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Effect of Abdominal Massage on the Occurrence of Constipation among Critically Ill Ventilated Patients at Intensive Care Unit

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Abstract: Constipation is a major gastrointestinal and poorly recognized problem among critically ill patients. There are numerous problems associated with constipation for patients admitted to Intensive Care Unit. These complications can increase mortality and delayed weaning from mechanical ventilation. **The aim** of the study was to evaluate the effect of abdominal massage on the occurrence of constipation among critically ill ventilated patients at Tanta Intensive Care Unit. **Setting**: The study was conducted at the Intensive Care Unit (ICU) affiliated to Tanta Emergency Hospital at Tanta University Hospital. **Study subjects**: A purposive sample of 60 critically ill patients with mechanical ventilation admitted to the ICU. **Tools:** 3 tools were used. **Tool I:** Patients' demographic characteristics and health related data**.** T**ool II:** Gastrointestinal Outcomes Assessment Tool**.** It included five parts**: Part (A):** Enteral feeding Assessment**, Part (B):** Gastric Residual Volume Assessment, **Part (C):** Abdominal circumference assessment, **Part (D):** Bowel movement Assessment **Part (E):** Frequency of defecation assessment**. Tool III:** Constipation assessment scale. **Results:** more than half (53.33%) of control group had severe constipation at the 7th day of the study. While severe constipation didn't reported among any patients in intervention group at seventh day of study. Statistical differences were observed between two groups throughout three times of assessment. **Conclusion:** Abdominal massage is more efficient in decreasing constipation and its adverse effect such as abdominal distension, circumference pressure and residual volume in the intervention sample. **Recommendations**: abdominal massage should be applied as a routinely care for all patients in ICU.

Key words: Abdominal massage, Constipation, Critically ill ventilated patients

Introduction

Constipation is a major gastrointestinal and poorly recognized problem in critically ill patients. It has a little attention in the literature. The reported incidence of this problem in the general population is between 2% and 25%, with the increased incidence in the critically ill patients to be between 16% and 83% [(1)]. Multiple studies defined constipation as a failure to pass stool within 72 hours of admission to the Intensive care Unit (ICU) [(2, 3)]. Risk factors of constipation in critical care unit include confinement to bed neuromuscular blocking agents, use of opioids and sedatives, vasopressors, electrolytic disorders, immobility, increased severity of disease, lack of fluids administration, and decreased fiber in enteral nutrition and fiber-free enteral diets that are recommended for critically ill patients at high risk of intestinal problems [(4,5)]. Numerous studies stated that drugs as morphine,

benzodiazepines and myo-relaxants leading to reduce intestinal mobility and increasing the risk of constipation [6]. Moreover, neurological diseases such as spinal cord injury, stroke, malnutrition and immobility caused by altered level of consciousness increase the risk of constipation in ICU[7].

Constipation among critically ill patients can lead to numerous problems such as overgrowth of bacteria in the digestive tract which had negative effects on the colon mucosa and tolerance of an enteral diet. These problems may increase mortality through intestinal obstruction and perforation, aspiration pneumonia, delayed weaning from mechanical ventilation and prolonged hospital stay[8]. Other problems associated with constipation in the critically ill patients involve gastrointestinal problems, abdominal pain, intra-abdominal pressure increased that may limit diaphragmatic movement [9].

Critical care nursing staff plays an important role in monitoring and checking bowel movements to decrease and prevent gastrointestinal complications [6]. Pharmacological and non-pharmacologic treatment is being used to prevent gastrointestinal problems. Abdominal massage is among non-pharmacologic methods considered as an acceptable method that used to enhance digestive function [10].

Abdominal massage is a light massage technique used to relax the abdominal region. It stimulates parasympathetic activity, improving gastrointestinal function, decreasing intra-abdominal pressure and producing a mechanical and reflexive effect on the intestines, reducing abdominal distension and increasing intestinal movements [11-13]. Gentle Massage is done on the abdominal wall around the intestines with a clockwise direction through rubbing, kneading, and vibrating to enhance bowel movements and stimulate the muscle contractions. In addition, changing intra-abdominal pressure and pressing on the rectum, creates a mechanical and reflex effect on the intestines and decreases pain and discomfort [14, 15].

Previous studies reported that using the abdominal massage for critically ill patients reduce gastrointestinal complications such as abdominal distension, high residual volume and constipation severity [11]. It is an independent nursing intervention that decreases the use of pharmacological treatment and has beneficial effect in preventing and treating constipation [13].

Significance of study: Based on clinical observations, constipation is one of bowel problems that are neglected by health and nursing staff. Nurses have an important and unique role for helping critically ill patients to manage bowel problems. Incidence of constipation in critically ill patients according to Arpan and Emilia, 2017 was 67% among mechanically ventilated patients. In Egypt, it was shown that there were few researches about nursing interventions related to the effect of abdominal massage on constipation. However abdominal massage may be effective in improving bowel movements and reducing the use of medication through improvements intestinal motility [9-13]. So, the aim of the current study was to evaluate the effect of abdominal massage on the occurrence of constipation among critically ill ventilated patients at Tanta intensive care unit.

Subject and Method

Aim of the study:

Evaluate the effect of abdominal massage on the occurrence of constipation among critically ill ventilated patients at Intensive Care Unit.

Research Hypotheses

Critically ill patients who receive abdominal massage are expected to have no or minimal abdominal distension, reducing GRV and constipation severity compared to control group.

Setting:

Anesthesia Intensive Care Unit (ICU) affiliated to Tanta Emergency Hospital. Which are equipped by 4 rooms and each room had 5 beds.

Study subjects:

A purposive sample of 60 critically ill patients with mechanical ventilation admitted to the ICU, divided into 2 groups 30 patients in each. It was estimated by using Epi Info Software. Total target population (200 patients) per year, coefficient level = 95% expected frequency = 50%, accepted error= 5% and confidence.

Inclusion criteria:

Adult critically ill patients with mechanical ventilation aged 20 years or more, both sex, newly admission to the ICU, having NG tube (for checking GRV), stayed in ICU more than three days.

Exclusion criteria:

Patients on parenteral nutrition, bowel disorders, had chronic constipation, and hepatic encephalopathy was excluded from the study.

Tools:

Three tools were used for data collection.

Tool I: Demographic characteristics of the patient. It was developed by the researchers according to the recent literature [9-11]. It involved two parts**.**

Part (1): Demographic characteristics of critically ill patients: It involved Patient's age and gender.

Part (2): Critically Ill Patients' Health related Data: It included current diagnosis, past medical history, ventilator modes, gastric motility, time of starting enteral feeding and current sedation of medications.

Tool II: Gastrointestinal Outcomes Assessment Tool: It was developed by the researcher to evaluate the effect of abdominal massage on gastrointestinal complications [10,15-18]. It consisted of five parts:

Part (A): Assessment of Enteral Feeding. It included data about time of starting of enteral feeding.

Part (B): Assessment of Gastric Residual Volume: It was used to assess the amount of gastric residual.

Part (C): Assessment of Abdominal Circumference: This part used to determine presence of distension through measurement of the abdominal circumference. No distension means that the abdomen is soft, not tense and normal abdominal circumference. Distended abdomen means hard, tender, and increase in abdominal diameter. The circumference was measured one hour after massage in 3rd, 5th and 7th day of the study. Normal waist circumference for men was below 94cm (37in). For women, below 80 cm (31.5 in).

Part (D): Bowel movement Assessment sheet: This part was adopted from **Abd El Gafa, Elgaphar (2017) [17]**. It was used to assess bowel movement by listening to bowel sound with stethoscope and included the following: score (1): Normal bowel sound (hollow noises from (5-30) sound per minute). Score (2): Hypoactive bowel sound (reduction in the loudness, tone, or regularity of the sounds from (3-5) per minute). Score (3): Hyperactive bowel sound (Increased

bowel sounds can sometimes be heard even without a stethoscope greater than 34 sounds per minute).

Part (E): Frequency of Defecation Assessment [10]**:** It included assessment of defecation frequency in 3rd, 5th and 7th day.

Tool III: Constipation Assessment Scale (CAS): This tool was developed by Millan and Williams in 1989[18], to assess severity of constipation. It consisted of eight items such as abdominal distension, bloating, bowel movement, oozing stool, rectal fullness, anal pain during defecation; low stool volume; and failure to defecate for 24 hour.

The scoring system:

The total score range between 0 and 16 and was categorized as: (1–4) score indicated mild constipation; score (5–9) indicated moderate constipation and sore 10 or above indicated severe constipation.

1-Administrative and ethical consideration:

- An official permission to collect data was obtained from pertinent authorities after explaining the significance of study and its purpose.
- Nursing Ethical Committee" of Tanta Nursing Faculty was obtained with code number (147-12-2022).
- An agreement was obtained from Patient 'family member after explanation the aim of the study. They were assured that collected data would be confidential through using code number and used for the research purpose only.
- The researcher started with the control group then study group to prevent data contamination.

2- Tools Development:

- The first and second tool was developed by the researcher after extensive review of the relevant literature and tool III was developed by Millan and Williams in 1989 [18].

3- Validity:-

- The tools were reviewed by five experts from Faculty of Nursing and Medicine to assess tool for its clarity, relevance, completeness and content validity. Their opinions were elicited regarding tools format, consistency and scoring system.

4- Reliability of the tools:

- The researcher used a test – retest methods to test the internal consistency of the tools, by administration of the same tools to the same subjects under similar condition on two different occasions. The reliability of tool (I) was 0.86, tool (II) was 0.83 and tool (III) was 0.87.

5- Pilot study:

- It was conducted on 10% of the study sample (6) patients to test feasibility, clarity and applicability of the tools then necessary modifications were carried out. The data obtained from the pilot study were excluded from the study sample. Data collection started from November 2022 to August 2022.
- Three phases are used in this study: Assessment phase, implementation phase and evaluation phase.

Assessment phase: (for both study and control group)

- During this phase the researcher collected baseline data as socio-demographic and health related data using tool (I) for both study and control group.
- Both groups were assessed for abdominal distension, bowel sound and constipation using tool II and III.
- Both groups were assessed for using tool III (constipation scoring system).

- The researcher received a training course about correct technique of abdominal massage from one of the professional physiotherapists.

Implementation phase:

Control group: This group underwent only routine unit care which included given laxatives medication.

Study group: Subjects received the abdominal massage.

- The intervention period for the study group was 7 days. These patients received 20 min of abdominal massage intervention twice a day, and the interval between two massages was 2 h. The GRV was measured each day one hour after the second massage.
- During massage application, the subject is placed in a supine position with the head-of-bed elevated at 30°–45°. The abdominal massage was applied in a clockwise direction over the abdominal wall with movements like brushing the skin in the abdominal area with adequate pressure of hand, the skin of under pressure area was squeezed [10, 19].
- ***Gastric Residual Volume*:** Both groups were assessed for GRV before each feeding. First, the feeding tube position was confirmed by listening to 20 ml of injecting air with a stethoscope at the epigastric area. Then, aspirate the stomach content slowly until no further content. The aspirated content measured by measuring container and discarded according to the ICU guidelines.
- **Measurement of abdominal circumference**: This part was used by the researches to determine the presence of abdominal distension through measurement of the abdominal circumference. It measured through using tape measure directly placed on skin or over no more than 1 layer of light clothing. The correct place to measure waist is halfway between lowest rib and the top of hipbone. This is roughly in line with your belly button.

Evaluation phase:

- The researchers evaluated both control and intervention groups for presence of constipation, abdominal distension using tool II and III three times (at 3rd, 5th and 7th day of admission).
- Comparison was done between the two groups at the end of the study to evaluate the effect of abdominal massage on the occurrence of constipation among critically ill ventilated patients at Tanta intensive care unit

Statistical analysis:

- Data were collected, coded, and organized into tables and then, analyzed using (SPSS 25). P-value was statistically significant at a level <0.05%.

Results

Table (1) reveals that near one half (43.33%) of intervention group and 40.00% of control group had age between (50-≤ 60) years old. Only (6.67%) of both groups aged more than 60 years. Regarding gender, more than half (53.33% and 60%) of two groups were male respectively.

Table (2) represents that 36.67% of control group and near half (43.33%) of intervention group had traumatic brain injury, the same percentages of both groups (26.67%) had respiratory diseases. In relation to enteral feeding more than half (53.33%) of intervention group and near to two third (63.33%) of control group started enteral feed after 48hours of admission respectively. Also, more than tow third (70%) of intervention group and half (50%) of control group had diabetes mellitus as a

past history. Moreover, 83.33%, 73.33% of control group were sedated and on control mode respectively compared to 66.67% of intervention group.

Table (3) reveals distribution of the samples regarding constipation assessment scale. It can be seen that, more than half (60%) of control group had severe constipation at the 3rd day of admission according to constipation assessment scale and the percentage become (53.33%) at 7th day of the study

On the other hand, more than one third (40%) of intervention group had severe constipation at the 3rd day of admission. Interestingly, severe constipation didn't reported among any patients in intervention group at seventh day of study. Moreover, significant differences were observed between both groups through three time of assessment (3rd, 5th, and 7th day) where, P= 0.15, 0.007 and 0.000 respectively.

Table (4): shows distribution of the studied patients regarding character of stool throughout period of the study, it was noticed that two fifth (40%) of control group had stool like metal and hard to pass at 3rd day of study and the percentage reached to more than one half (53.33%) at the 7th day of assessment with statistical significant difference throughout period of the study as P=0.018.

In addition, more than one third (36.67%) of the intervention group had stool like metal and hard to pass at the first time of assessment, however 40.00% of them had smooth, soft stool and easy to pass at the 7th day of assessment. Also, Statistical differences were observed between control and study groups throughout three times of assessment where P=0.041, 0.000, 0.000 respectively.

Table (5) represents distribution of the studied patients regarding gastro-intestinal assessment. Regarding frequency of defecation, 60.00% of control group didn't have any defecation at the third day of admission and this percentage increased to 83.33% at 7th day of admission. Also, about one fifth (23.33%) of control group defecates one time per day at the 3rd day and the percentage increased to more than half (53.33%) at 7th day with a statistical significant deference with P=0.000. While, near one third (26.67%) of patients in intervention group had two times of defecation at 3rd day and the percentage reached to more than half (53.33%) at the 7th day of intervention.

Concerning abdominal circumference, 60% of intervention group had normal circumference compared with only (6.67%) of control group at 7th day of intervention with statistical significant difference among study group with P=0.042. Finally, majority (86.67%) of intervention group had normal bowel movement at 7th day of admission compared to only (20%) of control group.

Table (6): It was noted that 60.00% and 23.33% of control group had tympany and floating increased diameter of the abdomen at 3rd day of the study respectively and the percentage become (53.33%) and (46.67%) at the 7th day of study.

In relation to intervention group, two fifth (40%) of them had tympany abdomen at 3rd day of study and near to half (43.33%) of them didn't had distended abdomen at 7th day of intervention with P=0.000.

Also, the mean residual volume score was 467.70±13.68 at 7th day among control compared with 242.87±8.73 in study group with statistical significant difference at 5th

and 7th day of admission when P= 0.011 and 0.000 respectively.

Table (7) Represents relation between demographic characteristics of sample and constipation severity. 40.00% of control group and 33.33% of study group that had severe constipation was in age between of 50 to 60 years. Statistical differences were observed among both groups with P= 0.006, 0.000 respectively. Also two fifth (40%) of both groups that had severe constipation were male with statistical and significant difference where P=0.040 and 0.000 respectively.

Table (8): Shows relation between of health relevant data of the studied patients and constipation severity. It was seen that near two third (64.67%) and one third (33.33 %) of control and study group with diabetes mellitus had severe constipation with P=0.004 and, 0.012 respectively.

In relation to medication, 53.33% and 33.33% of control and study group that had severe constipation were sedated respectively. Finally, 40.00% and near one third (30.00%) of control and study group that reported sever constipation started enteral feeding after 48 hours respectively with P=0.017among intervention group.

Table (1): Distribution of the studied patients regarding their socio-demographic characteristics

Characteristics	The studied patients (n=60)				χ^2 P
	Control group (n=30)		Intervention group (n=30)		
	N	%	N	%	
Age (in years)					
- (18-<30)	1	3.33	3	10.00	7.707 0.103
- (30-<40)	4	13.33	5	16.67	
- (40-<50)	11	36.67	7	23.33	
- (50-<60)	12	40.00	13	43.33	
- (≥60)	2	6.67	2	6.67	
Gender					
- Male	16	53.33	18	60.00	FE 0.795
- Female	14	46.67	12	40.00	

FE: Fisher' Exact test

Table (2): Distribution of critically ill patients regarding health relevant data.

Health relevant data	The studied patients (n=60)				χ^2 P
	Control group (n=30)		Intervention group (n=30)		
	N	%	N	%	
Diagnosis					
- Traumatic brain injury	11	36.67	13	43.33	0.722 0.982
- Respiratory disease	8	26.67	8	26.67	
- Cardiac disease	5	16.67	3	10.00	
- Liver disease	4	13.33	4	13.33	
- Renal disease	2	6.67	2	6.67	
Enteral feeding:					
- Early enteral feeding	11	36.67	14	46.67	FE 0.601
- Delay enteral feeding	19	63.33	16	53.33	
Past medical history					
- Hypertension	15	50.00	9	30.00	FE 0.187
- Diabetes mellitus	15	50.00	21	70.00	
Past surgical history					
- None	22	73.33	24	80.00	1.254 0.263
- cardiac surgery	6	20.00	3	10.00	
- abdominal surgery	2	6.67	3	10.00	
Gastrointestinal motility					
- Normal	30	100.00	30	100.00	-
# Medication					
- Opioids	15	50.00	13	43.33	0.758 0.685
- Sedatives	25	83.33	20	66.67	
- Antiacids	30	100.00	2230	100.00	
Modes of mechanical ventilation					
- Control mode	22	73.33	20	66.67	FE 1.00
- SIMV mode	8	26.67	10	33.33	

More than one answers FE: Fisher' Exact test

Table (3): Distribution of patients regarding constipation assessment scale.

Constipation assessment scale	The studied patients (n=60)													
	Control group (n=30)						χ^2 P	Intervention group (n= 30)						χ^2 P
	3rd day		5th day		7th day			3rd day		5th day		7th day		
	N	%	N	%	N	%		N	%	N	%	N	%	
- Non	2	6.67	0	0.00	0	0.00		6	20.00	9	30.00	12	40.00	
- Mild	3	10.00	2	6.67	0	0.00	**14.088**	8	26.67	5	16.67	14	46.67	**44.319**
- Moderate	7	23.33	14	46.67	14	46.67	**0.029***	4	13.33	15	50.00	4	13.33	**0.000***
- Severe	18	60.00	14	46.67	16	53.33		12	40.00	1	3.33	0	0.00	
Gp1 Vs Gp2 χ^2 P	**10.460 0.015***		**12.238 0.007***		**34.800 0.000***									

* Significant at level P<0.05

Table 4: Distribution of the studied patients regarding character of stool throughout period of the study.

Character of stool	The studied patients (n=60)											
	Control group (n=30)						Intervention group (n=30)					
	3rd day		5th day		7th day		3rd day		5th day		7th day	
	N	%	N	%	N	%	N	%	N	%	N	%
- Smooth, soft and easy to pass	2	6.67	0	0.00	0	0.00	6	20.00	8	26.67	12	40.00
- Sausage with cracks on surface	3	10.00	5	16.67	0	0.00	3	10.00	9	30.00	14	46.67
- Sausage shaped but lumpy	4	13.33	2	6.67	4	13.33	4	13.33	13	43.33	4	13.33
- Separate hard lumps	9	30.00	12	40.00	10	33.33	6	20.00	0	0.00	0	0.00
- Like metal and hard to pass	12	40.00	11	36.67	16	53.33	11	36.67	0	0.00	0	0.00
χ^2 , P	**18.495 , 0.018***						**23.495 , 0.000***					
Gp1 Vs Gp2 χ^2 P	**9.00 0.041***		**30.781 0.000***		**48.00 0.000***							

Gp1: Control group **Gp2:** Intervention group

* Significant at level P<0.05

Table 5: Distribution of the studied patients regarding Gastro-intestinal assessment throughout period of the study.

Gastro-intestinal Assessment	The studied patients (n=60)											
	Control group (n=30)						Intervention group (n=30)					
	3rd day		5th day		7th day		3rd day		5th day		7th day	
	N	%	N	%	N	%	N	%	N	%	N	%
Frequency of defecation												
- None	18	60.00	14	46.67	25	83.33	12	40.00	1	3.33	0	0.00
- One time/day	7	23.33	16	53.33	5	16.67	10	33.33	17	56.67	14	46.67
- 2 times/day	5	16.67	0	0.00	0	0.00	8	26.67	12	40.00	16	53.33
χ^2 , P	**31.050 , 0.000***						7.707 , 0.103					

Abdominal circumference												
- Normal	7	23.33	5	16.67	2	6.67	7	23.33	16	53.33	18	60.00
- (94-102)/or (80-88)	18	60.00	13	43.33	13	43.33	19	63.33	11	36.67	11	36.67
- >102 (or > 88)	5	16.67	12	40.00	15	50.00	4	13.33	3	10.00	1	3.33
χ^2 , P	8.788 , 0.067						**9.896 , 0.042***					
Bowel movement												
- Normal	7	23.33	7	23.33	6	20.00	14	46.67	18	60.00	26	86.67
- Hypoactive	23	76.67	23	76.67	24	80.00	16	53.33	12	40.00	4	13.33
χ^2 , P	**11.250 , 0.02***						**10.870 , 0.013***					

* Significant at level P<0.05

Table 6: Distribution of the studied patients regarding adverse effects of constipation throughout period of the study.

	The studied patients (n=60)											
	Control group (n=30)						**Intervention group (n=30)**					
	3rd day		**5th day**		**7th day**		**3rd day**		**5th day**		**7th day**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Abdominal Distention												
- No distention	2	6.67	0	0.00	0	0.00	6	20.00	9	30.00	13	43.33
- Hard, tender	3	10.00	2	6.67	0	0.00	8	26.67	5	16.67	14	46.67
- Floating/Increase diameter	7	23.33	14	46.67	14	46.67	4	13.33	15	50.00	4	13.33
- Tympany	18	60.00	14	46.67	16	53.33	12	40.00	1	3.33	0	0.00
χ^2 , P	5.417 , 0.492						**28.225 , 0.000***					
Gastric residual												
Range	(200-680)		(200-570)		(200-560)		(199-555)		(189-600)		(199-366)	
Mean ± SD	368.13±14.61		445.23±13.27		467.70±13.68		299.87±12.28		266.00±11.53		242.87±8.73	
F , P	0.349 , 0.706						2.486 , 0.089					
Gp1 Vs Gp2 (t , P)	**3.996 , 0.050**		**6.897 , 0.011***		**13.908, 0.000***							

* Significant at level P<0.05

Table (7): Relation between Demographic Characteristics of the studied patients and constipation severity

Characteristics	**The studied patients (n=60) Constipation level**															
	Control group (n= 30)								**Intervention group (n=30)**							
	None (n=2)		**Mild (n=3)**		**Moderate (n=7)**		**Severe (n=18)**		**None (n=6)**		**Mild (n=8)**		**Moderate (n=4)**		**Severe (n=12)**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Age (in years)																
- (18-<30)	0	0.00	0	0.00	0	0.00	1	3.33	3	10.00	0	0.00	0	0.00	0	0.00
- (30-<40)	2	6.67	1	3.33	1	3.33	0	0.00	3	10.00	2	6.67	0	0.00	0	0.00
- (40-<50)	0	0.00	2	6.67	6	20.00	3	10.00	0	0.00	6	20.00	4	13.33	0	0.00
- (50-<60)	0	0.00	0	0.00	0	0.00	12	40.00	0	0.00	0	0.00	0	0.00	10	33.33
- (≥60)	0	0.00	0	0.00	0	0.00	2	6.67	0	0.00	0	0.00	0	0.00	2	6.67
χ^2 , P	**27.744 , 0.006***								**55.490 , 0.000***							

Gender																
- Male	0	0.00	2	6.67	2	6.67	12	40.00	2	6.67	3	10.00	1	3.33	12	40.00
- Female	2	6.67	1	3.33	5	16.67	6	20.00	4	13.33	5	16.67	3	10.00	0	0.00
χ^2 , P	**8.332 , 0.040***								**19.815 , 0.000***							

* Significant at level P<0.05

Table (8): Relation between of health relevant data of the studied patients and the constipation severity.

Health relevant data	**The studied patients (n=60) Constipation level**															
	Control group (n= 30)								**Intervention group (n=30)**							
	None (n=2)		**Mild (n=3)**		**Moderate (n=7)**		**Severe (n=18)**		**None (n=6)**		**Mild (n=8)**		**Moderate (n=4)**		**Severe (n=12)**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Past medical history	2	6.67	2	6.67	3	10.00	4	13.33	2	6.67	2	6.67	1	3.33	2	6.67
- Hypertension	0	0.00	1	3.33	4	13.33	14	46.67	4	13.33	6	20.00	3	10.00	10	33.33
- Diabetes mellitus																
χ^2 , P	**13.476 , 0.004***								**10.952 , 0.012***							
Medication																
- Sedated	0	0.00	2	6.67	5	16.67	16	53.33	1	3.33	5	16.67	3	10.00	10	33.33
- Not sedated	2	6.67	1	3.33	2	6.67	2	6.67	5	16.67	3	10.00	1	3.33	2	6.67
χ^2 , P	**15.432 , 0.003***								**11.652 , 0.011***							
Enteral feeding																
- Early	2	6.67	1	3.33	2	6.67	6	20.00	5	16.67	3	10.00	0	0.00	3	10.00
- Delay	0	0.00	2	6.67	5	16.67	12	40.00	1	3.33	5	16.67	4	13.33	9	30.00
χ^2 , P	**0.523 , 0.914**								**10.134 , 0.017***							

* Significant at level P<0.05

Discussion

Constipation remains an important and poorly recognized problem in patients admitted to critical care unit and often neglected which can leads to a host of problems for critically ill patients[9]. The current study hypothesized that critically ill patients who will receive abdominal massage will have significant lower rate of constipation as compared to those in the control group who will not. There were decreased rate of constipation among the intervention group and this indicate the effectiveness of the abdominal massage.

The current result revealed that the two groups had nearly similar age between 50 to less than 60 years, as constipation is known to increase with ageing and more than half of both groups were male reflecting a higher prevalence of the problem among male patients. These results were quite consistent with **Mohamed et al, (2021) [14]**. Who found that nearly half of studied groups were in age between 40 to 60 years old and were male. On the contrary, **Etinkaya et al (2020) [20]** reported that most of studied patient in their study were female.

Regarding their health relevant data, it was seen that the most common diagnosis among studied groups was traumatic brain injury and respiratory disease. In addition, most of studied groups were on control mode of mechanical ventilation and sedated. These medical problems and sedation administration can decrease gut motility and positive pressure induced by

mechanical ventilation lower cardiac output, intestinal blood flow which contributes to increasing risk of constipation in ICU [21].

These findings were supported by **Ali et al. (2022)**[22] who found that mechanically ventilated patients who received continuous sedation and analgesia leads to reduced gut motility and increased incidence of constipation in these patients.

Concerning enteral feeding, majority of studied groups received enteral feed within 48hours of admission. A possible explanation is that the majority of them was nothing per nothing and connected to mechanical ventilation. Early initiation of enteral feeding is considered very important science it preserves gut health and then modulates the stress response to critical illness. However, it may increase risk of constipation. This result was agreed with **Song et al (2018)**[23] who revealed that given enteral feeding within 48 hours after admission is efficient and safe for critically ill patients. Moreover **Araujo et al (2020)** [24] reported that constipation is more frequent as diarrhea in patients fed by enteral nutrition.

In relation to constipation assessment scale, the current finding represented that more than half of control group had severe constipation at the 3rd and 7th day of the study. This could be related to nursing staff give little attention to problems regarding patient's elimination in control group. On the other hand, only one third of intervention group had severe constipation at the 3rd day and there was no severe constipation reported among patients in intervention group at seventh day of study. This may be due to the effect of abdominal massage that improves the intestinal movements and enhancing the gastrointestinal function. This result was consistent with **Abd-Elraheem et al (2020)** [25] who found that nearly three fourth of the control group had constipation versus less than one quarter of the study group that had constipation.

Also, **Ugras et al (2020)**[26] concluded that, abdominal massage improved bowel evacuation and decreased incidence of constipation among intervention groups. In contrast a study conducted by **McClurg et al (2016)**[27] revealed that patients in their study did not have any improvements in their bowel movements from the abdominal massage.

Regarding character of stool**,** it was found that two fifth of control group had stool like metal and hard to pass at the 3dr day of assessment and the percentage increased to more than one half at the seventh day of assessment. This can be explained as majority of the patients were immobilized and had enteral nutrition that may be lack of fibers, which cause the stool stays in the colon for a longer time and becomes hard to pass. Similarly, **Alimoradzadeh et al (2017)**[28] reported that decreased level of immobility lead to hard stool and comes out more difficult.

On the other hand, the entire patient in the intervention group didn't have stool like metal and hard to pass at 7th day of assessment, nearly more than one third of them had smooth, soft and easy to pass. This may be attributed to the effect of abdominal massage which may increase the bowel movements and improve evacuation process. This result was consistent with **Çevik et al. (2018)**[29] who showed that abdominal massage increases the number of bowel movements, and stool consistency, and reduces the mean scores of straining and inability of the bowel to empty completely .

As for frequency of defecation, more than half of control group didn't have any defecation at the 3rd and 7th day of

admission. However, more than half of patients in intervention group defecated two times per day at 7rd day of intervention. This may be due to abdominal massage improve defecation through stimulation of parasympathetic nervous system which reducing abdominal muscle tension and relaxing digestive sphincter muscles to promote bowel movements.

This finding was in line with **Tang et al (2020)**[30] who reported that studied patients who received abdominal massage defecated more often compared to patients in the control group. Similarly **Mohamed et al (2021)** [31] stated that the frequency of defecation significantly increased in study group who received abdominal massage.

As regard abdominal circumference and bowel movement, the current result showed that near two third of intervention group had normal circumference score and normal bowel movement with statistical significant among study group, while nearly half of control group had large abdominal circumference score and majority of them had hypoactive bowel movement at 7th day of intervention. It seems that abdominal massage increases peristalsis, changes abdominal pressure, and had a mechanical and reflexive effect which leads to improved bowel movement in intervention groups [10].

Similarly, a study conducted by Onur **et al (2020)**[32] presented that improved bowel movements and reduced waist circumference among studied patients who managed by abdominal massage. While large abdominal circumference score was observed among control group on the first day and sixth day of study. Also, **Diab et al (2021)**[33] reported a significant improvement among study group only in the 7 day of study after applying of abdominal massage.

Concerning adverse effects of constipation, the present findings revealed that more than one half of control group had tympanic and floating abdominal distention at 3rd day and the last day of the study. On the other hand, less than half of intervention group had tympanic abdominal distention at 3rd day of study and none of them had tympanic abdominal distention at 7th day of intervention.

This may be attributed to that massage of the abdomen lead to activation of intestine and stomach that cause easy digestion of food, hasting peristalsis, stimulating the nutrients absorption, and facilitating the passage of nutritional components in the intestine, resulting in decreasing abdominal distension [34]. This result was similar with **Seiiedi (2020)**[35],**Wang, (2019)**[36] and **Uysal (2017)**[37]who showed that massage of abdomen helps to decrease abdominal circumference, distension, GR, and vomiting.

Gastric residual volume is the amount of liquid drained from a stomach following administration of enteral feed. Monitoring of GRV is very important and remarkable standard for nutrition status improvement[38]. In this regard the present result showed that GRV was high in control group at 5th and 7th day of study and become within normal range among study group at 5th and 7th day after intervention with abdominal massage with statistical significant difference between both groups. This might be attributed that abdominal massage stimulating the parasympathetic division of the autonomic nervous system and relaxing the sphincter in the gut and improving peristalsis that results in increasing the gastric emptying and decreasing the residual volume [34].

This results were supported by **El-Feky and Ali (2020)** [39] and **Momenfar et al., (2018)** [40] found high GRV in the control

group who didn't receive abdominal massage. However these findings were inconsistent with **Dehghan et al (2018)** [10] who showed that GRV didn't change significantly among control and experimental groups after abdominal massage.

Regarding effect of patients' demographic data on constipation severity**,** our results represented that the most common age and gender that had severe constipation were male patients with age between (50-60) years old. This may be attributed that aging is associated with increased comorbidities with the health status, and physical inactivity which affect prevalence of constipation.

This result was matched to a study done by **Mansouri et al.(2018)**[41] who reported that elderly age of 60 years and older had severe constipation. Also, **Fargetal (2020)** [42] revealed that most of male patients in his study had constipation. On the other hand, this study was contradicted with **Black and Ford,(2018)**[43] that concluded that constipation was common among female than male patients.

As regard the Effect of health relevant data of the studied patients on the constipation severity. It was seen that past history of diabetes mellitus were the most common disorders among both groups that had severe constipation. This may be attributed that diabetes for long duration can lead to neuropathy and damage to the nerves controlling the digestive tract which lead to constipation, diarrhea, and incontinence[44]. This result was agreed with **Atasever et al (2018)** [45] who revealed that more than of their sample had past history of diabetes mellitus and cardiac diseases. Also **Piper and Saad (2018)**[46] concluded that constipation was one of the most commonly reported GI symptoms by diabetics patients.

Medications such as sedatives, analgesics are commonly prescribed to patients who are critically ill and often decreasing gastrointestinal motility and absorptive ability of the small intestine and increasing risk for constipation. In this regard the current study noted that sedation and delayed enteral feeding after 48 hours were the most common disorders among both groups that had severe constipation. Similarly **Guerra et al (2016)** [2] showed that the incidence of constipation was increased in patients receiving sedative and vasopressor medication.

Also our results revealed that one third of patients who received delayed enteral feeding after 48 hours had severe constipation. In the same line, **Chawla et al. (2021**)[47] concluded that early enteral nutrition is useful than delayed enteral feeding in managing patients who are critically ill through the maintenance of gut integrity and decreasing gastrointestinal disorders. Also **El-Saman and Ahmed (2017)** [48] reported that most of patients receiving delayed enteral feeding and low fiber diet was constipated

Conclusion

It can be concluded that massage that applied on abdomen is effective in decreasing constipation and its adverse effect such as abdominal distension, abdominal circumference pressure, gastric residual volume (GRV) and increasing defecation frequency in intervention group.

The study limitations

Inability to generalize the results due to conveniently selection of sample from one clinical setting.

Recommendations

- Applying abdominal massage as a routinely care for all patients in ICU by critical care nurses

- Providing training program about abdomen massage to enhance gastrointestinal motility for patients with critical illness,
- Replicating the study with larger probability sample to ensure generalizability of findings.
- Conducting further study, evaluate the effect of abdomen massage on physiological parameters of critically ill patients.

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Effectiveness of a Nursing Intervention Based on Acceptance Commitment Therapy on Stress, Marital adjustment, Sleep quality, and Fatigue among Patients with Breast Cancer

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Abstract

The most common kind of cancer among Egyptian women is breast cancer. Most patients present at a late stage with subsequent poor outcomes. It ranks as the second-most common malignant tumor in women and the most common cause of cancer-related death. **Aim:** to evaluate effectiveness of a nursing intervention based on acceptance commitment therapy on stress, marital adjustment, sleep quality, and fatigue among patients with breast cancer. **Design:** Aquasi-experimental design was utilized. **Setting:** The study was conducted at the Menoufia University Hospital's oncology outpatient clinic in Egypt's Menoufia Governorate. **Sample:** Sixty adult breast cancer patients were selected by purposive sample. **Tools:** Four tools used; (1) Depression, Anxiety and Stress Scale (DASS); stress self-reported subscale(2) Marital adjustment Scale(3) Pittsburg sleep quality index(4) Piper Fatigue Scale. **Result:** shown that after two months of intervention, When compared to prior intervention, there was a highly significant difference (p = 0.00) between the study and control groups in terms of the total mean score for fatigue, stress, sleep quality, and marital adjustment. When compared to the control group, there was a highly statistically significant negative correlation between the study group's marital adjustment and their overall scores for fatigue, stress, and sleep quality (high scores indicate poor sleep quality).**Conclusion:** Acceptance commitment therapy-based nursing intervention improves stress, marital adjustment, quality of sleep, and fatigue in breast cancer patients. **Recommendation: -** Acceptance commitment therapy should be the foundation of non-pharmacological cancer treatment for many malignancies.

Keywords: Acceptance and commitment therapy; breast cancer, fatigue, marital adjustment, stress, sleep quality

Introduction

Breast cancer is the second-leading cause of cancer-related deaths globally, and the most frequent malignancy in women, according to the World Health Organization **[1].** Breast cancer affects about 1.7 million women each year and is the leading cause of adult female death worldwide **[2].** Breast cancer still accounts for 15% of all cancer-related deaths. More than half of cancer patients experience psychological dysfunctions **[3].** The stress and anxiety that the disease causes is the biggest problem for cancer patients. Patients

who have cancer and receive therapy for it frequently develop physical and mental illnesses**[4][5].** One of the difficulties that cancer patients face is the stress that comes with dealing with their sickness. Cancer diagnosis, treatment, and daily life can all be extremely stressful. Stress can affect the progression, growth, and metastasis of malignant tumors. If the patient's stress is not properly managed, it will negatively affect his or her health**[4][6].**

Patients with breast cancer could experience poorer sleep quality due to psychological factors like perceived stress **[7].** According to a previous study **[8],** stress can have serious physical and psychological effects on patients as well as accelerate the spread of cancer. Patients with breast cancer are more likely than those with other cancers to feel psychological stress because they must deal with the threat that the disease poses to their life as well as accept the possibility of self-image deficits throughout treatment, which will unavoidably result in long-term distress **[7]**. As a result, increasing levels of perceived stress will have a significant impact on the quality of sleep. Breast cancer patients frequently experience sleep difficulties. According to most research, 60% to 90% of breast cancer patients experience sleeps disruptions, which is significantly greater than the prevalence in the general population of healthy people **[9] [10].** Patients who are being treated for cancer go through invasive medical procedures, chemotherapy, radiation, and hormone therapy, among other treatments that could have an impact on their emotional or psychological well-being **[11].**

Cancer patients frequently experience fatigue, which significantly lowers their quality of life **[12].** Fatigue is a mental, permanent, and unpleasant feeling that can result from cancer or its treatments. It can manifest as physical, emotional, or cognitive fatigue **[13].** According to studies, fatigue affects 99% of breast cancer patients receiving chemotherapy **[14].** About 50% of breast cancer patients generally feel moderate to severe fatigue during receiving therapy. Fatigue, which can last months, or even years after therapy is one of the most prevalent adverse effects of cancer treatment **[15]** and more than 25% still feel extremely fatigued after receiving initial cancer treatment**[16] .** After treatment, fatigue has been the most distressing and prevalent symptom among individuals with breast cancer (BC). Although other cancer survivors can also feel tired, women with a history of BC may have particular distinctive characteristics **[17].**

The patient's connections with his family, friends, coworkers, and in his career and financial life change after being diagnosed with cancer **[18]**. Breast cancer patients may have problems like post-operative discomfort, exhaustion, baldness, sadness, fear, degradation in body image perception, social isolation, and anxiety about relapse **[18] [19].** Breast cancer patients frequently experience sexual problems that have a negative impact on their relationships with their spouses **[20].** Partners of those women frequently struggle to maintain the desired degree of sexuality. Because of their anxiety, irritation, and sensitivities to their altered body image, some men are reluctant to engage in sexual activity. According to a research of survival concerns, the patient and her husband frequently had decreased sexual desire prior to therapy. Unpleasant sexual sensations and lack of desire were also described, in addition to the usual side effects of cancer treatment, such as hair loss, body part loss, nausea, and weight loss or gain **[19].** Inadequate marital adjustment not only results in unsatisfactory health outcomes but also raises the risk of death **[21].**

Breast cancer patients have a wide range of requirements, such as ways to manage the distress that comes with it both before and

after cancer treatment. It is crucial to prepare and set up the right social and emotional support systems for these women in order to reduce the negative consequences of the stress brought on by their sickness and treatment **[22].** There are two types of therapeutic approaches for cancer patients: pharmacological and non-pharmacological **[23].** A major component of curative therapy for many malignancies includes chemotherapy, hormone replacement therapy, immunotherapy, and surgery may all be used in addition to or instead of radiotherapy **[24].**

Significant of the study

According to **[25] [26],** breast carcinoma is the most common cancer in women in Egypt and the main reason for cancer deaths in developing nations. Every year, more than 22,000 new cases are identified, making up 33% of all female cancer cases in Egypt **[27]** Following breast cancer treatment, a number of unfavorable side effects often manifest, including trauma, weight fluctuations, hot flashes, and mood swings, as well as altered body image imposed by the removal or alteration of breast tissue. In addition, sexual dysfunction including vaginal dryness, dyspareunia, and orgasm issues, as well as emotional distress caused by her misfortune, which impaired their quality of life **[28].** So, it is crucial to address the challenges faced by patients with breast cancer.

The most prevalent form of cancer in the world, breast cancer carries a high chance of death **[29].** Acceptance and commitment therapy is one psychological support method that has been shown to increase patient survival and improve quality of life (ACT). According to **[30],** ACT strives to minimize maladaptive coping methods and increase psychological flexibility in dealing with life's challenges. Six essential processes are used by the ACT treatment method to improve psychological flexibility. Each of the six stages includes acceptance, cognitive diffusion, and interaction with the present moment, self-in-context, values, and committed action. The fundamental ACT principle is to commit to take actions that will enhance your life while acknowledging that there are things you cannot control **[31].** ACT places a strong emphasis on acceptance while promoting values-based, mindful living. According to studies by **[32] [33],** ACT may improve the quality of life and distress symptoms of cancer patients. Research on how acceptance commitment treatment helps the physical and psychological difficulties breast cancer patients encounter is lacking. The amount of study in this field is insufficient. Determining the impact of a nursing intervention based on acceptance commitment therapy was the aim of this study.

The subjects and procedures

The study's goal

Examine the efficiency of nursing intervention based on acceptance commitment therapy on stress, marital adjustment, quality of sleep and fatigue among patients with breast cancer.

Research design

Quasi-experimental design (study and control group) was used to achieve the study purpose.

Research hypothesis

1- Patients with breast cancer who receive therapy sessions (study group) will experience less stress levels following the intervention than those who don't (control group)

2- Patients with breast cancer who receive nursing intervention (study group) will have better marital adjustment as a result of the intervention than those who do not receive it (control group).

3- Patients with breast cancer who receive nursing intervention (study group) will

report better sleep quality post intervention than those who don't (control group).

4- Patients with breast cancer who receive nursing intervention (study group) will experience less fatigue following the intervention than patients who do not (control group).

Research setting

The outpatient oncology clinic at Menoufia University Hospital – Menoufia Governorate - Egypt.

Research Subject

A purposive sample of 60 adult breast cancer patients were selected.

Sample Size

The mean scores of pain acceptance were considerably decreased by ACT treatment, according to **[31],** who evaluated earlier data (F = 9.58, p 0.05). At 71.70 (17.54) versus 57.55, mean pain acceptability in the intervention group was significantly higher than in the control group (6.72). The sample size was obtained using the following formula:

N = 2SD2 [Z/2 + Z] 2 / d2 for an 80% power and a 95% confidence level. Thus, a total estimated sample of 60 participants was randomly split into two equal groups, each with 30 participants (the study group and the control group).These inclusion criteria were used to choose those patients: Adult patients who have completed their initial surgical and oncological treatments at least two months prior to inclusion, who are agreeable with treatments and free from any mental illnesses.

Data collection tools

Tool 1: It consisted of two portions:

(i) **Interviewing Questionnaire;**

constructed by the researchers to evaluate the socio-demographic characteristics of the patients and past medical history (ii) The Arabic version of the Depression, Anxiety, and Stress Scale (DASS) was assessed for content validity by **[34], [35]**.The scale has a total of 42 items over three self-reported subscales. A 4-point Likert scale with the following values is used to rate the items: 0 for not at all, 1 for somewhat, 2 for most of the time, and 3 for always. The 14-item stress self-reported subscale was employed by the researchers in this investigation. By adding the scores for the pertinent categories, researchers determined the stress scores. Higher scores reflect emotional negativity. Normal (0–14), mild (15–18), moderate (19–25), severe (2–33), and extremely severe (34+) stress levels are included in the scoring system.

Tool 2: Marital adjustment Scale

This is an Arabic scale adopted from **[36]**. It was designed to measure the marital adjustment among married women. 30 questions were included, with responses worth 5 points each. Likert scale with the options "never" (1) and "always" (5). Some of the items (3, 5, 8, 13, 14, 22, 23, 24, 26, 28, and 30) have negative statements and are evaluated adversely. The range of the total rating was (30-170). Poor marital adjustment is represented by a score of 30 to 70, moderate marital adjustment is represented by a score of 71 to 110, and strong marital adjustment is represented by a score of 111 to 150.

Tool 3: Pittsburg sleep quality index (PSQI):

It was created by **[37]** and the researchers translated it into Arabic. It measures numerous distinct elements of sleep and consists of 19 components. Every question is graded on a likert scale of 0 to 3, where 0 denotes little difficulty and 3 denotes extreme difficulty. The overall score on this questionnaire ranges from 0 to 21, with higher scores denoting poorer sleep quality. A score of less than 5 indicates that the respondent has a sleep disorder.

Tool 4: Piper Fatigue Scale (PFS)

It was created by **[38]** to evaluate the patient's complaints of unusual or extreme fatigue while they are ill, getting therapy, or recovering from a disease. It consists of 22 items; response to these items was recorded on ten point scored measurements from 0 to 10, where zero indicates no fatigue and ten indicate sever fatigue. For calculation of total fatigue score: The severity codes are range from 1-3 indicate mild degree, range from 4-6 indicate moderate degree, and range from 7-10 show severe degree. To keep the score on the same numeric 0 to 10 scale, combine the score of all elements and divide them by 22.

Validity of the Tools

Seven specialists on a panel with backgrounds in both mental health nursing and medical surgical nursing evaluated the study instruments for their face and content validity in terms of their clarity, relevance, and completeness. The required modific-ations were carried out based on the specialists' recommendations.

Reliability of the tools

Using Cronbach's alpha coefficients, the instruments' internal consistency was calculated. Test-retest reliability was used to assess the instruments' dependability, and results showed that it was reliable at 0.79 for the stress subscale, 0.939 for marital adjustment, 0.98 for the Piper Fatigue Scale (PFS), and 0.83 for the Pittsburg Sleep Quality Index (PSQI).

Data Collection Procedure

Ethics-related considerations: The Menoufia University Faculty of Nursing's ethics and research committee granted their clearance. The Director of Hospitals and the leaders of the nurses in the Department of Oncology were sent an official letter by the Dean of the Faculty of Nursing at Menoufia University after the study's goal had been made clear. After being made aware of the study's goals and given the assurance that all information acquired would be kept fully confidential, each participant gave informed consent to take part in it. The study's authors made particular to underline that participation was entirely voluntary and that the data were coded to protect the patients' privacy. The participants were also informed that they might discontinue the study at any moment.

A pilot study was performed on 6 patients (10%) to evaluate all tools for clarity, objectivity, feasibility, and applicability. Additionally, it was done to find any problem associated with administering the tools and estimate the time required for data collecting, then the necessary modifications were made. The current study did not include any of the data from the pilot study.

Data collection process

Beginning in September and ending in December 2021, data were collected throughout a four-month period. All participants who fulfilled the criteria for inclusion actively participated in this study, and the study's 60 participants were randomly divided into two equal groups (study and control group).Control group (30 participants) who don't obtain therapy sessions; study group (thirty participants) who obtain therapy sessions was divided into three groups, each of which contained ten patients. These groups each attended nine sessions, lasted between 60 and 90 minutes, once a week from 10 to 11.30 AM. A posttest was administered after two months had passed since the intervention sessions were finished. The study's application went through three phases (assessment phase, implem-entation, and evaluation phases).

Phase (1): Assessment phase

Once the permission was given, the intended investigation could be continued. The interviewers were placed in a quiet, private place. The participants were informed of the

study's purpose and scope. The above-mentioned research tools were used to conduct an assessment on 60 patients. They were then split into two equal groups; the study group and the control group, using a coin toss.

