23	9.8	
Mean SD	7.08±2.3		13.18 ± 2.6		12.88±1.98		
Communicates effectively:							
High	36	15.31	160	68.08	149	63.4	19.888
Moderate	40	17.02	60	25.53	67	28.51	<0.01**
Low	159	67.65	15	6.4	19	8.08	
Mean SD	9.36±2.9		17.21 ± 2.7		16.14±1.98		
Dependability/Attendance:							16.042
High	34	14.5	176	74.9	167	71.06	<0.01**
Moderate	39	16.6	49	20.85	54	22.97	
Low	162	68.93	10	4.25	14	5.95	
Mean SD	7.26±1.65		14.87 ± 3.4		13.70±3.08		
Job/Organizational Knowledge:							
High	29	12.34	165	70.21	161	68.51	17.003
Moderate	46	19.6	58	24.7	59	25.10	<0.01**
Low	160	68.08	12	5.10	15	6.4	
Mean SD	6.79 ± 0.99		13.22 ± 3.4		12.70±4.1		
Makes Effective Decisions:							
High	27	11.5	170	72.34	164	69.8	16.555
Moderate	50	21.3	55	23.40	58	24.7	<0.01**
Low	158	67.23	10	4.25	18	7.65	
Mean SD	8.01 ± 1.20		13.34 ± 2.0		12.84±3.2		
Planning/Organization:							
High	33	14.04	167	71.06	160	68.08	21.273
Moderate	40	17.02	53	22.55	56	23.82	<0.01**
Low	156	66.4	15	6.4	19	8.08	
Mean SD	7.26±1.65		14.87 ± 3.4		13.70±3.08		
Problem Solving/Judgment:							
High	32	13.61	169	71.91	162	68.93	19.003
Moderate	45	19.14	54	22.97	58	24.7	<0.01**
Low	158	67.23	12	5.10	15	6.4	
Mean SD	9.17±1.80		17.84 ± 3.5		16.1±2.99		
Productivity:							20.117
High	27	11.5	171	72.8	164	69.8	<0.01**
Moderate	46	19.6	49	20.85	54	22.97	
Low	162	68.93	15	6.4	17	7.23	
Mean SD	6.87 ± 1.43		13.42 ± 3.7		12.60±2.71		
Takes Responsibility:							16.281
High	28	11.91	171	72.8	153	65.10	<0.01**
Moderate	42	17.9	46	19.6	61	25.95	
Low	165	70.21	18	7.65	21	8.93	
Mean SD	6.99 ± 2.03		14.5 ± 3.9		13.99±4.1		

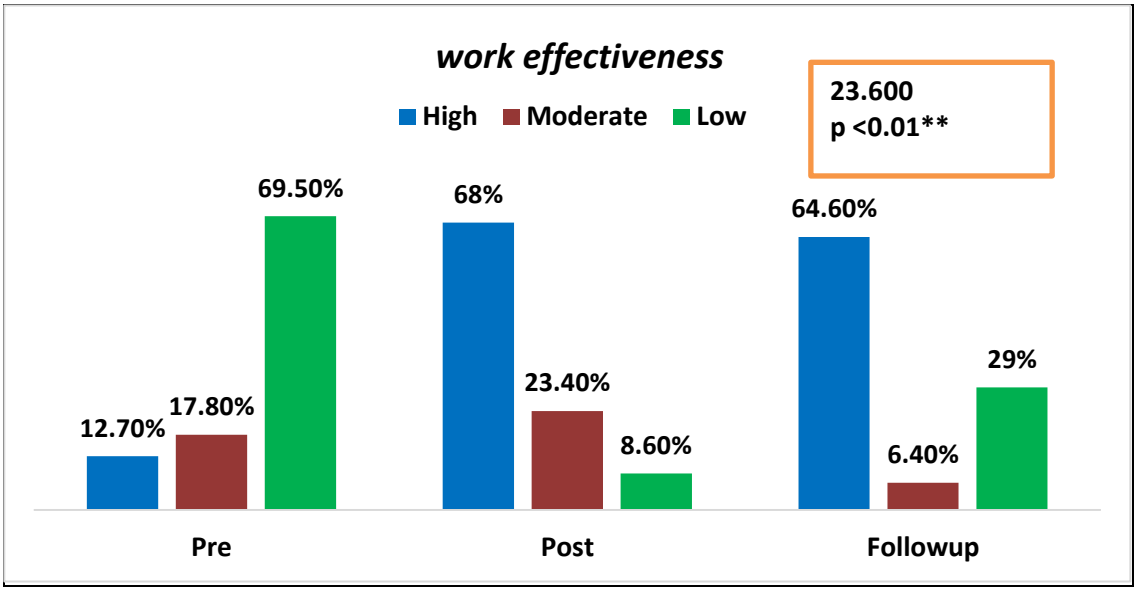

Figure (2): Distribution of studied nurses according to total work effectiveness (n=235)

Table (4): Correlation between domains of talent management scale at postintervention

		Talent Attraction	Talent Development	Talent Retention
Talent Attraction	r. p.		0.711 <0.01**	0.650 <0.01**
Talent Development	r. p.			0.789 <0.01**
Talent Retention	r. p.			

Table (5): Correlation between domains of work effectiveness scale at postintervention (n=235)

Work Effectiveness		Achieves	Communicate effectively	Dependability /Attendance	Job/ organizational Knowledge	Makes Effective Decisions	Planning/ organization	Problem Solving/ Judgment	Productivity	Takes responsibility
Achieves	r. p.		.409 <0.01**	.877 <0.01**	.504 <0.01**	.432 <0.01**	.722 <0.01**	.267 <0.05*	.722 <0.01**	.701 <0.01**
Communicates effectively	r. p.			.577 <0.01**	.667 <0.01**	.711 <0.01**	.609 <0.01**	.255 <0.05*	.733 <0.01**	.564 <0.01**
Dependability /Attendance	r. p.				.500 <0.01**	.614 <0.01**	.810 <0.01**	.301 <0.05*	.650 <0.01**	.634 <0.01**
Job/ Organizational Knowledge	r. p.					.570 <0.01**	.634 <0.01**	.341 <0.05*	.606 <0.01**	.801 <0.01**
Makes Effective Decisions	r. p.						.679 <0.01**	.268 <0.05*	.683 <0.01**	.603 <0.01**
Planning /Organization	r. p.							.200 <0.05*	.541 <0.01**	.731 <0.01**
Problem Solving /Judgment	r. p.								.700 <0.01**	.577 <0.01**
Productivity	r. p.									.496 <0.01**
Takes Responsibility	r. p.									

Discussion

Talent management is a process that includes a complete and interrelated set of organizational activities such as identifying, selecting, developing, and retaining the best employees, as well as building their potential for the most strategic positions and assisting them in applying their strengths to gain their engagement and contribution, which ultimately contribute towards organizational benefits [(22)], so the current study aimed to evaluate the effect of a designed program of talent management for nursing managers on nurses work effectiveness.

Regarding characteristics of studied participants, the mean value (±SD) of age in the nurses is 26.27±4.03 years. While in the nursing managers are 31.76±3.99 years. More than two thirds of the nurses are females, whilst more than half of the nursing managers are males. The mean value of experience years in the nurses is 5.71±1.64 years, but it is 8.08±1.90 years in the nursing managers. More than half of the nurses are graduated from Technical Health Institute however most of nursing managers have Bachelor of Nursing. No one in both nurses and nursing managers attends training course previously. These results attributed to defect at training unit at the hospital and not updated with newly topics and new trends at nursing administration. These results supported with the study by **Elhaddad, Safan, Elshall, (2020)** [(23)] who performed a descriptive correlational research design at Menoufia University Hospital at Shebin-Elkom on 400 nurses and found that more than two-fifths of staff nurses ranged from 25 to less than 35 years old, the majority of them were female, and more than half of them had technical nursing institute. About staff nurses' marital status, the majority of them were married, more than one- fifth of staff nurses had years of experience from five to less than ten years. While disagreement with **Abd Elhamed, Morsy, Mohamed, (2019)** [(24)] which done a descriptive research design on 44 head nurses and showed that the majority of head nurses were female and having 15 years' experience and nearly two thirds of them aged 35 years to less than 45 years old.

Regarding the talent management of the studied nursing managers, almost three quarters of them had low level regards pre talent management, while more than two thirds of them had high level regards post talent management and almost two thirds of them had high level regards follow up. A highly statistically significant difference exists between the studied nursing managers regarding their pre, post and in follow up total talent management. According to the researcher, an educational programme for nursing

managers was effective in improving nursing leadership competencies in talent management activities such as knowing and implementing hospital recruitment processes and policies, utilising time and effort to take advantage of vacancies, looking for ways to improve their work force, and the way to complete tasks by utilising the talents, time, and expertise of others.

These results cohort with quasi-experimental one-group pre-posttest research design by **Mohammed, Sliman, Mohamed, (2020)[25]**, they stated that the total score of talent management in post-implementation was higher than (63.6720±8.71111) pre-implementation (36.4640±3.24421). There were highly statistically significant differences between all talent management domains pre/post program. Also, Mostafa**, Mahfouz, Ebraheem (2021)[26]** concluded that there was statistically significant positive correlation among nurse managers' talent management knowledge and activities scores with their job affiliation and organizational excellence scores. Likewise, supported by **Abd El Rahman, Farghaly (2019)[27]**, who mentioned on their study that majority of head nurses had improvement regarding their talent management at pre, immediately after and after three months from Optimis' talent management model application but it was unsatisfactory preprogram.

According work effectiveness of the studied nurses, this study demonstrated that more than two thirds of them had low level regards pre work effectiveness, while more than two thirds of them had high level regards post work effectiveness and, about two thirds of them have high level regards follow up work effectiveness. A highly statistically significant difference was found between the studied nurses regarding their pre, post and follow up work effectiveness. These results may be due to the training program provided an opportunity for nursing managers to pay attention to the talents within their departments and motivate them to work efficiently and effectively.

These results regular with, **Abdrabou, El-SayedGhonem, (2020)[28],** they performed quasi-experimental research on 80 head nurses and stated that there was highly statistically significant positive correlation between total knowledge, total talent management and total leadership effectiveness among nurse managers' score throughout program phases. **Omotunde, Alegbeleye (2021)[29],** detected that the findings revealed that there was a positive significant relationship between talent management practices and job performance ($r = 0.58$, $p < 0.05$). Also, **Elhaddad, Safan, Elshall, (2020) [23]** reported that there was a positive highly statistically significant correlation between nurses' perception toward talent management, their work engagement, and retention.

Additionally, **Othman, Khalil, (2018)[30]** revealed that talent management reduces demotivation, but does not significantly influence the creativity of architectural firms. While, inconsistent with**, Dzimbiri, Molefi, (2021)[31]** conducted a cross-sectional survey on 834 registered nurses and the findings of the study demonstrate that talent management practices do not contribute towards job satisfaction of registered nurses in Malawian public hospitals. Similarly, **Mensah, Bawole, (2017)[32]** suggested that talent management does not only have a direct effect, but also an indirect effect on talented employees' affective commitment and decreased quit intentions via person–job fit working in selected parastatal institutions in Ghana.

The current study showed that there was highly statistically significant differences and positive correlation between talent development, talent attraction, also between talent retention and talent attraction, and so between talent retention and talent development. These results cohort with the study by **Kassem, Ahmed (2021)[33]** they conduct descriptive correlational design on 95 head nurses and reported that there was high positive correlation between talent development, talent attraction and talent retention domains at p value <0.01**.

Furthermore, there was a highly statistically significant differences and positive correlation between all domains of work effectiveness at post intervention except in Problem Solving/Judgment domain that there was a statistically significant difference and positive correlation with all other domains. These results consistent with the study aimed to assess work effectiveness in 340 Korean nurses and stated that there was high positive correlation between domains of work effectiveness **Eo, Kim, Lee, (2014) [34].**

Conclusion

Overall, the study concluded the following:

About (72%) of nursing managers have low level of talent management skill regards pre intervention, while (64%) have high level regards post intervention and (60%) of them have high level with follow up. A highly statistically significant differences ($p<0.01$**) exists between the studied nursing managers regarding their pre, post and follow up and total talent management.

About (72%) of nurses have low level of work effectiveness regards pre intervention, while (68%) have high level regards post intervention and, (64.60%) of them have high level regards follow up. A highly statistically significant differences ($p<0.01$**) found between the studied nurses regarding their pre, post and follow up for total work effectiveness. There are a highly statistically significant differences and positive correlation between all domains as regard talent management and work effectiveness at post intervention ($p<0.01$**).

Recommendations

Based on important findings of the study, the following were recommended:

1. Providing training programs to improve the efficiency of nursing managers to utilize the available staff talents and experiences in improving performance and work effectiveness.
2. Nursing managers should be use different talent management strategies at work to retain competent employees.
3. Studying the relationship of using talent management strategies to employee satisfaction and motivation.

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Diabetes Mellitus Risk Reduction among Pre-diabetics: Sustained Integrated Theory Based Nursing Intervention

Hassnaa Eid Shaban Mosa[1], Hanady Sh. Shehata[2], Eman Ahmed Elkaluby[3], Badria Mahrous Abdelhameed Mohammed[4,5]

[1] Assistant professor of Medical Surgical Nursing, Faculty of Nursing, Menoufia University, Egypt.
[2] Assistant professor of Family and Community Health Nursing, Faculty of Nursing, Menoufia University, Egypt.
[3] Assistant professor of Community Health Nursing, Faculty of Nursing, Alexandria University, Egypt.
[4] Lecture of Medical Surgical Nursing, Faculty of Nursing, Menoufia University, Egypt
[5]Assistant professor of Medical-Surgical Nursing, Albaha University, Faculty of Applied Medical Sciences, Saudi Arabia
Corresponding Author (1): baajlaan@gmail.com.

ABSTRACT

Background: Diabetes mellitus is a global health problem causing premature death rather than individuals, families and societies economic burden. **Aim:** To determine the effect of protection motivation sustained integrated nursing intervention on type 2 diabetes mellitus risk among pre-diabetics. **Subjects & Methods**: Purposive sample of 250 pre diabetics matched to the inclusion criteria was selected. **Setting:** General medical department and diabetic out-patients' clinics at Menoufia University and Shebien El-kom Teaching hospitals. **Tools:** Four tools were utilized. I. Self-administered questionnaire II: Protection Motivation Theory questionnaire; III: Nutritional assessment sheet. IV: Diabetes mellitus modifiable risk assessment score. **Design:** A quasi-experimental with pre, posttest and follow up was utilized. **Results:** The mean age of studied pre-diabetics was 44 years, the percentage of good dietary health habits was improved from 18.4% in pre intervention to 39.6% in post intervention and reached to 51.6% in follow up. High statistically significant activity level improvement from 25.2% pre intervention to 42.4% post intervention with p <0.0001. Statistically significant reduction in cumulative blood glucose level among pre-diabetics in post intervention and follow up from 46% and 23 % respectively. Percentage of regular checkup of blood glucose increased from 2.4% to 39.6% then to 55.6% from pre to post then to follow up, respectively. Percentage of low risk pre-diabetics increased from 24% to 59.6% in post intervention and reached to 84% in follow up intervention with P value < 0.001. **Conclusions:** The protection motivation sustained integrated nursing intervention had been beneficial in decreasing total risk score of Diabetes mellitus among pre-diabetics , improving the disease related healthy behavior as consuming a healthy diet, being physically active, reducing their weight, cholesterol & cumulative glucose level and number of smoked cigarettes**. Recommendation**: Close monitoring, early detection and proper management of pre-diabetics should be carried out by each country-authorized personnel.

Key words: Diabetes mellitus risk reduction, Pre-diabetics, Theory based nursing intervention.

Introduction

Type 2 diabetes mellitus (T2DM) remains a fast-growing public health problem especially in low-income countries, including African countries with a significant impact on morbidity, mortality and health care resources. Egypt has been identified as the ninth leading country in the world for the number of patients with T2DM. The prevalence of T2DM in Egypt was almost tripled over the last two decades. Currently, it is around 15.6% of all adults aged 20 to 79 years [(1)].

Diabetes mellitus usually associated with a two- to four-folds increased risk of developing cardiovascular and micro-vascular complications, which may already be present before diagnosis.

Therefore, it is important to detect pre-diabetic patients at an early stage. Pre-diabetics are people in the intermediate stage between normal glucose tolerance and overt T2DM; they recently defined through HbA1c which referring to the individual's average blood sugar over the previous two to three months [(2)].

Fortunately, the disease related modifiable risk factors as overweight/obesity, physical inactivity, hypercholesterolemia, hypertension, tobacco and alcohol use and excessive uncontrolled stress can

be changed by treatment, intervention, or behavioral and life style changes. Healthy lifestyle, not using tobacco, being physically active, maintaining a healthy weight and making healthy food choices greatly reduce person's risk of developing DM [3].

Nursing educational interventions are the main base for all preventive measures. As a result, past researches have highlighted the importance of nurse education in improving screening practices. Comprehensive, integrated and sustained educational interventions are clearly needed in order to increase awareness for decreasing DM risk among pre-diabetic patients with modifiable risk factors. Studies show that theory-based nursing intervention that applies cognitive frameworks had been positively affecting results[4].

T2DM can be prevented or even delayed for a few years by managing the modifiable risk factors which will benefit health. So, pre-diabetic patients with modifiable risk factors should be taught to modify their life style through consuming healthy diet, manage their stress, getting enough sleeping hours, being physically active most days of the week, losing weight gradually to achieve a healthy body mass index, monitor the predisposing health problems as hypercholesterolemia[5].

The selection of a relevant and influential theory-based intervention for behavioral change is the first stage in building an effective educational nursing program. Rogers (1975) introduced the protection motivation theory (PMT), which is now widely regarded as a broad paradigm for predicting health behaviors and health-related interventions. It is a social cognition theory that is used to assess protective behavior and variables that influence motivations. Fear, according to Rogers, may boost positive protective motives by enhancing eight elements: perceived vulnerability, perceived severity, perceived reward, self-efficacy, response efficacy, response cost, and fear and protection motivation[6].

The theory is designed to explain the effective and ineffective adaptive behaviors at the time of feeling threatened with health status. Based on this Theory, two types of threat appraisal and coping appraisal determine the intent of individuals for protective behaviors. Threat estimation involves understanding severity and perceived sensitivity of disease. The third factor added is the reward which is the consequence of selecting a good healthy behavior; therefore the coping appraisal is based on self - efficacy, response efficacy and cost of response. In general, based on this theory, if individuals feel more threatened regarding the consequences of not performing a behavior and, at the same time, adapt to this threat, there is a motive for changing behavior [7].

2- Significance of study

In Egypt, Global diabetes prevalence was anticipated at 9.3% (463 million people) in 2019, rising to 10.2% (578 million) by 2030 and 10.9 percent (700 million) by 2045. Urban regions (10.8 percent) have a greater frequency than rural areas (7.2 percent), while high-income nations (10.4 percent) have a higher incidence than low-income countries (4.0 percent). One-half of persons with diabetes (50.1%) are unaware that they have the disease. Impaired glucose tolerance is anticipated to affect 7.5 percent (374 million) of the world population in 2019, rising to 8.0 percent (454 million) by 2030 and 8.6 percent (548 million) by 2045 [8].

Pre-diabetics remain undiagnosed as a result of lack of screening and inadequate diagnostic facilities. On the other hand, patients who already have T2DM suffering from severe complications due to lack of self-care awareness, financial resources, regular checkup and facilities for medical supervision. Because the prevention is better than cure, measures should be taken to decrease diabetes mellitus risk among pre-diabetic patients [9 & 10].

Although, the protection motivation theory has been used in several studies associated with adoption of healthy behaviors, limited studies have focused on the adoption of health behaviors in T2DM high risk pre-diabetics. Therefore, this study aimed to determine the effect of protection motivation sustained integrated nursing intervention on T2DM risk among pre-diabetics.

3-Aim of the study

To determine the effect of protection motivation sustained integrated nursing intervention on type 2 diabetes mellitus risk among pre-diabetics.

Research hypotheses

1. Diabetes mellitus related dietary habits and physical activity level among studied sample will be improved post application of protection

motivation sustained integrated nursing intervention.

2. Diabetes mellitus related screening behaviors among studied sample will be regularly performed post application of protection motivation sustained integrated nursing intervention.
3. Diabetes mellitus total risk score will be decreased among studied sample post application of protection motivation sustained integrated nursing intervention.

Subjects and Methods

Design: Quasi-experimental design with pre, posttest and follow up.

Setting: General medical department and diabetic out-patients' clinics of Menoufia University and Shebien El- kom teaching hospitals.

Subjects: A purposive sample of 250 pre-diabetics matched the inclusion criteria was selected based on power of 80 %. The required sample size was determined using Epi info software.

Inclusion criteria

- Pre-diabetics (result of HbA1c analysis pre-intervention ranging from 5.7 to 6.4) having other DM modifiable risk factors.
- Both sexes, comply with follow-up appointment
- Patient's first degree relative admitted with them as an escort especially during intervention period.
- Able to cooperate and communicate
- Free from psychiatric problem.

Exclusion criteria

1- Contraindication to physical exercise or handicap.
2- Already diagnosed as diabetic.
3- Pregnant
4- Taking medications (e.g. glucocorticoid therapy, hypothyroidism and Cushing's disease).
5- Having metabolic or endocrine disorders.
6- Follow weight reduction program (medications /diet) to prevent conflict with the current intervention.

Tools: Four tools were utilized for data collection.

Tool I: Self-administered questionnaire: It was developed by the researcher after extensive reviewing of recent related literature to identify the participants' socio-demographic and their health related practice. It is comprised of three parts.

Part one: Demographic data: including age, sex, marital status, education, occupation, residence, nature of work, income status, self-reported personality nature and telephone number.

Part two: Diabetes mellitus related health practice: including five sections

Section one: Dietary practice: This includes eight questions regarding sugar intake, salts intake, omission of diet, whole grain products, fats intake, fibers intake, number of meals per day, and snacks between meals.

Scoring system: It is measured by three-point Likert's scale (always (zero point), sometimes (one point) and never (two point)). Answers were computed to obtain total mean scores to categorized as good practice with low-risk if the score 0-5 or accepted practice with moderate risk if the score 6-10 and bad practice with high-risk if the score 11-16.

Section two: Physical activity practice: which include four questions: exercise daily at least 30 minutes with moderate or vigorous intensity, increase physical activity and physical effort in everyday life (e.g. walking instead of driving or taking a bus, climbing stairs instead of using elevators, practice active life style, reduce time spent on TV

Scoring system: It is measured by three-point Likert scale (always (zero point), sometimes (one point) and never (two point). Answers were computed to obtain total mean scores to categorized as bad practice with high-risk if the score 6-8 or accepted practice with moderate-risk if the score 3-5 and good practice with low-risk if the score 0-2.

Section three: Smoking habits: Including a question about smoking habit. Scoring system was 2 for always (high risk), 1 for sometimes (moderate risk) and 0 for never (low risk). Answers were computed to obtain total mean scores

Section four: Checking blood glucose level: Including a question regarding checking blood glucose level. Scoring system was 0 for always (low risk), 1 for sometimes (moderate risk) and 2 for never (high risk). Answers were computed to obtain total mean scores.

Section five: Checking blood pressure: Including a question regarding checking blood pressure. Scoring system was 0 for always (low risk), 1 for sometimes (moderate risk) and 2 for never (high risk). Answers were computed to obtain total mean scores.

Tool II: Protection Motivation Theory questionnaire: Adopted from **Jacob 2013**[11] to evaluate the effect of the protection motivation-based intervention on pre-diabetics. It includes 56 items under 8 major constructs: perceived vulnerability (8

items), perceived severity (8 items), perceived reward (10 items), self-efficacy (10 items), response efficacy (8 items), and response cost (6 items), fear (4 items) and protection motivation (2 items). All items were rated on a 3-point scale ranging from 0 (disagree) and 1(neutral) to 2 (agree). Answers were computed to obtain total mean scores to categorize each construct as increased or decreased.

Tool III: Nutritional Assessment Sheet: Adopted from **National Nutrient Database for Standard Reference (2000)** [(12)] to evaluate the nutritional status of the participants and it was consisted of three parts.

Part one: Dietary recall tool: Used to calculate total calories consumed by recalling the nutritional elements of the 24 hours of dietary intake for three consecutive days.

Part two: Anthropometric Measurement: Measuring waist circumference and calculate the body mass index by measuring weight and height. BMI which classified according to WHO, 2021 [(13)] as 18.5- 24.9 indicating normal weight with low risk, ≥25.00 was overweight with moderate risk and ≥30.00 was obese with high risk score.

Part three: Lab investigation: It concerned with the investigation of

- Cholesterol level (scoring 0 with low risk for normal range, 1 with moderate risk if elevated but controlled and 2 with high risk if elevated and uncontrolled.
- HbA1c. Investigated firstly pre intervention to include the person in the study, and then post intervention by three and six months to determine the effect of the study.

Tool IV: **Diabetes mellitus modifiable risk assessment score:** Adapted from **Bang et al., 2009** [(14)] to assess DM modifiable risk score. It included six risks as smoking, cholesterol level, dietary practice, hypertension, body mass index and physical activity practice. The total score of this score was 12.

Scoring system: It is measured by three-point Likert scale. Answers were computed to obtain total mean scores to categorized as 9-12 high risk score or 4-8 moderate risk score and 0-3 low risk score.

Validity and Reliability

All tools were tested for its content validity by experts in the field of Medical Surgical and family and community health nursing. They were asked to judge the items for completeness and clarity. Suggestions were incorporated into the instrument. All recommended modifications were performed. Test-retest was used to ascertain **reliability** of the developed tools. The reliability of tool one reported that Cronbach's alpha reliability was 0.90. Tool two and tool three was coefficient alpha reliability of 0.92, and tool four was Cronbach's alpha reliability of 0.94 which indicates an accepted reliability of the tool.

Pilot study: It was conducted on 10% of participants to test the clarity and the applicability of the developed tools. The necessary modifications were done accordingly. Data obtained from those participants were not included in the final study.

Data collection procedure

- An official permission from Faculty of Nursing, Menoufia University and directors of the selected settings was obtained for carrying-out the study. Verbal consent was obtained from participants who fulfill the inclusion criteria after explanation the purpose and the nature of the study and its importance. Participants were reassured that any information obtained would be confidential and used only for the study purpose. The researchers emphasized that participation in the study is entirely voluntary and anonymity of the participants were assured through coding data.

- From January 2021 to the end of December 2021, the data were collected by the researchers to have base line data about demographic data, health related practice (diet, exercise and smoking) nutritional assessment sheet which include dietary recall tool and physical examination was performed including anthropometric measurements of body weight was measured with a high-precision scale, with the light clothes and bare foot, and height was measured to the nearest centimeter in the standing position on a Holtain portable anthropometer. The BMI is computed by dividing the weight in kilograms by the square of the height in meters. Waist circumference was measured midway between the lowest rib and the iliac crest. A blood sample was taken from the antecubital vein with the participants in a seated position after an overnight fast, and analyzed in the Biomedicine Laboratory of the hospital to assess cumulative blood glucose and total cholesterol. The collection of base line data took about two days per week for one month in each place, each interview took

about 25-35 minutes from each participant according to their level of understanding.

- Structured nursing intervention was carried out for participants in diabetic outpatient clinics through oral instructions as a method of teaching supported with booklet containing all the information and skills related to prevention of DM were used to introduce the theoretical part of nursing intervention depends on eight main constructs. Through five face-to-face teaching sessions one session per week in each sitting contain about 20 to 30 participants and each one took about 30 to 45 minutes then followed by 10 minutes at the end of each session the researchers made quick revision for receiving information and giving the freedom for participants to ask any questions.

First session: Focused to increase the perceived vulnerability to the threat (development of DM) this session started with a report on the statistics of DM around the world in the region (Middle East), in the country (Egypt) and risk factors. Participants' maladaptive practices regarding lack of vulnerability to DM were discussed.

Second session: Focused on perceived severity of the threat. A documentary videos describing complications and negative outcomes related to poor health habits affecting DM was presented. Participants informed about the negative aspects of DM will occur on their lives.

Third session: Focused on perceived rewards or benefits of prevention and early detection of DM. Emphasized the perceived benefits of preventive behaviors and a healthy lifestyle. Using a focus group discussion format, researchers allow participants to share their viewpoints about healthy behaviors related belonging DM prevention.

Fourth session: Focused on perceived effectiveness of the recommended preventative behavior to increase response efficacy and perceived self-efficacy to perform the recommended practice. To enhance self-efficacy, role model presented lectures to the group on personal lifestyle planning and then took questions from the group.

Fifth session: Focused on protective measures designed to implement structured nursing intervention. Cover the following main items dietary modifications by cutting 500 Kcal, eating three meals per day regularly, no dining out. The allowed and prohibited food was explained to them. As well as measures to control of high cholesterol level, exercise modification by practice 30 minute a day (approximately 6,000 steps/ day) stretching twice a day and stress management approach . Participants taught how to find better ways to cope with stressors and smoking cessation measures, monitoring hypertension, hypercholesterolemia, and the importance of compliance with regular periodical checkup.

- Each session followed by a summary of essential points then in the last session, the researchers summarized all components of previous sessions.
- Telephone number of each participant was taken to create telephone contact to assess them continuously to be sure that they follow the structured nursing intervention as illustrated by the researcher. Also, what's app group was made for any explanation about nursing intervention and reminding them about time of post assessment and follow up.
- Each participant was evaluated via scheduling meeting with them at the same day for his/her follow up appointment. Evaluation included anthropometric measurements; health related practice, nutritional assessment, protection motivation theory construct and laboratory investigation were reassessed again after 3 and 6 months as a follow up.

Statistical analysis: Data were collected, tabulated, statistically analyzed using an IBM personal computer with Statistical Package of Social Science version 19 (SPSS, Inc, Chicago, Illinois, USA). Quantitative data were presented in the form of mean, standard deviation and range while qualitative data were presented in the form numbers and percentages. The used tests of significance included *Paired t-test, *McNemar's test, Wilcoxon test, Marginal Homogeneity test and Spearman correlation.

- P value of >0.05 was considered statistically not significant.
- P value of <0.05 was considered statistically significant.
- P value of <0.001 was considered statistically highly significant.

Results

Table 1: Shows that; the mean age of studied sample was 44 years. The highest percentage of them (61.6%) was male. More than half of studied sample (56%) was middle education and majority of the studied sample (81.6%) was married. Nearly half of the studied sample (46%) their job nature required physical effort. Also, majority of them (82.4%) their income was less than expense. More than two third of the studied sample (70%) live in urban areas and more than half of them (56%) their personality nature was nervous.

Figure 1: Illustrated that; there was highly statistically significant difference in all protection motivation theory construct related to diabetes mellitus between pre, post and follow up intervention period with P<0.001

Table 2: Explained that dietary health habits, post intervention and in follow up had a highly significant improvement as p <0.0001. The percentage of good dietary health habits was improved from 18.4% in pre intervention to 39.6% in post intervention and reached to 51.6% in follow up. Also, it was observed that there was highly statistically significant increase in physical activity level as good practice increased from 25.2% pre intervention to 42.4% post intervention with p <0.0001. Regarding checkup of blood glucose level there was highly statistically significant improvement in regular checkup as the percentage of always checkup increased from 2.4% to 39.6% then to 55.6% from pre to post then to follow up, respectively. Also, the percentage of regular checkup blood pressure increased from 4.8% to 30.8% then to 46.8% from pre to post then to follow up, respectively.

Table 3: Clarified that there were high statistically significant reduction in total calories consumed, BMI, waist circumference, total cholesterol level and cumulative blood glucose during post intervention and follow up with p <0.0001.

Figure 2: Represented that there was statistically significant reduction in cumulative blood glucose level among pre-diabetic patients in post intervention and follow up from 46% to 23 % respectively with P value < 0.001.

Figure 3: Showed that there was statistically significant reduction in high and moderate risk pre-diabetic patients from post intervention to the follow up. In reverse the percentage of low risk participants increased from 24% to 59.6% in post intervention and reached to 84% in follow up intervention with P value < 0.001.

Table 4: demonstrates that there was statistically significant negative correlation between PMT theory construct and certain modifiable risk factors of diabetes mellitus especially with total calories, weight, waist circumference and cumulative blood glucos

Table (1): Distribution of Socio-Demographic Characteristics among the Studied Sample.

Demographic characteristics	Studied sample (N=250)	
	No.	%
Age		
19 – 30	54	21.6
31 – 40	111	44.4
41 - 58	85	34.0
Mean ± SD	44.87±6.10	
Gender		
Male	154	61.6
Female	96	38.4
Educational level		
Basic education	20	8
Middle education	140	56
University & above	90	36
Marital state		
Single	34	13.6
Married	204	81.6
Widow	12	4.80
Nature of job		
Require physical effort	115	46.0
Require mental effort	92	36.6
House wife/ Not work	43	17.2
Income		
More than expense	8	3.20
Equal expense	36	14.4
Less than expense	206	82.4
Residence		
Urban	175	70
Rural	75	30
Self-reported personality nature		
Nervous	140	56.0
Medium	57	22.8
Quiet	53	21.2

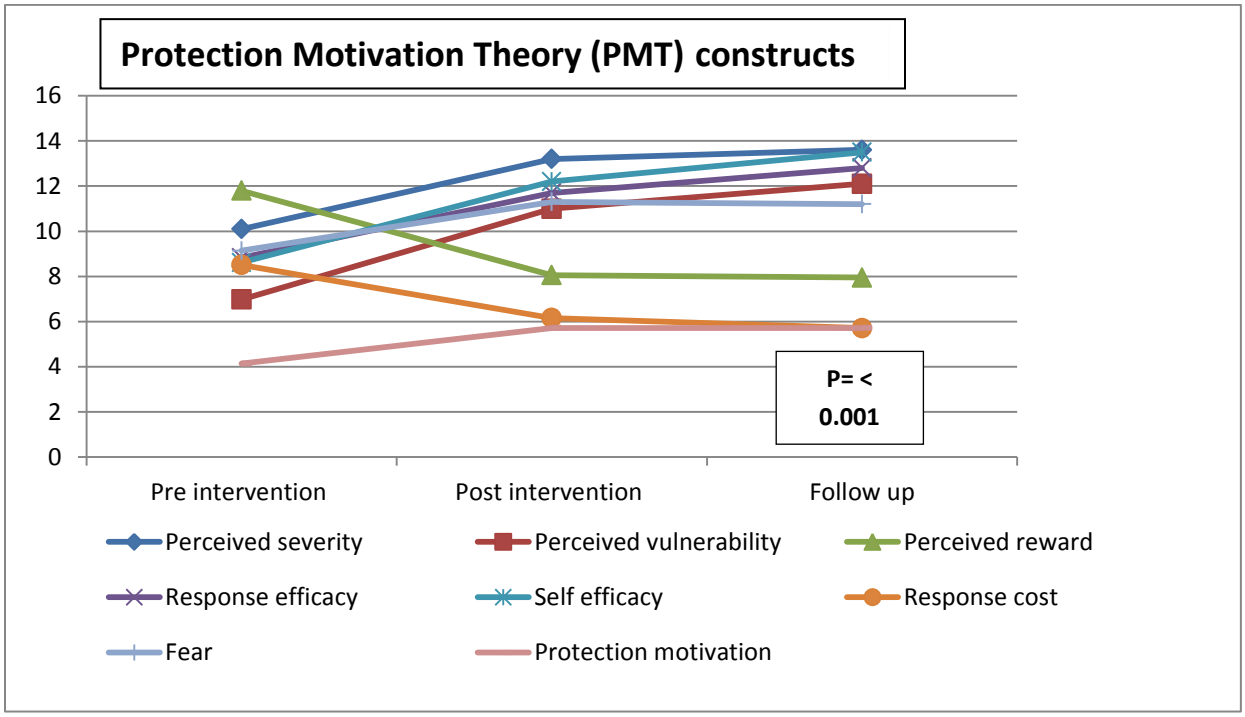

Figure 1: Mean ± SD of Promotion Motivation Theory Constructs about Diabetes Mellitus Modifiable Risk Factors Pre, Post and Follow -up Intervention.

Table (2): Distribution of Health Related Behavior Regarding Diet, Physical Activity and Checkup Pre, Post and Follow up Intervention (N=250)

Health Related Practice	Studied Sample (N=250)			Marginal homogeneity test	P value
	Pre Intervention	Post Intervention	Follow up Intervention		
	No (%)	No (%)	No (%)		
Dietary practice					
- **Bad**	141(56.4)	40(16.0)	16(6.40)	11.8	**P1:0.001****
- **Accepted**	63(25.2)	111(44.4)	105(42.0)	12.2	**P2:0.001****
- **Good**	46(18.4)	99(39.6)	129(51.6)	7.09	**P3:0.001****
Physical activity practice					
- **Bad**	64(25.6)	30(12.0)	18(7.20)	8.55	**P1:0.001****
- **Accepted**	123(49.2)	114(45.6)	94(37.6)	9.31	**P2:0.001****
- **Good**	63(25.2)	106(42.4)	138(55.2)	6.63	**P3:0.001****
Smoking habits					
- **Never**	208(83.2)	212(84.8)	228(91.2)	4.24	**P1:0.001****
- **Sometimes**	12(4.80)	22(8.80)	14(5.60)	5.17	**P2:0.001****
- **Always**	30(12.0)	16(6.40)	8(3.20)	4.89	**P3:0.001****

Checking blood glucose					
- **Always** - **Sometimes** - **Never**	6(2.40) 47(18.8) 197(78.8)	99(39.6) 129(51.6) 22(8.80)	139(55.6) 86(34.4) 25(10.0)	13.9 13.5 3.79	**P1:0.001**** **P2:0.001**** **P3:0.001****
Checking blood pressure					
- **Always** - **Sometimes** - **Never**	12(4.80) 64(25.6) 174(69.6)	77(30.8) 138(55.2) 35(14.0)	117(46.8) 113(45.2) 20(8.00)	13.5 13.1 6.92	**P1:0.001**** **P2:0.001**** **P3:0.001****

**High significant

P1: Comparison between pre intervention and post intervention

P2: Comparison between pre intervention and follow up intervention

P3: Comparison between post intervention and follow up intervention

Table (3): Distribution of Nutritional Assessment of Studied Sample Pre, Post and Follow up Intervention. (N=250)

Nutritional assessment	Studied Sample (N=250)			(%) of decrease	Wilcoxon test	P value
	Pre Intervention	Post Intervention	Follow up Intervention			
	Mean ± SD	Mean ± SD	Mean ± SD			
Total Calories (Kcals)	2351.1±347.4	1914.2±354.3	1843.8±345.8	18.5%(1) 21.5%(2)	13.7 13.6 10.3	**P1:0.001**** **P2:0.001**** **P3:0.001****
BMI (kg/m²)	30.1±2.15	27.6±2.14	25.7±2.21	8.30%(1) 14.6%(2)	13.1 13.5 12.8	**P1:0.001**** **P2:0.001**** **P3:0.001****
Waist circumference (cm)	86.0±6.66	81.7±7.15	78.9±7.12	5.00%(1) 8.25%(2)	13.2 13.4 13.0	**P1:0.001**** **P2:0.001**** **P3:0.001****
Cholesterol level mg⁄dl	237.4±34.9	212.6±30.9	191.7±29.2	10.4%(1) 19.3%(2)	13.1 13.2 12.2	**P1:0.001**** **P2:0.001**** **P3:0.001****
Cumulative blood glucose mg⁄dl	6.07±0.27	5.65±0.35	5.25±0.46	6.92%(1) 13.5%(2)	12.6 13.1 11.8	**P1:0.001**** **P2:0.001**** **P3:0.001****

(1): % of decrease post intervention **High significant

(2): % of decrease follows up intervention

P1: Comparison between pre intervention and post intervention

P2: Comparison between pre intervention and follow up intervention

P3: Comparison between post intervention and follow up intervention

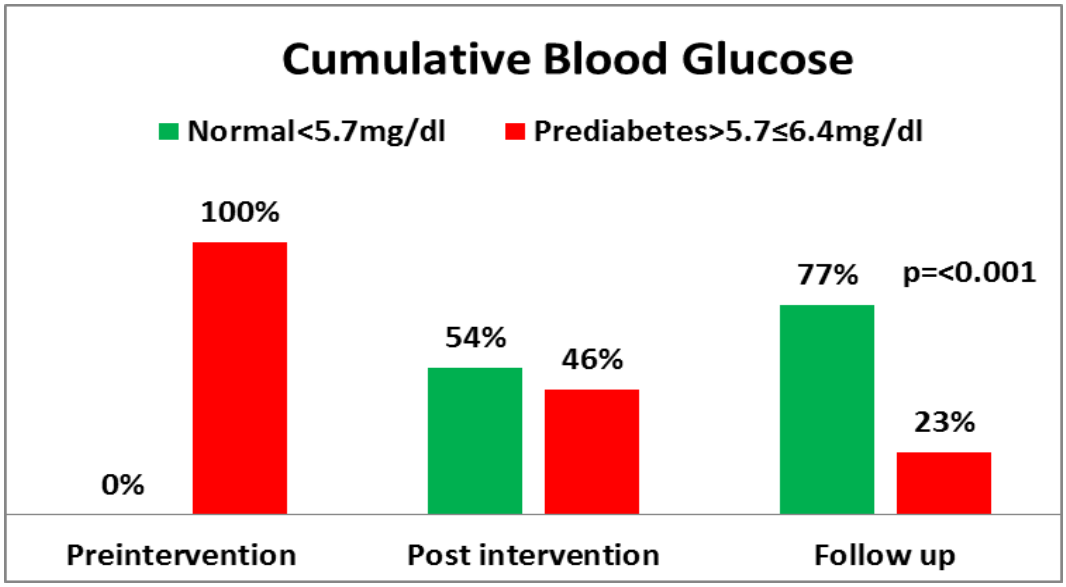

Figure 2: Distribution of Cumulative blood glucose pre, post and follow up intervention

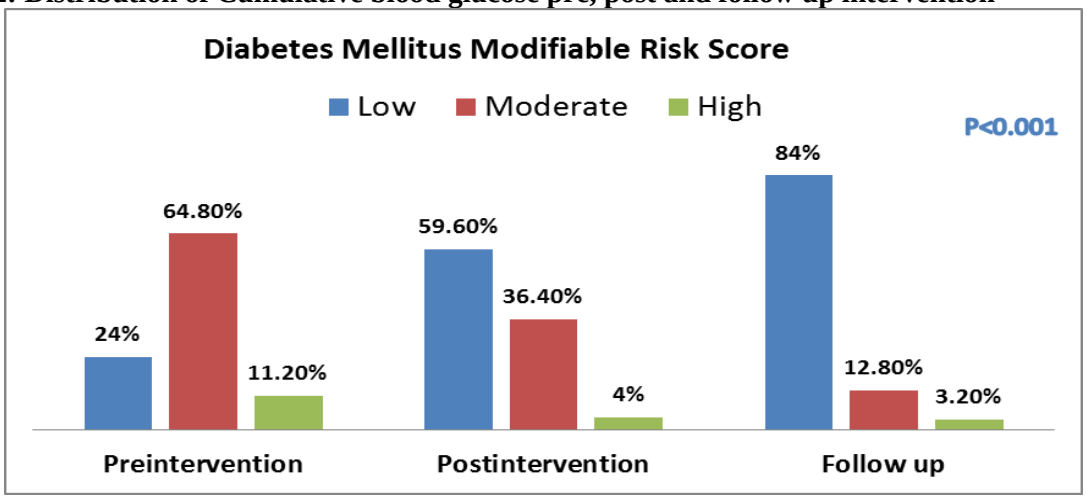

Figure 3: Distribution of Diabetes mellitus risk score pre, post and follow up intervention

Table 4: Correlation between PMT Construct and reported modifiable risk factors pre , post intervention and during follow up (N=250).