Phase (2): The implementation phase

When the researchers initially encountered the study group, they informed them that they'll receive nine sessions, eight of which would take place within two months (one day per week), and one of which would actually occur two months post intervention sessions for assessing the effectiveness of the nursing intervention. This was achieved by using a variety of learning strategies, including lectures, seminars, brain storming, and demonstrations, re-demonstrations, examples, and modeling. To help with explanation and serve as a guide for them, a data show, video, photographs, and a booklet was utilized as the media. Each session concluded with a summary, participant feedback, further explanations of any ambiguous content, and homework assignments from the researchers.

Acceptance commitment therapy description

Session 1: It dealt with open communication for identification, group integration, clarity of the purpose, and time allotted for the intervention sessions. Educating patients about treatment sessions and session rules, such as reiterating the security of research data and respecting meeting dates and times, avoiding from talking during other people's conversations, and performing necessary tasks during each session. After that, a pretest was administered to them using research tools.

Session 2: It focused on providing a detailed explanation about the concept and symptoms of breast cancer , determining the severity of each member's disease (illness duration and treatments), including its diagnosis, symptoms and how they affect different aspects of life, medical drugs treatment that are now accessible, as well as non-drug options and their success rates.

Session 3: Increase awareness of how a certain behavior affects, checking the members' upsetting thoughts and feelings, and determining the unsuccessful client's usage of coping mechanisms to deal with these thoughts and feelings. Encourage women with breast cancer to make decisions that will help them achieve their long-term goals and live a life consistent with their values.

Session 4: Being present; elaborating the practice of mindfulness, or being present in the moment, without judging the experience. It requires accepting what is occurring without attempting to predict or alter it. Take just few slow, deep breaths. Place your hands on your belly. Feel your belly expand as you inhale. Feel your belly come in as you exhale. Inhale for one, two, three, and four. Exhale for one, two, three, and four. (Repeat). Notice your belly moving in and out. When a thought arises, simply observe the thought when it arises, as if it were a cloud in the sky. Refocus on your breathing and the way it causes your belly to expand and contract. No matter how many thoughts invade your mind; thoughts and feelings are still existent, but we might become aware of them without instantly reacting to them. It works best if you take what we learn in this group and practice for five to ten minutes every day at home. These strategies will become habitual with repetition.

Session 5: Explaining the concept of acceptance, which is the intentional decision to acknowledge unpleasant experiences as they are without attempting to modify or deny them. It offers opportunities for accepting painful experiences and emotions and makes it easier to accept challenging ideas, emotions, and sensations. It

emphasizes more on acceptance than on avoidance.

Session 6: (Defusing of Thoughts):- After introducing mindfulness exercises, instruct patients to think in a negative thought and record it on paper, ask them how this thought makes them feel. Then encourage them to imagine it evaporating. Patients should be instructed to visualize the thought they drew moving away by setting it on a cloud. It is a strategy designed to change how someone responds to their feelings and thoughts. Defusing is detaching from our thoughts and allowing them to come and go so that they don't influence our behavior.

Session 7: The idea that a person is more than the sum of their experiences, thoughts, and emotions is conveyed by the phrase "self as context." It does, however, provide a different viewpoint that suggests that there is a self-separate from the present experience. There is more to us than just what happens to us. What happens to us affects us, not the other way around.

Session 8: Describing the concept of values and committed behaviors. Values are the features we decide to seek towards it at any specific time. Discussed with patients their values and value-oriented actions help them find valuable direction in their lives by encouraging them to live with fully experiencing their own experiences. We all hold values that influence our actions, whether we are aware of them or not. Encourage patients to use resources that enable them to live their lives in accordance with their values.

Session 9:- Closing and post-test): The patients' attendance and completion of the therapy sessions were acknowledged by the researchers. After two months had passed since the intervention sessions were complete, a posttest was conducted using the research tools to look into how nursing interventions based on ACT affected patients with breast cancer's fatigue, sleep quality, stress levels, and marital adjustment (evaluate the accomplishment of the study's goal).

Phase (3): Evaluation phase:

After the implementation phase, Participants were instructed to seek clarification or ask any questions they might have, and after two months of intervention sessions, a post-test was administered using study tools to evaluate the effectiveness of a nursing intervention based on acceptance commitment therapy on stress, marital adjustment, sleep quality, and fatigue in patients with breast cancer.

Statistical Analysis

On an IBM compatible computer, The SPSS (Statistical Package for the Social Science) version 22 was used to tabulate and evaluate the data that were obtained. There were two separate statistical investigations: 1) Descriptive statistics: for qualitative data, they were presented as number and percentage (No &%), and for quantitative data, as mean and standard deviation (X+SD). 2) Analytical statistics: Paired sample t-tests were used to compare two means pre- and post-intervention, which were shown as mean & standard deviation (X SD) in the quantitative data. While a separate t test was used to compare two means across different groups.

- P-value > 0.05 to be statistically insignificant.
- P-value ≤ 0.05 to be statistically significant.
- P-value ≤ 0.001 to be highly statistically significant.

Results

Table (1): demonstrates that the demographic characteristics of the study and control groups didn't differ significantly (p>0.05). In the study group, (46.7%) of them had secondary education and 90.0% were house wife. all the participants in the study group and control group were from rural areas.

Table (2): It shows that there was no significant difference between the two groups about their medical history with p>0.05. Less than three-quarters of the study group and the majority of the control group (73.3% and 90.0%, respectively) had a previous surgical history and more than a quarter of those with a previous surgical history in both the study and control groups had a previous mastectomy. In the study group, slightly above three quarters of had no history of chronic disease (76.7%) and less than one quarter (23.3%) had history of chronic disease (as diabetes mellitus, hypertension). Most participants in the study and the control group (93.3% and 80.0% respectively) their treatment lasted for 24 hours each week at a time. As regards to smoking history, there was not smoking history in both groups. More than one-third of both study and control group (36.7% and 40.0% respectively) practice exercise as walking.

Table (3) shows that after two months of intervention, The total mean score for exhaustion, stress, sleep quality, and marital adjustment was significantly different (p = 0.00) between the study and control groups compared to before the intervention.

Table (4): demonstrates an extremely strong positive correlation between study group's overall scores for stress and sleep quality and their overall scores for fatigue (p=.000) compared with control group; this mean that when total score of fatigue increase (increased degree of fatigue), total score of stress will increase, total score of sleep quality will increase (higher scores indicate poor sleep quality)

Table (5): It shows that there was an extremely substantial positive association between the study group's total stress score and overall sleep quality score (high score indicate poor sleep quality) (p=.000) compared with control group; this mean that when total score of stress increase, total score of sleep quality will increase (higher scores indicate poor sleep quality).

Table (6): illustrate that, there was a highly statistically significant negative correlation between the study group's marital adjustment and their overall scores for fatigue, stress and poor sleep quality (p=.000) compared with control group. It suggests that the marital adjustment will be decreased when there is a negative emotional state (increase in stress), poor quality of sleep (higher scores indicate poor quality of sleep) and increase fatigue degree.

Table (7): displays, there was an extremely statistically significant positive correlation between the study group's age and their overall scores for stress and marital adjustment (p=.000) compared with control group.

Table (1): distribution of the studied subjects according to their demographic characteristics (N =60)

Social Characteristics	Study group (N=30)		Control group (N=30)		X2	P - value
	No	%	No	%		
Age Mean ± SD	42.63±9.07		44.53±5.03		t=1.003 ns	0.32
Sex Female	30	100.0%	30	100.0%	a	-
Social Status Married	30	100.0%	30	100.0%	a	-
Level of education						
Illiterate	8	26.7%	9	30.0%	2.71 ns	0.61
Reads and writes	2	6.7%	1	3.3%		
Primary school	5	16.7%	2	6.7%		
Secondary	14	46.7%	15	50.0%		
Bachelor degree	1	3.3%	3	10.0%		
Occupation						
Worker	3	10.0%	0	0.0%	3.15 ns	0.12
House wife	27	90.0%	30	100.0%		
Place of residence Rural	30	100.0%	30	100.0%	a	-
Income						
Not enough	12	40.0%	14	46.7%	0.27 ns	0.40
Enough	18	60.0%	16	53.3%		

NB: a. No statistics are computed because the data is a constant. NS = not significant (p>.05).

Table (2): distribution and Frequency of medical history of the studied subjects (N=60**)**

Medical history	Study group (N=30)		Control group (N=30)		X^2	P -value
	No	%	No	%		
Previous surgical history						
Yes	22	73.3%	27	90.0%	2.78 ns	0.09
No	8	26.7%	3	10.0%		
If yes which of the following						
		(n=22)		**(n=27)**		
Mastectomy	7	31.8%	8	29.6%	3.73 ns	0.59
Caesarean section	0	0.0%	2	7.4%		
Others	4	18.2%	6	22.2%		
2+3(mastectomy& caesarean section)	4	18.2%	6	22.2%		
2+4((mastectomy &others)	6	27.3%	3	11.1%		
1+2(intestinal obstruction & others)	1	4.5%	2	7.4%		
History of chronic diseases						
Yes	7	23.3%	3	10.0%	1.92 ns	0.15
No	23	76.7%	27	90.0%		
If yes which of the following	**n=7**		**n=3**			
Diabetes	2	28.6%	1	33.3%	2.06 ns	0.36
Hypertension	2	28.6%	2	66.7%		
1+3(diabetes &chest allergy)	3	42.9%	0	0.0%		
Duration of treatment each time						
24hrs weakly	28	93.3%	24	80.0%	2.31 ns	0.13
Each.21.days	2	6.7%	6	20.0%		
Do you have smoking history						
No	30	100.0%	30	100.0%	a	-
Do you practice exercise						
Yes	11	36.7%	12	40.0%	3.27 ns	0.06
No	19	63.3%	18	60.0%		
If yes what type of exercise did you practice						
		(n=11)		**(n=18)**		
Walking	8	72.7%	9	50.0%	1.45 ns	0.20
Walking and flexibility.	3	27.3%	9	50.0%		

Table (3): Comparison of the fatigue, stress and sleep quality and marital Adjustment scores on before intervention and two months after-intervention for the study and the control groups.

Variables	Before intervention	Two months after intervention	Paired *t test*	P -value
	X ± SD	X ± SD		
Fatigue score				
Study group	168.87±24.87	75.62 ± 16.62	20.71***	0.00
Control group	168.06 ±13.15	173.20 ± 12.92	1.68 ns	.192
Independent t test	0.17 ns	- 25.33***		
p-value	0.86	0.00		
Stress score				
Study group	20.33±6.32	10.30 ± 5.15	7.11***	.000
Control group	18.31 ± 10.22	19.00±7.82	0.33 ns	0.74
Independent t test	1.05 ns	-5.51***		
p-value	0.29	0.00		
Sleep quality score				
Study group	20.20 ±2.47	7.50±0.86	32.32***	.000
Control group	19.90 ± 4.57	17.70 ± 4.13	1.35 ns	0.26
Independent t test	0.31 ns	-13.25***		
p-value	0.75	0.00		
Marital adjustment score				
Study group	49.80±4.37	90.63 ± 11.69	19.91**	0.00
Control group	46.933±6.34	47.27 ± 6.68	.343 ns	.734
Independent t test	1.66 ns	17.639***		
p-value	0.10	0.00		

Table (4): a Pearson correlation between overall scores for fatigue, stress, and sleep quality among the study and control groups

Variables	fatigue total score			
	Study group		Control group	
	R	p. value	R	p. value
Total score of Sleep quality	0.92***	.000	0.19 ns	0.15
Total score of stress	0.55***	.000	0.06 ns	0.64

Table (5): a Pearson association between the overall stress score and the overall sleep quality score among the study and control groups.

Variables	Total score of Stress			
	Study group		Control group	
	R	p. value	R	p. value
The Sleep quality total score	0.62***	.000	0.05 ns	0.71

Table (6): Pearson correlation between marital adjustment and the overall scores for fatigue, stress, and sleep quality among studied subjects.

Variables	Marital adjustment			
	Study group		Control group	
	R	p. value	R	p. value
Total score of fatigue	-0.83***	0.00	0.18 ns	0.17
Total score of Sleep quality	-0.88***	0.00	0.21 ns	0.11
Total score of stress	-0.58***	0.00	0.09 ns	0.46

Table (7): Pearson correlation between age, the total stress score and the total marital adjustment score among the study and control groups.

Variables	Age			
	Study group		Control group	
	R	p. value	R	p. value
Total score of stress	0.86***	0.00	0.15 ns	0.23
Total score of marital adjustment	0.92***	0.00	0.02 ns	0.86

Discussion

Significant physical and psychological symptoms accompanied breast cancer during and after initial treatment. Psychological counseling People with both chronic pain and emotional distress get less of both types of symptoms when receiving acceptance and commitment therapy (ACT) **[39].** ACT significantly improves the levels of sadness, anxiety, quality of life, exhaustion, pain, and physical health in this population **[40].** Instead of questioning or correcting uncomfortable thoughts or feelings related to hard life conditions like cancer, ACT focuses on creating "a life worth living" by giving meaning and purpose through engagement in activities congruent with patients' basic beliefs **[41].**

According to a recent study, housewives made up the majority of the study group and that nearly half had a secondary education. In addition, each member of the study group and control group was a citizen in a rural area. This can be because, in contrary to urban areas, most women in rural areas have limited employment possibilities and marry young before completing their schooling. The current result also showed that there was no statistically significant difference between the study and control groups' demographics with a p value of 0.05.This was consistent with the findings of **[31]** found no differences between breast cancer

patients in the intervention group and those in the control group in terms of mean age, length of marriage, or number of children. The occupation and educational level were also evaluated using the chi-square test, and no significant differences were discovered between the two groups for these factor either. According to the recent study, that less than three-quarters of the study group and the majority of the control group had a previous surgical history and more than a quarter of those with a previous surgical history in both the study and control groups had mastectomy before. This may be because one treatment option for those with early-stage breast cancer is a mastectomy. Most breast cancer patients have the option of having radiation therapy after breast-sparing surgery.

Additionally, the current research found that, with $p>0.05$, there was no statistically significant difference in the medical histories of the two groups. This was in accordance with **[42]** which showed that breast cancer management had evolved into a multidisciplinary, evidence-based surgical specialty with a focus on conservative surgery. According to a number of significant trials, lumpectomy followed by radiation is the standard of care for many patients.

Furthermore, the current study found that just over 75% of the study group's participants had no history of chronic illness., whereas less than one-fourth had (as diabetes mellitus, hypertension). This was supported by the study results from **[43]** revealed that more than 10% of women had chronic diseases prior to being asked for screening. In addition, they found that among women without chronic conditions, breast cancer mortality fell by 28% (95% CI, 20% to 35%) after invitation to screening. Also **[44]** concluded that having numerous chronic illnesses makes it challenging to complete screening for mammography in accordance with recommendations, emphasizing the value of preventative screening for people who are managing chronic illnesses. Moreover, hypertension has been linked to a higher risk of acquiring a number of cancers as well as a higher mortality rate from cancer **[45].**

The current study additionally showed that the majority of the study and control groups received treatment for a total of 24 hours per week. Walking is the preferred form of exercise for more than one third of both the study and control groups (36.7% and 40.0%, respectively), and neither group had a history of smoking. This may be because walking is the simplest form of exercise and smoking is not a common tradition for women in our community, in rural areas, in particular. It was consistent with **[46];** found that women who smoked cigarettes regularly experienced a markedly greater incidence of breast cancer than those who did not smoke cigarettes regularly. Additionally, according to **[47],** Physical activity (PA) reduces the risk, recurrence, and mortality from breast cancer, according to strong evidence.

The current study showed that after two months of intervention, The total mean score for fatigue, stress, sleep quality, and marital adjustment was significantly different ($p = 0.00$) between the study and control groups compared to before the intervention. This could be as a result of the intervention's positive benefits, which help the patient accept difficult ideas, emotions, and sensations by helping them acknowledge unpleasant experiences and accept painful experiences and emotions without attempting to change or deny them. It was coincides with **[40]** who discovered that ACT markedly decreased the psychological distress of cancer patients. Additionally, **[48]** revealed that participants in the ACT

displayed moderate reductions in fatigue and sleep disturbance.

According to the current research, there was a highly statistically significant positive correlation between the study group's levels of fatigue, stress, and sleep difficulties and the control group's levels of each (p=.000). This indicates that as fatigue levels rise, so do stress levels and sleep difficulties. This could be as a result of research showing that immune system suppression is caused by stress, anxiety, and depression. According to **[49],** there is compelling evidence that inflammation influences the development of cancer, contributes to cancer-related fatigue, and can influence how the body reacts inflammatorily to stress and depression. This was in line with **[50]** finding that the level of weariness experienced by breast cancer patients undergoing radiotherapy was directly influenced by symptom evaluation, anxiety and depressive symptoms, disorientation, and perceived stress. **Also, [51]** found a strong correlation between fatigue and sleep quality using the Spearman correlation coefficient. Furthermore, **[52];** concluded that, unlike nocturnal sleep, fatigue was substantially linked with both subjective perceptions of inadequate sleep and objective measures of daytime sleepiness.

In the present study, It was found that there was a highly statistically significant positive link between stress levels and poor sleep when comparing the study group to the control group (p=.000). This shows that sleep issues also grow in correlation with stress levels. This might be the case because felt loneliness and stress have a poor effect on sleep quality. This result was consistent with **[53],** who found a positive correlation between the severity of sleep problems and felt stress (P 0.01).Also, a significant correlation between stress levels and sleep quality (p=0.001) was found by **[54]** Furthermore, multiple logistic regression analysis by **[55]** revealed that patients with sleep disorders were much more likely to experience psychological distress, severe pain, and concern than patients with no sleep issues. Additionally, **[53]**; found that female breast cancer patients frequently experience sleep disturbances. Previous studies have supported the associations between perceived stress, loneliness, and sleep quality as well as between resilience and symptoms among cancer patients**. According to [56],** perceived stress and loneliness may be indicators of sleep problems.

The current study found that, as compared to the control group, there was a highly statistically significant negative correlation between the study group's marital adjustment and fatigue, sleep quality (high scores imply poor sleep quality), and stress. It suggests that the marital adjustment will be decreased when there is a negative emotional state; poor sleep quality and increasing fatigue. This result was supported by **[57];** concluded that women with breast cancer have been found to suffer lower levels of sexual satisfaction following their diagnosis, which is related to fatigue. Also, **[19]** study found that physical issues like fatigue, a lack of power and energy, pain, medical management, and body changes can have an impact on sexual wellbeing. Additionally, the research indicates that women with breast cancer who have surgical treatment experience sexual dysfunction as a result of the stress and tiredness they feel in the days and weeks following surgery. Chemotherapy-related fatigue is believed to affect a woman's perception of her sexual attractiveness **[58].**

Additionally, the current finding revealed that the study group's marital adjustment demonstrated a highly statistically significant negative correlation with poor

sleep quality compared with control group , indicating that poor sleep quality (an increase in the overall sleep quality score) will have a negative effect on marital adjustment; finding was coincides with **[59];**they found that poor marital adjustment was substantially accompanied with depression, anxiety, and poor sleep.

In addition, the current study reveals that, in comparison to the control group, the study group's marital adjustment and stress had a highly statistically significant negative link; this finding suggests that the marital adjustment will be worsened when there is a negative emotional state (increase in stress). This finding was consistent with **[59];** confirmed the presence of a substantial link between marital adjustment and psychological distress of patients with cancer. They also, illustrated that patients with poor marital adjustment had worse sleep problems.

The present study's findings showed that, there was a greatly statistically significant positive correlation between the study group's age and their total scores for stress when compared to the control group. This implies that stress levels increase with age, suggesting that older patients experience greater stress than younger ones. However, **[60]** discovered that younger patients experienced greater levels of stress than older ones. **[61]** also found a correlation between age and reduced stress levels in breast cancer patients above the age of 65.

Furthermore, the recent study found that, there was a strong statistically significant positive association between the age of the study group and their total marital adjustment scores compared to the control group; this indicates that older patients have a higher level of marital adjustment than younger ones, and that women's marital adjustment will improve as they age. This finding was supported by **[62];** found that a woman's marriage age had a substantial impact on her marital adjustment and that older marriage ages were associated with greater marital adjustment.

Conclusion

The study came to the conclusion that patients with breast cancer benefit from nursing interventions based on acceptance commitment treatment in terms of stress levels, marital adjustment, sleep quality, and fatigue.

Recommendation

Acceptance commitment therapy should be the foundation of non-pharmacological cancer treatment for many malignancies.

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Effect of Oral Care and Swallowing Interventions on Post extubation Dysphagia among Children at Pediatric Intensive Care Units

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Abstract

Background, Post extubation dysphagia is a frequently experience problem in critically sick children with recent intubation. Oral care and swallowing intervention are one of the treatment modalities that can help to enhance swallowing function and reduce swallowing problems after extubation. **Aim** was to evaluate the effect of oral care and swallowing interventions on post extubation dysphagia among children at pediatric intensive care units. **Design**, A quasi-experimental design was applied. **Setting**: the study was performed at the Pediatric intensive care units at Menoufia University hospitals. **Sample**, A purposeful sampling of 60 hospitalized pediatrics patients. **Instrument**s four instruments were used. I; Social Characteristics Structured Questionnaire, II; Oral Assessment Guide for Children. III; Bazaz dysphagia scale. IV; Functional Oral Intake Scale. **Result**s: There was a statistically significant improvement in the total mean score of oral status in the study group after 7th and 14th days of intervention than on pre intervention. Also, there was significant improvement in the study group in relation to severity of dysphagia after 14th days of intervention than on pre intervention. Moreover, oral intake level was improved in the study group after 14th days of intervention compared to control group. **Conclusion**; nursing interventions that involves swallowing and oral care reduces post-extubation dysphagia, improves clinical swallowing function, and increases the probability of faster oral intake. **Recommendations**; swallowing education and oral care intervention should be started as early as possible for children who intubated greater than 48 hours

Keywords: Post-extubation, Dysphagia, Swallowing exercise & Oral Care Interventions

Introduction

Pediatric intensive care units introduce holistic care to children with both acute life-threatening disorders and chronic illnesses. The majority of children admitted to pediatric intensive care units require endotracheal intubation and mechanical ventilation to save their lives. (1) Despite the benefits of mechanical ventilation, it is associated with many complications, such as ventilator-associated pneumonia, ventilator-induced lung injury and it requires sedation that is associated with other complications including prolonged duration of mechanical ventilation. (2) In addition, prolonged duration of mechanical ventilation leads to dysphagia post extubation. (3)

Dysphagia is a well-defined phenomenon after extubation of critically ill population and it might last long after hospital discharge. (4,5) It includes any incapability or difficulty to efficiently and properly move food and drinks from the mouth to the esophagus. (6) Algendy & Bahgat (7) mentioned that up to 62% of intensive care unit patients experience dysphagia after extubation. This prevalence rate of dysphagia may potentially be higher in children due to anatomical variations in the size and physical relationship of the oral structures. So, children may be more susceptible to acquiring dysphagia as a result of these differences (8).

Post extubation dysphagia and difficulty of swallowing usually occurs in patients who experiencing long period of intubation more than 48 hours due to laryngeal damage , inactivity of the oropharyngeal muscles, glottis damage, mucosal inflammation that destroys tissue architecture & vocal cord ulcerations following endotracheal intubation.[3,9] Along with the possible inflammatory and traumatic effects of intubation and the endotracheal tube itself on the oropharynx and larynx, there is aversive stimuli such as endotracheal intubation, suctioning, and naso- or orogastric tubes that may develop oral aversions to children affecting their capacity for oral feeding. [10]

Furthermore, because swallowing and feeding are still developing during infancy and early childhood, any stoppage of these processes can have a major negative impact, including maladaptive oral motor functioning.[4] In light of this, after extubation, prolonged dysphagia is linked to an increased risk of pneumonia in hospitals, failure of weaning from mechanical ventilation, a prolonged stay in the pediatric intensive care unit, a higher risk of re-intubation, higher hospital expenses, and higher rates of mortality.[8] Moreover, the prolonged use of artificial ventilation associated with sedation, and bed rest, increase the risk of swallowing musculature dysfunction, which may last for months or years following discharge. [11]

Since Post-extubation dysphagia has the potential of life-threatening effects, early detection of post-extubation dysphagia is crucial to prevent complications. Also, comprehending the therapy methods of post-extubation dysphagia is crucial to reduce problems and raise the standard of care. [7]

So, swallowing intervention is one of the treatment modalities that can help to enhance swallowing function, preserve the capacity to consume food & liquids safely, and reduce swallowing problems that may develop after extubation. [12]

In addition, swallowing and oral care interventions including oral lubrication, perform massage to the upper & lower jaw and oral range of motion exercises for the lips, tongue, jaw, and cheeks would speed up the process of resuming oral intake and enhance saliva flow and would improve oral lubrication and strength in the lips, tongue, jaw, and cheeks. [13] Moreover, it helps to improve the oral sensation as the oral cavity has several somatosensory receptors. Stimulating these sensory receptors in the tongue and other areas of the mouth cavity may improve proprioception and oral sensorimotor regulation during swallowing. [14]

Nurses play a critical role in managing children with swallowing difficulties to help reestablish safe oral intake to normal level as soon as possible, minimize complications and improve quality of life for patients with post extubation dysphagia.[15] Additionally, they can manage patients' mealtimes, instruct patients on safe feeding techniques, and disseminate information on swallowing & oral care intervention, treatment plans and record patient progress which helpful in improving and preventing further injury in individuals who are vulnerable after extubation.[16,17] For this reason, this study aimed to examine effect of oral care and swallowing interventions on post extubation dysphagia among children at pediatric intensive care units.

Significance of the study

The children are more susceptible to dysphagia due to differences in the anatomical size and physical relationship of the oral structures. In addition, pediatric post extubation dysphagia incidence is higher than the published rates of 29% and 57% in previous pediatric research. This suggests that dysphagia in critically unwell children

after mechanical ventilation may be a problem that isn't fully understood. [18]

The majority of children with dysphagia presented with multiple comorbidities and was at high risk for mortality. It has been discovered that children with dysphagia have higher rates of morbidity and mortality. [18] Also, Warnecke et al., [19] mentioned that dysphagia is another sign of a poorer functional outcome and it increases the risk of aspiration pneumonia, malnutrition, and dehydration, all of which can result in serious complications. As a result, effective and efficient management is crucial to preserve the child's life. So, the current study was conducted to develop and use a variety of swallowing and oral care intervention to help children with post extubation dysphagia to improve their ability to swallow, maintain adequate nutritional intake, and maximize airway protection. For this reason, this study was aimed to examine effect of oral care and swallowing interventions on post extubation dysphagia among children in pediatric intensive care unit.

Aim of the study

The aim of the current study is to evaluate the effect of oral care and swallowing interventions on post extubation dysphagia among children at pediatric intensive care units. This aim can be achieved through the following objectives:

1. Improve oral care and maintain adequate nutritional intafke.
2. Evaluate the effect of swallowing exercises on children swallowing function.
3. Decreased severity of dysphagia among children at pediatric intensive care units.

Research Hypotheses

1- Children in the study group who are receiving swallowing and oral care interventions are more likely to experience improvement of oral care compared with control group.

2- Implementation of swallowing exercises program is expected to improve swallowing ability and alleviate swallowing problems of the study group compared with control group.

3- Children with post-extubation dysphagia who are receiving swallowing and oral care interventions are more likely to have increased functional oral intake and have lower severity of dysphagia than control group.

Operational definitions

1. **Oral Care intervention**

Oral hygiene is the process of maintaining a healthy, disease-free mouth. It included flossing and brushing teeth in addition to regularly visiting dentist for dental X-rays, exams and cleanings. [20] In this study, oral care intervention included the researcher used a soft toothbrush and distilled water to brush the participant's oral cavity (teeth/gum, tongue, and palate) and rinse the oral cavity. Then next applied Vaseline to the subjects' lips for moisture.

2. **Swallowing interventions**

Swallowing practices involve exercises of the jaw, lips, tongue, soft palate, pharynx, larynx, and/or respiratory muscles to enhance their function. Some of these interventions could also incorporate sensory stimulation [21]. **In this study**, the researcher softly massaged/ pressed the overlying surface of the parotid, sublingual, and submandibular salivary glands and then oral motor exercise were performed to lips, tongue, jaw, and cheeks

3. **Safe-swallowing education**

It is a brief and simple instruction was given for patients and their family caregivers to minimize the risk for aspiration. Like an examples, sitting up during eat and modifying viscosity and dietary texture etc [14].

Method

Research Design

A quasi-experimental design (Study and Control group) was utilized for this study.

Research Setting

The study was conducted at the Pediatric intensive care units (PICUs) in Emergency hospital affiliated to Menoufia University hospitals. The PICUs were located at fourth floor include one intensive care room with 10 beds.

Research Sampling

A purposive sample of 60 hospitalized children was selected from the above-mentioned setting according to the following inclusion and exclusion criteria:

Inclusion criteria

- Currently undergoing emergency oral endotracheal intubation for at least 48 hours.
- Aged from 6 -18 years old.
- Aware and able to communicate.
- Having no sensory deficit and accepted to participate in the research.

Exclusion criteria

- Those who have a history of neuromuscular disease.
- Preexisting Swallowing problems.
- Agitated children.

The sample size was established statistically by counting the number of children admitted to the pediatric intensive care units at Menoufia University Hospital.

Estimation approach for subjects:

- G power Program
  - Power= 80% Alpha error=5%
  - Medium effect size =0.4
  - The minimum required sample size=52 .

The selected sample was then split into two equal groups, each one consisted of 30 patients (study and control group).

The control group; it included 30 children who had successfully been extubated and maintained on routine hospital care by PICU staff.

The study group comprises of 30 children who were successfully extubated and received regular oral care interventions and swallowing exercises start the day after their successful extubation and extending for 14th days. Additionally, the participants were provided with a brief education on safe swallowing.

Instruments

Four instruments were utilized for data collection in order to achieve the aim of the research, as follows:

Instrument one: - A Children's bio-socio-demographic data: A structured interview questionnaire was developed by the researcher and consisted of two parts to collect the following data:

Part One: Socio-demographic characteristics for children that include child's age, gender, and educational level.

Part Two: Baseline clinical characteristics including admission diagnosis, prior medical history, pre intubation, the child's current weight, and height etc...

Instruments two: - Oral Assessment Guide for Children (OAG). This tool was created by Eilers in [22], refined by Prendergast [23], then supplemented with images, and then utilized in several researches. Voice, ability to swallow, lips, saliva, tongue, mucous membranes, gingiva and teeth are the eight categories it encompassed. Every category is rated on a scale ranging from 1 (without oral problems) to 3 (Severe oral problems). Total score of the oral assessment guide is ranged from 8 (without oral problems) to 24 (with severe oral problems) It has been graded as; excellent oral health (8), moderate oral health (9-16) and poor oral health (17-24).

Instruments Three: Bazaz dysphagia scale: It was developed by Bazaz, et al [24] to evaluate dysphagia symptoms. The degree of the children' dysphagia symptoms is determined by the degree of difficulty to

swallow both liquids and solid foods. Levels of dysphagia include none, mild, moderate, and severe. A numeric rating scale with values between 0 (none) and 3 (severe dysphagia). More severe dysphagia is indicated by a higher Bazaz score. Grades of dysphagia were; No episodes of difficulty swallowing with both liquids or solids =0, No difficulty swallowing liquids and only infrequently difficulty swallowing solids =1, difficulty swallowing only specific foods such as (bread or steak) = 2 and Frequent difficult swallowing with most of foods= 3

Instruments Four: - **Functional Oral Intake Scale (FOIS):** It developed by Chen et, al [25] to provide a numeric score to the level of functional oral intake of liquid and food in patients with dysphagia. It was applied three times; at assessment, 7th day, and 14th days after performing the swallowing exercises. It includes 7 items, the first three items (no oral intake, tube dependent with minimal/inconsistent oral intake, and tube supplements with consistent oral intake); rating scale from (1 to 3 levels tube dependent). The remains fourth items (total oral intake of a single consistency, total oral intake of multiple consistencies requiring special preparation, total oral intake with no special preparation, but must avoid specific foods or liquid items, and total oral intake with no restrictions); are rated on scale from (4 to 7 total oral intake). A higher score equates to better oral intake.

Tools Reliability

The reliability of tools was applied to establish the extent to which categories in the questionnaire were correlated to one another by Cronbachs co-efficiency alpha. The reliability of Oral Assessment Guide for Children (OAG) was (a = 0.87). The reliability of bazaz dysphagia scale was (a = 0.96). The reliability of Functional Oral Intake Scale (FOIS) was (a = 0.94) .

Tools validity

The study content was reviewed and approved by five experts (two pediatric nursing professors, professor in pediatric medicine and two medical surgical nursing professors) to assure the validity of content. The scale content index average (S-CVI/AVE) was used to evaluate the content validity. The lower limit of acceptability for S-CVI/AVE was 0.80. The experts' opinions showed that the items on the scales correlated well with each other.

Pilot study

A pilot study was conducted on randomly selected 6 patients (10% of the sample) to evaluate the applicability and clarity of the tools and to detect any potential difficulties that may be faced during the actual study. Additionally, the time required to answer the tools was also estimated. The instruments appeared to be understandable and clear no modifications were required. So children in the pilot study sample added to the whole study sample.

Ethical Consideration:

- The consent was obtained from the children who agreed to participate in the research and their parents or guardians.
- To gain the children's cooperation, a preparatory interview was conducted to explain the purpose and process of data collection to them. They reassured that the data obtained would be considered confidential and used only for the research. They were kept informed that participation in the study was completely voluntary and they were able to withdraw at any time.
- Anonymity of the personal data was assured through coding all data and put data through closed cabinet.

Data collection

- Prior to data collection, a written permission to carry out the study was obtained from the head of pediatric intensive care unit after submitting an official letter from the Dean of

the Faculty of Nursing at Menofia University explaining the purpose of the study and methods of data collection.

- Ethical approval was obtained from the scientific research and ethical committee of the Faculty of nursing to conduct the study.
- Data collection for this study was conducted for a period of 10 months extending from June 2021to the end of March 2022 during morning and afternoon shifts.
- Each patient in the study and control groups was interviewed by the researchers individually and in total privacy to assure confidentiality of information and its utilization only for the purpose of the research. The researchers introduced themselves to the patients and explained the purpose of the study and then the consent was obtained for participation in the study. To limit transmission of the data from study to control group, the control group was collected first to avoid contamination data and left for routine hospital care.
- **The control group**; after the successful extubation was, they kept on routine care and received standard hospital treatment provided by pediatrics ICU staff.
- **The study group:** They received oral care and swallowing intervention following successful extubation starting the day after extubation and continuing every day for 14^{th} consecutive days. Additionally; the children's who participated in the study and their care giver received a brief education about safe-swallowing technique. Oral care intervention and safe-swallowing education were carried out in three phases.
- **Assessment phase:** Baseline data was collected from children in both study and control group using tool I. During this interview instrument II was gathered from the children and pre assessment of oral cavity condition done for both groups to assess the oral health, it took about 30 minutes. After that both groups were utilized the tool III to assess their severity of dysphagia depending on the response of patients it took about 15 minutes then tool (IV) was used to evaluate oral intake for both groups.

Implementation phase

The researcher began work by establishing a welcoming environment that would make the children feel relaxed and win their cooperation. The researchers conducted individual interviews with each patient. The Swallowing and Oral Care (SOC) intervention was given the day after successful extubation, regardless of intake status, and every day for the following fourteen days. The researcher equipped with tongue holder, cheek retractor, and dental suction tube, during the morning and afternoon shifts, the researcher carried out the SOC intervention, which included tooth brushing, salivary gland massage, oral motor practice, and instruction about safe swallowing.

–**Tooth brushing:** To smother the sticky coated plaque and mechanically stimulate tissues, the researcher washes the child's mouth with distilled water before brushing the child's teeth, tongue, gums, and palate with a soft toothbrush. The mouth is then rinsed. Apply a thin layer of Vaseline to the child's lips three times per day; it should last for around five minutes.

– Illustrated pictures, videos and Printed material were used. Time for break was allowed and helpful suggestions were encouraged.

– Salivary gland massage: In order to "milk" the parotid gland, the submandibular gland, and the sublingual gland, the researcher gently massages the child's cheek area in front of the ears, moves along the chin under the jaw and tongue areas, and gently presses 5–10

times in the submental area with both fingers. This procedure takes about 15 minutes.

Figure (1) [26]

- Oral motor exercise of lips, tongue, jaw, and cheeks
- **Active- range of motion (ROM)**:- Ask the child to pucker the lips, spread them out to both sides of the faces, and move the tongues forward, out of the mouths to the right and left, and then back into the oral cavity . When pronouncing "sh," make sure to open the lips widely, puff up and down the cheeks, and keep the final "sh" as long as you can. Depending on the child's tolerance, each has 3, 5, or 10 repetitions.

Figure (2) [27]

- **Resistive ROM when tolerated**

  Ask the child to open their mouth widest possible while resisting the researcher's pressure on their cheeks, push their lips outward against the force of the tongue depressor, push their tongues to their right and left cheeks while resisting the researcher's pressure on their cheeks, and blow out the party horn. Depending on the child's tolerance, each exercise has 3, 5, or 10repetitions and lasts for around 30 minutes

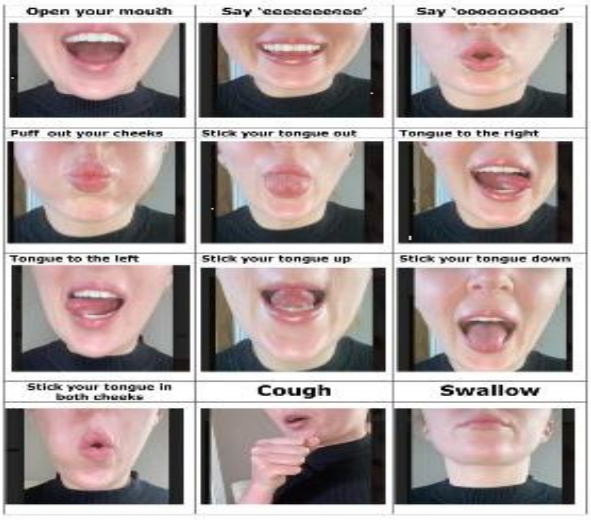

Figure (3) [28]

- **Abrief safe-swallowing education**:Based on the status of child's intake, a brief safe-swallowing education was given to patients and their families. This included explaining the warning symptoms and signs of unsafe swallowing, offering advice on how to eat while sitting up, and changing the texture and viscosity of food to lower the risk of aspiration. Sit upright at 90 degrees when eating and drinking. Eat or drink nothing while sitting or lying down. Eats small bites of food. Take small sips of fluid. Before swallowing eat slowly and chew foods well. Make sure you have swallowed your food or drink before taking more. When you have food in your mouth, avoid speaking.

  –The researchers use a variety of foods to test participants' capacity to swallow, including potatoes, custard, biscuits, and teaspoons of water it last about 10 minutes.

  – Time allotted for each child to practice the steps under close observation until they feel confident in doing so.

  –The researcher improves interaction with the kids by sharing experiences and offering the necessary direction.

–**Evaluation phase**: This phase was implemented for both groups using tool 2, 3 and 4. The first measurement time was after 7th day's post-extubation. The second time was after 14th day's post-extubation. The

average score of the two measurements points was calculated.

Statistical Analysis

Data was coded and transformed into specially designed form to be suitable for computer entry process. Data was entered and analyzed by using SPSS (Statistical Package for Social Science) statistical package version 20. Graphics were done using Excel program. Quantitative data were expressed inform of mean and standard deviation (X ±SD) independent t-test was used for comparison between the two groups. Qualitative data was expressed in form of number and percentage, chi-square test (X^2) was used. For comparison between the quantitative data at different intervals for the same group, ANOVA test was used. Spearmen correlation was also used for explaining relationship between normally distributed quantitative variable. A statistical significant difference was used if P-value ≤ 0.05. A highly statistical significant was considered if P-value ≤ 0.001.

Results

Table 1 shows socio-demographic characteristics of the studied children in the study and control groups. It was obvious from this table that more than one third of the studied children in the study and control groups were in the age group of 12-15years. Regarding children's gender, more than half of studied children in both study and control groups (53.3% & 60.0% respectively) were females. In relation to educational levels, more than one third of children in both study and control group (36.7% & 40.0% respectively) were in the middle school.

Table 2 clarifies distribution of children in the study and control groups according to their previous medical history. This table revealed that, 20.0% of children were admitted with diabetic ketoacidosis (DKA) and pneumonia in the study group. Meanwhile, this was noted that nearly one third of studied children (30.1%) were admitted with pneumonia in the control group. As regards previous intubation, the majority of children in both study and control groups did not have previous intubation (63.3% & 73.3%) respectively.

Figure 4 illustrates the total mean score of child's weight among study and control groups on pre intervention, after 7^{h} and 14th days. It was obvious that the total mean score of child's weight in the study group has been increased after 7th and 14th days of intervention (28.85 ±5.50 & 28.92 ± 5.50 respectively) than on pre intervention (28.58±5.47). Meanwhile, in the control group the mean total score of child's weight has been decreased after 7th and 14th days of intervention (30.00 ±5.62 & 29.77 ± 5.52 respectively) than on pre intervention (30.23 ±5.75).

Table 3 represents mean score of oral status assessment among study and control groups on pre intervention, after 7th and 14th days. This table pointed out that in the study group, the children had healthier oral cavity after 14th days in the means and standard deviations of Voice, Ability to swallow, Lips (1.20 ± 0.48, 1.23 ± 0.43,& 1.07 ± 0.25 respectively) compared to (2.46 ±51, 2.37 ± 0.56, 2.23 ±0.63 respectively) in pre intervention. Regarding salivary flow, this table reflected that the children in the study group had greater salivary flow after 7th and 14th days following swallowing exercise (1.50 ± 0.57 &1.20 ± 0.48 respectively) than the control group (2.40±0.59 & 2.43±0.73 respectively). Above all, there were statistically significant improvement in the mean score of oral status assessment at 5% level of statistical significance in the study group on 7th and 14th days after swallowing exercise than pre intervention.

Table 4 illustrates the total mean scores of oral status assessment guide among study and control groups on pre intervention, after

7th and 14th days. This table pointed out that there was a statistically significant improvement in the total mean score of oral status assessment in the study group after 7th and 14th days of swallowing exercise (11.87 ±2.33 & 9.43 ± 1.69) respectively than on pre intervention, (18.43±2.43). Therefore, there were highly statistical significant differences at 1 % level of statistical significant between pre intervention, after 7th and 14th days of swallowing exercise. Meanwhile, in the control group the mean total score of oral status assessment decreased after 7th and 14th days of intervention (18.70 ±2.44 & 18.20 ±1.32) respectively compared to (19.03 ±1.97) on pre intervention, for this reason, there were no statistical significant differences between pre, after 7th and 14thdays of intervention.

Figure 5 reflects level of oral status assessment among study and control groups on pre intervention, after 7th and 14th days. The results found that the majority of children in both study and control group had severe oral problems on pre intervention (73.30%, 93.30%) respectively. Meanwhile, in the study group oral health status was improved after demonstrate swallowing exercise which indicated that 96.70% of children had slight or no oral problems after14th days of intervention. On the other hand, it was obvious that the majority of children (86.7 %) have poor oral health and the percent were increased from after 7th days to (90.0 %) after 14th days in the control group.

Figure 6 reflects severity of dysphagia among study and control groups on pre intervention, after 7th and 14th days. This table reveals that about three quarters in both study and control group had severe dysphagia in pre intervention (76.70% &73.30%) respectively. Moreover, there was significant improvement of dysphagia level of the studied children in the study group that 20.0% of children having moderate dysphagia after 7th days of intervention. Also, absence of dysphagia was observed in 73.30% of children after 14th days of practicing swallowing exercises. While, the percent of severe dysphagia increased in the control group from 76.70 % after 7th days to 80.00 % after 14th days.

Figure 7 Clarifies functional oral intake among study and control groups on pre intervention, 7th and 14th days after the program. The results illustrated that the majority of children were tube dependent on pre intervention in both study and control groups (76.70% &86.7%) respectively, while significant improvement was observed among the studied children in the study group regarding oral food intake after application of swallowing exercises. Meanwhile, the children were assumed total oral intake on 7th and 14th days in the study group (63.3 %, & 93.3%) respectively, compared to (20.0%, &26.70%) respectively in the control group. There was an improvement in functional oral intake after 7th days of application of swallowing exercises and more significant improvement was observed 14th days later with continuous application for the swallowing exercises.

Table 5 shows correlation between level of oral status assessment and severity of dysphagia & functional oral intake. It was obvious that, there were positive correlation was between severity of dysphagia and level of oral status assessment in the study group. Likewise, it was clear that there was a negative correlation was between functional oral intake and level of oral status assessment with (P <0.001) in the study group, the presence of poor oral health limited the patients' functional level of oral intake. With contrast to that, there were no correlation between severity of dysphagia,

functional oral intake and level of oral status assessment in the control group.

Figure 8 describes correlation between severity of dysphagia and functional oral intake for the study and control groups. It was clear that there was negative correlation between severity of dysphagia and functional oral intake. The severity of dysphagia limited the patients' functional level of oral intake. Meanwhile, there was no correlation between severity of dysphagia and functional oral intake for the control group.

Table (1): Socio-demographic Characteristics of the Studied Children (N=60).

Socio-demographic Characteristics	Study group (N=30)		Control group (N=30)		χ^2	P-value
	No	%	No	%		
Age						
– 6-9 years	7	23.3%	7	23.3%		
– 9-12 years	7	23.3%	10	33.3%	0.85	0.84
– 12-15 years	12	40.0%	10	33.3%		
– 15-18 years	4	13.4%	3	10.1%		
Gender						
– Male	14	46.7%	12	40.0%	0.27	0.80
– Female	16	53.3%	18	60.0%		
Educational level						
– Primary School	9	30.0%	8	26.7%		0.95
– Secondary School	10	33.3%	10	33.3%	10,0	
– Middle School	11	36.7%	12	40.0%		

Table (2): Distribution of Children in the Study and Control Groups According to Their Previous Medical History (N=60)

Medical data	Study group (N=30)		Control group (N=30)		χ^2	P-value
	No	%	No	%		
Admission Diagnosis						
- **DKA**	6	20.0%	4	13.3%		
- **Pneumonia**	6	20.0%	9	30.1%		
- **Respiratory**	5	16.8%	3	10.0%		
Failure	3	10.0%	3	10.0%	4.50 ns	0.81
- **COPD**	1	3.3%	1	3.3%		
- **Atelectasis**	4	13.3%	4	13.3%		
- **Head Injuries**	3	10.0%	2	6.7%		
- **Pulmonary**	1	3.3%	4	13.3%		
Edema	1	3.3%	0	0.0%		
- **Skull Fracture**						
- **Brain Tumor**						
Previous Intubation						
- **NO**	19	63.3%	22	73.3%	0. 69 ns	0.29
- **Yes**	11	36.7%	8	26.7%		

NB: *ns = not significant (p>.05)*

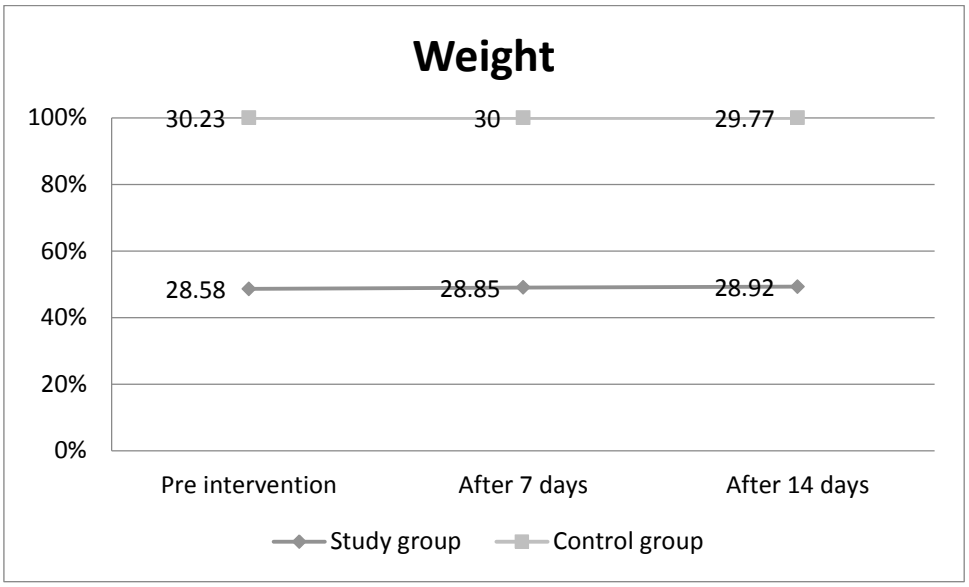

Figure (4) : Total Mean Score of Children's Weight pre interventions, at 7th and 14th days post interventions.