Modifiable risk factors	PMT construct (N=250)					
	Pre Intervention		Post Intervention		Follow up Intervention	
	r	P value	R	P value	r	P value
Total calories	-0. 113	0.074	**-0. 175**	**0.006****	**-0.196**	**0.002****
Weight	-0.001	0.988	**0.148**	**0.019***	**0.149**	**0.018***
BMI	**-0.131**	**0.038***	-0.082	0.199	-0.014	0.827
Waist circumference	**-0.276**	**0.001****	**-0.215**	**0.001****	**-0.217**	**0.001****
Cholesterol level	-0.100	0.144	-0.011	0.860	-0.002	0.979
Cumulative blood glucose	-0.003	0.98	-0.160	0.009**	-0.247	0.001**

Discussion

Globally diabetes mellitus is the major serious among the top ten causes of death among adults, as it is a long-term condition with a major impact on individuals, families and societies worldwide [8].

The current study revealed positive improvement in healthy eating habits and physical activity level with reduction in the number of smoked cigarettes which indicating positive behavioral changes among pre-diabetics. The same results was obtained by **Chamroonsawadi et al., 2021 [15]** who studied "protection motivation theory to predict intention of healthy eating and sufficient physical activity to prevent diabetes mellitus in Thai population: A path analysis" and concluded that self-efficacy had a direct effect on modifying both unhealthy eating behaviors and physical activity level.

Also there was a statistically significant difference between pre, post and follow up results regarding perceived disease vulnerability as the researcher increased the pre-diabetic patients' perception about their vulnerability to develop diabetes mellitus, in turn, a positive effect appeared on conducting preventive behavioral modification clarified through total calories consumption reduction, increased physical activity level, reduction of total number of smoked cigarettes and improved disease related screening behavior. This result is similar to results of **Vasheghani et al., 2012 [16], Malmir et al., 2018 [4] and Khiyali et al., 2017 [17]**. So, it is important to elevate high risk groups' knowledge level related to vulnerability to diseases development.

Statistically significant difference was also, presented post the intervention in the mean score of perceived severity as participant became insighted with DM seriousness, its health threat and its severe complications. These findings are in the same line with **Khani et al., 2022 [18] and Malmir et al., 2018 [4].** This mean that if people become aware of the consequences and harms of diabetes on their health and life, protection motivation will be effective as an educational intervention which increase perceived severity.

The screening behavior regarding regular periodical check of blood glucose & blood pressure raised in post-intervention and follow up than pre-intervention. This demonstrated the beneficial effect of nursing intervention in this regard. Similarly, this exemplified the positive impact of nursing care in this area. Similarly, **Vasheghani et al., 2012 [16] and Khiyali et al., 2017 [17]** who reported an increase in pap smear test screening among the women of the experimental group after the implementation of protection motivation theory based educational interventions about cervical cancer.

In addition, the study findings' revealed that the mean score of perceived reward about not performing the screening tests for early detection of DM was significantly reduce in posttest and follow up. This result is consistent with **Khani et al., 2022** [18] findings**.** It seems that the reason for augmented perceived threat in this study was the emphasis of the nursing intervention on the consequences of DM and screening behavior benefits among participants. These results suggest that high-risk groups are more

probable to perform the screenings if they logically address the benefits and understand the severity and harms of the disease as well as the associated consequences.

The findings indicated that the mean score of the response of self-efficacy increased after the intervention in posttest and follow up. Self –efficacy was a strong predictive factor for screening and promoting healthy behaviors as smoking cessation, having healthy diet and increased physical activity level. This result is in agreement with **Khani et al., 2022[18], Chamroonsawadi et al., 2020** [15] **and Malmir et al., 2018** [4] who reported the effectiveness of educational intervention on the enhancement of self-efficacy of screening behaviors for skin and breast cancers. Also, they reported that belief in high personal self-efficacy to do a behavior strongly decreased the perceived barriers for performing it.

Regarding response efficacy, a statistically significant difference was found in posttest and follow up intervention which is consistent with **Khani et al., 2022** [18] **and Malmir et al., 2018** [4]**.** They show that belief in desirable outcomes of a health behavior could lead to a better performance. Furthermore, the present study demonstrated that the mean score of response cost significantly diminished. These findings are in congruence with the findings of similar studies of **Khani et al., 2022** [18] **and Madadzadeh et al., 2018** [19]**.** According to the theory construct, coping appraisal is the second method considered by researchers when encountering high-risk people. In addition to the efficacy of the prescribed response, the researcher encouraged pre-diabetic patients to assess their own efficacy level. Pre-diabetic patients' perceived response costs can be viewed as roadblocks to implementing preventative behaviors. As a result, implementing an educational nursing intervention and assisting pre-diabetics in removing obstacles can help them become more protective.

Fear was also increased from pre to post intervention and follow up. These findings was consistent with results of previous studies of **Sadeghi et al., 2019** [20] who studied the predictive factors for preventing hookah smoking and health promotion among young people based on the protection motivation theory and **Khosravi et al., 2022** [21] who studied the prostate cancer screening behaviors and the related beliefs among 50-to 70-year-old men in Hamadan: Appraisal of threats and coping. This means that if a person be afraid of having diabetes, the motivation will increase for following protective and preventive behaviors.

The present study indicated a statistically significant difference in protection motivation scores from pre to post intervention and follow up, which is consistent with the findings of **Khani et al., 2022** [18] **and Malmir et al., 2018** [4] who observed that when the perceived threat and efficacy are strong, participants are more motivated to control the danger and accept the recommended response. According to the study, people approach danger with more caution and awareness as they believe the risks are substantial and that they can effectively mitigate the threat.

Through the present study in post intervention and follow up, all scores of protective motivation constructs were significantly changed which come in agreement with the results of **Khani et al., 2022 [18] and Malmir et al., 2018** [4] who explained that training based on the theory of incentive protection is effective in modifying the score of the structures.

Also, there was a statically significant reduction in total calories consumption in post intervention and follow up. Similar finding was reported by **Alieva et al., 2020 [22]** who studied the effect of dietary components and the association with coronary artery disease risk score and reported that there was statistical significant reduction on the total calories intake post intervention. This means that nutritional educational therapy based on PMT improved not only the nutritional knowledge of individuals after intervention but also, sufficient to change behavior.

The results of present study showed that there was statically significant reduction in cumulative glucose level among pre-diabetic patients in pre, post intervention and follow up. One possible cause of this reduction may be the improved physical activity level and adherence to healthy diet. These results are consistent with studies of **Chamroonsawadi et al., 2020 [15] and Najafipour et al., 2017 [23].** They showed that eight weeks of physical activity reduces HbA1c levels compared to the control group. The researchers explained that; careful implementation nursing intervention based on PMT can be used to help control diabetes status; in addition, adherence to healthy diet and physical activity were increased.

Also, there was a statistically significant negative correlation between weights among pre, post intervention and follow up and PMT construct. This came in agreement with **Azami et al., 2020** [24] and **Elkafrawi et al., 2017 [25]** as they documented that; increased weight loss and PMT construct scores after application of motivational interviewing on a weight loss program based on the protection motivation theory. The researchers concluded that obesity with high waist circumference is a major risk factor for the development of T2DM. Waist circumferences is considered a better and more convenient method than BMI in the prediction of T2DM**.**

As observed, all previously mentioned results pointed to all research hypotheses were supported.

Conclusion: The protection motivation sustained integrated nursing intervention had been beneficial in decreasing total risk score of diabetes mellitus among pre-diabetics improving the disease related screening behavior, improving the disease related healthy behavior as consuming a healthy diet, being physically active, reducing their weight, cholesterol & cumulative glucose level and number of smoked cigarettes.

Recommendations

- Periodic and continuous early detection and proper management of pre-diabetics should be carried out by each country-authorized personnel.
- Large-scale awareness programs should be implemented after identifying the appropriate means of message spread among pre-diabetics.

- Unraveling the mechanisms by which dietary modifications, regular physical activity and gradual weight loss specifically resolve DM various stages.
- Further studies are required before practice-changing recommendations can be made.

Limitations of the study

A self-reported tool was used for data collection so the study may not have taken into account all confounding variables.

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Effect of Self- Care management on Health Outcomes and Symptoms for Females with Systemic Lupus Erythematosus

Shaimaa Hassan Mohamady [1], Ola Abdelwahab Abdallah Srour [2], Nora Salah Eldin Saad [3]

[1] Assistant Professor of Maternal and Newborn Health Nursing Department, Faculty of Nursing, Helwan University, Egypt.

[2,3] Lecturers of Adult Health Nursing Department, Faculty of Nursing, Helwan University, Egypt.

The corresponding author: "olasrour01 @gmail.com" **OR** "drolasrour@yahoo.com "

Abstract

Background: Systemic lupus erythematosus is a common chronic autoimmune inflammatory disease and self-care management aimed to equip females with practices to participate and take responsibility in the care of disease. **Aim:** The study aimed to evaluate the effect of self- care management on health outcomes and symptoms for females with systemic lupus erythematosus. **Design:** A quasi-experimental design was utilized. **Setting:** The study was conducted at Rheumatology and Immunology and Antenatal outpatient clinics at El Mansoura University Hospitals. **Sample:** A purposive sample of 66 females was included in the study. **Tools:** Four tools were used for data collection; **Tool (I)** A structured interviewing questionnaire with three parts covering demographic data, clinical data and females' knowledge regarding systemic lupus erythematosus, **Tool (II)** Fatigue severity scale, **Tool (III)** Brief pain inventory & **Tool (IV)** Lupus patient reported outcomes. **Results:** There was a statistical significant difference between pre and one month after self-care management in all items of knowledge regarding systemic lupus erythematosus (P-value < 0.001) among females. There was a highly statistically significant reduction of fatigue and pain level between pre and one month after self-care management (P-value <0.001). There was a highly statistically significant difference in total Lupus PRO scores one month after self-care management as compared to pre interventions (P-value < 0.05). **Conclusion:** Implementation of self-care management had a positive and significant effect on females' knowledge level as well as reducing fatigue and pain severity, additionally a significant improvement in total Lupus PRO scores post self-care management were found. **Recommendations:** Design a continuous health promotion program for females with systemic lupus erythematosus in hospitals.

Keywords: Health Outcomes, Self-Care management, Systemic Lupus Erythematosus.

Introduction

Systemic lupus erythematous (SLE or lupus for short) is a chronic, multisystem disease involving complex pathogenic mechanisms characterized by widespread affections of different body organs as the kidney, cardiovascular system, and central nervous system in a progressive pattern with recurrent exacerbating attacks with a major contribution to the worldwide morbidity and mortality [(1)].

Lupus occurs ten times more often in females than males. It most commonly occurs in females in the reproductive and working age group with the peak SLE incidence occurs at age 20–29 years, followed by 30–39 years old for females. The mortality risk in females with SLE has been ranged from twofold to fivefold relative to the total population [(2)].

Systemic lupus erythematous development has a different risk factors including genetic factors that is often associated with environmental factors and lifestyle factors, such as solar, radiation exposure, stress, sedentary behavior, and use of certain medications that tend to trigger disease manifestation. Early diagnosis, suitable medical management specific to the disease (management and reduction of symptoms) and lifestyle modifications reduce flares and thus prevent complications [(3)].

Also, pain, fatigue and side effects of medications impact negatively social

functioning, mental health, moreover; complex in the case of fertility and pregnancy [4].

Fatigue is a general and continued feeling of tiredness or difficulty performing physical and mental activities for days to weeks, which is not resolved by rest [5].

Fatigue is the most common and disabling symptom in SLE that may impair female patients' physical and mental health and reduce quality of life by impacting upon their emotions, work, and daily life activities[6].

Non-pharmacological interventions and lifestyle arrangements are very important in disease management, these include female education, protection from sunlight, rest and the reduction of fatigue, use of medication, infection control, vaccination, a diet low in salt, fat and cholesterol, avoidance of stress, pregnancy and contraception and reduction of psychosocial effects [7].

Disease management has an importance in SLE than treatment for increased female survival and for the prevention and managing chronic complications. Continuous education and counseling given to patients and their families on the disease, treatment and interventions in order to reduce flares positively affected female health outcomes and increased self-efficacy which is important in disease management[8].

Self-care management is defined as interventions aim to equip females with practices to participate and take responsibility in the care of disease in order to function optimally through acquiring knowledge and a combination of independent sign/symptom monitoring, medication management, enhancing problem-solving and decision-making skills for medical treatment , management and changing physical activity, dietary, and/or smoking behavior [8,9].

Nurses have a significant role in the SLE management process especially during periods of disease exacerbation. Because the nurse helps females to cope with the disease in their everyday lives, teaches how to deal with lupus symptoms, prevents periods of SLE exacerbations, and provide health education concerning lifestyle changes. The nurse provides the necessary help and emotional support to the female and family, undertaking educational actions connected with lifestyle and rehabilitation to improve their quality of life [10]. Lifestyle modifications, such as avoiding overexposure to sunlight, stress management, smoking cessation and a diet low in saturated and fats are also very important [11].

Significance of the study

Systemic lupus erythematosus (SLE) is a potentially life-threatening autoimmune rheumatic disease, which can affect most organ systems. SLE has an undesirable outcome on various features of female's life, for example mental health, pregnancy, labor, quality of life and daily functioning, which might result in low employment values and heavyweight economic load [9].

The prevalence of SLE in the developed world is 24/100,000 population. Furthermore, there was limited epidemiological studies from Egypt have been published limited by small sample sizes, and have not reported data from multiple geographic regions over the country [12].

In Egypt SLE had a wide variety of clinical and immunological manifestations, the overall estimated prevalence of adult SLE in Egypt was 6.1/100,000 population (1.2/100,000 males and 11.3/100,000 females) [13]. Therefore the aim of this study was to evaluate the effect of self- care management on health outcomes and symptoms for females with systemic lupus erythematosus.

Aim of the Study

The study aimed to evaluate the effect of self- care management on health outcomes and symptoms for females with systemic lupus erythematosus.

Research hypotheses

The following research hypotheses were formulated to fulfill the aim of the current study

H1: Knowledge scores of studied females regarding SLE will expect to be improved post implementation of self-care management**.**

H2: Studied females will exhibit improvement in their fatigue and pain post implementation of self-care management.

H3: Studied females will reveal improvement in their health outcomes post implementation of self-care management.

Subject and Methods

Research Design

A Quasi-experimental research design was utilized in this study.

Research Setting

This study was conducted at Rheumatology and Immunology and Antenatal outpatient clinics of El Mansoura University Hospitals, Egypt.

Subjects

A purposive sample of (66) females diagnosed with systemic lupus erythematosus was recruited in the study using a purposive technique based on inclusion criteria; adult conscious female aged above 18 years, who didn't participate in any previous educational program regarding systemic lupus erythematosus and willing to participate in the study. Based on the flow rate obtained from the statistical of El Mansoura University Hospitals in the previous year (2020), the total population size (660 female) diagnosed with SLE [14] and the sample size was determined using the Yamane [15] statistical equation

$$n = \frac{N}{1+N(e)^2} = 66 \text{ female}$$

Where:

n= Corrected sample size.

N = Population size.

e = Margin of error, and e = 0.05

Tools for Data Collection

For collecting the data, four tools were utilized

Tool (I): A structured interviewing questionnaire, this tool was developed by the researchers after reviewing relevant and recent related literature and research studies [13. 16, 17].It was divided into three parts:

Part (1) addressed the demographic data of the studied females including age, level of education, residence, occupation and marital status.

Part (2) was dealt with female clinical data; it included medical history as duration of disease, past medical and family history, medical follow up, signs and symptoms reported by females and aggravating factors of symptoms, also obstetric history including gravida, para, number of previous pregnancy with SLE, previous pregnancy complications with SLE, mode of delivery and previous labor complications with SLE.

Part (3) was concerned with assessing knowledge of studied females about SLE; it was used as pre-post (one month after self-care management) using 8 items which contained 15 multiple-choice questions covering definition, causes, risk factors, signs and symptoms, SLE diagnosis, treatment and complications of systemic lupus.

Scoring system

Two levels of scoring for questions were as the following; complete and correct answer scored (2), incomplete and incorrect answer scored (1). The total score of knowledge was between 15 and 30, then distributed into two categories as unsatisfactory knowledge when the total score less than 75% (1< 23 degrees) and considered satisfactory knowledge when the total score equal and more than 75% (23 ≤ 30 degrees).

Tool (II): Fatigue Severity Scale (FSS)

It is a short and simple tool adopted from [18]. The FSS consisted of a form with nine items concerning fatigue symptoms.

Scoring system

Each statement is rated from one to seven. A higher score indicates a higher fatigue level. Options for answers: 1=strongly disagree, 2=disagree, 3=tend not to participate,

4=undecided, 5=tend to participate, 6=agree, 7=strongly agree.

Tool (III): The Brief Pain Inventory (BPI) – Pain Interference scale

It is a short questionnaire which was adopted from [19] to assess pain interference on daily function. The BPI measures how much pain has interfered with seven daily activities, including general activity, walking, work, mood, enjoyment of life, relations with others, and sleep.

Scoring system

The items of pain interference on females function are presented as numeric rating scales, with 0 not interfere to 10 completely interfere. BPI pain interference is scored as the mean of the seven interference items. A function interference subscale is calculated by adding the scores on the interference items.

Tool (IV): Lupus Patient Reported Outcomes (Lupus PRO)

It is SLE-specific tool that was adopted from [20]. The tool has a 43-item questionnaire that includes not only health related quality of life (HRQoL) domains such as lupus symptoms, cognition and body image but also non HRQoL domains including desires–goals, coping, social support and satisfaction with care. The Lupus PRO was translated into Arabic and used to assess females reported outcome. The questionnaire was divided into 12 domains: lupus symptoms (Three items), cognition (two items), lupus medication (two items), procreation (two items), physical health (five items), pain-vitality (five items), emotional health (five items), body image (five items), desires-goals (four items), social support (two items), coping (three items) and satisfaction with care (four items).

Scoring system

The Lupus PRO has 5 point Likert response format, where 0=none of the time/not applicable, 1= a little of the time, 2= some of the time, 3=Most of the time, 4= All of the time, 5= not applicable (recode as 0 for scoring). Each item scored on Likert scale and each domain score was calculated by summing its items. A total score is calculated by summing the score of the 12 domains. Total Lupus PRO score presented in three categories as, low >75%, moderate 50 – 75%, and high <50%

Tools validity

The validity of the tools was checked by a panel of seven experts from the Medical Surgical & Maternity and Newborn Health Departments, modifications were done based on their opinions.

Test reliability

Testing reliability of the proposed tools was assessed using Cronbach's Alpha coefficient test; the first tool's internal consistency was 0.86. For the second tool (FSS) internal consistency was 0.95.The third tool (the Brief Pain Inventory (BPI) – Pain Interference scale) had an internal consistency of 0.78 and the fourth tool Lupus Patient Reported Outcomes (Lupus PRO) was 0.82.

Ethical Considerations

An informed oral consent was taken from females who agreed to participate in the research process after explaining all information related to the study (aim and activities, expected outcomes, and benefits and risks associated) before data collection. Confidentiality and anonymity were also guaranteed. Participants were told the right to discontinue at any time without any consequences and without giving any reason. Values, culture, and beliefs would be respected. A code number was used instead of name.

Pilot Study

The simplicity, clarity, and applicability of the tools were evaluated in a pilot study involving 10% of the entire sample (7 female). The time required to fill the questionnaires was determined and any problems peculiar during data collection were identified. Females participated in the pilot study were excluded from the main study sample.

Field Work (Procedure)

An official letter from the dean of the Faculty of Nursing, Helwan University was taken and forwarded to the hospital director and nursing director of Mansoura University Hospitals seeking permission to perform the study after clarifying the aim of the study. The study was conducted in four phases namely assessment, planning, implementation, as well as evaluation. The phases lasted six months from beginning of January, 2021 to the end June 2021.

Researchers were available at Rheumatology and Immunology and Antenatal outpatient clinics at El Mansoura University Hospitals two days per week (Saturday & Tuesday) from 9.00 Am to 2.00 Pm. The clinics are suitable for direct contact with the females and applying the self-care management. The time consumed to fill the study tools was from 30 to 40 minutes for the pre-test; and about 20-30 minutes for posttest.

Phase I: Assessment phase

The researchers interviewed the females in the outpatient waiting place, introduced themselves, and explained to each female the objective, process, and expected outcomes and then informed consent from females was attained. The tools were filled by females or the researchers if the females were unable to read or write (pretest).

Phase II: Planning phase

According to the analysis of pretest findings gained during the assessment phase on detecting the actual educational needs of females and relevant literature, the researchers designed self-care management. The content of the self-care management was prepared by the researchers based on literature review [13, 21, 22]. Objectives of the study were determined based on the needs of the studied females. An illustrative structured booklet was prepared and written in simple Arabic language as a guide for the females. The study tools were filled in and completed in 2 phases (pre- self-care management and one month after the implementation of the self-care management).

Phase III: Implementation Phase

During this phase the self-care management was carried out through five sessions (two theoretical and three practical).

The first session focused on overview about systemic lupus erythematosus by providing information about definition, causes, risk factors, signs and symptoms.

The second session involved information about diagnosis, treatments, and measures related to healthy diet as eating well balanced diet, taking vitamins as prescribed .Also the session included complications such as general complications and complications during pregnancy as spontaneous abortion, intrauterine fetal death, pre-eclampsia, intrauterine growth retardation , premature rupture of membrane, preterm birth and neonatal lupus.

The third session addressed the practice of females that involved demonstration to females physical activities by explaining and demonstrating instrumental activities of daily living, self-care activities performed at home and pain & fatigue management.

The fourth session involved demonstration to females the techniques used for stress management including relaxation techniques and lifestyle modification as well as measures to prevent relapses of trigger factors.

The fifth session focused on empowering females to manage SLE symptoms independently and its recurrence, additionally compliance with medical regimen. The researchers presented ways of coping strategies such engage in problem solving to overcome and resolve the problems encountered in doing self-care , expressing distressing emotions and maintain emotionally supportive relationships. These educational sessions were done either individually or in groups (2-3) female based on the number of females in each room in the clinics.

Each session started by a summary about what had been given through the previous session then the objectives of the new topics, taking into consideration the use of simple

language to suite the level of females. The duration of each session ranged from 30-45 minutes for theoretical sessions and (45-60) minutes for practical sessions and it was accompanied by feedbacks. Discussion, motivation and reinforcement during sessions were used to enhance learning. Teaching methods used were group discussion, questions and answers, demonstration and re-demonstration, PowerPoint presentations, brainstorming, and short educational videos.

Evaluation Phase

One month after implementation of the self-care management, post-test was applied to each female in the study using the same pretest tools (the first tool, the second , third and fourth tools) to evaluate effect of the self-care management , this evaluation was done during monthly follow up visit of females to outpatient clinics.

Statistical Design

The collected data were analyzed using (SPSS) version 24. The frequency and percentage of qualitative data, the mean and standard deviation of quantitative data were utilized. A Chi-square and paired sample t-test was used to detect the relation between the variables. Relations between different qualitative variables were tested using correlation coefficient (person correlation). Probability (p-value) ≤ 0.05 was significant < 0.001 was highly significant and > 0.05 was non-significant [23].

Results

Table (1): Denotes that 51.5% of studied females were more than 30 years old with a mean age 30.07±7.57. Regarding the level of education 53.0% had preparatory school. It was found that 83.3% of the females had living in rural areas. Regarding marital status, 75.8% of studied females were married and finally 71.2% were housewives.

Figure (1): Illustrates that, 57.6% of studied females had obtained information about systemic lupus Erythematosus from mass media. Meanwhile, 21.2% of the studied females obtained information from health care staff.

Table (2): Reflects that, 29.1% of studied females were primigravida, while the rest of them were multigravida with 36.4% having previous 2-3 pregnancies. Meanwhile, 34.5% of the studied females were nulliparous while, the rest had previous labor experience. The common mode of delivery was cesarean section (61.2%). According to number of pregnancies in the presence of SLE, 36.3%, 30.2% and 25.1% of the studied females had one, two and three or more pregnancies respectively. The reported complications during previous pregnancies were abortion (81.8%), pre-eclampsia (13.7%) and fetal congenital anomalies (4.5%). Also, 14 females of the study sample had associated complications with delivery, which included 71.4% premature rupture of membrane and 28.6% premature labor.

Table (3): Reveals that, 39.4% of studied females had the disease from 1 to <5 years. 72.7% didn't have other chronic diseases. Moreover 63.6% of them had no family history of systemic lupus erythematous and 30.3 % of them had follow up every two months. Regarding risk factors, 75.8% 66.7& 53% of studied females had physical, emotional and hormonal risk factors respectively for SLE.

Figure (2): Illustrates that, the most common symptoms of studied females were fatigue (87.9%), pain (74.2%), skin rash (71.2%) as well, 69.7% had hair loss & 60.6% complaining of arthritis.

Table (4): Illustrates that, there was a highly statistically significant difference between pre and one month after self-care management in all items of knowledge regarding SLE (p-value < 0.001).

Figure (3): Displays that, there was noticeable progress among studied female's total score of knowledge pre and one month after self-care management. As well as the figure shows that , 17.9% of studied females had satisfactory total knowledge about SLE,

which increased post self-care management to 84.3%.

Table (5): Clarifies that, there was a highly statistically significant difference among the studied females between pre and one month after self-care management regarding to all items of fatigue (p-value < 0.001). As well the same table showed a significant improvement with a reduction in total fatigue severity after one month of self-care management.

Table (6): Reflects that, there was highly statistical significant difference among the studied females between pre and one month after self-care management regarding to pain level (p-value < 0.001). As well a significant reduction in the total pain level among studied females was observed one month of self-care management**.**

Table (7): Displays that; mean total Lupus PRO score of studied females were improved significantly after one month of self-care management (97.1667 ±3.85340) compared to (83.2424±4.19912) pre self-care management. There were highly statistical significant differences regarding all Lupus PRO items between pre and one month after self-care management.

Table (8): Portrays a negative correlation between pain, fatigue and Lupus PRO score among studied females. In addition there was a highly positive correlation among studied females total knowledge, pain, fatigue and total Lupus PRO score at one month after self-care management.

Table (1): Distribution of the studied females According to demographic characteristics (n=66)

Items	No	%
Female's age		
20< 25	9	13.6
25<29	23	34.9
≥ 30	34	51.5
Mean ±SD	**30.07±7.57**	
Educational level		
Can't read & write	4	6.1
Primary	23	34.9
Preparatory	35	53.0
Secondary	3	4.5
University	1	1.5
Place of residence		
Urban	11	16.7
Rural	55	83.3
Marital status		
Married	50	75.8
Not Married	11	16.7
Divorced	5	7.5
Occupation		
Housewife	47	71.2
Worker	19	28.8

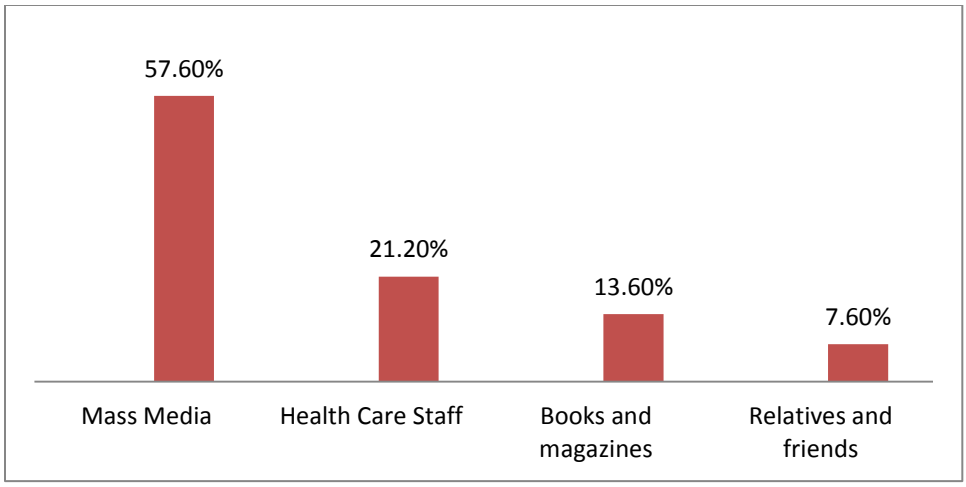

Figure (1): Distribution of the studied females according to source of information regarding systemic lupus Erythematosus (n =66)

Table (2): Distribution of the studied females according to obstetric history (n= 55)

Items	N0	%
Gravida		
Primigravida	16	29.1
2-3	20	36.4
4-5	17	30.9
>5	2	3.6
Para		
Nulliparous	19	34.5
Primipara	16	29.1
2-3	15	27.3
4-5	4	7.3
>5	1	1.8
No of previous pregnancy with SLE (n=36)		
Non	9	25.1
1	13	36.3
2	11	30.2
≥3	3	8.4
previous pregnancy complication with SLE:(n=22)		
Abortion	18	81.8
Preeclampsia	3	13.7
Fetal congenital anomalous	1	4.5
Mode of delivery (n=36)		
Normal Vaginal delivery	14	38.8
Cesarean section	22	61.2
previous labor complications with SLE (n=14)		
Premature labor	4	28.6
Premature rupture of membrane	10	71.4

Table (3): Distribution of the studied females regarding medical history (n=66)

Items	N0	%
Onset of the disease		
< one year	7	10.6
1-4	26	39.4
5-10	14	21.2
>10	19	28.8
Other chronic diseases		
Yes	18	27.3
No	48	72.7
Family history of SLE		
Yes	24	36.4
No	42	63.6
Medical follow up		
Monthly	9	13.6
Every two months	20	30.3
Every three months	15	22.7
Every six months	10	15.2
Irregular follow up	12	18.2
Risk factors*		
Emotional	44	66.7
Physical	24	75.8
Sunlight	12	18.2
Eating pattern	22	33.3
Sleep disturbance	50	36.4
Hormonal	35	53.0

***Responses are not mutually exclusive**

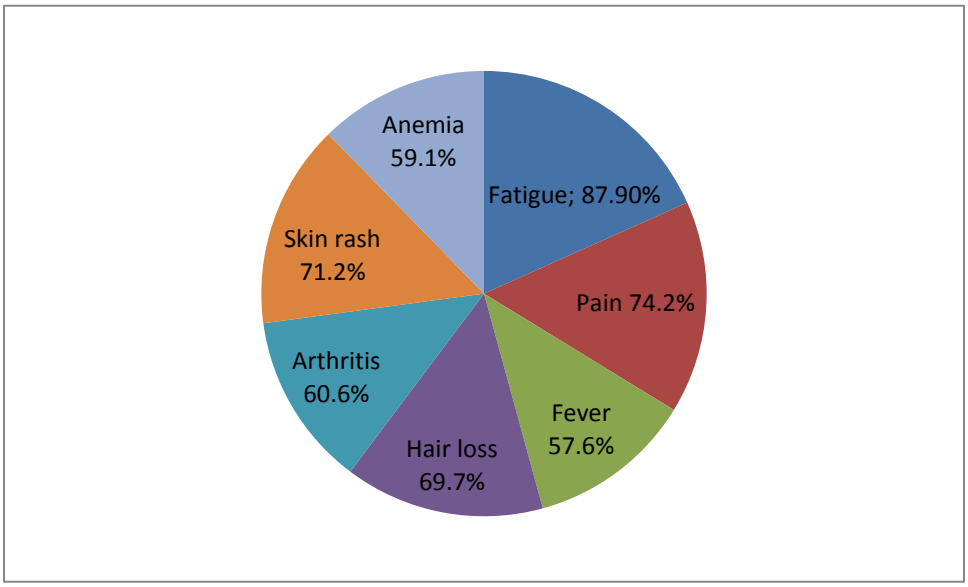

Figure (2): Distribution of the studied females regarding to systemic lupus erythematosus symptoms (n=66)

Table (4): Distribution of the studied females according to knowledge level pre and one month after self-care management (n=66)

* Statistically significant difference (p≤0.05), **Highly statistically significant difference

Items	Pre self-care management				One month after self-care management				x2 Test	P- value
	correct		incorrect		correct		Incorrect			
	NO	%	NO	%	NO	%	NO	%		
1. Definition of systemic lupus.	18	27.3	48	72.7	56	84.8	10	15.2	44.41	0.000**
2. Causes of systemic lupus.	9	13.6	57	86.4	47	71.2	19	28.8	44.78	0.000**
3. Types of systemic lupus.	7	10.6	59	89.4	54	81.8	12	18.2	67.32	0.000**
4. Risk factors of systemic lupus.	3	4.5	63	95.5	61	92.4	5	7.6	98.47	0.000**
5. Clinical manifestations of systemic lupus.	12	18.2	54	81.8	53	80.3	13	19.7	50.95	0.000**
6. Diagnostic tests of systemic lupus.	10	15.2	56	84.8	50	75.7	16	24.3	48.88	0.000**
7. Treatment of systemic lupus.	8	12.2	58	87.8	52	78.8	14	12.2	59.15	0.000**
8. Complications of systemic lupus.	11	16.7	55	83.3	48	72.7	18	27.3	41.95	0.000**

(p≤0.001).

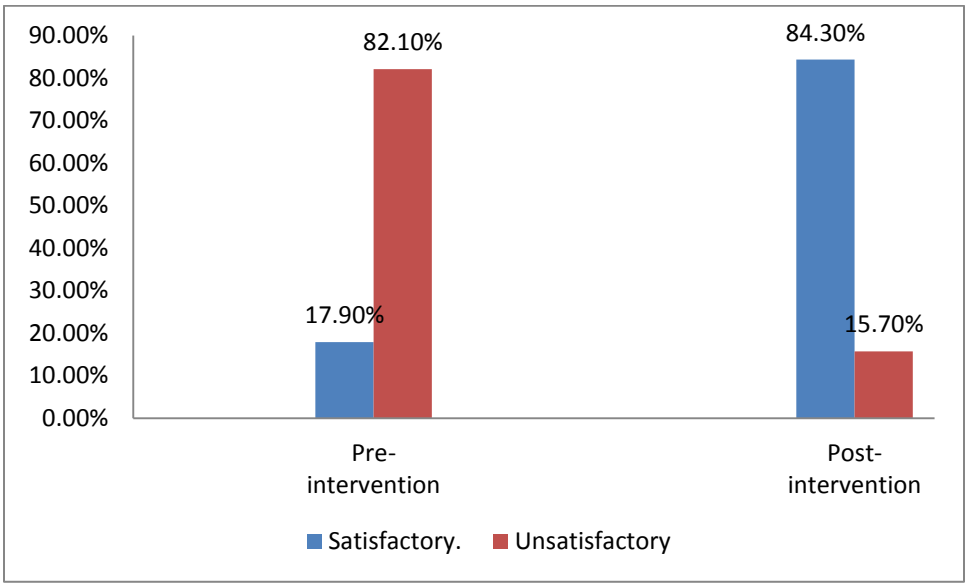

Figure (3): Distribution of the studied females regarding total knowledge about SLE pre and one month after self-care management (n=66)

Table (5): Distribution of the studied females according to fatigue severity pre and one month after self-care management (n=66)

Fatigue Items	Pre self-care management	One month after self-care management	Paired t test	P value
	Mean ±SD	Mean ±SD		
1. Motivation is lower when being fatigued.	6.2576 ±.61456	2.9545 ±.71105	30.614	<0.001**
2. Exercise brings on fatigue.	6.1061 ± .80630	2.6818 ±.82572	20.131	<0.001**
3. Being easily fatigued.	5.6970 ± .74358	2.6364 ±.93868	18.020	<0.001**
4. Fatigue interferes with physical functioning.	5.6364 ±.75725	2.5909 ±.58117	23.696	<0.001**
5. Fatigue causes frequent problems.	5.8030 ±.63778	2.8182 ± .80210	23.204	<0.001**
6. Fatigue prevents sustained physical functioning.	5.9545 ±.68908	2.4242 ± .63393	27.168	<0.001**
7. Fatigue interferes with carrying out certain duties and responsibilities.	6.0758 ± .80976	2.7424 ± .50568	30.084	<0.001**
8. Fatigue is the most disabling symptoms.	5.9394 ±.90942	2.7576 ± .87812	21.990	<0.001**
9. Fatigue interferes with work, family, or social life.	5.8939 ±.58517	2.5606 ± .65934	27.150	<0.001**
Total	53.3636 ±2.47222	24.1667 ±2.62288	57.596	<0.001**

* Statistically significant difference (p≤0.05), **Highly statistically significant difference (p≤0.001).

Table (6): Distribution of the studied females according to pain interference level pre and one month after self-care management (n=66)

Pain Interference items	Pre self-care management	One month after self-care management	Paired t test	P value
	Mean ±SD	Mean ±SD		
General Activity	6.2576 ±1.57996	3.0455±.99895	15.505	<0.001**
Mood	6.6364± 1.41025	2.5758±1.05336	19.948	<0.001**
Walking ability	6.5758± 1.61779	2.1970±.70645	19.720	<0.001**
Normal work (includes both work outside the home and housework)	6.4242±1.35942	2.2879±.98863	21.991	<0.001**
Relations with other people	6.3030±1.66382	2.4697± .93183	15.780	<0.001**
Sleep	5.9394±1.51788	3.0606±1 .18684	15.445	<0.001**
Enjoyment of life	5.9394± 1.48716	2.9545± 1.31771	13.211	<0.001**
Total	44.3788 ± 3.29925	18.5909 ± 3.29091	44.219	<0.001**

* Statistically significant difference (p≤0.05), **Highly statistically significant difference (p≤0.001).