Table (3): Mean Score of Oral Status Assessment among Study and Control Groups on Pre intervention, after 7th and 14th days.

Mean score of OAG	Pre intervention	After 7th days	After 14th days	Anova test	P -value
	X ± SD	X ± SD	X ± SD		
Voice					
Study group	2.46 ±51	1.60 ± 0.56	1.20 ± 0.48	46.63 S	0.00
Control group	2..43 ±0.63	2.20 ±0.55	2.33 ± 0.60	1.16 ns	0.32
Independent t test	0.27. ns	4.17. HS	7.99 HS		
p-value	0.82.	0.00	0.00		
Ability to swallow					
Study group	2.37 ± 0.56	1.67± 0.55	1.23 ± 0.43	37.76 H.S	0.00
Control group	2.40. ±0.62	2.13±0.63	2.37±0.55	1.74 ns	0.18
Independent t test	0.22 ns	3.07 HS	8.83 HS		
p-value	0.83	0.00	0.00		
Lips					
Study group	2.23 ±0.63	1.43 ± 0.63	1.07 ± 0.25	37.76 H.S	0.00
Control group	2.50±0.57	2.25 ±0.72	2.23±0.43	3..30 ns	0.06
Independent t test	1.72 ns	4.66 HS	12.79 HS		
p-value	0.09	0.00	0.00		
Saliva					
Study group	2.17 ± 0.65	1.50 ± 0.57	1.20 ± 0.48	22.45 H.S	0.00
Control group	2.37 ±0.56	2.40±0.59	2.43±0.73	0.07 ns	0.93
Independent t test	1.28 ns	5.43 HS	7.28 HS		
p-value	0.21	0.00	0.00		
Tongue					
Study group	2.23 ± 0.68	1.43 ± 0.57	1.23 ± 0.50	24.28 H.S	0.00
Control group	2.46 ±0.57	2.23 ± 0.50	2.17 ±0.59	2.40	0.09
Independent t test	1.44 ns	5.77 HS	6.58 HS		

p-value	0.16	0.00	0.00		
Mucous membrane					
Study group	2.27 ± 0.69	1.33 ± 0.61	1.20 ± 0.41	30.06 H.S	0.00
Control group	2.33 ± 0.55	2.27 ± 0.64	2.27 ± 0.52	0.14 ns	0.87
Independent t test	0.41 ns	5.80 HS	8.84 HS		
p-value	0.68	0.00	0.00		
Gingiva					
Study group	2.27 ± 0.64	1.37 ±0 0.61	1.13 ± 0.35	35.54 H.S	0.00
Control group	2.27± 0.52	2.17 ±0.59	2.20 ± 0.48	0.72 ns	0.76
Independent t test	0.00. ns	5.13 HS	9.82 HS		
p-value	1.00.	0.00	0.00		
Teeth					
Study group	2.43 ±0.50	1.53 ± 0.73	1.17 ± 0.46	38.23 H.S	0.00
Control group	2.27 ±0.52	2.07±0.45	2.17 ± 0.46	1.31 ns	0.27
Independent t test	1.26 ns	3.41 HS	8.40 HS		
p-value	0.21	0.00	0.00		

NB: *ns = not significant (p>.05), S= significant (p≤.05), HS = highly significant (p≤.01).*

Table (4): Total Mean Scores of Oral Status Assessment Guide among Study and Control groups on Pre intervention, after 7th and 14th days.

Total Mean Score of OAG	Pre intervention	After 7th days	After 14th days	Anova test	P -value
	X ± SD	X ± SD	X ± SD		
Study group	18.43±2.43	11.87 ±2.33	9.43 ± 1.69	137.24 HS	0.00
Control group	19.03 ±1.97	18.70 ±2.44	18.20 ±1.32	1.37 ns	0.26
Independent t test	-1.14 ns	-11.10 HS	-22.32 HS		
p-value	0.26	0.00	0.00		

NB: *ns = not significant (p>.05) HS= highly significant (p≤.01)*

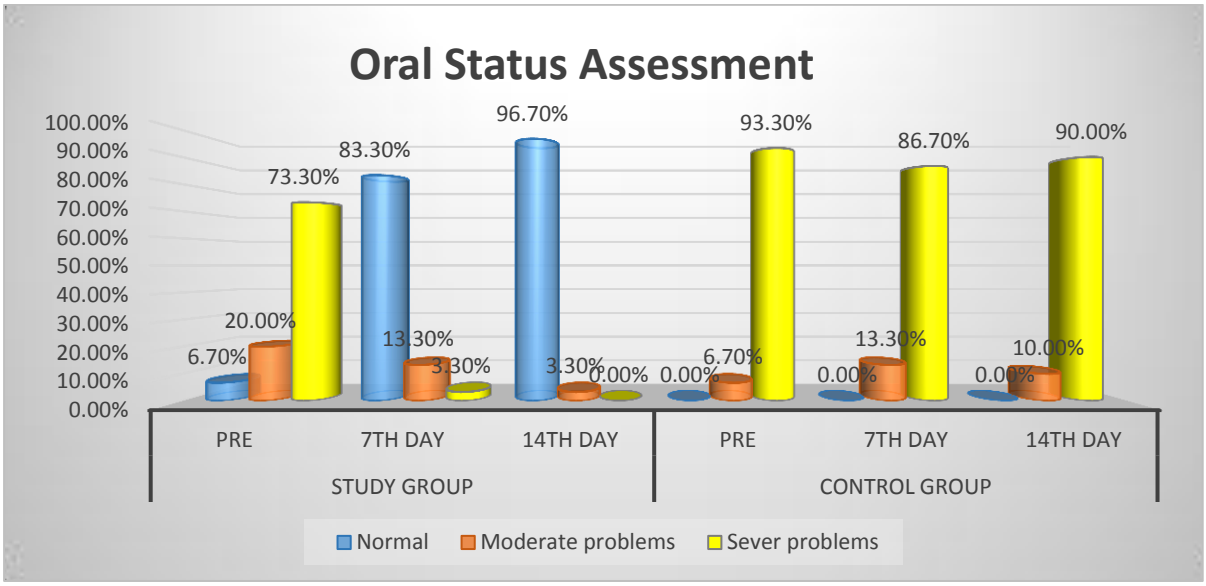

Figure (5): Level of Oral Status Assessment among Study and Control groups on Pre Intervention, after 7th and 14th days.

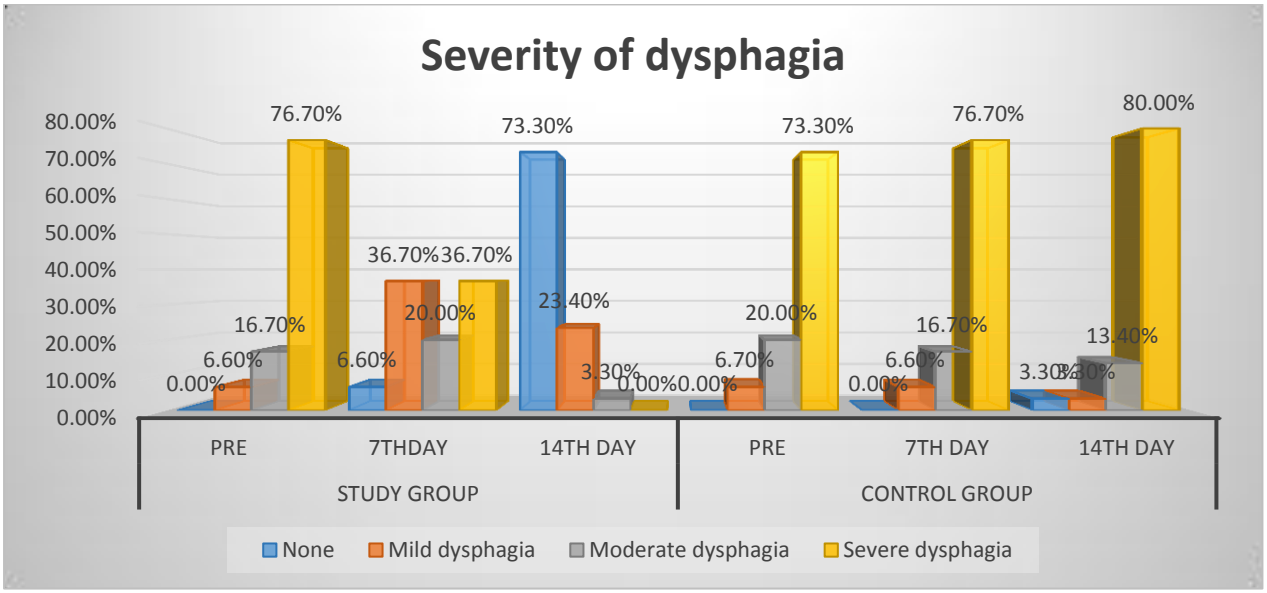

Figure (6) Severity of Dysphagia among Study and Control groups on Pre Intervention, after 7th and 14th days.

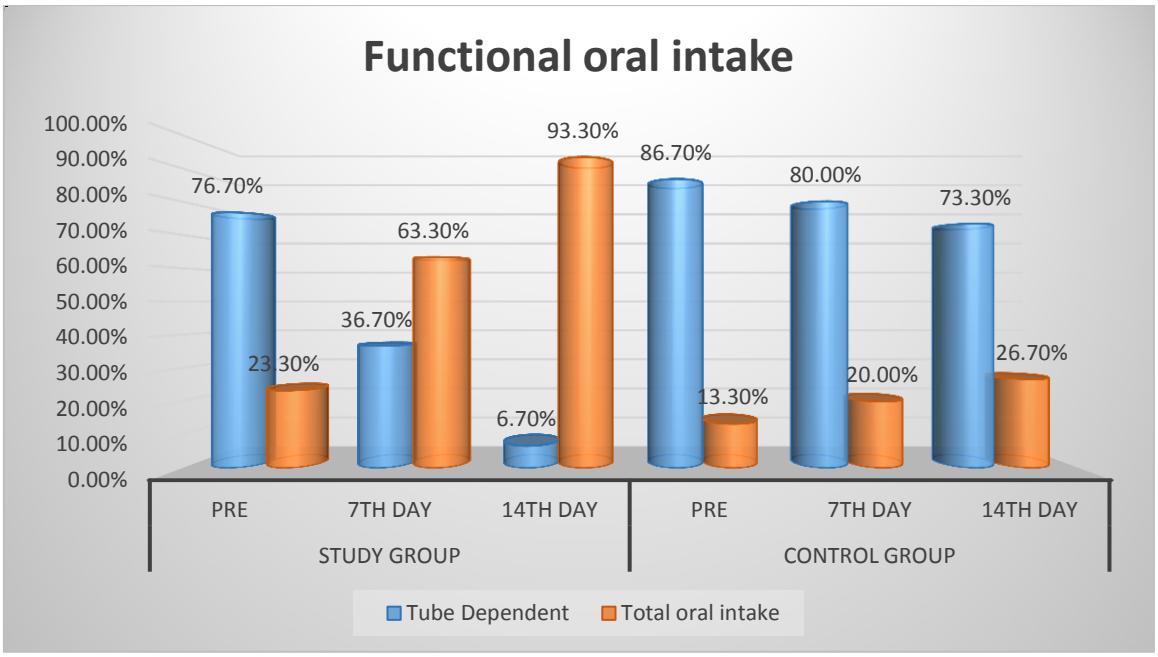

Figure (7): Functional Oral Intake among Study and Control groups on Pre Intervention, after 7th and 14th days of the Program.

Table (5): Correlation between Level of Oral Status Assessment and Severity of Dysphagia &Functional Oral Intake for the Study and Control Groups.

Variables	level of oral Status Assessment			
	Study group		Control group	
	R	p. value	R	p. value
Severity of dysphagia	0.59**	.000	-0.08 ns	.42
Functional oral intake (FOIS)	-0.37**	0.00	-0.02 ns	0.86

NB: *ns = not significant (p>.05)* ***= highly significant (p≤.01)*

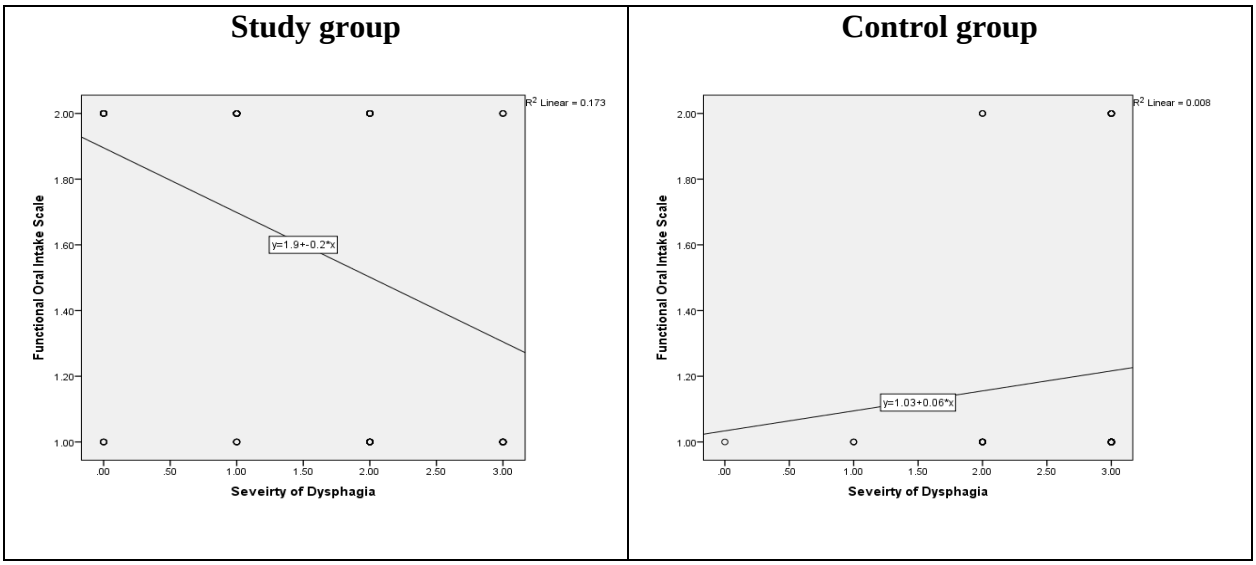

Figure (8) Spearman correlation between severity of dysphagia and functional oral intake for the study and control groups.

Discussion

Post-Extubation Dysphagia is frequently evident in critically ill patients requiring endotracheal intubation for mechanical ventilation particularly in patients who have had protracted endotracheal intubation (greater than 48 hours). According to recent research, postoperative patients who had extended intubation had a higher incidence of post-extubation dysphagia than those who needed intubation for a shorter period of time. [13] Post-extubation dysphagia is associated with poor outcomes for patients including delayed oral intake, low quality of life, aspiration pneumonia and prolonged hospital stays. Moreover, public health care systems have a heavy financial strain. [29]

In order to overcome the problem of post-extubation dysphagia, various techniques for swallowing training are created. Exercises for strengthening, stimulation of the biofeedback system, temperature control, and taste stimulation are some of these techniques. [30] Moreover, Swallowing and oral care intervention combined oral lubrication and oral sensation will enhance chewing, swallowing, and tactile perception. [31] In addition, because of the large number of somatosensory receptors in the oral cavity, oral feeling is also significant. It may be possible to enhance oral sensor-motor control when swallowing by stimulating these sensory receptors in the tongue. [32]

Concerning weight of studied children, the finding of the current study showed that there were no statistical significant differences at 5 % level of statistical significant in both study and control group between pre, 7th and 14th days of intervention. This result was in the same line with previous study [33] , who stated that no significant weight changes were observed among the studied patient on pre and post intervention. From the researchers' point of view this may be due to the short period of the intervention. In the contrary previous study [34] that mentioned that swallowing dysfunction had a significant relation with the long-term loss of weight.

Regarding oral assessment guide, the present study reflected that the children in the study group had good voice, ability to swallow, lips and greater salivary flow over 7th and 14th days of intervention following extubation than the control group. This result pointed to that there was a statistically significant improvement in the total mean score of oral assessment guide in the study group after 7th and 14th day of swallowing exercise. This result was consistent with previous study [35] that indicated that there was marked improvement in functional swallowing with no dysphagia-related problems during or after program. Also, other previous study [31] concluded that the salivary flow markedly increased for up to five minutes after the intervention. In addition, another previous study [36] that discovered, there was a statistically significant improvement of oral motor structures and reflexes after receiving swallowing and an oral care intervention compared to pre intervention.

Similar results [14] have been reported that oral intervention post extubation enhanced salivary flow after prolonged endotracheal intubation greater than 48 hours. Also, another study [9] stated that there was a considerable improvement of swallowing in the majority of patients after five consecutive days of swallowing exercises. In addition, previous research [29] clarified that there was a statistically significant improvement in the total mean score of oral assessment guide that indicate slight to moderate oral problems post intervention compared to pre intervention. Moreover, another previous research [7] showed that there was a dramatic improvement in oral assessment score in the study group on post intervention.

In relation to Bazaz dysphagia scale score regarding severity of dysphagia, the current finding revealed that, more than half of the studied children in the study group were having moderate dysphagia after 7th days and absence of dysphagia after 14th days of practicing swallowing exercises. This finding was congruent with previous study [36] that indicated there was absence of dysphagia after the application of the swallowing exercises for patients with post extubation dysphagia. Also, previous study, [33] indicated that the majority of patients had absence of dysphagia after swallowing exercises. This may be related to the swallowing exercises that is associated with a positive effect on swallowing physiology which leads to improvement in swallowing initiation, laryngeal elevation, post swallowing residue and thus reduce the severity of dysphagia over the course of intervention.

Concerning functional oral intake, there was an improvement in functional oral intake after 7th days of application of swallowing exercises & education and more significant improvement were observed 14th days later with continuous application of the swallowing exercises& education. From the researchers' point of view this could be due to early starting of swallowing exercises immediately after diagnosis led to significant improvement in level of dysphagia that enhance patients` functional oral intake and

reduce complications of dysphagia as aspiration. This result was in the same line with previous research [37], that discovered a statistically significant increase in oral intake and a high probability of patients restarting complete oral consumption after intervention than before intervention. It has been demonstrated that performing daily 15-minute swallowing exercises increased patients' odds of resuming oral intake because they kept their oral cavities lubricated and clean and allowed their lips, tongue, and jaw to move easily.

The present study's findings are also consistent with previous study [36] that reported that there was improvement in the functional oral intake after the application of the swallowing exercises for patients with post extubation dysphagia. Also, in another previous study [29] mentioned that there was a statistically significant improvement of the functional oral intake post intervention compared to pre intervention. In addition, in previous study [33] the majority of patients had improvement in the functional oral intake after swallowing exercises.

On the other hand, in previous study [29] mentioned that examined how lingual exercise affected swallowing in elderly persons over the age of 75 and discovered that there was no improvement in oral intake over the course of the next 14 days. This could be explained by the subjects' advanced age, which is a factor associated with alterations in swallowing function.

Regarding correlation between level of oral assessment and severity of dysphagia &functional oral intake for the study and control groups. The findings revealed that there were highly statistical significant relation was found between functional oral intake and level of oral assessment. This could be due to the presence of good oral health status that improve the patients' functional level of oral intake. This finding was congruent with previous study [33] that reported that the severity of dysphagia decreased and functional level of oral intake increased with improving oral health status.

Concerning correlation between severity of dysphagia and functional oral intake for the study group, the present study revealed that there was negative correlation between severity of dysphagia and functional oral intake. This could be due to decrease the difficulty of swallowing after the intervention which consequently improve the total oral intake. This finding was consistent with previous study [33] that showed that there was a significant relation between functional oral intake score and Bazaz dysphagia scale score (dysphagia severity),

Conclusion

Based on the findings of the present study, it was concluded that nursing intervention that involves swallowing and oral care for a period of 30 minutes per day for 14th days reduces post-extubation dysphagia, improves clinical swallowing function, and increases the probability of faster oral intake after extubation.

Recommendations

Based on the findings of the present study, the following recommendations can be suggested:

1. Swallowing education and oral care interventions should be integrated as a part of routine daily care for critically ill child post extubation.
2. Swallowing education and oral care interventions should be started as early as possible for patients who intubated greater than 48 hours.
3. Critical care nurses should receive ongoing training in oral care protocols for child who is at high risk of developing post-extubation dysphagia as part of normal clinical procedures.
4. The length of the study period should be increased more than two weeks to gain

comprehensive data on the favorable impact of swallowing and post-extubation dysphagia oral care intervention.

5. A systematic routine screening should be performed in all patients at risk for post-extubation dysphagia.
6. Conducting further similar studies in different intensive care units in Egypt with larger number of participants to widely assess the effect of oral care intervention and safe-swallowing education on dysphagia among ICU patients post endotracheal extubation

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The Relation between Prepregnancy Body Mass Index and Abnormal Placental Morphology and Birth Weight

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Abstract

Background: Birth is enormously important, and the care that a woman receives during labor affects women`s health physically and emotionally in the short and long-term periods. The placenta plays a pivotal role during pregnancy by being intimately connected to the mother and fetus**. Aim** of the current study is to examine the relation between prepregnancy body mass index and abnormal placental morphology and birth weight. **Methods**: A descriptive correlational research design was used for this study to achieve the study aim. **Sample**: A purposive of 150 laboring women were enrolled in the study. **Setting**: the study was conducted at the delivery unit at Al kaser Alini University Hospital, Cairo University, Egypt.**Tools**: Three tools were used to collect the data; 1) Structured Interviewing Questionnaire, 2) Maternal Assessment Tool, And 3) Neonatal Assessment Tool. **Results**: The mean age of the study sample was 29.77 ± 5.47 years old. The mean prepregnancy body mass index (BMI) was 26.22 ±3.20 and there is a positively correlated with it and newborn birth weight (r=0.18; p=0.02), placental weight (r=0.16; p =0.04), and placental thickness (r=0.21; p=0.03). **Conclusions**: The study findings concluded that prepregnancy body mass index parameters which are known to influence birth weight and determinants of abnormal placental morphology. **Recommendations**: Authoritive personnel should encourage protocols and develop guides/checklists for placental examination in health care facilities.

Keywords: Placental Morphology , Laboring Women, Birth Weight, prepregnancy BMI

Introduction

The placenta plays an important role in mediating fetal growth and viability, and it is involved in hormonal and metabolic alterations during pregnancy [1]. Changes in maternal metabolism influence placental function and morphology, based on the type and timing of the effect [2]. The well-being of the newborn is affected by a number of factors [3], including maternal characteristics, the placenta, umbilical cord morphology, and functions [4].

It is a fantastic organ regularly neglected due to its transient existence; it performs functions as separate organs, including the lungs, liver, gut, kidneys, and endocrine glands [5]. It is the interface between mother and fetus and influences newborn morbidity and mortality [6]. Careful examination of the placenta can shed light on the in-utero environment of the fetus [7&8] and can help to explain an abnormal neonatal outcome and might have consequences for treatment. It might identify a risk of recurrence, resulting in preventive measures during subsequent pregnancies. However, there is evidence that the quality of the examination of the placenta is very variable [9&10].

The global epidemic of overweight and obesity is rapidly becoming a major public health problem in many diverse parts of the world, with recent statistics revealing that 38

of 136 countries have more than 50% of their female population classified as being above the recommended Body Mass Index (>25 Kg/m2) [11]. It is well established that maternal obesity like gestional diabetes influences both the placenta and the fetus, often resulting in fetal overgrowth and a greater frequency of large for gestational age (LGA) infants). Maternal obesity is associated with a higher probability of delivering a large for gestational age (LGA, birth weight >90th centile after adjustment for gender and gestational age) or macrosomic (birth weight >4000 g) infant [12&13]. Children born to obese mothers are also more likely to develop childhood obesity and metabolic disease [14].

In pregnancy, women with a high Body Mass Index (BMI) have an increased risk of developing gestational diabetes and often give birth to offspring with high birth weight [15]. High birth weight has been linked to both short-term and long-term adverse outcomes lead to major placental abnormalities and offspring shoulder dystocia at delivery even in non-diabetic mothers [16], and hypertension and obesity in adulthood [17]. High maternal BMI has also been associated with a large placenta and a large placenta relative to birth weight [18]. This factor increase the risk of short- and long-term adverse outcomes for the child and mother [19&20]. Therefore, the aim of this study is to examine the relation between the prepregnancy Body Mass Index and abnormal placental morphology and birth weight.

Significance of the Study

Obesity has been cited as a health problem in women of childbearing age. A recent report found that 25% of the adult population was obese. The obesity rate has rapidly increased in the general population and in women of childbearing age [21]. The increasing incidence of obesity among women worldwide has become one of the most significant public health concerns. High maternal body mass index (BMI) is related to changes in placental morphology and adverse maternal pregnancy outcomes such as pre-eclampsia, eclampsia, pre- and post-term delivery, induction of labor, macrosomia, cesarean section, and postpartum hemorrhage [22].

Developing countries like Egypt and India, also face problems of malnutrition and complications related to being underweight like anemia, premature rupture of membranes, low APGAR scores, low birth weight babies, preterm delivery, and increased perinatal mortality [23]. Antenatal ultrasound examination and placental examination after delivery which evaluates the placental parameters and morphology such as the weight, diameters, shape, thickness, and cord insertion has been proven to be of predictive value in the pregnancy outcomes such as fetal weight and adverse effects [24]. These emphasize the need for the present study. There is a need for increased evaluation of placental morphology in relation to the body mass index and neonatal birth weight. The findings of the current study will highlight the priority areas to be addressed in parturient women to raise awareness about the importance to be in ideal body weight before pregnancy to improve well-being. Moreover, the results of this study will serve as input for program designers and policymakers to design evidence-based interventions related to the importance of examining palcenta after delivery. Also, this study will be of paramount importance for future researchers interested in related topics.

Operational Definition

Placental morphology: In the current study placental morphology means placental characteristics as; placental weight, diameters, thickness, number of cotyledons, cord length and diameters, insertion of the cord, and cord around the neck.

Aim

The aim of the study is to examine the relation between prepregnancy Body Mass Index and abnormal placental morphology and birth weight.

Research questions

1-Is there a relation between prepregnancy (BMI) and abnormal placental morphology?

2-Is there a relation between prepregnancy (BMI) and neonatal birth weight?

Subjects and Methods

Research Design:

A descriptive correlational research design was used for this study to achieve the study's aim. This design will be suitable for the study because it allows the description of variables and identifies the relationship that occurs naturally between and among them.

Sample

A purposive sample of 150 laboring women. The sample was recruited according to the following **inclusion criteria:** women with singleton fetuses full term, primiparous and multiparous women (not more than 3 times), and free from any chronic diseases and prepregnancy weight recored in the sheet or women know her weight before pregnancy. **Exclution criteria:** Women who were diagnosed with fetal congenital anomaly, on anticoagulant therapy, current pregnancy complications, and any serious bleeding episode in the current pregnancy were excluded from the current study.

Sample size

One hundred Fifty laboring women (150) were selected according to the following statistical formula: n = Z2p (1-p), where Z is the level of confidence according to the standard normal distribution (for a level of confidence of 95%, Z = 1.96); p is the estimated proportion of the population that presents the characteristic (when unknown, we used p = 0.5), (P is considered 0.05).

Setting

The study was conducted at the delivery unit at Al kaser Alini University Hospital, which is a Cairo University-affiliated hospital that provides care for women in labor and abortions. The department consists of reception of labor unit which contain two rooms; one for history taking and the other for examination with four beds and ultrasonography , delivery suites which contains two parts; one for first stage of labor which includes 9 beds and the other part for delivery which includes 3 delivery rooms with heater for newborn and delivery bed in each one. This unit conducts approximately 14108 deliveries annually according to (***Kasr Al-Ainy university hospital Statistics, 2021***).

Tools for Data Collection

Three tools were used for data collection after an extensive literature review.

Tool (1). Structured interview sheet

This tool was designed by the researcher after reviewing of literature and included data relate to socio-demographic characteristics as; maternal age, level of education, occupation, and residence as well obstetric history as; parity, number of abortions, mode of previous delivery, pervious pregnancy and delivery complications; data related to current pregnancy as the first day of the last menstrual period (LMP) to calculate expected date of delivery (EDD) and determine the gestational age.

Tool (2). Maternal Assessment Tool

This tool was designed by the researcher after revirewing of literature and consisted of two parts; **The first part**: Encompassed of baseline of body weight before pregnancy from the medical record, and height, to calculate body mass index (BMI) and determine prepregnancy Body Mass Index (BMI) according to the international scoring classification by ***WHO (2017)***. BMI was calculated by utilizing the formula "weight in Kg, divided by hight squared in meters [32].

$$\mathbf{BMI} = \frac{\mathbf{mass_{kg}}}{\mathbf{height_m}^2}$$

The following diagnosis BMI of < 18.5kg/m² = underweight; BMI of 18.5 < 24.9 kg/m² = appropriate weight; BMI of > 25-29.9 kg/m²

Category	WPRO	New (Ife) criteria*	WHO
Underweight	<18.5	<17.8	<18.5
Normal	18.5-22.9	17.8-24.7	18.5-24.9
Overweight	23.0-24.9	24.8-27.8	25.0-29.9
Obesity	≥25.0	≥27.9	≥30.0

*New (Ife) criteria for both sexes. WHO: World Health Organization, WPRO: Regional Office for Western Pacific of WHO, BMI: Body mass index

= overweight, and BMI of 30 kg/m² = obese) As in the following table [32].

The second Part: Placental Examination Chart. This tool for examination of the placental criteria was developed by the researchers after an extensive literature review. It examines placental characteristics such as weight, diameters, thickness, number of cotyledons, cord length and diameters, insertion of the cord, and if there was a special condition such as a cord around the neck or abnormal shape of the placenta.

Tool (3). Neonatal Assessment Tool: This tool was designed by the researcher after reviewing of literature and consisted of two parts; **The first part**: included data related to neonatal birth weight. This part was adopted by the researchers from (***WHO, 2017***) to document neonatal weight after birth directly according to categories based on gestational age (normal weight at term is 2500–4200g; Low birth weight (LBW) is 2,499 g or less, Subcategories included very low birth weight (VLBW), which is less than 1500 g, and extremely low birth weight (ELBW), which is less than 1000 g, and high birth weight is more than 5000g. **The second part**: included data related Neonatal Gestational Age Assessment Chart (Tenth and ninetieth percentile). This part was adopted by the researchers from (***WHO, 2017***), and it included an assessment of neonatal Anthropometric measurements such as weight, length, head & chest circumference and plotted the results on the chart and compare them against the curve at the tenth and ninetieth percentile on the growth chart to determine if the neonate was appropriate for gestational age (AGA), small for gestational age (SGA) or large for gestational age (LGA). The research investigator plotted the neonate's weight, length, and head circumference by gestational age on the chart, to determine if the growth was below the 10th percentile, the neonate was small for gestational age (SGA), if the growth was above the 90th percentile, the neonate was large for gestational age (LGA) called macrosomic baby, if the growth was in between 10th and 90th percentiles, the neonate was appropriate for gestational age (AGA).

Tool validity and Reliability

Tools were submitted to 5 experts in the field of maternity nursing to test content validity, clarity of sentences, and appropriateness of content; modifications were carried out according to the expert's judgment. Reliability analysis was done to investigate the consistency of internal instruments, used in the study; Cronbach's alpha coefficients were calculated for examining the measurement reliability with multipoint items (r=0.92).

Pilot Study

It was conducted on 10% of the study sample, were selected randomly (15 women). It aimed to evaluate the simplicity and clarity of the tools. It also helped in the estimation of the time needed to fill in the forms. According to the results of the pilot study, simple modifications were done as rephrasing questions or canceling some questions. The needed modifications were done, and the participants in the pilot study were excluded from the final study sample.

Ethical Considerations.

The research approval was obtained from the Research and Ethics committee at the Faculty of Nursing Cairo University (**Code of Ethics number 2021/55**). At the initial interview, each potential participant was informed about the purpose, procedure and benefits of the study. They were informed that participation in the study is completely voluntary and they have the right to withdraw from the study at any time without any penalty, moreover, the entire participant was informed that the study posed no risk or hazards to their health. Confidentiality also will be assured.

Procedure:

Official permission was obtained from the hospital as well as written informed consent from women who met the inclusion criteria.

The study was carried out through: recruitment, interviewing, and assessment.

A) Collecting the data (recruitment) and Interviewing: The researcher introduce herself to each woman and explain to them the purpose and the scope of the study to gain their cooperation then was proceed with the data collection with those who fit the inclusion criteria and accept to participate in the current study also asked to sign the consent form. Each woman in the groups was interviewed individually in a quiet environment to collect data (the researcher asked questions and recorded the answer. The interview took around 15 minutes for each woman in the forth stage of labor. Data related to socio-demographics as age, level of education, occupation, monthly income, and residence; and obstetric history as parity, number of abortions, mode of previous delivery, previous pregnancy, and delivery complications; current pregnancy as the first day of last menstrual period (LMP) to calculate Expected Date of Delivery (EDD) and to determine gestational age (GA). Determine prepregnancy BMI from the medical record.

B) Assessment: after delivery, the researchers assesses placenta weighing in the third stage of labor using the same scale to assure accuracy among study samples look of characteristics, and cord characteristics and recorded it in the maternal assessment tool as well as, Length, weight, and head circumferences for the newborn were assessed by the researcher after delivery in the second stage of labor and plotted on a growth chart to determine if the growth below the 10th percentile, within or above the 90th percentile. The researcher measured neonates, weight when they were quiet, and unclothed, utilizing a baby weight scale where the accuracy was obtained by balancing zero prior weightings. Also, the neonates' length was measured from head to toe when the neonates were in a supine position and their legs were extended was measured. Then, measured head circumference was through measurement tape firmly around the head above the eyebrow ridge. If the growth was below the 10th percentile the neonate was small for gestational age (SGA), if the growth was above the 90th percentile, the neonate was large for gestational age (LGA) called macrocosmic baby, if the growth was in between 10th and 90th percentiles, the neonates were appropriate for gestational age (AGA). The researcher ask the study participant the questions in clear Arabic language and plotted their answer in the designed tool. Also Apgar scale assessment in the 5^{th} minutes had been assessed for the newborn.

Statistical Analysis

Upon the completion of data collection, data will be tabulated and analyzed, relevant statistical analysis will be used to test the obtained data using Statistical Package for Social Science (SPSS) program, version 20. Descriptive and inferential statistics will be carried out: (1) Descriptive statistics: On the basis of the raw data, the mean, and standard deviations will be calculated for each component of the dependent variables for all subjects, in addition to frequencies and percentages distributions. (2) Inferential statistics: (T-test& Chi-square) will be used to examine the differences and similarities between the study groups.

RESULTS

The aim of the current study was to examine the relation between prepregnancy body mass index and abnormal placental morphology and birth weight. The results were presented in three sections which include; 1) Description of the study sample, 2) The relation between prepregnancy BMI and abnormal placental morphology, and 3) The relation between neonatal characteristics and prepregnancy BMI.

1) Description of the study sample

This section included data related to the socio-demographic and clinical characteristics of the study sample and the obstetrical and past medical history of the study sample. The age of the study sample ranged from 18-35 years with a mean of 29.77±5.47 years old. Regarding the level of

education, 39.3 % of the study sample had received primary education, and 81.3% of the selected sample were housewives compared to 18.7% who were working. Seventy -six point seven percent lived in urban areas compared to 23.3% who lived in rural areas, and 47.3% of them had adequate socioeconomic status as presented in **Table** (**1**).

Concerning the prepregnancy BMI, more than half of the study sample (65.3%) were overweight, while 3.3% of them were underweight, 24% were normal, and the remaining of them 7.3% were obese as presented in **figure (1)**.

Regarding current obstetrical profile, 70.7% of the study sample were primiparous with the mean of gestaional age was 38.69 ± 1.40 weeks. Regarding mode of delivery among the study sample nearly half (42.7%) of them delivered through vaginal delivery with episotomy, while 32.7% of them delivered cesearn section as presented in **Table** (**2**).

2) The relation between prepregnancy BMI and placental morphology

Table (3) showed that there were statistically significant differences between placental weight, placental thickness, and diameter, and different categories of BMI (p=<0.05) with increased placental mean weight in overweight and obese categories (525.27 ±77.16 grams and 545.09±89.80 grams) respectively. While, there were no statistically significant differences between the number of cotyledons, cord length, cord diameter and insertion, cord around the neck, and different categories of prepregnancy BMI (p= >0.05).

3) The relation between Neonatal Characteristics and prepregnancy BMI

Half (54.6%) of the 150 neonates were male and 45.3% were female with statistically significant differences between baby gender and different categories of maternal prepregnancy BMI. the majority (86%) had a normal birth weight of 2.5 - 3.9 kg; the mean birth weight was 3102.84 ±700.82. In the overweight category, 17.3% had LGA for their neonates and 60% had SGA in the underweight category. There were statistically significant differences between maternal prepregnancy BMI categories and Apgar score in the fifth minute with a mean score of 8.00 ±0.70 in the underweight group and 8.61±0.94 in the overweight group as presented in Table (4). There was a positive correlation between maternal prepregnancy BMI, neonatal birth weight, and placental weight as shown in **Table (5)**.

Table 1:Distributions of the study sample according to socio- demographic charecterstics (n=150)

Characteristics	Frequency	%
Maternal age		
<20	13	8.7
20-29	51	34
≥30	86	57.3
Mean maternal age (yrs.)	29.77 ± 5.47	
Residence		
Urban	115	76.7
Rural	35	23.3
Level of education		
Can't read & write	4	2.7
Read &Write	39	26
Primary level	59	39.3
Preparatory level	13	8.7
Secondary level	34	22.7

University level	1	0.7
Occupation		
House wife	122	81.3
Working	28	18.7
Socioeconomic status		
Adequate	71	47.3
Inadequate	28	18.7
Adequate & save	51	34

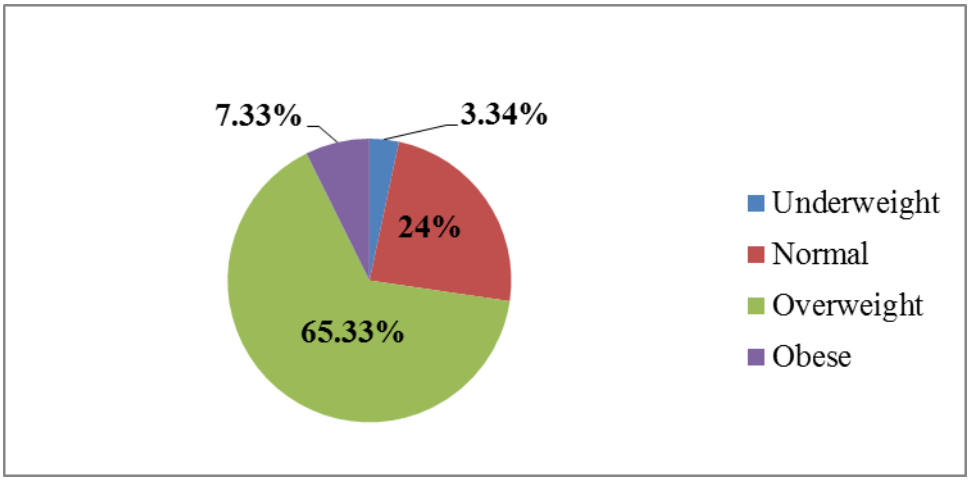

Figure (1) Prepregnancy Body Mass Index Categories Among The Study Sample

Table (2): Distribution of the Study Sample Regarding Current Obstetrical Profile (n=150)

Characteristics	Frequency	%
Parity		
Primipara	106	70.7
Multipara	44	29.3
Gestational age at recruitment/weeks	38.69 ± 1.40	
BMI in Kg/m2 at study recruitment		
Mean ±SD	26.22 ±3.20	
Mode of delivery among the study sample		
Normal delivery	37	24.7
Vaginal with episiotomy	64	42.7
Cesarean Section	49	32.7

Table 3. The Relation between Prepregnancy BMI And Abnormal Placental Morphology (n=150)

Placental Morphology	Underweight (n=5)	Normal (n=36)	Overweight (n=98)	Obese (n=11)	Test
Weight of the placenta(g)	397.80 ±2.58	515.38± 83.15	525.27 ±77.16	545.09±89.80	P=0.00*
Number of cotyledons **Less 15** **15-20** **More than 25**	0(0%) 5(100%) 0(0%)	1(2.8%) 35(97.2%) 0(0%)	1(1%) 94(95.9%) 3(3.1%)	0(0%) 11(100%) 0(0%)	P=0.87
Placental thickness **< 2 (thin)** **2-4(normal)** **> 4.1(thick)**	5(100%) 0(0%) 0(0%)	6(16.7%) 30(83.3%) 0(0%)	52(53.1%) 40(40.8%) 6(6.1%)	8(72.7%) 3(27.3%) 0(0%)	P=0.00*
Diameter of placenta(cm) **< 11(small)** **11-22(normal)** **≥ 23(large)**	2(40%) 3(60%) 0(0%)	0(0%) 36(100%) 0(0%)	0(0%) 94(95.9%) 4(4.1%)	4(36.4%) 7(63.6%) 0(0%)	P=0.00*
Cord length(cm)	49.60 ±3.57	50.08 ±0.93	49.60 ±4.96	51.09 ±2.94	P=0.69
Cord diameter(cm) **< 1(thin)** **1-2(normal)** **>2(thick)**	0(0%) 5(100%) 0(0%)	0(0%) 36(100%) 0(0%)	0(0%) 95(96.9%) 3(3.1%)	0(0%) 11(100%) 0(0%)	P=0.65
Cord around the neck **Yes** **No**	0(0%) 5(100%)	2(5.6%) 34(94.4%)	8(8.2%) 90(91.8%)	0(0%) 11(100%)	P=0.66
Cord insertion **Centric** **Eccentric** **Marginal**	5(100%) 0(0%) 0(0%)	33(91.7%) 1(2.8%) 2(5.6%)	92(93.9%) 2(2%) 4(4.1%)	11(100%) 0(0%) 0(0%)	P=0.96

Table (4) The Relation between Neonatal Characteristics and Prepregnancy BMI (n=150)

Characteristics	Underweight (n=5)	Normal (n=36)	Overweight (n=98)	Obese (n=11)	Test
Baby gender					
Male Female	5(100%) 0(0%)	18(50%) 18(50%)	50(51%) 48(49%)	9(81.8%) 2(18.2%)	P=0.04*
Newborn weight (kg)					
<2.5 (Underweight) 2.5-3.9 (Normal) ≥ 4 (Big baby)	0(0%) 5(100%) 0(0%)	3(8.3%) 30(83.3%) 3(8.3%)	10(10.2%) 81(82.7%) 7(7.1%)	0(0%) 6(54,5%) 5(45.5%)	P=0.006 *
M ±SD (g)	2840	3130.83 ±602.02	3107.82±648.	3086.36±13	P=0.85

	±89.44		82	87	
Birth weight percentile					
SGA AGA LGA	3(60%) 2(40%) 0(0%)	3(8.3%) 27(75%) 6(16.7%)	7(7.1%) 74(75.5%) 17(17.3%)	9(81.8%) 2(18.2%) 0(0%)	P=0.001 *
Apgar score (5 min)	8.00 ±0.70	8.80 ±0.88	8.61 ±0.94	8.00±1.00	P=0.04*

Statistically Significant at p ≤ 0.05

Table (5): Correlation Between Prepregnancy BMI And Placental Morphology And Neonatal Birth Weight

Variable 1	Variable 2	Pearsons	P-value
Prepregnancy Body Mass Index (BMI)	Neonatal birth weight (kg)	0.18	0.02**
	Placental weight (g)	0.16	0.04**
	Placental thickness (cm)	0.21	0.03**

Statistically Significant at p ≤ 0.05

Discussion

Fetal well-being is influenced by a number of factors, including maternal characteristics, and placental and umbilical cord characteristics. So the aim of the current study is to examine the relation between prepregnancy body mass index, placental morphology, and birth weight. The frame of the study sample and answers to the research questions.

Regarding the socio-demographic and clinical characteristics of the study sample, the age ranged from 18–35 years with a mean of 29.77±5.47 years old. This finding is consistent with the findings of **Elly et al [25],** who found that the maternal age ranged from 18 to 39 years old. Regarding the level of education, 39.3 % of the study sample had received primary education, and 81.3% of the selected sample were housewives compared to 18.7% who were working. 76.7% lived in urban areas compared to 23.3% who lived in rural areas, and 47.3% of them had adequate socioeconomic status. On the same line, **Martino et al. [26]** concluded in their study results that 40% of their study sample were in primary education, 80% were housewives, 75% lived in urban areas, and 45% had adequate socioeconomic status. More than one third of the study sample received primary education and this reflects that low education may be a risk factor for obesity because they had not enough knowledge to achieve the ideal body weight before pregnancy. Furthermore more than three third of the study sample were housewife and this may be another risk factor for obesity other than working women.

Concerning prepregnancy BMI categories, more than half of the study sample (65.3%) were overweight, while 3.3% of them were underweight, 24% were normal, and 7.3% were obese, this results contradictory with the study of **Elly et al [25]** who indicated in their results that 8.5 % were underweight, 88.1% were normal, and 3.4% were overweight, this difference may be related to different sample size and setting .

Concerning the relation between prepregnancy (BMI) and abnormal placental morphology

Findings of the current study indicated statistically significant differences between placental weight thickness, and diameter, with different categories of maternal BMI ($p<0.05$), while there is no statistically

significant difference between the number of cotyledons, cord length, cord diameter, insertion, and the cord around the neck, versus different categories of maternal BMI ($p > 0.05$). These results were in accordance with the study of **Elly et al.** [25], who indicated in the Chi-square analysis of the maternal BMI with abnormal morphology of the placenta of the study that there were highly statistically significant differences between placental weight, thickness and maternal BMI ($p<0.0001$), and no significance between cord length & diameter, cord around the neck, cord insertion, and maternal prepregnancy BMI and recommended that it is very important to discuss this issue with health care providers [25]. Similarly, **Hailey et al.** [27] concluded that prepregnancy maternal BMI (maternal underweight and obesity) had a significant impact on placental pathology and increased risk for neonatal inflammation, and they recommended support interventions to optimize placental neonatal health [27]. So, it is very important to achieve normal prepregnancy BMI and prepregnancy ideal body weight to increase positive maternal and neonatal outcomes and avoid any complications.

A study was done by **Nasralla et al.** [33] to evaluate the association between neonatal birth weight and placental weight and other demographic characteristics. The researchers found that the association between the placental weight and birth weight was significant, and we found that for each gram increase in placental weight, birth weight increased by 2.848 g ($SE = 0.178$, $p < 0.01$). Similarly, there was a significant relation between placental weight and newborn birth weight, and researchers found that for each kg increase in maternal weight, birth weight increased by 17.018 g ($SE = 5.281$, $p =0.001$).

Concerning the relation between prepregnancy (BMI) and neonatal birth weight

Regarding neonatal characteristics, the findings of the current study mentioned that the neonatal birth weight was 3102.84±700. 82 grams. Placental weight had a mean of 520±57.13 grams. The mean gestational age was 38.69±1.40 weeks. There was a significant relations between placental weight and birth weight, with each gramme increase in placental weight increasing birth weight by ($p = 0.01$). Similarly, there was a significant relation between placental weight and neonatal birth weight, and researchers found that for each kilo-gram (Kg) increase in maternal weight, birth weight increased ($p = 0.001$), with statistically significant differences between prepregnancy maternal BMI and birth weight percentile and an Apgar score at the fifth minute. These findings were consistent with the findings of **Laura et al.** [28] who concluded that abnormal prepregnancy BMI worsened maternal and fetal complications even in normal pregnancy and that there were significant correlations between them, recommending that more research be conducted to evaluate infant health born to underweight and overweight mothers.

Our study concluded that there was a strong correlation between maternal prepregnancy BMI and placental weight and neonatal birth weight, these results were in accordance with the study of **Ellen et al.** [29] who concluded in their study that placental weight and newborn birth weight increased with increasing prepregnancy BMI in women without diabetes. Also, **Wen-Yuan et al.** [30] concluded in their study that prepregnancy overweight and obesity are significantly associated with the rapid growth of offspring from birth to age three**.** On the same line, **Toki Jin et al.** [31] concluded that the

prepregnancy BMI had a great effect on the placental size and neonatal health and recommended the importance of pre-conception counseling to improve maternal and fetal outcomes. In addition, **Nasralla et al.** [33] concluded that; placenta weight and prepregnancy BMI are independent predictors of fetal birth weight. This may be related to the placenta being the interface between the mother and the fetus, through which all nutrients and metabolic excretions must pass to the fetus. Therefore, it plays a major role in fetal growth and development, and it can be an independent predictor of fetal condition. Prepregnancy BMI is a major risk factor for the mothers and newborn and women should be encouraged to achieve ideal body weight before pregnancy.

CONCLUSION

The study supports the research questions that maternal prepregnancy BMI are known to influence birth weight and placental morphology. Underweight women had a low placental weight of <400g and thin placental thickness. There is a positive correlation between maternal prepregnancy body mass index versus placental weight and newborn birth weight.

Recommendations

1) Midwives, doctors, and delivery assistants should check the placenta to make sure it is complete because if some is missing the woman is in danger of bleeding or infection.

2) Authoritative personnel should encourage protocols and develop guides/checklists for placental examination in health care facilities.

3) Healthcare providers should encourage women to achieve normal BMI before pregnancy to avoid maternal and fetal complications.

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Factors Affecting Quality of Nursing Handover among Staff Nurses and Its Relation to Patients' Safety in Intensive Care Units

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Abstract

Background: Intensive Care Unit (ICU) staff nurses role includes maintaining the continuity of patients care around the clock. High-quality nursing handover helps them to accomplish their role efficiently. **Aim:** This study aimed to assess factors affecting quality of nursing handover among staff nurses and its relation to patients' safety in ICUs. **Subjects and Method: Design:** A descriptive correlational study design was used to achieve the aim of the present study. **Setting:** The study was conducted at Tanta International Teaching Hospital (ICUs). **Subjects:** 255 staff nurses were involved in the study. **Tools:** Two tools were used to collect the data. **Tool I:** Factors Affecting Quality of Nursing Handover in ICUs Questionnaire. **Tool II**: Patients' Safety Issues in ICUs Questionnaire. **Results:** ICU staff nurses' highest mean percent of factors affecting nursing handover process quality were regarding relations with outgoing nurse 86.66, last handover experience 80.64 and unit safety climate 71.18. According to total ICU staff nurses' perceptions about patients' safety, 51.8% perceived a fair level in their work environment. 53.8% of staff nurses perceived a good level of patients' safety issues in their supervisors' expectations and actions promoting safety. **Conclusion:** There was a positive correlation between total factors affecting quality of nursing handover process and patients' safety issues in ICUs. **Recommendations:** Hospital management need to conduct continuous updating of handover policies and strategies to ensure its efficiency to keep patients' safety. Also, ICU staff nurses require allocating enough time every shift for the handover process.

Keywords: Intensive Care Units, Nursing handover, Patients' safety, Quality of nursing handover, Staff nurses.

Introduction

Intensive care is a multidisciplinary and inter-professional specialty dedicated to the overall management of patients' needs or acute and life-threatening organ dysfunction. While the underlying disease is being treated and resolved, the primary goal of intensive care is to prevent additional physiologic deterioration .(1) Nursing care is provided around the clock in intensive care by nurses having special qualifications and specialized training. The nurse to patient ratio is higher than in other areas of the hospital. (2) ICU staff nurses role includes protection, promotion and optimization of health and abilities.(3) There is a significant nursing shortage in ICUs which has led to concerns about the adverse impact of this shortage on the quality of patients' care.(4)

Maintaining the continuity of care between working shifts is one of the most important aspects of patient care in ICUs. (5) Effective nurse handover can reduce the amount of time spent searching for information. (6) Nursing handover is considered to be a communication pattern used in the daily nursing procedures, to fulfill the goals of healthcare organization, continuity, consistency and patients' safety. (7) Factors affecting quality of nursing handover in ICUs consist of five dimensions , last handover experience, work environment, relationship with the outgoing nurse, staff nurses' feelings about work in general and unit safety climate.(8) Last nursing handover experience characteristics are key factors for the reinforcement of a wider understanding

around main handovers points.[9] In work environment, nursing handover requires determining an area away from interruptions and maintaining patients' privacy.[10]

Beneficial relationships with the outgoing nurse help nurses to make appropriate decisions about the type and amount of information provided to the incoming nurse. [11] Staff nurses' feelings about work in general include fatigue and job stress can hinder nursing handover. Positive safety climate appears in low rates of pressure ulcers as well as increased safety behaviors. [12]

Lack of handover protocols jeopardizes patients' safety causing delays in care and inappropriate interventions. The hospital work unit, the supervisor expectation and action promoting safety, communication, frequency of events reported and the hospital management support for patients' safety are the five dimensions of patients' safety issues. The hospital work unit with good work environment and better professional staff nurses has more satisfied patients and staff nurses. [13]

Supervisor expect ctations and actions promoting safety include establishing patients' safety as astrategic priority. [14] Communication among staff nurses is an essential element to the planning and evaluation of patients' care and safety. [15] Frequency of events reported include documentation of all adverse events that may or

actually cause harm to the patients.[16] The hospital management support for patients'safety which manifests itself inincreased hospital administration awareness and reinforcement leads to improve patients' safety.[17]

Significance of the study

The quality of nursing handover can affect patients' safety as it saves time spent searching for omitted information [18]; it can prevent nursing mistakes and reduce medication errors. [19] Accordingly, safe treatment in a safe environment is a basic patients' right and a fundamental hospital duty. The main goal of patients' safety is to prevent physical and psychological harm to the patients. [20] So, this study assessed the factors affecting quality of nursing handover and its relation to patients' safety issues in ICUs which hope to assure an interactive qualified handover that maintains patients' safety.

Aim of the study

Assess factors affecting quality of nursing handover among staff nurses and its relation to patients' safety in intensive care units.

Study Design

Subjects and Method A descriptive correlational study design was used to achieve the aim of the study.

Setting

The study was conducted at Tanta International Teaching Hospital. The official opening took place in May 2015. It contains Neonatal, Medical, Pediatric, Anesthesia, Cardiac and Burn Intensive Care Units.

Subjects

The subjects of the study consisted of all (n=255) staff nurses from the previously mentioned setting as follow; Neonatal (n = 55), Medical (n=54), Pediatric (n=17), Anesthesia (n=50), Cardiac (n=60) and Burn (n=19) Intensive Care Units

Tools of data collection: **Tool I: Factors AffectingQuality of Nursing Handover in ICUs Questionnaire.** The tool wasdeveloped by the researcher basedon Thomson (2016) (8) and recentrelated literature (23-26). Itconsisted of two parts; **Part 1:** Personal characteristics of staff nurses working in ICUs included age, sex, marital status, educational qualification and years of experience in nursing. **Part 2:** Factors affecting quality of nursing

handover inICUs. It included 49 items under fivesubscales: last handover experience, work environment, relationship withthe outgoing nurse, staff nurses'feeling about work in general and unit safety climate. Staff nurses responses were measured on a three points Likert Scale ranged from 3-1 where agree = 3, uncertain = 2 and disagree = 1. The total score was calculated by summing of all categories and high scored factors indicated high effect on quality of nursing handover. The scoring system was reversed for the negative items

Tool II: Patients' Safety Issues in ICUs Questionnaire. This tool was developed by the researcher based on Agency for Healthcare Research and Quality (AHRQ) (2016) (27) and recent related literature (28-30). It includes 56 items under five subscales: the hospital work area/unit, the supervisor xpectation and action promoting safety, communication, frequency of events reported and the hospital management support for patient safety. Staff nurses responses were measured on a three points Likert Scale ranged from 3-1 where agree= 3, uncertain = 2 and disagree = 1. The scoring system was reversed for the negative. The total scores were calculated by summing of all categories and classified into levels (31): good patient safety ≥ 75%, fair patient safety 60 < 75% and poor patient safety < 60%.

Method

-An official permission to conduct the study was obtained from the responsible authorities of Faculty of Nursing to the director of Tanta International Teaching Hospital.

- **Ethical and legal considerations:**

a) Approval of the ethical committee of the Faculty of Nursing was obtained.
b) Nature of the study was not cause harm or pain to the staff nurses.
c) An informed consent for participation in the study was obtained from staff nurses after explanation of nature and purpose of study.
d) Confidentiality was put into consideration regarding the data collected. A code number was used instead of names.
e) Subjects had the right to withdraw from the study at any time during the study.

-The tools were translated into Arabic and presented to a jury of five experts in the area of specialty to check content validity and clarity of questionnaire. The face validity value of Tool I = 93.96% and Tool II =97.18%.

-A pilot study was done on 10% (26 nurses) of the subject.

- Reliability of tools was tested using Cronbach' Alpha Coefficient Factor, its value for tool I was 0.762 and for tool II was 0.821.

-The researcher met ICU staff nurses individually during their work shifts to distribute the questionnaires. Theappropriate time for data collection was according to the type of work and workload for each unit; sometimes it was in the middle of the shift in morning, afternoon and night shifts. The time needed to complete the questionnaires was around 30 minute

- The duration for collecting data was 4 months from August to November 2019.

Results

Table (1): Shows personal characteristics of ICU staff nurses. The table revealed that the age of staff nurses ranged between 22 to 45 years old with mean age 27.34+2.92. Regarding educational qualification, it was noticed that less than half (47.5%) of staff nurses had Bachelor degree and 43.1% of them had Associate degree in nursing. Also, the table represented that years of

experience in nursing of staff nurses working in ICUs ranged from 1 to 21 years of experiences with mean years of experience 4.95+3.08.

Table (2): Illustrates work characteristics of ICU staff nurses. The table showed that less than half (48.2%) of staff nurses had night shift in their last work shift. Also, less than quarter (23.5%, 21.5% and 21.2%) of them worked in Cardiac, Neonatal and Medical ICU respectively. Additionally, more than two thirds (69.4%) of staff nurses were mostly assigned to two patients every shift and less than half (45.5%) of them used both oral and written handover. The table indicated that less than one third (30.2%) of staff nurses had more than one source of intrusions.

Figure (1): Shows mean percent of ICU staff nurses' perception regarding factors affecting quality of nursing handover process. The highest mean percent of ICU staff nurses' perception were (86.66 and 80.64) regarding relations with outgoing nurse and last handover experience that affect quality of nursing handover process respectively. Followed by mean percent (71.18 and 68.95) regarding unit safety climate and work environment that affect the quality of nursing handover process respectively.

Figure (2): Shows levels of total ICU staff nurses' perception regarding patients' safety issues. The figure clarified that more than half (51.8%) of ICU staff nurses perceived a fair level of total patients' safety issues in their work environment. Figure (3): Illustrates levels of ICU staff nurses' perception regarding patients' safety issues. The figure clarified that more than half (53.8%) of ICU staff nurses had a good perception level regarding their supervisors' expectations and actions to promoting safety. Additionally, more than three quarters (79.6%) of ICU staff nurses had a fair perception level regarding hospital work area/unit.

Table (3): Shows correlation between factors affecting quality of nursing handover process and patients' safety issues in ICUs. The table showed that there was significant statistical correlation between last handover experience, relations with outgoing nurse, unit safety climate and all patients' safety issues subscales at P.value $\geq$ 0.001 and r = 0714. Also, there was significant statistical correlation between staff nurses' feelings about work in general and hospital work unit, supervisors' expectations and actions promoting safety in addition to hospital management support for patients' safety at P.value $\geq$ 0.001 and r = 0714.

Table (1): Personal characteristics of ICU staff nurses (n = 255)

Personal characteristics	ICU staff nurses	
	No	%
Age in years:		
20-	212	83.1
30-	41	16.1
40-	2	0.8
Range (min-max)	22-45	
Mean ±SD	27.34±2.92	
Sex:		
Male	0	0
Female	255	100
Marital status:		
Single	52	20.4
Married	201	78.8
Widow	1	0.4
Divorced	1	0.4
Educational Qualification:		
Diploma of nursing	1	0.4
Associate degree in nursing	110	43.1
Bachelor of nursing	121	47.5
Post graduate studies	23	9.0
Years of experience in nursing:		
<5	126	49.4
5-	108	42.3
10-	15	5.9
15-	5	2
20-	1	0.4
Range (min-max)	1-21	

Table (2): Work characteristics of ICU staff nurses (n = 255)

Work characteristics	ICU staff nurses	
	No	%
Last working shift:		
Morning	54	21.2
Afternoon	78	30.6
Night	123	48.2
Working unit:		
Neonatal ICU	55	21.5
Medical ICU	54	21.2

Pediatric ICU	17	6.7
Anesthesia ICU	50	19.6
Cardiac ICU	60	23.5
Burn ICU	19	7.5
No. of patients mostly assigned/shift:		
1 patient	74	29.0
2 patients	177	69.4
3 patients	4	1.6
The method of handover in the last shift:		
Oral	27	10.6
Written	111	43.5
Both oral and written	116	45.5
Mobil call	1	0.4
The source of intrusions which may happen during handover:		
Patients	3	1.2
Patients relatives	47	18.4
Alarms from devices	68	26.7
Outside noise or chatter	60	23.5
More than one source	77	30.2

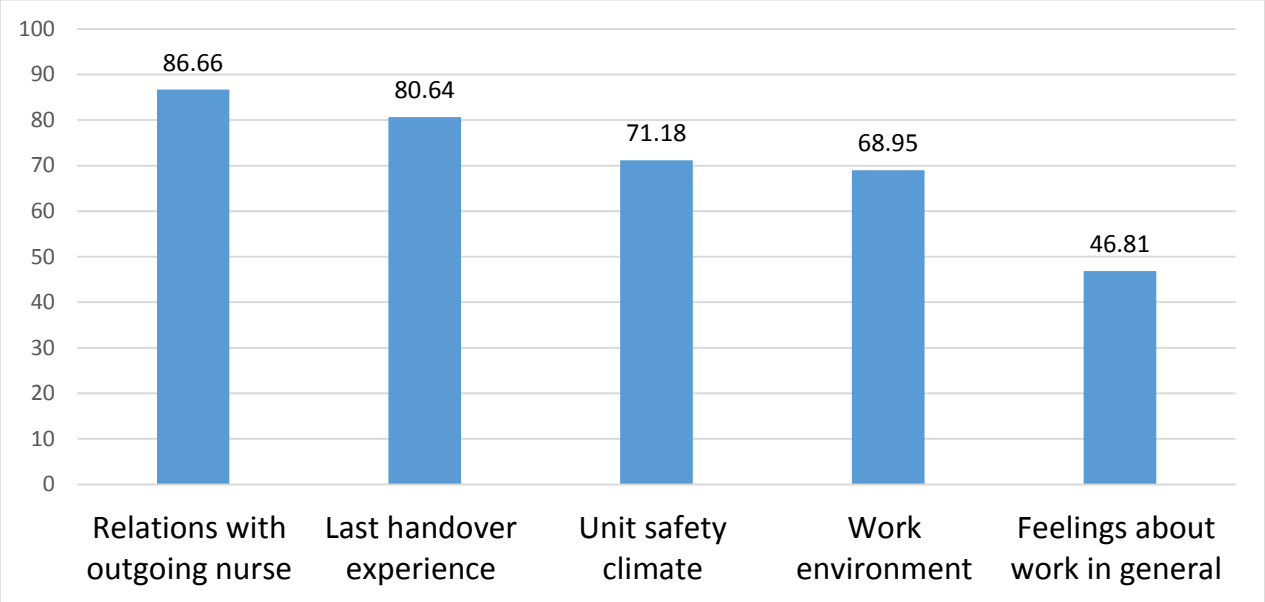

Figure (1): Mean percent of ICU staff nurses' perception regarding factors affecting quality of nursing handover process (n=255)

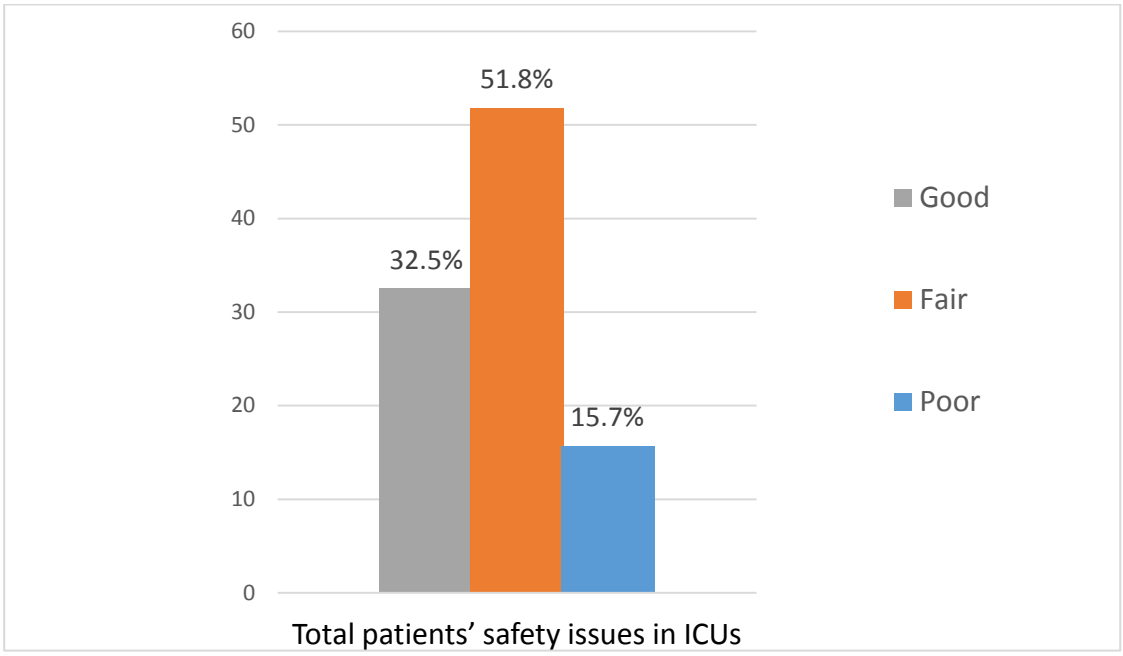

Figure (2): Levels of total ICU staff nurses' perception regarding patients' safety issues (n=255)

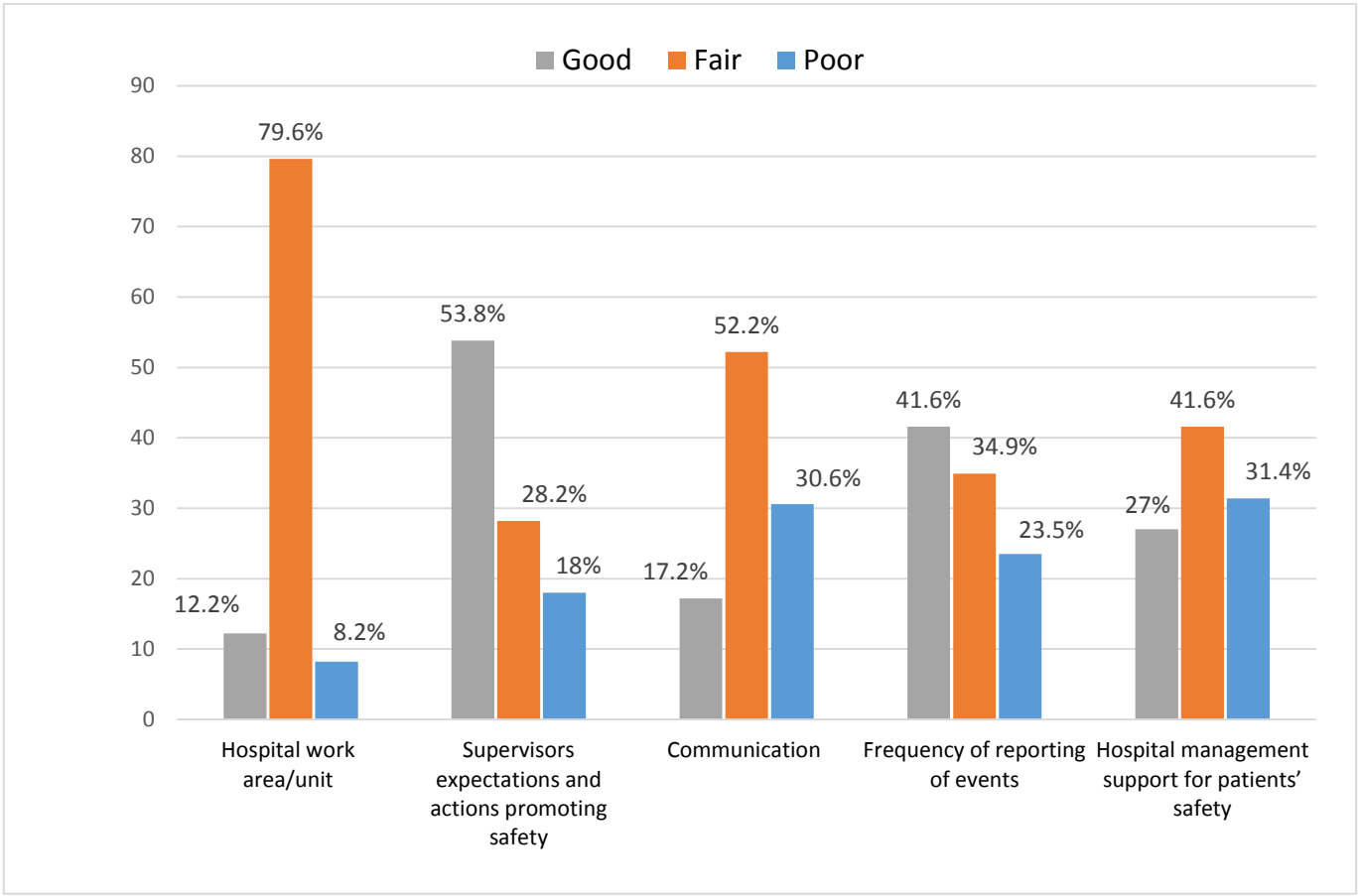

Figure (3): Levels of ICU staff nurses' perception regarding patients' safety issues (n=255)

Table (3): Correlation between factors affecting quality of nursing handover process and patients' safety issues in ICUs (n=255)

Patients' safety issues	Factors affecting quality of nursing handover process									
	Last handover experience		Work environment		Relations with outgoing nurse		Staff nurses' feelings about work in general		Unit safety climate	
	r	p	R	p	r	p	r	P	r	P
Hospital work area/unit	0.327	0.001*	-0.006	0.920	0.360	0.001*	0.161	0.010*	0.517	0.001*
Supervisors expectations and actions promoting safety	0.485	0.001*	-0.114	0.070	0.347	0.00*	0.155	0.013*	0.483	0.001*
Communicat -ion	0.482	0.001*	0.085	0.178	0.451	0.001*	0.099	0.113	0.552	0.001*
Frequency of reporting of events	0.433	0.001*	-0.036	0.583	0.275	0.001*	0.091	0.147	0.435	0.001*
Hospital management support for patients' safety	0.436	0.001*	0.045	0.476	0.307	0.001*	0.207	0.001*	0.546	0.001*

Discussion

Nursing handover is critical for ensuring ongoing patients care as it involves essential clinical information, clinical care requirements and the transfer of care responsibility. During handover, the staff nurses can obtain immediate feedback and exchange of information; thus, problems or errors can be noticed and rectified quickly. (32) Furthermore, during handover staff nurses must double-check certain information to ensure the patient's safety in their ICUs. Patients' safety is one of the components of quality that aims to improve patients care outcomes and prevent harm occurrence. (33)

Intensive care unit staff nurses' perception regarding factors affecting quality of nursing handover process.

The present study results showed that the relations with outgoing nurse dimension was the highest factor affecting quality of the nursing handover process from ICU staff nurses' perspective. This could be due to majority of staff nurses aged from 20 to 29 years old. This age affinity creates a common understanding language that facilitated the exchange of information between them. This result was approved by **Pezzolesi (2013)** (34) who reported that majority of staff nurses rated their outgoing nurses' relationships as being positive. Also, this result was supported by

Bost (2012) [35] who assured that relationships within staff nurses and communication which included a discussion of clinical information influence handover quality positively. But this study was disagreement of the findings with **Thomas (2013)** [36] who found that staff nurses who relates to each other positively take longer time to share necessary information.

Intensive care unit staff nurses' perception regarding patients' safety issues.

The current study results clarified that more than half of ICU staff nurses perceived a fair level of total patients' safety issues in their work environment. This could be attributed to ICU staff nurse worked longer hours to give best patient care and felt that their mistakes were held against them. These results were in the same line with **Aiken (2018)** [37] and **Busse (2012)** [38] who reported that nearly half of the staff nurses described their units as providing fair patients safety and quality of care. This finding was contraindicated by **McHugh (2016)**[39] who stated that most of staff nurses perceived a poor level of patients' safety work environments which made complete involvement to evidence-based safety interventions hard.

Correlation and relation between factors affecting quality of nursing handover process among ICU staff nurses and patients' safety issues.

The results of present study showed a statistically significant correlation between total factors affecting quality of nursing handover and patients' safety issues in ICUs. This can be due to comprehensive and effective handover process provides nurses with adequate information required to adequate patients care necessary to keep the patients safe. This study finding was confirmed by **Rush (2012)** [40] who found that a positively correlated between nursing handover and patients' safety. Also, according to the **Agency for Healthcare Research and Quality (AHRQ) (2016)** [27] effective patient information handover, personal responsibility at shift changes, and department accountability during patient transfers were all strongly linked to patient safety perceptions. In addition, **Alkhaqani (2022)** [41] confirmed that good communication influenced the teamwork that resulted in a significant improvement in patients' safety culture. This finding was not supported by **Else (2013)** [42] who found that there was no statistically significant correlation between handover and patients' safety. Staff nurses' perceptions of handover were positive and indicated a lack of awareness and implementation of patients' safety procedures.

The current study showed a statistically significant correlation between last handover experience, relationships with the exiting nurse, unit safety climate and all patients' safety issues. This could be because staff nurses learned from previous experiences to prevent adverse occurrences from occurring again. This study finding was confirmed by **Zrelak (2012)** [43] which reported that there were significant statistical relation between staff nurses' handover experience level, relations between them and patients' safety. These findings were parallel with **Gravio (2016)** [44] who stated that significant relationships were found between safety climate and patients' safety performance; therefore, improvements in patient safety climate will improve the safety performance of nurses. These findings were not parallel with **Tlili (2020)** [45] who reported that all aspects of

patients' safety needed to be promoted. These findings could be due to lack of knowledge and awareness of the many different domains of patients' safety culture.

Conclusion and Recommendations

Conclusion

ICU staff nurses' highest mean percent of factors affecting nursing handover process quality were regarding relations with outgoing nurse, last handover experience and unit safety climate. More than half of ICU staff nurses perceived a fair level of total patients' safety issues in their work unit. More than half of ICU staff nurses' perceived a good level of patients' safety issues in their supervisors' expectations and actions promoting safety. There was a positive correlation between total factors affecting quality of nursing handover process and patients' safety issues in ICUs.

Recommendations

For hospital management:

Continuous updating of handover policies and strategies to ensure its efficiency to keep patients' safety. - Design and implement continuous training programs and workshops for ICU staff nurses and newly hired nurses, to equip them with essential knowledge and skills for effective handover and patients' safety. **For ICU nurses' supervisors**: - Support ICU staff nurses to select the most appropriate method of handover and follow the structured handover approach that focus on most related information. - Provide ICU staff nurses with appropriate feedback about their performance. **For ICU staff nurses:** - Allocate enough time every shift for the handover process. - Document errors to analyze them and prevent future incidence.

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Effectiveness of Implementing Sleep Hygiene Guidelines on Daily Living Activities for Anterior Knee Cruciate Ligaments Reconstruction Patients

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Abstract

Back ground: Sleep hygiene is the term that are used to describe good sleep habits. Sleep is defined as a set of behaviors that impact sleep quality and duration. **Aim**: This study was conducted to evaluate the effectiveness of implementing sleep hygiene guidelines on daily living activities for anterior cruciate ligaments reconstruction patients**. Subjects and methods**: A quasi-experimental study was conducted in at orthopedic departments of Tanta Universal Teaching Hospital and Orthopedic Outpatient Clinic for follow up.The convenience sampling of (60) adult post-operative anterior cruciate ligaments reconstruction patients was included in the study and randomly divided into two groups. **Group 1:** (control group) Consists of (30) patient who received the usual hospital routine of care. **Group 2:** (study group) Consists of (30) patient who received the application of sleep hygiene guidelines. Three tools were being used as follow. ***Tool (I)*** Structured Interview Schedule**.** ***Tool (II)*****):** Sleep Hygiene Index **Tool (III)):** Knee Outcome Survey-Activities of Daily living scale. **Results**:The main results revealed that the majority of the studied patients in study group were developed their sleeping habits 80% while among control group was 10% at the 2nd week of the operation. **Conclusions and recommendations**: sleep hygiene guidelines program has a favorable effect on the activity of daily living among patients with anterior cruciate ligaments reconstruction, : In addition to the patients' ability to perform this activity improved. It's recommended to provide clear instruction to patients about behavior change to provide a foundation for improvement of sleep hygiene.

Key words: Anterior Cruciate Ligaments Reconstruction, Sleep hygiene, daily living activitie

Introduction

Anterior cruciate ligament (ACL) injuries are one of the most common injuries of the knee.(1)The most common mechanism that can cause tear of the anterior cruciate ligament (ACL) is sudden deceleration (slowing down or stopping motion), hyperextension or pivoting in place. This also includes sports-related injuries which is considered the most common cause, the types of sports that have been associated with ACL tears are numerous, which requiring the foot to be planted and the body to change direction rapidly such as basketball and football.(2) The activities of daily living (ADLs) is a term that are used to collectively describe fundamental skills required to independently care for self, such as eating, bathing and mobility. The inability to perform ADLs results in the dependence on other individuals or mechanical devices. The inability to accomplish essential activities of daily living may lead to poor quality of life. Measurement of ability or inability to perform ADLs is important in describing the functional status of a person and then in implementing an intervention.(3)

Sleep hygiene" refers to those behaviors that are believed to promote improved quantity and quality of sleep. According to the

National Slep Foundation sleep hygiene is defined as a group of behaviors that impact sleep quality and duration and can be classified into five different factors which are including, Behavioral factors as have regular exercise but avoid strenuous workouts close to bedtime and avoid eating food that can cause indigestion just before sleep as heavy meals, fatty meals, spicy dishes, citrus fruits, and carbonated drinks.(4)

Cognitive factors as avoid worrying and planning right before bedtime. Environmental factors as use comfortable mattress and pillows, be mindful of room temperature, sound, and light; and turn off electronic devices before bed. Sleeping pattern, have a regular sleep schedule and bedtime routine, limit daytime naps to thirty minutes. Substance use, avoid stimulants such as caffeine and nicotine close to bedtime. (5-6) Maintain a regular sleep schedule, will help regulate body's clock and promote quality of sleep and wake time. Avoid naps if possible. If the persons have to take a nap, they must try to keep it to less than one hour and avoid taking a nap after three p.m.(7-8)

Have evening and bedtime routine, practicing this routine half an hour to two hours before bed is one of the most important guideline for sleep hygiene, and it is recommended to include, Personal care, Take a warm shower or bath about ninety minutes before bed.(9) Avoid caffeine, smoking and eating fatty meals before bed, heavy meals can make you uncomfortable while sleeping, caffeine and nicotine give a stimulant effect that takes up to two hours to start to disappear.(10)

Preparing the body for sleep, avoid caffeine after lunch, the effects of caffeine may last for several hours after ingestion. Caffeine is a stimulant and reaches its peak effect in the first hour but with a half-life elimination of three to seven hours. Caffeine is a potent sleep inhibitor and it increases sleep latency. Avoid going to bed hungry or full, if the stomach is too empty it can interfere with sleep. However, eating a heavy meal before bedtime can interfere as well. Dairy products and tuna contain tryptophan which acts as a natural sleep inducer. Exercise regularly but avoid strenuous exercise within six hours of your bedtime. (11-13) Prepare sleeping area**,** remove all TVs, computers and other electronic devices from the bedroom. Use bedroom only for sleeping. Avoid bright light by using an eye mask while sleeping. Stay away as much as possible from noise and use earplugs while sleeping, teach patient how to wear eye mask and ear plug and how to preform relaxation technique that help to sleep easly.(14)

Significance of the study: Sleep is an important part of recovery; however, patients who are recovering from a knee reconstruction find it difficult to sleep at night, the patients suffering from severe pain and immobility of knee as it heals can affect the ability to get a good night's rest. So maintaining good sleep hygiene will improve daily living activity of patients undergoing Anterior Cruciate Ligaments Reconstruction (ACL), to evaluate the effectiveness of implementing sleep hygiene guidelines on daily living activities for anterior knee cruciate ligaments reconstruction patients.

Aim of the study

To evaluate the effectiveness of implementing sleep hygiene guidelines on daily living activities for anterior knee cruciate ligaments reconstruction patients.

Research Hypothesis

Patients undergoing anterior knee cruciate ligaments reconstruction will exhibit improvement in their activities of daily living post follow good sleep hygiene guidelines.

Subjects and methods

a quasi- experimental research design was utilized to conduct the study.

Setting

The study will be conducted at orthopedic departments of Tanta Universal Teaching Hospital and orthopedic outpatient clinic to follow up of sleep hygiene guidelines.

Subjects

A convenience sampling of (60) adult post-operative anterior knee cruciate ligaments reconstruction patients in the above previously mentioned settings. The sample size was calculated based on Epidemiological Information Program, based on the total patients per year according to review of Tanta Universal Teaching Hospital Statistical Records. They were divided into two equal groups; each group were consisted of (30) patients as following:

Group (1): - Consists of (30) patients who were received the usual hospital routine of care (vital sings measures, receiving medication, wound dressing, wound care and hygienic care).

Group (2):- Consists of (30) patients who were received the sleep hygiene guidelines plus the previous usual hospital routine of care mentioned.

Inclusion criteria

- Conscious patient
- Age ranges between 21-60years.
- Patients of both sex.
- Patients have anterior cruciate ligaments tear and undergone arthroscopic anterior cruciate ligaments reconstruction

Exclusion criteria of patient's

- Knee fractures
- Knee multiple ligamentous injuries.
- Patient who refuse to participate in study.

Tools of data collection

Three tools were used in the study, which includes the following:

Tool (I):- Structured Interview Schedule :- It was comprised of three parts:-

Part 1) Patients' Socio- demographic characteristics

Which included; patient name, age, sex, educational level, marital status, occupation, pattern of sleep, number of days with sleep disturbances, number of cigarettes per day and drinking caffeine.

Part 2) Medical data

Which included present and past medical history, medication history, date of admission, date of operation, mechanism of injury, affected knee (right or left knee).

Part 3) knowledge assessment (pre-posttest): - It was developed by the researcher based on literature review [3,4,9,10] to assess patient's knowledge regarding anterior cruciate ligament surgeries and sleep hygiene guidelines. It was consisted of 6 open end question .**Scoring system :-** it was scored as the following: Correct answer was scored as (1) and incorrect answer was scored as (0). Total scoring system of knowledge assessment questioner was calculated and classified as the following: 70% and more will be considered as satisfactory, Less than 70% will be considered as unsatisfactory.

Tool (II):- Sleep Hygiene Index (SHI)

Sleep Hygiene Index (SHI), originally developed by **Mastin et al. (2006).[15]**It was consisted of 13 items of self-reported instrument that was implemented to assess habits, practices and behaviors related to sleep hygiene. It was consisted of four factors, Factor 1: "Arousal at bedtime" Factor 2: "Regular routines" Factor 3: "Sleep environment" Factor 4: "Sleep-disrupted behaviors" Particularly, the first factor, that composed of five items 7, 8, 9, 12, 13; the second factor composed of three items 2, 3 and 5; the third factor was composed of two items 10 and 11; and finally fourth factor was composed of three items 1, 4, 6. Participants was asked to rate the frequency to which they have engaged in specific behaviours on a 5-point Likert scale ("always" = 5, "frequently" = 4, "sometimes" = 3, "rarely" = 2, "never" = 1). Higher scores were indicative of poorer

sleep hygiene status and less sleep hygiene behaviors.[16] **The scoring system :** <26 was considered as good sleep hygiene, 27-34 was considered as average and >35 was considered as poor sleep hygiene.

Tool (III) :- Knee Outcome Survey-Activities of Daily living scale(ADL)

The knee outcome Survey was a patient self-report survey developed by **Irrgang et al.[17]** To assess activities of daily living of patient's undergoing anterior cruciate ligament reconstruction postoperatively, This self-administered scale was consisted of two parts:- **Part (1):** symptoms of knee that affect level of daily activity it was included (6 factors) such as pain, stiffness, swelling, giving way buckling, or shifting of the knee , weakness, limping. The response to the symptoms questions was scored from 0 (the symptom prevents all daily activities) to 5 (do not have the symptom). **Part (2):** functional limitation of ADL (8 factors) such as walk, go upstairs, go down stairs, stand, kneel on front of your knee, squat, sit with your knee bent, rise from a chair. The response to questions in the functional limitation of ADL was scored from 0 (unable to do the activity) to 5 (activity is not difficult).

The scoring system was calculated by summing the scores of all 14 factors. [18] The highest possible score was 70. The scores of all items are summed, divided by 70, then multiplied by 100 to give an overall ADLS percent rating. Higher percentages reflect higher levels of functional ability. Less than 40 of total score considered as low of (Daily Living activity), From 40 to less than 60 considered as moderate and from 60 to 70 considered as high.

Ethical and legal consideration

- Nature of the study did not cause any harm or pain to the entire subjects.
- An informed consent was taken from every patient after explanation the aim of the study.
- Confidentiality and privacy was taken into consideration a regarding data collection .
- The patient was informed the right to withdraw from the study at any time with no reason.

Mehods of data collection

- An official permission was obtained from the orthopedic departments of Tanta Universal Teaching Hospital and orthopedic outpatient clinic
- All tools were tested for content validity and clarity of questionnaire by five experts in the Medical Surgical Nursing at the faculty of nursing and orthopedic field professors.
- All tools of the study were tested for reliability by using alpha Cronbach's test and found to be 0.823, 0.775, and 0.810 respectively for the tool I, II, III which represent highly reliable tools, when alpha Cronbach was >0.5 .
- The **pilot study** was conducted before the actual study on (10%)of the patients, to test the clarity, feasibility; relevance and applicability of the different items of the tools to determine any obstacles that may encountered during the period of data collection, accordingly needed modifications were done before the main study.
- Data were collected over a period of 6 months, started from March 2022to August 2022
- The present study was conducted through four phases (assessment, planning, implementation, evaluation).

A. Assessment phases

Tool (I); part (1,2) was used at the time of patients' admission for collection of the baseline data and assessed the patients who met the inclusion criteria and was included in the study.

B. Planning Phase

The guideline and power point was prepared by the researcher based on patient's level of

education, objectives of the study were determined based on the needs of the study subjects. The guideline booklet was distributed to the studied patients at the end of sessions and power point was presented.

Objectives: - To improve knowledge and practice of patients undergoing anterior cruciate ligament reconstruction regarding sleep hygiene practice.

Educational methods and aids

Educational aids include :- booklets, lab top and power point was prepared by the researcher based on literature review.

Educational methods include individualized discussion as the patient can't move from the bed, demonstration and re-demonstration where used as teaching method.

C. Implementation phase

Giving guidelines to the patient regarding sleep hygiene were adopted and implemented by researcher based on patients' level of education. **These sleep hygiene guidelines will include the following;** Maintain a regular sleep schedule, Maintain evening and bedtime routine, Preparing the body for sleep, Maintain comfortable environment and Practice relaxation techniques before bedtime which include(Deep breathing, Progressive muscle relaxation, Guided imagery).

Educational session:- Were given to all patients included in the study, educational sessions were implemented over five sessions ranged from 30-45 minutes for each one including 30 minutes for explanation of instruction and re-demonstration of theoretical and practical part and 15 minutes for discussion and feedback. Sessions will be individualized.

Content of each session was divided as following

Theoretical part:-

this sessions were given patient information about**:-**

First session

Contents: Simple note of the anterior cruciate ligament of the knee. Definition of the anterior cruciate ligament reconstruction surgery of the knee. Mechanism of performing the cruciate ligament surgery. Complications of the anterior cruciate ligament reconstruction surgery of the knee.

Second session

Contents: Definition of sleep. Importance of sleep. Definition of sleep hygiene.

Third session

Contents: Preforming sleep hygiene guidelines. Discharge instructions about (activities of daily living (ADL), reporting unusual signs and symptoms)

Practical part:- was presented through demonstration and re-demonstration

Fourth session

Contents: Practical part of sleep hygiene guidelines include (sleep eye mask and earplugs, inform patient how to perform relaxation technique)

Fifth session

Contents: Practical part of sleep hygiene guidelines include (teach patient how to perform progressive muscle relaxation and guided imagery).

D. Evaluation Phase

Post-operative anterior cruciate ligaments reconstruction patients who was received sleep hygiene guidelines was evaluated by tool I part (3) to assess patient's knowledge before and after implementation of sleep hygiene guidelines, and by tool II and tool III to assess daily living activities of knee on the second day of operation in hospital and after one week and after two weeks in orthopedic outpatient clinic for follow up.

Methods of data analysis

Statistical presentation and analysis of the present study was conducted, using the mean, standard Deviation, **chi-square test** was used to compare between groups in qualitative, **linear correlation coefficient** was used for

detection of correlation between two quantitative variables in one group. By (*IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.)***.**

Significant level: >0.05 Non significant <0.05 significant <0.001* High significant*

Results

Table (1) Shows distribution of the studied patients according to their socio–demographic characteristics among the studied groups. The results revealed that nearly half of the patients in both control and study groups (50.0%and 36.7% respectively) were between (30- <40) years old with mean age of 31.8±5.82 in control group and31.57±8.27 in study group. **In relation to sex**, more than half of the patients in the control and study groups were male (93.3%and 90.0% respectively), **Concerning marital status**, more than half of the patients in the control and study groups were married (80.0% and 66.7% respectively). **Regarding educational level**, more than half of studied patient in the control and study groups were had university education (53.3% and 43.3% respectively). **As regard to occupation**, it was observed that less than half of the patients in control and study groups were office worker (46.7% and 36.7% respectively).

Table (2) Shows distribution of the studied patients according to their medical data among the studied groups. The results revealed that about one third of the patients in the control and study groups their mechanism of injury was due to playing sports (20 % and 36.7% respectively). Concerning with the affected knee, it was observed that more than half of the patients in control and study groups were lift knee affected (40.0% and 63.3% respectively).

Table (3) Shows distribution of the studied patients according to their sleeping pattern among the studied groups. The results revealed that more than half of the patients in the control and study groups were not sleeping well (63.3% and 76.7% respectively). **Regarding taking day time nap,** more than half of the patients in the control and study groups were taking day time nap (60.0% and 83.3% respectively). **In relation to smoking**, half of the patients in the control and study groups were smoker (50%) and 33.3% of control group and 53.3% of study group were smoking 5:8 pack/ day respectively. **As regard to drinking caffeine,** it was observed that more than half of the patients in control and study groups were drinking caffeine (53.3% and 60.0% respectively). **Concerning Number of days with sleep disturbances,** the results revealed that more than one third of the patients in both control and study groups were having sleep disturbances for 4 days (45.8% and 30.8 % respectively). **As regard to action that patients do to get sleep,** it was observed that nearly half of the patients in both control and study groups were getting out of the bed (50.0% and 40.0% respectively).

Table (4): shows the **distribution of the studied patients according to their total knowledge regarding anterior cruciate ligament surgeries and sleep hygiene guidelines among the studied groups**.

The study found that 30% of patient in control groups were considered as satisfactory while 70% considered as unsatisfactory pre-test, compared with 26.7% of patients in study groups considered as satisfactory and 73.3% considered as unsatisfactory pre-test. On the other hand, the study shows that 33.3% of patient in control groups were considered as satisfactory while 66.7% considered as unsatisfactory post-test, compared with 83.3% of patients in study groups considered as satisfactory and 16.7% considered as unsatisfactory post-test.

Figure (1) Show distribution of the studied patients according to their total of habits,

practices and behaviors. The results revealed that less than one quarter of the patients in the control and study groups were having good sleep hygiene at the second day of the operation (20.0% and 13.3% respectively), which developed after 1st week of operation in the control and study groups to (16.7% and 73.3% respectively), then become (10% and 80% respectively) in the control and study groups at the 2nd week of the operation.

Figure 2 :- Show distribution of the studied patients according to their total symptoms of knee that affect level of daily activity. The result found that more than half of studied patients in control and study groups were suffering from high symptoms of knee that affect level of daily activity (66.7% and 60.0% respectively) at 2nd day of operation, which developed after 1st week of operation in the control and study groups to (53.3% and 23.3% respectively), then become much better in the control and study groups at the 2nd week of the operation(60% and 16.7% respectively).

Figure 3: - Illustrate distribution of the studied patients according to their total of functional limitation of activity of daily living by Knee Outcome Survey-Activities of Daily living scale(ADL). The result show that more than half of studied patients in control and study groups were suffering from high functional limitation of activity of daily living (66.7% and 63.3% respectively) at 2nd day of operation, which developed after 1st week of operation in the control and study groups to (56.7% and 23.3% respectively), then become much better in the control and study groups at the 2nd week of the operation (50% and 10% respectively).

Table (1): Distribution of the Patients According to their Socio–Demographic Characteristics among the Studied Groups.

	Control		Study		Total		Chi-square	
	N 30	%	N 30	%	N 60	%	X^2	P-value
Age								
21 -< 30	11	36.7	13	43.3	24	40.0	1.182	0.554
30- <40	15	50.0	11	36.7	26	43.3		
40 -<50	4	13.3	6	20.0	10	16.7		
Mean±SD	31.8±5.82		31.57±8.27		31.68±0.709			
Sex								
Male	28	93.3	27	90.0	55	91.7	0.218	0.640
Female	2	6.7	3	10.0	5	8.3		
Marital status								
Married	24	80.0	20	66.7	44	73.3	3.030	0.220
Single	5	16.7	10	33.3	15	25.0		
Widow	1	3.3	0	0.0	1	1.7		
Occupation								
Not work	4	13.3	5	16.7	9	15.0	0.625	0.732
office work	14	46.7	11	36.7	25	41.7		
manual work	12	40.0	14	46.7	26	43.3		
Level of education								
Read and write	1	3.3	0	0.0	1	1.7	1.882	0.597
Primary education	1	3.3	1	3.3	2	3.3		
secondary education	12	40.0	16	53.3	29	48.3		
University education	16	53.3	13	43.3	28	46.7		

Table (2) Distribution of the studied patients according to their medical data among the studied groups.

	Control		Study		Total		Chi-square	
	N 30	%	N 30	%	N 60	%	X^2	P-value
Previous hospitalization								
Yes	2	6.7	2	6.7	4	6.7	0.000	1.000
No	28	93.3	28	93.3	56	93.3		
Past and present history								
Hypertension	5	16.7	1	3.3	6	10.0	2.963	0.085
DM	1	3.3	1	3.3	2	3.3	0.000	1.000
Arthiritis	4	13.3	2	6.7	6	10.0	0.741	0.389
Renal disease	2	6.7	1	3.3	3	5.0	0.351	0.554
Medication history								
Antibiotics	23	76.7	22	73.3	45	75.0	0.089	0.766
Anti-inflammatory drugs	18	60.0	12	40.0	30	50.0	2.400	0.121
Narcotics\analgesic	18	60.0	11	36.7	29	48.3	3.270	0.071
Anesthetics	12	40.0	5	16.7	17	28.3	4.022	0.045*
Antidepressant drugs	0	0.0	1	3.3	1	1.7	1.017	0.313
Mechanism of injury								
Playing sports	6	20.0	11	36.7	17	28.3	2.052	0.152
Sudden change of direction	11	36.7	6	20.0	17	28.3	2.052	0.152
Direct contact with object	4	13.3	3	10.0	7	11.7	0.162	0.688
Motor vehicle collisions	4	13.3	8	26.7	12	20.0	1.667	0.197
Landing from a jump	3	10.0	2	6.7	5	8.3	0.577	0.448
Unknown	2	6.7	0	0.0	2	3.3	0.218	0.640
Affected knee								
Right	18	60.0	11	36.7	29	48.3	3.270	0.071
Left	12	40.0	19	63.3	31	51.7		

Table (3) Distribution of the studied patients according to their sleeping pattern among the studied groups.