Table (7): Mean Lupus PRO scores of studied females pre and one month after self-care management (n=66)

Lupus PRO Items	Pre self-care management	One month after self-care management	Paired t test	P value
	Mean ±SD	Mean ±SD		
Lupus Symptoms	3.3788±1.33319	9.3182±1.47970	-23.863	<0.001**
Cognition	1.8333 ±.75617	5.1818 ±.94314	-23.791	<0.001**
Lupus Medication	4.6364 ±1.60419	6.4242 ±1.05336	-10.473	<0.001**
Procreation	2.7121 ±1.17362	6.2879 ±1.17362	-21.924	<0.001**
Physical Health	6.9394 ±1.17511	15.8788 ±1.27116	-37.502	<0.001**
Pain-Vitality	7.2879 ±1.87095	17.1212 ±1.13022	-36.990	<0.001**
Emotional Health	7.7424 ±1.47085	17.0152 ±1.60281	-39.115	<0.001**
Body Image	5.7727 ±1.39002	12.9697 ±1.63585	-32.650	<0.001**
Desires-Goals	3.6818 ±1.24232	10.1515 ±1.25566	-28.160	<0.001**
Social support	2.7576 ±.74546	5.1061 ±1.15197	-13.143	<0.001**
Coping	4.4394 ±1.02475	8.1970 ±1.54142	-20.791	<0.001**
Satisfaction with care	5.0303 ±1.21490	10.5455 ±.91453	-28.515	<0.001**
Total Lupus PRO score	83.2424±4.19912	97.1667 ±3.85340	20.854	<0.001**

* Statistically significant difference (p≤0.05), **Highly statistically significant difference (p≤0.001).

Table (8) Correlation between studied females' total knowledge score, fatigue, pain and total lupus PRO score pre and one month after self-care management (n=66)

Variables		Pre self-care management				One month after self-care management			
		Knowledge	Fatigue	Pain	Lupus PRO	Knowledge	Fatigue	Pain	Lupus PRO
Knowledge pre intervention	R	1	.037	.044	.226	-	-	-	-
	p-value		.770	.728	.068	-	-	-	-
Fatigue pre intervention	R	.037	1	.049	-.137	-	-	-	
	p-value	.770		.697	.272	-	-	-	-
Pain pre intervention	R	.044	.049	1	.041	-	-	-	-
	P-value	.728	.697		.750	-	-	-	-
Lupus PRO pre intervention	R	.226		.041	1	-	-	-	-
	p-value	.068		.750		-	-	-	-
Knowledge one month after intervention	R	-	-	-	-	1	.351**	-..434**	-.256*
	p-value	-	-	-	-		0.000	0.000	0.05
Fatigue one month after intervention	R	-	-	-	-	.351**	1		.351**
	p-value	-	-	-	-	0.000			0.000
Pain one month after intervention	R	-	-	-	-	-.434*	.152	1	310*
	p-value	-	-	-	-	0.05	.222		0.05
Lupus PRO one month after intervention	R	-	-	-	-	-.256*	.351**	.310*	1
	p-value	-	-	-	-	0.05	0.000	0.05	

Discussion

Systemic lupus erythematosus is an autoimmune, systemic and a heterogeneous disease associated with widespread inflammation and tissue damage. It is associated with variations in signs, symptoms, and disease activity. Also, it is characterized by generalized body pain and most importantly fatigue [(24)]. Therefore, this study aimed to evaluate the effect of self- care management on health outcomes and symptoms for females with systemic lupus erythematosus.

Concerning age, the present study results illustrated that more than half of the studied females aged more than 30 years old. This finding agrees with Wageeh et al., (2020) [(17)] in a study "effect of nursing education on knowledge and self-care for patients with systemic lupus erythematosus" who reported that the majority of the studied subjects age ranged from (35-45) years old. While this results inconsistent with Abd El latifa , Hassana and Gomaab (2018) [(25)] who studied "effect of systemic lupus on patient's self-esteem and quality of life" and showed that half of the study sample was aged between 20 and 30 years . Also, Yu et al**.,** (2020) [(26)] conducted a study entitled "trends of hospital palliative care utilization and its associated factors among patients with systemic lupus erythematosus in the United States" and found that more than half of the study sample was older than 50 years. It seemed that SLE occurred most frequently between the age ranges 20-39 years. This high predisposition of childbearing age produced a major concern for care of this age group as well SLE is more common among females in the reproductive age as a result of hormonal changes in adolescence, and perinatal period till premenopausal age.

Regarding the level of education, the present study results showed that more than half of the studied females had preparatory school. This finding is in accordance with Wageeh et al., (2020) [(17)] who revealed that the majority of the subjects were educated, while, Zhang etal., (2019) [(27)], who studied "lack of patient education is risk factor of disease flare in patients with systemic lupus erythematosus" clarified that half of the studied sample had a high education.

As regard place of residence the present study finding clarified that more than half of the females were living in rural areas, this finding is supported by Abd El-Azeem et al., (2018) [(28)] who studied " effect of health promotion program on quality of life for patients with systemic lupus erythematosus" and revealed that more than half of the studied sample were living in rural areas.

As regards to marital status the present study results indicated that three quarters of the females were married. This finding goes on the same line with Zhang etal., (2019) [(27)] who clarified that about three quarters of the patients were married. In the same context, this result is congruent with O'Riordan, Doran and Connolly (2017) [(29)] who studied "fatigue and activity management education for individuals with systemic lupus erythematosus" and mentioned that the majority of the participants were married. From the

researchers' point of view these findings reflecting that SLE is a long-term disability disorder affecting the young patients during their productive years as well as the hospital serves the surrounding rural areas with minimal fees, finally; differences in results between researches could be due to differences of tools used for data collection and sitting at which the study was conducted.

Regarding the source of information about systemic lupus erythematosus the present study results illustrated that about two thirds of studied females had obtained information regarding systemic lupus erythematosus from mass media. This results are supported by Bin Haikel and Al Tulaihi (2018) [30], who conducted a study in Riyadh, Saudi Arabia about "awareness of systemic lupus erythematosus among primary health care patients" and clarified that more than half of participants had heard the term systemic lupus erythematosus and recognized the disease through the internet way (online resources). While Macejova et al., (2020) [21], in the study titled "living with systemic lupus erythematosus: a profile of young female patients" described that the most frequent sources of SLE related information were mostly physician.

Regarding previous obstetric history, the results of the current study revealed that more than one fourth of studied females were primigravida, while the rest of them were multigravida with more than one third had previous 2-3 pregnancies. Furthermore, about two fourth of the studied females was nulliparous while the rest had previous labor experience. This study findings agrees with Abd El-Salam et al.,(2019) [31], who conducted a study entitled "assessment of quality of life among pregnant women with systemic lupus erythematosus " and reported that about one fifth of the study women were primigravida while the rest of them were multigravida with more than two fifth having previous 2-3 pregnancies.

Continuing talking about obstetric history, the results of the present study clarified that about two fifth and one third of the studied females had one and two pregnancies in the presence of SLE, as well; the most reported complications during previous pregnancies were abortion followed by pre-eclampsia. Also, the most associated complications with delivery included premature rupture of membrane. These study findings are supported by Abdwani et al., (2018) [32], who studied "neonatal and obstetrical outcomes of pregnancies in systemic lupus erythematosus" and found that about half of the studied sample had previous obstetric history of abortion, about two fifth had preeclampsia and the minority had preterm labor.

With reference to onset of systemic lupus erythematous, the present study revealed that about two fifth of studied females had the disease from one year to less than five years. This result goes on the same line with El Fadeel, and El-Deen (2020) [16], who reported that half of the study group and more than one third of the control group had SLE for less than 5 years. Also, Gheita etal., (2021)[13], who studied "adult systemic

lupus erythematosus in Egypt" mentioned that disease duration was 4 years.

As regard other chronic diseases the results of the present study results revealed that more than two thirds of the studied females didn't have other chronic diseases. This finding are supported by Elsayed and Mesbah (2018) [33] who studied "effect of health education based intervention on self-care among systemic lupus erythematosus clients" and revealed that three quarters of patients didn't have other chronic diseases. On the contrary, Kankaya and Karadakovan (2020) [7] who studied "effects of web-based education and counseling for patients with systemic lupus erythematosus: self-efficacy, fatigue and assessment of care" found that more than half of study sample had other comorbidities.

Regarding risk factors that increase symptoms, the present study results clarified that, three quarter, more than two thirds and more than half of studied females had physical, emotional and hormonal risk factors for SLE respectively. This finding is consistent with Mohamed, EL-Bastawesy and Hegy, 2020) [9] who studied "impact of an education program on self-care agency and self-rated abilities among patients with systemic lupus erythromatosis" and stated that more than one third of the patient's symptoms increase due to physical and emotional tiredness.

Similarly; this result is in accordance with Kusnanto et al., (2018) [34], who stated in a study about "self-care model application to improve self-care agency, self-care activities, and quality of life in people with systemic lupus erythematosus" that the precipitating factor was physical stress and tiredness .

In relation to medical follow up the study results showed that one third of studied females had follow up every two months. Macejova et al.,(2020) [21] mentioned that more than two fifth had follow up every one month, and more than one third had follow up every two months which support the present study findings. However, Elsayed and Mesbah (2018) [33], showed that one third of the studied patients had follow up every six months. According to researcher's' point of view the most studied females reported that they came to hospital every two months as the outpatient clinics policy changed from regular follow-up and obtaining medications monthly to every two months because of Covid -19 pandemic.

Regarding symptoms of systemic lupus erythematosus as reported by the studied female, the present study results illustrated that the most common symptoms were fatigue, pain, skin rash as well as hair loss and complaining of arthritis. This finding is consistent with Cornet et al., (2021) [35] in a study entitled " living with systemic lupus erythematosus" and reported that fatigue is recognized as one of the most prevalent and common symptom affecting more than three quarter of studied females with SLE.

Similarly Bin Haikel and Al Tulaihi, (2018) [30], reported that the most common symptoms of lupus are complaints of fatigue and health

malaise. As well; many patients experience symptoms that include skin rash, photosensitivity and mouth ulcers. In addition Mahmoud et al., (2018) [36], in a cohort study of "clinical and immunological pattern and outcome of Egyptian systemic lupus erythematosus patients" reported that common presenting features of SLE occurring at the onset of the disease were arthritis**.**

Continuing talking about symptoms Abdel Masieh et al., (2019) [37], who studied "systemic lupus erythematous: symptoms and signs at initial presentations" mentioned that more than half of study sample had arthritis. Also a recent study conducted by Elgendi, (2021) [38], concluded that pain, tenderness and swelling of the joints are frequent symptoms for SLE females.

Regarding the total knowledge of studied females regarding systemic lupus erythematous the results of the current study clarified a noticeable progress among studied female's total score of knowledge pre and one month after self-care management with a highly statistically significant difference between pre and one month after self-care management. These results confirms the research hypothesis (H1) which stated that knowledge scores of studied females regarding SLE will expect to be improved post implementation of self-care management.

This results was congruent with Wageeh et al., (2020) [17], who show that there was a high statistically significant difference in patient knowledge regarding SLE in the pre-posttest for the study subjects with a p value =0.001. According to researchers' point of view deficient in knowledge before carrying out self-care management, may be due to unavailability of educational programs to give females required information about disease. As well increasing female's ability to manage their problems after increasing their awareness and acquiring healthy behaviors through educating them.

Moreover, the study finding was supported by Elsayed and Mesbah (2018) [33], who mentioned that, after implementation of the intervention, there were improving mean and standard deviation of studied patients' knowledge regarding systemic lupus erythematous disease with statistically significant differences between pre and post intervention. In this respect Mostafa and Abd-Elrehem (2017) [39], who studied "self- management guidelines: effect on awareness of patients with systemic lupus erythmatosus" added that more than two thirds of the patients included in their study had satisfactory awareness level regarding SLE post-implementation of self-management guidelines with highly statistical significance.

Concerning studied females fatigue the current study showed that, there were statistically significant differences in fatigue between pre and one month after self-care management with significant reduction in the level of fatigue in the studied females was observed post self-care management which supported hypothesis two which stated that studied females will exhibit

improvement in fatigue and pain post implementation of self-care management. This result is in accordance with Kankaya and Karadakovan (2020) [7], who studied "effects of web-based education and counseling for patients with systemic lupus erythematosus: self-efficacy, fatigue and assessment of care" and reported a significant reduction in the level of fatigue in the experimental group that had been observed in measurements after the intervention.

Similarly, Youssef, (2019) [3], who studied "effect of exercises training on fatigue, depression and physical activity in patients with systemic lupus erythematosus" reported that a significant difference post treatment than pre-treatment in fatigue severity with $p<0.001$. According to researchers' clinical experience, this could be due to positive effect of self-care management as well using non pharmacological management therapies and coping strategies such as relaxation techniques, increasing physical activities gradually and exercise as well as improving females diet and instruct on the importance of vitamin D supplement in dealing with fatigue demonstrated a beneficial effect on fatigue

As regard studied female's pain, the present study findings revealed that, there were statistically significant differences among the studied females between pre and one month after self-care management regarding to pain. As well a significant reduction in the level of pain in the studied females was observed post self-care management. These results also confirmed hypothesis two.

This finding is in accordance with Mohamed et al., (2018) [40],who studied "effect of self-management guidelines on health outcomes for patients with systemic lupus erthematosus" and concluded that there was a high statistically significant difference regarding pain. This could be due to positive effect of self-care management as well using non pharmacological management methods such as relaxation exercises such as deep breathing exercise, heat/cold application, exercises and positioning.

In concern to mean Lupus PRO scores of studied females the present study result displays that there were highly statistical significant differences regarding all Lupus PRO items between pre and one month after self-care management which support hypnosis three of the study which stated that studied female will reveal improvement in health outcomes post implementation of self-care management.

This could reflect the importance of self-care management in improving health outcome for SLE females. In this respect Elsayed and Mesbah (2018) [33], illustrated highly statistical significant improvement regarding all Lupus PRO items post intervention.

These findings are compatible with Williams et al., (2017) [11], in a study entitled "effective self-management interventions for patients with lupus" who clarified that self-management interventions that incorporate both social support and health education had a positive effect in improving health

outcome through reduced pain, improved function and delayed disability among patients with lupus.

In the same context Gholizadeh et al.,(2019) [41] who studied " body image mediates the impact of pain on depressive symptoms in patients with systemic lupus erythematosus" reported that the Lupus PRO- pain & vitality and Lupus PRO-body image indicate lower scores on the Lupus PRO before intervention which demonstrate elevated symptomatology. This finding is in accordance with Feldman et al., (2013) [42] who studied "designing an intervention for women with systemic lupus erythematosus from medically underserved areas to improve care" and found that the success of an intervention can be measured by improvements in ability to perform daily living activities, maintain a healthy diet, and exercise regularly as outcome measures.

The results of present study revealed a significant positive correlation among studied females total knowledge, pain, fatigue and total Lupus PRO score at the one month after self-care management. This result is consistent with Kusnanto, et al.,(2018) [34], they declared that the self-care activities that had been implemented increased quality of life. In the same context Pellegrini et al., (2018) [43], in the study about "use of physical activity monitors in rheumatic populations" found that self-care activities are carried out to reduce the arthritis pain often experienced by people with rheumatology disorders, such as SLE. This could reflecting the importance of performing physical exercise or sports in increasing female's vitality, primarily by helping them to overcome fatigue, also effective stress management can help female maintain emotional stability and increase adaptive coping.

Additionally; this result is consistent with Elsayed and Mesbah (2018) [33], who indicated highly positive association among studied subjects total knowledge, self-care practice and total Lupus PRO score post intervention. While Sari, (2016) [44], who studied "systemic lupus erythematosus: correlation between sensory knowledge, self-efficacy, preventive action towards triggers factors, self-care practice and quality of life" found that self-care practices were uncorrelated with health related quality of life and health outcomes in lupus patients.

Conclusion

The study's findings concluded that the implementation of self-care management had a positive and significant effect on females' knowledge level as well as reducing fatigue and pain severity, additionally a significant improvement in total Lupus PRO scores post self-care management were found. There was a highly positive correlation among studied females total knowledge, pain, fatigue and total Lupus PRO score at the post self-care management. Thus, the aim of the study was achieved and research hypotheses were supported.

Recommendations

The following recommendations are suggested:

- A simplified, comprehensive and illustrated Arabic guided images booklet about SLE should be distributed for each newly admitted female diagnosed with SLE.
- Encouraging the holistic approach for caring of SLE females through interdisplinary team including (physician, nurses, social workers and psychologists).
- Design a continuous health promotion program for females with SLE in hospitals in addition to media to help in improving the health status of these females.
- Conducting additional studies on larger samples from a wider range of females.

Further studies are suggested to

- Conduct web-based education to increase female's awareness about SLE.
- Apply educational programs for maternity' nurses about the continuous health promotion for females with SLE in hospitals.

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Impact of Safety Guidelines on Nurses' Knowledge regarding Incidents and Nurses' Safety Attitude at Neonatal Intensive Care Unit

Seham Mohammed Elmwafie [1], Amany Ibrahim Abdallah [2], Reda Mohammed Abduallah[3]

[1] Assistant Professor of Pediatric Nursing, Faculty of Nursing, Beni-Suef University, Egypt.

[2] Lecturer of Pediatric Nursing, Faculty of Nursing, Fayoum University, Egypt.

[3] Lecturer of Pediatric Nursing, Faculty of Nursing, Benha University, Egypt.

Abstract

Background: Patient safety has become a top issue in the global health-care quality agenda. **Aim:** The study aimed to explore the impact of safety guidelines on nurses' knowledge regarding incidents and nurses' safety attitude at Neonatal Intensive Care Unit. **Subject & Methods:** A quasi-experimental research design was used to conduct the study at three capital neonatal intensive care units. Thirty-three nurses were recruited for this study using purposive sampling technique. Data were collected using: (I) Safety Attitudes Questionnaire, (II) Incident sheet, and (III) Nurses' safety knowledge questionnaire /pre and posttest. **Results:** According to the study's findings, 69.3 % of nurses indicated a positive attitude toward the teamwork climate and 35.1 % of the most common incidents recorded were invasive procedure. In addition, there was highly statistical significant difference in the nurses' total knowledge before and after the educational guidelines intervention. **Conclusion:** This study concluded that, a low positive attitude in most areas toward safety was reported by the nurses. As well, the most incidents reported were invasive procedures and respiratory care errors resulted in minor problems. The guidelines program intervention was effective for improving nurses' knowledge bout neonatal safety measures. **Implications for clinical practices:** Nurse practitioners should apply incident reporting systems that are a key strategy to learn from incidents and monitor progress in the prevention of medical errors recurrence. It is necessary to train neonatal nurses and supervisors in relation patient safety competency.

Keywords: Safety attitude, Incidents, Neonatal intensive care unit, Safety guidelines.

Introduction

Medical errors and their negative impact on health are gaining increasing interest around the world. Neonatal Intensive Care Units (NICUs), recognized as a high sensitive environment, which signals the importance of healthcare team awareness about the causation of incidents.

Recently, the safety of neonatal ICU patients appears to be a top priority on the healthcare quality agenda. Unfortunately, medical errors still present and unavoidable in highly complex health setting like NICU [(1)]. Medical errors, known as incidents, accidents and adverse events, can cause severe harm or death. The effect of these errors can be reduced thorough

causative identification approach followed by detailed analysis of its consequences and prevention measures [2].Nowadays neonate safety improvement become a key focus of clinical care and research. The patient safety climate of an institution is critical element of ensuring safe environment and, as a result, consider critical key in preventing adverse events. Measuring the safety climate is significant since it has been shown that an organization's culture and team attitudes influence patient safety results, and it can be used to track change over time [3, 4].

Because patient safety is so important in healthcare, NICU nurses should be conversant with the unit's safety procedures, apply best practices, promote a safety culture, and maximize efforts to reduce errors. Moreover, top management commitment developing a patient safety culture is crucial in order to achieve the desirable organizational safety outcomes [5]

Neonatal nursing is a sub-specialty of nursing that works with baby born with a range of problems. It encompasses care for these neonates who experiences problems quickly after the first preliminary hours of start till 28 days of life. So, it is in truth essential for nurses to bear training that now not only enhance knowledge, but deliver exchange in behavior by using retaining accountability to care neonates and to meet general to particular needs. In the NICUs, nurses are in charge for introducing special, immoderate high quality and safe care for infants. Therefore, it is crucial their information and competencies associated with protection come to be part of nurses' functions and each day habits [1,6].

Despite these, the patient safety idea as an imperative part of patient care has yet to permeate aspect of the neonates' care. As well as, it has yet to become a trendy part of the curriculum in the nursing educational settings. Although case and observational studies proceed to record errors and neonate harm throughout ongoing care, additional research is wanted to apprehend the causes, consequences and evidence-based finding to eliminate neonatal intensive care-related incidents [7].

Significance of the study

Patient safety concerns have acquired extra attention from the health scientific community and national organizations, however little information is available on claims of neonatal malpractice. Although critical care settings provide vital care to high-risk newborns, they combine with considerable dangers of unfavorable risks of incidents and serious medical errors. Hence, it is critical to study the safety culture condition, the attitude of nurses and their knowledge about national neonatal safety guidelines and understand the common factors that contribute to the occurrence of the error and provides the fundamental data essential for improving neonates' safety. To address these problems, this research highlighted the impact of the safety guidelines intervention on nurses' knowledge and studies their safety attitude for a future research agenda.

Aim of the study

The study aimed to explore the impact of safety guidelines on nurses' knowledge regarding incidents and nurses' safety attitude at Neonatal Intensive Care Unit.

Study Hypothesis

H_1: Nurses are expected to have a positive attitude regarding patient safety at NICU.

H_2: Nurses' knowledge regarding neonatal safety measures will be expected to improved post implementation of the safety guidelines.

Subject and methods

Research design

A quasi-experimental research design was utilized to accomplish this study.

Sample size and sample technique

The participants in this study recruited using the purposive sampling technique. The sample consisted of 33 nurses working in the NICUs affiliated to Beni-Suef, Minia and Benha university hospitals, following these criteria; accepted to participate in the study, both sex included, any age, having at least 6 months' experiences in NICU and responsible for providing direct care for the neonates with any health problems.

Data collection tools

In order to achieve the aim of this study, three instruments were utilized for data collection including:

I: Safety Attitudes Questionnaire (SAQ): it is a short adapted 30-item version was designated by **(Sexton et al., 2006)** [8]. This questionnaire comprises two parts. The first part contains questions that address perceptions of patient's safety and the second part collects data about the professional respondent, including position held, sex, main job and years of experience. The instrument measures healthcare professionals' perceptions in six areas, the teamwork climate, the safety climate, job satisfaction, perceptions of management, stress recognition and working conditions, with a response is Likert scale ranging from:1=disagree strongly,2=disagree slightly, 3=neutral, 4=agree slightly, 5=agree strongly

The respondent who got a score of 75 or higher was considered to have positive attitude and those who had score less than 75 is considered to have negative attitude toward patient safety. The total domain score was calculated by summing all items in each domain then divided by the number of items with the conversion to the 100-point scale:1=0,2=25,3=50,4=75,5=100.

Content validity reliability of the SAQ: Cronbach's alpha was calculated for each factor of the SAQ. Values of Cronbach's alpha exceeding 0.70 indicate adequate internal consistency. Additionally, inter-item correlations and correlations between items and corresponding factor scores were calculated to examine the internal consistency reliability of SAQ, correlations greater than 0.30 indicate good reliability. Validity evidence based on content was evaluated by calculating scale and item level content validity indexes. The scale-level content validity index was 0.83, indicating good content validity. For

most of the items was also good, ranging between 0.78 and 0.95.

II: Incident sheet: This tool designed by the researchers after reviewing the relevant literature **(Snijders et al., 2007).** [9] Incidents were collected with the direct continuous observation of nurses or nurses' notes. The sheet includes incident type, severity, and time of occurrence. Nurses raters judged severity on a three-point Likert scale, minor (no interventions required), moderate (requiring routine therapy), major (need for intensive care specific to the ICU). Observations on incidents progress were done by the nurses who used the sheet weekly for six months with a list of possible medical errors.

III: Nurses' Knowledge Structured Questionnaire: It was designed by the researchers; and prepared based on **Egyptian Neonatal Safety Standers (2014)** [10]**.** It was consisted of 100 structured questions, concerning safety measures knowledge about infants' identification (5 item), ventilator care/oxygen therapy (10 items), invasive procedures (20 items), acquired infections in NICU prevention (15 items), diagnostic and sample errors (10 items), skin lesion and trauma (6 items), safely medication and total parenteral nutrition (20 items), reduce the risk of fires (9 items), safe transfer for newborn (5 items). The score for each question allotted as follows:

Answer	Score
correct	1
Incorrect/unknown	0
Total scores	10

Validity and reliability: The tool validity test was done through five panels of expertise; they are faculty members of pediatric nursing departments. In order to check the validity of the knowledge and practice regarding neonatal safety items in the current study, the data collection tool, applied to a pilot sample consist of 5 nurses. The sample was selected randomly from the study population. After the responses, Pearson correlation was conducted to get correlation coefficients between scores of each item and the total score of the items in which the item belonging to. This helped in determining the consistency of the questionnaire. The correlation coefficients ranging (.464-.732). The reliability of the tool was computed using a split - half method (r=0.84), this method was used to assess the homogeneity of the tool.

Ethical consideration

The present study was approved by the institutional ethical committee board of Faculty of Nursing, Benha University, and the study aim explained to the nurses before obtaining their written consent. Written consent outlined voluntary participation and anonymity. The nurses reminded that they have a right to withdraw whenever they wished and that the study results will be used solely for research purposes.

Field work

The study conducted from 1st April 2020 up to the end of September 2021.After official permission was obtained, the researchers started by explaining the study purpose briefly to the nurses and how to fill the questionnaires and incidents sheet. In this phase the researchers started recruiting the sample to using SAQ to determine the safety attitude. These questionnaires were filled by the nurses. Data has collected through the questionnaire and interview techniques.

Subsequently, eligible nurses were met, and invited to participate in the educational program, all nurses approved to join the program. Before implementing the safety guidelines program, areas of weaknesses of the nurses' knowledge were identified and the objectives set. The researchers designed a safety education program contents based on Egypt national safety standers

Those who gave their consent to participate in this study were interviewed using the knowledge questionnaire form, including pre-and post-test. The program intervention done through eight sessions, the patient safety measures discussed were: prevention of the identification errors, uses medicines safely in NICU such as dose, administration technique, wrong route/medication error, omission & commission; wrong site prevention, wrong patient and wrong procedures; reduced risk of healthcare acquired infections. In addition, reduce the risk of newborn accidental fall; safe transfer; using well-functioning machines and equipment, use monitor alarms safely; reduce the risk of the fires; mechanical ventilation/intravascular lines connection and disconnections safety guidelines. Immediately after the program intervention, the knowledge questionnaire posttest done to evaluate the nurses' knowledge improvement (tool III).

Statistical analysis

Data was organized, entered and analyzed by using SPSS software (Statistical Package for Social Science) version 16. Graphics were done using Excel program. Quantitative data were expressed as mean &standard deviation (X± SD) and analyzed by using T-test. Enumeration data were analyzed by the chi-square test. $P < 0.05$ was considered as a level of statistical significance.

Results

Table (1) showed that, the studied nurses consisted of 15.1% males and 84.9 females. Among them, 69.8 nurses had technical nursing institute. Most of the nurses were 26-30 years of age. As well, 60.6% of nurses' experience were less than 5 years. The same table indicated that only 9.1 % of nurses have attended specific course/ training in neonatology, and 100% of them reported no incidents reporting system within NICU.

Figure (1) showed the percentage of nurses who reported positive attitude was 69.3% of the teamwork climate, 57.2% of the safety climate, 53.4% of job satisfaction, 35.4% of stress

recognition, 59.3% of the perception of management and 49.5% of working conditions.

As obvious from **table (2)** that, there was a significant statistical correlation between age of nurses, their years of experience and their positive scored in relation to safety climate where P = (0.05, .001) respectively.

Table (3) showed the percentage of the common incident reported in the NICUs were invasive procedure, 35.08 %, respiratory care and ventilator care-related errors 21.05%, skin lesions 17.54%, medication and total parenteral nutrition errors 14.03%, infection control errors 10.52%. As well as, 70.17% of incidents had minor harm. The same table showed that, 66.31% of incidents occurred during ongoing care.

Table (4) documented that, the total mean score of nurses' knowledge pre and post program intervention, it was 59.3±5.87- 76.4±8.42 respectively and it revealed high statistical significant improvement post-intervention (P = 0.00).

Table (1): Socio demographic characteristics of the studied nurses (total n=33)

Sample characteristics	No.	%
Gender		
Male	5	15.1
Female	28	84.9
Age (years)		
20-25	3	9.1
26- 30	25	75.7
31- 40	3	9.1
≥40	2	6.1
Mean ± SD (26. 17±7. 12)		
Educational level		
Diploma	5	15.1
Technical nursing institute	23	69.8
Bachelor degree	5	15.1
Experience years		
Less 5	20	60.6
5 – 10	7	21.2
10 – 15	4	12.1
More than 15	2	6.1
Training courses		
Yes	3	9.1
No	30	90.9
Incidents reporting system applied at NICU		
Yes	0	0.0
No	33	100

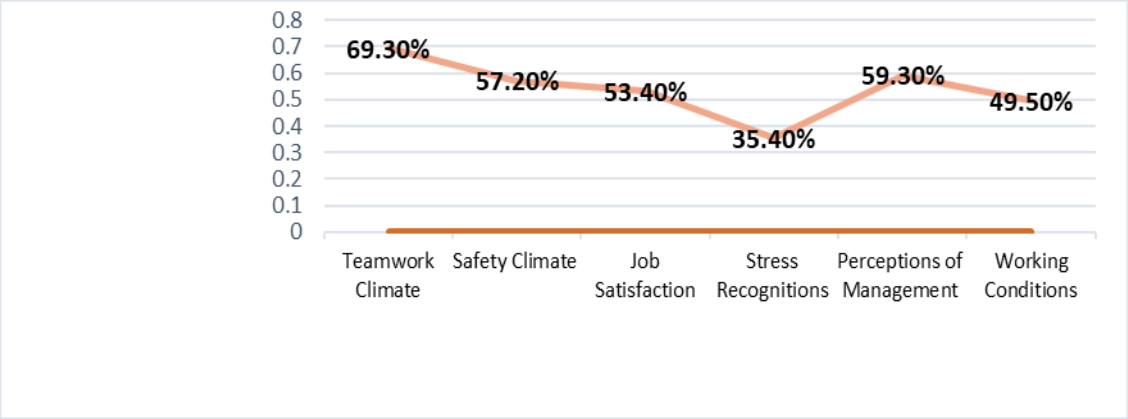

Figure (1): Percentage of the nurses' positive responses per SAQ areas.

Table (2): Correlation between characteristics of the nurses and SAQ subscales scores

study characteristic	F	Sig.	F	Sig.	F	Sig	F	Sig	F	Sig	F	Sig
Age of nurses	1.412	.259	6.36	.005*	.972	.390	.015	.985	.384	.685	4.860	.015
Years of experiences	9.608	.000*	6.57	.001*	.221	.925	.604	.663	3.307	.024	3.874	.013
Works Hours	.358	.554	.005	.942	.546	.465	4.776	.037	.004	.950	2.651	.114
Educational level	4.221	.024	2.369	.111	.568	.573	.128	.881	5.321	.011	3.476	.044

*p <.0.05 significant correlation

**p <.0.001 high statistical significant

Table (3): Incidents types, severity and time of occurrence in NICUs reported by nurses

Incidents types (total 285 incidents)	No.	*%*
Medication and total parenteral nutrition errors	40	*14.03*
Respiratory care and ventilator care-errors	60	*21.05*
Invasive procedures errors	100	*35.08*
Infections control errors	30	*10.52*
Diagnostic and sample errors	5	*1.75*
Skin lesion and trauma	50	*17.54*
Incidents severity		
Severe	35	*12.28*
Moderate	50	*17.54*
minor	200	*70.17*
Time of occurrence		
Admission	9	*3.16*
Ongoing care	189	*66.31*
Emergency	76	*26.67*

*Number is not exclusive

Table (4): Mean scores of nurses' knowledge about safety measures in NICU pre-and post-program intervention (N=33)

National Safety measures knowledge	**Pretest**	**Posttest**	**P value**
	Mean ±SD	**Mean ±SD**	
• Newborn ' identification safety	4.03±.76	4.53±.16	.069
• Ventilator care/oxygen therapy safety	4.21±1.31	8.21±.78	.000**
• Invasive procedures safety	11.93±2.55	16.23±1.3	.000**
• Acquired infections	10.51±1.8	13.91±.23	.027
• Diagnostic and sample errors	4.84±1.62	8.04±.06	.000**
• Skin lesion and trauma prevention	3.09±1.30	5.09±.30	.000**
• Safely Medication and TPN	11.87±2.4	17.08±1.6	.000**
• Reduce the risk of fires in NICU	5.36±.03	7.04±1.73	.000**
• Safe transfer for newborn	3.50±.62	4.13±.31	.000**
Total knowledge	59.3±5.87	76.4±8.42	.000**

** Highly significant at P < 0.01

Discussion

The present study is figuring out that, most the nurses were female and had experienced less than 5 years. Regarding their education, the result revealed that the rest of them achieved their college nursing education. In addition, the majority of them did not attain any course or training program in relation to patient safety. These results are consistent with findings from previous studies done by **El Sayed et al., (2013)** [11] who highlight that, most the nurses are secondary nursing school graduates, and didn't attend any previous in-service training program about neonatal care.

Concerning the application of the safety attitude questionnaire, the current study findings confirmed that, most of nurse presented positive safety attitude in relation team work safety, and nearly half of them had positive attitude about climate safety, job satisfaction and the perception of management. This finding goes on line with another study done by **Hemmat et al., (2015)** [12] about the determining the perception of patient safety culture, and found that, nurses' positive response mean score to the 12 areas of patient safety culture was high. As well, in a research performed in France by **Scherer and Fitzpatrick (2008)** [13] entitled perceptions of patient safety culture among physicians and nurses in the perioperative area, found that teamwork dimension in the unit obtained the highest positive response rate.

Additionally, these findings showed that less than half of nurses had a positive attitude in relation job satisfaction, and stress recognition. This finding agreed with **Canadian Patient Safety Institute, (2011)** [14] it referred to that, in healthcare settings, a significant percentage of errors are attributed to a lack of effective administration team. Another study done by **Needleman, et al., (2002)** [15] that examined nurses' job satisfaction and documented that less than half of nurses were dissatisfied with their work. This finding supported by a study done by **Gabrani (2013)** [16] who observed that the international benchmark standards of patient safety have been not met, as evidenced by the low mean values in relation to the five safety dimensions. The findings of this study showed a significant correlation between age of the nurses, their years of experience with their positive attitude percentage in relations teamwork climate, and safety climate.

Based on researchers` point of view, increasing positive safety attitude for nurses by improving team management, job satisfaction and good communication are crucial and can lead benefits such as reducing the treatment errors, enhancing patient safety, and improving the quality of healthcare services. In this context, **Ausserhofer et al., (2013) and Tavares et al., (2018)** [17,18] pronounced that poor communication and ineffective teamwork are elements that contribute to the occurrence of patient safety incidents.

Study findings illustrated that, there were 285 incidents reported within 6 months in the selected NICUs. Invasive technique errors presented the most frequent incident type, constitute one third of the total number of medical errors. This was followed by respiratory procedure incidents, including intubation, mechanical ventilation, and nasal prong technique. This is may be due to that high risk neonates had high length of stay and required complex invasive maneuvers, so they had more chance for medical errors, in addition to lack of the nurse competency level. These results are consistent with other studies done by **Ligi et al., (2008) and El-Shazly et al., (2017)** [19,20] about medical errors in neonatal intensive care unit, they showed that invasive procedures incidents were the most frequent type of medical malpractice, constituting 27.28% of the total number of errors followed by endotracheal intubation incidents.

On the other hand, results of this study showed that, medication error constitutes 17.02 % of the total errors followed by skin trauma. This finding goes on line with **Stavroudis et al., (2010)** [21] they reported that, in NICUs medication errors occur eight times more often, raising the chance to cause severe danger. In this perspective, **Snijders et al., (2011)** [22] reported that incidents concerning mechanical ventilation, parenteral nutrition and medication dosing errors consider the highest risk to NICU patients.

Moreover, the study results showed that, most reported incidents were minor and not need any intervention. Similar studies done by **Kugelman et al., (2008) and Singer & Vogus, (2013)** [23,7] revealed that most of the incidents were

classified as minor. In our opinion identifying errors should be the first and main instrument to prevent them.

The researchers think that, these incidents may be due to that, neonates receive an excess number of medications and expose to many invasive procedures for diagnosis and treatment over a prolonged time, as well as, incidents can due to less equipment, devices failure, poor team communication, lack of nurses' education and training. In this regards **El-Meneza et al., (2019)** [24] mentioned that, the most adverse event types were due to equipment/device failure and added, the most errors contributing factors were due to poor education/training, and communication problems.

The researchers suggest that, application of voluntary, non-punitive incident report including both adverse events and medical errors within NICUs generates more and valuable data about type, causes and ways of prevention.

Regarding nurses' knowledge scores about safety measures in NICUs on pre- program intervention, finding of this study showed that, the nurses' mean score was low in relation to all safety measures. These agreed with **Elsayed et al, (2013)** [11] who found that, before the educational program application at NICU the total scores of nurses' knowledge was poor. This study finding can attribute the inadequate nurses' knowledge due to deficiency of the orientation program, deficiency of the nurses training program about safety guidelines within NICU, low level of nurses' education and absence of unified policy. This attribution confirmed by **WHO (2009)** [25] which stated that there was lack of nurses' knowledge and practice and attributed this problem to more reasons, such as lack of orientation program, less number of the nursing conferences and lack of supervisors' competency.

Moreover, our study showed significant improvement of nurses' total knowledge mean score about safety measures in NICU post program intervention. This finding was due to the effect of training and guidelines application which provided by the researchers. This finding consistent with **Rahimi, et al., (2018)** [26] who study the impact of training on nurses' performance, and stated that, the study not only showed positive impact of training on nurses, but also, validates scope of continuing nursing education. In this regard **Kelly et al., (2011)** [27] mentioned that, providing more chances for nurses to pursue extra education could improve their performance level. Meantime, the nurses are capable of applied theoretical knowledge to clinical practice which lead to improving the quality of patient care globally

From study results the researchers suggested that, to eliminate the risk of incidents, the neonatal nurses should expose to the periodical training programs, including updating safety guidelines at NICU, which help them to apply care properly and effectively with minimal errors. Thus, assessing contributory factors, and implementing preventive measures can be helped in reducing these errors.

In this context **Amiri et al., (2018**) [6] mentioned that it is important to train nurses and supervisors frequently in the hospital to improve the general patient safety culture and implement additional actions necessary such as reported incidents and added that, lack of trained staff can lead to unsafe care.

Conclusion

According to study findings, it can be concluded that a weak positive safety attitude in most areas of SAQ especially in relation to job satisfaction and stress recognition was perceived by the studied nurses team. The most incidents reported by the nurses were invasive procedures and respiratory care malpractices which lead to minor problems. while some errors consider serious and needed intensive care. Additionally, the findings can point to that, educational guidelines were effective for improving nurses' knowledge regarding to safety measures at neonatal intensive care unit. As well, this study indicated that hospitals need to assess patient safety status and climate frequently and promote health team communication system.

Implications for clinical practices

1. Team management and the effective channel of communication with nurses must be improved.
2. Nurses should follow the national neonatal safety care guidelines to eliminate medical errors.
3. The nurses should apply the incidents reporting systems which consider as the key

of incident monitoring and the progress of medical error recurrence prevention.