	Control		Study		Total		Chi-square	
	N 30	%	N 30	%	N 60	%	X^2	P-value
Sleeping well								
Yes	11	36.7	7	23.3	18	30.0	1.270	0.260
No	19	63.3	23	76.7	42	70.0		
taking day time naps								
Yes	18	60.0	25	83.3	43	71.7	4.022	0.045*
No	12	40.0	5	16.7	17	28.3		
Smoking								
Yes	15	50.0	15	50.0	30	50.0	0.000	1.000
No	15	50.0	15	50.0	30	50.0		

Numbers of packs per day								
1	4	26.7	0	0.0	4	13.3	9.692	0.138
2	0	0.0	1	6.7	1	3.3		
5	4	26.7	2	13.3	6	20.0		
7	0	0.0	2	13.3	2	6.7		
10	5	33.3	8	53.3	13	43.3		
15	1	6.7	2	13.3	3	10.0		
20	1	6.7	0	0.0	1	3.3		
Drinking caffeine								
Yes	16	53.3	18	60.0	34	56.7	0.271	0.602
No	14	46.7	12	40.0	26	43.3		
Numbers of cup								
2	0	0.0	2	11.1	2	5.9	3.471	0.628
3	7	43.8	6	33.3	13	38.2		
4	4	25.0	2	11.1	6	17.6		
5	3	18.8	5	27.8	8	23.5		
6	1	6.3	2	11.1	3	8.8		
7	1	6.3	1	5.6	2	5.9		
Number of sleeping hours/ day								
4	1	3.3	0	0.0	1	1.7	3.779	0.286
5	15	50.0	13	43.3	28	46.7		
6	8	26.7	14	46.7	22	36.7		
7	6	20.0	3	10.0	9	15.0		
Number of days with sleep disturbances								
2	4	16.7	1	3.8	5	10.0	5.091	0.165
3	7	29.2	11	42.3	18	36.0		
4	11	45.8	8	30.8	19	38.0		
5	2	8.3	6	23.1	8	16.0		
what do you do to get sleep								
Taking medication	2	6.7	3	10.0	5	8.3	1.915	0.751
Get out of the bed	15	50.0	12	40.0	27	45.0		
Drinking milk	0	0.0	1	3.3	1	1.7		
Taking bath	10	33.3	12	40.0	22	36.7		
Reading stories	3	10.0	2	6.7	5	8.3		

Table (4): Distribution of the studied patients according to their total knowledge regarding anterior cruciate ligament surgeries and sleep hygiene guidelines among the studied groups

Total knowledge	Pre						Post					
	Control		Study		Chi-square		Control		Study		Chi-square	
	N	%	N	%	X^2	P-valu	N	%	N	%	X^2	P-value
Satisfactory	9	30.0	8	26.7	0.082	0.774	10	33.3	25	83.3	15.429	<0.001*
Unsatisfactory	21	70.0	22	73.3			20	66.7	5	16.7		
Mean±SD	1.93±0.58		2.20±0.76				2±0.53		5.93±0.25			

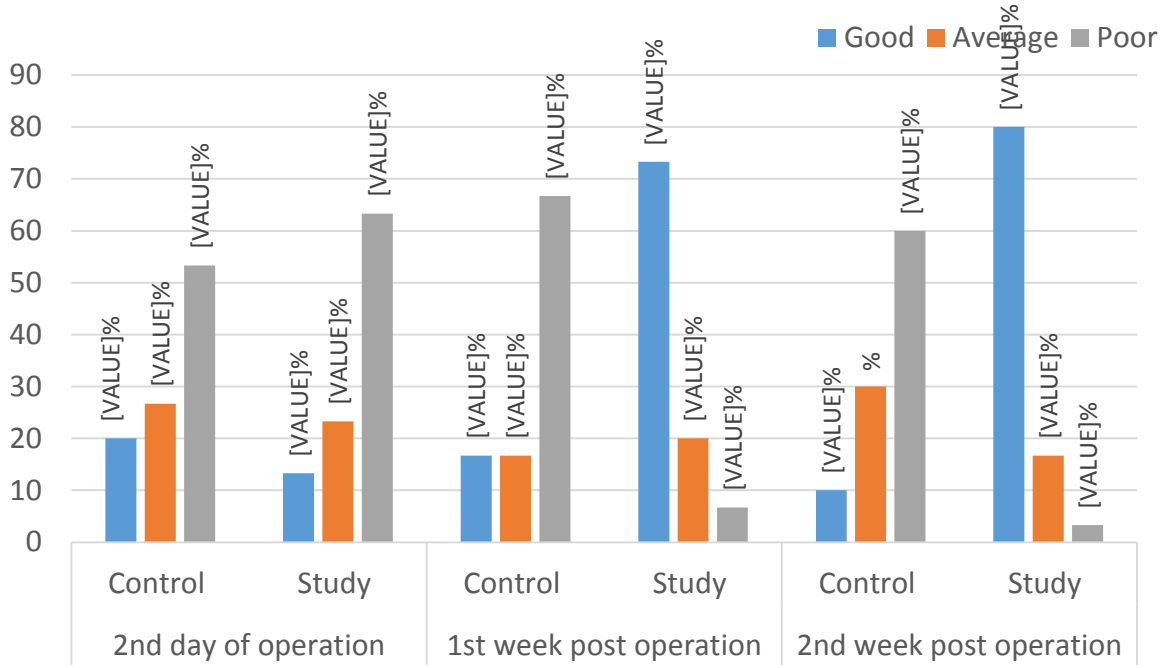

Figure (1) Distribution of the studied patients according to their total of habits, practices and behaviors related to sleep hygiene by Sleep Hygiene Index (SHI), 2nd day of operation, after 1 week and after 2 weeks of the operation.

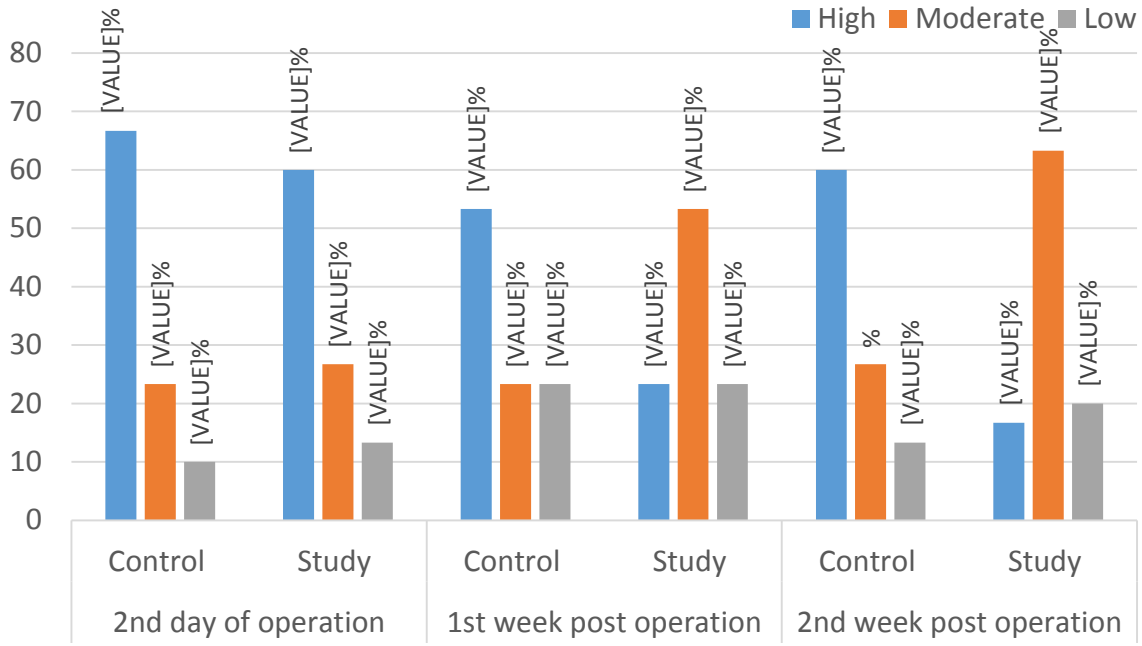

Figure 2 :- Distribution of studied patients by Knee Outcome Survey-Activities of Daily living scale(ADL), regarding their total symptoms of knee that affect level of daily activity

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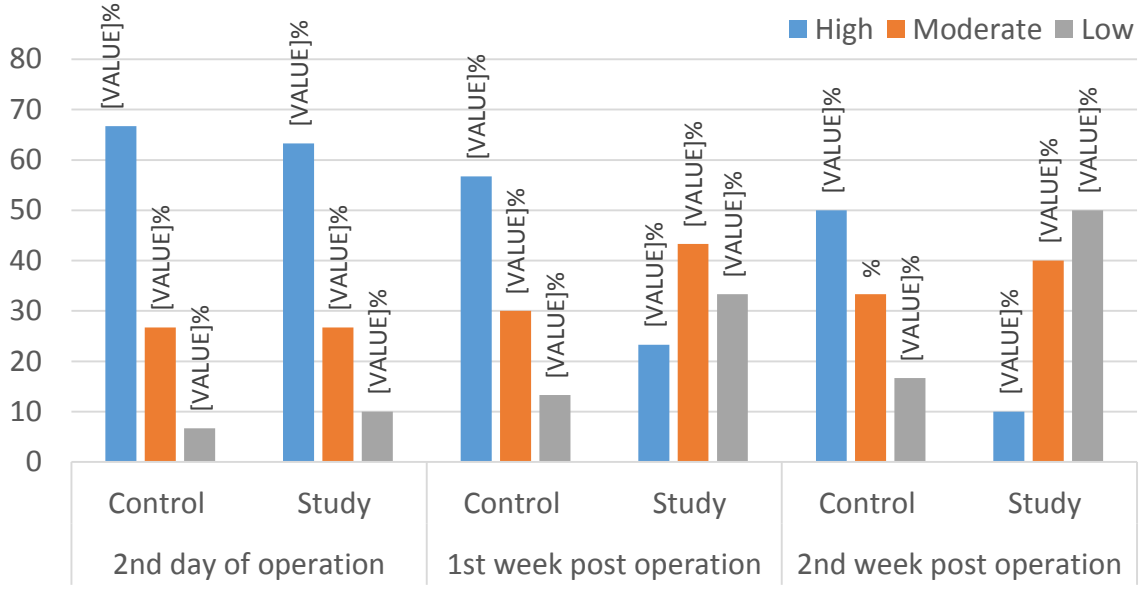

Figure 3: Distribution of the studied patients regarding their total daily living activities by Knee Outcome Survey-Activities of Daily living scale(ADL), through assessing functional limitation of ADL.

Table 5: - Correlation between Total knowledge pre-program implementation with Total sleep Hygiene Index score, Total knee Outcome Survey Activities and Total functional Limitations with Activities of Daily Living score at (2nd day of operation) in both groups.

	Total knowledge pre-program implementation			
	Control		Study	
	r	P-value	r	P-value
Total sleep Hygiene Index score (2nd day of operation)	-0.767	<0.001*	-0.777	<0.001*
Total knee Outcome Survey Activities of Daily Living sco (2nd day of operation)	-0.821	<0.001*	-0.638	<0.001*
Total functional Limitations with Activities of Daily Livir score (2nd day of operation)	0.735	<0.001*	0.680	<0.001*

Table 6: - Correlation between Total knowledge post program implementation with Total sleep Hygiene Index score, Total knee Outcome Survey Activities and Total functional Limitations with Activities of Daily Living score at (1st week and 2nd week after operation) in both groups.

	Total knowledge post program implementation			
	Control		Study	
	r	P-value	r	P-value
Total sleep Hygiene Index score (1st week post operation)	-0.404	0.027*	-0.662	<0.001*
Total sleep Hygiene Index score (2nd week post operation)	-0.329	0.076	-0.675	<0.001*
Total knee Outcome Survey Activities of Daily Living sco (1stweek post operation)	-0.154	0.416	-0.755	<0.001*
Total knee Outcome Survey Activities of Daily Living sco (2ndweek post operation)	-0.503	0.005*	-0.673	<0.001*
Total functional Limitations with Activities of Daily Livir score (1stweek post operation)	0.411	0.024*	0.685	<0.001*
Total functional Limitations with Activities of Daily Livir score (2ndweek post operation)	0.425	0.019*	0.745	<0.001*

Discussion

Reconstructive surgery has remained the gold standard of care for anterior cruciate ligament injuries, it's aimed to prevent erosion and osteoarthritis and regain ligament stability and normal knee function.[19]. Sleep disturbances are commonly reported following musculoskeletal injury and surgery. Pain at night and sleep disturbances are often associated with joint osteoarthritis. Substantial evidence suggests that sufficient quantity and quality of sleep are necessary for maintaining normal bodily function, including restoration of damaged tissues and flushing toxins from the brain, while inadequate sleep can have serious long-term health consequences.[20] .

Not having sufficient sleep has been reported as a public health risk contributing to obesity, cardiovascular disease and mental health disorders. These increased inflammatory markers may adversely

prolong recovery following orthopedic-related surgery or musculoskeletal injury. [26] so this study will evaluate the effect of implementing sleep hygiene guidelines on daily living activities for anterior cruciate ligaments reconstruction patients. **Concerning socio-demographic characteristics** of the studied patients. The present study showed that nearly half of the patients in both control and study groups were between (30- <40) years old. This study as the same line of, **Lionel et al, (2022)[21]** who studied anterior cruciate ligament injury epidemiology in team-ball sports, reported that the majority of the studied patients were in age between 30-40 years old. In the contrary,**Mardani et al, (2022)[22]** who performed study about reconstruction of anterior cruciate ligament over 50 years old.

Regarding sex in the present study it was found that more than half of the patients in the control and study groups were male. This finding is agree with **Sik Ahn et al, (2021) [23] ,** who studied physical activity in anterior cruciate ligament injury, showed that the majority of the studied patients were male. on the other hand, this study is in disagreement with **Howe et al, (2021)[24]** , they reported that female were at higher risk for ACL rupture than male. **Regarding marital status** in the present study more than half of the patients in the control and study groups were married These subjects' marital status was similar to **AbdElghany et al,(2019)[25],** who reported that that most of their studied sample were married. **In relation to educational level**, the finding of this study represented that most of both groups were university educated. This agree with **Alqarni et al,(2020)[26],** who reported that that most of their studied sample were university educated.

As regarding to mechanism of injury the results revealed that about one third of the patients in the control and study groups their mechanism of injury was due to playing sports. This study is in the line with **Godin et al,(2017)[28],** who reported in their studies that the majority of the mechanism of injury were playing football**. In contrast, it disagrees with Spörri et al,(2022)[29],** who reported that the most mechanism of injury among studied patient were an accidental case.

Concerning with the sleeping pattern among the studied groups and number of days with sleep disturbances, the results revealed that more than one third of the patients in both control and study groups were having sleep disturbances for 4 days and the results revealed that more than half of the patients in the control and study groups were not sleeping well. This agree with **DePhillipo et al,(2021)[30],** who reported that there was high incidence of acute self-reported sleep disturbances following arthroscopic knee surgery..**In contrast, it disagrees with Wainwright et al,(2019)[31],** who stated that there was an improvement in sleep quality and duration can be expected after total knee arthroplasty.

Regarding taking day time nap, more than half of the studied patients in the both groups were taking day time nap. This is in the same line with **Gulam et al, (2020)[32],** they reported that the majority of studied patients taking day time nap which affect their sleeping at night. **In contrast, it disagrees with Jensen et al, (2021)[33],** who reported that only one quarter of studied patients in both groups were taking day time nap.

In relation to smoking, half of the patients in the control and study groups were smoker. **In the same line with Costa et al,(2018)[34],** they reported that more than of studied patients were smoker. **As regard to drinking caffeine,** it was observed that more than half of the patients in control and study groups were drinking caffeine. This agree with **Garrett et al,(2021)[35],** who reported

that more than half of studied patients need caffeine to perform their work.

Concerning the acquisition of knowledge, the result of the current study revealed that more than half of the studied patients hadn't good level of knowledge regarding anterior cruciate ligament surgeries and sleep hygiene guidelines among the studied groups, before program implementation. This results were agree with **Hussein et al,(2020)[36], Piussi et al,(2021)[37],** reported that the majority of the studied sample had a good knowledge level. Additionally, the result of the current study revealed that more than half of the studied patients had satisfactory level of knowledge regarding anterior cruciate ligament surgeries and sleep hygiene guidelines among the study groups, after program implementation. This results were supported by, **Øiestad et al,(2018)[38],** reported that more than two third of studied patients had improvement in knowledge about sleep hygiene .

Regarding habits, practices and behaviors related to sleep hygiene of the studied patients. The results revealed that less than one quarter of the patients in the control and study groups were having good sleep hygiene at the second day of the operation, which developed after 1st week of operation in the study groups, then become much better in the study groups at the 2nd week of the operation. **This results agree with Anwer et al, (2019)[39]**, reported that sleep hygiene index show an acceptable internal consistency as well as a high reproducibility among studied sample.

Concerning with knee outcome survey-activities of daily living, the results of the present study revealed that there were improvements and statistically significant difference regarding the degree of performing activities of daily living, The patients' ability to perform their activities were improved as result of reduction of knee symptoms and improved knee function at 2nd week post operative. The activities of daily living scores also improved with time. **This finding agrees with Szczepanik et al,(2018)[40],** stated that there were an enhancement in knee function and reduction of knee symptoms in more than half of the studied patients.

Regarding Correlation between Total knowledge pre-program implementation with Total sleep Hygiene Index score, Total knee Outcome Survey Activities of Daily Living score and Total functional Limitations with Activities of Daily Living score at (2nd day of operation) in both groups. The present result revealed that there was highly statistically significant with positive correlation between total knowledge pre and total functional limitations with activities of daily living score (2nd day of operation) in two groups, highly statistically significant with negative correlation between total knowledge pre with total sleep hygiene index score and total knee outcome survey activities of daily living score (2nd day of operation) in two groups. This finding with the same line with, **Panagopoulos et al, (2020)[41],** who studied Cross-cultural adaptation of the greek versions of the lysholm knee scoring scale and tegner activity scale, reported that there was highly statistically significant with positive correlation between total knowledge and total functional limitations with activities of daily living score.

Regarding Correlation between Total knowledge post program implementation with Total Sleep Hygiene Index score, Total knee Outcome Survey Activities of Daily Living score and Total functional Limitations with Activities of Daily Living score at (1st week and 2nd week after operation) in both groups. The current result revealed that There was highly statistically significant with negative correlation between total knowledge with total sleep hygiene

index score (1st week post operation), total sleep hygiene index score (2nd week post operation), Total knee Outcome survey activities of daily living score (1stweek post operation) and total knee outcome survey activities of daily living score (2ndweek post operation) in study group. **In the same line with, Cui et al, (2020)[(42)].** who studied, Global, regional prevalence, incidence and risk factors of knee osteoarthritis in population-based studies, reported that there was highly statistically significant with negative correlation between total knowledge with total sleep hygiene index score.

Conclusion

Based on the finding of the current study, it can be concluded that: sleep is a fundamental aspect of health and well-being, particularly when recovering from an illness or injury. It is clear that there are recognizable environmental factors that can be removed or adjusted with relatively simple changes to practice and the use of earplugs and eye-masks. According to the results of this study, sleep hygiene guidelines program has a favorable effect on the activity of daily living among patients with anterior cruciate ligaments reconstruction, the patients' ability to perform this activity improved as result of improvement of sleeping habits and reduction of knee symptoms.

Recommendations

Based on the findings of the present study, the following recommendations are suggested: Provide clear instruction to patients about behavior change interventions that consider both personal (family obligations, attitudes towards sleep) and environmental factors (irregular work schedules, location of workplace) to provide a foundation for improvement of sleep hygiene- Regularity of rise time- Exposure to morning light and exercise for easy transition to sleep and sleep maintenance. It's recommended that future research in sleep hygiene focused on: Strategies that manage negative emotions at bedtime. Establishing high carbohydrates or tryptophan-rich foods.

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Effect of Buteyko Breathing Technique versus Diaphragmatic Breathing on Clinical Outcomes for Children with Lower Respiratory Tract Infection

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Abstract

Background: Lower Respiratory tract infection is the main cause of utilizing health services by children. Complementary therapies as buteyko and diaphragmatic breathing technique are used to improve clinical outcomes. **The current study was aimed to** evaluate the effect of buteyko breathing technique versus diaphragmatic breathing on clinical outcomes for children with lower respiratory tract infection. **Research hypotheses**:1-Children who are applying diaphragmatic breathing technique are expected to improve their breathing than control group. 2- Children who are applying buteyko breathing technique are expected to improve their breathing than control group. 3-Children clinical outcomes are expected to be improved lower respiratory tract infection as heart and respiratory rate, oxygen saturation. **Subjects and Method**: A convenience sampling of ninety children with lower respiratory tract infection participated in the study. The study was conducted at pediatric medical departments of Tanta Main University Hospital . **Five Tools were used to collect data**: Structured Interview Schedule, Control Pause Breathing Test, Physiological Measurement and Oxygen Saturation , Peak Expiratory Flow Rate, Children Clinical Outcomes. **The results :** Statistical significant differences were found regarding decreasing respiratory rate, increasing oxygen saturations after application of buteyko and diaphragmatic breathing technique. **Conclusion:** Both buteyko and diaphragmatic breathing had a positive effect on improve clinical outcomes as decreasing respiratory rate, increasing oxygen but buteyko breathing technique was more effective in improve clinical outcomes as on decreasing heart rate and improving peak expiratory flow rate than diaphragmatic technique for children with lower respiratory tract infections. **Recommendation:** Implementation of buteyko and diaphragmatic breathing technique should to be endorsed as a part of the routine care for children with lower respiratory tract infection to improve their clinical outcomes.

Keywords: Buteyko , Diaphragmatic, Breathing, Technique, Outcomes ,Children, LowerRespiratory, Infection .

Introduction

Respiratory system is most susceptible to infection from the external environment as a result of its frequent exposure to airborne particles, chemicals and infectious organisms, most common types of lower respiratory tract infections include pneumonia, asthma, bronchitis, bronchiolitis, tracheitis and tracheobronchitis, which are transmitted by inhaling airborne droplets.(1)

Lower respiratory tract infection is classified into acute or chronic respiratory tract infection. Acute lower respiratory tract infection as pneumonia, bronchitis and bronchiolitis may show signs of impaired in gas exchange and raised respiratory rate and chest retractions.(2)

Chronic lower respiratory disease is a group of conditions that affect the lungs; it is a serious illness influencing a large number of children as chronic bronchitis, emphysema, and bronchial asthma that are all characterized by shortness of breath caused by airway obstruction. (3,4)

Breathing exercises are helpful for reducing breathing difficulty, which allow children to be able to relax quickly during facing stressful situations. Breathing exercises have an important role in airway clearance and parenchyma expansion by improve the effectiveness of respiratory muscles as pursed lip breathing exercise, deep breathing exercise, diaphragmatic and buteyko breathing exercise.(5)

Several previous researches illustrate the effect of breathing exercise on the clinical outcomes for children with respiratory problems as asthma and pneumonia , it found that after implementation of buteyko breathing technique , there was an increase in the value of the peak expiratory flow rate and oxygen saturation compared to the previous pre-test. Other research on buteyko breathing techniques in controlling asthma, which means a difference between controlling respiratory manifestations after implementing buteyko breathing.(6)

Buteyko breathing technique is a type breathing exercise which utilizes breath control and breath-holding exercises to treat a wide range of medical issue associated with hyperventilation and low carbon dioxide. The technique aims to diminish hyperventilation by teaching child a method to hold their breath and assimilate shallow breathing technique with relaxation.(7)

Diaphragmatic breathing is slow and deep breathing technique through the nose utilizing using the diaphragm with a minimum chest movement. Diaphragmatic breathing is an important therapeutic strategy for children in different lower respiratory tract infection conditions to enhance the child ventilation and decrease the work of breathing and improve oxygenation and gas exchange.(8)

Nurses have an important role in managing children with lower respiratory tract infection, which includes the following: provide rest, fluids, good oral hygiene, change position frequently, suction and use humidified oxygen. Pharmacotherapy alone has limited role in improving the respiratory function, therefore the complementary and alternative approaches that can use for lower respiratory tract infection management as breathing exercise which make breathing more efficient. (9)

Significance of the study

Lower respiratory tract infections are a leading cause of morbidity and mortality for children. Lower respiratory tract infections represented around 11.9 million of young children hospitalized worldwide. Whereas applying breathing exercises have an important role in improving the efficiency of respiratory muscles. So the nurses should be applying breathing exercises to promote lower respiratory infection management for those children.(10)

Aim of the study

The study was conducted to evaluate the effect of buteyko breathing technique versus diaphragmatic breathing on clinical outcomes for children with lower respiratory tract infection.

Subjects and Method

A quasi-experimental research design will be used in the present study. The study was conducted at Pediatric Medical Departments of Tanta Main University Hospital which is affiliated to the Ministry of Highly Education and Scientific Research .

Sample

The total number of children with lower respiratory tract infection in the age between 6-12 years was 255 child/ last year at Pediatric Medical Departments of Tanta Main University Hospital . The sample size was calculated using Epi-info software statistical package and the calculation was based on type 1 error 0.05and confidence level 95%. A convenience sampling of 90 children with lower respiratory tract infection was collected from above previously mentioned setting. The sample was selected randomly.

They were divided into three equal groups:

1-**Study Group (I):** Thirty children who implemented buteyko breathing technique.

2- **Study Group (II):** Thirty children who implemented diaphragmatic breathing technique.

3-**Control group (III):** Thirty children who were received routine day hospital care.

Inclusion criteria of children: both sexes, aged from 6-12 years, children with lower respiratory tract infection (asthma, pneumonia, bronchitis-bronchiolitis).

The researcher started to implement the study, with buteyko group then, diaphragmatic group and finally control group who were received routine day hospital care .

Five tools were used in the current study as follow.

Tool I: Structured interview Schedule: It was developed by the researchers to collect the required information and it includes the following two parts:-

Part (1): Socio demographic characteristics of the studied children: as age, sex, educational level, residence, date and duration of admission.

Part (2): Medical History of the child related to lower respiratory tract infection: prescribed medication, history of the disease, triggering factors for symptoms, duration, treatment, complications, duration of last admission.

Tool II: **Control Pause Breathing Test.** It was adapted from (Buteyko International, 2014).[11] Buteyko breathing exercise used to assess the depth of breathing and consequent retention of carbon dioxide, result oxygenation and health by using special breathing hold manner, it was used before and immediately after the technique by using stopwatch .

Scoring system of children breathe holding time: -Control Pause (40 to 60 seconds): It indicated a normal, healthy breathing pattern and excellent physical endurance of children.

-Control Pause (20 to 40 seconds): It indicated mild impairment in breathing of children, most symptoms are not there, but may occur following triggering event.

- **From 10 to 20 seconds**: It indicated impairment of breathing and weak tolerance to physical exercise; inhalation and exhalation training and modifications of life were encouraged. Along with symptoms, such as blocked nose, snoring, insomnia, and coughing, short breath.

- **Under 10 seconds**: It indicated the vigorous impairment of breathing, very slow exercise tolerance, health is severely affected.

Tool III: Physiological measurement and oxygen saturation. Part (1): Basic physiologic measurement

as measuring temperature, heart and respiratory rate.

Part (2): Measurement of oxygen saturation using pulse oximeter. Scoring system of children oxygen saturation:

96-100% normal oxygen saturation
91-95% Mild desaturation .
85 -90% Moderate desaturation .
51-85% Hypoxic.

- **Tool IV: Peak expiratory flow rate:** It measured with mini wright peak flow meter device to display child capacity to expire out air through the bronchi, the meter test the ability to force out of the lung. [12,13]

It categorized into three zones of depth: green, yellow and red zone.

-Green zone: Peak flow result was between **80-100%** of child predicated value, this was the all clear zone.

-Yellow zone**:** peak flow result **50%-79%** of child, predicted value. This was the caution zone.

- Red zone: Peak flow results less than **50%** of child predicted value this was crisis.

Tool V: Children clinical outcomes: it was used to assess clinical outcome for both study groups (I, II) and control group (III) at pre and immediately after technique procedure it included:

- **Physiological measurement:** Improved temperature, respiratory, pulse rate.

-**Oxygen saturation:** Using pulse oximeter , higher oxygen indicated good breathing and prognosis .

-**Peak expiratory flow rate:** improvement in child capacity to expire out air through the bronchi.

Method

An official permission to conduct the study was obtained from the responsible authorities of the Pediatric Medical departments of Tanta Main University Hospital to obtain their approval and cooperation to conduct the study. Nature of the study would not cause any harm or pain to the entire subject, oral consents were obtained from parents and their children to participate in the study after explaining the aim of the study, they have the right to withdraw at any time from the study, children and their parents were informed about the confidentiality of their information and it was used only for the purpose of the study, study tools was developed &modified based on review of related literature: five tools was developed. A pilot study was carried out on nine children (10%) of the sample to test clarity, visibility and applicability of the study tools and the necessary modification was done, those children were excluded from total sample of the study.

- **Phases of the study:** The study was conducted through four phases:

1. Assessment Phase

It was done by the researcher for all studied subjects to assess children who met the inclusion criteria. The researcher firstly met chest nurses and resident doctors to explain the purpose of the study to gain their cooperation. Children and their parent were interviewed by the researcher. The parents were asked about socio demographic and medical data of their children to complete questions of (Tool I).

2. Planning Phase

Setting objectives of the buteyko and diaphragmatic breathing technique, preparation of the content (booklet, video), the duration of data collection was done within six month.

3. Implementation Phase

The researcher attended two day/ week from 9.00pm to 2.00 am , buteyko and diaphragmatic breathing technique was conduct in four sessions two day/ week , the first two sessions for group I and the second two sessions for group II, each group taught breathing technique in 2 sessions and the time of each session took about 30-45 minutes.

For (group I and II)

- The researcher measured the duration that a child could comfortably hold breathing before breathing technique (Tool II).
- The researcher recorded the physiological measurements of children (Tool III) included:
  - measure temperature, heart rate and respiratory rate. Measured oxygen saturation by instrument (pulse oximeter) before implementation breathing technique .
- The researcher measured peak expiratory flow rate by instrument(peak flow meter) before implementation breathing technique (Tool IV).
- The researcher initially implemented the procedure by herself, after completing data collection and then taught it to children and caregivers who volunteered to perform it by themselves under the researcher supervision.

After teaching the procedure

After 5consecutive days the researcher measured the following:

- Duration that a child can comfortably hold breathing immediately after breathing techniques (Tool II).
- Recorded physiological measurements and oxygen saturation of children immediately after breathing techniques using (Tool III).

The researcher measured peak expiratory flow rate of children after breathing technique using (Tool IV).

- The researcher recorded children clinical outcomes for both study groups (I, II) immediately after procedure technique (Tool V).
- Control group received hospital routine care provided to child and clinical outcome was measured and recorded before and immediately after routine care (Tool V).

4. Evaluation Phase

It was done to children to evaluate the clinical outcomes for both study groups (I, II) and control group (III) was done before and immediately after five days of teaching the procedure technique

- Comparison between the three groups was done.

Statistical analysis

The data collected were organized, tabulated and statistically analyzed using SPSS software (Statistical Package for the Social Sciences, version 26, SPSS Inc. Chicago, IL, USA). For quantitative data, the range, mean and standard deviation were calculated. For qualitative data, a comparison between two groups and more was done using Chi-square test ($\chi 2$). For comparison between means of two related groups (before and after data) of parametric data, paired t-test was used.[14]

Results

Figure (1): It was evident that 53.3% , 46.7% and 40% were between 6-8 years respectively in buteyko, diaphragmatic and control group.

Figure (2): It was observed that 43.3%,46.7 % and 53.3% of children have pneumonia respectively in buteyko, diaphragmatic and control group.

Figure (3): It was observed that the mean Score of control pause breathing before procedure was 17.8 which increased to 42.3.6 after procedure in buteyko group. Regarding diaphragmatic group, the mean Score of control pause breathing before procedure was 19.8 which increased to 32.64after procedure . Regarding control group, it was evident that the mean Score of control pause breathing before procedure was 19.8 which increased to 28.6 after procedure.

Table (1): Shows percentage distribution of the studied children regarding heart rate measurement before and after procedure. It was observed that after procedure, there were statistically significant differences in buteyko group (χ^2=5.711, p=0.017) where there were no statistically significant differences among the studied children (χ^2=2.443, p=0.118) (χ^2=0.000, p=1.000) respectively in diaphragmatic and control group .

Table (2) Shows percentage distribution of the studied children regarding respiratory rate measurement before and after procedure .It was found that after procedure, there were highly statistically significant differences (χ^2 =27.778 , P =0.0001) (χ^2 =20.317 ,P =0.0001) among the studied children respectively in buteyko and diaphragmatic group .On the other hand , there were no statistically significant differences (χ^2 =1.071, P = 0.301) in control group .

Table (3) illustrates percentage distribution of the studied children regarding measurement of oxygen saturation after procedure. It was noticed that after procedure, there were highly statistically significant differences where (χ^2 =24.093,P=0.0001), (χ^2 =9.600,P= 0.002) among the studied children respectively in buteyko and diaphragmatic group.

Table(4) Illustrates percentage distribution of the studied children regarding peak expiratory flow rate before and after procedure. Regarding level of peak expiratory flow rate, it was noticed that there were a highly statistically significant differences among children in buteyko group. (χ^2 =10.553,P=0.005) after buteyko technique .Where there were no statistically significant differences among studied children in diaphragmatic and control groups (χ^2 =4.903,P= 0.086)and (χ^2 =2.373, P =0.305) after procedure respectively in diaphragmatic and control group.

Table (5) Explains the correlation between socio demographic data and peak expiratory flow rate for studied children before and after the procedure .It was found that there was a positive non-significant correlation between age, sex, level of education of children in three groups and their peak expiratory flow rate among children of buteyko ,diaphragmatic and control groups before and after the procedure.

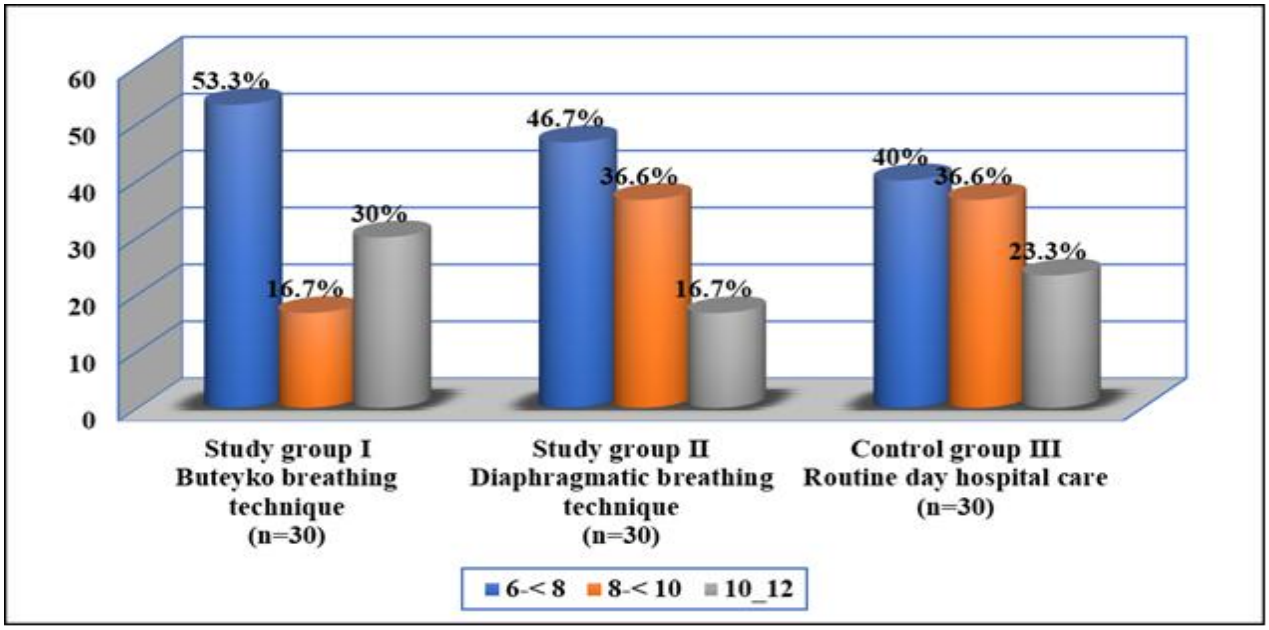

Figure (1): Age (years) of the studied children.

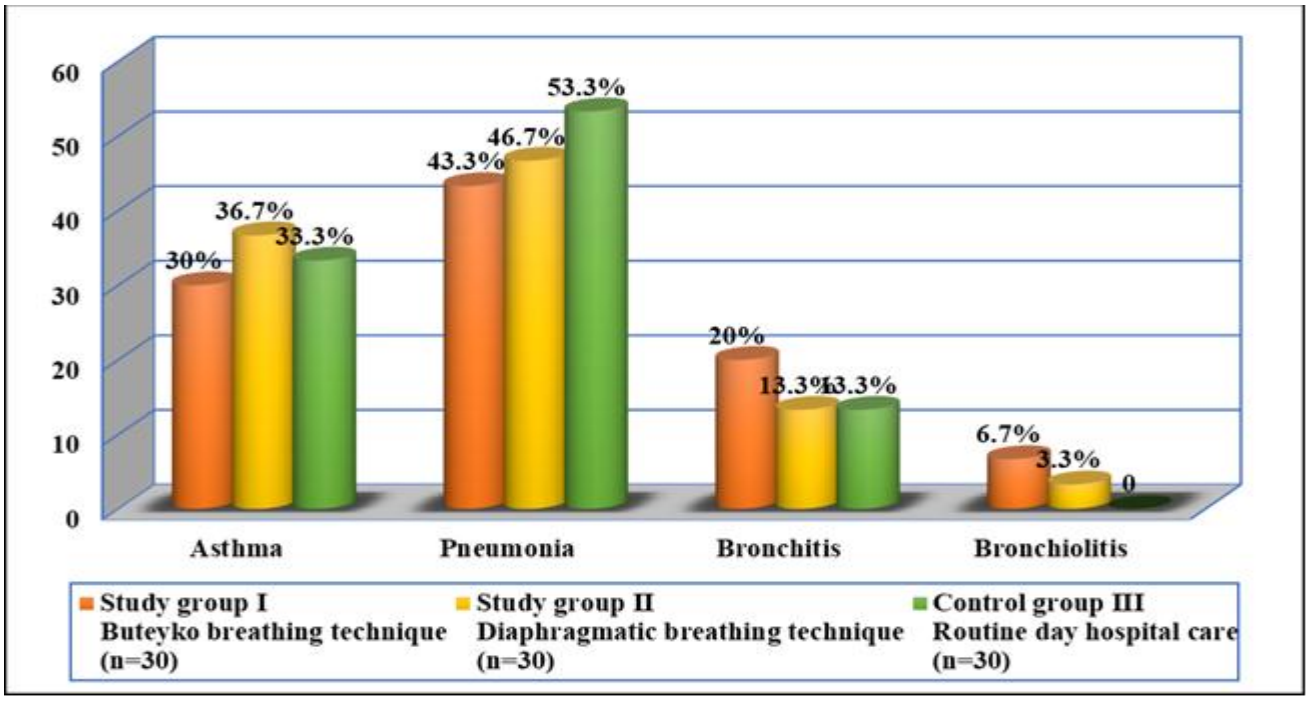

Figure (2): studied children related to types of disease (n=90)

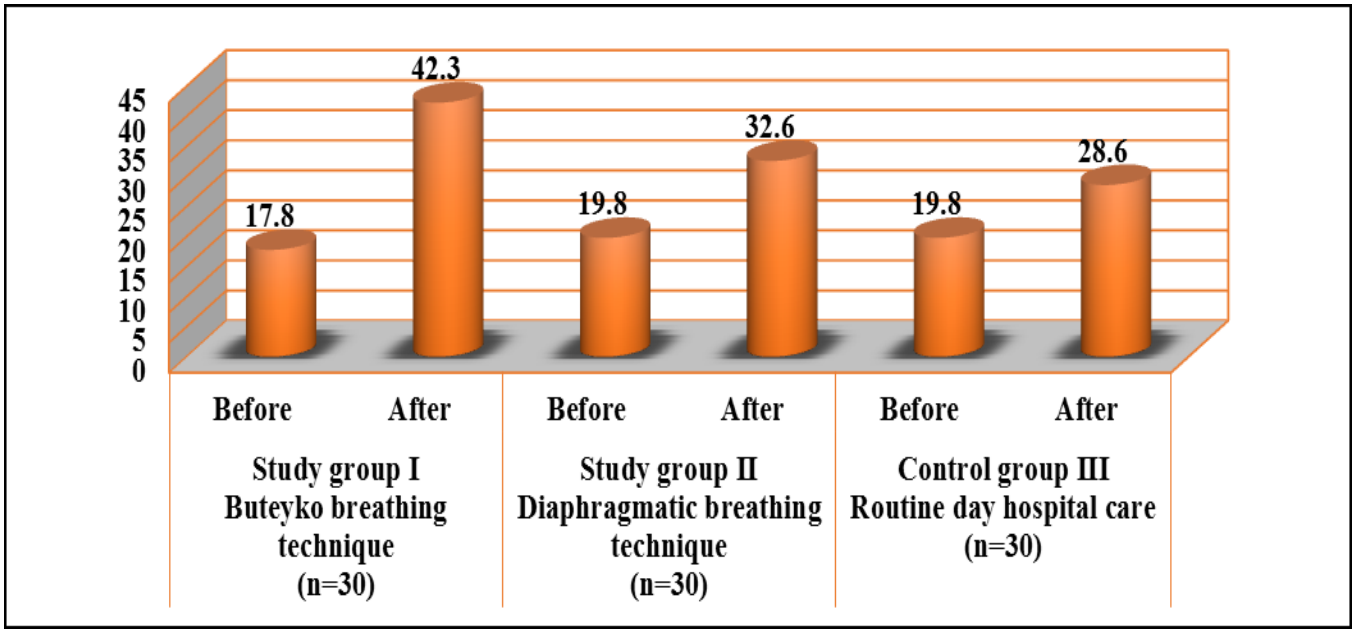

Figure (3): Mean scores of the studied children regarding control pause breathing score before and after procedure (n=90)

Table (1): Percentage distribution of the studied children regarding heart rate measurement before and after procedure.

Heart rate	Study group I Buteyko breathing technique. (n=30)				Study group II Diaphragmatic breathing technique (n=30)				Control group III Routine day hospital care (n=30)			
	Before		After		Before		After		Before		After	
	No	%	No	%	No	%	No	%	No	%	No	%
Normal (75 – 110)	14	46.7	23	76.7	17	56.7	20	66.7	14	46.7	14	46.7
Above normal (> 110)	16	53.3	7	23.3	13	43.3	10	33.3	16	53.3	16	53.3
χ^2, P	**5.711, 0.017***				2.443, 0.118				0.000, 1.000			
Range	94 : 131		90 : 130		92 : 134		85 : 130		91 : 133		90 : 131	
Mean ± SD	113.0±10.8		106.4±8.69		113.9±11.5		109.9±11.3		114.4±14.3		112.5±11.6	
t-test, P	**3.954, 0.0001****				2.048, 0.050				1.002, 0.325			

*** Statistically Significant difference at (P<0.05)**

**** Highly Statistically Significant difference at (P<0.01)**

Table (2): Percentage distribution of the studied children regarding respiratory rate measurement before and after procedure .

Respiratory rate	Study group I Buteyko breathing technique. (n=30)				Study group II Diaphragmatic breathing technique (n=30)				Control group III Routine day hospital care (n=30)			
	Before		After		Before		After		Before		After	
	No	%	No	%	No	%	No	%	No	%	No	%
Normal (18 – 24)	2	6.7	22	73.3	1	3.3	17	56.6	1	3.3	3	10.0
Above normal (> 24)	28	93.3	8	26.7	29	96.7	13	43.3	29	96.7	27	90.0
χ^2, P	**27.778, 0.0001****				**20.317, 0.0001****				1.071, 0.301			
Range	22 : 36		19 :28		24 : 35		20 :32		24 : 34		22 :33	
Mean ± SD	28.7±3.13		23.0±2.38		29.0±3.57		24.8±2.96		29.5±3.01		27.3±2.50	
t-test, P	**9.365, 0.0001****				**8.031, 0.0001****				**4.553, 0.0001****			

*** Statistically Significant difference at (P<0.05)**

**** Highly Statistically Significant difference at (P<0.01)**

Table (3): Percentage distribution of the studied children regarding oxygen saturation measurement before and after procedure.

Oxygen saturation	Study group I Buteyko breathing technique. (n=30)				Study group II Diaphragmatic breathing technique (n=30)				Control group III Routine day hospital care (n=30)			
	Before		After		Before		After		Before		After	
	No	%	No	%	No	%	No	%	No	%	No	%
Normal oxygen saturation (96 - 100%)	6	20.0	25	83.3	9	30.0	21	70.0	7	23.3	14	46.7
Mild Desaturation (91 - 95%)	24	80.0	5	16.7	21	70.0	9	30.0	23	76.7	16	53.3
χ^2, P	**24.093, 0.0001****				**9.600, 0.002****				10.729, 0.001**			
Range	92 : 96		95 : 99		93 : 97		94 : 99		93 : 97		93 : 98	
Mean ± SD	94.6±1.02		96.7±1.14		95.1±1.04		96.2±1.43		94.7±1.04		95.2±1.11	
t-test, P	**9.204, 0.0001****				**3.756, 0.001****				**2.504, 0.018***			

*** Statistically Significant difference at (P<0.05)**

**** Highly Statistically Significant difference at (P<0.01)**

Table (4): Percentage distribution of the studied children regarding peak expiratory flow rate before and after procedure.

Peak expiratory flow rate	Study group I Buteyko breathing technique. (n=30)				Study group II Diaphragmatic breathing technique (n=30)				Control group III Routine day hospital care (n=30)			
	Before		After		Before		After		Before		After	
	No	%	No	%	No	%	No	%	No	%	No	%
Levels of peak expiratory flow rate:												
Green zone (clear zone) 80-100% of child predicated value.	3	10.0	13	43.3	3	10.0	10	33.3	2	6.7	6	20.0
Yellow zone (caution zone) 50%-79% of child, predicted value.	13	43.3	12	40.0	15	50.0	12	40.0	13	43.3	12	40.0
Red zone (crisis) 50% of child predicted value.	14	46.7	5	16.7	12	40.0	8	26.7	15	50.0	12	40.0

χ^2, P	**10.553, 0.005****		4.903, 0.086		2.373, 0.305	
Score of peak expiratory flow rate						
Range	90 : 370	190 : 380	100 : 330	150 : 360	100 : 320	120 : 340
Mean ± SD	216.6±84.6	311.0±65.3	203.6±74.5	269.6±71.3	191.3±64.7	231.3±66.6
t-test, P	**7.866, 0.0001****		**9.577, 0.0001****		**7.261, 0.0001****	
Changes in peak expiratory flow rate after than before						
Range	10 : 250		10 : 180		0 : 150	
Mean ± SD	94.3±65.6		66.0±37.7		40.0±30.1	
Z value, P	**4.784, 0.0001****		**4.789, 0.0001****		**4.720, 0.0001****	
χ^2 value	**17.835**					
P	**0.0001****					

*** Statistically Significant difference at (P<0.05)**

**** Highly Statistically Significant difference at (P<0.01)**

Table (5): Correlation between sociodemographic data and peak expiratory flow rate for studied children before and after the procedure (n=90)

Socio demographic data	Study group I Buteyko breathing technique. (n=30)				Study group II Diaphragmatic breathing technique (n=30)				Control group III Routine day hospital care (n=30)			
	Before		After		Before		After		Before		After	
	R	P	R	P	R	P	R	P	r	P	R	P
Peak expiratory flow rate												
Age (Years)	0.175	0.354	0.284	0.128	0.143	0.451	0.044	0.819	0.174	0.358	0.097	0.611
Sex	0.286	0.125	0.108	0.570	0.072	0.707	0.138	0.468	0.198	0.295	0.233	0.214
Residence	-0.115	0.545	-0.139	0.463	0.041	0.830	0.033	0.862	0.075	0.694	0.043	0.867
Level of education	0.138	0.466	0.273	0.145	-0.077	0.686	0.071	0.710	0.242	0.198	0.148	0.436
Duration of admission/ length of hospital stay (days)	-0.050	0.792	-0.024	0.900	0.100	0.598	0.117	0.537	-0.081	0.669	0.150	0.430

Discussion

lower respiratory tract infection is one of the most prevalent infectious diseases in children is, it is the fifth reason for mortality worldwide and the most common infectious cause of death in children.[14]

Non-pharmacological interventions have gained attention in the treatment of lower respiratory tract infection as breathing exercises.[15]The current study was conducted to evaluate the effect of buteyko breathing technique versus diaphragmatic breathing on

clinical outcomes for children with lower respiratory tract infection.