4. It is necessary to train nurses and supervisors working in the NICUs about patient safety competency.

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Comparison among Three Different Rehabilitation Programs on Outcomes of Patients with Posterior Tibial Tendon Dysfunction

Rasha Ali Ahmed Abdelmowla[*1], Hanan Ali Ahmed Abdelmowla[2], Asmaa Sayed Abd-Elmageed[3]
[1 ,3]Assistant Professor of Medical-Surgical Nursing, Faculty of Nursing, Assiut University, Assiut, Egypt
[2] Lecturer of Medical-Surgical Nursing, Faculty of Nursing, Assiut University, Assiut, Egypt
[*]Correspondence: Rasha Ali Ahmed Abdelmowla, Faculty of Nursing, Assiut University, Assiut, Egypt, Email: rashaali@aun.edu.eg

Abstract

Background: Posterior tibial tendon dysfunction is a chronic, progressive, disabling condition of tendon that adversely affects ankle, foot and lower limb function.**Aim:** Was to compare among three different rehabilitation programs on outcomes of patients with posterior tibial tendon dysfunction. **Subjects and methods:** Research design: Quasi-experimental design was used with a comparative study using parallel-randomized groups (three intervention groups) with absence of control group. Subjects and setting: The study included 60 patients with stage I posterior tibial tendon dysfunction attended to orthopedic department and orthopedic outpatients clinic at Assiut University Hospitals. They randomly assigned into 3 equal groups (20 for each) by using a computer based selection program; group (A) muscle strengthening exercises and cold application, group (B) muscle strengthening exercises, medial arch support insoles and contrast bath, and group (C) muscle strengthening exercises, medial arch support insoles, ankle strengthening exercises and contrast bath. Tools: Patients assessment sheet, visual analog scale, revised foot function index, short musculoskeletal functional assessment questionnaire and exercises adherence logbook. **Results:** Pain level, revised foot function index scores, and short musculoskeletal functional assessment questionnaire scores significantly decreased in all groups after rehabilitation (p. value < 0.01). Group (C) demonstrated most improvement in each category followed by group (B) while group (A) demonstrated least improvement. **Conclusion:** Muscle strengthening exercises, medial arch support insoles, ankle strengthening exercises and contrast bath considered more effective rehabilitation program in reducing pain and improving perceptions of function than other rehabilitation programs. **Recommendation:** Rehabilitation should be considered within the first line of managing patients with stage I posterior tibial tendon dysfunction.

Keywords: Patients outcomes; Posterior tibial tendon dysfunction; Rehabilitation programs

Introduction

Posterior tibial tendon dysfunction (PTTD) is an inflammation and/or overstretching of posterior tibial tendon that connect tibialis posterior muscle to bones of foot. It also can involve the associated ligaments and joints on the medial inner side of the foot and ankle leading to collapse of the medial longitudinal arch of the foot and sometimes ankle deformities occur which become debilitating or disabling in later stages [(1)].

Data on prevalence of PTTD is limited, however, PTTD is estimated to occur in about 3.3% to 10% of population, but this percent is likely to be higher as it can often be poorly recognized. It can occur in women over 40 years, occupations necessitate prolonged standing, limited ankle dorsiflexion, plantar heel spurs, excessive foot pronation, excessive running, athletic, patients with inflammatory arthritis, diabetes, hypertension, obesity, and foot or ankle trauma [(2, 3)].

Posterior tibial tendon dysfunction cause pain and/or swelling in the inner ankle, impaired mobility, instability while walking, toes begin to point outward, poor function and acquired flatfoot deformity. If PTTD left untreated, correction of the flattened foot may require surgery [(4)].

Posterior tibial tendon dysfunction divided into three stages according to Johnson and Strom. Stage I characterized by medial ankle pain, mild swelling, normal but sometimes possibly painful heel rise with no deformity. Stage II characterized by progressive flattening of the medial longitudinal arch with the foot appears flat, inability to rise heel, forefoot abduction and hindfoot valgus malalignment. Stage III includes all signs of stage II with fixed valgus hindfoot deformity accompanied by fixed compensatory forefoot varus [(5)]. Myerson added

stage IV that involves valgus tilt of the joint of ankle within mortise lead to lateral tibiotalar degeneration [6].

Management of PTTD in the early stages (I and II) is typically conservative, aiming to relieve pain and swelling. It mainly focuses on arch supporting devices, non-steroid anti-inflammatory drugs and local strengthening exercises. Surgical management aiming to correct deformity in the late stages (III and IV) and recently to prevent joint and soft tissue destructions in early stages (I and II) that do not respond to conservative treatment [7].

Nursing takes a key role in short and long-term care of patients. Nursing rehabilitation includes positioning and mobilization, supporting patients to independently and to actively perform self-care. Rehabilitation nurses make patients actively participate in the rehabilitation plan [8]. Rehabilitation involved care, education and training that help patients to accomplish the goals of intervention. It enables patients experiencing disability to improve, reach and maintain optimal functioning [9]. Depending on the patients` needs, nurses deliver rehabilitation interventions. In many and different patients conditions, nurses are considered the only professionals who deliver rehabilitation to patients. Basic rehabilitation interventions are delivered to the patients; they are educated and trained in managing disability [10].

Significance of the study

Posterior tibial tendon dysfunction is a progressive condition continuum from pain and tendon dysfunction to acquired flatfoot deformity if not treated properly in early stages. Clinical trials for the efficacy of exercises management in PTTD are lacking and exercises prescription parameters are poorly reported in the literature. Some clinical trials suggests that exercises are beneficial in reducing tendon pain and disability but there is no evidence about the best type of exercise used in managing patients with PTTD in early stages. So, this study conducted in an attempt to reduce pain and improve functional ability and identify which rehabilitation program would be most effective.

Aims

General objective

This study was aimed to compare among three different rehabilitation programs on outcomes of patients with stage I posterior tibial tendon dysfunction.

Specific objectives

1. Reduce pain, improve mobility and functional status for patients with stage I posterior tibial tendon dysfunction after rehabilitation programs.
2. Identify the most effective rehabilitation program for patients with stage I posterior tibial tendon dysfunction.

Research Hypothesis

The hypothesis of this study included that:

1. Rehabilitation programs would show significant improvements in reducing pain, and improving foot function, mobility and functional status for patients with stage I posterior tibial tendon dysfunction.
2. The results of the rehabilitation program applied for group (C) including muscle strengthening exercises, medial arch support insoles, ankle strengthening exercises and contrast bath would be positively different than the results for those patients in groups (A) muscle strength exercises and cold application and (B) muscle strength exercises, medial arch support insoles and contrast bath.

Subjects and Methods

Study Design

Quasi-experimental design was used with a comparative study using parallel- randomized groups (three intervention groups) with absence of control group to compare among three different rehabilitation programs on outcomes of patients with stage I PTTD.

Subjects and Setting

Patients diagnosed with stage I PTTD were recruited from the orthopedic department and outpatients clinic at Assiut University Hospitals. All eligible patients with stage I PTTD who agreed to participate in the study were included. Sixty adult male and female patients with age ranged from 18 to 65 years old with current complaint of foot and ankle pain and diagnosed with stage I PTTD. Patients were divided randomly into three groups (A, B and C, 20 patients for each) by using a computer based selection program. They randomly assigned to one of the three different rehabilitation programs. Exclusion criteria included pregnancy, rigid foot deformity, previous foot local injection or surgery and neurological,

Peripherovascular, or other foot pathology.

Sample size

In order to reach (90% power) of study for detection effect size assuming (5% type I statistical error), a sample size of 60 patients to be included as a total number was found to be sufficient. So, this study included 20 patients in each group.

Tools

Tool I: Assessment sheet for patient with stage I PTTD

It developed by the researchers and included two parts to assess patients demographic and medical data:

Part 1: Demographic data: age, gender, occupation and level of education.

Part 2: Medical data: body mass index, co-morbidities, affected leg and history of foot or ankle trauma.

Tool II: Visual analog scale (VAS)

It was developed by **Scott and Huskisson, (1976)** [(11)] to measure pain intensity. It is a self-reported measure by making a hand written mark on (10 cm) line represents a continuum from "0 to 10". No pain (0), mild (1-3), moderate (4-6) and severe (7-10).

Tool III: Revised foot function index (FFI-R)

It was developed by **Venditto et al., (2015)** [(12)] to give information about foot function as to how foot pain affected patients' abilities to manage daily living activities. It divided into 3 subscales; pain (pain of foot in different situations) included 5-items (range 0-50), disability (difficult in performing various functional activities due to foot problems) included 9-items (range 0-90) and activity limitation (restriction in activities due to foot problems) included 3-items (range 0-30). Scoring of each item is rated on (0 to 10) Likert scale; 0 means no pain/disability and 10 means worst pain imaginable/severe disability to each item. Total score "maximum 170" multiplied by "100" (the total score/ 170×100 = the total FFI-R score %).

Tool IV: Short musculoskeletal functional assessment questionnaire (SMFA)

It was developed by **Swiontkowski et al., (1999)** [(13)] to measure functional status of patients with various musculoskeletal disorders. It consists of mobility, dysfunction and bother indexes. It is a 46-item self-report instrument (34-item for assessment of patients function and 12-item covering how bothered patients are by their symptoms). Each item included in the 34-item of mobility and dysfunction indexes has 5-point response; 1 point = good function and 5 points = poor function. Each item included in the 12-item of bother index has also 5-point response; 1 point = not at all bothered and 5 points = extremely bothered. The lower score indicate better function, mobility, and patients are less bothered by their symptoms while the higher score indicate worse function, mobility and patients are bothered by their symptoms.

Tool V: Exercises adherence logbook

It was developed by the researchers to ensure adherence of patients to the rehabilitation programs. It consisted of checklist pages containing the rehabilitation program for 6 months follow up period. Self-reported adherence of each patient in the three groups was recorded as complete adherence = 2, partial adherence = 1 and non-adherence = 0.

Procedure

Ethical considerations

Before conducting the current research, ethical approval was obtained from faculty of nursing ethical committee and from authorities of Assiut University Hospitals. Oral consent was obtained from each patient to participate in this research after fully explanation to the aim and nature of this research. Patients were informed by researchers that their participation in this research was voluntary and their data would be confidential.

Tools validity

The content validity of the used tools was tested for comprehensiveness, relevance, clarity, and appropriateness, it reviewed by five experts (one assistant professor of medical-surgical nursing and one professor and one lecturer of orthopedic and traumatology and 2 professors of rheumatology, rehabilitation and physical medicine in Assiut University). Modifications were done to ensure visibility and clarity of sentences and suitability of the content.

Tools reliability

The reliability for VAS (tool II) as assessed by intraclass correlation coefficients was (0.97). The internal consistency for FFI-R (tool III) was (0.95) Cronbach's alpha test. The internal consistency for SMFA (tool IV) was (0.90) Cronbach's alpha test.

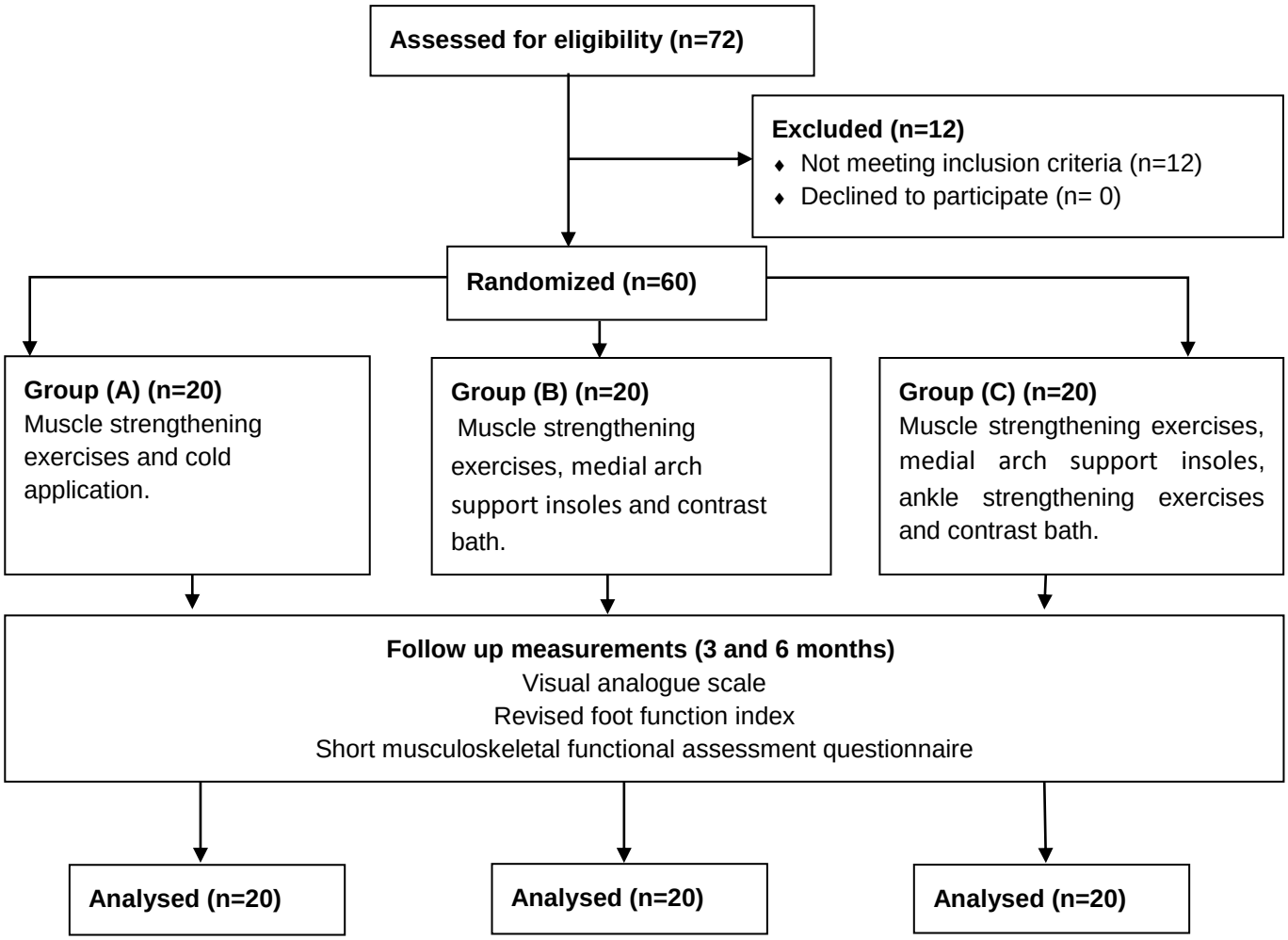
Pilot study

It was conducted on 10% [6 patients (2 patients from each group)] to ensure the feasibility and

applicability of the research tools and the time required to completed. Depending on the results of the pilot study, necessary modifications were performed. The six patients who involved in the pilot study (2 from each group) did not included in the current study sample.

Fieldwork

Based on the inclusion and exclusion criteria, patients with stage I PTDD were classified into 3 groups. They randomly assigned into 3 equal groups (20 for each) by using a computer based selection program. They randomly assigned to one of the three different rehabilitation programs.



Flow diagram of study sample recruitment

All groups of patients (A, B, and C) were assessed initially for demographic and medical baseline data (tool I). Also, they were assessed before and after rehabilitation programs for pain intensity (tool II), foot function (tool III), and their functional status (tool IV).

Each tool was taken from 15-30 minutes to fill out by the researchers. After group allocation, all patients were provided with instructions about their allocated rehabilitation program. Patients were informed that muscle soreness in leg was a normal response to exercises

Rehabilitation Programs (Handout)

It developed by the researchers guided by **[Nilgun et al. (2012) (14) ; Blasimann et al. (2015) (2) ; Houck et al. (2015)** [(15)] ; **Ross et al. (2018)** [(16)] .It developed in Arabic language to meet patients` needs.

Group (A)

-Muscle strengthening exercises of:

-Flexor digitorum longus (2 sets of 15 repetitions, 1-2 times per day).

-Flexor hallucis longus (2 sets of 15 repetitions, 1-2 times per day).

-Tibialis posterior (3 sets of 10 repetitions once per day).

-Foot intrinsic (3 sets of 10 repetitions once per day).

- Cold application for 20 minutes (2-3 times/day).

Group (B)

-Muscle strengthening exercises of:

-Flexor digitorum longus (2 sets of 15 repetitions, 1-2 times per day).

-Flexor hallucis longus (2 sets of 15 repetitions, 1-2 times per day).

-Tibialis posterior (3 sets of 10 repetitions once per day).

-Foot intrinsic (3 sets of 10 repetitions once per day).

-Contrast bath for 20 minutes (2-3 times/day).

-Medial arch support insoles.

Group (C)

-Muscle strengthening exercises of:

-Flexor digitorum longus (2 sets of 15 repetitions, 1-2 times per day).

Flexor hallucis longus (2 sets of 15 repetitions, 1-2 times per day

-Tibialis posterior (3 sets of 10 repetitions once per day).

-Foot intrinsic (3 sets of 10 repetitions once per day).

-Ankle strengthening exercises (Ankle resistance exercises):

-Elastic band plantar flexion (2 sets of 15 repetitions, 1-2 times per day).

-Elastic band dorsiflexion (2 sets of 15 repetitions, 1-2 times per day).

-Elastic band inversion (2 sets of 15 repetitions, 1-2 times per day).

-Elastic band eversion (2 sets of 15 repetitions, 1-2 times per day).

-Contrast bath for 20 minutes (2-3 times/day).

-Medial arch support insoles.

-All patients received one educational session in the orthopedic department and outpatients clinic at Assiut University Hospitals lasted approximately 40-50 minutes where they informed about the average time of resolution of symptoms (realistic anticipation of rehabilitation program success; 3 to 6 months), and the importance of commitment to the recommended rehabilitation program.

According to their random allocation, wearing suitable footwear (avoid tight and hard footwear), and weight control. Every patient was given a handout of the rehabilitation program according to random allocation.

-All patients informed to do and adhere to the allocated rehabilitation program at home and they encouraged continuing with their rehabilitation program independently. They followed up for 6 months after implementation of the rehabilitation program according to their random allocation. Patients were evaluated at 3 and 6 months in the orthopedic outpatients clinic at Assiut University Hospitals for pain intensity using (tool II), foot function (tool III), and functional status (tool IV) .

-Exercises adherence logbook (tool V) was used to encourage patients to follow and record their commitment to the allocated rehabilitation program. It was recorded by patients, and collected after 6 months-the end of follow up to aid researchers to confirm patients` commitment to the allocated rehabilitation program.

Statistical analysis

It was performed with SPSS 20.0 software. Categorical variables were described by number and percent, where continuous variables described by mean and standard deviation. Chi-square test (X^2) used to compare between categorical variables. One way ANOVA test (F) used to compare between continuous variables. A two-tailed ($p < 0.05$) was considered statistically significant

Results

Table (1): clarified that no statistical significant difference was found among all groups of patients (A, B and C) regarding demographic data (p.value > 0.05). The mean ages of patients were 50.84 ± 9.36, 48.17 ± 6.82, and 49.95 ± 11.73 years, respectively. The majority of patients in all groups were females. All of them were educated and working. Regarding baseline medical data, no statistical significant difference (p.value > 0.05) was found among all groups of patients (A, B and C). The mean body mass indexes of patients were 28.4 ± 4.52, 27.5 ± 9.61, and 28.6 ± 7.24 kilogram, respectively. Fewer percent of them were having diabetes mellitus, hypertension and history of foot or ankle trauma.

Table (2): displayed that there was no statistical significant difference among the three groups as regard pain level using VAS before stating the rehabilitation programs (p.value > 0.05). Statistical significant difference (p.value < 0.01) was found among the three groups as regard pain level while group (A) demonstrated the least improvement.

scores after 3 and 6 months of the rehabilitation programs. There was an obvious improvement in pain level scores after 3 and 6 months of the rehabilitation programs among the three groups. However, the improvement was highly in group (C) followed by group (B) then group (A).

Figure (1): illustrated that more than one-third of patients in all groups were having swelling along the posterior tibial tendon before application of rehabilitation programs. After application of rehabilitation programs, swelling along the posterior tibial tendon disappeared in all patients in the different three groups.

Table (3): showed that no statistical significant difference was found among patients in the three groups before rehabilitation programs regarding their FFI-R mean scores (p. value > 0.05). Statistical significant difference was found among patients in the three groups after 3 and 6 months of rehabilitation regarding pain and disability subcategory mean scores of the FFI-R (p.value < 0.01). The improvement in mean scores was found in the three groups, markedly high in group (C) followed by group (B) then group (A).

Table (4): displayed that no statistical significant difference was found among patients in the three groups before rehabilitation programs regarding their SMFA mean scores (p. value > 0.05). There were significant main effects for rehabilitation time, indicating that all groups improved overtime of rehabilitation after 3 months (p.value < 0.01) regarding dysfunction and mobility items of the SMFA scores and after 6 months regarding dysfunction (p.value < 0.001) and mobility (p.value < 0.01) items of the SMFA scores.

Short musculoskeletal functional assessment questionnaire scores decreased in all groups after rehabilitation. Group (C) demonstrated the most improvement in each category followed by group (B) .

Table (5): showed that no statistical significant differences were found among all groups of patients regarding their adherence to the rehabilitation programs (p. value > 0.05). The majority of patients in all groups were completely adhering to their rehabilitation programs through their follow up period.

Table (1): Frequency distribution of demographic and medical data of the studied groups

Variables	Group (A) (n=20)		Group (B) (n=20)		Group (C) (n=20)		F/X^2	p. value
	No.	%	No.	%	No.	%		
Age (years) (18-53)								
Mean ± SD	50.84 ± 9.36		48.17 ± 6.82		49.95 ± 11.73		0.408	0.667
Sex								
Male	2	10	4	20	1	5	2.264	0.322
Female	18	90	16	80	19	95		
Level of education								
Low	7	35	3	15	4	20	2.703	0.609
Moderate	6	30	7	35	8	40		
High	7	35	10	50	8	40		
Occupation								
Office work	6	30	8	40	9	45	2.420	0.659
Machinery work	5	25	2	10	4	20		
Manual work	9	45	10	50	7	35		
Co-morbidities								
None	15	75	17	85	16	80	1.668	0.797
Diabetes mellitus	2	10	2	10	1	5		
Hypertension	3	15	1	5	3	15		
Body mass index								0.883
Mean ± SD	28.4 ± 4.52		27.5 ± 9.61		28.6 ± 7.24		0.125	
Involved side								
Right	9	45	13	65	8	40	2.800	0.247
Left	11	55	7	35	12	60		
History of foot or ankle trauma	2	10	4	20	3	15	0.784	0.676

Chi-square test for qualitative data One way ANOVA test for quantitative data
Non-significant $p > 0.05$

Table (2): Percentage distribution of pain level using visual analog scale scores for patients before and after application of different rehabilitation programs

Visual analog scale (Pain level)	Group (A) (n=20)		Group (B) (n=20)		Group (C) (n=20)		X^2	p. value
	No.	%	No.	%	No.	%		
Before rehabilitation								
No pain (0)	0	0	0	0	0	0	0.404	0.817
Mild (1-3)	0	0	0	0	0	0		
Moderate (4-6)	8	40	10	50	9	45		
Severe (7-10)	12	60	10	50	11	55		
After rehabilitation (3 months)								
No pain (0)	1	5	1	5	3	15	12.408	0.015*
Mild (1-3)	15	75	17	85	7	35		
Moderate (4-6)	4	20	2	10	10	50		
Severe (7-10)	0	0	0	0	0	0		
After rehabilitation (6 months)								
No pain (0)	4	20	5	25	11	55	9.932	0.042*
Mild (1-3)	14	70	15	75	9	45		
Moderate (4-6)	2	10	0	0	0	0		
Severe (7-10)	0	0	0	0	0	0		

Chi-square test *Significant $p < 0.01$

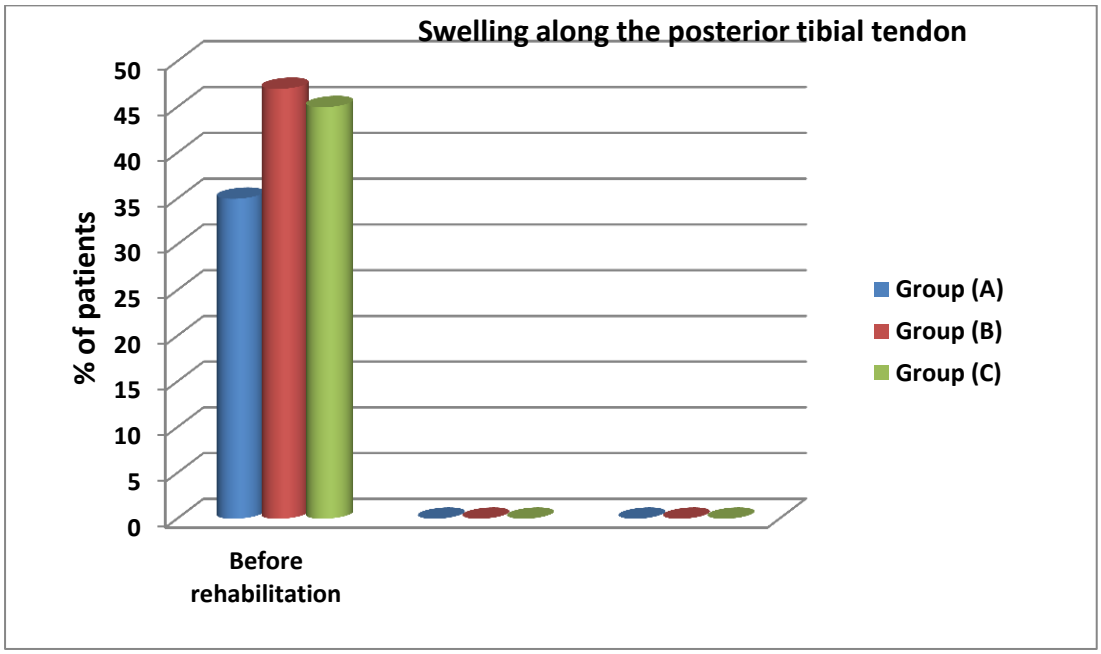


Figure (1): Percentage distribution of swelling along the posterior tibial tendon for patients before and after application of different rehabilitation programs

Table (3): Distribution of revised foot function index mean scores for patients before and after application of different rehabilitation programs

Revised foot function index	Group (A) (n=20)	Group (B) (n=20)	Group (C) (n=20)	F	p. value
	Mean ± SD	Mean ± SD	Mean ± SD		
Before rehabilitation					
Pain subcategory (range 0 - 50)	35.2 ± 16.4	33.7 ± 12.9	35.8 ± 14.3	0.110	0.896
Disability subcategory (range 0 - 90)	37.5 ± 13.8	34.9 ± 14.5	36.3 ± 11.9	0.187	0.830
Activity limitation subcategory (range 0 - 30)	15.0 ± 9.7	14.6± 11.2	15.2 ± 10.8	0.017	0.983
Total	29.2 ± 13.1	27.7 ± 12.7	29.1 ± 12.2	0.088	0.916
After rehabilitation (3 months)					
Pain subcategory (range 0 - 50)	15.4 ± 13.1	14.7 ± 11.4	10.1 ± 8.5	1.331	0.042*
Disability subcategory (range 0 - 90)	20.5 ± 18.4	15.1 ± 10.2	9.4 ± 7.6	3.695	0.049*
Activity limitation subcategory (range 0 - 30)	9.8 ± 12.6	6.7 ± 7.3	5.8 ± 6.9	1.017	0.598
Total	15.2 ± 14.5	12.2 ± 9.7	8.8 ± 5.9	1.814	0.068
After rehabilitation (6 months)					
Pain subcategory (range 0 - 50)	10.6 ± 8.2	8.1 ± 5.3	5.4 ± 4.9	3.400	0.040*
Disability subcategory (range 0 - 90)	15.2 ± 10.6	10.1 ± 8.4	4.2 ± 5.6	8.485	0.012*
Activity limitation subcategory (range 0 - 30)	7.5 ± 9.6	5.9 ± 7.1	3.8 ± 5.2	1.218	0.303
Total	11.1 ± 9.5	8.0 ± 6.7	5.5 ± 4.8	2.985	0.059

One way ANOVA test *Significant p < 0.01

Table (4): Distribution of short musculoskeletal function assessment questionnaire mean scores for patients before and after application of different rehabilitation programs

Short musculoskeletal function assessment questionnaire	Group (A) (n=20)	Group (B) (n=20)	Group (C) (n=20)	F	p. value
	Mean ± SD	Mean ± SD	Mean ± SD		
Before rehabilitation					
Dysfunction	20.5 ± 11.8	19.7 ± 8.0	20.3 ± 10.7	0.033	0.968
Mobility	24.6 ± 12.3	21.7 ± 10.9	23.6 ± 10.2	0.348	0.708
Bother	23.5 ± 18.7	20.9 ± 14.1	20.4 ± 13.9	0.224	0.780
After rehabilitation (3 months)					
Dysfunction	12.5 ± 7.2	10.8 ± 5.9	7.6 ± 4.6	3.445	0.039*
Mobility	15.0 ± 9.6	13.2 ± 6.8	9.5 ± 2.5	3.262	0.046*
Bother	14.2 ± 11.1	11.4 ± 5.6	10.5 ± 4.2	1.297	0.281
After rehabilitation (6 months)					
Dysfunction	9.8 ± 6.0	7.9 ± 4.2	4.0 ± 3.8	7.706	<0.001**
Mobility	9.5 ± 7.9	7.2 ± 4.6	4.0 ± 4.1	4.561	0.015*
Bother	11.2 ± 8.4	9.4 ± 3.5	7.0 ± 2.4	3.001	0.057

One way ANOVA test *Significant p < 0.01 **Significant p <0.001

Table (5): Percentage distribution of patients` adherence to rehabilitation program after 3 and 6 months

Adherence to rehabilitation program	Group (A) (n=20)		Group (B) (n=20)		Group (C) (n=20)		X^2	p. value
	No.	%	No.	%	No.	%		
After rehabilitation (3 months)								
Complete adherence	18	90	16	80	15	75	1.558	0.436
Partial adherence	2	10	4	20	5	25		
After rehabilitation (6 months)								
Complete adherence	15	75	13	65	14	70	0.476	0.325
Partial adherence	5	25	7	35	6	30		

Chi-square test Non-significant p > 0.05

Discussion

Posterior tibial tendon dysfunction is a progressive disorder continues to deteriorate without treatment. Early detection and intervention help to slow progression. Patients provided with rehabilitation have been shown to have significant improvements. High quality clinical trials about the efficacy of exercises management in PTTD are lacking and exercises prescription parameters are poorly reported in the literature [17]. In the present study, we developed three different rehabilitation programs, specifically designed for patients with stage I PTTD and implemented by patients at home in an attempt to recommend rehabilitation program for patients with stage I PTTD.

The comparison of the characteristics and the baseline medical data of patients in the different groups revealed no statistical significant differences (they were similar). All patients were adult, working and educated. The majority of them were females and overweight. Fewer percent of them were having diabetes mellitus, hypertension and history of foot or ankle trauma.

In this regard, study of **Houck et al., (2015)** [15] reported the same findings regarding characteristics and baseline medical data for patients with PTTD as the majority of the study sample was adult, female and overweight. Recent literature reported higher prevalence of PTTD in females than in males, with no

explanation for this discrepancy. Although diabetes mellitus, overweight and mechanical influences as trauma to the medial ankle reported to contribute to PTTD.

From the researchers point of view, higher prevalence of PTTD in females than in males could be because of the condition in females peaks during perimenopause, hormonal influence [loss of estrogen] could have a role in degeneration of tendons. The same processes which affect changes in bone [collagen I] during menopause may also affect tendons and ligaments, thereby contributing to increased incidence of PTTD in females above 45 years.

In the current study before starting the rehabilitation programs for patients with stage I PTTD, the level of pain obtained from the VAS in all groups were close to each other, no significant statistical difference among them. It was determined high level of pain among patients in all groups. There was significant main effect for rehabilitation time, all groups improved overtime of rehabilitation after 3 and 6 months. More improvement was achieved after 6 months of rehabilitation. Pain level was significantly decreased across all groups after rehabilitation. Group (C) demonstrated the most improvement in pain followed by group (B) while group (A) demonstrated the least improvement in pain. Also, swelling along the posterior tibial tendon was found in some patients before rehabilitation and improved after rehabilitation.

A study of **Ross et al., (2018)** [16] supported the current study which reported that patients with PTTD complain of pain with palpation, pain on tendon loading, swelling along the posterior tibial tendon and impaired function which is considered key features in the clinical presentations of PTTD. Pain and difficulty during various activities that load medial aspect of foot and posterior tibial tendon as single leg heel raise are key clinical features of PTTD.

In the same line, a study of **Hoang et al., (2021)** [18] reported that habitual use of foot orthoses combined with exercises and also exercises alone were clearly found to have better effect on alleviation of pain than wearing foot orthoses only. Active intervention was found to have better efficacy in decreasing pain more effectively than the passive intervention.

A study of **Cook et al., (2016)** [19] stated that the mechanism of effect for outcomes improvements for patients with PTTD following strengthening exercises is understood to be related to the load. It suggested that load through tendon during exercises need to be sufficiently high enough to elicit the physiological changes within tendon. Also, a study of **Malliaras et al., (2013)** [20] suggested that the physiological response to exercises may be greater with eccentric strengthening and heavy-slow resistance due to higher loads applied via tendon during these exercises.

From the researchers point of view, adherence of all patients in the different three groups to the rehabilitation programs through the follow up period (6 months-the end of follow up) resulted in more significant improvements in relieving/reducing pain. Use of insoles in addition to strengthening exercises showed significant pain reduction mechanism in patients of groups (B and C) and this could be mostly related to its supporting function of medial longitudinal arch.

In the present study before starting the rehabilitation programs for patients with stage I PTTD, the FFI-R mean scores were close to each other in all groups, no significant statistical difference among them. It determined increased pain, disability and activity limitation among patients in all groups. There were significant main effects for rehabilitation time, patients in all groups improved overtime of rehabilitation after 3 and 6 months regarding pain and disability subcategories of the FFI-R. Pain and disability were significantly decreased across all groups of patients after rehabilitation. More improvement was achieved after 6 months of rehabilitation. Group (C) demonstrated the most improvement in pain and disability subcategories of the FFI-R followed by group (B) while group (A) demonstrated the least improvement.

In the same line with the finding of the current study, a study of **Nilgun et al., (2012)** [14] displayed that statistical significant differences were found between pre and post rehabilitation programs regarding pain and FFI. Rehabilitation for patients with grade 1 to grade 3 PTTD was effective in relieving/reducing pain and improving functional outcome. Rehabilitation programs provide better improvement regarding tibialis posterior strength, restore muscular balance and reduction/reversal of PTTD complaints and symptoms.

A systematic review who conducted by **Ross et al., (2018)** [16] to determine the effect of strengthening exercises compared with other forms of conservative management for patients with PTTD provide limited evidence to suggest that tibialis posterior strengthening, stretching and orthoses and ankle strengthening, balance and stretching exercises similarly reduce pain, improve mobility and dysfunction for patients with PTTD in the short term compared with no strengthening exercises.

The results of the present study clarified that before starting the rehabilitation programs for patients with stage I PTTD, the SMFA mean scores were close to each other in all groups, no significant statistical difference among them. It determined increased mean scores of the SMFA among patients in all groups. Overtime with continuing adherence of all patients in the different groups to the rehabilitation programs, improvement was achieved after 3 months and more significant improvement was achieved after 6 months and more specifically observed in the mobility and dysfunction indexes of the SMFA. Group (C) demonstrated the most improvement in decreasing disability and improving mobility of the SMFA followed by group (B) while group (A) demonstrated the least improvement.

In the same line with the finding of the current study, a study of **Houck et al., (2015)** [15] reported that a positive effect of the strengthening exercises was observed in the mobility and dysfunction indexes of the SMFA. Gains in ankle muscle strength or improved recruitment of muscles used for mobility might explain these mobility findings, while it may also be possible that increased mobility adversely affects any reduction in pain that might result from the strengthening program.

A study of **Kulig et al., (2009)** [21] supported the present study finding which stated that patients with stage I and II PTTD exhibited significant increase/improvement in function and significant reduction in pain after participation in a three month rehabilitation program that emphasized education and use of orthoses. Simultaneous involvement in exercises which specifically targeted the posterior tibial tendon furthered the improvement. Designing exercises program that strengthening the weakened tibialis posterior musculotendinous is essential for effective management of the early stages of PTTD and in preventing further degeneration. The intensity of a stimulus as exercise required sufficient load and frequency to trigger adaptation.

Also, a study of **Ross et al., (2018)** [16] clarified that tolerance and ability to do the exercises with good/correct form were the criteria for progressing load. Patients in eccentric group were better able to tolerate higher loads during exercises program, optimizing tendon response, and reporting greater improvement in pain, disability and overall foot function. However, were not different between groups.

In this regard, a study of **Cook and Purdam, (2014)** [22] reported that foot orthoses and activity modification help in altering tensile loads; supporting medial longitudinal arch and reducing torque required from tibialis posterior during activities.

From the researchers point of view, adherence of all patients in the different three groups to the rehabilitation programs through the follow up period (6 months-the end of follow up) resulted in more significant improvements in their outcomes overtime; relieving/reducing pain, improve mobility and functional outcomes. Use of insoles showed significant pain reduction mechanism of patients in groups "B and C" and this could be mostly related to its supporting function of medial longitudinal arch. Also, contrast bath used for patients of groups "B and C" helped in decreasing inflammation around the tendon and reducing swelling resulted in more pain relieve/reduction than cold application used by patients of group "A". The overall better improvements observed in all outcome measures of patients in group (C) could be suggested to be as a result of addition of ankle strengthening exercises (ankle resistance exercises) to their rehabilitation program than patients of groups "A and B". These strengthening exercises allowed for quantification of load and constant resistance throughout the exercises. This raised the possibility that the differences in patients` outcomes in the different groups were more dependent on the load.

Also, the researchers point of view supported by other study results which stated that standard management that may prevent the need for surgical intervention include use of orthotic devices and physical therapy. Evidence from clinical management of similar conditions

suggests that active exercises (strengthening exercises) are more effective in leading to fast recovery. Adding strengthening exercises to a normal intervention of orthotic devices is more effective in improving range of symptoms in early stages of PTTD patients than using orthotic devices only [23].

Study limitations

The most important limitation of the current study was the absence of control group without any rehabilitation program at all or provided with only orthotic support for the medial longitudinal arch following the diagnosis of stage I PTTD. Patients' adherence to the rehabilitation programs was recorded in the logbook and reported to the researchers by patients and not observed directly by the researchers.

Conclusions

The habitual use and adherence to the different rehabilitation programs was clearly found to provide significant effect in alleviation/reduction of pain and swelling, improve mobility and functional outcomes overtime. Moreover, the rehabilitation program that composed of muscle strengthening exercises, medial arch support insoles, ankle strengthening exercises and contrast bath showed more significant improvements than other rehabilitation programs. Managing patients with PTTD in an early stage with the recommended rehabilitation program may delay/prevent progressing to the later stages of the disease and prevent the need for surgical intervention.

Recommendations

The current study findings recommended that disseminating the handout of the 6 months rehabilitation program (muscle strengthening exercises, medial arch support insoles, ankle strengthening exercises and contrast bath) for patients with early stage PTTD in the orthopedic and rheumatology, rehabilitation and physical medicine departments in different hospitals as rehabilitation guide. Disseminating the handout should be accompanied by education to patients to describe and explain the content and the importance of the rehabilitation program to improve condition, avoid chronicity and recurrence of symptoms, prevent or delayed progression to later stages of the disease and avoid surgical intervention. Education should be done by qualified health care practitioner; nurses, orthopedic specialist, and/or physiotherapist to ensure patients understanding, awareness and practicing exercises in correct form. Also, follow up is necessary to ensure patients` commitment to the rehabilitation program.

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Health Care Seeking Behavior of the Pregnant Women during COVID 19 Pandemic

Azza Fouad Mohammed El Adham[1] and Rabaa Elsayed Shaban Shehata[2]

[1,2] Assistant Professors of Maternal and Neonatal Health Nursing, Faculty of Nursing, Tanta University, Tanta, Egypt.

Abstract

Background: Pregnant women are one of the vulnerable groups who are impacted negatively by coronavirus pandemic (COVID 19). Scarce researches exist about their health care seeking behavior during COVID 19 pandemic. **The aim** of this study was to assess health care seeking behavior of the pregnant women during COVID 19 pandemic. **Subjects and Method**: **Design:** A descriptive study design was used. **Setting:** This study was carried out at 3 antenatal clinics of Obstetric and Gynecological departments at Tanta University Hospital affiliated to Ministry of High Education, as well as El-Menshawy General Hospital and El-Mahalla Alkobra General Hospital affiliated to Ministry of Health and Population. **Subjects:** A purposive sample of 300 pregnant women who met the inclusion criteria was included in the study. **Tools of data collection**: Four tools were used for data collection: **Tool (I):** Structured interview schedule of socio-demographic characteristics, and medical and reproductive history of the studied pregnant women, **Tool (II):** Pregnant women's perception / awareness regarding infection with COVID 19 pandemic during pregnancy, **Tool (III):** Pregnant women's knowledge regarding antenatal care during COVID 19 pandemic, and **Tool (IV):** Pregnant women's health care seeking behavior during COVID-19 pandemic. **Results:** A statistically significant positive relation observed regarding knowledge, perception and health care seeking behavior of the studied pregnant women during COVID 19 pandemic (r, = 0.275, P = 0.000**). **Conclusion:** COVID-19 affected pregnant women health care seeking behavior both directly and indirectly on access to the timely needed appropriate high-quality care, with a statistically significant relation between their knowledge, perception and health care seeking behavior. **Recommendations:** It is important to increase pregnant women awareness regarding the significance of seeking maternal health services during the COVID 19 pandemic to decrease maternal and neonatal mortality and morbidity rates. Additionally, programs and practical actions should be integrated to improve the quality of care provided to pregnant women particularly during the critical time of COVID 19 pandemic.

Key words

Pregnant women, COVID 19 pandemic, Antenatal Care, Health care seeking behavior

Introduction

Coronavirus disease (COVID-19) is a global pandemic infectious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2 virus). [1,2] Many studies reported a higher rate of SARS-CoV-2 infection in pregnant women compared with similarly aged adults. [3-5] While COVID-19 affects all countries and groups of individuals' worldwide, pregnant women face unique challenges due to the physiological and immunological changes that occur in their bodies to support and protect the developing fetuses. Pregnant women, especially those who are recently pregnant or in the third trimester and those who have gestational diabetes, pre eclampsia, medical diseases, and health discriminations are vulnerable groups to COVID-19, which can also go into the fetal cells via the placenta and affect health and wellbeing of the pregnant women and their offspring both directly and indirectly. [6-8]

Direct effect of COVID 19 on pregnant women involves complications as miscarriage, cesarean delivery, as well as childbirth and postnatal maternal complications, while effect of COVID 19 on the fetus include complications as intrauterine growth restriction (IUGR), preterm birth, stillbirth (12.1 compared to the national rate 4-5 per 1000 births), and congenital anomalies as neural tube defects. [9,10]

On the other hand, indirect effect of COVID 19 is due to the changes occurred in health care, social policy, and economic circumstances. These include losing income, increased exposures to domestic violence, more childcare demands, and increased political inequalities, harmful policies in the healthcare infrastructure, decreased antenatal care visits, and change of

the healthcare delivery from face to face to virtual consultations. [4,11-13]

Furthermore, the consequences of COVID-19 extend to affect the psychological status of pregnant women. In this regard COVID-19 is considered one of the most intense emotional experiences in pregnant women's life that contributes to a greater sense of fear, stress, panic and anxiety. [14,15]

Pregnant women are expressing concerns about greater severity of COVID-19 disease on their infant's safety and the potential vertical transmission from an infected mother to her newborn, increased the risk of adverse neonatal outcomes, sudden changes in the antenatal healthcare (for example, modifications of scheduled appointments, restrictions on the presence of family members during childbirth and postnatal visitation), and protection methods.(8,10-12) Thus, it is critical for pregnant women to be aware and have accurate knowledge regarding infection with COVID 19 disease, and components of antenatal care to enhance their health care seeking behavior during this period. [16-19]

Accurate information materials can be administered to pregnant women as part of the antenatal care (ANC) package; including COVID-19 symptoms, modes of transmission, high-risk groups, and preventive measures in pregnancy. [24-26] Good ANC, especially during COVID 19 can contribute to good health, while poor ANC can increase maternal, fetal, and neonatal mortality and morbidity rates, especially in certain cases, such as pre eclampsia and eclampsia and antepartum hemorrhage, and cases infected with COVID 19. [20-23] So, health care seeking behavior of pregnant women is very important to identify high risk conditions during ANC. Consequently, decrease maternal, fetal, and neonatal mortality and morbidity rate. [24-27]

Understanding pregnant women approach to healthcare seeking is also crucial to decrease adverse pregnancy outcomes and the serious effects of infection with COVID 19 during pregnancy. This can be reached through enhancement of individuals' adequate and correct risk perception, health education, and healthy practices such as safety measures (sterilization, and regular hand washing with soap and water), as well as social distancing, access to portable source of water supply, and obtaining information regarding travel history. Health care seeking behavior refers to decisions and actions carried out by pregnant women during COVID 19 pandemic in response to any health problem. [28-31]

Health belief model (HBM) highlighted that it can be affected by the perceived degree of impairment or disease, and the healthcare provider's perceptions. It can also be affected by past medical and obstetrics history, present signs and symptoms of pregnancy, cognitive, biological and socio-economic factors, culture, believes, norms, expectations, money, time, effort, and public media. Another study listed six main factors that included childbearing challenges; increased worry; uncertainty and fear; sense of loss; challenges accessing care; strategies for coping with the COVID 19 pandemic stress; and reflections and advice to other pregnant women and health care professionals. [32-34]

In addition, there are various concerns about antenatal, intra-partum and postpartum care, and perceived limited sources of help to pregnant women related to COVID 19 pandemic. [32] In this regard, lack of emotional support from family and society was associated with a high prevalence of severe to very severe depression, anxiety, and stress among Egyptian individuals. Due to the major impact of COVID 19 pandemic on pregnant women and their offspring, many questions exist regarding the importance of involving them and their families' in designing future maternity care services. [35-37]

Nurses and other health care providers have a pivotal role in communication and counselling; providing accurate knowledge, and standardized performance to assessment and enhance health care seeking behavior of the pregnant women during the COVID 19 pandemic. [9-38-41]

Significance of the study

Pregnant women are considered one of the vulnerable groups to COVID 19, due to the physiological and immunological changes that occur in their bodies during pregnancy. Recent, unvaccinated and or not fully vaccinated, as well as pregnant women in the third trimester are at increased risk of becoming severely ill, need in an urgent intensive care and their babies being born prematurely if they are infected with COVID 19 virus. Worldwide, numerous studies had been conducted regarding vulnerable groups

such as people with serious medical conditions, but unfortunately scarce research exists regarding health care seeking behavior of pregnant women during COVID 19 pandemic.

The aim of the study

The aim of this study was to assess health care seeking behavior of the pregnant women during COVID 19 pandemic.

Research Question

What is the health care seeking behavior of pregnant women during COVID 19 pandemic?

Operational Definition

Awareness means whether pregnant women had heard or not about COVID 19.

Subjects and Method

Subjects

Study Design: A descriptive cross-sectional research design was used to conduct this study.

Settings: This study was carried out at 3 antenatal clinics of Obstetric and Gynecological departments of Tanta University Hospital affiliated to Ministry of High Education, as well as El-Menshawy General Hospital and El-Mahalla Alkobra General Hospital affiliated to Ministry of Health and Population.

Subjects: A purposive sample of a total of (300) pregnant women was selected from the previously mentioned settings; comprised (100) women from each setting .The sample size is calculated based on power analysis by using Epi-Info software statistical package created by World Health Organization and Center for Disease Control and Prevention, Atlanta, Georgia, USA version 2002 [12]. Sample size calculation criteria were: 95% confidence COVID 19 pandemic and 80% power of the study. **The inclusion criteria for the study subjects were as follows:** Attended at least one antenatal care visit, aged between 18-45 years, singleton pregnancy, not a health care professional and willing to participate in the study.

Tools of data collection

To achieve the aim of the present study four tools were adapted by the researchers from different national and international research studies in English language. They were translated into Arabic language and verified by an expert committee in the field of Obstetric and Gynecological Nursing and pre tested to collect the necessary data as follows:

Tool (I): Structured interview schedule of socio-demographic characteristics, and medical and reproductive history of the studied pregnant women

This tool was developed by the researchers from recent related literatures [4,9,11] to collect basic data about the studied pregnant women. It included **3 parts** (16) questions (1 to 16) as follows:

Part (1): **Socio-demographic data**: Such as age, level of education, occupation, income, marital status, residence, and religion.

Part (2): Medical history: Such as presence of any chronic disease, height, weight, and body mass index.

Part (3): Reproductive history: Such as duration of current pregnancy (gestational weeks or months), gravidity, parity, number of abortion, presence of any pregnancy complication such as gestational diabetes, pregnancy induced hypertension, hyperemesis gravidarum, overweight, threatening abortion, and fetal congenital anomalies.

Tool (II): Structured interview schedule of the studied pregnant women' perception / awareness regarding infection with COVID 19 pandemic during pregnancy

This tool was developed by the researchers after reviewing recent relevant literatures [8,10] to collect data about perception/awareness of the studied pregnant women regarding infection with COVID 19 pandemic during pregnancy. It included 10 questions (17 to 26), such as: Is pregnant woman vulnerable to infection with the emerging coronavirus (Covid-19)? Does COVID-19 affect the health of the pregnant woman? And what is the impact of COVID 19 on the health of the pregnant woman?

Scoring system was calculated as follows: Likely aware was scored as 1 and not likely aware was scored as 0.

The total score was calculated as follows: ≥ 60% positive awareness and 0 - < 60 % negative awareness.

Tool (III): Structured interview schedule of the studied pregnant women' knowledge regarding antenatal care during COVID 19 pandemic

This tool was adapted by the researchers from **Maharlouei N. et.al., (2020)** [42] after reviewing recent relevant literatures to collect data about knowledge of the studied pregnant women regarding antenatal care during COVID 19 pandemic. It included 31 statements and questions (27 to 57), such as: I have information

about health care during pregnancy. What are the components of health care during pregnancy? And what do you do, where do you go and who do you tell during the COVID-19 pandemic for information about health care during pregnancy?

Scoring system was as follows: Correct and complete answers were scored as (2), correct and incomplete answers were scored as (1), and incorrect answers and didn't know were scored as zero (0).

The total score was calculated as follows: High level of knowledge ≥ 70%, moderate level of knowledge 60 < 70% and low of knowledge <60%.

Tool (IV): Structured interview schedule of health care seeking behavior of pregnant women during COVID 19 pandemic

This tool was adapted by the researchers from **Johnbosco M., et.al., (2020) [43]** to collect data related to health care seeking behavior of the studied pregnant women during COVID-19 pandemic. It included 4 parts, 27 statements and questions (58 to 85) as follows:

Part (1): Pregnant woman' health care seeking behavior regarding antenatal care during COVID-19 pandemic: It included 9 statements and questions (58 to 66), such as: I had a pregnancy follow-up and an antenatal check-up on time. How many pregnancy follow-up visits did you make in each trimester of pregnancy? And I made the tests that should be done for the pregnant woman.

Part (2): Pregnant woman' health care seeking behavior regarding prevention infection of COVID 19 pandemic during pregnancy: It included 11 statements and questions (67 to 77), such as: I wear a mask when going out. I change location or try to stay away from those who appear to have a cold or fever (coughing, sneezing, etc.) on public transport or indoors. I wash my hands more often, especially after interacting with others outside. What is the average daily washing of hands with soap/hand sanitizer prior to knowing the outbreak of COVID-19? And what is the average daily washing of hands with soap / hand sanitizer after knowing the outbreak of COVID19?

Scoring system was as follows: Always occur was scored as (3), sometimes occur was scored as (2), and never occur was scored as (1).

The total scoring was as follows: Positive health care behavior ≥ 60% and negative health care behavior < 60%.

Part (3): Pregnant woman's health care behavior when feeling panic and anxiety during the COVID-19 pandemic: It included question number 78, as follows: What is your source/s of information when feeling panic and anxiety during the COVID-19 pandemic?

Part (4): Factors affecting health care seeking behavior of the pregnant women during COVID-19 pandemic included items, such as: Fear of contracting the virus, delays in deciding to seek care, delays in reaching healthcare facilities and delays in receiving quality healthcare services, governmental restriction to decrease the spread of COVID 19 as: Compulsory lockdown, quarantine and national cessation of movement, role of the pregnant woman in her family, also her role in decision-making related to health care behavior during COVID 19 pandemic? And what are the sources of help when feeling panic during the pandemic?

Method

1. Official letter clarifying the purpose of the study was obtained from the Faculty of Nursing Tanta University and was submitted to the responsible authorities of the selected settings.
2. Ethical and legal considerations: Pregnant women's oral consent was taken after providing complete and detailed information about the aim and the benefits of the study, as well as the opportunity of withdrawing at any time. The researchers ensured that the nature of the study didn't cause any harm or pain for the entire sample. In addition, confidentiality and privacy were taken into consideration regarding data collection.
3. The study tools were developed by the researchers after reviewing recent related literatures. Then, they were translated into Arabic language and tested for content and construct validity by an expert committee of 5 experts in the Obstetric and Gynecological Nursing field and the recommended modifications were done before conducting the study.
4. A pilot study was carried out on 10% (30) of the studied pregnant women to test the tools of the study for feasibility, fidelity, applicability, language competency, content

validity, time needed to be fulfilled, and reliability of the study tools. Modifications were done where deemed necessary. The data obtained were excluded from the study.

5. Tools reliability examined by Alpha Cronbach's statistical test analysis was 0.73.
6. Data were collected in a period of 6 months during the morning shifts from the beginning of October 2020 to the end of April 2021. The time needed to fulfill the study tools was 20 minutes.
7. Statistical Analysis: The collected data were organized, tabulated and statistically analyzed using SPSS software statistical computer package version 26. For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, comparison was done using Chi-square test (χ^2). Correlation between variables was evaluated using Pearson and Spearman's correlation coefficient r. A Statistical significance was adopted at $P<0.05$ for interpretation of results of tests of significance (*). Also, a highly significance was adopted at $P<0.01$ for interpretation of results of tests of significance (**).

Results

A total number of 300 pregnant women were enrolled in this study according to the inclusion criteria. The results of this study are presented in 7 tables and 3 figures. **Table (1):** Exhibits percentage distribution of the studied pregnant women during COVID 19 pandemic according their socio-demographic-characteristics (N = 300). It was evident that 61.3% their age ranged from 18 - < 25, and 25% was 25 - <35 years old with a total mean age 21.08±4.872 years. It was also noticed that 46.3% had university education, 22% had general/technical secondary school, and 16.7% had no formal education. Additionally, 34.3% had governmental jobs, the majority 92.7% were married, and 7.4% were widow, 57% had enough monthly income, and 61.3% were rural residents. The study results also revealed that there was no statistically significant relation between socio-demographic characteristics and the studied pregnant women's knowledge and health care seeking behavior. On the other hand, a statistically significant relation (p= 0.018*) existed between perception/awareness of the studied pregnant women and level of education.

Table (2): Shows percentage distribution of the studied pregnant women during COVID 19 pandemic according to their medical and reproductive history (N = 300). Concerning their medical history, it was evident that 80.7% didn't have any chronic disease, their mean height was 1.6473±0.065 meter, their mean weight was 77.11±12.564 kilograms, and their mean body mass index was 28.369±4.071. Regarding their reproductive history, the table reveals that 65.7% were in the first trimester of pregnancy, 69.3% were primigravida, 61.7 had no previous abortion, 42.7 had no children, and 54.7% had no pregnancy complications (# more than one answer).

Table (3): Indicates percentage distribution of the studied pregnant women during COVID-19 pandemic according to the factors affecting their health care seeking behavior, and sources of help when feeling panic (N = 300). It was noticed that (55.3%, 42.7 %and 2% respectively) stated that fear of contracting the virus leading to the delays in deciding to seek care, delays in reaching healthcare facilities and delays in receiving quality healthcare services. It also found that (38.3% and 33.3% respectively) declared that compulsory lockdown and quarantine were governmental restriction to decrease the spread of COVID 19. Moreover, 58% declared working and sharing the expenses, 76.3% had role in decision making, With regards to the studied pregnant women health care seeking behavior sources of help when feeling panic during COVID 19 pandemic, 55.7% used the internet, 66.3 got help from medical staff, 23.7% got help from relatives or friends, and 4.3% didn't ask for help (# more than one answer).

Table (4): Illustrates distribution of the studied pregnant women according their perception/ awareness regarding probability of infection with COVID 19 pandemic during pregnancy. It was noticed that (74.0% 72.0%, and 72.0%, respectively) of women had incomplete correct answer about COVID-19 affects health of the pregnant woman, pregnant woman is vulnerable to infection with the emerging Covid-19 and COVID-19 can be transmitted from a pregnant woman with the disease to her fetus during pregnancy. Meanwhile, more than half of them had incomplete correct answer about COVID-19 can be transmitted from a pregnant woman with the disease to her fetus during childbirth

Table (5): Demonstrates distribution of the studied pregnant women according their health seeking behavior regarding prevention of infection during COVID-19 pandemic. It was Revealed that more than three quarter (81.3%, 75.3 and 72.7%, respectively) of the studied women change location or try to stay away from those who appear to have a cold or fever (coughing, sneezing, etc.) on public transport or indoors, wash their hands more often, especially after interacting with others outside and their wear a mask when going out.

Table (6) and Figure (1): Display percentage distribution of the studied pregnant women according their total levels of health care seeking behavior, knowledge regarding antenatal care and perception/awareness regarding infection with COVID 19 pandemic (N = 300). It was noticed that regarding their level of health care seeking behavior, almost all (98%) of the studied pregnant women had unsatisfactory health care seeking behavior regarding antenatal care during COVID 19 pandemic, with a (total mean ± SD = 21.99±3.818**)**. Concerning their level of knowledge regarding antenatal care during COVID 19 pandemic, 88% of them had low level of knowledge with a (total mean ± SD = 27.14±7.297). As regards to perception/awareness regarding infection with COVID 19 pandemic during pregnancy, 86.3% had negative perception/awareness with a (total mean ± SD = 9.15±3.278).

Table (7) and Figures (2,3): Demonstrates percentage comparison and correlations between total level of health care seeking behavior of the studied pregnant women and their total levels of both perception/awareness regarding infection with COVID 19 pandemic and knowledge regarding antenatal care during COVID 19 pandemic (N =300). In this regard, **table (7) and figure (2):** Verifies that 84.3% of the studied pregnant women had negative perception/awareness regarding infection with COVID 19 pandemic, with no statistical significant relation (r, p = 0.089, 0.125) between their total level of health care seeking behavior of the studied pregnant women and total level of perception/awareness. Moreover, **table (7) and figures (3):** Confirms that 86.3% of the studied pregnant women had low total level of knowledge regarding antenatal care during COVID 19 pandemic, with a highly statistically significant relation (r= 0.275, p = 0.000**) between their total level of health care seeking behavior and total level of knowledge. **Table (7)**: Also proves that 76% of the studied pregnant women had low level of knowledge regarding antenatal care and negative perception/awareness regarding infection with COVID19 pandemic, while 12% of them had low level of knowledge regarding antenatal care and positive perception/awareness regarding infection with COVID19 pandemic with a statistically significant relation (r= 0.139, p = 0.016*) between their total level of knowledge and total level of perception.

Table (1): Percentage distribution of the studied pregnant women during COVID 19 pandemic according their socio-demographic-characteristics (N = 300).

Socio-demographic characteristics	The studied pregnant women (N= 300)	
	N	%
Age (in years)		
▪ (< 18)	40	13.3
▪ (18-< 25)	184	61.4
▪ (25-<35)	75	25.0
▪ (35-44)	1	0.3
Age (in years): Range (10-40), **Mean ± SD** (21.08±4.872)		
Educational level		
▪ No formal	50	16.7
▪ Primary	35	11.7
▪ General/technical secondary	66	22.0
▪ University	139	46.3
▪ Post studies	10	3.3
Relation between perception/awareness of the studied pregnant women and level of education: (p= 0.018*)		
Occupation		
▪ Doing a government job	103	34.3
▪ Self-employed	48	16.0
▪ Student	2	0.7
▪ Do not work (housewives)	147	49.0
Marital status		
▪ Married	278	92.7
▪ Widow	22	7.4
Monthly income of the family		
▪ More than enough	11	3.7
▪ Enough	171	57.0
▪ No income	118	39.3
Residence		
▪ Urban	116	38.7
▪ Rural	184	61.3

Table (2): Percentage distribution of the studied pregnant women during COVID 19 pandemic according to their medical and reproductive history (N = 300).

Medical and reproductive history	The studied pregnant women (N= 300)	
	N	%
Chronic disease		
▪ None	242	80.7
▪ 1	43	14.3
▪ 2	15	5.0
Height (in meters): **Range** (1.50-1.81), **Mean ± SD**1.6473±0.065		
Weight (in kilograms: **Range** (50-105), **Mean ± SD** (77.11±12.564)		
Body mass index (BMI): **Range** (19.53-39.04), **Mean ± SD** (28.369±4.071)		
Duration of pregnancy in weeks or months		
▪ First trimester	197	65.7
▪ Second trimester	103	34.3
Number of pregnancies		
▪ One	208	69.3
▪ Two	92	30.7
The number of abortions		
▪ None	185	61.7
▪ One	96	32.0
▪ Two or more times	19	6.3
The number of births		
▪ None	128	42.7
▪ One	113	37.7
▪ Two or more times	59	19.7
# Pregnancy complications		
▪ None	164	54.7
▪ Gestational diabetes	74	24.7
▪ High blood pressure during pregnancy	54	18.0
▪ Excessive weight gain	50	16.7
▪ Aborted/threatened abortion	16	5.4

More than one answer was chosen

Table (3): Percentage distribution of the studied pregnant women during COVID-19 pandemic according to the factors affecting their health care seeking behavior, and sources of help when feeling panic during COVID 19 pandemic (N = 300).

Factors affecting health care seeking behavior, and sources of help when feeling panic during COVID-19 pandemic	The studied pregnant women (N= 300)	
	N	%
Fear of contracting the virus leading to: -		
▪ The delays in deciding to seek care	166	55.3
▪ Delays in reaching healthcare facilities	128	42.7
▪ Delays in receiving quality healthcare services	6	2.0
Governmental restriction to decrease the spread of COVID 19 included:-		
▪ Compulsory quarantines	100	33.3
▪ National cessation of movements	85	28.4
▪ Compulsory lockdowns	115	38.3
Role of the pregnant woman in her family		
▪ work and share the expenses	174	58.0
▪ Don't work and only at home	126	42.0
Role of the pregnant woman in decision-making		
▪ Has no role	71	23.7
▪ Has a role	229	76.3
# Sources of help when feeling panic		
▪ Medical and nursing staff	199	66.3
▪ Relatives or friends	71	23.7
▪ The Internet	167	55.7
▪ I don't ask for help	13	4.3

More than one answer were chosen

Table (4): Distribution of the studied pregnant women according their perception / awareness regarding probability of infection with COVID 19 pandemic during pregnancy (N = 300).

Perception/Awareness Items	The studied pregnant women (n=300)					
	Incorrect		Incomplete		Complete	
	N	%	N	%	N	%
1. Pregnant woman is vulnerable to infection with the emerging Covid-19	69	23.0	216	72.0	15	5.0
2. COVID-19 affects health of the pregnant woman	67	22.3	222	74.0	11	3.7
3. COVID 19 has an impact on health of the pregnant woman	116	38.7	120	40.0	64	21.3
4. COVID-19 can be transmitted from a pregnant woman with the disease to her fetus during pregnancy	79	26.3	216	72.0	5	1.7
5. COVID-19 can be transmitted from a pregnant woman with the disease to her fetus during childbirth	149	49.7	147	49.0	4	1.3
6. COVID-19 can be transmitted from an infected mother to her baby during breastfeeding	123	41.0	0	0.0	177	59.0
7. COVID-19 can affect the health of the fetus or newborn	114	38.0	0	0.0	186	62.0
8. COVID-19 has a serious impact on the health of the fetus or newborn	144	48.0	83	27.7	73	24.3
9. A pregnant woman must make antenatal care follow up to prevent infection with the emerging corona virus	50	16.7	130	43.3	120	40.0
10. A pregnant woman must put personal protective equipment in the delivery bag she is going to take with her to the hospital during the COVID-19 pandemic	102	34.0	95	31.7	103	34.3

Table (5): Distribution of the studied pregnant women according their health care seeking behavior regarding prevention of infection during COVID-19 pandemic (N = 300).

Health seeking behavior regarding prevention of infection	The studied pregnant women (n=300)					
	Incorrect		Incomplete		Complete	
	N	%	N	%	N	%
1. I wear a mask when going out	82	27.3	0	0.0	218	72.7
2. I change location or try to stay away from those who appear to have a cold or fever (coughing, sneezing, etc.) on public transport or indoors	56	18.7	0	0.0	244	81.3
3. I wash my hands more often, especially after interacting with others outside	74	24.7	0	0.0	226	75.3
4. Average daily washing of hands with soap/hand sanitizer prior to knowing the outbreak of COVID-19	13	4.3	196	65.3	91	30.3
5. Average daily washing of hands with soap / hand sanitizer after knowing the outbreak of COVID19	5	1.7	184	61.3	111	37.0
6. Average weekly spit on the floor before the COVID-19 outbreak was known	3	1.0	95	31.7	202	67.3
7. Average Weekly Spit on the Ground after Knowing the COVID-19 Outbreak	2	0.7	96	32.0	202	67.3
8. Average weekly exit before the COVID-19 outbreak was known	127	42.3	164	54.7	9	3.0
9. Average Weekly exit after knowing the COVID-19 Outbreak	130	43.3	47	15.7	123	41.0
10. Average weekly showers before the COVID-19 outbreak was known	146	48.7	117	39.0	37	12.3
11. Average weekly shower after learning about the COVID-19 outbreak	156	52.0	107	35.7	37	12.3
Range (5-17), **Mean ± SD** 11.06±2.337						

Table (6): Percentage distribution of the studied pregnant women according their total levels of health care seeking behavior, knowledge regarding antenatal care and perception/awareness regarding infection with COVID 19 pandemic (N = 300).

Total levels of health care seeking behavior, knowledge regarding antenatal care and perception regarding infection with COVID 19 pandemic	The studied pregnant women (N= 300)	
	N	%
Health care seeking behavior		
▪ Unsatisfactory (< 70%)	294	98.0
▪ Satisfactory (≥70%)	6	2.0
Range (12-32), **Mean ± SD** (21.99±3.818)		
Knowledge		
▪ Low (< 60%)	264	88.0
▪ Moderate (60%-75%)	35	11.7
▪ High (>75%)	1	0.3
Range (12-46), **Mean ± SD** (27.14±7.297)		
Perception		
▪ Negative (< 60%)	259	86.3
▪ Positive (≥ 60%)	41	13.7
Range (2-16), **Mean ± SD** (9.15±3.278)		

Figure (1): Percentage distribution of the studied pregnant women according their total levels of health care seeking behavior, knowledge regarding antenatal care and perception/awareness regarding infection with COVID 19 pandemic (N = 300).

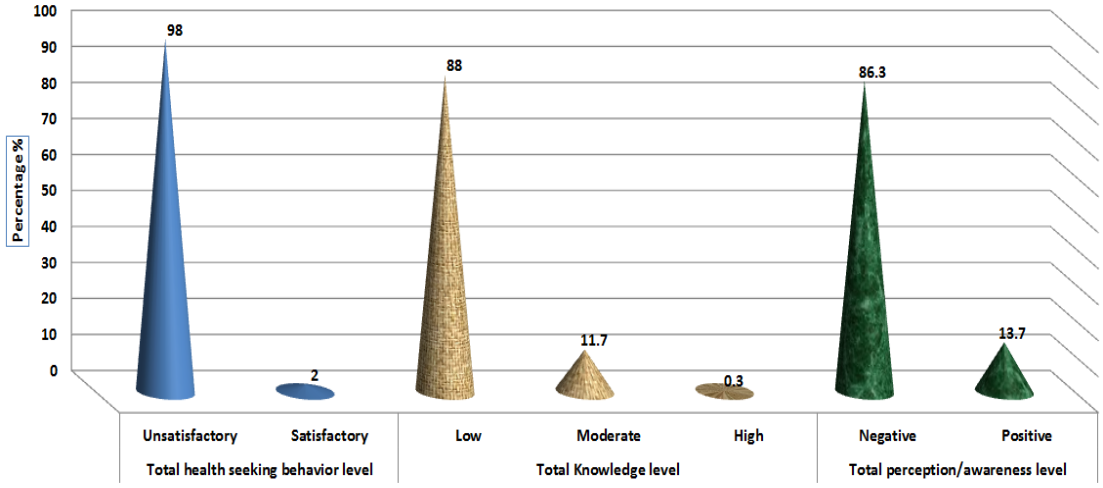


Table (7): Percentage comparison and correlations between total level of health care seeking behavior of the studied pregnant women and their total levels of both perception/awareness regarding infection with COVID 19 and knowledge regarding antenatal care during COVID 19 pandemic, as well as between total knowledge and total perception/awareness (N =300).

Total levels of both perception regarding infection and knowledge regarding antenatal care during COVID 19 pandemic	Total health care seeking behavior level (N= 300)				χ^2 P
	Unsatisfactory (n=294)		Satisfactory (n=6)		
	N	%	N	%	
Total perception/awareness level					
▪ Negative	253	84.3	6	2.0	FE
▪ Positive	41	13.7	0	0.0	1.00
r , p (0.089 , 0.125)					
Total knowledge level					
▪ Low	259	86.3	5	1.7	
▪ Moderate	34	11.3	1	0.3	0.167
▪ High	1	0.3	0	0.0	0.920
r , p (0.275 , 0.000**)					

Total levels of perception regarding infection with COVID 19 pandemic	Total knowledge level regarding ante natal care (N= 300)						χ^2 P
	Low (n=264)		Moderate (n=35)		High (n=1)		
	N	%	N	%	N	%	
Total perception/awareness level							
▪ Negative	228	76.0	30	10.0	1	0.3	0.170
▪ Positive	36	12.0	5	1.7	0	0.0	0.919
r , p (0.139 , 0.016*)							

r: Pearson' correlation coefficient, (*) Statistically significant at level P< 0.05, (**) Highly statistically significant at level P< 0.01

Figure (2): Percentage comparison and correlations between the total level of health care seeking behavior of the studied pregnant women and their total level perception/awareness regarding infection with COVID 19 pandemic (N =300).

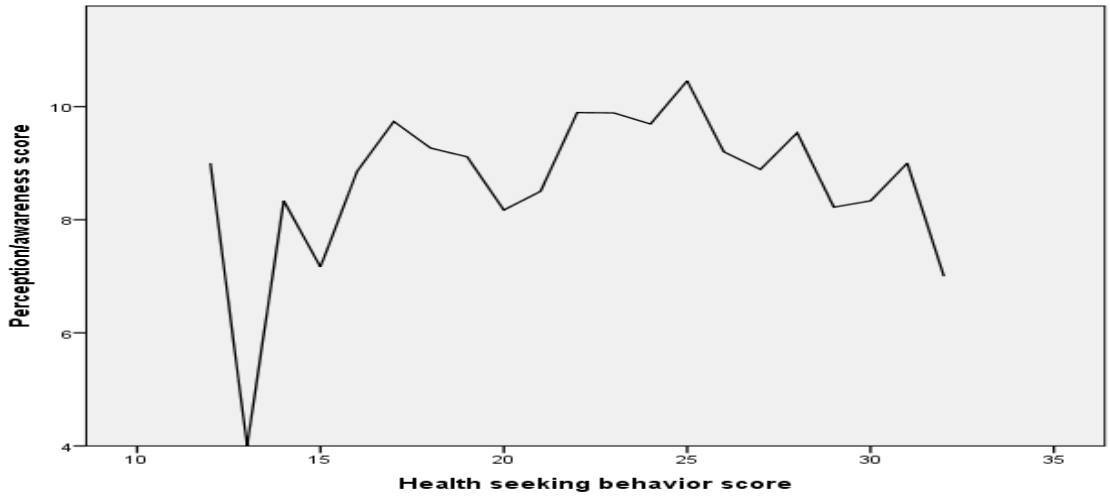
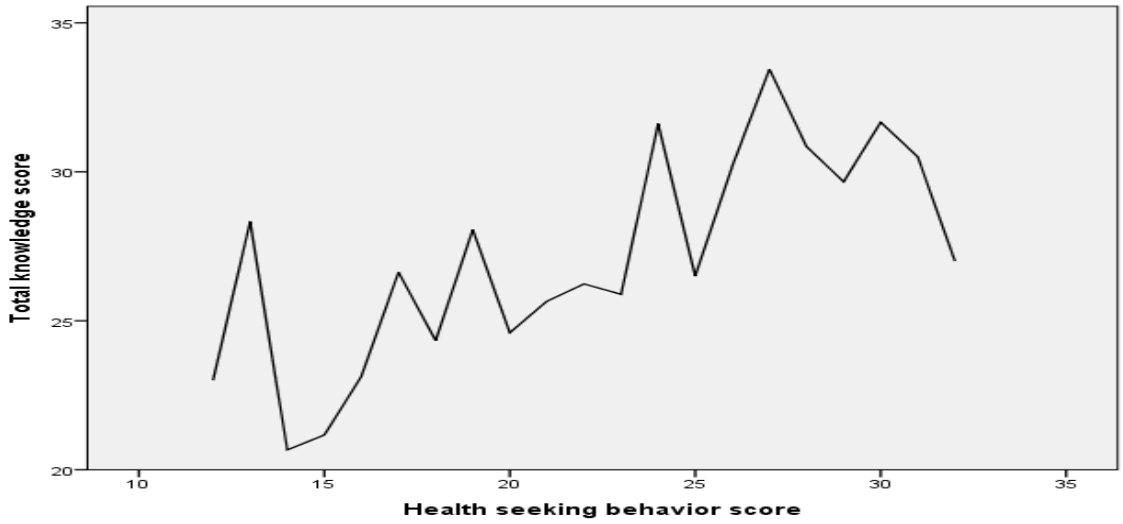


Figure (3): Percentage comparison and correlations between the total level of health care seeking behavior of the studied pregnant women and their level of knowledge regarding antenatal care during COVID 19 pandemic (N =300).



Discussion

Pregnant women are one of the vulnerable groups who are impacted negatively by coronavirus pandemic. Scarce researches exist regarding their health care seeking behavior during COVID 19 pandemic. So, the aim of this study was to assess health care seeking behavior of the pregnant women during COVID 19 pandemic. Results of the present study revealed that regarding socio-demographic characteristics of the studied pregnant women during COVID 19 pandemic, more than two thirds of the studied pregnant women their age ranged from (18-< 25) years and the age of one quarter of them ranged from (25-<35) years old with a total mean age (21.08±4.872) years. It was also noticed that nearly one half of them had university education, slightly more than one fifth had general/technical secondary school, and nearly one half were housewives, slightly more than one third had governmental jobs, the majority were married, slightly more than one half had enough family income, and nearly two thirds were rural residents.

These results are consistent with **Huaman Y., et al., 2021** [19] who displayed that 84.5% women aged between 18 and 34 years, 79% were housewives,71.9% had high school education, and 60% a cohabiting marital status. Additionally, **Mortazavi F., et al., 2021** [16] stated that the women' aged < 30 years, employed, and with a low family income. Moreover, **Nicomedes C., et al., 2021** [15] highlighted that the mean age of the studied subjects was 31.3 years, and they were a geographically diverse. **Kotlar B., et al., 2021** [9] also indicated that approximately 46% were employed in critical sectors, while 19% and 13%, respectively, were employed in locked-down sectors.

Concerning the medical history of the studied pregnant women, this study showed that slightly more than four fifths were healthy (didn't have any chronic disease), their mean height was (1.6473±0.065) meter, their mean weight was (77.11±12.564) kilograms, and their mean body mass index was (28.369±4.071). This result agrees with **Huaman Y., et al., 2021** [19] who stated that pre-gestational body mass index assessment showed that 36.7% were normal weight, 38,1% were overweight, and 30.3% were obese pregnant women.

With regards to reproductive history of the studied pregnant women, the present study revealed that nearly two thirds were in the first trimester of pregnancy, slightly more than two thirds were primigravida, nearly two thirds had no previous abortion, and no children, and slightly more than one half of them had normal pregnancy course (no complications). This result agrees with, **Nicomedes C., Avila R., 2021** [15] who evidenced that 37% of the studied subjects were nulliparous. On the other hand, regarding gestational age, the present study is contradicted with **Afshar Y., et al., 2020** [22], as well as with **Huaman Y., et al., 2021** [19] who displayed that the average gestational age at enrollment was (24.1 weeks and 36 weeks respectively). This result was incongruent **Maharlouei N., 2020**, [42] who indicated that Median gestational age of participant sample was also 29

(7–40) weeks, and the mean was 27.8 (±8.1) weeks.

In relation to the factors affecting the studied pregnant women health seeking behavior, the present study illustrated that slightly more than one half stated that fear of contracting the virus leading to the delays in deciding to seek care, delays in reaching healthcare facilities and delays in receiving quality healthcare services. It also found that nearly two fifths declared that compulsory lockdown and quarantine were governmental restriction to decrease the spread of COVID 19. Moreover, 58% declared working and sharing the expenses, 76.3% had role in decision making,

In this regard, **Liu G., et al., 2019** [26] and **David O., et al., 2021** [44] were consistent with the present study as they demonstrated that majority of the study participants were considered the fear from contracting the virus an important factor affecting the health care seeking behavior during COVID 19 including; the delays related to reaching health facilities due to restrictions that were put in place to curb the spread of the COVID-19 pandemic, and delays related to the experience of pregnant women at healthcare facilities which impacted the pregnant women's decision to go for regular antenatal care visits at the health facilities.

With regards to the studied pregnant women health care seeking behavior sources of help when feeling panic during COVID 19 pandemic, more than one answer were included and specified that slightly more than one half (55.7%) used the internet, slightly more than three thirds (66.3) got help from medical staff, slightly more than one fifth (23.7%) got help from relatives or friends, and 4.3% didn't ask for help.

These findings were corresponded with **Ratih M., and Nurya V., 2021** [45], who pointed out that the television news bulletins remain the most widely used source of information. Some people use twitter or other social media as a source of convincing information on corona virus's pandemic among pregnant women. Meanwhile, this agrees with **Ilesanmi O., et al., 2020** [34] who stated that calling the COVID-19 help number (58.3%) was the frequently reported practice. On the other hand, **Kolker S., et al., 2021** [27] disagreed with the present result. They specified that pregnant women lacked the social support due to COVID-19 pandemic restrictions and had a profound sense of loss of what they thought their pregnancy and postpartum period should have been. This discrepancy from the researcher point of view may stem from availability of different sources regarding help about COVID-19.

As regard health seeking behavior regarding prevention of infection during COVID-19 pandemic, the present study shows that more than three quarter of the studied women had correct and complete answers regarding preventive behavior during COVID-19 pandemic. This findings were supported by **Johnbosco M., et al., 2020** [43] who posed that most of the participants had adequate knowledge of preventive measures against COVID-19 infection but the practice of these preventive measures were poor among the participants.

Owing to the studied pregnant women total level of health care seeking behavior, this study identified that almost all them had unsatisfactory health care seeking behavior care during COVID 19 pandemic, with a (total mean ± SD = 21.99±3.818**)**. **David O., et al., 2021** [44] were consistent with the present study as they documented that majority of the study participants didn't take antenatal visits.

On the other hand, **Islam M., and Masud M., 2018** **[36]** disagreed with this study. They pointed out that 65% mothers received at least one prenatal care visit, and only 18.0% received the WHO recommended optimal level of four or more ANC visits. **Ilesanmi O., et al., 2020** **[34]** added that going to the hospital (95%) was the frequently reported practices.

Concerning their total level of knowledge regarding antenatal health care seeking during COVID 19 pandemic, the present study revealed that most of the studied pregnant women had low level of knowledge with a (total mean ± SD = 27.14±7.297). On the other hand, these results were relatively in line with **Ratih M., and Nurya V., 2021** [45], who stated that most pregnant women had a low level of knowledge about Covid-19, while a little number of them had sufficient and good of knowledge level.

In relation to perception/awareness regarding of COVID 19 pandemic, this study indicated the majority of the studied pregnant women had negative perception/awareness regarding probability of infection with COVID 19 during pregnancy with a (total mean ± SD = 9.15±3.278). Regarding, correlations between the total level of health care seeking behavior of the studied pregnant women and total level of perception/awareness regarding infection with COVID 19 during pregnancy, the present study demonstrated that slightly more than four fifths had negative perception, with no statistical significant relation (r, p = 0.089, 0.125).