It was evident that 53.3% , 46.7% and 40% were between 6-8 years respectively in buteyko, diaphragmatic and control group. The researcher illustrates that the current result may be due to young age children had higher predominance of lower respiratory tract infections . **Rodman (2022)** who in the same direction and reported that during the study period, the mean age of children with lower respiratory tract infection was 7.4 years.(16)

As regard types of lower respiratory infection, the current study showed that pneumonia was the most frequent type of lower respiratory tract infection. The current findings may attributed to pneumonia was the most prevalent infection in children and main reason for pediatric hospitalizations. **Ramesh(2021)** whose results were congruent with the present results and stated that bronchopneumonia was the more common diagnosis for lower respiratory tract infection among children under twelve years.(17)

Regarding control pause breathing score, the present study showed that buteyko breathing technique was more effective in increase mean scores of the studied children regarding control pause breathing score after procedure than diaphragmatic breathing technique.

The researcher illustrates that the current result may be due to the improvement in the post test to the decrease of the body sensitivity to CO_2 level in the blood as buteyko breathing technique involving a period of breath holding interspersed with periods of shallow breathing , which leads to dilatation of smooth muscles of respiratory system, and therefore optimizes ventilation perfusion matching.

This finding was in the same line with **Priyalatha (2018)** who supported the current result and reported that buteyko breathing technique was significantly effective in improving control pause breathing score in children .(18) While **Afshan (2020)** who disagreed with the current findings and stated that there was significant improvement in breath holding time, control pause breathing test of post-cardiac surgery group after using incentive spirometer when compared to the buteyko breathing technique group .(19)

The results of the present study showed that there were statistically significant differences decrease in the mean scores of pulses, respiratory rate after buteyko breathing technique. These findings may be due to that reduction in heart rate may come from the relaxation state in all system of the body that presented by a drop in the heart rate and buteyko exercise is designed to slow down or reduce the lungs' air intake to reduce interference with the respiratory tract in infection after buteyko exercise.

This finding was supported by **Hassan (2022)** who reported that there were highly statistically significant differences regarding decrease of means respiration and heart rates of children who received buteyko breathing technique after the procedure. (20) While **Rai ,Hembrom, Sharma (2018)** who disagreed with these findings and recorded that the heart rate in the post-test was higher than that in the pre-test after practice of buteyko breathing exercise .(21)

Concerning the diaphragmatic group, the current study showed that there was a statistically significant difference in the studied children regarding decrease mean of respiratory rate after diaphragmatic breathing exercise and no statically significant regarding heart rate .

The justification of the researcher toward the current results may be due to diaphragmatic breathing requires slow, rhythmic inspiration and expiration with emphasis on the diaphragm muscle moving downward on

inhalation and upward on exhalation. The exhalation phase is prolonged than the inhalation phase leading to a decrease in respiratory rate.

This finding was in the same line with **Mendes (2019)** who noticed that there was a significant decrease in the breathing rate and a significant increase in inspiratory time and expiratory time were observed for diaphragmatic breathing group. [22]

Regarding mean scores of oxygen saturation , the result of the current study revealed that there were statistically significant differences among the studied children of buteyko and diaphragmatic groups after procedure .The current result may be illustrated on the basis that buteyko breathing technique is aimed to reduce pulmonary ventilation which will increase the carbon dioxide levels in human body. The increase of carbon dioxide levels is leading to an increase in the oxygen partial pressure that forces the oxygen to be released from the hemoglobin, it was increase the oxygen delivery into the tissues and cells.

This finding was in the same line with **Sullivan(2019)** who mentioned that buteyko breathing technique assists in balancing the CO_2 levels, causing smooth oxygenation, and can help decrease the occurrence of hypoxia and hyperventilation .[23]

Regarding diaphragmatic breathing exercises have direct effect on the oxygen saturation as ventilation become easy and an child can inhale maximum oxygen after normal expiration .Through diaphragmatic breathing exercise, diaphragm fully expands and more air is inhaled in the lungs which leads toward increase in the stamina and flexibility of the respiratory muscles and improve oxygen saturation. **Russo(2017)** who reached the same result and notified that there diaphragmatic breathing has various physiological effects in humans which decreased alveolar dead space and increasing the arterial oxygen saturation. [24]

Regarding peak expiratory flow rate , the current study revealed that there were a highly statistically significant differences among children in buteyko group. The present results may be explained on the basis that buteyko breathing helps to improve bronchospasm which lead to increase maximize speed of expiration which leads to a significant improvement in peak expiratory flow rate.

This result was supported by **Rajendra (2020)** and **Hassan(2022)** who found that comparison of pre and post values of peak expiratory flow rate were done and it shows the significant improvement in peak expiratory flow rate after the intervention of buteyko breathing exercise.[25,20] On the contrary **Arora (2019)** who mentioned that the there was no statistically significant difference in peak expiratory flow rate and functional capacity suggesting that both conventional physiotherapy and buteyko breathing did not bring about an improvement in peak expiratory flow rate and functional capacity.[26]

It was found that there was a positive non-significant correlation between age, sex and level of education of children in buteyko ,diaphragmatic and control groups and their peak expiratory flow rate before and after the procedure. This result can be explained that socio demographic characteristic of children in three groups was nearly equal and this may reflect buteyko and diaphragmatic breathing technique effect not controlled by age ,sex or educational level, but can give a significant effect for all children .

This result was in agreement with **Mohamed (2019)** who notified that after application of the buteyko breathing exercise, there were no statistically significant correlation amongst among the study group's age, gender and risk factors with asthma control levels.[27] Beside

Perciavalle (2017) whose results was in the same line with the current results who found in his study there were no significant changes were observed in experimental and control group were found between both sex after practice deep diaphragmatic breathing exercise.[28]

On the other hand, **Vaishnav (2020)** whose results also were against the present results as they mentioned that in buteyko group significant relations among level of peak expiratory flow rate before technique and their selected socio-demographic characteristic as level of education, residence, length of illness, age, gender, religion. [29]

Conclusion and Recommendations

Based on the findings of the present study, it can be concluded that that both buteyko and diaphragmatic breathing exercise had a positive effect on improve clinical outcomes than control group as decreasing respiratory rate and increasing oxygen saturations but the buteyko technique was more effective in improve clinical outcomes as on decreasing heart rate and improving peak expiratory flow rate than diaphragmatic technique for children with lower respiratory tract infections .

Recommendations

Based on the findings of the present study, the following recommendations are suggested:

For nurses

1-Continuous in-service educational training programs should be conducted for chest nursing staff about the application of buteyko and diaphragmatic breathing technique and its effect on improve clinical outcomes for children with lower respiratory tract infections.

2- Implementation of betyko and diaphragmatic breathing technique should be endorsed as a part of the routine care for lower respiratory tract infections children to improve clinical outcomes.

For hospital administration

1- Hospital managers are encouraged to include buteyko and diaphragmatic breathing techniques in the training program for chest nurses and recommended to be included in the hospital protocol for the management of lower respiratory tract infections.

For future nursing researches

1- Replication of the study using a larger probability sample from different geographical areas, on various age groups, and on other breathing exercises procedures to attain more generalization of results.

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Nurse Mangers' Time Management Strategies and its Relation to Their Effective Delegation in Intensive Care Units

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Abstract

Background: Time management is important component of work performance and professional nursing practice. Delegate skill is an important part of time management for managers' success, abilities and performance in hospital. So,the present study **aimed** at assess the relation between nurse managers time management strategies and its relation to their effective delegation skill in intensive care units .**Subject and**. **Method:** Descriptive-correlational research design was utilized in current study. **Setting:** The study was conducted at Tanta University Main Hospitals and El-Menshawy General Hospital, which affiliated to Ministry of Health in El-Gharbia Governorate. **Subject:** included all (n=200) nurse mangers working in the previously mentioned settings and available at time of data collection. collected by using two **tools:** 1- nurse managers perception of time management strategies questionnaire. And 2- nurse managers perception of delegation making effectiveness scale. **Results:** Regarding overall time management and over all delegation more than two - third (68.2%) of nurse managers had unsatisfactory level at Tanta university Hospital and El-Menshawy General Hospital. **Conclusion:** There was statistically significant correlation between nurse managers overall time management strategies and effective delegation skills . It was **recommended:** to support nurse managers time planning and establishing prioritizes lead to raise organization and improvement

Keywords: Nurse managers , Time management strategies, Importance of delegation skill, Relation between time management and delegation.

Introduction

Nurse mangers are professional nurses appointed leadership position with authority on nurses for effective performance, responsibility for resource utilization and accountability for work outcome. (1) They provide services to health care organization in appropriate, efficient equitable manner. Nurse mangers, as other managers, have four types of resources which are personnel, equipment, finance, and time .(2) Time management is the ability to use time effectively by quality of doing the right task correctly and efficiently by right utilization of resource for right task. Nurse manager can use time effectively through learning time management strategies, these include time planning and establishing prioritize, completingthehighest priority task, reprioritize what tasks importance, not urgency, setting short term and long term goal ,making to do list. (3)

The position of nurse mangers in ICUs requires essential skills including good supervision, interpersonal communication ,delegation and time management skills in order to lead and direct staff nurses.(4) So, they should be familiar with human resources procedures regarding promoting nursing personnel to manage and evaluate staff nurses.

Nurse managers have four kinds of resources ,people, equipment, money, and time. They perform the managerial task. Effective management of time helps get more work done, produces a higher work quality, and decreased stress with good time organization. Additionally, there is a better sense of self-control, improved self-image. Time management is essential to successfully performing and progressing as a nurse along.[5] Nurse mangers face time wasters as disorganization, excessive supervision, under delegation procrastination, interruptions, too much information, inability to say no. Time management is a skill like other skills, it requires behavior modification by replacing wasteful time habits with more effective habits.[6]

There many factor affecting time management including; inadequate information and communication systems; unnecessary phone; over- employment; bad management; unexpected visits, hesitation in decision -making, unsound delegation; wrong order of priorities. Interruption during work, starting to implement tasks without prior thinking and planning, moving to new task before accomplishing a present one, and obsession with less important routine matter

Time management skills mean focusing time on the things that are most important It also means spending less time on everything else. Effective time management includes better scheduling, improved decision-making, better organization, and time leverage, increases job satisfaction and improves mental health. [7] Nurses manager need to improve their time management skills in order to provide health care services with high quality include prioritizing, goal setting, and delegation. [8] Delegation is a leadership and management strategies designed to maximize time management , transfer of responsibility for performance of an activity from one nurse manager to another while retaining accountability for the outcome.[9] There are many reasons for delegation , the most important reason of delegation is saving time. Delegation maximizes the use of the talents of nurse manager. It can build trust and increase self-esteem, and job satisfaction. [10] Nurse mangers learn by doing. Their involvement tends to increase their management skills, motivation, and commitment to delegation, the delegation, or sharing of the work and responsibility with other nurse managers involves three important concepts and practices: responsibility, authority, and accountability. [11] Responsibility refers to the assignment itself and the intended result that means setting clear expectations. It also means nurse manager avoid prescribing nurses how the assignment should be completed.[12] Authority refers to the appropriate power given to the individual or group including the right to act and make decisions. It is very important to communicate boundaries and criteria such as budgetary considerations. Accountability refers to the fact that the relevant nurse managers must ‘answer’ for their actions and decisions along with the rewards or penalties that accompany those actions or decisions. [13] There are basic guidelines to help nurse managers to delegate more effectively: including what task to delegate, clarify the results, clearly define the nurse manager responsibility, define nurse manager authority over the delegated task, fairness in delegating staff nurses, be sure nurse manager understand authority, establish a time limit and establish a follow-up schedule.[14]

Effective delegation allows nurse managers to promote high productivity and

efficiency, generate a culture of enthusiasm, innovation, creativity, cooperation, and openness. It reduces nurse turnover and furnish the organization with better-qualified, more skilled nurse managers. Delegation maximizes the use of the talents of nurse manager. It can build trust and increase self-esteem, pride, and job satisfaction .(15)

Barriers of delegation .

Under -delegating, over -delegating, and improper delegating. Nurse mangers make recurrent mistakes in delegation. Nurse managers have a false guessing that delegation may be explained as lack of ability to do job correctly or completely that means under delegation. (16) Nurse managers make under delegation because they fail to anticipate the help they will need .Nurse managers are emerging from the clinical nurse role under delegate because they find it difficult to assume the manager role. There are some of activities need to do by nurse managers, but their first task is to make sure every nurse accomplish assigned task to achieve organizational goals and mission team. (17)

Significance of study

Nurse managers work in a context with high level of pressure, uncertainty and rapid changes accompanied by the challenges in intensive care units. So, the The effective use of time management tools becomes even more important to enable nurse mangers to meet personal and professional goals, nurses managers need to be good time management to cope with health organization.(18)

Delegation build trust and increase self-esteem, and job satisfaction. Nurses manager define which responsibilities to delegate to achieve their plan as timeline, cooperate with others in the organization.(19)

Aim of the Study

Assess the relation between nurse managers time management strategies and its relation to their effective delegation skill in intensive care units.

Research question:

What is the relation between nurse managers time management strategies and its relation to their effective delegation skill in intensive care units?

Subjects and Method

Study design: A descriptive correlational study design.

Setting: The study was conducted at Tanta University Main Hospitals and El-Menshawy General Hospital, which affiliated to Ministry of Health in El-Gharbia Governorate .

Subject included all (n=200) nurse mangers working in the previously mentioned settings and available at time of data collection including; Tanta University Main Hospital, nurse manger (n=130) and El- Menshawy General Hospital, nurse managers (n=70).

Tools

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

First tool I: Nurse mangers' Time Management Strategies Self-reporting Questionnaire include

Part (1). Personal characteristics of nurse mangers, age, sex, martial status, unit, education level, years of experience and hospital name.

Part (2). Nurse mangers' Time management strategies questionnaire. It will consist of activities that reflect nurse mangers uses of time management strategies including 23 items about nurse managers it divided in to, time planning and establishing prioritizes(10) items , completing the highest priority task(5) items and reprioritize what tasks(8) items .

Scoring system Likert Scale ranging from (1) "never"(2) sometimes and (3) always

– Satisfactory time management skills > 60%

– Unsatisfactory time management skills < 60%

Part (3). Factors affecting nurse mangers' time management strategies included (22) items, it divided into Personal factors(7)items as spending more time answering social telephone calls than caring for patients. Administrative and organizational factors (15) items as failure to delegate routine task, a lack of daily or weekly set up. Nurse Mangers' responses will be measured on three points.

Scoring system , Likert scale ranging from (1) disagree ,(2) neutral and(3) agree.

- High level of perceived factors >75%
- Moderate level of perceived factors < 60-75
- Low level of perceived factors < 60%

Second tool II: Nurse mangers' effective delegation questionnaire .This tool included (25) items, it will be used to reflect nurses manger' uses of effective delegation. It will be covered the three basic concepts and practice of delegation as Authority (8) items as involve employees in goal setting. Responsibility (7) items as when they delegate a project, they make sure that everyone involved knows who is in charge. Accountability (10) items as control about work of the delegate member. Nurse mangers, responses will be measured on three points.

Scoring system Likert scale ranging from (1) "rarely"(2) sometimes and (3) always. The total score will be calculated by summing scores of all categories. The total scores represent varying levels as

-Satisfactory delegation ≥60%

Unsatisfactory delegation skills < 60%.

Method

1-Official permission to conduct the study was obtained from the dean of Faculty of Nursing to Emergency Hospital and Main University Hospital Director.

Ethical consideration

a- Approval of ethical committee at faculty of nursing was obtained.

b- Nature of the study will not cause any harm or pain to the entire subjects.

c- Oral formal consent for participation was obtained after explanation of the nature and the purpose of the study.

2-The tools were translated into Arabic and presented to a jury of five experts in the area of specialty to check content validity and clarity of the questionnaire.

3-Suitable statistic test was done for its reliability, reliability of the study tools was used tested using Cronbach's alpha coefficient test, where reliability of tool (1) = 0.953, reliability of tool = 0.906, and it's both value = 0.942 and the content validity value was 0.985.

4-Pilot study was carried out on a sample (10%) n=200 of nurse managers to test the tools for its clarity, applicability estimate time needed to fulfill it , the sample was included in the total study subjects.

Results

Figure (1): This figure Illustrates more than two - third (68.2%) and more than half (51.9%) of nurse managers had unsatisfactory level regarding overall time management strategies at El-Menshawy General Hospital and Tanta university Hospital.

Figure (2): This figure shows around half (57.6%,44.4%) of nurse manager had high level of perceived factor at El-Menshawy General Hospital and at Tanta University Hospital respectively.

Figure (3): this figure shows that around two-third (68.1%,54.1%) of nurse manager had unsatisfactory levels at Tanta University Hospital and El Menshawy General Hospital ,respectively regarding overall delegation skills.

Table (1): represent distribution of nurse managers according to the

personal characteristics, This table shows ,as total nurse managers (40.7%) aged30-≥40years while13.6% aged ≥50 years with mean age 37.97±8.65 years. All (100%) nurse managers were female and the majority (96.8%)of them were married.

Table (2): showed mean score, percent score and rank of time management strategies among nurse managers, with statistically significantly difference at both hospitals regarding domain of time management strategies. The first rank was for time planning and establishing prioritizes. As total (61.0±21.37) nurse managers had mean score ,while (64.22±21.82), (56.59±19.84) their mean score at Tanta University Hospital and at ELmenshawy General Hospital respectively.

Table(3): shows mean score, percent score and rank of factors affecting nurse managers time management strategies. As total there was statistically significant difference at both hospital regarding overall factors, personal factor and administrative factor affecting nurse managers.

Table(4): shows mean score,percent score and rank of nurse managers effective delegation domain. As total (58.95±20.50) nurse managers had mean score, while, (62.78±19.89), (50.59±18.64) their mean score at Tanta University Hospital, and at El Menshawy General Hospital respectively

Table (5):showed, Correlation between nurse manager's time management strategies and their effective delegation. this table shows correlation between nurses manager time management strategies and their effective delegation except accountability for all domains, as total ,there was positive statistically significant correlation among three domains.

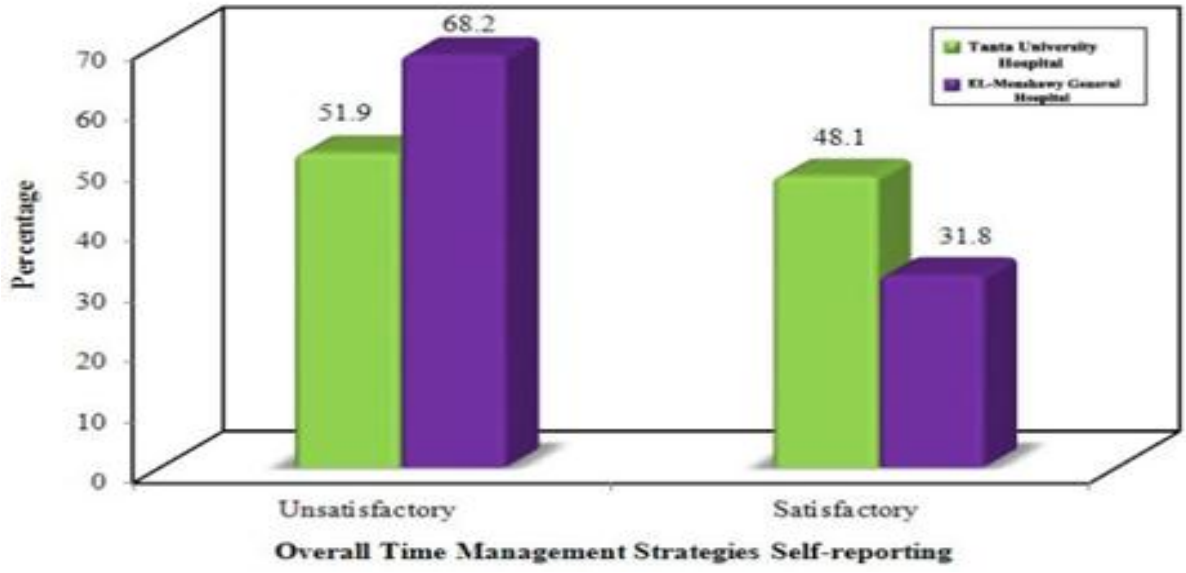

Figure (1): Distribution of nurse manager according to overall time management

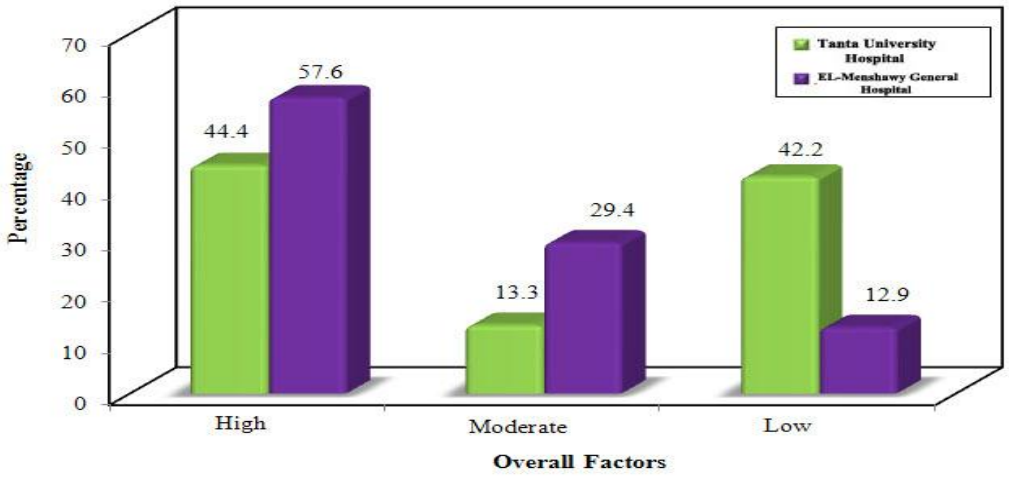

Figure (2): Distribution of nurse manager according to levels of factors affecting nurse managers time management strategies .

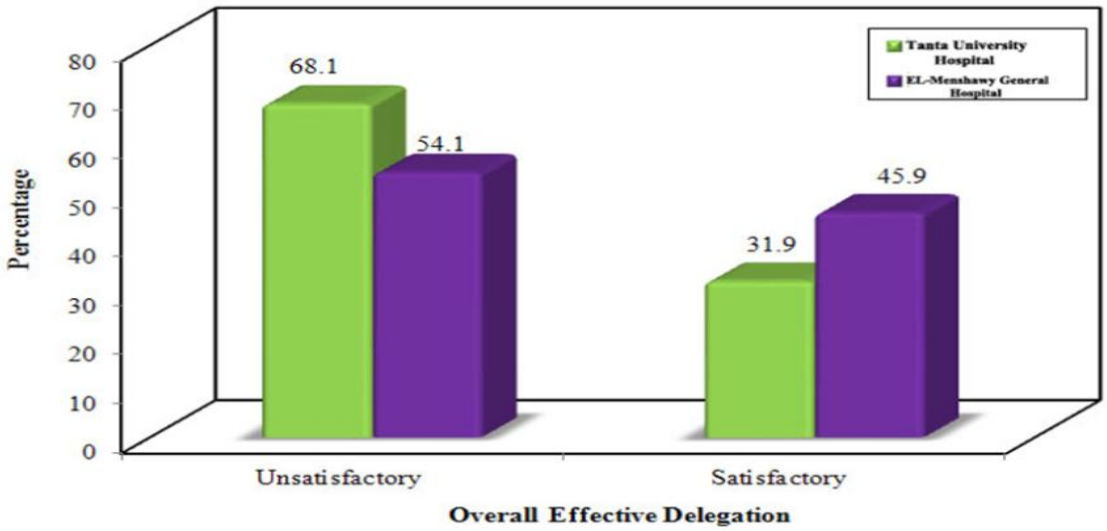

Figure (3): Distribution of nurse manager according to levels of over all delegation affecting nurse managers time management strategies.

Table (1): Distribution of nurse managers according to personal characteristics (n=200)

Part(1): Personal characteristics of nurses manger	**Total (n = 200)**		**Tanta University Hospital (n = 130)**		**El-Menshawy General Hospital (n = 70)**		**Test of Sig.**	**P**
	No.	**%**	**No.**	**%**	**No.**	**%**		
Age (years)								
< 30	40	18.2	10	7.4	25	35.3		
30- > 40	74	40.7	50	43.7	30	38.2	χ^2=	
40- < 50	56	25.5	41	30.4	10	17.6	31.812*	<0.001*
≥ 50	30	13.6	25	18.5	5	5.9		
Min. – Max.	23.0 - 55.0		24.0 - 55.0		23.0 - 55.0		U=	
Mean ± SD.	37.97 ± 8.65		40.59 ± 40.59		33.81 ± 7.57		2922.50*	<0.001*
Median	35.0		39.0		34.0			
Sex								
Male	-	-	-	-	-			
Female	200	100.0	130	100.0	70	100.0		
Marital status								
Single	7	3.2	3	2.2	4	4.7	χ^2=	FEp=
Married	198	96.8	128	97.8	68	95.3	1.044	0.434
Unit name								
Neurology care unit	29	13.2	28	20.7	1	1.2		
Intensive care unit	26	11.8	11	8.1	15	17.6		
Neonatal care unit	36	16.4	3	2.2	33	38.8	χ^2=	MCp=
Emergency care unit	17	7.7	15	11.1	2	2.4	112.279*	<0.001*
child care unit	32	14.5	23	17.0	9	10.6		
Chest care unit	2	0.9	6	4.5	-	-		
Anaesthesia care unit	27	12.3	22	16.3	-	-		
Cardiology care unit	9	4.1	6	4.4	3	3.5		
Educational qualification		.						
Bachelor of nursing	130	71.8	85	69.6	50	75.3		
Technical institute of nursing	30	21.4	30	24.4	10	16.5	χ^2= 2.193	0.334
Diploma of nursing	15	6.8	8	5.9	7	8.2		
Years of Experience								
< 10	40	20.9	10	8.1	30	41.2	χ^2=	
10- < 15	60	30.5	30	30.4	20	30.6	39.067*	<0.001*
≥ 15	100	48.6	70	61.5	10	28.2		
Min. – Max.	1.0 - 35.0		1.0 - 35.0		1.0 - 30.0		U=	
Mean ± SD.	14.65 ± 8.06		17.47 ± 7.41		12.18 ± 6.50		2704.50*	<0.001*
Median	14.0		15.0		11.0			
Training courses								
Yes	190	91.8	125	96.3	60	84.7	χ^2=	0.002*
No	10	8.2	5	3.7	10	15.3	9.327*	

Table (2): Mean score, percent score and rank of time management strategies among nurse managers .

Nurses manager Time Management Strategies	Total (n = 200)	Tanta University Hospital (n = 130)	El-Menshawy General Hospital (n = 70)	Rank	U	P
Time planning and establishing prioritizes						
Total Score	**(10 – 30)**					
Min. – Max.	13.0 – 30.0	15.0 – 30.0	13.0 – 30.0			
Mean ± SD.	22.20 ± 4.27	22.76 ± 4.38	21.32 ± 3.97			
Median	20.0	20.0	20.0			
% Score				**1**	4703.0*	0.020*
Min. – Max	15.0 – 100.0	30.0 – 100	15.0 – 100.0			
Mean ± SD.	61.0 ± 21.37	64.22 ± 21.82	56.59 ± 19.84			
Median	50.0	50.0	50.0			
Completing the highest priority task						
Total Score	**(5 – 15)**					
Min. – Max.	6.0 – 15.0	8.0 – 15.0	6.0 – 14.0			
Mean ± SD.	10.90 ± 2.25	11.42 ± 2.08	10.06 ± 2.26			
Median	10.0	10.0	10.0			
% Score				**3**	4239.50*	0.001*
Min. – Max.	10.0 – 100.0	25.0-100.0	10.0 – 90.0			
Mean ± SD.	58.95 ± 20.50	62.78 ± 19.89	50.59 ± 18.64			
Median	50.0	50.0	50.0			
Reprioritize of task						
Total Score	**(8 – 24)**					
Min. – Max.	10.0 – 24.0	14.0 – 24.0	10.0 – 22.0			
Mean ± SD.	17.56 ± 3.31	18.21 ± 3.32	16.52 ± 3.03			
Median	16.0	16.0	16.0			
% Score				**2**	4456.50*	0.004*
Min. – Max.	12.50 – 100.0	37.50 – 100.0	12.50 – 87.50			
Mean ± SD.	59.74 ± 22.68	63.84 ± 20.75	53.24 ± 22.94			
Median	50.0	50.0	50.0			
Overall Time Management Strategies						
Total Score	**(23 – 69)**					
Min. – Max.	36.0 – 69.0	40.0 – 69.0	36.0 – 63.0			
Mean ± SD.	50.65 ± 7.96	52.39 ± 7.89	47.89 ± 7.29			
Median	47.0	50.0	46.0			
% Score					3739.0*	<0.001*
Min. – Max.	28.26 – 100.0	36.96 – 100.0	28.26 – 86.96			
Mean ± SD.	60.12 ± 17.29	63.90 ± 17.15	54.12 ± 15.85			
Median	52.17	58.70	50.0			

Table (3): Mean score, percent score and rank of factors affecting nurse managers time management strategies

Factors affecting nurses time management Strategies	Total (n = 200)	Tanta University Hospital (n = 130)	El–Menshawy General Hospital (n = 70)	Rank	U	P
Personal factors	**(7 – 21)**					
Total Score						
Min. – Max.	9.0 – 21.0	11.0 – 21.0	9.0 – 19.0			
Mean ± SD.	15.40 ± 2.86	16.04 ± 2.74	14.40 ± 2.76			
Median	14.0	14.0	14.0			
% Score				**2**	4114.0*	<0.001*
Min. – Max.	14.29 – 100.0	19.57 – 100.0	14.29 – 85.71			
Mean ± SD.	60.03 ± 20.42	58.55 ± 19.60	52.86 ± 19.72			
Median	50.0	50.0	48.0			
Administrative and organizational factors	**(15 – 45)**					
Total Score						
Min. – Max.	20.0 – 45.0	22.0 – 45.0	20.0 – 44.0			
Mean ± SD.	34.92 ± 6.40	36.30 ± 6.72	32.73 ± 5.18			
Median	33.0	33.0	33.0			
% Score				**1**	4243.50*	0.001*
Min. – Max.	16.67 – 100.0	23.33 – 100.0	16.67 – 96.67			
Mean ± SD.	66.41 ± 21.32	64.55 ± 19.6.0	59.10 ± 17.25			
Median	60.0	50.0	60.0			
Overall Factors affecting nurses time management Strategies	**(22 – 66)**					
Total Score						
Min. – Max.	32.0 – 66.0	33.0 – 66.0	32.0 – 62.0			
Mean ± SD.	50.33 ± 8.45	45.34 ± 8.71	47.13 ± 6.96			
Median	50.0	50.0	46.0			
% Score					3892.50*	<0.001*
Min. – Max.	22.73 – 100.0	25.0 – 100.0	22.73 – 90.91			
Mean ± SD.	64.38 ± 19.20	62.96 ± 19.78	57.11 ± 15.81			
Median	63.64	68.18	54.55			

Table (4): Mean score, percent score and rank of nurse managers effective delegation .

Nurses effective delegation	Total (n = 200)	Tanta University Hospital (n = 130)	El-Menshawy General Hospital (n = 70)	Rank	U	P
Authority	**(8 – 24)**					
Total Score						
Min. – Max.	12.0 – 24.0	12.0 – 24.0	13.0 – 24.0			
Mean ± SD.	17.85 ± 3.30	17.53 ± 3.40	18.38 ± 3.07			
Median	16.0	16.0	18.0			
% Score				**1**	4475.50*	0.004*
Min. – Max.	25.0 – 100.0	25.0 – 100.0	31.25 – 100.0			
Mean ± SD.	61.59 ± 20.62	61.54 ± 21.27	64.85 ± 19.21			
Median<	50.0	50.0	62.50			
Responsibility	**(7 – 21)**					
Total Score						
Min. – Max.	7.0 – 21.0	7.0 – 21.0	8.0 – 21.0			
Mean ± SD.	15.09 ± 3.19	15.47 ± 3.35	14.48 ± 2.84			
Median	14.0	14.0	14.0			
% Score				**2**	4772.50*	0.028*
Min. – Max.	0.0 – 100.0	0.0 – 100.0	7.14 – 100.0			
Mean ± SD.	58.79 ± 22.79	59.53 ± 23.93	56.45 ± 20.25			
Median	50.0	50.0	55.0			
Accountability	**(10 – 30)**					
Total Score						
Min. – Max.	14.0 – 30.0	14.0 – 30.0	15.0 – 28.0			
Mean ± SD.	21.64 ± 3.87	22.01 ± 4.14	21.06 ± 3.35			
Median	20.0	20.0	21.0			
% Score				**3**	5143.50	0.184
Min. – Max.	20.0 – 100.0	20.0 – 100.0	25.0 – 90.0			
Mean ± SD.	55.20 ± 19.37	58.04 ± 20.71	55.29 ± 16.73			
Median	50.0	50.0	50.0			
Overall Effective Delegation Self-reporting	**(25 – 75)**					
Total Score						
Min. – Max.	37.0 – 75.0	37.0 – 75.0	40.0 – 71.0			
Mean ± SD.	54.59 ± 8.76	55.01 ± 10.04	53.92 ± 6.23			
Median	52.0	50.0	54.0			
% Score					5250.0	0.281
Min. – Max.	24.0 – 100.0	24.0 – 100.0	30.0 – 92.0			
Mean ± SD.	56.17 ± 17.53	58.01 ± 20.08	55.84 ± 12.45			
Median	54.0	50.0	58.0			

Table (5): Correlation between nurse manager time management strategies and their effective delegation .

Nurse managers effective delegation		Nurse managers time management strategies			
		Completing the highest priority task	Time planning and establishing prioritizes	Reprioritize of task	Overall Time Management
Responsibility	r_s	0.165*	0.056	0.071	0.153*
	P	0.014*	0.410	0.292	0.023*
Authority	r_s	0.222*	0.191*	0.138*	0.303*
	P	0.001*	0.004*	0.041*	<0.001*
Accountability	r_s	0.057	-0.069	0.125	0.092
	P	0.399	0.305	0.063	0.172
Overall effective delegation	r_s	0.203*	0.040	0.152*	**0.202***
	P	0.002*	0.556	0.024*	**0.003***

Discussion

Time management is a way to develop and use processes and tools for maximum efficiency, effectiveness, and productivity. It involves mastery of a set of skills like setting goals, planning, assigning priorities, and the effective use of time to achieve desired results. In time management, nurse managers are managing their time better and are simply making better decisions about what they do and how they will do it[20]. Delegation is an art and skill of professional nursing that is considered as one of the core concepts and major element of the organizing and directing functions of nursing management by which nurse managers entrusting someone else to accomplish parts of their job to meet specific client and organizational goals .Effective delegation gives the nurse managers more time to concentrate on what is urgent and important and can improve job satisfaction, responsibility and productivity.[21] **Nurse managers' time management strategies.** The present study finding showed more than half of nurse

managers hadunsatisfactory level regarding overall time management strategies with statistically significantly difference This is result is consistent with **Abilio, andMaria, (2021)**[22]

who reported that learning to manage time is a problem for many nurse managers and many nurse not try to use time management skills. Also, **Dudovskiy, (2020)**[23] reported that time management is complex concept. The finding of current study, showed that first rank was for time planning and establishing prioritizes domain of time management strategies. This result may be due to majority of nurse managers force theirselves to make time for planning, do not postpone today's work to tomorrow, **Silva, Khan, Jung, and Han, (2020).** [24] they found that more than half of nurse manager had high rank for time planning and establishing prioritize tasks in working. On other hand, **Ageiz, and Eid,**

(2019) [25], disagreed with this result and reported that more than two- fifth of nurse manager had poor time planning. The present study showed that more than half of nurse managers had unsatisfactory level regarding completing the highest priority task, this result may be due to high workload, improper planning of nurses, and poor organization of technique and ineffective time management, and had no chance of training programs. This result is in agreement with **El-Shaer, et al., (2020)**[26] and **Kisa, and Ersoy**, et al, **(2019)** [27] who found that more than half of nurse managers unsatisfied with completing the highest priority task .The current study result showed that nearly two-thirds of nurse managers had unsatisfactory level regarding to reprioritizes of task. This result may be due to shortage of staff nurses, increase stress and pressure on nurse manager and increase wokload with limited supplies. The result supported with **Grissom, Loeb, and Mitani, (2021)**[28] reported more than forty of nurse manager had high unsatisfaction level with reprioritizes of task.

Nurse managers' factor. Specifically, the current study regarding overall factor ,demonstrated more- two fifths of nurse manager had moderate level of administrative factor at both hospital. This finding is consistent with**, Habib, Afzal, Hussain, and Naseer, et al., (2019)** [29] who found that one third of manager nurses had high level administrative factor. **Also Hardiker, and Staniland,. et al, (2018)**[30] who demonstrated that high percent of nurse managers had high perceived organizational factor. Specifically, the result showed that more than half of nurse managers had neutral agreement that not able to implement time management guidelines.

The current study demonstrated that administrative and organizational factor had the first rank with statistically significantly difference at Tanta University Hospital and Elmenshawy General Hospital among nurse managers .This result may be due to nurse managers had adequate information about polices and laws of their organization ,fair delegation of duties to personnel according to personnel capabilities . This result supported with **Qteat, and Sayej, et al, (2020)** [31] who reported that the organizational factor had the highest mean score which came first in rank. Specifically, the current study demonstrated more- two fifths of nurse manager had moderate level of administrative factor at both hospital. This result may be due to majority of nurses suffering from bad organizational management and leadership style, shortage human resources .**Hussain, and Naseer, et al., (2019)** ([32]) who found that one third of manager nurses had high level administrative factor. Also who demonstrated that high percent of nurse managers had high perceived organizational factor. The current study demonstrated that personal factor had the lowest rank with statistically significantly difference This result may be due to nurse manager are working under pressure affects time management, lack of motivation and reward affect quality of care. **Vassilis, (2021).**[33] who reported majority of nurse managers had perceived personal factor.

Nurse managers' effective delegation.

The finding of current study showed that nurse managers had unsatisfactory level regarding over all delegation. This result is in consistent with **Abu-Bakr, et el., (2020)** [34] and et **Alfadli, and Al-mehaisen al.,(2019)** [35] who reported that majority of nurse manager unsatisfication with delegation of authority. The current study

finding showed that nurse managers had first rank for authority with statistically significantly difference between both hospital regarding authority, responsibility and accountability of effective delegation skill. This is may be due to nurse managers repeat the details of the task to delegate, give person authority for accomplishing task. **Thomas. et al., (2020)** [36] who found that the highest percentage of nurse managers had proper delegation in their tasks with subordinates.

This result showed that more than two-thirds nurse managers had unsatisfactory levels regarding responsibility. This result is accordance with **Demers,, et al., (2021)** [37] who supported that the majority of nurse managers were unsatisfied with delegation of responsibility. Also **Gamal, and Adam, et al 2020,**[38] who reported that high level satisfied with responsibility. Specifically, the result finding regarding responsibility, showed that more than half of nurse managers sometimes use the ideas of outside experts to develop nursing care, make their decisions in line with the goals of the organization. This result is supported by **Gassas,. Mahran, and Banjar, et al., (2020)** [39] who agreed that more than forty of nurse manager had delegation of responsibility. The current result finding showed that more than half of nurse manager had unsatisfactory regarding accountability. This result is in accordance with **Josephsen, (2021)** [40] found that more than forty nurse managers unsatisfied with accountability of delegation. Also, **Judge, Weiss, Kammeyer, and Hulin**. **(2020)**[41] agreed with this result

Correlation between nurse manager's time management strategies and their effective delegation.

The current study finding showed that there was statistically significant correlation between nurse managers overall and all domains of time management and their effective delegation skills**.** . The result is supported with **Linnen, and Rowley (2021)** [42] who found that a significant correlation of authority and accountability on time management strategies

Conclusion

The study result concluded that , as total, there was statistically significant difference at El-Menshawy General Hospital and Tanta university Hospital, more than two - thirds of nurse managers had unsatisfactory level ,regarding overall time management strategies, with first rank for time planning and establishing prioritize. In **addition around half of** nurse managers had high level of perceived factor regarding over all factor with first rank for administrative and organizational factor. Also around two-third of nurse managers had unsatisfactory levels with first rank for authority regarding over all delegation skill. There was statistically significant correlation between nurse managers overall time management strategies and effective delegation skills.

Recommendations

Based on the results of the present study, the following recommendations are suggested for:

1-Conduct frequent scientific meetings and congresses for nurse managers to improve delegation skill , especially promotion for nursing position.

2- Encourage nurse managers to use time management strategies to generate a strong work environment and culture that indorses effective time management. Especially the problems affecting administrative time management in health organizations

3- Empower nurse managers through advocating their right for respect, provide support, psychological counseling and comprehensive care for nurses and open door policy and uses two-way communication on a regular basis.

- Asses the administrative strategies for enhancing newly head nurses' supportive role to their nursing staff.

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Perceived Social Support and its Relation with Mental Adjustment among Women Diagnosed with Breast Cancer

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Abstract

Women with breast cancer experienced many problems in various aspects of their lives, that they use active approaches which can result in improving their psychosocial adaptation to the disease. Social support buffers the harmful impacts of cancer. ***Aim of the study*:** was to evaluate perceived social support and its relation with mental adjustment among women diagnosed with breast cancer ***Subject*:** 85 women with breast cancer as a convenient sample from both inpatient and outpatient services of oncology Department of Tanta University Hospital was included. ***Study design***: a descriptive correlation research design was utilized. ***Tools* of the *Study*: Tool 1:** Perceived Social support scale, include 2 parts: **Part one**: Socio-demographic Characteristics and Clinical Information. **Part two**: Perceived Social support scale. **Tool 2**: Mental Adjustment to Cancer Scale. ***Results*:** majority 74.1% women had moderate social support while one third 25.9% of them had high social support. The majority 78.8% of women had adapted in fighting spirit subscale of positive adaptation. But two thirds 68.2% of them had not adapted in anxious preoccupation, hopelessness /helplessness, and avoidance subscales of negative adaptation subscales while 31.8% of them had adapted. ***Conclusion***: perceived social support dimensions were not statistically significant correlated with mental adjustment to cancer dimensions. Also perceived social support dimensions with positive & negative mental adjustment to cancer dimensions. While breast cancer severity & degree was statistically significant related with positive mental adjustment dimensions. ***Recommendations***: women showing negative psychological responses to cancer need to psychiatric intervention during cancer treatment.

Key words: Breast Cancer, Mental Adjustment, Social Support

Introduction

One of the most feared and a dreaded disease is cancer that the individuals expose nowadays. This unhappiness is not defensible, since maximum malignancies are preventable or can identified and healed primarily sufficient to reach a treatment. A tumor identification is a difficult and probably painful experience, and although once positive cure, the cancer identification and management may remain to be a cause of significant suffering [(1)].

The most common disease around the world presently is breast cancer and nearly leads to deaths. Cancer led to suffering and disturbs person adaptation from the pre-identification time to the final incurable time. Also, breast cancer has numerous harmful results on person's wellbeing. Breast cancer women hurt by complications produced from operation, chemotherapy, radiotherapy and hormonal treatment, along with family and work life problems, and they are unclear around upcoming, which have harmful impacts on their bodily and psychosocial health [(2)].

Fighters of sarcoma and their relatives face numerous illness-related real and expressive difficulties, e. g. worries from relapse and somatic problems. As the spouse, helpers, and other health care providers considered significant individuals have the potential to provide belonging, tangible, emotional, appraisal social support countering difficult things of the illness. A decreased social support has been related to disease-related load and lower value of life or distress [(3)]. Increased social support levels have been related to confident results, such as improved overall health status, increased life value, and better adjustment to a cancer diagnosis, as well as fewer psychosocial problems. High societal sustenance is related to lower risk recurrence [(4)].

Shared support denotes to the mental and physical assets delivered by a social link to assist individual handle stress. This social support come in different forms sometimes might include assisting somebody with many regular jobs when they are unpleasant or presenting economic assistance when they need. It includes providing guidance to associates when they are fronting a problematic condition. And sometimes it simply contains presenting concern, compassion for valued persons in requirement [(5)]. In previous researches, societal sustenance was also known as an important issue easing tumor patients' mental suffering and identified as interactive associations which guard persons from the harmful impact of tension, and is believed to conserve the individual by enhancing behavioral adjustment for tension or other dangers to health, as tumor [(6)].

Sustenance expected by a woman is possibly affecting her capability to find and practice associated data, control her feelings, and take serious healing choices. To improve the appreciative part of social sustenance in easing the managing energies of cancer person [(7)].

The concept of apparent shared sustenance is measured big real instrument for handling with life difficulties. It is measured as an element of one’s faith scheme that marks a person harder yet in the circumstances that are painful in natural surroundings. Apparent shared sustenance denotes to probable existing societal sustenance that may result from various grounds of the person's environment they joined to such as family, friends, teachers, and community. [(3)]

Heavy shared support, lower invasive ideas, and escaping beforehand cure correlated to healthier adaptation one month afterward cure, and shared support shortage was

related to increased despair, worry and lesser value of life. Hopefulness provoked shared support and lowered depression. In advanced phases of illness development, social sustenance seemed to be improved [8].

Societal sustenance shows a significant part in a cancer patient lifetime, it recognized as apparent security, loving, help and respect the person obtains from surroundings. The occurrence or lack of societal sustenance can be an important source inducing the growth of cancer. Societal sustenance contributing to accepting and appreciating themselves, in the intervening time, there is somebody who esteems and concerns for them [9].

The existence of helpful interactive associations has the probability of affecting health of cancer fighters, and it appears to be an important modifier of hopeful and progressive feeling. Societal sustenance has continuously been identified as a dominant firearm for handling with the encounters and life hassles. It has been reflected as a powerful strength for preserving wellbeing in all world societies [10].

The properties of social sustenance had quantified by researchers on mental welfare and additional results. Societal sustenance has been originated to defense the harmful impact of cancer. It has also been related to greater life value. Psychological sustenance repressed low managing approaches and was so connected with adaptations. It was also linked to low suffering. Generally, Psychological sustenance was the kind of sustenance greatest preferred and greatest intensely associated with adaptations [11].

Breast sarcoma is related to enormous psychological problems that patient need to manage through managing approaches, which can disturb cure results and persistence degrees of breast tumor [12].

The adjustment concept denotes to mental procedures that happen in terminated period, which considers the societal environment of knowledge involvement of individual, and adjusting to various alterations which need to result from the illness and its management. The managing approaches with the identification of tumor are related to the course of mental adaptation for tumor in the extended time. Optimism and practice of positive managing approaches such as fighting spirit or difficult resolving, recognizing welfares in the understanding and communicating feelings related to cancer are all linked to larger mental adaptation and better quality of life**. Watson et al,1993** established the psychological adaptation to tumor measure to quantity intellectual and conduct reactions of cancer suffering patients [13].