This result disagrees with **Karavadra B., et al., 2020** [30] findings, which revealed that the main areas of concern of pregnant women were mode of coronavirus transmission, use of antenatal virtual clinics and their acceptability to patients, the presence of a birthing partner, and the way in which information is communicated about services, as well as barriers to accessing healthcare for pregnant women during COVID-19.

Somayyeh K., et al., 2022 [46] reported that there was a positive and significant correlation between perception, self-care practices and knowledge regarding controllability of the COVID-19 during prenatal period. Moreover, the present study in line with **Yohannes F., et al.,** [47], who notice that COVID-19 preventive measure practices and knowledge were low among pregnant women aged ≥35 and need to be counseled on practices of preventing COVID-19 by their healthcare providers.

Relating to correlations between the total level of health care seeking behavior and total level of knowledge, regarding antenatal care during COVID 19 pandemic**,** this study confirmed that the majority had low level of knowledge, with a highly statistical

significant relation (r, P = 0.275 , 0.000**). In the same line, **Ratih M., and Nurya V., 2021** [45] illustrated that most of the pregnant women have a low level of knowledge and indicate there is a significant correlation between knowledge and practices of pregnant women during the Covid-19 pandemic. In this regard, **Gupta R., et al., 2015** [48] addressed that the majority of the study respondents had Good perception about early ANC services (before 16 weeks), While their knowledge about adequate antenatal visits was poor.

On the other hand, **Degu A., et al., 2021** [37] demonstrated that almost all of the respondents (100%) mentioned that they had ever heard about COVID-19. The primary source of information was mass media, health worker, social media and others (like friends and colleagues). In addition, our study showed that the majority of respondents had a good knowledge about COVID-19.

Conclusion: This study revealed a statistically significant relation between the studied pregnant women' knowledge, perception and their health care seeking behavior during COVID 19 pandemic.

Recommendations: It is important to increase pregnant women awareness regarding the significance of seeking maternal health services during the COVID 19 pandemic. Consequently, to decrease maternal and neonatal mortality and morbidity rates. Additionally, programs and practical actions should be integrated to improve the quality of care provided to pregnant women particularly during the critical time of COVID 19 pandemic.

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Effect of Nursing Intervention program on Mothers' Knowledge, Practice and Attitudes toward Management of their Children with Epilepsy and Intellectual disability

Nahla Ali Maher Nashaat [1], Gamalat Mustafa Abd El-Ghany [2], Samia Farouk Mahmoud [3] Safia Ragab El Sebaie [4], Seham, I., AbdelrhmanAlhanafy [5] ,Etab Hussein Mohamed El Syad [6]

[1] Lecturer of Community Health Nursing department, Faculty of Nursing, Alexandria University

[2,3,5] Assistant Professors of Community Health Nursing department, Faculty of Nursing, Zagazig University, Egypt

[4] Lecturer of Psychiatric and Mental Health Nursing Faculty of Nursing, Zagazig University,

[6] Lecturer of Community Health Nursing, Faculty of Nursing, Zagazig University

Abstract

Background: High levels of knowledge, and practice among mothers could support the needs of their children with epilepsy and intellectual disability. **The aim of this study** was to assess the effect of nursing intervention program on improving mothers' knowledge, practice, and attitudes toward management of their children with epilepsy and intellectual disability. **A quasi-experimental design** was applied in current study**. A purposive sample** composed of 71 mothers was recruited from three intellectual disability schools in Sharkia Governorate. Three tools were used: **Tool (I):** Mother's knowledge about their children with epilepsy and intellectual disability. **Tool (II):** Mother's practice observation checklist about their children with epilepsy and intellectual disability. **Tool (III):** Mother's attitudes scale about their children with epilepsy and intellectual disability scale. **Results**: The majority of the mothers surveyed were married. Additionally, statistically significant increases in the mother's knowledge, practice, and attitudes were observed between pre- and post-sessions, with the total knowledge satisfied increasing from 2.8 % pre- to 100 % post-intervention and follow-up. The total positive attitudes increased from 56.3% in pre intervention, to 100% in post intervention and at follow up. Highly significant difference between scores of before fit, during fit, emergency, and after fit at pre, post- and follow-up at $p<0.001$. **Conclusion**: Current study revealed that the intervention efficiently improved mother's knowledge, attitude, and practice of epilepsy. Therefore, it is **recommended** that mothers should be equipped with all the necessary knowledge regarding children with epilepsy and intellectual disability either through a vast media campaign or by qualified health professionals.

Key words: Epilepsy, Mothers, Intellectual disability, Knowledge, Practice, Attitudes.

Introduction:

Epilepsy is a global public health problem that involves today more than 70 million people worldwide and over 85% of global disease burden presents in developing countries with at least 50% of cases begin at childhood or adolescence [1&2]. In Egypt [3] detailed that age-specific lifetime prevalence of epilepsy among children (< 18 years of age) was 9.7/1000. Similarly, Epilepsy is one of the most prevalent secondary disabilities among children with mental retardation in intellectual disability schools, and its frequency increases in direct proportion to the severity of the intellectual impairment. Around 50% of persons with substantial learning disabilities and between 10% and 20% of those with profound disabilities have had seizures at some point in their lives [4]. Similarly, epilepsy is one of the most prevalent neurological illnesses globally, with an estimated two million new cases occurring each year.

The effects of epilepsy on children and family incorporate several challenges such as complicated treatment regimens and psychosocial comorbidities. These obstacles have an impact on everyday living, place a significant financial and social strain on families, and are associated with a low quality of life [5].

In 2017, the International League Against Epilepsy (ILAE) reported that seizures are categorized as: focal onset (arise in localized area in one cerebral hemisphere), generalized onset (traversing the brain's two hemispheres), unknown (It is impossible to identify the commencement of seizure activity.), or unclassified (insufficient data or difficulty to classify in other categories) [6].

The etiology of seizures is classified as genetic, infectious, structural, metabolic, immune, and an unknown group. Genetic are those believed to be caused by a known or presumed genetic abnormality. Structural/metabolic causes of epilepsy include acquired lesion, such as tumor, stroke, infections, and trauma, as well as congenital malformations. An infectious etiology refers to epilepsy that occurring due to specific infectious agent such as meningitis or encephalitis. Metabolic reasons relate to a well-defined metabolic abnormality that manifests or alters biochemically across the body, such as uremia or aminoacidopathies. Metabolic reasons relate to a well-defined metabolic abnormality that manifests or alters biochemically across the body, such as uremia or aminoacidopathies [7].

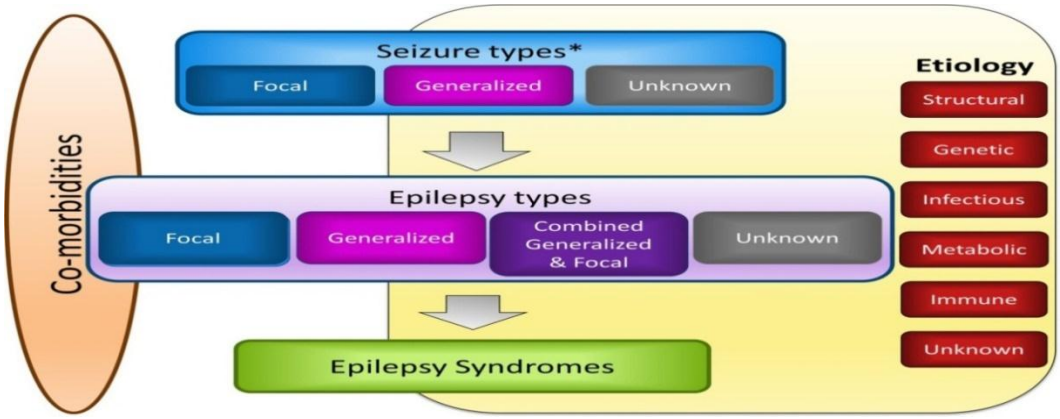

Fig (D): ILAE classification of the epilepsies

Source: [7]

ILAE classification of the epilepsies: Position paper of the ILAE Commission for Classification and Terminology Epilepsies; 58(4):512–521.

Insufficient epilepsy knowledge and practice; forgetting to take medicine; and insufficient problem resolution, communication, and self-management skills. Additionally, a lack of social support contributes to non-adherence [8]. Due to the high rate of non-adherence to treatment regimens among persons with epilepsy, it is critical to offer them with necessary supporting information about the illness and the need of sticking to medication, as well as frequent follow-up [9]

Seizures in certain children occur in reaction to stimuli. While triggers vary per children, understanding what causes someone's seizures implies that they may be able to avoid certain circumstances. The most common seizure triggers in children include emotional stress, sleep deprivation, fatigue, fever, infection, and illness [10]. Other precipitating factors include flashing or bright lights, missed medications, overstimulation (like staring at a computer screen or playing video games for too long), nutritional deficiencies and fasting, dehydration, fever, certain medications, as well as hyperventilation (breathing too fast or too deeply) [11].

Establishing a diagnosis of epilepsy is critical. The process of diagnosis in children suspected of having epilepsy includes (1) determining whether epilepsy or seizure exists and not an alternative diagnosis, and (2) defining the underlying cause if possible [12]. Recently,[13] mentioned that a diagnosis of epilepsy or seizure is based on obtaining an accurate urseuphysical, neurological and developmental examination, laboratory studies, electroencephalogram and brain imaging (CT scan or MRI).

The basic tent of treatment for the children with seizures is to treat the whole children. The goals are to identify and correct the cause of the seizure, eliminate the seizure with a minimum side effect and the least amount of medication, and normalize the children's and family's lives [14]**.** Medical treatment of epilepsy focuses on controlling

seizures or reducing their frequency, the first choice of treatment is the pharmacological management (antiepileptic drug therapy) [15].

Care of the children with a recurrent seizure disorder involves physical care and instruction regarding the importance of the drug adherence, the problems related to the emotional aspects of the disorder. Fears and misconceptions about the disease and its treatment are common and lead to anxiety among family members. The major role of the community health nurse (CHN) is directed toward educating the children and family in particular mother about epilepsy and helping them develop strategies to cope effectively with the psychological and sociologic problems related to it. In addition, the Community Health Nurse (CHN) plays an important role in providing the mothers with clear instructions about home care as seizure precaution measures, dosage and side effect of medications, possible precipitating factors, and the importance of maintaining as normal a lifestyle as possible [16]. Additionally, preventing injury during seizures, administrating appropriate medication and treatments to prevent or reduce seizures, and monitoring neurologic status closely are also CHN has important role [17].

The aim of this study was to evaluate the effect of nursing intervention program on improving mothers' knowledge, practice, and attitudes toward management of their children with epilepsy and intellectual disability.

This was accomplished through the specific objectives:

1. Assess mothers' knowledge, practices and attitudes prior and after the nursing intervention program toward management of their children with epilepsy and intellectual disability.
2. Plan, implement, and evaluate the effect of nursing intervention program on improving mothers' knowledge, practices, and attitudes toward management of their children with epilepsy and intellectual disability.

Hypotheses

- Mothers' knowledge, practices, and attitudes' scores toward management of their children with epilepsy will be improved after nursing intervention program.

Subjects and Methods

Study design

A quasi-experimental interventional design, with pre-, post-, evaluations applied.

Study setting

This study was conducted at three settings:

1. Intellectual education schools at Zagazig.
2. Intellectual education schools at Menia-El Amh.
3. Intellectual education schools at Dierb-Negm.

Subjects

A purposive sample was used in this study. The total intellectual education schools at Sharkia Governorate were 13 schools. Random sample was used for choosing the schools, intellectual education schools at Zagazig, Menia-El Amh, and Dierb-Negm were selected. All mothers and their children who met the inclusion criteria were invited to join in the present study.

Sample criteria

Only mothers with children with epilepsy and were willing to participate

in this research were included in this study.

Tools of data collection

Three tools were applied for collecting necessary data for achieving the study objectives, and there were a number of different questions as MCQ, and essay.

Tool (I): Mother's knowledge toward their children with epilepsy and intellectual disability. It consisted of three parts namely;

- **Part (A):** Mother's demographic characteristics, for collecting data pertaining to the mothers developed by the researchers as; age, residence, marital status, education, crowding index, income and source of information.
- **Part (B):** Children 's demographic characteristics, for collecting data pertaining to the children, developed by the researchers as gender, age at first fit, precipitating factor, degree of disability, number of medications, and regular medications. Additionally, children school characteristics as school phase, performance, Regular school attendance.
- **Part (C):** Mothers' knowledge questionnaire, to assess mothers' knowledge toward management of their children with epilepsy and intellectual disability. It was adapted by [18] as**;** definition, nature, causes, symptoms/signs, onset age of epilepsy, treating specialty, treatment duration, precipitating factors, diagnosis, prevention, precautions, treatment, petit mal fit and emergency**.**

Scoring system

For knowledge items, a correct answer received a score of one, while an erroneous response received a score of zero. For each area of expertise, the item scores were added together, and the total divided by the number of items, resulting in a mean score for the section. These scores were then translated to percentile rankings. Knowledge was regarded good if the percent score was 50% or above, and unsatisfactory if the percent score was less than 50%.

- **Tool (II):** Mother's practice observation checklist to assess practices toward management of their children with epilepsy and intellectual disability. It was adapted from [19]**,** which included 30 items, and covers 4 parts namely;

Part A: Covers practices during the focal seizure. It consists of three items, as do not blame the children, do not criticize the children, and record the number of times.

Part B: Covers practices during epilepsy fits. It consists of 13 items, as; stay calm, register time of the seizure, protect from injury and place something soft under the head, loosen anything tight around the neck, don't restrain the children, don't put anything in the mouth, gently roll the children onto his or her side, do not put onions, perfume in children's nose or mouth, avoid giving the children any food, drink or even medication during the seizure until he/she fully wakes up. Moreover, avoid spraying the children's face with water.

- **Part C:** It consists of 10 items, which covers practices when calling ambulance, such as; if it is a first-time seizure, the children is injured, or has diabetes, additionally, if a convulsive seizure lasts more than 5 minutes, if consciousness or regular breathing does not return after the seizure has ended, and if seizure repeats without full recovery between seizures.
- **Part D:** Covers practices to be followed

after epilepsy fits have been ended; Mother's should register time post the seizure, reassure and comfort the children if confusion follows the seizure.

Scoring system: Each observed "done" step received a score of one, while the "not done" steps received a score of zero. According to statistical analysis, a practice was regarded good if the percent score was 50% or above, and unsatisfactory if the percent score was less than 50%.

Tool (III): This measure was developed to ascertain mothers' attitudes toward children with epilepsy; it was modified from [20]. Mothers were asked to choose one of three responses to each statement: "Agree," "Disagree," or "Not sure." The statement of attitudes covering four domains as dealing with epileptic child, treatment, prognosis, and social stigma. Hence, the attitude scale was considered positive 60% or more and unsatisfactory if less than 60% based on statistical analysis.

Content validity and reliability of tools

Three specialists evaluated the data collected for tools. Two professors from the Department of Community Health Nursing, one assistant professor from the Department of Psychiatric Health Nursing at Zagazig University's Faculty of Nursing, and one professor with a specialty in brain and nerves from Zagazig University's Faculty of Medicine evaluated the tools' clarity, relevance, application, and comprehension. All changes to the tools that were proposed have been implemented. Cronbach's Alpha was used to determine the reliability of the suggested tools; the results were 0.759 for tool (I), 0.680 for tool (II), and 0.948 for tool (III) (III).

Field work

Data collection took six months, beginning of from October 2020 to end of March 2021. The study was carried out through 4-stages: assessment, planning, implementation, and evaluation.

Assessment phase

This phase involved data collection prior to intervention to assess the baseline. The researchers first introduced themselves and explained the purpose of the research briefly to the directors of all the intellectual education schools and to the mothers. The Director of each school appointed the Director of the school Training Unit to facilitate the administration of the questionnaires.

All the mothers were met, and verbal agreements were obtained for participation. The pretest knowledge, and attitude were distributed, and the same questionnaire was used after the sessions' implementation for post assessment (post-test). Data were analyzed initially to provide the basis for the design of the intervention sessions.

Planning phase

The researchers designed the intervention sessions' content. The learning booklet was prepared by the researchers and its content was validated and then distributed to mothers to be used as a guide for self-learning.

General objective: The general objective of the mothers' sessions was to raise their knowledge, practices and attitudes towards epilepsy.

Specific objectives: By the end of the sessions, the mothers should be able to:

- Define the meaning of epilepsy.
- Enumerate the causes of epilepsy.
- List the symptoms of partial and generalized epilepsy.
- Describe the common age, periods of treatment, and referral of doctors of epilepsy.
- Describe the triggering factors of epilepsy
- Discuss the diagnosis of epilepsy.
- Illustrate the prevention measures of epilepsy.
- Describe the treatment of epilepsy.
- Explain the precautions of epilepsy.
- Explain the practice and positive attitude during the focal seizure
- Apply the practice during and after epileptic fit correctly.
- Demonstrate when to call ambulance for generalized epilepsy.

Implementation phase

The intervention was implemented in the form of sessions; these were performed in the school library. The educational training methods were group discussions, role play, and demonstration. The sessions were supported using video, through labtop data show to facilitate and illustrate teaching. The total sessions of all intellectual schools was 11 sessions. The number of mothers in each session was 4-6 mothers. The objectives of the sessions were as follows:

At the beginning of the first session an orientation to the session such as; the purpose of the subject, contents, time and location. The objective of the second session was the explanation the basic knowledge regarding epilepsy as definition, nature, causes, symptoms/signs, triggering factors, and diagnosis, as well, the types of treatment and the precautions. The third session focused on applying the practice of the focal seizure epilepsy, as well as the practice during and after epileptic fit correctly and finally, when to call ambulance for emergency generalized epilepsy and global summarization and revision of the aim of the session and termination module sessions.

The last session was to evaluate the effect of health educational sessions on improving mothers' knowledge practices and attitudes regarding epilepsy.

Evaluation phase

An evaluation of educational intervention for nursing was carried out immediately after the implementation of the sessions. A follow-up evaluation was carried out after three months through the application of the same tools of the pretest.

Pilot study

Before starting the main study, a pilot study was conducted on 7 mothers (10%), who were excluded from the main study.

Administrative and ethical considerations

Permission to carry out the study was granted by submission of official letters from the Faculty of Nursing to the responsible authorities of the study settings to obtain their permission for data collection. All ethical issues were taken into consideration during all phases of the study.

Statistical Design

The SPSS statistical software program version 20.0 was used to enter data and conduct statistical analysis. For qualitative variables, data were presented using frequencies and percentages; for quantitative variables, data were presented using means, standard deviations, and medians. Chi-square test was used to compare qualitative category variables. Where anticipated values in one or more cells in a 2x2 table were less than 5, the Fisher exact test was utilized instead. The

Spearman rank correlation coefficient was employed to analyze the correlations between quantitative and ranking variables. To discover independent determinants of knowledge, attitude, and practice scores.

Results

Table (1) shows distribution of mothers according to their demographic characteristics, 62.0% of mothers were in the age <40 years, while their mean age was 37.9±8.1. The study also examined the educational level of the mothers, it is noted that mothers with illiterate level dominated the study (46.5%), as well, rural residence (91.5%). As for marital status of the mothers 93.0% were married and 46.5% of them reported that their income was sufficient income.

Table (2) indicates the epileptic children demographic and disease characteristics. It reveals that 59.2% of the children were boys, the highest children's age in the category <12 (63.4%), and the mean of children age at first fit was 2.3±2.7. In addition, 34.1% of the epileptic children are having more than one of precipitating factors followed by fever (18.2%). Moreover, for 67.6% of the children, it was severe mental retardation disease. Furthermore, 25.5% of them use 4 drugs and for 53.1% they were regular medications.

Table (3) describes that 69.0% of the children were primary school phase and 67.6% of them were poor school performance. Moreover, 50.7% of children were regular school attendance.

Table (4) reveals that the highest mothers' source of information regarding epilepsy was physician (94.4%), followed by nurse, (9.9%), and media (4.2%).

Table (5) clarifies that there are significant increases in the score of all studied mothers' outcomes in the post-intervention than pre-intervention ($p<0.001$). Additionally, the total knowledge satisfactory increased from 2.8% in pre intervention, to 100% in post intervention and follow up.

Table (6) describes mothers' attitudes toward their children with epilepsy and intellectual disability. There were highly statistically significant differences between mothers in relation to their attitude toward epilepsy whether dealing with children, treatment, and prognosis ($p<0.001$). Additionally, the total attitudes positive increased from 56.3% in pre intervention, to 100% in post intervention and at follow up.

Table (7) shows that there was highly statistically significant differences in mothers' practices between scores of before fit, during fit, emergency, and after fit at pre, post and follow up at p value <0.001*. Furthermore, the total adequate practice increased from 4.2% in pre intervention, to 100% after intervention and decreased to 93% at follow-up. All the differences observed were statistically significant p= 0.001.

Table (8) portrays that there was a statistically significant difference between mothers' attitude at pre-intervention phase and their regular medications ($p<0.05$).

Table (9) displays that correlation matrix of mothers' knowledge, attitude, and practice scores. There are statistically significance differences between attitude and knowledge (.842), practice and knowledge (.881), attitude and practice (. 8 8 8)

In a multivariate analysis. A table 10 show that the statistically significant

independent positive predictors of the mothers' knowledge scores related to epilepsy was their intervention. The model explains 0.66% of the variation in this score, whereas none of the other mother's 'characteristics had a significant influence on it. In a multivariate analysis, Table 11 demonstrates that the statistically significant independent positive predictors of the mothers' attitude scores related to epilepsy were their intervention, mother's age, income, and knowledge scores. The model explains 0.78% of the variation in this score, whereas none of the other mother's characteristics had a significant influence on it. In a multivariate analysis, Table 12 shows that the statistically significant independent positive predictors of the mothers' practice scores related to epilepsy were their girl children, knowledge score, and attitude score. The model explains 0.87% of the variation in this score, whereas none of the other mother's characteristics had a significant influence on it.

Table 1: Demographic Characteristics of Mothers in the Study Sample (n=71)

Demographic characteristics	Frequency	Percent
Age:		
<40	44	**62.0**
40+	27	**38.0**
Range	**20-57**	
Mean±SD	**37.9±8.1**	
Median	**37.0**	
Residence:		
Urban	6	**8.5**
Rural	65	**91.5**
Marital status:		
Married	66	**93.0**
Widow	5	**7.0**
Education:		
Illiterate	33	**46.5**
Basic	6	**8.5**
Secondary	24	**33.8**
Intermediate	3	**4.2**
University	5	**7.0**
Crowding index:		
<2	21	**29.6**
2+	50	**70.4**
Income:		
Insufficient	38	**53.5**
Sufficient	**33**	**46.5**

Table 2: Epileptic Children Demographic and Disease Characteristics (n=71)

Demographic and disease characteristics	Frequency	Percent
Children gender:		
Boys	42	**59.2**
Girls	29	**40.8**
Children age:		
<12	45	**63.4**
12+	26	**36.6**
Children age at first fit:		
Range	**0.0-14.0**	
Mean±SD	**2.3±2.7**	
Median	**1.0**	
Precipitating factor:		
No	27	**38.0**
Yes	44	**62.0**
Factors (n=44):		
Punishment	1	**2.3**
Fever	8	**18.2**
Hunger	1	**2.3**
Anger	6	**13.6**
Fear	5	**11.4**
Irregular medication	1	**2.3**
Late night sleep	2	**4.5**
Fatigue	5	**11.4**
More than one	15	**34.1**
Degree of disability:		
Moderate	23	**32.4**
Severe	48	**67.6**
No. of medications;		
0	7	**9.9**
1	12	**16.9**
2	25	**35.2**
3	16	**22.5**
4+	11	**25.5**
Regular medications:		
No	30	**46.9**
Yes	**34**	**53.1**

Table 3: Characteristics of Children with Epilepsy and Intellectual Disability (n=71)

School Characteristics	Frequency	Percent
School phase:		
Primary	29	**69.0**
Preparatory/secondary	22	**31.0**
School performance:		
Poor	48	**67.6**
Good	23	**32.4**
Regular school attendance:		
No	35	**49.3**
Yes	**36**	**50.7**

Table 4: Mothers' sources of information about epilepsy (n=71)

Sources of information:	Frequency	Percent
Physician	67	**94.4**
Nurse	7	**9.9**
Media	**3**	**4.2**

(@) Not mutually exclusive

Table 5: Mothers Knowledge of Epilepsy throughout Intervention Phases

Knowledge about epilepsy:	Time						X^2 (p-value) Pre-post	X^2 (p-value) Pre-FU
	Pre (n=71)		Post (n=71)		FU (n=71)			
	No.	%	No.	%	No.	%		
Definition	15	21.1	71	100.0	70	98.6	92.47 (<0.001*)	88.66 (<0.001*)
Nature	58	81.7	71	100.0	71	100.0	14.31 (<0.001*)	14.31 (<0.001*)
Causes	12	16.9	71	100.0	71	100.0	100.94 (<0.001*)	100.94 (<0.001*)
Symptoms/signs	34	47.9	71	100.0	71	100.0	50.04 (<0.001*)	50.04 (<0.001*)
Onset age	7	9.9	71	100.0	71	100.0	116.51 (<0.001*)	116.51 (<0.001*)
Treating specialty	33	46.5	71	100.0	71	100.0	51.88 (<0.001*)	51.88 (<0.001*)
Treatment duration	6	8.5	71	100.0	70	98.6	119.87 (<0.001*)	119.87 (<0.001*)
Precipitating factors	44	62.0	71	100.0	71	100.0	33.34 (<0.001*)	33.34 (<0.001*)
Diagnosis	20	28.2	71	100.0	71	100.0	79.58 (<0.001*)	79.58 (<0.001*)
Prevention	10	14.1	71	100.0	71	100.0	106.94 (<0.001*)	106.94 (<0.001*)
Precautions	13	18.3	71	100.0	701	98.6	98.05 (<0.001*)	94.21 (<0.001*)
Treatment	60	84.5	71	100.0	71	100.0	11.92 (0.001*)	11.92 (0.001*)
Seizures	7	9.9	71	100.0	71	100.0	116.51 (<0.001*)	116.51 (<0.001*)

Petit mal fit	5	7.0	71	100.0	71	100.0	123.32 (<0.001*)	123.32 (<0.001*)
Emergency	33	46.5	71	100.0	71	100.0	51.88 (<0.001*)	51.88 (<0.001*)
Total knowledge:								
Satisfactory	2	2.8	71	100.0	71	100.0	134.22	134.22
Unsatisfactory	69	97.2	0	0.0	0	0.0	<0.001*)	(<0.001*)

(*) Statistically significant at p<0.05

Table 6: Mothers Attitude towards Epilepsy throughout Intervention Phases

Positive (60%+) Attitude towards:	Time						X^2 (p-value) Pre-post	X^2 (p-value) Pre-FU
	Pre (n=71)		Post (n=71)		FU (n=71)			
	No.	%	No.	%	No.	%		
Dealing with epileptic child	42	59.2	71	100.0	71	100.0	36.44 (<0.001*)	36.44 (<0.001*)
Treatment	21	29.6	69	97.2	69	97.2	69.91 (<0.001*)	69.91 (<0.001*)
Prognosis	8	11.3	71	100.0	71	100.0	113.24 (<0.001*)	113.24 (<0.001*)
Social stigma	70	98.6	70	98.6	70	98.6	Fisher (1.00)	Fisher (1.00)
Total attitude:								
Positive	40	56.3	71	100.0	71	100.0	39.66	39.66
Negative	31	43.7	0	0.0	0	0.0	(<0.001*)	(<0.001*)

(*) Statistically significant at p<0.05

Table 7: Mothers' Practices in Caring with Children with Epilepsy and Intellectual Disability throughout Intervention Phases.

Practice Adequate (60%+)	Time						X^2 (p-value) Pre-post	X^2 (p-value) Pre-FU
	Pre (n=71)		Post (n=71)		FU (n=71)			
	No.	%	No.	%	No.	%		
Before fit	23	32.4	71	100.0	68	95.8	72.51 (<0.001*)	61.96 (<0.001*)
During fit	5	7.0	71	100.0	63	88.7	123.32 (<0.001*)	94.93 (<0.001*)
Emergency	6	8.5	71	100.0	69	97.2	119.87 (<0.001*)	112.16 (<0.001*)
After fit	13	18.3	70	98.6	67	94.4	94.21 (<0.001*)	83.48 (<0.001*)
Total practice:								
Adequate	3	4.2	71	100.0	66	93.0	130.49	11.89
Inadequate	68	95.8	0	0.0	5	7.0	(<0.001*)	(<0.001*)

(*) Statistically significant at p<0.05

Table 8: Relations between Mothers' Attitude at Pre-intervention Phase and Their children characteristics

Items	Attitude				X^2 test	p-value
	Positive		Negative			
	No.	%	No.	%		
Children gender:						
Boys	25	59.5	17	40.5		
Girls	15	51.7	14	48.3	0.42	0.51
Children age:						
<12	23	51.1	22	48.9		
12+	17	65.4	9	34.6	1.36	0.24
Precipitating factor:						
No	16	59.3	11	40.7		
Yes	24	54.5	20	45.5	0.15	0.70
School phase:						
Primary	26	53.1	23	46.9		
Preparatory/secondary	14	63.6	8	36.4	0.69	0.41
School performance:						
Poor	25	52.1	23	47.9		
Good	15	65.2	8	34.8	1.09	0.30
Regular medications:						
No	22	73.3	8	26.7		
Yes	13	38.2	21	61.8	7.92	0.005*
Regular school attendance:						
No	21	60.0	14	40.0		
Yes	19	52.8	17	47.2	0.38	0.54

(*) Statistically significant at $p<0.05$

Table 9: Correlation Matrix of Mothers' Knowledge, Attitude, and Practice Scores

Scores	Spearman's rank correlation coefficient		
	Knowledge	Attitude	Practice
Knowledge	1.000		
Attitude	.842**	1.000	
Practice	.881**	.888**	1.000

(**) Statistically significant at $p<0.01$

Table 10: Best Fitting Multiple Linear Regression Model for the Knowledge Score

	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Constant	-1.80	3.82		-0.470	0.639	-9.33	5.74
Intervention	35.57	1.77	0.81	20.103	<0.001	32.08	39.06

r-square=0.66
Model ANOVA: F=404.13, $p<0.001$
Variables entered and excluded: age, education, residence, income, child age and sex

Table 11: Best fitting Multiple Linear Regression Model for the Attitude Score

	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Constant	63.11	2.58		24.426	<0.001	58.01	68.20
Intervention	1.72	0.81	0.12	2.121	0.035	0.12	3.32
Mother age	0.10	0.05	0.07	2.002	0.047	0.00	0.20
Income	1.42	0.79	0.06	1.794	0.074	-0.14	2.98
Knowledge score	0.26	0.02	0.78	14.252	<0.001	0.23	0.30

r-square=0.78

Model ANOVA: F=189.21, p<0.001

Variables entered and excluded: education, residence, child age and sex

Table 12: Best Fitting Multiple Linear Regression Model for the Practice Score

	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value	95% Confidence Interval for B	
	B	Std. Error				Lower	Upper
Constant	-30.77	9.10		-3.382	0.001	-48.71	-12.84
Girls children	3.15	1.43	0.06	2.204	0.029	0.33	5.96
Knowledge score	0.48	0.04	0.62	11.712	<0.001	0.40	0.56
Attitude score	0.77	0.12	0.33	6.314	<0.001	0.53	1.01

r-square=0.87

Model ANOVA: F=457.90, p<0.001

Variables entered and excluded: age, education, residence, income, child sex and onset age, intervention

Discussion

Epilepsy is a chronic condition that requires long term care and results in neuropsychological dysfunction, quality of life deterioration, and recurrent physical injury; also it leads to social stigma, low academic performance, decreased work opportunities, and shortened lifespan. Accurate information for epileptic children and their families especially mothers' education about the consequences of epilepsy, and skills development are essential components for helping them become better partners in children-centered care. The effects of epilepsy on a child and family incorporates several challenges as complicated treatment regimens and psychosocial comorbidities that influence daily life, put critical financial and social burden on families, and associated with poor quality of life [15].

The current study revealed that the highest age in the category group less than forty years, illiterate education, and insufficient income and epilepsy occur more in boys than girls. This might be due to the mortality associated with epilepsy in low-income countries. These results are in agreement with those of **Vaid et al., (2012)** [21] in **Ethiopia**, who said that persons with epilepsy were much more subject to be illiterate or to be able to read and write only, and far less likely to have finished secondary or higher education. Additionally, there was a link between epilepsy and employment as a laborer or traditional farmer. Similarly, study results done by **Kishk et al., (2019)** [22], in Egypt, which mentioned that females were more illiterate and unemployed compared to males.

In the present study, almost one of quarter of children uses more than 4 drugs and more than half of children were regular medications. It may be due to their inadequate awareness about their medications and the importance of adherence. Forgetfulness was the most common cause of non-adherence as reported by many studies [23,24&25].

For more than half of the studied children, the most common triggering factors of seizure were having more than one of precipitating factor. This might be due to the mothers and their children while dealing with seizure-precipitating factors is a partly neglected and ignored. Acknowledging and avoiding seizure precipitants may improve seizure control in many children. This finding similar to that of **Elshiekh et al., (2021)** [26], in **Egypt**, who mentioned that more than one of triggering factors of seizure of the children as emotional stress (48%), medication incompliance (40%), sleep deprivation, fatigue and physical effort (30%), having cold, stimulant (sit in front of TV for long periods) and other least common factors, which account for 18. These results are almost similar to those of research done by **Dugassa et al., (2017)** [27] in **Shambu General Hospital, North West Ethiopia**, they found nearly the same triggers with different percentages as emotional stress (97.4%), sleep deprivation (78.1%), missing meal (29.8%), missing medication (21.9%), a menstruation cycle, heavy alcohol, cold weather, and chat (34.2%).

The source of information in the present study was physician or nurse showing its importance. This finding might be due to, the mothers follow up with the doctor to check on the development of the children every 6 months to prevent complications. The result of the present study is supported by **Kolahi et al., (2018)** [20] in neurology clinic of a pediatric hospital, who found that physicians and nurse were the leading sources of information about epilepsy. This finding contrasting with **Dargie et al., (2020)** [28], found that the most prominent source of knowledge was internet (59.8%). This difference may be due to difference in location and culture.

Concerning answering the research hypothesis which stated that mothers' knowledge, practices, and attitudes' scores toward children with epilepsy and intellectual disability will be improved after nursing intervention sessions, the findings of the present study revealed that minority of the mothers had satisfactory knowledge, and practices, and more than half of mothers were having positive attitudes in pre intervention. This might be due to that no such study was previously conducted on those mothers. Moreover, more than two thirds of mothers had illiterate level. The study revealed that the level of knowledge, attitudes, and practices towards epilepsy needs community educational program to fill the gaps. As well, level of education and income seem to be the two major contributing factors. The overall poor knowledge magnitude was in line with the study

conducted in **Ethiopia**, by **Henok and Lamaro (2017)** [29], which mentioned that majority of mothers were having unsatisfactory knowledge and practices. Similarly, study done by **Ibrahim and Shata** (**2017**) [30] in **Egypt**. They mentioned 80.5% of mothers got unsatisfactory knowledge. This result was in agreement with that of a study done by **Dargie et al., (2020)** [28], aimed to assess a public knowledge and attitude towards epilepsy and its associated factors in **Debre Berhan, North Shoa, Amhara Region**, **Ethiopia.** They found that 43.6% had poor knowledge about epilepsy, and 32.2% of the study participants reported seizure attacks didn't originate from the brain, caused by evil spirit (46.6%), and infection or injury can't cause a seizure disorder (52%). Similarly, 29.5% did not know about the presence of different types of seizure disorder, 34.1% thought there is no medical test for diagnosing seizure disorder. These results matched with those of **Kissani et al., (2020)** [31] in **Marrakesh, Morocco**, who mentioned that knowledge was very poor highlighted, the need for a more global intervention.

After implementation of the nursing intervention sessions, the findings of the present study revealed that highly statistically significant improvements in mothers' total knowledge, practices, and attitudes scores, about epilepsy were demonstrated after implementing the educational training program (P<0.01), where the majority of the studied group had satisfactory knowledge scores following the intervention. As well, highly statistically significant differences were detected between scores of before fit, during fit, emergency, and after fit at pre, post and follow up at p value <0.001. This difference could be related to the nature and the effect of the program, its content; teaching methods and interactive media used to impart knowledge; telephone follow up calls to remind participants about the next session and discuss any concerns about the disease.

This study result was in agreement with that of a study conducted in **Abha City, Kingdom of Saudi Arabia by Asiri et al., (2018)** [32], which aimed to assess parent's knowledge and attitude and practice towards their children with epilepsy, they mentioned that most of **Saudi** parents in **Abha** showed that adequate practice pattern. This was consistent with other study in **KSA,** by **Obeid et al., (2012)** [33], which aimed to identify the cause of epilepsy, and they found adequate practice and knowledge among mothers. These findings were supported by those of **Kolahi et al., (2018)** [20], which aimed to assess knowledge, attitudes, and practices among mothers of children with epilepsy and demonstrated good knowledge and practice scores. As well, these findings matched with those of **Giuliano et al., (2017)** [34], as they mentioned that of the 216 subjects involved in the program, only 133 (61.6%) subjects completed the questionnaires, a month after the educational program.

A significant improvement was recorded in knowledge, attitudes, and practices toward epilepsy, reflecting a reduction of stigma levels. These results matched with those of **Kausar et al., (2020)** [35], in **Pakistan,** who found that, the post-test results revealed a significant increase in mother's knowledge (P = < 0.002), and attitude (P = < 0.04). The same result disclosed by **Turan Gürhopur and Dalgiç (2018)** [36] in a study reported that, consistent and regular education through interactive teaching methods improves knowledge, self-efficacy and the quality of care for children with epilepsy.

Regarding the attitude towards epilepsy in the present study, more than half of mothers had a positive attitude towards epilepsy before intervention. However, after intervention all of mothers' at immediately post as well as follow up three months had adequate attitude. This study result is in line with those of several studies done in **Ethiopia** by **Henok & Lamaro (2017)** [29], Uganda **by Kiwanuka, & Anyango-Olyet (2018)** [37], and Nigeria by **Osakwe et al., (2018)** [38]. Additionally,[28] in **Ethiopia** found that 41.3% of the respondents had an unfavorable attitude towards epilepsy before intervention which improved after intervention. Also, **Asiri et al., (2018)** [32] showed that most of Saudi parents in **Abha** had adequate attitude. In accordance the study done in **Italy** showed good attitude toward dealing with epileptic children in good manner **Savarese et al., (2015)** [39].

Fortunately, the improvements on the knowledge, management of epilepsy among mothers, and attitudes in the next three months (follow up test) were still stable except practices have been reduced by a very small percentage, this might be due to lack of continued education

and reinforcement during the follow-up period regarding practices, additionally, because mothers tend to forget some of what they learned as long as time passes. So, this indicates the need to carry out a periodic nursing intervention about the disease at least every six months to guarantee that the mothers' practices are still good to deal with such children. This finding was matched with that of **Abusaad & El-Wehedy (2016) [40]**, who found a slight decrease in the level of knowledge after six months of the educational sessions.

In the present study, a multivariate analysis showed that, the statistically significant independent positive predictors of the mothers' practice scores related to epilepsy were their girl children, knowledge, and attitude score. As well, the statistically significant independent positive predictors of the mothers' attitude scores related to epilepsy were their intervention, mother age, income, and knowledge score. This might be related to that positive knowledge leads to improve practice and positive attitude. Generally, this study reflected that the educational training program had significant positive effect on epileptic mothers' performance. These findings matched with **Abusaad & El-Wehedy (2016) [40]** who found that statistically significant independent positive predictors of the mothers' attitude scores related to epilepsy was their intervention.

Conclusion

Based on the present study results, one can conclude that slightly more than two thirds of children with epilepsy are having severe intellectual disability. Furthermore, more than almost three fifths of the children were boys. The highest mothers' source of information regarding epilepsy was physician. Moreover, the comprehensive educational training program for mothers with children with epilepsy and intellectual disability had a profound effect on improving their knowledge, practices, and attitudes about the disease. As well, highly scores of before fit, during fit, emergency, and after fit at pre, post and follow up tests at p value <0.001. In a multivariate analysis, a statistically significant independent positive predictor of the mothers' knowledge scores related to epilepsy was their intervention.

Recommendations

1. Educational sessions, an illustrated booklet and written leaflets about disease, treatment, strategies to improve knowledge, attitudes, practices and drug adherence, and self-management practices are mandatory.
2. Educational nursing intervention about epilepsy should be provided periodically and continually to all mothers in all intellectual education schools to equip them with the necessary knowledge and skills for proper management of children with epilepsy in the school.
3. Further study should be carried out on a larger scale for generalization of results.

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The association between Servant Leadership, Career Adaptability and Job Embeddedness among Staff Nurses at Main Mansoura University Hospital

[1]Reda Shehata Elsayed , [2] Asmaa Moustafa Abdel-Ghani

[1] Assistant Professor, Nursing Administration, Faculty of Nursing, Mansoura University

[2] Lecturer, Nursing Administration, Faculty of Nursing, Mansoura University

Abstract

Background: In a fast changing environment, managers play a crucial role in delivering effective leadership. Servant leadership is one of the most effective leadership styles in the healthcare field. Servant leadership prioritizes the professional growth of staff nurses through listening empathetically, empowering them, and addressing their needs. It is critical in assisting staff nurses in effectively adapting to career changes and improving their job embeddedness. **Aim:** The aim of the present study was to examine the association between servant leadership, career adaptability and job embeddedness among staff nurses at Main Mansoura University Hospital. **Methods:** A descriptive correlation design was utilized. Sample of the study consisted of all nurses working at Main Mansoura University Hospital (n=151 staff nurses) who fulfills the criteria of having a minimum of one year experience were included in the study. Three tools were utilized for data collection, namely; Servant Leadership Survey (SLS), Career Adaptability Scale (CAS) and Job embeddedness Scale (JES). **Results:** Major findings of the present study were positive correlation between servant leadership and staff nurses' career adaptability. Also, there were statistically significant positive correlation between servant leadership and staff nurses' job embeddedness. Additionally, there were statistically significant positive correlation between staff nurses' career adaptability and their job embeddedness. **Conclusion:** It was concluded that servant leadership dimensions have significant roles in developing and enhancing both staff nurses' career adaptability and job embeddedness. Career adaptability also plays an important role in improving staff nurses' job embeddedness. **Recommendation:** It was recommended that, establishing work environment that supports the benefits of servant leadership and its impact on the career adaptability and job embeddedness of staff nurses.

***Keywords*: Staff nurses, Servant leadership, Career adaptability, Job embeddedness.**

Introduction

With the rising trend of career uncertainty, the nature of work in healthcare organizations is changing rapidly in today's world [(1).] Nursing staff are frequently confronted with emergency situations, resulting in unpredictably high workloads and uncertain working conditions [(2).] The demands of the job become overwhelming in such circumstances, and it becomes extremely challenging for nurses to equilibrium the needs of work with the demands of family life. Furthermore, if nurses are unable to adjust to these changes, their turnover rate will rise, resulting in severe consequences for the organization. Furthermore, job embeddedness hailed as a gift for nurses as an indirect method of lowering turnover and increasing nurse retention [(3, 4).]

Furthermore, healthcare organizations must embrace an effective leadership philosophy that allows staff nurses to adapt to career changes and increase their job embeddedness [(5, 6).] In today's dynamic environment, servant leadership is a favorable leadership style. Rather than constraining subordinates, it uses influence and persuasion [(7).] Servant leadership is more than a style of leadership; it is a concept and set of activities that enrich the lives of nurses, improves organization and in the end promotes a more objective and compassionate environment [(8).]

Servant leadership is a comprehensive and broad leadership method that involves followers in numerous dimensions, allowing them to grow into what they are capable of becoming [(9).] Servant leadership stresses "service" and prioritizes meeting employees' needs, and it can influence employees by serving and assisting them in developing their behavior [(10).] The dimensions of servant leadership are conceptual skills, emotional healing, putting subordinates first, helping subordinates grow and develop, behaving ethically, empowering, creating value for the community and humility [(10,11).]

Many conceptual skills are possessed and demonstrated by servant leaders. They are usually in a position for direction; provide timely support and resources to subordinates because they have sufficient knowledge of the

organization its goals and tasks. Emotional healing entails sensitivity and caring for subordinates' concerns and needs. Servant leaders prioritize the goals and accomplishments of their subordinates. Such leaders also assist their subordinates in growing and succeeding by demonstrating real interest in their professional growth and achievement of their objectives by providing adequate opportunities to sharpen their talents[9].

While, ethical behavior is the open, fair and honest integration with others. On the other hand, empowering subordinates entails facilitating and encouraging their ability to assume responsibility as well as giving them the essential freedom to respond to and manage difficult events that come their way[12].

Another distinguishing feature of servant leaders is their focus on developing community and encouraging subordinates to follow the same steps. Finally, humility requires leaders to recognize their own strengths and limitations and seek help from others [13]. Furthermore, servant leaders possess effective characteristics that help subordinates to boost their career adaptability and job embeddedness [14].

Career adaptability is defined as the employees' competencies, capacities, and resources of in dealing with transitions, traumas, and occupational growth issues in their careers [15]. It refers to how well employees are prepared for predictable activities in their jobs, responsibilities they play and the shifting or unanticipated situations they encounter [16].

Concern, curiosity, control and confidence are four adaptive dimensions of career adaptability, each contains its own set of attitudes, competences and beliefs [17,18].

Concern emphasis on employees' preparation for achieving their mission in the career future. **Curiosity** permits employees to participate in exploring future career opportunities that they feel called to do. While, **control** is a resource that supports employees to impression that they can track their calling in affecting their future career [19]. Finally, **confidence** is the ability to solve the problems confronted and to do what is necessary to overwhelmed difficulties [20]. These elements of career adaptability are valuable resources that enable staff to display a high level of job embeddedness [21].

Job embeddedness is defined as perceptual and contextual powers that hearten employees to stay within organization. It is the degree to which employees are connected, attached, or tied to their job which preserves them from leaving their current job [22]. Job embeddedness includes three dimensions: fit, link and sacrifice. These qualities are important in terms of allowing employees to connect with their organization [4].

The term *fit* refers to an employee's general compatibility or comfort with an organization and their job. It also implies that employees' personal beliefs, career ambitions, and long-term plans are in line with the current job's requirements, such as job knowledge, skills and talents [23]. Nurses are more likely to feel personally and professionally connected to an organization if they have good fit [24].

Link refers to formal or informal connections with other employees groups and organization [25]. Employees who have many contacts in many aspects of their occupation have a stronger bond with the organization and are less likely to leave [26]. *Sacrifice*, on the other hand, refers to the perceived cost of losing psychological or pecuniary rewards as a result of leaving a job. Employees who leave a job risk losing a variety of things, including coworker friendships, a productive work team, and perks [21]. The greater the sacrifice, the more difficult it will be for an individual to leave organization [27].

Significance of the study

Healthcare organizations are not only looking for ways to earn profits in today's fast-changing environment, but also for strategies to establish and preserve competitive advantages [1,12]. In such climate, staff nurses experience a variety of obstacles and career insecurity, which can lead to high turnover rate and increasing costs on organization associated with turnover, training, and recruitment of new staff nurses [28,29]. Furthermore, healthcare organizations have been working to find ways to improve staff nurses' career adaptability, create and expand their job embeddedness. All of these benefits can be obtained by maintaining a successful leadership style [30]. Servant leadership is one of the most effective and idealized leadership

styles in healthcare settings [31]. Servant leaders possess a wide range of leadership skills that enable them is to serve, nurture, and develop subordinates to reach their maximum potential. They assist their subordinates in achieving their objectives, preparing for the future, making independent decisions, and gaining confidence to overcome barriers [8]. Therefore, subordinates will have a high degree of career adaptability and feel more connected to the organization (job embeddedness) [14]. Therefore, investigating the association between servant leadership, career adaptability and job embeddedness among staff nurses in the health care context represents a significant contribution to the field.

Aim of the study

The aim of the study is to examine the association between servant leadership, career adaptability and job embeddedness among staff nurses at Main Mansoura University Hospital.

Research hypothesis

1. Servant leadership will have a positive effect on staff nurses' career adaptability.
2. Servant leadership will have a positive effect on staff nurses' job embeddedness.
3. Career adaptability will has a positive effect on Job embeddedness.

Design:

A descriptive correlation design was used in carrying out this study.

Setting

The research was carried out at the Main Mansoura University Hospital, which has a bed capacity of 900 and provides a comprehensive range of health services in the Delta Region.

Subjects

The study comprised all staff nurses working in the Main Mansoura University Hospital (n=151) who met the requirements of having at least one year of experience and being accessible at the time of data collection.

Tools of data collection

Three tools were used for data collection, namely; Servant Leadership Survey (SLS), Career Adaptability Scale (CAS) and Job embeddedness Scale (JES).

I. Servant Leadership Survey (SLS). It was developed by [32] and modified by the researchers based on literature review. This questionnaire divided into two parts:-

The first part: It was used to recognizing demographic characteristics of the staff nurses as: age, educational qualifications and years of experience.

The second part: It includes 41 items to measure staff nurses' perception to their leader's servant leadership characteristics. These items was grouped under eight dimensions namely; conceptual skills (5 items), emotional healing (5 items), putting subordinates first (5 items), helping subordinates grow and develop (6 items), behaving ethically (5 items), empowering, (5 items), creating value for the community (4 items) and humility (6 items). The assessment was done on 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

II.Career Adaptability Scale (CAS). It was developed by [17]. It consists of 24 items grouped under four dimensions, namely concern, control, curiosity, and confidence. Each dimension consists of 6 items aimed at assessing staff nurses' career adaptability through a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree)

III. Job embeddedness Scale (JES). It was developed by [33] and modified by the researchers based on literature review aimed at assessing job embeddedness of staff nurses. It consists of 25 items grouped under three dimensions, namely organizational fit (10 items), organizational sacrifice (10 items), and organizational links (5 items). The assessment was done on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Methods of Data Collection

1. The director of the Main Mansoura University Hospital gave his consent for the study to be conducted.
2. All participants were interviewed for the purpose of clarifying the study's goals and methods, and they had the option to withdraw from the study at any time. Oral consent was gained from participants to participate in the study.
3. Data collection tools were translated into Arabic and a jury comprising three academic personnel from Mansoura's Nursing Administration Department and four nurses from the research hospital and evaluated them

for content validity and relevance. The appropriate changes were made.

4. A pilot study was performed on 10% of staff nurses at the study hospital in order to determine its clarity and feasibility.

5. The staff nurses were given the questionnaires and were asked to fill them out. The time it took to complete each sheet was around 10-15 minutes. Data collected in two months starting November 2021.

Statistical analysis

Using the SPSS software statistical computer programme version 19, the acquired data was organized, tabulated, and statistically evaluated. For numerical variables, the mean and standard deviation were used to summarize the data. The maximum score is determined by the number of topics and items in each. To evaluate the hypotheses, multiple regression analysis was utilized, as well as basic linear regression analyses. For correlation analysis between quantitative variables, the r-test was utilized. The threshold of significance was fixed at the $p<0.01$, 0.05 level.

Results

Table (1) depicts the demographic characteristics of the study subjects. As regard to the age, about 77% of staff nurses their age ranged from 25 to 35 years and 10.6% aged more than 35 years. Regarding experience in nursing profession, 71% of staff nurses had experience less than 10 years and about 62% of them held technical degree in nursing. The highest percentage of them (21.9%) was working in surgical unit and most of them were married (76%).

Table (2) shows descriptive statistics of servant leadership dimensions as perceived by the study subjects. The overall mean of servant leadership was 145.87 representing 71.16% of maximum score. The dimension of conceptual skills had the highest mean score 76.36% of maximum score and followed by helping subordinates grow and develop 75.57%. While, the least mean score was related to emotional healing with 67.08 %

Table (3) shows descriptive statistics of career adaptability and job embeddedness dimensions as perceived by the study subjects. Regarding career adaptability the overall mean was 86.80 representing 72.33% of maximum score. The dimensions of curiosity and confidence had the highest mean score 73.23% while the least was control 70.23%. On the other hand, the overall mean of job embeddedness was 88.52 representing70.82% of maximum score. The dimension of organizational links had the highest mean score 73.84 % while the least was organizational fit 69.04 %.

Table (4) presents relationship between servant leadership dimensions with career adaptability and job embeddedness dimensions in the selected settings**.** This table shows a statistical significant positive relation between one dimension of servant leadership (empowering) and one dimension of career adaptability (curiosity).While, there were statistical significant positive relation between three dimensions of servant leadership (humility, empowering and behaving ethically) with one dimension of job embeddedness (organizational links). Also, there was a statistical significant positive relation between humility and organizational sacrifice. On the other hand, there was a statistical significant positive relation between emotional healing and organizational fit.

Table (5) depicts relationship between servant leadership, career adaptability and job embeddedness with demographic characteristics of staff nurses at the selected settings. There were statistical significant positive relations between all demographic characteristics and total servant leadership. Young staff nurses who aged less than 25 years had the highest mean score of total servant leadership. Also, mean score of staff nurses perception about total servant leadership characteristics was high among staff nurses who had less than10 years of experience in nursing (147.48) and among married than single (146.95). On the other hand, there was a statistical significant positive relation between years of experience and total job embeddedness. Staff nurses who less than 10 years of experience in nursing had the highest mean score of job embeddedness. While, there were no statistical significant relations between demographic characteristics and total career adaptability.

Table (6) & figures 1, 2: shows correlation between servant leadership, career adaptability and job embeddedness at the selected settings.

There was a positive correlation between servant leadership and staff nurses' career adaptability but not statistically significant. hand, there was a statistical significant positive correlation between career adaptability and job embeddedness.

While, there was a statistical significant positive correlation between servant leadership and job embeddedness. On the other

Table (1): Demographic characteristics of the study subjects (n= 151)

Characteristics	No.	%
Age		
< 25	19	12.6
25- 35	116	76.8
>35	16	10.6
Mean + S.D		
Years of experience:		
<10	107	70.9
10-	33	21.9
>20	11	7.3
Mean + S.D		
Educational qualification:		
Diploma degree	57	37.7
Technical degree	94	62.3
Job:		
Staff nurses	151	100.0
Department:		
ICU	30	19.9
Surgical unit	33	21.9
Ear and nose unit	15	9.9
Renal dialysis unit	13	8.6
Medical unit	28	18.5
Neurological unit	9	6.0
Orthopedic unit	15	9.9
Operating room	8	5.3
Marital status		
Single	36	23.8
Married	115	76.2

Table (2): Descriptive statistics of servant leadership as perceived by the study subjects (n= 151).

Servant leadership dimensions	Minimum	Maximum	Study nurses	
			Mean ±SD	% *
Conceptual skills	14.0	24.0	19.09±2.37	76.36
Emotional healing	8.0	21.0	16.77±3.28	67.08
Putting subordinates first	12.0	22.0	17.05±2.54	68.2
Helping subordinates grow and develop	16.0	27.0	22.37±2.92	75.57
Behaving ethically	12.0	25.0	18.40±2.92	73.6
Empowering	13.0	22.0	17.73±2.24	70.92
Creating value for the community	9.0	18.0	13.46±2.03	68.2
Humility	14.0	27.0	21.01±3.52	70.03
Total servant leadership	115.0	165.0	145.87±10.67	71.16

**** Percentages are calculated relative to maximum score.***

Table (3): Descriptive statistics of career adaptability and job embeddedness dimensions as perceived by the study subjects (n= 151).

Career adaptability dimensions	Minimum	Maximum	Study nurses	
			Mean ±SD	% *
Concern	16.0	27.0	21.79±2.74	72.63
Control	13.0	27.0	21.07±3.83	70.23
Curiosity	15.0	26.0	21.97±2.74	73.23
Confidence	17.0	28.0	21.97±2.52	73.23
Total Career adaptability	73.0	101.0	86.80±6.83	72.33
Job embeddedness dimensions				
Organizational fit	27.0	40.0	34.52±3.27	69.04
Organizational sacrifice	26.0	42.0	35.54±3.00	71.08
Organizational links	13.0	23.0	18.46±2.30	73.84
Total Job embeddedness	76.0	100.0	88.52±4.88	70.82

**** Percentages are calculated relative to maximum score.***

Table (4): Relationship between servant leadership dimensions with career adaptability and job embeddedness dimensions in the selected settings (n= 151).

Career adaptability dimensions	Servant leadership dimensions							
	Conceptual skills	Emotional healing	Putting subordinates first	Helping subordinates grow and develop	Behaving ethically	Empowering	Creating value for the community	Humility
Concern	0.44	0.28	0.23	0.06	0.22	0.19	0.17	0.06
Control	0.62	0.77	0.78	0.45	0.33	0.90	0.70	0.17
Curiosity	0.69	0.39	0.44	0.97	0.08	**0.04***	0.96	0.50
Confidence	0.14	0.43	0.07	0.83	0.40	0.88	0.22	0.58
Job embeddedness dimensions								
organizational fit	0.51	**0.02***	0.36	0.22	0.50	0.11	0.11	0.98
organizational sacrifice	0.22	0.31	0.83	0.94	0.11	0.05	0.20	**0.000****
organizational links	0.99	0.41	0.99	0.98	**0.05***	**0.02***	0.79	**0.002****

***Correlation is significant at the 0.05 level (2-tailed).**

****Correlation is significant at the 0.01 level (2-tailed).**

Table (5): Relationship between servant leadership, Career adaptability and Job embeddedness with demographic characteristics of staff nurses at the selected settings (n= 151).

Demographic characteristics	Total servant leadership scores	Total career adaptability scores	Total job embeddedness scores
	Mean±SD	Mean±SD	Mean±SD
Age			
▪ < 25	148.63±8.83	88.74±8.03	88.74±4.03
▪ 25- 35	146.34±11.2	86.52±6.74	88.62±5.07
▪ >35	139.19±4.90	86.56±5.94	87.56±4.55
F/p	4.04/0.02*	0.87/0.42	0.35/0.71
Marital status			
▪ Single	142.38±2.27	85.41±6.58	87.36±4.12
▪ Married	146.95±11.96	87.23±6.87	88.88±5.05
t/p	2.27 / 0.03*	1.39 / 0.16	1.65 / 0.10
years of experience			
▪ <10	147.48±11.77	86.97±7.19	89.15±4.8
▪ 10-	142.85±6.42	86.42±6.42	87.18±3.68
>20	139.27±1.01	86.27±4.38	86.45±7.41
F/p	4.88/0.009**	0.12/0.89	3.21/0.04*

***Correlation is significant at the 0.05 level (2-tailed).**

****Correlation is significant at the 0.01 level (2-tailed).**

Table (6): Correlation between servant leadership, career adaptability and job embeddedness at the selected settings (n= 151).

	Correlation with Career adaptability		**Correlation with Job embeddedness**	
	r-value	p.value	r.value	p.value
Servant leadership	0.13	0.13	0.21	0.009**
Career adaptability			0.26	0.008**

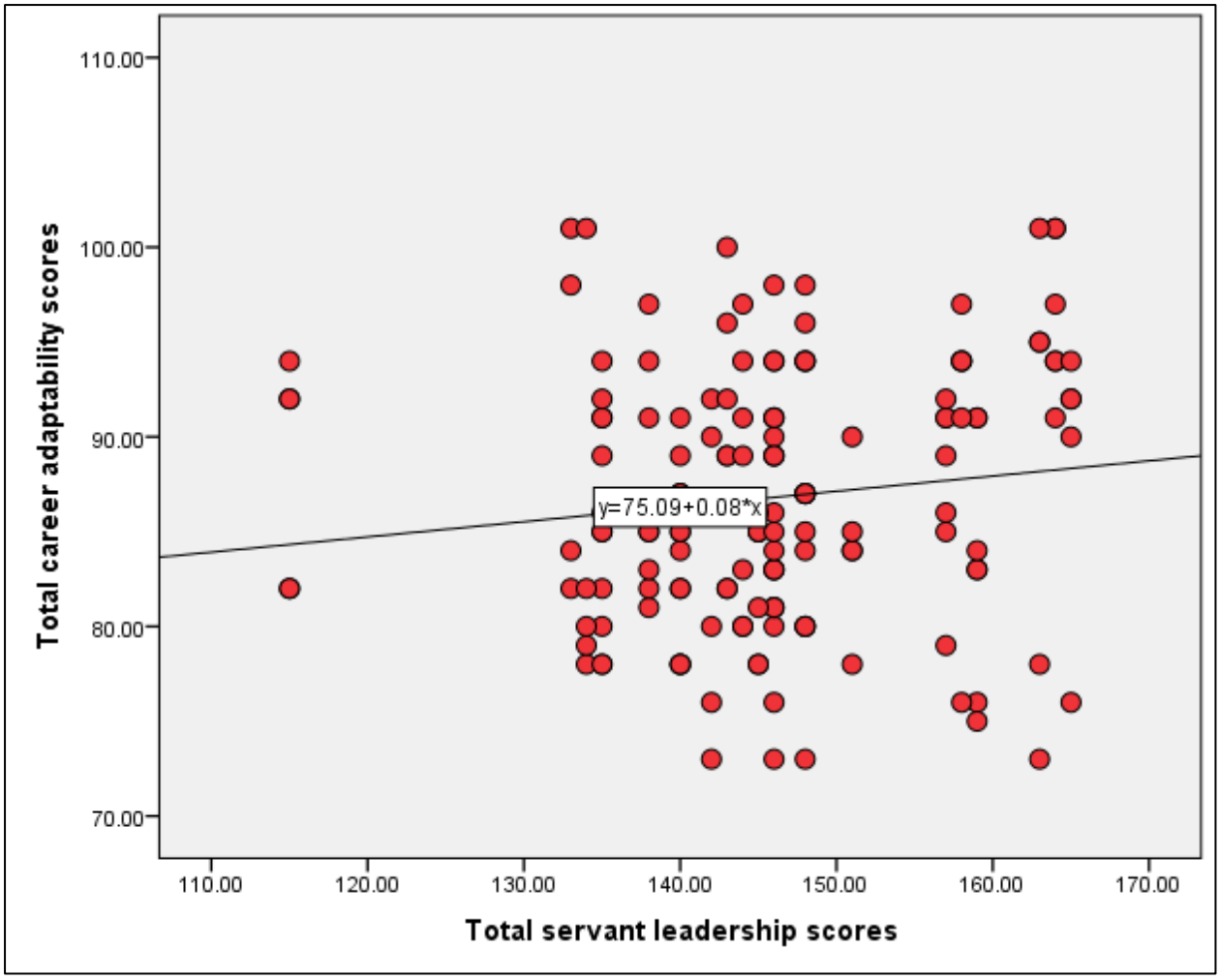

Figure 1: Correlation of servant leadership with career adaptability.

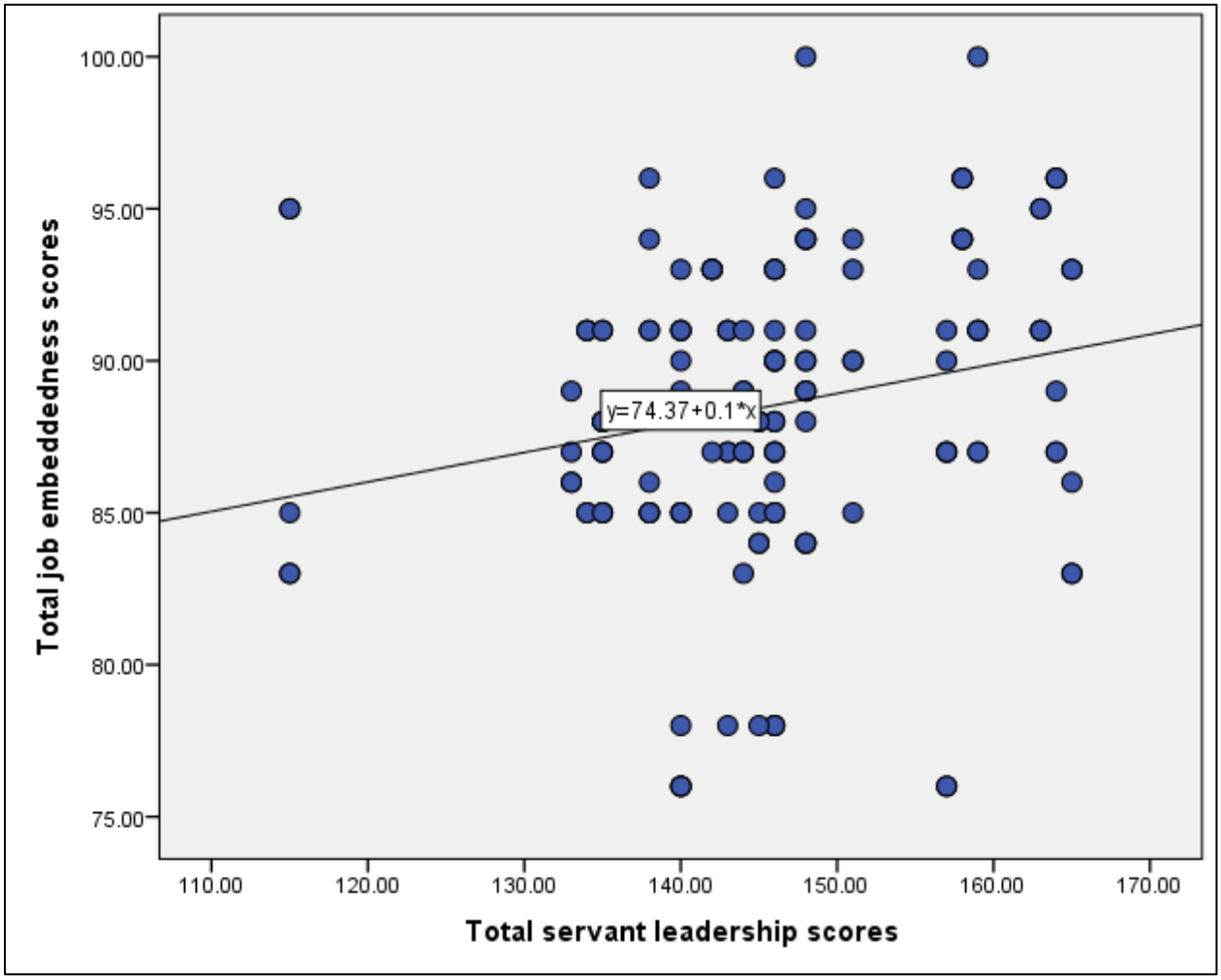

Figure 2: Correlation of servant leadership with job embeddedness.

Discussion

In facing rapid changes in the health care system, it is essential for healthcare organizations to cultivate servant leaders who are able to develop new strategies for maintaining, retaining, developing and motivating staff nurses. Thus, staff nurses will be able to cope with career changes effectively and improve their job embeddedness Mitterer (2017) and Pajic 2018 [5, 6].

Findings of the present study revealed that there was a positive correlation between servant leadership and staff nurses' career adaptability. It could be related to that servant leaders serving as a role model to staff nurses, inspiring trust and providing information, feedback and resources. They help staff nurses to identify their career goals, grow and develop, build self-confidence and encourage them to handle important career decisions and make their career development a priority. Therefore, staff nurses learn new skills to overcome obstacles and improve their competence to solve problems and find new ways to adapt with unfavorable working conditions. Thus Best (2020) [34] concluded that, a nurse servant leader attempts to understand their staff's needs and constantly inquires about how they can assist the team in resolving challenges and promoting their personal development. In addition to that, servant leaders ensure the voice of patients are heard, staff are supported using an empathetic, compassionate and fair approach.

These results agreed with, Rachmawati & Lantu, (2014) [35] who stated that, servant leadership delivers chances for subordinates to increase attentiveness of internal and external work settings in order to learn, grow, and

share power In this respect, Hutchinson & Jackson (2013) [36] conducted study about transformational leadership in nursing: towards a more critical interpretation and stated that, leaders in nursing must be aware of the changing environment and be able to motivate subordinates to accept new problem-solving models.

Additionally, Al Maqbali (2015) [30] examined the job satisfaction of nurses in a regional hospital in Oman reported that, hospitals are complex adaptive systems and require close attention to interpersonal constructs between leaders and nurses.

This finding also was consistent with Sorour (2021) [37] studied the relationship between servant leadership and its' role on staff nurses' creativity and sustainable development behavior who stated that, in healthcare organizations, servant leadership fulfill nurses' needs effectually through helping them to prioritize their career growth and development. Also, Huertas- (2018) [38] examined the effects of different leadership styles on hospitality workers and reported that, the servant leader helps nurses to evolve and carry out their activities by maintaining creative nursing work of the career as possible.

Again, this finding supported by Delle& Searle (2020)[39] investigate the career adaptability: the role of developmental leadership and career optimism who stated that Leadership behaviors that emphasize subordinates' growth and development, clarify work goals and expectations, offer support, and encourage their engagement at work are more likely to boost career adaptability and related phenomena

This is the same view of Shabeer (2020) [40] who tested inclusive leadership and career adaptability: the mediating role of organization-based self-esteem and the moderating role of organizational justice and reported that contemporary approaches of leadership such as servant leadership was reported positive relation with career adaptability. Such leaders always support subordinates and keep open communication to offer input. They exhibit willingness, availability and concern about the feelings, expectations and interests of subordinates. Moreover, Ji, & Yoon (2021) [41] who examined The effect of servant leadership on self-efficacy and innovative behavior and reported that, to build confidence in completing subsequent tasks, servant leaders use a consultative approach by providing qualitative feedback rather than an arithmetical evaluation of subordinates' work.

In this respect Gong (2020) [42] investigated the role of career adaptability, feedback environment, and goal-self concordance based on the conservation of resources theory and stated that, the leader feedback provides subordinates with accurate and useful information that help them to shape the environment, reduce job uncertainty and therefore, improve their career adaptability.

Regarding relation between dimensions of servant leadership and career adaptability dimensions, the present findings revealed a statistical significant positive relation between empowerment and staff nurses curiosity. It could be related to that; the servant leader empowers staff nurses to handle difficult situations and take the responsibility to make important decisions. These behaviors make staff nurses curious about new opportunities, investigate alternatives before making a choice and learn new skills. Furthermore, empowered nurses believe they have more influence over their work and a stronger sense of task autonomy.

In this same line, Van Dierendonck, (2011) [10] stated that, Servant leaders' empowering and developing behaviors combined with the correct mix of autonomy and direction, are more likely to result in a high-quality dyadic relationship, which is linked to higher participation in difficult activities.

In addition to that, Parris & Peachey (2013) [43] mentioned that, Managers that practice servant leadership have more flexibility, are more receptive to new ideas, and have more positive employees who are innovative and eager to learn. Furthermore, Van (2014) [44] who exploring the differential mechanisms linking servant leadership and transformational leadership to follower outcomes and reported that, empowering is improved autonomy and empowering subordinates to execute tasks and participate in corporate decision-making are examples of this.

Also, Hurt (2017) [45] examined servant Leadership's Influence on Turnover Intentions and Job Satisfaction: The Mediating Role of

Perceived Organizational Support and Job Embeddedness mentioned that the Subordinates are empowered by servant leaders who share power with them, giving them a sense of efficacy and pushing them to enhance performance.

This finding also consistent with, Chraim (2016) [46] who assessed the impact of servant leadership behaviors on trust and organizational citizenship behavior and revealed that, servant leader empower subordinates through investing in their capabilities, and entrusting them with work-related tasks. Thus, empowerment is closely related to other attributes as encouragement, delegation and teaching that in turn increase subordinates' curiosity.

The result of the present study also indicated a statistical significant positive correlation between servant leadership and job embeddedness. It could be related to that, servant leaders empower staff nurses, put them first, help them grow and succeed, provide emotional healing, behave ethically, create value for the community, and develop and foster conceptual skills. Thus, they motivate staff nurses be more attached or remain in their jobs.

Moreover, Chiniara. & Bentein (2016) [9] examined linking servant leadership to individual performance: differentiating the mediating role of autonomy, competence and relatedness need satisfaction and found that, When servant leaders put their subordinates first and give them signs that their work is essential and meaningful, they will acquire a strong sense that their work is meaningful and vital, which will improve their job embeddedness. So, [1] study the meaning of work and job embeddedness affecting the creative behavior of organization members and mentioned that, the important role of human resource management is inspiring organization members to stay in their existing positions.

In this same respect, Karatepe & Avci (2019) [47] who assessed the nurses' perceptions of job embeddedness in public hospitals and reported that, if hospitals managers create an environment that allows nurses to acquire support from head nurses, they reciprocate through high job embeddedness. Also, Jit, (2017) [48] argued that nursing leaders adopting a servant leadership demonstrate compassion and traits which build a strong workforce, a sense of cohesiveness and sustainable relationships. In such healthy working environments and positive working relationship, nurses become more enmeshed in their jobs and trigger their job embeddedness.

This finding was congruent with the finding of Hurt (2017) & Zia (2021) [45, 49] who reported that, servant leadership has positive effect on subordinates' job embeddedness. Servant leaders, who are driven by a heart-felt desire to serve, are able to gain credibility and influence subordinates more profoundly. Therefore, they focus on satisfying the legitimate needs of subordinates, promote stronger leader-follower relationships and operate from a moral perspective which ultimately improves work outcomes.

This also is the same view of Huning (2020) [50] who tested the effect of servant leadership, perceived organizational support, job satisfaction and job embeddedness on turnover intentions and found that, servant leadership was a significant predictor job embeddedness and job satisfaction. As servant leaders place an emphasis on subordinates' development, listening empathetically, empowering them, and meeting their needs. Job embeddedness and job satisfaction were both significantly influenced by servant leadership. The servant leaders focus on the growth of their subordinates by listening empathically, empowering them and addressing their needs.

Regarding to the relationship between dimensions of servant leadership and job embeddedness dimensions all dimensions of job embeddedness were positively correlated to many dimensions of servant leadership. Organizational links is positively correlated to empowering and behaving ethically, and humility.

While, organizational fit is positively correlated to emotional healing. On the other hand, organizational sacrifice is positively correlated to humility. It could be related to, servant leadership is regarded as virtuous, highly ethical and based on the premise that service to subordinates is at the core of leadership. Servant leaders build good relationship with staff nurses, encourage them to interact frequently with effective work group, care about their well-being and provide

help to them when they had personal problems. Additionally, they encourage staff nurses to take on new responsibilities and deal with challenging situations in their own unique way, which helps them grow personally and professionally.

Furthermore, staff nurses feel their jobs are compatible with their goals and values get good match with this organization and their loss by leaving their job increase. This is the same view of, Ciptaningtyas (2017) [51] who examined the relationships between Job embeddedness, person-organization fit, and turnover intention and reported that the greater the compatibility or suitability between employees and their organization in goals and values, the greater the employees' attachment to their work and preserve benefits received.

This result agreed with, Trastek (2014) & Ferreira, (2017) [52, 53] who reported that, ethical behavior of servant leadership correlates to job embeddedness dimensions. Servant leadership supports with the professional and ethical duties of health care team when providing the high-value care patients deserve while developing stronger team bonding through service to peers.

In this regard, Cummings (2020) [54] reported that, the servant-leader is the perfect ethic goodness for a nurse as human, or the general quality of goodness, or moral excellence. Additionally, Ratnawati, (2020) [55] stated that, organizational link has some indicators, such as providing employees the opportunity to participate in all work, allowing them to long interact with peers at work, and having close friends in organization. Accordingly, Zeng & Xu (2020) [56] reported that, Followers of servant leaders feel emotionally protected, which increases their readiness to come up with new ideas, feel autonomous, and take on new tasks.

This finding was also in congruent with Hurt (2017) & Gunnarsdottir (2014) [45,57] who reported that, higher levels of servant leadership, particularly on the dimensions of humility and empowerment, result in greater job embeddedness. These qualities enable subordinates to have access to information and resources, maintain participate in decision making and open channels to learn. In addition to that, Owens& Hekman, (2012) [58] mentioned that, humility trait of servant leaders enables them Individual and team accomplishments, talents, and abilities should be recognized, and subordinates should be encouraged to engage in behaviors that go beyond their work responsibilities.

Thus humility and empowerment dimensions have greater benefits that foster the development of deeper relations of subordinates to the organization and increase their organizational links. These benefits would be great value to subordinates and a major sacrifice if lost. Furthermore, Huning (2020) [50] stated that organizations should benefit from detecting ways to enhance employees' links to the organization.

In this same line, Eva (2019) & Opoku (2019) [7, 59] reported that servant leaders think more about subordinates by empowering them to meet their expectations and resultantly they feel appreciative and reciprocate with more positive behavior in the organization. Furthermore, Cicolini (2014) [60] reported that, nurses' empowerment, their control of care delivery, and shared decision-making are positively correlated with their intention to stay within organization. They are likely to improve a strong sense of belonging and acceptance and maintain close ties to the organization.

Again, the findings of the present study revealed a statistical significant positive correlation between staff nurses' career adaptability and their job embeddedness. It could be related to that, career adaptability comprised of four competencies that enable staff nurses to successfully handle complicated tasks or problems during their careers which are concern, control, curiosity, and confidence. An adaptable staff nurse is the one who is getting concerned about their professional future, taking charge of their efforts to prepare for it, demonstrating interest by researching possible self and future scenarios, and building confidence in their ability to achieve their goals.

This finding agreed with the finding of Yang & Chen (2020) [21] who reported that career adaptability and its' dimensions: concern, confidence curiosity, and control are positively correlated with nurses' job embeddedness. Concern helps nurses to recognize the benefits of a professional network and to invest in growing their professional networks. While,

confidence enables nurses take the initiative to communicate with significant people, thus increase their chances of career success. On the other hand, curiosity enables nurses to proactively discover job opportunities and create bonds in different career phases. Finally, control empowers nurses to feel accountable for continuing to invest in shaping job embeddedness.

In this respect, Coetzee (2015). [61] mentioned that career adaptability is necessary for achieving set goals, progressing in a profession and adapting to changing work conditions. That is meaningful for employees to make work–life balance. Moreover, [35] stated that when employees have career planning and progression opportunities; and when their goals and values are a good match with those of the organization, they will feel a greater sense of organization fit.

Also, Ferreira (2013) [62] reported that a fit between employees' career goals and plans for the future and as well as the demands of the immediate job leads to a stronger sense of job embeddedness. Furthermore, [63] stated that career adaptability is seen as a valuable resource that allows employees to exhibit a high level of job embeddedness.

Also, this finding supported by Orie & Semeijn (2021) [25] who found positive relationship between employees' career adaptability and their job embeddedness. Employees with better career adaptability have more adaptability resources, and are therefore expected to be more involved in discovery, establishment, and management.

This finding also agreed with the finding of Bouzari (2021) & Xie, (2016) [14, 64] who reported that, Employees with a greater level of career adaptability are more embedded in their jobs. Employees who consider their future make their own decisions and take responsibility for their actions, explore their surroundings, try to learn new skills and stronger attached to their organizations and cannot simply leave the organization where they work.

Regarding the relationship between demographic characteristics with servant leadership, career adaptability and job embeddedness, the study finding indicated statistical significant relations between all demographic characteristics and total servant leadership. Perception of servant leadership characteristics was high among young staff nurses and those who had less than 10 years of experience in nursing. It could be related to that, young staff nurses who have less years of work experience feel that their supervisors care for them as persons, help them to obtain further job-related training and maintain their growth and development.

This finding disagreed with [57] who found that perception of servant leadership was lowest among the youngest age group of nursing staff. While, Taylor (2007) [65] reported that, no demographic variables were significantly related to servant leadership.

Again, the finding of the present study revealed statistical significant relations between staff nurses' age and years of experience with job embeddedness. Young staff nurses who had less than ten years of experience in nursing had higher job embeddedness than old staff nurses. This finding is unexpected because staff nurses' job embeddedness is likely to be sharpened and strengthened over years of experience. It could be related to that, young staff nurses are eager to learn new skills and maintain close relationship with peers and leaders. They get pleasure from putting plans for the future and working to make them fact. So, they feel more attachment to organization.

This result was inconsistent with Halfer (2011) [66] who mentioned that, job embeddedness was low among less experienced nurses. So, nursing leaders and staff development educators should implement career training and socialization opportunities for nurses with one to three years of experience to improve their job embededdness and retention strategies.

On the other hand, the finding of the present study revealed no statistical significant relations between demographic characteristics and staff nurses career adaptability. This finding disagreed with Ispir, (2019) [20] who indicated that, career adaptability is a coping skill that can be gained and improved through employees' years of experiences. Thus, experienced employees are able to make more planned and realistic decisions than non-experienced.