The implied supposition lies in managing will replicate a stable attitudinal or communicative patterns in the persons challenged with an identification of cancer. In psychological adaptation, the intellectual and conduct reactions for tumor are interpreted as composed by appraisal, consisting in the person's perception of cancer consequences, thoughts and behaviors to reduce the danger of illness [14].

Folkman's and Lazarus' concept of stress management can be utilized as psychological adaptation for tumor, According **to Watson and Greer (1993),** psychological adaptation is recognized as "the intellectual and behavioral reactions the person does to the identification of tumor". Psychological adaptation and managing have been recognized as a significant influence for mental condition of patients with tumor [15].

Adjusting kinds are the individual intellectual or conduct energies to cope with the difficulties of a traumatic condition.

While the efficacy of adjusting approaches used by persons detected with cancer differs through conditions and must not be expected early adjusting managing kinds (e.g., struggling soul, looking for sustenance) are totally related to ideal adaptation, while negative adaptation styles (e.g., powerlessness- desperateness, worried uneasiness, avoidance) stay linked by reduced psychological results [16].

Psychological adaptation involves appraisal, in term of how the person recognizes the consequences of sarcoma & the resultant responses and what persons thinks, and does toward decreasing threat posed by the disease. Adaptation reaction such as struggling soul, labeled as "an extremely hopeful approach, associated with exploration of large data for breast tumor", have been stated to be useful, while replies as deserted- desperateness, when persons stay empty of optimism and understand themselves as extremely sick, expressed a harmful influence on psychological wellbeing [15].

Since tumor is a serious illness of life, influenced persons' psychological adaptation to their illness broadly measured [16]. Adaptation to tumor indicates that coping through cognitive and behavioral avoidance is detrimental to adjustment [17].

The study aim

To evaluate the perceived social support and its relation with mental adjustment among women diagnosed with breast cancer

Questions of this research

- What is the level of social support among women diagnosed with breast cancer?
- What is the level of mental adjustment among women diagnosed with breast cancer?
- What is the relation of perceived social support with mental adjustment among women diagnosed with breast cancer?

Study subjects and method:

The design of study

The design used for this study is a descriptive correlation research

The study setting:

The study was conducted on oncology department at both inpatient and outpatient services of at Tanta university hospital which is belonging to Ministry of High Education.

Subjects

The study included a convenient sample of 85 women. Epi-Info software statistical package determined study sample number. Sample size calculation criteria were as follows: 95% self-confidence level and predictable result is 70% with border of mistake: 5% the sample size based on the formerly stated standards should be N >80. Sample size chased from the above setting conferring to the following:

Inclusion criteria

1- Women diagnosed with breast cancer

2- Willingness of women to participate in the study.

3- Communication ability of women to participate in the study

The criteria excluded

1-Patients who had mental disorder.
2-Patients who were mentally retarded or other co-morbidities

Tools:

Tool 1: Perceived Social support scale, include 2 parts:

Part 1: **Socio-demographic Data and Medical Evidence Interview Schedule**.

It included demographic data as age in years, wedded condition, habitation, education levels, work condition, economic status and religion. **Medical Evidence** included schedule of follow up (3 months, 6 months, one year, other), duration of illness, onset of illness,

Part **2: Perceived Social support scale:** Interpersonal support evaluation list shortened version **Cohen, S., & Hoberman, H. (1983) [18],** it include 12-items quantity social support perceptions. This measure is a shortened version of the original ISEL (40 items; Cohen & Hoberman, 1983). This questionnaire has three diverse subscales planned to quantity three subitems of perceived social support. These subitems are:

1.) Appraisal Support subscale include: Items 2, 4, 6, 11

2.) Belonging Support subscale include: Items 1, 5, 7, 9

3.) Tangible Support subscale include: Items, 3, 8, 10, 12

For each subitem is scored by 4 items on a 4-point score fluctuating from "Definitely True" to "Definitely False".

Social Support Scoring: The reverses scored are items of: 1, 2, 7, 8, 11, 12. All scores are kept continuous.

Scoring system: from each total score the minimum and maximum score can be acquired is 12 and 48 in that order, and 4 & 16 in that order for each subscale and A score of:

- 12–16 is poor perceived social support.
- 17–32 as moderate social support.
- 33–48 as high perceived social support.

Tool 2: Mental Adjustment to Cancer Scale (MAC): it was developed by **Watson et al, (1988) [(19)],** and include a 40 element quantity the psychological (Coping) responses that cancer patients can exhibit to adapting to the diagnosis and treatment of their illness. The responses esteemed by 4 point likert scale ; Definitely does not apply to me (1), Does not apply to me (2) , Applies to me (3) , Definitely applies to me (4). By adding up the answer of the assigned item for each subscale to calculation of its score.

A questionnaire of self-rating which could be administered. Five dimensions are measured by the MAC scale:

1-Fighting Spirit (FS; 16 items) characterized by a determination to fight the illness and the adoption of an optimistic attitude.

2-Anxious Preoccupation (AP; 9 items) characterized by constant preoccupation with cancer and feelings of devastation, anxiety, fear, and apprehension.

3- Helplessness/Hopelessness (HH; 6 items) characterized by feelings of giving up and engulfment by knowledge of the diagnosis and a pessimistic attitude.

4-Fatalism (FA; 8 items) where the patient puts herself in the hands of God, while she takes 1 day at a time and,

5- Avoidance/Denial (AV; 1 item) where the patient distracts herself and avoids thinking about the illness.

Scoring system:

By adding up the answers of the assigned items for each subscale to calculation of its score.

This score was converted into a percent score, and classified into the following two categories:

-Positive mental adjustment: fighting spirits 16-64

< 50% Not adapted (16-39)

≥ 50% Adapted (40-64)

-Negative mental adjustment: Anxious Preoccupation, Helplessness/Hopelessness, Fatalism, Avoidance /Denial 24-96

<50% adapted (24-59)

≥ 50% not adapted (60-96)

Methods

The following steps were accomplished to this study:-

1. The oncology directors of the department at Tanta University Hospital received official letter from the dean of the faculty of

nursing to give their consent for gathering of the data.

2. Ethical considerations

- The agreement of Scientific Research Ethical Committee of the Faculty of Nursing at Tanta University was obtained.
- After explanation the purpose of the study to women, informed consent was obtained from them.
- Privacy of women was being respected and confidentiality of data and women were being assured about this.
- The right of women was respected to withdraw during the data collection period at any time.
- Women were not exposed to harm or pain during the study.

3- Internal validity of the study tools (I part 2, II) were tested by five experts in psychiatric nursing and translated into Arabic language by the researchers. Therefore required corrections were carried out.

4- Using Cronbach's alpha test for reliability of study tools was found to be 0,912 and 0,873 in that order for tool 2, tool 3 which signified greatly reliable tools.

5- Identifying the barriers and problems for tools, and testing the clarity for it by a pilot study was conducted on 10% of women with breast cancer **before conducting the actual study** and accordingly the necessary modification were done.

6- Actual study of data collection:

- The women' records reviewed by the researcher and selected according to the inclusion criteria by getting their approval to carry out the research from the appropriate authorities.
- Women informed by the researcher to the nature of the study, and invite them to participate in the study and gathering the information over interview by face to face contact with each woman to evaluate the social support, and the mental adjustment levels.
- The women met the researcher within range of three to four days per week, the number of the women every day range from 2 to 6 women and the time needed to collect the data sheet ranged from 30 to 45 minute conferring to the condition of women tolerability to answer the questions. The duration of data collection was five months, starting from 1st March to the end of Jun 2022.

Analysis of the statistical data

SPSS software were using to organize, tabulate data collections statistically analyzed using statistical computer package version 26.For numerical data, the range, mean and standard deviation were calculated. The relation between variables was calculated by Pearson's correlation coefficient (r). For categorical variables, the number and percentage were calculated. Variances between categories of each variable were statistically analyzed using chi square test (X2). The level of significance was adopted at $p < 0.05$

Table 1 clarifies distribution of the studied women according to their sociodemographic characteristics. Concerning women age; the majority (60%) of women aged more than 45 years, (34.1%) of them aged 35 to less than 45 years and 5.9% of them aged less than 25 to less than 35 years. In relation to the residence; above half (51,8%) of them were living in urban while (48.2%) of them were living in rural community.

In regarding to marital status, most (94.1%) of them were wedded and 5.9 % of them were widowed, (35.3%) of women were illiterate while the 28.2% of them had college graduate. and only 9.4% had postgraduate education. Regarding work condition; three quarter of studied women (62.4%) had not working and one quarter

(37.6%) of them had working. In concerning to income, **58.8% of them** had adequate income while 41.2% of them had inadequate income.

Table 2 shows the percent distribution of the studied breast cancer women according to their medical history characteristics. Regarding breast cancer (Tumour) severity stages 32.9% of women had stage II and only 2.4% of them had stage IV. In concerning to time since diagnosis 56.5% of women had one year and more diagnosed with breast cancer. While 23.5% of them had <6 months, and only 5.9% of them had 10–<12 months. 71.8 % of women exposed to mastectomy, and 28.2% of them exposed to Lumpectomy.

Regarding to received adjuvant chemotherapy 85.9% of women received adjuvant chemotherapy. And 14.5% received adjuvant radiotherapy. Regarding past history of family to breast cancer 88.2% had no family history to breast cancer but 11.8% of them had family history to breast cancer.

Figure1 presents the percent distribution of women diagnosed with breast cancer according to their perceived social support level. It shows that the majority (74.1%) of women had moderate social support while **nearly** one third (25.9%) of them had high social support.

Figure 2 presents the distribution of women diagnosed with breast cancer according to their mental adjustment to cancer. The majority (78.8%) of women had adapted in fighting spirit subscale of positive adaptation while 21.2% of them had not adapted. but more than two thirds (68.2%) of them had not adapted in anxious preoccupation, hopelessness /helplessness, and avoidance subscales of negative adaptation subscales while 31.8% of them had adapted.

Table 3 show the correlation between perceived social support dimensions of the studied women diagnosed with breast cancer and their mental adjustment to cancer (MAC) dimensions.as perceived social supports dimensions was not related statically significant with mental adjustment to cancer dimensions at p: 0.581. And also perceived social support dimensions were not related statically significant with positive and negative dimensions of mental adjustment to cancer at p: 0.144, p: 0.774 respectively.

Table 4 presents the effect of the medical history women with breast cancer on their positive & negative mental adjustment to cancer (MAC) score as breast cancer severity & degree was statistically significant related with positive mental adjustment at p: 0.032. And there was no statistically significant relation with the other items of medical history and positive mental adjustment.

Concerning time since diagnosis a statistically significant relation was found between it and negative mental adjustment to cancer at p: 0.043, also type of surgery was a statistically significant related with negative mental adjustment to cancer at p: 0.040.

Table 5 shows the effect of the socio–demographic characteristics of the studied women with breast cancer on their social support score. Marital status was positively significant related with social support at p: 0.002, the educational level was positively significant related with social support at p: 0.003. Also occupation was positively significant related with social support at p: 0.001.

Table 6 shows the effect of the socio–demographic characteristics of the studied women with breast cancer on their mental adjustment to cancer (MAC) score. The

income was positively significant related with mental adjustment to cancer at p: 0.030. But mental adjustment to cancer was not significantly related with the rest of sociodemographic characteristics.

Table (1): Percent distribution of the studied women diagnosed with breast cancer according to their socio–demographic characteristics.

Characteristics	The studied women (n=85)	
	N	%
Age (in years)		
- 25-<35	5	5.9
- 35-<45	29	34.1
- ≥ 45	51	60.0
Residence		
- Rural	41	48.2
- Urban	44	51.8
Marital status		
- Married	80	94.1
- Widow	5	5.9
Educational level		
- Illiterate	30	35.3
- Primary & essential school	7	8.2
- Secondary school	16	18.8
- College graduate	24	28.2
- Postgraduate education	8	9.4
Income		
- Enough	50	58.8
- Not enough	35	41.2
Occupation		
- Work	32	37.6
- Not work	53	62.4

Table (2): Percent distribution of the studied women diagnosed with breast cancer according to their medical history characteristics.

Medical history	The studied women (n=85)	
	N	%
1-Breast cancer (Tumour) severity stages		
- stage I	24	28.2
- stage II	28	**32.9**
- stage III	16	18.8
- stage IV	2	**2.4**
- Unclassified	15	17.6
2-Time since diagnosis (In months)		
- <6	20	23.5
- 6–<10	12	14.1
- 10–<12	5	**5.9**
- One year and more	48	**56.5**
3- Type of surgery		
- Lumpectomy	24	**28.2**
- Mastectomy	61	**71.8**
4- Received adjuvant chemotherapy		
- Yes	73	**85.9**
- No	12	14.1
5- Received adjuvant radiotherapy		
- Yes	41	48.2
- No	44	**51.8**
6-Family history of breast cancer		
- Nil	75	**88.2**
- First/second degree relative	10	11.8

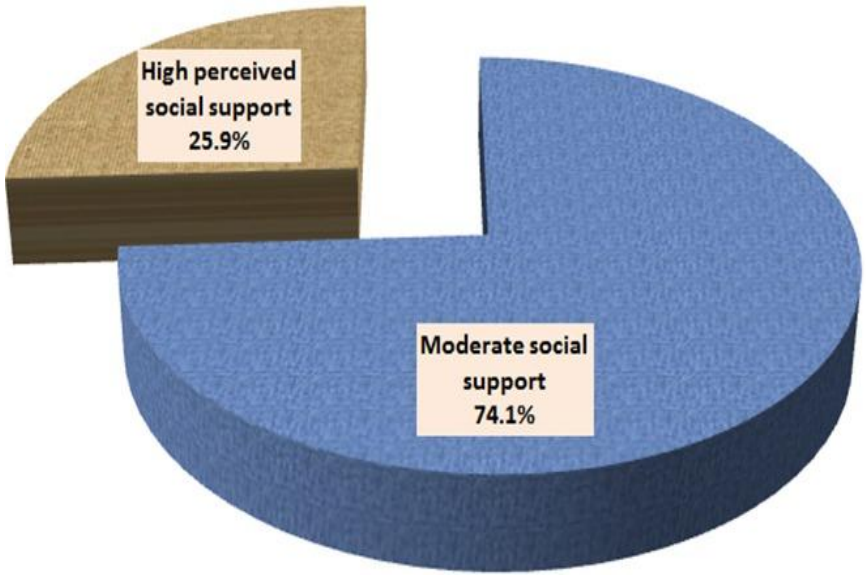

Figure (1): Percent distribution of the studied women diagnosed with breast cancer according to their perceived social support level

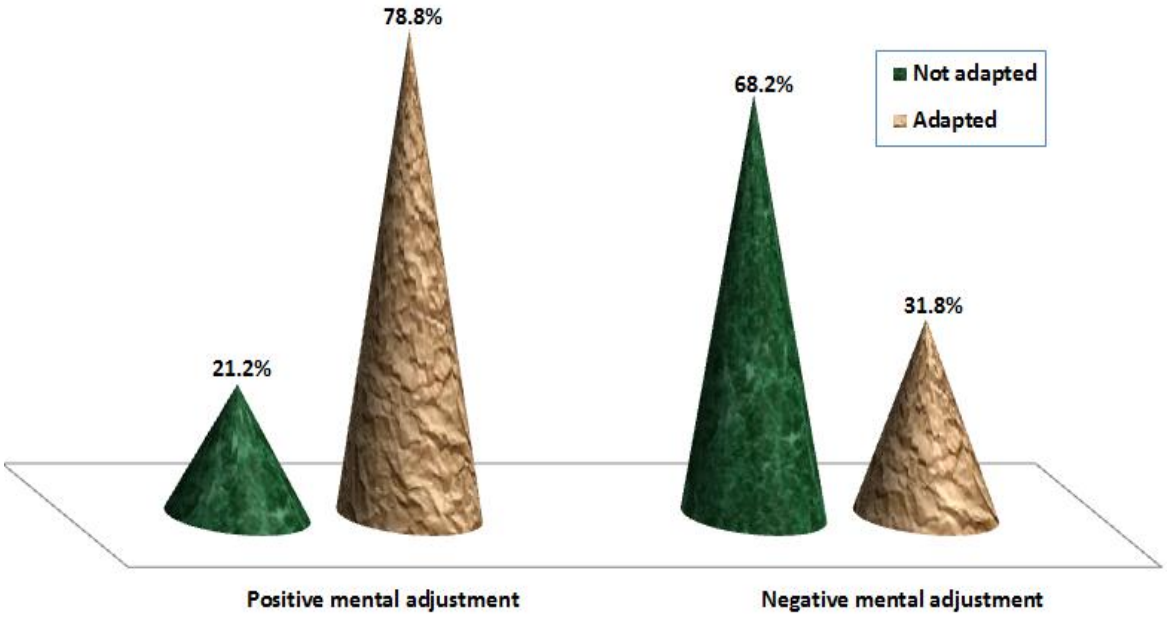

Figure (2): Percent distribution of the studied women diagnosed with breast cancer according to their mental adjustment to cancer

Table (3): Correlation between perceived social support dimensions of the studied women diagnosed with breast cancer and their mental adjustment to cancer (MAC) dimensions.

MAC Dimensions	Perceived social support dimensions							
	1.Belonging support		2.Appraisal support		3.Tangible support		Total social Support	
	R	P	R	P	r	P	r	P
Positive mental score	-0.145	0.185	-0.055	0.616	-0.123	0.261	-0.160	0.144
1-Fighting spirit								
Negative mental score	-0.001	0.991	0.022	0.842	-0.029	0.792	-0.003	0.979
2-Anxious preoccupation	0.080	0.467	0.130	0.237	0.122	0.264	0.172	0.115
3-Hopeless	-0.110	0.315	-0.027	0.810	-0.005	0.964	-0.067	0.541
4-Fatalism	-0.193	0.077	0.071	0.521	0.176	0.108	0.043	0.694
5-Avoidance								
Total Negative mental score	-0.034	0.760	0.045	0.682	0.041	0.706	0.032	0.774
Total MAC score	-0.095	0.388	0.001	0.995	-0.036	0.744	-0.061	0.581

r: Pearson' correlation coefficient

(*) Significant at level P<0.05

Table(4): Effect of the medical history characteristics of the studied women diagnosed with breast cancer on their positive and negative mental adjustment to cancer (MAC) score

Medical history	Positive mental Adjustment	F/t P	Negative mental adjustment	F/t P
1-Breast cancer severity/degree/stage				
- stage I	47.04±6.48	**2.793**	64.13±9.80	0.855
- stage II	42.39±7.25	**0.032***	62.93±7.91	0.495
- stage III	38.00±10.38		57.81±8.49	
- stage IV	43.50±0.71		70.50±0.71	
- Unclassified	38.27±16.34		63.73±24.41	
2-Time since diagnosis (In months)				
- <6	44.10±6.25	0.883	66.95±9.05	**2.842**
- 6–<10	38.08±12.95	0.454	53.92±14.56	**0.043***
- 10–<12	43.00±2.74		65.40±6.31	
- One year and more	42.31±11.23		62.71±13.47	
3- Type of surgery				
- Lumpectomy	43.38±11.12	0.454	58.08±9.47	**4.334**
- Mastectomy	41.70±9.94	0.502	64.41±13.63	**0.040***
4-Received adjuvant chemotherapy				
- Yes	42.15±10.76	0.003	62.44±13.77	0.106
- No	42.33±6.64	0.955	63.75±4.58	0.745

5- Received adjuvant radiotherapy				
- Yes	42.20±12.64	0.000	63.98±15.68	0.874
- No	42.16±7.52	0.987	61.36±9.55	0.353
6-Family history of breast cancer				
- Nil	41.75±10.57	1.123	62.71±13.57	0.026
- First/second degree relative	45.40±7.01	0.292	62.00±5.38	0.871

(*) Significant at level P<0.05

Table (5): Effect of the socio–demographic characteristics of the studied women diagnosed with breast cancer on their social support score

Characteristics	Social support	F/t P
Age (in years)		
- 25-<35	31.00±1.23	0.555
- 35-<45	31.86±4.66	0.576
- ≥ 45	30.94±3.38	
Residence		
- Rural	31.80±3.89	1.666
- Urban	30.75±3.64	0.200
Marital status		
- Married	31.03±3.66	**5.481**
- Widow	35.00±4.18	**0.022***
Educational level		
- Illiterate	33.07±4.26	
- Primary & essential school	31.71±2.87	**4.417**
- Secondary school	31.38±3.36	**0.003***
- College graduate	29.13±2.86	
- Postgraduate education	30.25±2.66	
Income		
- Enough	30.94±3.78	0.862
- Not enough	31.71±3.79	0.356
Occupation		
- Work	29.50±3.18	**12.651**
- Not work	32.32±3.74	**0.001***

(*) Significant at level P<0.05

Table (6): Effect of the socio–demographic characteristics of the studied women diagnosed with breast cancer on their mental adjustment to cancer (MAC) score

Characteristics	Mental adjustment to cancer (MAC)	F/t P
Age (in years)		
- 25-<35	104.00±3.32	1.515 0.226
- 35-<45	110.03±9.14	
- ≥ 45	101.90±24.82	
Residence		
- Rural	104.68±17.64	0.003 0.959
- Urban	104.91±22.60	
Marital status		
- Married	105.14±20.58	0.375 0.542
- Widow	99.40±14.03	
Educational level		
- Illiterate	105.93±18.70	1.069 0.377
- Primary & essential school	102.86±4.60	
- Secondary school	97.94±27.82	
- College graduate	110.25±21.22	
- Postgraduate education	99.63±7.80	
Income		
- Enough	108.76±8.35	**4.863**
- Not enough	99.14±29.25	**0.030***
Occupation		
- Work	106.50±21.27	0.359 0.551
- Not work	103.77±19.73	

(*) Significant at level P<0.05

Discussion

Women's relationships with others stressed by diagnosis of advanced breast cancer and, they do not receive the social support they need**.** Support provided to patients from their treating team, family members, friends and fighters of breast cancer are required to assist them manages such feelings to facilitate their emotional permanence as they direct their cancer course. Moreover, a women's relationship with her spouse/partner can be negatively affected explained by variations in mood or negative perceptions about themselves they often link their appearance of body to their awareness of attractiveness which can impact sexual relationships after the identification of, and treatment [20, 21].

Social sustenance may make optimistic impact to the health of breast cancer women. It enables women to manage with their disease better and gain a positive point of view on their medical condition and to physically and psychologically adapt, and have enhanced value of life. Social support offers cancer patients with precaution and concern, and helps them to handle their fear and anxiety after the

illness and to alleviate the difficulties they face during the various stages of the illness [22-24].

Thoughts of death emerged from cancer in person awareness, resulting in feelings of pessimistic, powerlessness, and unhappiness. This can decrease one's capacity to manage, leading to important rising in the psychological meaning level and affecting various procedures of exploring the atmosphere and inner feeling condition practiced by women [25].

Social support also affects how patients adjust with cancer raising hopefulness, encouraging and enhancing positive coping skills. Cancer women choice coping approaches such as looking for societal sustenance, resolving issues, denying, and helpful thoughts. Patients who seek social support get emotional understanding from others, ask for help and advice [26]. this study aimed to evaluate the social support and its relation with mental adjustment among women diagnosed with breast cancer.

The present findings indicated that greatest women with breast cancer had moderate level of societal sustenance this may be due to women with breast cancer feels very close to her partner may be engrossed with her spouse's worry for the disease and trying to adjust with the illness and its suffering as a mean to secure their-self from psychological suffering and they felt appraisal and tangible support from their families and relatives is importantly to receive societal sustenance that they need to care for themselves during treatment. This is in same line with **Romdhane, 2022** stated that breast cancer women reporting equally the uppermost and the lowermost post traumatic growth were had societal sustenance higher levels and consequences confirm to the important role of social linkages and societal sustenance in creating helpful mental practices and possible in protecting harmful consequences afterward breast tumor [27].

Also the results are in the same line with **Mahmood and Amen, 2022.** The finding of present study indicated that the breast cancer patients in **those** who perceived higher social support showed better global health status [28].

The present results denoted that societal sustenance related significantly to demographic variables; marital status, educational levels, occupation, as people with higher educational levels had a better understanding of themselves, illness, people around them, and their support although one quarter of them were illiterate and other quarter had college education. This might be understood that the feeling of belonging by women from societal sustenance from their families. In addition, women with breast cancer are regularly requiring support of people to face the adverse action of illness. This is in same line with **Horwood, Anglim 2019**,who indicated that social support related significantly with educational level [29].

This finding is not in line with the results of **Lv XQ, Wang BQ, Tong, et al 2022. And, McLaughlin 2014, their studies** demonstrated that social support is related to income level [30,31]**. Also, Jadidi, Ameri, 2022** showed that social support not significantly related with all demographic variables, except the place of residence [32]. Moreover, the findings of **Ebid, and Assy,2020,** indicates that level of social support for breast cancer patients had no statistically significant difference related to the variables of age, education and therapy period [33].

In addition Results of **Denewer, Farouk 2011,** also show that residence places not statistically significant differ from the social sustenance total score. Also stated that social support does not vary in Egyptian patients with breast cancer according to any of the socio-demographic variables examined [(34)].

The current results found that social support not significantly related with psychological adjustment among women of breast cancer. This could be due to that social sustenance initiate to minimize the danger of mental suffering in cancer women. Hence, the women appear to be optimistic because of great social sustenance they obtain as the culture of Egypt characterized by more love and psychological sustenance women had from their relatives and family. Social sustenance received by women in their connection characterized by admiration and worth for their capabilities and expertise and by estimation to their information.

However, Tilaki et al,2022, found that social sustenance linked, who said social sustenance linked with healthier mental adaptation and fewer mental indicators and recognized as a protective factor against unhappy affect and health results [(35)]. Also **Holland & Holahan 2010**, in their research found that perceived social sustenance linked with confident adaptation [(36)]. **A study done by Romdhane2022, indicated** the necessity of societal linkages and social sustenance in creating helpful mental practices and possible in protecting harmful consequences afterward breast tumor [(27)]. In addition the study of **Benson et al 2020,** stated that there was a relation between support source and managing approaches among breast cancer women. Extra elements of societal sustenance motivate women to accept a managing approach more than women with fewer elements of societal sustenance [(37)]. Another study done by Rizalar 2014,found that their results found that societal sustenance for breast cancer women had impact on their psychosocial adaptation to disease [(38)].

Struggling soul is described by hopeful outlook to one's capability to adapt with the disease. Following to small scores of worry & despair, persons described by struggling soul like to identify the disease as an encounter. The current study find that breast cancer severity & degree statistical significantly related with positive mental adjustment (fighting spirit) that explained by ability of women to struggle for adherence by treatment to cancer and think it is probable to use many controller for the disease, this is agree with **Czerw2015,** who reported that strongest fighting spirit manifested by patients with the shortest duration of disease [(39)]. This is in converse to **Tomi 2019,** who reporting no statistical association between cancer stage and adjustment [(26)].

Hopelessness/helplessness and preoccupation with anxiety refer a managing patterns considered as increased ranks of worry and unhappiness, beside the thought of reduced controller over the medical viewpoint, desperateness, and worried concern seem to be the greatest important signs of mental suffering and negative adaptation. This study illustrated that time since diagnosis statistically significant related with negative mental adjustment to cancer. This is due to fear, anxiety and hopelessness feeling women exposed during time of diagnosis belief the presence of difficult efforts to exercise somewhat regulation for the disease, and

mental characteristics of the understanding of taking a dangerous disease.

The present results show that the type of surgery statistically significant related with negative mental adjustment to breast cancer, as diagnosis & type of surgery affect women **psychosocially and the** relationship with their families, the capacity to adapt to the tumor practice is affected by therapeutic managements, and by interpersonal and intrapsychic features of the person.

The study findings illustrated that income statistically significant related with mental adjustment to cancer. As the financial source and family income influences on the women treatment for their disease by a large degree which result to some negative thinking lead to distress. This is consistent with **Ashraf et al 2018,** who found that the descriptive characteristics of the participants differ significantly with their total scores in the psychosocial adjustment to illness scale in terms of educational status, occupation, place of residence, income level and type of operation. **Also,** they detected that higher social support scores come with those who had high school graduates and employed with a high economic status [(40)].

The results is inconsistent with **Mishra and, Saranath,2019**, noted that coping not significantly associated and demographic characteristics in breast cancer patients [(41)].

Also study of **Benson et al 2020**, said that coping strategies adopted by women with breast cancer were associated with age, marital status, and employment status and higher age has no influence on active coping [(37)].

Conclusion

It was concluded from the results that majority of women had moderate societal sustenance while one quarter of them had high social support**.** Majority of women had adapted to cancer in fighting spirit subscale of positive mental adjustment while little of them had not adapted. But two thirds of them had not adapted in anxious preoccupation, hopelessness /helplessness, and avoidance subscales of negative adjustment subscales while one third of them of them had adapted.

From observation that perceived social support dimensions statically significant correlated with mental adjustment to cancer dimensions. Social supports dimensions not statically significant related with positive & negative dimensions of mental adjustment to cancer**,** while breast cancer severity & degree statically significant correlated with positive mental adjustment. Concerning time since diagnosis it was significantly related with negative mental adjustment to cancer, and also type of surgery significantly related with negative mental adjustment to cancer.

Recommendations

1.Breast cancer patients need a psycho-educational support program to enjoy better emotional, functional and social/family well-being at the time since diagnosed with cancer.

2. Further researches recommend for stigma of cancer and, psychological encounters, and the impacts on breast cancer. Also it is essential to more discovering sustenance net accessible women at all stages of disease.

3. The needed studies for appraising necessity of assessment of mental adjustment though formation of management and rehabilitation.

4. Psychological intervention for women with breast cancer afterward diagnosis and through surgery time and after it to enhance their psychological coping.

5. Patients showing negative psychological responses to cancer needed psychiatric intervention during cancer treatment.

6.The psychological and clinical intervention studies are necessary required aiming to increase adaptive variables e.g., feeling of rationality, receiving and decreasing misadjusting e.g., unhappiness, and rejection.

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Effect of Implementing Evidence Based Nursing Guidelines on Nurses' Performance and Clinical Outcomes for Children Undergoing Stem Cells Transplantation

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Abstract

Background

Evidence based guidelines during stem cells transplantation process provides nurses with the high quality of nursing care to help them to make well-founded decisions and reduce patient's expected complications**. Aim of the study:** was to determine the effect of implementing Evidence Based Nursing Guidelines on nurses' performance and clinical outcomes of children undergoing stem cells transplantation**. Subjects and Method:** A quasi-experimental research design was utilized for a convenience sampling of 30 nurses working at Bone Marrow Transplantation Unit of Tanta Universal Educational Hospital and 20 children undergoing stem cells transplantation. **Tools of data collection:** Three tools were used to collect data**:** Structured interview schedule to assess nurses' knowledge about stem cell transplantation, Evidence Based Nursing Practice regarding care of children undergoing stem cells transplantation and children's clinical outcomes assessment sheet. **Results**: All nurses had low level of knowledge about stem cells transplantation and high percentage of them had unsatisfactory practice regarding care of children undergoing stem cells transplantation before Evidence Based Nursing Guidelines' implementation, whereas immediately and one month after ,nurses' total scores of knowledge and practice improved .**Conclusion**: there was a highly statistically significant improvement in nurses' total scores of knowledge and practice with statistically significant improvement in the children's outcomes. **Recommendations*:*** Continuous implementation of evidence based nursing guidelines for nurses caring of children undergoing care of children undergoing stem cells transplantation.

Key words: Children, Clinical outcomes, Evidence Based Nursing Guidelines, Nurses' performance, Stem cell transplantation.

Introduction

Hematopoietic Stem Cell Transplantation known as Bone Marrow Transplantation (BMT) is a life expectancy treatment for several incurable disorders nowadays as the survival rate following the operation has grown.[1,2] It's uses has expanded to patients with fatal diseases other than cancer to autoimmune diseases, inherited skeletal dysplasia and malignant infantile osteoporosis. [3]

Hematopoietic Stem Cells Transplantation (HSCT) is a medical treatment that restores healthy bone marrow to patients whose bone marrow has been destroyed by disease or chemotherapy. [4]This operation includes transfusion of healthy hematopoietic stem cells usually collected from bone marrow, peripheral blood, or umbilical cord blood which migrate to bone marrow where they

can produce new blood cells and enhance engraftment of new bone marrow. [5]

The transplant rate in pediatrics from 1984 to 2011 in eight countries was 5187 transplants of which 4513 (87%) were allogeneic and 674 (13%) were autologous. The largest number of transplants during this period were performed in Saudi Arabia with a total of 1977 transplants (38.2%) followed by Iran (*n*=1197, 23.1%), Egypt (*n*=811, 15.6%), Jordan (*n*=361, 7%), Pakistan (*n*=325, 6.2%), Tunisia (*n*=249, 4.8%), Oman (*n*=162, 3.1%) and Lebanon (*n*=105, 2%). [6] Nasser Institute is the first and largest centre for hematopoietic stem cell transplantation in Egypt with 20 cabins outfitted with High Efficiency Particulate Air (HEPA) filters, positive pressure, and vertical laminar air flow. [7, 8]

Hematopoietic Stem Cell Transplantation can be classified into three types which are autologous, syngeneic and allogeneic transplant. Autologous transplant; occurs when the child get the stem cells from himself or herself while in syngeneic transplant the child receive the healthy bone marrow from their identical twins and a more difficult transplant known as allogeneic, in which the child receives the stem cells from a healthy donor who is Human Leucocytes Antigen (HLA) compatible with him or her.[9] The ideal donor of stem cell in allogeneic transplantation is fully matched Human Leucocytes Antigen related donor (sibling from the same parents of the child) [10].

Preparation therapy called Conditioning therapy is most crucial in preparing the child for transplantation which administered various days prior the infusion of stem cell. It comprises utilizing different protocol regimens of chemotherapy, radiation, and/or immunotherapy. Alternatively, the pre hematopoietic stem cell transplantation conditioning can be chemotherapy only without radiation. It used for eradication of disease, generate a space in childs' bone marrow for engraftment of new stem cells and act as immunosuppressant to decrease the risk of rejection of stem cells by the host cells.[11]

There are many complex complications from allogeneic stem cell transplantation which cause multiple readmissions to hospital as infection and rejection of new stem cells called Graft Versus Host Diseases (GVHD) and psychological complications include anxiety, stress and depression. [12] GVHD can only develop after allogeneic hematopoietic stem cell transplantation in children who get a transplant from a histocompatible related or unrelated donor in human leukocyte antigen typing. It happens when the T lymphocytes of donor's cells fails to recognize the recipient's cells and start to attack the recipient's tissues. [13]

The child needs extra care throughout the preparation with conditioning regimens to avoid difficulties with transplantation.[14]

Nurses should be oriented with the potential complications in order to prevent or discovering the warning signs as sepsis, fluid overload, organ malfunction and take the necessary actions to reduce negative consequences and restore the child's clinical status. [14, 15] Prior to discharge, nurses also give the children and their families' intensive instruction on post stem cells transplantation restrictions, food, medications, fluid balance, test results, care of catheter and the importance of follow-up. As a result, this care is extremely difficult and demands advanced nursing skills and abilities. [15]

Nurses should always ensure that their information and practice regarding stem cells transplantation are updated in order to perform safely and competently at all times.

[16] As a result, it's critical that competency and training programs are organized, ongoing and supported by evidence based implementation to give nurses the scientific information they need to make informed judgments and minimize anticipated child's consequences. [17]

Evidence Based Practice (EBP) refers to the application of interventions and techniques whose efficacy has been verified by research. [18] The ultimate objectives of evidence-based nursing practice are to advance high-quality treatment that is informed by research and knowledge as well as cost-effective results for patients, healthcare professionals and the health care system.[19,20]

Nurses have a critical role in ensuring Evidence Based Nursing Guidelines (EBNGs) in care provided for children who gets stem cell transplantation and in the prevention, management of complications which begins with sustaining a highest quality of care while isolating the child with highly strict infection control precautions, delivery of intravenous chemotherapy and immunosuppressant safely, maintaining the hemodynamic state, managing complications and making the discharge plan. [21, 22]

Significance of the study

Hematopoietic Stem Cell Transplantation is a survival procedure which performed when child's bone marrow isn't healthy enough to produce the blood components as in cases of a plastic anemia, leukemia, lymphoma, sickle cell anemia and thalassemia. [3] It starts in Egypt since 1997 with the transplants rate of pediatrics per 10 million population was 109 transplants annually. [6]

The scope of nursing science in HSCT has shifted from considering symptoms, treatment and process improvement to high quality life and long-term mortality topics integrating children as much as possible in their healthcare decisions and emphasizing care. [2] Sometimes owing to a lack of information and inadequate practice, nurses are unable to provide modern or recent nursing care for children receiving stem cell transplants. [14]

Evidence Based Nursing Guidelines is the most effective standard for providing the high efficient nursing care. Implementing these guidelines on children undergoing stem cells transplantation is not only a vital step for nursing practice but it also has a major impact for nursing science. Additionally, it is important to give children complete, comprehensive information they need to ensure the little degree of discomfort throughout the various stages of stem cells transplantation and minimize the possible complications. [23]

Aim of the Study

The aim of this study was to determine the effect of implementing evidence based nursing guidelines on nurses' performance and clinical outcomes of children undergoing stem cells transplantation.

Research Hypotheses

1-Implementing Evidence Based Nursing Guidelines for nurses working at bone marrow transplantation unit are expected to improve their performance.

2- Clinical outcomes of children undergoing stem cells transplantation are expected to be improved after implementing stem cells Evidence Based Nursing Guidelines.

Subjects and Method

Research design: Aquasi-experimental research design was used.

Setting: The study was conducted at the Bone Marrow Transplantation unit of Tanta International Educational Hospital which is affiliated to the Ministry of Higher Education and Scientific Research which consists of two zones (outer and inner zone)

-**The outer zone consists** of five rooms which includes (Secretory office, clinical pharmacy, meeting room, laboratory for storage of stem cells and preparation of chemotherapy, laboratory for separation and apheresis of stem cell and for storage of blood and its components.

-**The inner zone consists** of three red lines: first line consists of one post-transplant room that contains two beds, second line consists of two intermediate rooms each room contains one bed, third line consists of four isolation rooms (capsule), each capsule consists of two parts first one called (ante room) for preparation of medication and second one contain bed for the child, television and bathroom.

Subjects

- All available nurses (30 nurses) who provide direct care for children at the previously mentioned setting were involved in the current study.

-A purposive sample of 20 children who admitted to bone marrow transplantation unit for stem cells transplant.

Inclusion criteria of children include

-Age from 1-16 years.

-Both sexes.

-Diagnosed with any of the following diseases: thalassemia, severe aplastic anemia, and lymphoma.

- Children have donors matched with their Human Leucocyte Antigen.

-Free from the following diseases: tumors and immune, liver, cardiopulmonary, brain diseases.

Tools of data collection

Three tools were used to collect the study data:

Tool I: Bio-sociodemographic characteristics and structured interview schedule: It was developed by the researcher based on relevant literatures [24, 25] to assess nurses' knowledge about stem cell transplantation and consisted of the following parts:

Part (1): Socio-demographic data of the studied nurses as age, sex, level of education, place of work, years of experience and attendance of any training programs related to stem cell transplantation

Part(2):Socio-demographic characteristics of the studied children as age, sex, birth order, number of family members and residence.

Part (3): Medical history of the children as past and present medical history, family history, diagnosis and duration of receiving blood.

Part (4): Nurses' knowledge about stem cell transplantation: It contained; sites, function of bone marrow, types, steps of stem cells transplantation and its blood disorders, nursing care before, during and after stem cell transplantation, during complications and infection control precautions.

The questionnaire contained 46 questions. The grades ranged from (0-2) for each question. Correct complete answer was scored 2; incomplete correct answer was scored 1 and zero for incorrect or didn't know answer.The sum of all questions was 92.

Total scoring system for nurses' knowledge was categorized as the following

-High level of knowledge was considered from 80 % and more.

-Moderate level of knowledge was considered from 60 to less than 80%.

-Low level of knowledge was considered less than 60%**.**

Tool II: Evidence Based Nursing Practice regarding care of children undergoing stem cells transplantation observational checklists : It was developed by researcher based on relevant literatures [26-29] to

evaluate nurses' practice: before, during, after transplantation, during complications and discharge which included the following:

-Before stem cells transplantation process (35 items).

-During stem cells transplantation day (14 items).

-After stem cells transplantation (14 items) and during complications (38 items).

-Discharge education regarding care of the child after stem cells transplantation (13 items)**.**

Observational checklists consisted of 117 items; each item was scored from 0-2 grades. Correct complete done was scored 2; incomplete correct done was scored 1 and zero for incorrect or didn't do. The sum of all items was 234

Total scoring system for nurses' practice was calculated as

-Less than 80 % was considered unsatisfactory practice.

-From 80 % to 100% was considered satisfactory practice.

Tool III: Children's clinical outcomes assessment checklist: This tool was developed by the researcher after reviewing of related literatures [23,28,30] .It was used to assess Children's' clinical outcomes and their early and late complications after stem cells transplantation.

Method

- The research was achieved through the following phases:

1-Adminstrative process

The researcher got an official permission from Faculty of Nursing, Tanta University and also from the administrators of Bone Marrow Transplantation Unit at Tanta Universal Educational Hospital to facilitate performance of the study.

2-Ethical and legal considerations

Nurses were informed about the confidentiality of the information obtained from them .The nature of the study didn't cause any harm or pain to the entire subjects. Nurses' oral consent was obtained to participate in the study after explanation of the aim& benefits by the researcher.

3-Tools development

The researcher developed three study tools based on recent and evidence-based literatures. Structured Interview Schedule (Tool I) and Observational Checklists (Tool II) and Children's Clinical Outcomes Assessment Checklists (Tool III).

4-Content Validity

Tools of the study were tested for content validity by five experts in the field of pediatric nursing, modifications were carried out accordingly and the content validity index was 98%.

5-Content Reliability

A Pilot study was conducted to test the reliability of tools (high reliability: Cronbach's alpha was 0.951).

6-Pilot study:

The researcher assessed the clarity, visibility, and applicability of the research tools by conducting a pilot study on 10% of the nurses (3 nurses) and necessary adjustments were made. Pilot study was excluded from the study sample.

7- **The study steps**

The steps of Evidence Based Practice were conducted through the following phases:

1- Assessment phase:

Assessment of nurses' performance regarding stem cells and clinical status of children undergoing stem cells were done using study tools (I, II and III) three times: before, immediately and one month after the implementation of evidence based nursing guidelines through ;interview with nurses in bone marrow transplantation unit. All nurses were observed during different nursing procedures related to care for children

undergoing stem cells transplantation at morning and afternoon shifts.

2- Planning phase

Educational guidelines were planned according to nurses' needs assessment and based on literatures reviews which were focused on setting the objectives. Content preparation was included the rational for implementing the sessions. The educational guidelines were translated into Arabic. A variety of teaching materials were used as interactive lecture, demonstration and re-demonstration, video tape, power point and poster presentation for the evidence based nursing guidelines

3- Implementation phase

Nurses were divided into 6 subgroups: Each group consists of 5 nurses. Evidence Based Nursing Guidelines had been presented to all nurses included in the study in 8 sessions for each group; each session take from 45-60 minutes due to the largest volume of content. The sessions covered the following topics:

First session

It focused on; definition, sites function, sources and types of bone marrow, the most common blood disorders which treated with stem cells transplantation.

Second session

It focused on; definition, types, indications and steps of stem cells transplantation, important tests needed before stem cells transplantation.

Third session

It focused on explanation of the Evidence Based Nursing Guidelines before stem cells transplantation.

Fourth session It focused on explanation of the Evidence Based Nursing Guidelines during the day of stem cells infusion.

Fifth session

It was about the signs and symptoms of rejection (Graft Versus Host Disease) and infection after stem cells transplantation.

Sixth session

It focused on nursing care after transplantation, wound care, nutritional intake assessment and administration of immunosuppressive drugs.

Seventh session

It focused on infection control measures related to stem cell transplantation and health education about complications after stem cells transplantation.

Eighth session

It focused on discharge education about; infection control measures follow up times, fluid intake and diet restriction, manifestation of GVHD and infection.

Evaluation phase

Evaluation of the effectiveness of implementing Evidence Based Nursing Guidelines on nurses' knowledge, practice and clinical outcomes of children undergoing stem cells transplantation was performed three times; before, immediately and after one month by the same study tools.

Statistical analysis

The collected data were organized, tabulated and statistically analysed 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). 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, a highly significance was adopted at P<0.01 for interpretation of results of tests of significance (**).[31]

Results

Table(1):Demonstrates socio-demographic characteristics of studied nurses. It was observed that, 73.3% of them aged from 25 to less than 30 years with the mean age score (**28.50±1.456**) years and were females. In relation to the level of education, it was evident that, 63.3% of nurses had bachelor of nursing while 36.7% of them had technical health institute.

As regards the years of experience, it was cleared that 83.3% of nurses had less than five years of experience at bone marrow transplantation unit, while 16.7% of them had experience from 5 years to less than 10 years .Also 80% of them hadn't any training programs related to bone marrow transplantation.

Table (2): Represents Socio-demographic characteristics of children, It was observed that 45% of them their age was ranged from 5 to less than 10 years old with the mean age **(8.57±5.094)** years while 30% of them ranged from 3 to less than 5 years and 25% of them aged more than 10 to less than 15 years .Also 55% of them were males and had a family consisting of 5 members In addition, 80% from them were the second child in the family and 85% of them lived in rural areas while 15% from urban areas.

Table (3): Shows medical history of children. It was observed that 75% of them were diagnosed as thalassemia and 15% were diagnosed as aplastic anemia while 5% were diagnosed as lymphoma and pure red cell aplasia. All of them had no past history of health problems related to bone marrow and were received previous blood contents (packed RBCs) .Also 95% of them had no presence of any family history related to bone marrow diseases.

Table (4): Clarifies the total levels of nurses' knowledge about stem cell transplantation. It was revealed that, the highest mean score was during immediate phase (**57.60±1.632**) then after one month (**52.50±0.820**) from EBNGs implementation. There were highly statistically significant differences during three phases of the EBNGs with χ^2=27.56, P1=0.000, χ^2=51.07, P2=0.000, χ^2=22.46, P3=0.000 before, immediately and after a month from EBNGs implementation**.**

Table (5): Clarifies the total level of nurses' practice regarding care of children undergoing stem cell transplantation**.** It was apparent that, before the EBNGs implementation the majority of nurses 96.7% had un satisfactory practice level while immediately after EBNGs implementation all of them (100%) had satisfactory level of practice and one month after implementation, 96.7% of them had a satisfactory practice level with highly statistically significance differences regarding total practice before, immediately and after one month with χ^2=68.67, P1=0.000, χ^2=57.33, P2=0.000,χ^2=21.33, P3=0.044.

Table (6): Show percentage distribution of the studied children according to their clinical outcomes. The study reveals that there was a highly significant improvement in the studied children's temperature, blood pressure, central venous pressure, intake and output and nutritional status and weight where χ^2=24.81, P=0.001,χ^2=25.00, P=0.000,χ^2=25.00, P=0.000 ,χ^2=25.00, P=0.000 ,χ^2=13.074, P=0.001, χ^2=20.00, P=0.000 respectively before, immediately

after and after one month from EBNGs implementation.

Also the study reveals that there was a highly statistically significant difference on reduction in the occurrence of low cell count (Pancytopenia) to the studied children with χ^2=7.921, P=0.001 before, immediately after and after one month from EBNGs implementation respectively.

Table (7): Shows percentage distribution of children related to signs of rejection for skin and gastrointestinal Graft Versus Host Diseases. The study reveals that there was a highly statistically significant difference on reduction in the occurrence of GVHD on skin and gastro intestinal tract (dry rashed skin, diarrhea) and oral mucositis on the studied children with χ^2=24.81, P=0.001,χ^2=13.074, P=0.001,χ^2=7.302, P=0.026, ,χ^2=7.302, P=0.026 before, immediately after and after one month from EBNGs implementation respectively.

Table (8): Shows percentage distribution of children related to their signs of infection. The study reveals that that there was statistically significant difference on reduction in the occurrence of signs infection on the studied children as hyperthermia, hotness, redness, swelling at site of Hickman with χ^2=16.232, P=0.000, χ^2=9.714, P=0.008, χ^2=9.714, P=0.008 respectively before, immediately after and after one month from EBNGs implementation .