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Conclusion:

The present study confirms that servant leadership has greater benefits for both staff nurses and organization. Servant leadership dimensions have significant roles in developing and enhancing both staff nurses' career adaptability and job embeddedness. Career adaptability also plays an important role in promoting staff nurses' job embeddedness.

Recommendations

Based on the findings of the present study, the following can be recommended:-

- Health care organizations should assume a servant leadership philosophy and develop leaders who establish the qualities of servant leadership.
- Health care organizations should create work structures in the workplace that support the advantages of servant leadership and its effect on staff nurses' career adaptability and job embeddedness.
- The managers should maintain a nurturing environment that enables staff nurses to function independently and increase their willingness to take risks.
- The managers should provide opportunities for staff nurses to grow and develop, build confidence and encourage them to handle important career decisions.
- To improve staff nurses' career adaptability, managers should facilitate work group building, carry out long-term plans and solve work problems with new creative ideas.
- To promote job embeddedness, the managers should produce appropriate work relationships and seek ways to increase staff nurses' links and fit, and to highlight the sacrifices inherent in job change.
- Intervention study of servant leadership should be supported in future research.

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Effect of health education program-based on a health belief model on mothers' knowledge and practices regarding choking prevention and management for their children

Reda Elfeshawy [1] , Fatma Ahmed El Sobky[2], Farida Khalil Ibrahim Mohamed [3] Hamida Ahmed Mustafa Darweesh[4]

1. Lecturer of Pediatric Nursing, Faculty of Nursing, Menoufia University
2. Assistant professor of Pediatric Nursing, Faculty of Nursing, Benha University
3. Lecturer of Critical Care and Emergency Nursing, Faculty of Nursing, Alexandria University
4. Lecturer of Nursing Education, Faculty of Nursing, Alexandria University

Abstract

Background: Foreign body aspiration (FBA) is a vital public health problem. The most dangerous complication of FBA is choking. Nurses can play a critical role in increasing education efforts through providing choking-prevention educational programs to parents and other caregivers **Aim of the study:** evaluate the effect of a health education program based on a health belief model on mothers' knowledge and practice regarding choking for their children. **Subjects and method:** quasi-experimental research design was used. **Settings:** This study was conducted at Benha University and Benha Teaching Hospital outpatient Clinics. **Subjects:** Convenience sampling including 110 mothers was used for data collection. **Tools of data collection:** tool I: a structured questionnaire to assess mothers' knowledge and practice related to choking management and prevention. Tool II: The questionnaire expanding the concepts of HBM **Results:** The results showed the majority of the mothers had satisfactory knowledge level after 30 days from application of educational program. There was a statistically significant difference between pre and after 30 days of health education application to the mothers. Also, after 30 days from application, nearly all of them have good FBA practice management. **Conclusion:** The study concluded that the prominence of continuing education based on HBM on mothers' knowledge and practice in management and prevention of FBA. **Recommendation:** educational programs and proposing training programs is tremendously crucial to inhibit choking and FBA.

Keyword: Health education, Health belief model, Choking prevention and management, Mothers' knowledge and practice

Introduction

Foreign body aspiration is a vital public health problem for young children and can be an emergency life-threatening pathologic state [(1)]. The most dangerous complication of foreign body aspiration is choking which is defined as the interruption of respiration as the effect of an internal obstruction of the airway; usually this obstruction is caused by food parts or small toys among young children [(2, 3, 4)]. Foreign body aspiration can lead to complete airway obstruction and so, inadequate ventilation and inadequate oxygenation and as a complication brain

damage or also it may lead to brain death will happen within four minutes [5]. Over the course of years, death from choking has attracted the attention of health care providers, and recently, they start to focus on the importance of instructing parents, other caregivers and toy industrialists about the threats, and the prevention of choking[6] .

The Pediatric airway foreign body aspiration has a high rate of airway distress, morbidity, and mortality in children less than 3 years old [7]. Deaths from choking occur in the home environment in up to 95% of cases [2, 8]. The height age for aspiration events is 1-2 years; this can be because of incomplete dentition, immature swallowing coordination, and an inclination to be easily distracted while eating. The most death related choking events were identified among children under age 5 [9]. Food, coins, balloons, and other toys are identified as the items which have the greatest risk of choking-related injuries and death. Certain features, constituting the shape, size, and nature of certain toys and food's parts, upsurge their possibility to cause choking amongst young children. Most Choking conditions caused by food materials were occurred among children under 3 years old while the incidence of choking caused by non-food particles was happened more in the children above three years old[10] .

The most common foreign body retrieved is peanuts [11]. Other aspirated items include pieces of food, like carrots, nuts, candies, grapes, seeds, popcorn, and hot dogs [12]. Non-Food objects include coins, pills, safety pins, marbles, ball bearings, and beads. Food items like nuts can expand and become friable, and, as a result, they get fragmented during their removal and cause more obstruction. Peanuts can release oils and cause chemical irritation. Presenting symptoms vary from no apparent distress to impending respiratory failure, looking at the size and placement of the foreign body. Children can also present with coughing, wheezing, shortness of breath, fever, or recurrent pneumonia [13].

Children less than three years old were identified by previous studies as the highest risk group for choking, which was related to their small airways. They do not have the ability to chew hard food or large pieces of food well, as the older children who have the full set of teeth, so large pieces of food may obstruct the throat and make them aspirated [14]. Furthermore, the anatomical structure of the larynx in infants shows that it is very narrow in comparison to older children and adults, which facilitates the choking hazard and increases the risk of fatal obstruction of the upper airway in infants [15]. In relation to the non-food related choking, the shortage of adequate monitoring and innate suction in infants was identified as the most common causes of choking. Whatever the object that causes choking is food or non-food material, when it gets inside the infant's mouth, it will be considered as the fatal object for example; seeds, small objects, rubber balloons etc.[16,17].

Many nonfood-related choking accidents were caused by coins and toys among children. Parents face challenges when they think about buying toys for their children from different age stages. They wish they were able to allow their children to play together, but different ages need different toys' characteristics, different protection and different supervision[3].

Some toys are not allowed to younger kids because they contain small parts that can increase the risk for choking. It was found that choking deaths among children younger than 6 years are mostly related to latex balloons [16, 18]. Especially danger related to un-inflated pieces of broken latex balloons as they can advance to the child's airway and lead to an impermeable seal. The examination gloves were found to have equal danger of death related choking when they were given to children [19]. At the same level of importance and danger of any round or cylinder-shaped objects such as balls, marbles, and sphere-shaped toys or small toy parts; specifically, magnets and batteries were proven to be risk factors for choking and threats to kids' life. When the diameter of these objects is equal to the width of a child's upper airway, complete airway obstruction will be the result and it will be difficult to resolve this obstruction with common rescue maneuvers [20, 21].

Choking related food, despite its seriousness, has not received sufficient attention around the world. Al Ali, (2015)[22] found that 44.4% of choking cases under 3 years old were caused by food materials in comparison to 18.5 % of choking cases by non-food material in the same age group. Introduction of solid food beside or instead of breast or formula-milk feeding should be at appropriate timing (when the child is adequately developed physically and functionally), otherwise serious complications will occur [10, 22]. Exclusive breastfeeding for the most of six months of life is endorsed by the American Academy of Pediatrics (AAP) and other health organizations [23]. Moreover, a study by Garther et al., (2005) [24] revealed that children under 5 years were unable to chew foods adequately. It was easier for infants and young children to swallow the whole food especially if it was unfamiliar, irregular or hard food.

Previous studies revealed that most parents and caregivers have low levels of information about choking hazards. Nichols et al. (2012) [25] conducted a cross sectional survey to judge knowledge of parents about hazards of choking caused by household food and non-food items. They found that parental knowledge of choking food is incomplete. The consumption of choking hazard foods in children under 4 is significantly related to decrease parental knowledge. However, nuts were proven to be causative of choking in 40% of cases in high-income and low-middle income nations [26]. Higuchi et al. (2013)[27] conducted a study on 17 Japanese mothers with children under 2 years old and their findings displayed that the mothers did not recognize whole nuts and seeds as risk factors for choking in infants and toddlers. Moreover, Susy Safe data [28], which is considered as one of the largest registries in the world, evaluated foreign body (FB) injuries in children between 0 to 14 years old they found that about nearly half of well-known food injuries were related to the absence of adult supervision while children were eating [29]. While eating improper food or food prepared improperly were identified as risk factors for the remaining 60 %[30]. Risk of pediatric choking should be emphasized and highlighted through comprehensive and coordinated prevention activities. Improved parental knowledge may decrease rates of choking among children.

Karatzanis et al. (2007) [31] evaluated the effect of a campaign for suitable education of the general public on the hazard of foreign body aspiration in children. Their results revealed that the overall number of bronchoscopies during recent years has decreased as a result of a campaign for the correct education of the general public and particularly parents, caretakers, and families. Moreover, Bentivegna et al., (2018) [32] conducted a quasi-experimental study to assess the effect of an educational interference on parent knowledge of choking threats and its preventive measures. They found that parental knowledge of choking hazards and prevention was improved immediately after the brief educational video and 30 days later.

Passali et al. (2015) [33] conducted a review to summarize current knowledge on foreign body injuries in children. They found that there is a great possibility of nonspecific symptoms, or an entire absence of symptoms, which may cause misdiagnosis or even delayed detection. Moreover, about 15% of patients will experience acute or chronic symptoms. The previous information and the fact of the huge risk the children will suffer, educational programs as primary prevention strategies for FB injuries become urgently required. Parents are the most important population who need to be educated about which food their children should eat and what appropriate toys for their age. They have to recognize nuts and seeds and, more generally, any food items similar to a child's airway like hot dogs as risk factors for choking in kids younger than 4 years old, and to provide adequate adult supervision when young children are playing or eating. Nurses can play a critical role in increasing education efforts through providing choking-prevention educational programs to parents and other caregivers as a vital part of preventative and management activities of choking risks. As well, because there is a great possibility of the inability to prevent all choking episodes among children, teaching parents, teachers, caregivers, about CPR and first aid of choking between infants and children, mainly children at risk of choking. Mothers are the first caregiver and mostly the 24 hours' child 'supervisor. So, it's vital to examine the mother's beliefs, knowledge, and practices in choking prevention and management after the discharge of the foremost recent and comprehensive 2021 pediatric resuscitation and choking guidelines [34, 35].

Health belief model (HBM) is one of the most accurate and important model and is utilized to discover the link between the persons health beliefs and theirs behaviors. This model explains the cause to perform or not perform certain behavior according to individual perception of severity or susceptibility of some life-threatening health behavior [36, 37]. Elsobkey & Amer, (2019) [38] proved the effectiveness of using the health belief model as a guidance tool of health education schemes. For previous reasons, this study will evaluate the effect of health education program-based on a health belief model on mother's knowledge and practice toward prevention and management of choking among their children.

Aim of the study

The study aimed to evaluate the effect of a health education program based on a

health belief model on mothers' knowledge and practice regarding choking prevention and management among for their children.

Research hypothesis

Health education program-based on a health belief model increases the mothers' knowledge and practice toward prevention and management of choking among their children

Subjects and method

Research design: A quasi-experimental research design was used in this study.

Settings: The study was conducted at outpatient Clinics of Benha University and Benha Teaching Hospital which affiliated to ministry of health and population

Subjects: Convenience sample composed of one hundred and ten mothers (55 mothers from each hospital which affiliated to ministry of health and population) was used to gather the data for the current study. The mothers' inclusion criteria were having toddler children aged between one to three years, either female or male children.

Tool of data collection

Two tools are used by the researcher for data collection:

Tool I: A structured questionnaire was developed by the researcher after a review of the relevant literature [33, 32, 23, 24, 34, 35, and 39]. At the beginning the tool was developed in English version, then it has been translated to the Arabic language, and it entails of four parts:

First part: Socio-demographic data of mothers and their children such as the child age and sex; mother age, educational level, mother occupation, and place of residence.

Second part: This part consisted of questions to measure the mothers' knowledge related to foreign body aspiration and choking. It consisted of 12 questions as definitions, common age, risk factors of choking, abdominal thrust, etc.

Third part: Mother's choking prevention practices consisted of 6 inquiries to measure mothers' practices to prevent choking in the step with Likert scale as start solid food in 6 months, avoid foods that pose choking risks, which are an analogous size and shape as a child's airway, at time for supper take care to serve a child's food in small bites, teach the children to take a seat during all meal times, etc.

Fourth part: Choking management practices were developed supported by the review of relevant literature to assess choking management practices among mothers. It involved of 4 Scenarios as the following:

Scenario 1: What mother will do if the child or infant coughs effectively, it includes 2 items.

Scenario 2: What mother will do if the kid remains conscious but has ineffective coughing, return blows it includes 2 items.

Scenario 3: If back blows don't relieve the airway obstruction, perform abdominal thrusts for the kid over 1 year, it includes 8 items.

Scenario 4: If the kid with foreign body airway obstruction is, or becomes, unconscious, move to treatment with the pediatric BLS algorithm, it includes 20 items.

Knowledge Scoring

To each item, a score of (2) was given when the response of the mothers was correct and complete, score (1) was given to the mother's answer when this answer was correct but incomplete and a score (0) was given when the mother's response was incorrect, or they don't know. Mothers' total knowledge score was twenty-four and the total score was classified as the following; the mothers' knowledge score which was < 60% was unsatisfactory level of knowledge and; the mothers' knowledge score, which was ≥ 75% was satisfactory level of knowledge

Choking prevention practices' score

The questionnaire consists of 6 items to measure the parts that are consistent with the statement of preventing infants from choking; the mothers in the study are required to use a Likert scale of 1 to 3 points. The response never acquired (1) score, sometimes acquired (2) and always acquired (3). The overall practice score for choking prevention is 18.

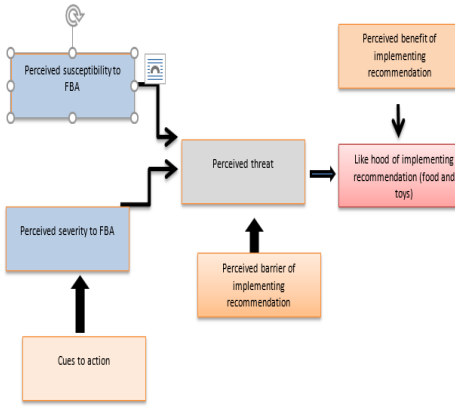
Choking management practices' score

The Questionnaire consisted of 4 Scenarios, all included sub items to assess what the mother decided to do in the case of choking; each item classified as correct done was given 2 score, done but not complete was given 1 score and score 0 when the mothers are not done. The overall practice score was 64 divided as follows: the mother attained ≥ 75% was given good practice, 75- ≥ 60 % was given average practice and less than 60 % was given poor practice.

Tool II: Questionnaire involved questions established expanding the concepts of the health belief model (HBM). The items of HBM were perceived susceptibility, perceived severity, perceived barriers, perceived benefits and cues to action [36, 37, 38]. This tool was counted in a twenty-five item. Those 25 items were distributed as the following 5 items to measure the mothers' perceived susceptibility, 5 items to measure the mothers Perceived severity, 4 items to measure the mothers Perceived benefits, 6 items to measure the mothers Perceived barriers and five items to measure the mothers Cues to action.

Health Belief Model scoring system

A 5-point Likert scale extending from strongly to strongly disagree was used to measure the 25 health belief model items. In order to measure the mother's perception related to choking preventions (1 score for the response strongly agree. - 2 score for the response Agree acquired – 3 score for the response Natural. – 4 score for the response Disagree. – 5 score for the response strongly disagree). The minimum and maximum scores for the 5 items of the HBM were divided such as the following; a min score of five and a max score of twenty-five for the Perceived susceptibility, Perceived severity and Cues to action. A min score of four and a max score of twenty for the Perceived benefits. A min score of six and a max score of thirty for the Perceived barriers.



Method

The study was extended to three months from the start of July 2021 to the last of September 2021. An official approval to carry out this study was gained from the Dean of college of Nursing and the Directors of Benha University and Teaching Hospital. The health education program was developed in four steps: interviewing and assessment, planning, implementation, and evaluation.

The tools were sent to six experts of pediatric nursing, critical care, and nursing education departments (2 professors from each department) to test the content validity and they agreed on the content. As for reliability, the reliability coefficient alpha was checked by the tools' questions and it was 0.76.

Pilot study was conducted on 10% of the studied sample (11 mothers) to test the clarity and applicability of the tools and those piloted mothers that were excluded from the studied sample.

Data collection: data was collected by:

Assessment Phase

To collect the baseline data from mothers, the researchers conducted an interview with each mother. The researchers greeted the mother's participation at the start of the interview, introduced themselves to each mother, clarified the study purpose, the duration, and took their written consent. Each interview was around half an hour. The average number of interviews conducted was 11 mothers/day. The sample was divided into 10 groups containing 5 participants for each session for each hospital. A pretest was conducted in order to collect the mothers' knowledge and practice before the intervention.

Planning Phase

Based on baseline data that are acquired from the assessment phase and significant literature, the researchers designed a health education booklet about choking prevention and management. This booklet was prepared according to the mothers' educational level and language to outfit their comprehension

Implementation Phase

The researchers go to the two hospitals four days/week two days in each hospital, from 9.00 Am to 12.00 Pm. The health education program was held in four sessions and each session was 45 min to an hour. The health education program exemplified The Arabic booklet and pictures in guidelines to add to mothers' knowledge, prevention, and management practices for Choking. Health education included five sessions. The first one; each mother was given a brief explanation related to foreign body aspiration among young children and importance of prevention. - The second was about how to manage choking with demonstration and re-demonstration to make sure the mothers are able to manage a child with choking. –

The third one about improper beliefs and behavior about FBA and false perception that may hinder FBA appropriate practice and behaviors. - The fourth was about encouraging the mothers to be attentive about the FBA and complications and consequences if they're not doing the correct practice in upcoming (perceived susceptibility) and serious awareness of problems, which will happen from risky practices (perceived severity). - The fifth one was about the advantages of healthy eating habits, appropriate toys used for children and a safe environment (perceived benefits. At the beginning of each session, mothers' feedback about the preceding session was obtained and likewise the objectives of the new session were stated. At the conclusion of each session, mothers' point of view and acquired knowledge were discussed to correct any misinterpretation. Modified lectures and group discussions, demonstration and re-demonstrations were the strategies of teaching that are used. A colored poster about FBA management also was used as a suitable instructional media.

Evaluation Phase

A post test was conducted after a month of the carrying out of the health education program in order to measure the mothers' knowledge, choking prevention and management practice and health belief model using tool 1 (third, fourth and fifth part) and tool 11.

Ethical considerations

After explaining the study aim an official permission to conduct the study was obtained from the director of Benha University Hospital and Benha Teaching Hospital. A written and oral description about the nature of the study, aim, voluntary participation was conducted for each participating mother. Privacy and confidentiality issues were assured in this study. The mother's right to withdraw from the study at any time and buoyed the crucial moral principle of beneficence was assured.

Statistical analysis

Data was entered to the pc and dissected utilizing IBM SPSS programming bundle variant 20.0. (Armonk, NY: IBM Corp) descriptive statistics was revealed consuming number and percent. Relations were illustrated consuming mean, variance, chi square, student t test and ANOVA test. Significance of the results was absolute at the five hundred levels.

Results

Table 1 revealed that half (50%) of mothers aged less than 20 years. Most of them (85.5%) didn't have any previous training about FBA. This table also showed that 40% of their children aged between 18 < 24 months and 70.0% of them were male.

Figure (1) illustrates that half (50.9%) of mothers didn't work and 63.6% of them were from the rural areas.

Figure (2) revealed that half of mothers 50.9% graduated from primary school while 15.5% of them have bachelor degrees.

Table 2: Displayed the total mothers' knowledge about FBA, more than half (58.2, 61.8, 52.7, 60.0, 67.4 &64.5 % respectively) of mothers had incorrect knowledge about the definition of FBA, emergency situations, the most common age, abdominal thrust, object that causes

the most serious injury and food represent in choking respectively. To measure the knowledge retention amongst those mothers later, one month of health education carrying out, 66.4, 68.2, 63.6, 59.1and 60.0% respectively of mothers had accurate answers in the same questions and there was a statistically significant difference between before and after 30 days of carrying out of the educational program of the mothers' knowledge level in those items whereas (p=<0.001).

Table 3: The study results proved that 65.5%, 67.3%, 69.1, 63.6 and 79.1% respectively had never reported choking prevention methods such as avoiding food that poses choking, serving child food in small bits, sitting-down and don't laugh or talk with food in their mouth, checking the flattened balloons, metal coins, beads, trifling toy slices and batteries to be away from children, Lying on the floor and choosing safe age-appropriate toys. But one month after implementing the education program, they always mentioned the same items of prevention. There was a statistically significant difference in the prevention of choking substances amongst pre health education carrying out and later 30 days from carrying it whereas (p=<0.001).

Table 4: Indicated that before the implementation of the educational program 52.7, 80.0, 97.3 and 95.5 respectively had poor management practices related to the scenario of "if the child coughs effectively, if the child is still conscious but has ineffective coughing, perform abdominal thrust and BLS steps. While one month after receiving a health education program, most of mothers obtained good choking management practices in the same steps. While one month after receiving a health education program, most of them (84.5 and 86.5) obtained good management practices in the same steps.

Table 5: Confirmed that there was a statistically significant variance between pre and 30 days later health education carried out whereas (p=<0.001). As for the health belief model items, the table also disclosed that there is an increase in the mean score of all items after 30 days from the carrying out of the health education program. The table also revealed the mothers' total knowledge with regard to FBA, the results of this study demonstrated that almost all mothers had an unsatisfactory level of knowledge before the carrying out of the health education. Furthermore, the mothers' knowledge mean score was 5.73 ± 3.68. To measure the knowledge retention amongst mothers after 30 days of health education carried out, the identical tables confirmed that the bulk of them had satisfactory knowledge and correspondingly the mothers' knowledge mean score was 18.70 ± 4.18. The results also demonstrated that there was a statistically significant difference between pre and after 30 days of carrying out a health education program whereas (p=<0.001).

Table 6: Displayed the mothers' total knowledge with regard to FBA, the results of this table showed that almost all (95.5%) of mothers had an unsatisfactory level of knowledge before the carrying out of the health education. Furthermore, the mothers' knowledge mean score was 5.73 ± 3.68. To measure the knowledge retention amongst mothers after 30 days of

health education carried out, the similar table confirmed that the bulk (86.4%) of them had satisfactory knowledge and correspondingly the mothers' knowledge mean score was 18.70 ± 4.18. The results also demonstrated that there was a statistically significant difference between pre and after a 30 days of carrying out of health education program whereas (p=<0.001) The similar table also exhibited the total mother's reported practice, it indicated that nearly all (95.5%) of them have FBA poor practice management before the implementation of health education. While, after one month of the implementation nearly all (93.6%) of them had a good FBA practice management. The possible explanation of the study results is that the appliance of educational programs is taken into account as an efficient tool in increasing the knowledge and the practice among the instructed group.

Table (1): Percentage distribution of mothers and their children related to their of baseline characteristics

Mothers characteristics and their children	N (110)	%
Mother age:		
<20	55	50.0
20-<30	33	30.0
30-<40	12	10.9
40 and more	10	9.1
Previous training:	94	85.5
No	16	14.5
Yes		
Child age:		
12<18 month		
18< 24 month	29	26.4
24 < 30 month	44	40.0
30 ≤ 36 month	22	20.0
	15	13.6
Child gender:		
Male	78	70.9
Female	32	29.1

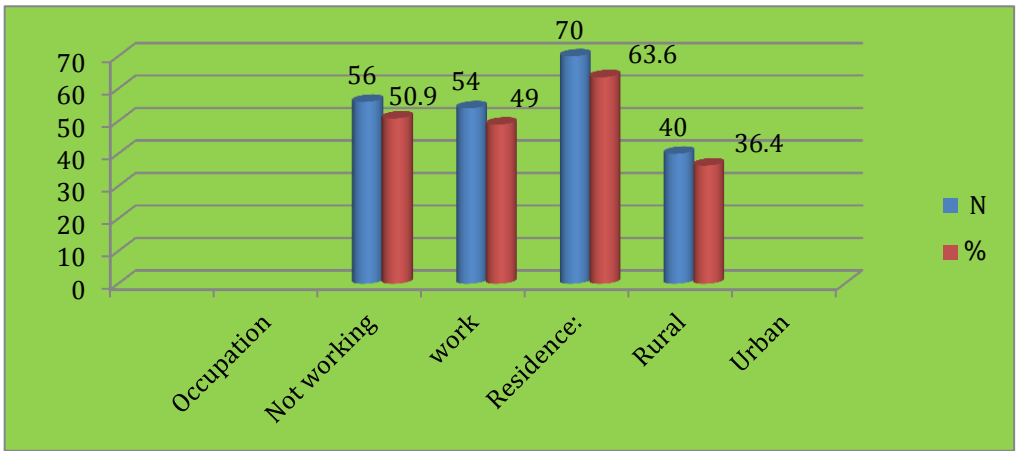


Figure (1): distribution of mothers according to personnel characteristics

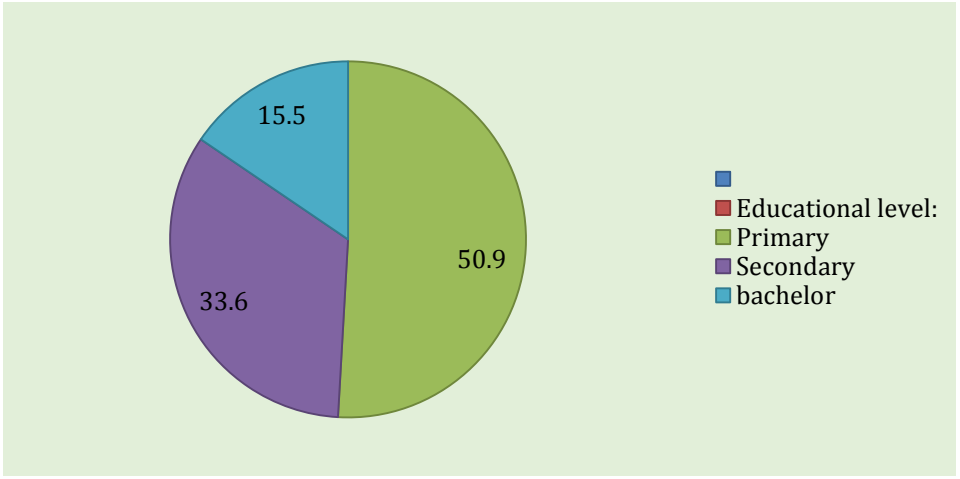


Figure (2): Educational level of mothers

Table (2): Mother's knowledge about fba before health education implementation and after1 month from health education implementation

Items	Pre Health Education						After one month from Health Education						X^2	P
	Incorrect		Correct but incomplete		Correct complete		Incorrect		Correct but incomplete		Correct complete			
	N	%	N	%	N	%	N	%	N	%	N	%		
Definition of FBA	64	58.2	42	38.2	4	3.6	10	9.1	27	24.5	73	66.4	4.3	<..005
FBA emergency case	68	61.8	38	34.5	4	3.6	9	8.2	26	23.6	75	68.2	12.9	
Common age	58	52.7	44	40.0	8	7.3	8	7.3	32	29.1	70	63.6	11.7	<..001
When should it be assumed that a child has inhaled a foreign what should be done	52	47.3	44	40.0	14	12.7	8	7.3	25	22.7	77	70.0	13.7	<..005
Abdominal thrust	66	60.0	39	35.5	5	4.5	4	3.6	36	32.7	70	63.6	10.9	<..005
Causes for risk of choking	56	50.9	52	47.3	2	1.8	13	11.8	16	14.5	81	73.6	2.4	>005
Time Should Call the Doctor or Go to the ER	55	50.0	51	46.4	4	3.6	9	8.2	30	27.3	71	64.5	4.8	<..005
Items are commonly associated with choking in infants and children	57	51.8	53	48.2	0	0.0	15	13.6	30	27.3	65	59.1	17.2	<..001
objects cause the most serious and fatal injuries	74	67.3	34	30.9	2	1.8	14	12.7	26	23.6	70	63.6	8.7	<..005
food represents a high risk of choking to children	71	64.5	38	34.5	1	1.0	13	11.8	32	29.1	64	59.1	1.6	>..005
What should children do during meals and when eating	66	60.0	39	35.5	5	4.5	7	6.4	37	33.6	66	60.0	6.8	<..005
particular food preparation techniques help to reduce the risk of choking	55	50.0	55	50.0	0	0.0	10	9.1	25	22.7	75	68.2	. 77	>.005

Table (3): The Mothers' choking prevention Practice before Health Education Implementation and after 1 Month from Implementation

The Mothers' choking prevention Practice	Pre Health Education		After one month from Health Education		X^2	P
	No	%	No	%		
Start introduction of solid food beside breastfeeding at age of six months: Never Some times Always	78 24 8	70.9 21.8 7.3	5 30 75	4.5 27.3 68.2	15.62	<0.001
Avoid foods that pose choking risks which are a similar size and shape as a child's airway: Never Some times Always	72 29 9	65.5 26.4 8.2	9 31 70	8.2 28.2 63.3	5.8	<0.05
At mealtime, be sure to serve a child's food in small bites: Never Some times Always	74 27 9	67.3 24.5 8.2	10 27 73	9.1 24.5 66.4	27.1	<0.001
Teach kids to sit down for all meals and snacks and not to talk or laugh with food in their mouths: Never Some times Always	70 24 16	63.6 21.8 14.5	9 29 72	8.2 26.4 65.5	6.7	<0.001
Beware of deflated balloons, coins, beads, small toy parts, and batteries. Get down on the floor often to check for objects that kids who are learning to walk or crawl could put in their mouths and choke on Never Some times Always	76 27 7	69.1 24.5 6.4	9 25 76	8.2 22.7 69.1	7.1	<0.05
Choose safe, age-appropriate toys. Always follow the manufacturer's age recommendations : Never Some times Always	87 19 4	79.1 17.3 3.6	5 9 96	4.5 8.2 87.3	15.55	<0.001

Table (4): Mothers' reported practice about FBA before Health Education Implementation and after1 Month from Health Education Implementation

Items	Pre Health Education						After one month from Health Education						X^2	P
	Good		Average		Poor		Good		Average		Poor			
	N	%	N	%	N	%	N	%	N	%	N	%		
Scenario 1: If the child or infant is coughing effectively	13	11.8	39	35.5	58	52.7	93	84.5	17	15.5	0	0.0	49.9	<..001
Scenario 2: If the child is still conscious but has ineffective coughing, give back blows	11	10.0	11	10.0	88	80.0	95	86.4	6	5.5	9	8.1	12.0	<..005
Scenario 3: Perform abdominal thrusts for children over 1	0	0.0	3	2.7	107	97.3	93	84.5	17	15.5	0	0.0	38.4	<..001
Scenario 4: If the child/infant with foreign body airway obstruction is, or becomes, unconscious, move to treatment with the pediatric BLS algorithm.	0	0.0	5	4.5	105	95.5	93	84.5	11	10.0	6	5.5	72.0	<..001

Table (5): Comparison of Mothers' Health Belief Models Mean score before Health Education Implementation and after1 Month from Implementation.

Items	Pre Health education	After one month	t test	P value
	Mean ± SD	Mean ±SD		
Perceived Susceptibility	9.50 ± 1.83	20.70 ± 1.98	-49.50	<0.001
Perceived Severity	10.94 ± 2.07	17.50 ± 3.34	-17.44	<0.001
Perceived Barriers	12.40 ± 1.38	24.05 ± 4.50	-26.54	<0.001
Perceived Benefits	8.70 ± 1.39	15.82 ± 3.73	-21.70	<0.001
Cues to Action	11.90 ± 1.81	20.35 ± 3.11	27.81	<0.001

Table (6): Comparison between the Total Mean Score of Mothers' knowledge & choking Practice management before Health Education Implementation and after 1 Month from Implementation

Items	Pre Health education		After one month		t test	P
	N	%	N	%		
Total Knowledge about FBA						
Satisfactory	5	4.5	95	86.4	-33.77	<0.001
Unsatisfactory	105	95.5	15	13.6		
Mean ±SD	5.73 ± 3.68		18.70 ± 4.18			
Total reported practice					-57.88	<0.001
Good	0	0.0	103	93.6		
Average	5	4.5	7	6.4		
Poor	105	95.5	0	0.0		
Mean ±SD	14.90 ± 6.10		52.86± 3.97			

Discussion

Foreign body aspiration (FBA) is a risky condition with astonishing morbidity, primarily if interference is delayed. Children who are below three years old are at the prodigious intimidation level of FBA [(40)]. In addition to their significant role of reporting FBA urgently, mothers' attentiveness about prevention and management of aspiration is crucial in the commencement of management. It's been found that mothers' education integrates a main role in reducing the occurrence of FBA and re-treating the vulnerability of complications allied with late diagnosis for instance pneumonia and bronchitis [(41, 42)].

Our results indicated that more than half of mothers had incorrect knowledge about the definition of FBA, emergency situations, the most common age, abdominal thrust, object that causes the most serious injury and food represented in choking respectively. To measure the knowledge retention amongst those mothers later, one month of health education carrying out, more than half of the mothers had accurate answers in the same questions and there was a statistically significant difference between before and after 30 days of carrying out of the educational program of the mothers' knowledge level in those items whereas ($p=<0.001$). The results endorse the study hypothesis and these results could also be because of the fact that the given education was simpler in enlightening mothers' knowledge and practice around the prevention and management of foreign body aspiration and to condense choking in kids than mothers who weren't educated about FBA aspiration.

The results of this study are in harmony with Higuchi et al. (2013) [(43)] who displayed that the majority of mothers did not have correct knowledge about clinical signs and causes of FBA. Also, 27.7% and 41.8% of mothers didn't discern that impulsive choking and impulsive coughing were clinical signs intending FBA, respectively. Moreover, Al-Qudehy et al. (2015)[(44)] results displayed that with respect to the clinical manifestation of foreign body aspiration, more than one tenth and one-quarter of mothers respectively, didn't discern that impulsive choking and coughing were indicators intending FBA. The knowledge of the clinical data of FBA was low amongst the studied groups.

The results of this study also displayed that the majority of mothers had never reported choking prevention such as avoiding food that poses choking, serving child food in small bits, sitting-down and don't laugh or talk with food in their mouth, checking the flattened balloons, metal coins, beads, trifling toy slices and batteries to be away from children, Lying on the floor and choosing safe age-appropriate toys. But one month after implementing the education program, they always mentioned the same items of prevention. There was a statistically significant difference in the

prevention of choking substances amongst pre health education implementation and later 30 days from carrying out whereas (p=<0.001).

The results of the current study are agreed with Higuchi et al. (2013) [43] who displayed that only 4.3% [95% CI 3.3–5.3] of mothers recognize that avoiding food that poses choking, serving child food in small bits as a preventative method of FBA, while 20.2% [95% CI 18.2–22.2] didn't know that children must sit down and don't laugh or talk with food in their mouth, check deflated balloons, metal coins, beads, trifling toy fragments, and batteries, and 48.1% [95% CI 45.5–50.6] failed to know that they ought to not give peanuts to a toddler younger than 3 years old.

On the opposite hand, Maalim et al. (2021)[45] results revealed that more than one-third of kindergarten teachers recognize the communal risk factors for choking for example disastrous mastication of food particles, undeveloped teeth, running, and jerking with food particles in their mouth, and the ravenous feature of young kids. More than half of kindergarten teachers spots that coin structures are approaching for triggering a choking intimidation while uncut grapes (16.6%) and popcorn (5.9%) were the minimum things that grounds choking. The majority of kindergarten teachers countered two minutes as a first-rate time for handling the child however (6.7%) said an hour. As for clinical manifestation of complete airway obstruction, the majority of the applicants were experienced and well-defined it as inability to convey sound and cough. This contradiction between the study result and also the previous study results is also thanks to the difference of the topic whereas our subjects were mothers, not kindergarten teachers.

The present study results signposted that previously the carrying out of the educational program the bulk of mothers had poor management practices related to the scenario of "if the child coughs effectively, if the child is still conscious but has ineffective coughing, perform abdominal thrust and BLS steps. While one month after receiving a health education program, most of mothers obtained good management practices in the same steps. The results of this study are agreed with Koramangala (2014)[46] who displayed that almost all (51.4%) of the study population stated poor management skills as water should run to drink to a one that was choking. Twenty-nine percent of mothers said that they need to softly tap on the back of the kid with head down and chest up. Some mothers said that they offer bananas to eat or simply pat on the head and chest.

The results of the current study are agreed with Megahed et al. (2016)[47] who displayed that there was a remarkable heightening in participants' managing practice of household injuries (causes, prevention, and first aid) after the program (P < 0.001) paralleled there with before the program. Furthermore, they

concluded that the mean knowledge score was statistically highly significant after the application of the program whereas (P < 0.001). Moreover, the current study results inveterate that there was a statistically significant variance between pre and 30 days later health education carried out whereas (p=<0.001). As for the health belief model items, the table also disclosed that there is an increase in the mean score of all items afterward, the carrying out of health education

The current study results are in agreement with Jeihooni et al. (2017)[48] results which indicated that the investigational group exhibited a foremost upsurge in all items of the health belief model four months afterwards, the interference. Furthermore, Elsobkey & Amer, (2019) [38] and Gamal Eldeen et al. (2020)[49] proved the effectiveness of using the health belief model as a guidance tool of health education programs.

Also, the study results were in step with Jeihooni, et al. (2015)[48] results which indicated that approximately six months later, the investigational group displayed a significant rise in all items of the health belief model matched to the control group.

The current study results revealed the mothers' knowledge with regard to FBA, the results of this study demonstrated that almost all mothers had an unsatisfactory level of knowledge before the carrying out of the health education. Furthermore, the mothers' knowledge mean score was 5.73 ± 3.68. To measure the knowledge retention amongst mothers after 30 days of health education carried out, the identical tables confirmed that the bulk of them had satisfactory knowledge and correspondingly the mothers' knowledge mean score was 18.70 ± 4.18. The results also demonstrated that there was a statistically significant difference between pre and after 30 days of carrying out a health education program whereas (p=<0.001).

As for the mother's reported practice, the finding signposted that nearly all of them have FBA poor practice management before the implementation of health education. While, after one month of the implementation nearly all of them had a good FBA practice management. The possible explanation of the study results is that the appliance of educational programs is taken into account as an efficient tool in increasing the knowledge and the practice among the instructed group.

The results are agreed with Behboudi et al. (2021)[50] results indicated that the mean scores of knowledge (n = 45, M = 13.48, SD = 1.85) and practice (n = 45, M = 8.53, SD = 1.31) of applicants immediately and mean several knowledge (n = 45, M = 14.69, SD = 1.99) and practice of participants (n = 45, M = 9.57, SD = 2.16) one month later the educational interferences, within the study group, were statistically significantly in excess of the control group. Intragroup contrast of the mean vast knowledge and practice immediately and one

month later educational interference disclosed that merely in the study group did the mean scores have a statistically significant upsurge, ($p < 0.05$).

The results were also congruent with Almutairi and Alharbi (2021)[51] which displayed that the mean and standard deviation knowledge score was 4.99 (1.44)/9 opinions and the practice score was 12.6 (2.15)/21 opinions. Fathers and mothers were more than half and Fathers and mothers with good knowledge were more than one third also, fathers and mothers with poor practices were 55.6% and fathers and mothers with good practices 44.9%.

Conclusion

The results of this study showed the prominence of continuing education and its effect on mothers' knowledge and practice in the management and prevention of FBA. The results of this study showed that education continued with a health belief model can increase the knowledge, practice, and all items of the health belief model. The results showed that the majority of mothers had an unsatisfactory level of knowledge before health education employment however after a month from health education employment the same tables and data verified that the majority of the mothers had satisfactory knowledge level. There was a statistically significant difference between pre and after a 30 days of health education application to the mothers whereas ($p=<0.001$). Also, the results displayed that nearly all the mother's conveyed practice has poor practice management before health education joining. However, after 30 days from application, nearly all of them have good FBA practice management.

Recommendations

Based on the current study finding, it can be recommended that given educational programs throughout this concern for mothers, parents, and other child caregivers and proposing training programs in abundant math media networks is tremendously crucial to inhibit vigorous risk problems similar to choking and FBA. Also, improved attentiveness of the parents, teachers, concierges, and health care providers can play an essential role so as to lessen the hazard of this possibly life threatening situation. Moreover, based on the study results further researches about the development of guidance for protocols regarding management and prevention of chocking and should be disseminated in different media channels.

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