Table (9): Represents correlation between total knowledge and total practice score among studied nurses. The study showed that, there was statistically significant positive correlation between total knowledge score and total practice score before, immediately and after one month from EBNGs implementation (r= 0.407, P= 0.026) (r=0.201, P= 0.001) (r= 0.137, P=0.013) respectively

Table (1): Percentage distribution of studied nurses' about socio-demographic characteristics (n=30):

Socio-demographic characteristics of the studied nurses	The studied nurses (n=30)	
	No	%
Age (in years)		
- 20 < 25	0	0
- 25 < 30	22	73.3
- ≥30	8	26.7
Range	**(25-32)**	
Mean ± SD	**28.50±1.456**	
Sex		
- Male	8	26.7
- Female	22	73.3
Educational level		
- Institute of technical health	11	36.7
- Bachelor of nursing	19	63.3
Years of experience in Bone Marrow Transplantation unit		
- <5	25	83.3
- 5< 10	5	16.7
Attendance of any training program related to Bone Marrow Transplantation		
- Yes	6	20.0
- No	24	80.0

Table (2): Percentage distribution of children's about socio-demographic characteristics (n=20):

Socio-demographic characteristics of the studied Children	Studied children (n=20)	
	No	**%**
Age (in years)		
- <5	6	30.0
- 5-10	9	45.0
- >10	5	25.0
Range	**(3-15)**	
Mean ± SD	**8.57±5.094**	
Sex		
- Male	11	55.0
- Female	9	45.0
Birth order		
- Second	16	80.0
- Third	4	20.0
Number of family members		
- Fourth	4	20.0
- Fifth	11	55.0
- Sixth	5	25.0
Residence		
- Urban	3	15.0
- Rural	17	85.0

Table (3): Percentage distribution of children's medical history (n= 20)

Children's medical history	Studied children (n=20)	
	No	**%**
Previous health problems related to bone marrow		
- No	20	100.0
Diagnosis		
- Thalassemia	15	75.0
- A plastic Anemia	3	15.0
- Non Hodgkin lymphoma	1	5.0
- Pure Red Cell Aplasia	1	5.0
Child receiving any previous blood contents		
- Yes		
- No	20	100.0
Type	0	0.0
- Packed red blood cells		
- Packed red blood cells and platelets	17	85.0
	3	15.0
Presence of any Family history related to bone marrow diseases		
- Yes	1	5.0
- No	19	95.0

Table (4): Total scores of studied nurses' knowledge regarding stem cells transplantation before, immediately and after one month from Evidence Based Nursing Guidelines' implementation(n=30):

Total knowledge levels	Studied nurses (n=30)						χ^2 P	χ^2 P1	χ^2 P2	χ^2 P3
	Before EBNGs implementation		Immediately after EBNGs implementation		After one month from EBNGs implementation					
	No	%	No	%	No	%				
- Low (<60%)	30	100.00	0	0.00	0	0.00				
- Moderate (60-<80) %	0	0.00	0	0.00	1	3.33	91.52 0.000*	115.97 0.000*	64.82 0.000*	71.04 0.000*
- High (≥80 %)	0	0.00	30	100.00	29	96.67				
Range	(22-38)		(55-61)		(51-54)		F=942.55	27.56	51.07	22.46
Mean ± SD	30.03±4.148		57.60±1.632		52.50±0.820		P=0.000*	0.000*	0.000*	0.000*

***Statistically significant difference at (P<0.05).**

P1: Before and immediately after EBN guidelines.

P2: Before and one month after EBN guidelines.

P3: Immediate and one month after EBN guideline.

Table (5): Total scores of studied nurses' practices about care of children undergoing stem cells transplantation before, immediately and after one month from Evidence Based Nursing Guidelines' implementation (n=30)

Total scores of studied nurses' practice related to care of children undergoing stem cell transplantation	Studied nurses (n=30) Total practice level						χ^2 P	χ^2 P1	χ^2 P2	χ^2 P3
	Before EBP guidelines implementation		Immediately after EBP guidelines implementation		After one month from EBP guidelines implementation					
	No	%	No	%	No	%				
▪ Unsatisfactory <80%	29	96.7	0	0.0	1	3.3	85.719 0.000*	68.67 0.000*	57.33 0.000*	21.33 0.044*
▪ Satisfactory ≥80 %	1	3.3	30	100.0	29	96.7				

***Statistically significant difference at (P<0.05).**

P1: Before and immediately after EBN guidelines.

P2: Before and one month after EBN guidelines.

P3: Immediate and one month after EBN guideline.

Table (6): Percentage distribution of children regarding their clinical outcomes.

Children's clinical outcomes	Studied children(n=20)						
	Before EBP guidelines implementation (n=6)		Immediately after EBP guidelines implementation (n=7)		After one month from EBP guidelines implementation (n=7)		χ^2 P
	No	%	No	%	No	%	
Temperature							
- Normal	0	0.0	5	71.4	5	71.4	**24.81**
- Hyperthermia	6	100.0	2	28.6	2	28.6	**0.001***
Pulse							
- Normal	3	50.0	6	85.7	6	85.7	2.857
- Tachycardia	3	50.0	1	14.3	1	14.3	0.240
Respiration							
- Normal	2	33.3	5	71.4	5	71.4	2.540
- Tachypnea	4	66.7	2	28.6	2	28.6	0.281
Blood pressure							
- Normal	2	33.3	7	85.7	6	85.7	**25.00**
- Abnormal	4	66.7	0	14.3	1	14.3	**0.000***
Central venous pressure							
- Normal	2	33.3	7	85.7	6	85.7	**25.00**
- Abnormal	4	66.7	0	14.3	1	14.3	**0.000***
Intake & output							
- Balanced	2	33.3	7	100.0	6	85.7	**25.00**
- Not balanced	4	66.7	0	0.0	1	14.3	**0.000***
Nutritional state							
- Normal	0	0.0	7	100.0	4	57.1	**13.074**
- Decreased appetite& Refuse to eat	6	100.0	0	0.0	3	42.9	**0.001***
Weight							
- Normal	0	0.0	7	100.0	7	100.0	**20.00**
- Underweight	6	100.0	0	0.0	0	0.0	**0.000***
Pancytopenia							
- present	4	66.7	1	14.3	2	28.6	**7.921**
- Not present	2	33.3	6	85.7	5	71.5	**0.001***

* Significant at level P<0.05

Table (7): Percentage distribution of children related to signs of rejection for Graft Versus Host Diseases.

Signs of rejection and GVHD	Studied children(n=20)						
	Before EBP guidelines implementation (n=6)		Immediately after EBP guidelines implementation (n=7)		After one month from EBP guidelines implementation (n=7)		χ^2 P
	No	%	No	%	No	%	
Skin GVHD							
Dry rashed skin							
- Not present	0	0.0	5	71.4	5	71.4	**24.81**
- present	6	100.00	2	28.6	2	28.6	**0.001***
Mouth and GIT GVHD							
Bleeding ,ulcer & sores of gum							
- Not present	0	0.0	5	71.4	4	57.1	**7.302**
- Present	6	100.0	2	28.6	3	42.9	**0.026***
Oral mucositis							
- No	0	0.0	5	71.4	4	57.1	**7.302**
- Yes	6	100.0	2	28.6	3	42.9	**0.026***
Diarrhea							
- Not present	0	0.0	7	100.0	4	57.1	**13.074**
- present	6	100.0	0	0.0	3	42.9	**0.001***

* Significant at level P<0.05.

Table (8): Percentage distribution of children related to their signs of infection.

Signs of infection	Studied children(n=20)						
	Before EBP guidelines implementation (n=6)		Immediately after EBP guidelines implementation (n=7)		After one month from EBP guidelines implementation (n=7)		χ^2 P
	No	%	No	%	No	%	
Hyperthermia							
- Present	6	100.0	0	0.0	1	14.3	**16.232**
- Not present	0	0.0	7	100.0	6	85.7	**0.000***
Hotness at site of Hickman							
- Present	6	100.0	1	14.3	3	42.9	**9.714**
- Not present	0	0.0	6	85.7	4	57.1	**0.008***
Redness &Swelling around site of Hickman							
- Present	6	100.0	1	14.3	3	42.9	**9.714**
- Not present	0	0.0	6	85.7	4	57.1	**0.008***

* Significant at level P<0.05

Table (9): Correlation between total knowledge and total practice scores of studied nurses' before, immediately and after one month from Evidence Based Nursing Guidelines' implementation

Total Practice Score	Total knowledge score					
	Before EBP guidelines		Immediately after EBP guidelines		After one month	
	r	P	r	P	r	P
	0.407	**0.026***	**0.201**	**0.001***	**0.137**	**0.013***

r: Pearson' correlation coefficient

* Significant at level P<0.05

Discussion

Stem cell transplantation is a medical treatment in which functional and healthy stem cells are used to replace the diseased bone marrow of those with malignant and non-malignant disorders.[32] The nurses are committed to improve their quality of life and ensuring that they have the greatest possible level of physical and mental comfort .[14]

Nurses in stem cells transplantation units are critical and vital members in the management and prevention of the early and late complications of HSCT process. They require specific training and should use Evidence Based Nursing Guidelines that provide them with the scientific research to make well-founded decisions about health

care of the child and reduce their expected complications.[14]

Regarding educational level of nurses, the result showed that nearly two thirds of nurses had bachelor degree**.** It may due to that the administrators of the unit were selecting them for the unit of BMT due to their abilities to understand the tasks more efficiently. **Ali et al., (2019)** was agreed with current finding who reported that majority of nurses were bachelor degree. [33] While these results disagreed with **Mary (2016)** who clarified that the majority of nurses had nursing diploma. [34]

Regarding nurses' years of experience**,** the results of the current study clarified that most of studied nurses had less than five years of experience in the bone marrow transplantation unit. This might be related to the modernity of the BMT medical field in Egypt and this BMT unit is newly established in Tanta Universal Teaching Hospital. **Ali et al., (2019**) was in harmony with the current finding who reported that more than half of the studied nurses had years of experience from one to less than five years. [33] While **Khalil (2016)** disagreed with these results who reported that less than two-third of nurses had an experience of more than 10 years. [35]

As regards nurses' attendance of training courses related to bone marrow transplantation, the current study revealed that most of them didn't attend training programs related to bone marrow transplantation. It may be due to the shortage in nurses' number in BMT unit and work over load that prevent them from attendance any training programs .This findings correspondent to **Shaban (2018)** who found that the majority of the nurses hadn't any previous information. [36] Similarity **Rochester (2017)** who reported that nurses working in the bone marrow transplantation unit needs extra education to give optimal care for patients. [37]

In relation to residence of the studied children, the study showed that the most of studied children were from rural areas **.**It might due to that the surrounding areas around Tanta universal Teaching Hospital are rural areas. This study supported by **Bhatt et al.,(2014)** whose results revealed that the most of children were living in rural areas.[38]

Regarding medical history of the studied children**,** the current study revealed that three quarters of total studied children were diagnosed as thalassemia and it was noticed that all of them had received previous blood contents**.** It might be due to the indication of Bone Marrow Transplantation which depends on various factors as type and stage of disease, response to previous treatment as BMT is a life- saving procedure for many diseases such as aplastic anemia, leukemia, inherited blood diseases as thalassemia, sickle cell disease and autoimmune diseases.

Elhaddad (2017) and **Sherif (2016)** were in harmony with the current finding as they clarified that most of children undergoing bone marrow transplantation had cancer and blood diseases as thalassemia, aplastic anemia and all of them need continuous blood content transfusion and chemotherapy related to their diseases. [6,39]

Regarding total scores of nurses' knowledge regarding stem cell transplantation, the results of current study revealed that all of them had low level of knowledge about stem cell transplantation before EBNGs implementation while immediately after guidelines' implementation, nurses' knowledge improved and all of them had good knowledge scores whereas one month after EBNGs implementation, there was a

slight decline in nurses' total knowledge scores.

Khalil et al., (2021) were in the same line with the current study who reported that less than one fifth of nurses had good level of knowledge about bone marrow transplantation before EBNGs implementation while immediately after guidelines' implementation, three quarter of them had good level of knowledge but after three months follow up, there was a slight decline in nurses total knowledge. (40)

Also **Karaly et al., (2019)** who agreed with the current study that all of the study nurses had an unsatisfactory total knowledge score before educational guidelines application while their total knowledge score improved to satisfactory score after guidelines application, while this improvement lowered slightly in the follow up phase.(41)

Regarding total nurses' practices scores for children undergoing stem cells transplantation, the current study clarified that nearly all of the studied nurses had unsatisfactory level of practice regarding care of children before implementation of EBNGs **.**While immediately after implementation, all of them had satisfactory level of practice. But there was a slight decline in nurses' practice after one month from EBNGs implementation**.**

El- Sayed et al., (2020) who mentioned that a majority of studied nurses had incompetent level of performance pre application of clinical nursing protocol in regard to care of children with stem cell transplantation therapy contrasted with more than two third of them had competent level of performance after protocol intervention, and declined to more than half of them at follow up protocol intervention phase. (42)

Regarding to complications and clinical outcome of the studied children, the current study showed that all of studied children suffered from some early and late complications as low cell count, oral mucositis, decrease in body weight, infection signs and GVHD before implementation of evidence based guidelines **.**While this complication decreased immediately and one month after guidelines' implementation.

This result in accordance with **Sherif (2016)** who revealed that there was significant improvement in studied patient's complications after implementation of educational program. (39)Also **Singh (2015)** who stated that promoting nurses' knowledge will decrease complications of their patients. (43)

As regard correlation between total nurses' knowledge and practices regarding children undergoing stem cell transplantation the current finding represent that, there was statistically significant positive correlation between total knowledge scores and total practice scores before, immediately and one month after guidelines' implementation.

Also **Ali et al., (2019)** was in the same harmony with this result who reported that there was a positive correlation between total knowledge score and total practice score pre and post teaching program. (33)

Conclusion

Based on the results of this study, it can be concluded that, nurses' knowledge and practices regarding care for children undergoing bone marrow transplantation were significantly improved after EBNGs implementation and there was statistically significant improvement in the children's outcomes with statistically significant decrease in their complications immediately after guidelines' implementation.

Recommendations

-In-service training programs should be conducted periodically and regularly for all

nurses working in bone marrow transplantation unit about application of evidence-based nursing guidelines for children undergoing bone marrow transplantation.

-Bone marrow transplant units must have a documented policy describing the standard nursing care that should each patient receives in the unit.

-Developing a system at bone marrow transplantation unit for evaluating nurses' knowledge and practice regarding the updated strategies in care of children undergoing bone marrow transplantation.

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Effect of Health Promotion Guidelines on Knowledge and Practice for Caregivers at Nursery schools

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Abstract

Preschool period is a crucial stage of life in terms of a child's physical, intellectual, emotional, and social development, health promotion knowledge of pre-school caregivers is an important factor that affects children's health. Nursery school is essentially an important place for preschool children to learn healthy eating, adequate hydration, exercise, proper hygiene, teeth care, and controlling emotions with their classmates. Caregivers as educators should make preschool children aware of the dangers of unhealthy behaviors which cause fall, burn, bleeding, and airway obstruction. By teaching children how to stay healthy and safe, caregivers prepare children for these times by teaching them; to deal with accidents and an emergency. A**imed** of the present study was to determine the effect of health promotion guidelines on knowledge and practice of caregivers at nursery schools. Convenience sample caregivers contacted by children from 3-6years working at 20 nurseries. The total number of sample was 60 caregivers. Tools of data collection included A structured interview questionnaire & observational checklist and health promotion guidelines to assess Caregivers' knowledge and practice about health promotion of preschool children. R**esults: T**here were statistically significant differences in relation to knowledge and practice scores of the caregivers throughout the three phases of the guidelines intervention. **Conclusion,** it was concluded that guidelines effect on caregivers' knowledge and practice regarding health promotion of preschool children. **Recommendation** of this study was to provision of health guidelines for caregivers especially those new about health promotion and the needs of preschool children.

Key wards: Caregivers, Health Promotion, Knowledge, Practice Nursery schools

Introduction

Preschool period is a crucial stage of life in terms of a child's physical, intellectual, emotional, and social development. Growth of mental and physical abilities progress at an amazing rate and a very high proportion of learning take place. Preschool children particularly need high-quality of hygienic care and learning through nursery school. [1, 2]

Children constitute a large segment of population .Number of children in Egypt arrived at 39.2 million children (2020). According to Central Agency for Public Mobilization and Statistics, more than 40% of the population was children & 31.9% of children were in the preschool period. [3]

Nursery school is virtually important places for preschool children to learn healthy eating, adequate hydration, exercise, proper hygiene, teeth care, and controlling emotions with their classmates. Caregivers as educators should make preschool children aware of the dangers of unhealthy behaviors which cause fall, burn, bleeding, and airway obstruction.

Teaching children how to stay healthy and safe, caregivers can prepare children for these times by teaching them to deal with accidents and an emergency. [4-7]

Nursery school provides an excellent vehicle for expanding children's experiences with others it is also excellent preparation for entrance to elementary school. In nursery school, children have opportunities to learn about group cooperation; adjustment to sociocultural differences; and coping with frustration, dissatisfaction, and anger. In nursery school mastery and achievement, which allow children to gain increased feelings of success, and self-confidence, whether structured learning is imposed is less important than the social climate, type of guidance, and attitude toward the children that is fostered by the caregivers or teachers. Caregivers should be aware of preschoolers' developmental abilities and needs, children will learn from the activity provided, as; quiet play, outdoor activity, group activities ,games and projects, creative or free play, and snack and rest periods. [8-10]

Preschool caregivers are an individual has a very important role in regard to their job duties. Caregivers are caring for young children while teaching children various things along the way. Caregivers are the first teachers to provide instruction to the preschool children and have many different general responsibilities and specific duties in the daily guiding role and teaching children, about things related to intellectual, physical and social growth, through helping the preschool children to interact with others while learning necessary tools to get ready for school entry. Through providing a wonderful learning environment, teaching preschool children to be creative and providing a safe and caring environment to learn and grow. [11, 12]

Aim of Study

Determine the effect of health promotion guidelines on knowledge and practice of caregivers at nursery schools.

Research Hypothesis

Caregivers who will receive health promotion guidelines are exhibited to be improved of total knowledge and practice means score post guidelines implementation

Subjects and Method

Research design

Quasi-experimental research design was used in this study.

Setting

The present study was conducted at 20 nurseries from the first and second district of Social Affairs at Tanta city, were selected by stratified random sample.(Ten nurseries were selected from the first district and ten from the second district).

Subjects

Convenience sampling of 60 caregivers contact by children from 3-6 years working at previously mentioned nurseries.

Tools of data collection

Two tools were used to collect the necessary data required for this study.

Tool I- Structured interview Schedule. It was developed by the researcher after review recent literatures [8-10, 13-16] to collect the necessary data included;

Data related to the caregiver such as: age, level of education, years of experience, marital status,

Data related to preschool age children such as: age of children and the number of children in each class.

Caregiver's knowledge about preschool age children's growth &development such as:

Definition, classification, type of physical growth (as, weight and height), physiological growth (Temperature, pulse, and respiration), types of development as (motor, cognitive, emotional, and psychosocial Development) of preschool age [8-10, 13]

Health promotion of preschool children include; nutrition of preschool children as;(caloric, protein needs, types of food, and the number of meals/day), Personal hygiene; (hand washing, grooming, oral hygiene, and dental care), Toilet training as (normal age, importance, and problems of toilet training), Sleep pattern as (normal sleep hours, sleep problems, needs to nap), Play as (importance, type of play needed to preschool children and role of caregiver)

Preschool children problems such as; physical problems (causes, prevention, care of problems), Behavioral problems and psychological problems [13-16]

Scoring system for caregiver's knowledge

Knowledge obtained from caregivers was scored and calculated according to the answer, and their responses were evaluated using the model key answer sheet prepared by the researcher. The questionnaire sheet contained questions growth, development, and health promotion of preschool children. The caregivers respond to these questions before, immediately and after one month of the guidelines. Three levels of scoring were used: Correct and complete answer will be scored (2), Correct but incomplete answers were scored (1), and incorrect or don't know was given (0). **Total scores** were calculated as follows less than 60% were considered poor, 60%-75% were considered fair and 75%-100% were considered good

Tool II- Observation checklist it was developed by the researcher after review recent literature to assess caregivers' practice related to - Care provided to preschool children such as

-Most common injuries of preschool-age children as; burn, fracture and bleeding

-Physical measurement as weight and height

Physiological measurement as measure temperature, pulse, and respiration

Hygienic care such as: hand washing, and oral hygiene.

-Two levels of practices scoring were used; Done scored (2) and Not done scored (1) **The total percent of caregiver's practices** as follows less than 60% were considered poor, 60%-75% were considered fair and 75%-100% were considered good

Method

An official letter was sent from the Faculty of Nursing of Tanta University to the responsible authorities of nurseries which are affiliated to social affairs to take their permission to conduct this study.

-An official letter was sent from Social affairs to the responsible authorities of nurseries to take their permission to conduct this study.

-Ethical community approval was taken to conduct study: consent was obtained from caregivers after explaining the aim of the study at any time

-Confidentiality and privacy were taken into consideration during data collection they have the right to withdraw at any time.

-The tools were developed by the researcher under supervision of the

supervisors after a through detailed review of literature. And tested for its content validity by five experts (two professors of pediatric nursing, two professors of community nursing, and one professors of community medicine)

-A pilot study was conducted on 10% of the studied sample (one nursery from the first district and one another from the second district) to test the applicability and clarity of the tools. Data obtained from the pilot was excluded from the sample size.

Tool I was distributing to the caregivers during the break time and returned after fillet back to the researcher.

Every caregiver was observed by the researcher during day work to assess their actual practice in providing care for preschool-age children using **Tool II.**

General objective of the guidelines

The educational guidelines aimed to improve caregiver's knowledge, practice and promote the health of preschool children

Specific objectives of the guideline were to

- Knowledge about the growth and development of preschool children.
- Knowledge health promotion of preschool children
- Knowledge about common injuries and immediate care

The study was conducted through three phases

1-Assessment phase

The guidelines were built on the assessment of caregivers' knowledge and practice that were done before the implementation of health instructions.

2-Implementation phase

The developed guideline for caregiver in nurseries school was implemented by the researcher based on assessment phase and literature review. All study subject using interactive lectures, posters and demonstration. It was carried out eight sessions .Each educational session was taken 20-30minutes. **The first session** It was covering; an introduction about the importance of these guidelines, definition of growth and development, types of physical growth, physiological growth, types of development, growth and development in preschool age. **The second session** it was focused on health promotion of preschool children as nutrition, hygiene, toilet training, sleep pattern, and play. By the end of this session, caregivers were able to identify the health promotion of preschool children. Nutritional needs and its problems, normal sleep hours and sleep problems and its care, personal hygiene (oral care, hand washing, and its importance). Suitable time for toilet training and its importance. Play (importance of play, types of play, the role of caregiver during play.

- **The third session** it was concentrated on the physical problems of preschool children.
- **The fourth session** it was covering the following topics behavioral problems of preschool children.

  The fifth session was concentrated on promote safe environment to prevent injuries.

  The sixth session was focused on practice related to care provided to children with injuries (burn, fracture, bleeding)
- **The seventh session was** focused on physical growth such as**:** measurement of temperature, pulse, respiration, weight, and height.
- **The eighth session** was focused on hygienic care (oral hygiene and hand washing)

The researcher was selected different teaching activities as small discussion, and; demonstration, and presentations.

3-Evaluation phase

Evaluation of health promation guidelines were carried out immediately after the program and one month using tool I&II**.**

Result

Table(1) Presents Socio-demogra- phic characteristics of studied caregivers .It was observed that, all of them in the studied setting with ages ranging between 18-40year mean age 26.833±4.865, nearly half (43.33%) of caregivers had a diploma of education. Mean of years' experience 2.179±2.047 of years' experience of them. (88.33%) didn't have training courses related to health promotion of preschool-age children

Table (2) Shows Percentage distribution of Caregiver's knowledge about growth and development, It was found that, before the guidelines, 16.67% of caregivers gave complete answers regarding the weight & height of preschool-age children and this percentage increased to 50.00% & 48.33% immediately and after one month of the guidelines respectively.

Regarding their knowledge about a child's pulse, it was found that nearly a fourth (23.33%) of caregivers gave complete answers this percentage increased to 65.00% &61.67% immediately and after one month of the guidelines respectively.

Concerning the definition, types of development were a complete answered by 15.00%&13.33% of caregivers before the guideline while this, percentage improved to 75.00% & 70.00% immediately and after one month of the guidelines respectively.

Table (3) Represents caregiver's knowledge about health promotion of preschool age (Nutrition) It was shown that Nutritional needs, Basic components of nutrition, Food to be avoided, Dealing with refused food, Fluid need, and the importance of fluid for preschool children .It was found that 10.00% of caregivers gave a complete answer about the nutritional of preschool children before the guidelines while two- third (68.33% &61.67%) respectively immediately and post one month of guidelines

Regarding to Fluids' need, it was found that 10, 00% of the caregivers gave complete answers compared to 70.00% and 66.67% respectively immediately and after one month of guidelines implemented

Table (4) Shows caregiver's knowledge about personal hygiene of preschool children, It was clear that, 41.67% of the caregivers gave complete answers about hand washing before the guidelines, while most of them improved to (83.33%) & (81.67%) immediately and after one month of guidelines respectively.

Oral problems of preschool children it was found that only (8.33%) of caregivers gave complete answers before the guidelines, while the percentage increased to 60.00% and 51.67% immediately, and after one month of guidelines respectively

Child grooming found that 21.67% of caregivers gave complete answers before the guidelines, while two-third (65.00%) of them immediately and after one month of the guidelines implementation. Knowledge related to toilet training of children Bladder control time, it was found that 10.00% of caregivers gave complete answers before the guidelines, this percent become 53.33% & 51.67% immediately and after one month of the guidelines implemented. It was clear that, 25.00% of

caregivers gave complete answers before the guidelines about control time, this percent improved to 61.67% & 60.00% immediate, and after one month of guidelines respectively

Table (5) Illustrates caregiver's knowledge about sleep patterns and play of preschool-age children .it was clear that, before the guidelines only 11.67% of the caregivers gave complete answers about the required sleep hours for preschool children compared to 63.33% & 61.67% immediate and after one month of guidelines respectively.

Related to the Importance of play for preschool Children one quarter (25.00%) of caregivers know the importance of play compared to 71.67% & 70.00% immediately and after one month of guidelines implemented respectively.

Table (6) shows Total scores of Caregiver's Practices related to preschool children pre, Immediate, and post-one month of the guideline of health promotion was found that, no one caregiver had a good score before guidelines nearly (75.00% & 71.67%) had good scores immediate and after one month of guidelines respectively. Height also found that 6.67% of caregivers had good scores before the guidelines while 61.67% & 60.00% immediately and after one month respectively. There was a statistical difference in caregivers' practice this difference was (<0.001*)

Table (7) illustrates Total scores of Care giver's Practices related to the measurement of axillary's temperature it was shown that only 3.33% had good scores before the guidelines 68.33% immediate and after one month of guidelines

There was statistically significant difference in caregivers' practice through the study period in relation to axillary's temperature where p<0.001*

Table (8) Illustrates Total scores of Care giver's practices related to Hygienic care for preschool children. Hand washing shows that no one of the caregivers had good scores before the guidelines while a majority of them (91.67%& 90.00%) immediately and after one month respectively

Oral hygiene found only 10.00% of caregivers had good scores while three fourth (78.33%& 75.00%) of them immediately & after one month respectively.

There was a statistically significant difference in caregivers' practice through the study period in relation to items (hand washing & oral hygiene) where p<0.001*

Table (9) illustrates Relation between Mean scores of total Caregivers' knowledge, practice, and biosocial data it was observed that there was a significant relation between the educational level and their total knowledge &practices score before the guidelines and after immediate and one month of guidelines (p<0.001*).There was a significant relation between had training courses and their total knowledge &practice scores before (p<0.001*) The same table shows that there was a significant relation between their marital state and their total knowledge &practices scores before the guidelines and after immediately and one month of guidelines (p<0.001*)

Table (10) Correlations between total knowledge scores of caregivers, total practices scores caregivers and their characteristics revealed that there was significant relation throughout the three

phases of the study between caregivers' total knowledge, practice, and their age ($p<0.001^*$) Also, there was a significant relation between years of experience and their total knowledge &practices scores before the guidelines and after immediately and one month of guidelines ($p<0.001^*$)

Table (1) Percent distribution of studied caregivers about sociodemographic characteristics (n=60)

Sociodemographic Characteristics	No	%
Age /years		
- Range	**18-40**	
- Mean ±SD	**26.833±4.865**	
Educational level		
- High Educational	**34**	**56.67**
- Diploma	**26**	**43.33**
Years of experience		
- Range	**0.25-10**	
- Mean ±SD	**2.179±2.047**	
Training courses		
- Yes	**7**	**11.67**
- No	**53**	**88.33**

Table (2) Percent distribution of Caregiver's knowledge about growth and development (n=60)

caregivers Knowledge about	Pre						Immediate						Post						Chi-Square	
	Complete answer		Incomplete		Don't know		Complete answer		Incomplete		Don't know		Complete answer		Incomplete		Don't know		X^2	P-value
	No	%	No	%	No	%	N	%	N	%	N	%	N	%	N	%	N	%		
1-Physical growth	18	30.00	30	50	12	20.00	48	80.00	10	16.67	2	3.33	45	75.00	12	20.00	3	5.00	39.463	<0.001*
-Definition	17	28.33	30	50	13	21.67	47	78.33	10	6.671	3	5.00	44	73.33	12	20.00	4	6.67	38.267	<0.001*
-Types	10	16.67	12	20	38	63.33	30	50.00	19	31.67	11	18.33	26	43.33	23	38.33	11	18.33	37.926	<0.001*
-Weight	10	16.76	6	10	44	73.33	29	48.33	17	28.33	14	23.33	30	50.00	15	25.00	15	25.00	40.328	<0.001*
-Height																				
2-Physiological growth(vital signs)	26	43.33	2	3.33	32	53.33	46	76.67	7	11.67	7	11.67	45	75.00	8	13.33	7	11.67	37.334	<0.001*
- temperature	14	23.33	1	1.67	45	75.00	39	65.00	9	15.00	12	20.00	37	61.67	9	15.00	14	23.33	48.533	<0.001*
-Pulse																				
3-Development	9	15.00	36	60.00	15	25.00	45	75.00	12	20.00	3	5.00	43	71.67	11	18.33	6	10.00	55.442	<0.001*
-Definition	8	13.33	36	60.00	16	26.67	42	70.00	16	26.67	2	3.33	38	63.33	20	33.33	2	3.33	52.479	<0.001*
-Types																				
4-Factors affect growth and development	10	16.67	29	48.33	21	35.00	38	63.33	20	33.33	2	3.33	34	56.67	22	36.67	4	6.67	42.890	<0.001*

Table (3) Percent distribution of Caregiver's Knowledge about health promotion of preschool children regarding Nutrition (n=60).

Children Health promotion	Complete answer		Incomplete		Don't know		Complete answer		Incomplete		Don't know		Complete answer		Incomplete		Don't know		X^2	P-value
	No	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
1-Nutritional needs	6	10.00	32	53.33	22	36.67	41	68.33	17	28.33	2	3.33	37	61.67	19	31.67	4	6.67	58.067	<0.001*
Basic components of nutrition	24	40.00	27	45.00	9	15.00	46	76.67	12	20.00	2	3.33	47	78.33	11	18.33	2	3.33	25.845	<0.001*
Food to be avoided	8	13.33	40	66.67	12	20.00	47	78.33	12	20.00	1	1.67	45	75.00	13	21.67	2	3.33	67.032	<0.001*
Deal with refused food	11	18.33	39	65.00	10	16.67	44	73.33	15	25.00	1	1.67	40	66.67	18	30.00	2	3.33	45.965	<0.001*
2-Fluids' need	6	10.00	38	63.33	16	26.67	42	70.00	13	21.67	5	8.33	40	66.67	14	23.33	6	10.00	54.624	<0.001*
Importance of fluid	13	21.67	30	50.00	17	28.33	43	71.67	15	25.00	2	3.33	40	66.67	16	26.67	4	6.67	41.285	<0.001*

Table (4) Percent distribution of Caregiver's Knowledge about personal hygiene (n=60).

Caregivers Knowledge about hygiene	Pre						Immediate						Post						Chi-Square	
	Complete answer		Incomplete		Don't know		Complete answer		Incomplete		Don't know		Complete answer		Incomplete		Don't know		X^2	P-value
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
1-Hand washing	25	41.67	28	46.67	7	11.67	50	83.33	10	16.67	0	0.00	49	81.67	11	18.33	0	0.00	36.224	<0.001*
2-Oral hygiene	47	78.33	00	00.00	13	21.67	57	95.00	00	00.00	3	5.00	58	96.67	00	00.00	2	3.33	17.606	0.001*
-Oral problems	5	8.33	38	63.33	17	28.33	36	60.00	22	36.67	2	3.33	31	51.67	26	43.33	3	5.00	47.102	<0.001*
3-Grooming	13	21.67	29	48.33	18	30.00	39	65.00	19	31.67	2	3.33	39	65.00	17	28.33	4	6.67	37.673	<0.001*
4-Nails care	51	85.00	00	00.00	9	15.00	57	95.00	00	00.00	3	5.00	56	93.33	00	00.00	4	6.67	4.253	0.119
5-Toilet training																				
-Bladder control time	6	10.00	29	48.33	25	41.67	32	53.33	24	40.00	4	6.67	31	51.67	23	38.33	6	10.00	42.714	<0.001*
-Bowel control time	15	25.00	19	31.67	26	43.33	37	61.67	17	28.33	6	10.00	36	60.00	16	26.67	8	13.33	28.992	<0.001*
-Importance of toilet training	12	20.00	35	58.33	13	21.67	40	66.67	19	31.67	1	1.67	39	65.00	20	33.33	1	1.67	28.992	<0.001*
-Toilet training problems:- Incontinence	5	8.33	26	43.33	29	48.33	36	60.00	21	35.00	3	5.00	35	58.33	21	35.00	4	6.67	61.402	<0.001*

Table (5) Percent distribution of Caregiver's knowledge about sleep pattern and play of preschool age children (n=60)

Caregivers Knowledge about	Pre						Immediate						Post						Chi-Square	
	Complete answer		Incomplete		Don't know		Complete answer		Incomplete		Don't know		Complete answer		Incomplete		Don't know		X^2	P-value
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
1-Sleep pattern -Sleep hours required	7	11.67	28	46.67	25	41.67	38	63.33	17	28.33	5	8.33	37	61.67	17	28.33	6	10.0	47.777	<0.001*
-Sleep problems	9	15.00	28	46.67	23	38.33	37	61.67	21	35.00	2	3.33	34	56.67	23	38.33	3	5.00	48.880	<0.001*
2-play -presence of games in nursery	60	100.00	00	00.00	00	00.00	60	100.00	00	00.0	00	00.0	60	100.00	00	00.00	0	00.0		
-Types of games in nursery Suitable to child age	13	21.67	46	76.67	1	1.67	33	55.00	27	45.0	0	0.00	33	55.00	27	45.00	0	0.00	19.347	<0.001*
-Importance of play for preschool Children	15	25.00	36	60.00	9	15.00	43	71.67	17	28.33	0	00.0	42	70.00	17	28.33	1	1.67	40.054	<0.001*
Role of caregivers during child's play	9	15.00	38	63.33	13	21.67	42	70.00	18	30.00	0	0.00	40	66.67	18	30.00	2	3.33	52.982	<0.001*

Table (6): Total scores of Caregiver's Practice related to anthropometric measurement of preschool age children (n=60)

		Pre		Immediate		Post		Chi-Square	
		N	%	N	%	N	%	X^2	P-value
Weight	Good	0	0.00	45	75.00	43	71.67	115.620	<0.001*
	Fair	26	43.33	15	25.00	17	28.33		
	Poor	34	56.67	0	0.00	0	0.00		
Height	Good	4	6.67	37	61.67	36	60.00	102.964	<0.001*
	Fair	4	6.67	17	28.33	18	30.00		
	Poor	52	86.67	6	10.00	6	10.00		

Table (7): Total scores of Care giver's Practice related to physiological measurement (axillary's temperature) for preschool children (n=60)

Temperature	Pre		Immediate		Post		Chi-Square	
	N	%	N	%	N	%	X^2	P-value
Good	2	3.33	41	68.33	41	68.33	88.263	<0.001*
Fair	5	8.33	9	15.00	9	15.00		
Poor	53	88.33	10	16.67	10	16.67		
Total	60	100.00	60	100.00	60	100.00		

Table (8): Total scores of Caregiver's practice related to Hygienic care of preschool children (n=60)

Total scores		Pre		Immediate		Post		Chi-Square	
		N	%	N	%	N	%	X^2	P-value
1-Hand washing	Good	0	0.00	55	91.67	54	90.00	141.014	<0.001*
	Fair	41	68.33	5	8.33	6	10.00		
	Poor	19	31.67	0	0.00	0	0.00		
2-Oral hygiene	Good	6	10.00	47	78.33	45	75.00	102.760	<0.001*
	Fair	4	6.67	8	13.33	10	16.67		
	Poor	50	83.33	5	8.33	5	8.33		

Table (9) Relation between Mean scores of total Caregivers knowledge, practice and biosocial data

Total		N	Pre			Immediate			Post		
			Mean	± SD	P-value	Mean	± SD	P-value	Mean	± SD	P-value
Educational level	High Educational	34	197.412	± 50.006	<0.001*	302.824	± 30.605	<0.001*	297.206	± 31.293	<0.001*
	Diploma	26	133.923	± 43.171		249.962	± 45.343		244.846	± 46.968	
Training courses	Yes	7	267.286	± 29.534	<0.001*	336.000	± 8.981	<0.001*	334.571	± 9.217	<0.001*
	No	53	157.038	± 45.597		272.509	± 43.428		266.585	± 43.582	
Marital state	Married	27	202.148	± 47.857	<0.001*	297.481	± 38.744	0.006*	292.333	± 39.213	0.006*
	Single	33	143.515	± 49.340		265.545	± 46.538		259.939	± 47.531	
Having children	Yes	21	210.143	± 49.418	<0.001*	299.714	± 39.744	0.013*	296.095	± 40.142	0.007*
	No	39	148.231	± 47.941		269.256	± 45.660		262.897	± 46.051	

Table (10) Correlations between Caregivers total knowledge scores, total practice scores and their Characteristics

	Time	Caregiver's age (Years)		Years of experience (Years)	
		R	P-value	r	P-value
Knowledge	Pre	0.614	<0.001*	0.782	<0.001*
	Immediate	0.416	0.001*	0.550	<0.001*
	Post	0.424	0.001*	0.569	<0.001*
Practice	Pre	0.435	0.001*	0.758	<0.001*
	Immediate	0.292	0.024*	0.524	<0.001*
	Post	0.303	0.018*	0.553	<0.001*
Total	Pre	0.609	<0.001*	0.809	<0.001*
	Immediate	0.406	0.001*	0.581	<0.001*
	Post	0.421	0.001*	0.612	<0.001*

Discussion

Regarding sociodemographic characteristics of studied caregivers' .the current study revealed that all of the caregivers in the studied setting with ages ranged between 18-40year and nearly half of caregivers had a diploma of education, this result may affect caregivers' awareness and knowledge about the health of preschool children. These results agree with **Hongmei & etal** (2020) who mentioned that about one third of preschool teachers in their study were undergraduate & not specialized in preschool childhood and also **Sainio & etal** (2018) revealed that near half of preschool teachers/caregivers had moderate education [17,18]

As regards caregiver's experience the current study show that most of caregivers had low years' of experience this finding may explain the cause of poor caregiver's knowledge about preschool childhood. This result agrees with **EL-Marsomy** (2019) who show that studied caregiver's in her study more caregivers had experienced less than 5 years. Also, the current study revealed that most of the caregivers didn't have training courses related to health promotion of preschool-age children, this finding may be due to the courses not being available and caregivers hadn't time to attend courses. [19].

The results of the current study revealed that there was a lack of knowledge about; the definition of growth and development, types, gross motor development, fine motor development, and language. This finding may be due to most of them had not specialized education in this field. This finding agrees with **Brito &etal** (2022) who mentioned that there was a knowledge deficit in the definition of growth and development, types, gross motor development, fine motor development, and language [20]

As regards health promotion knowledge of pre-school caregivers is an important factor that affects children's health, the current study revealed that caregivers had

lacking knowledge about the nutrition &fluid need of preschool children, this result may be due to that more caregivers hadn't any information about a healthy diet for preschool children .These results agree with **Lamanauskas** (2019) who mentioned that a deficit in kindergarten teachers' knowledge about nutrition .While this finding disagree with **Lorrian & Carolyn** (2016) who presented that preschool staff had good knowledge of healthy eating of preschool children. [21, 22]

As regards caregivers' knowledge about personal hygiene of preschool children more of them had poor knowledge about, oral hygiene, grooming, nail care, and toilet training. This finding may be due to a lack of providing and attending specialized courses about personal hygiene. This finding agrees with **Lamanauskas** (2019) and **Amat & Zain** (2021) who mentioned that teachers/caregivers did not have enough knowledge about personal hygiene .Also, **El-Sabagh** & **etal** (2016) revealed that preschool children's knowledge, attitude, and practices of personal hygiene were deficient and need for more health education concerning personal hygiene [21, 23, 24]

Regarding the caregiver's practice of hand washing the present study revealed that no one of the caregivers had a good score before the guidelines these finding agree with **Ogwezzy** & **Solomon** (2019) who showed that only 17.3%of mothers/caregivers were doing proper hand washing. This indicates while the practice of hand washing was high among mothers/caregivers of children less than 5 years in Lagos, really were not doing it the hygienic way [25]

Regarding caregivers' knowledge about hand washing the current study showed that obvious improvement was documented in caregivers' knowledge scores post guidelines with highly significant statistical differences. This result agree with **Assefa & Kumie** (2014) cited that adequate knowledge of hand hygiene has proved to yield positive hygiene behavior is the greatest influence in teaching hand washing, also **Jamaluddine &etal** (2020) concluded that a comprehensive hand hygiene education progress included awareness of the caregivers, proper hand washing and facilities resources in instilling and sustaining good knowledge of hand hygiene [26, 27]

As regards knowledge of caregivers on preschool oral hygiene .it was observed that most caregivers had poor knowledge pre the guidelines. This result may be due to low education and lack of experiencing in oral hygiene. On the same line, **Mani and etal** (2017) &**Ashkanani and Al-Sane** (2013) stated that caregivers had weak knowledge in relation to oral health of preschool children in contrast with **Khanal** (2015) who found that knowledge regarding oral hygiene was satisfactory knowledge the most parents/caregivers of preschool children had moderate knowledge. [28, 29, 30]

As regards practices of caregivers on preschool oral hygiene, the present study revealed that more caregivers improved in performing all steps of brushing their teeth post the guidelines. These findings could be attributed to the oral care practice of caregivers observed and had good knowledge about oral care post the guidelines. Similarly, the study by **Haque *et al.* (2016)** cited that a significant improvement in oral health practices among the participants and a change to healthy practices occurred after program

was implemented .Also, the results of the study by **Abu-Elenen *et al.* (2015)** to evaluate the effect of an oral care educational program on the knowledge, practice, among children is improved after the program is implemented. Also, **Seif El-Nasr (**2017) And **Fernando** (2013) concluded that oral health intervention program has a positive impact on practices toward oral health. [31-34]

Regarding caregivers' knowledge about toilet training of children, the current study shows that most caregivers had poor knowledge about bladder control time, bowel control time, and the importance of toilet training. This finding may be a result of the majority of caregivers did not attend any courses on this topic and the courses weren't available. These results agree with **El-Khedr & Mohamed** (2014) **& Chellaswamy** (2019)who revealed that majority of the mothers/caregivers had lack knowledge about children's toilet training. Also as regarded caregiver's knowledge about toilet training of children, the current study revealed that highly significant statistical improvement in caregiver's knowledge scores after the guidelines, this finding may be due to the caregivers' willingness to improve their knowledge about the growth and development of preschool children but they couldn't take the courses because these courses are expensive. [35, 36]

Sleep is very important for the healthy growth and development of children. As regarding caregiver's knowledge about sleep the current study revealed that caregivers had a lack of knowledge about sleep hours needed by preschool children and sleep problems. This result may be due to more caregivers having diploma school not related to preschool childhood. This result in agreeing with **Temal** & **Gultekin** (2020) **& Owens** (2011) who revealed the caregivers had deficient knowledge of sleep and sleep problems in children age. [37, 38]

Regarding caregivers' knowledge about the play of preschool children the current study showed that more caregivers had incomplete knowledge related to the importance and their role during children is play this result may be due to more caregivers had not specialized education about preschool childhood age. This result agrees with **Hongmei Hu &etal** (2020) **& Jayasuriya** (2014) in their study concluded that had poor knowledge regarding play of preschool children. In contrast, **Akar** (2019) who cited that in his study the caregivers had Satisfying knowledge about children's play. [17, 39, 40]

Conclusion

In the light of finding of present study, can conduct that there were lack of essential and proper knowledge and practice concerning health promotion of preschool children in nursery, the application of health promotion guidelines of preschool led to improve caregiver's knowledge and practice

Based on the results of the current study the following recommendations were suggested

-Ministry of health in collaboration with universities organizes mobile health teams to give awareness lectures for caregivers/teachers related to health promotion of preschool children

-Provision of health guidelines for caregivers especially new about health promotion and needs of preschool children

-Aperiodic training for health promotion, emergency procedures and first aid should be conducted.

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Effect of Implementing Telerehabilitation versus Traditional Pulmonary Rehabilitation Program on Clinical Outcomes of Patients Post Covid-19

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Abstract

Background: Post COVID-19 syndrome is a persistent signs and symptoms that emerge during or after COVID-19 infection. Telerehabilitation is a method to overcome the limitations of traditional based pulmonary rehabilitation through the use of communication technologies to provide rehabilitation services from a distance **Aim:** This study aimed to evaluate the effect of implementing telerehabilitation versus traditional pulmonary rehabilitation program on the clinical outcomes of patients post covid-19. **Subjects and Method:** a purposive sample of 60 patients post covid-19 infection, who admitted Contiguous disease control center at Tanta Main University Hospitals and Isolation department in Qutor Central Hospital affiliated to Ministry of Health and Population during the period of data collection. **Tools**: four tools were used. **First Tool:** A Structure Interview Questionnaire**,** which composed of three parts: Part (1): patients' socio-demographic data. Part (2): Clinical patients' data, as past medical history. Part (3): Lab investigations which Include: PCR and PT. **Second Tool:** Chronic Respiratory Disease Questionnaire (CRQ). **Third Tool**: Fatigue Assessment Scale (FAS).**fourth Tool**: Modified Borg Scale (MBS).**Results:** the main results revealed that there was a high significant improvement in the total health related quality of life, fatigue and dyspnea in telerehablitation group since p value was ≤ 0.05 one month post implementing the program. **Conclusion& Recommendations**: The implementation of pulmonary telerehablitation program had a good impact on post covid- 19 patients' HRQOL, fatigue and dyspnea. It was recommended that nurses should follow pulmonary rehabilitative program as a routine care for patients.

Key words

Telerehablitation, Pulmonary Rehabilitation, Post covid-19, HRQOL, Fatigue and Dyspnea.

Introduction

Coronavirus disease (COVID-19) is natural disasters, a recently emergent disease and epidemics that cause many challenges in providing health care, caused by SARS-CoV-2. COVID-19 spreads primarily with respiratory droplets that caused when a person's saliva discharged through coughing or sneezing and occurs in a space of 1 m (close contact). [1,2,3]

According to world meter statistics in 2021, the prevalence of Covid-19 is about 232,186,217confirmed cases and 4,755,384 deaths worldwide. Regarding Egypt the prevalenceare 286.352 confirmed cases and 16.671death.[4,5] A statistical record of Tanta University Contiguous disease control center indicated that the number of patients admitted with covid-19 at 2021 is 155 patients and the statistical record in Qotor Central Hospital Affiliated to ministry of health is 200 patients .[6,7]

Covid-19 clinical manifestations include mild features as fever, running nose and loss of smell. Moderate features as shortness of breath and oxygen saturation is greater or equal to 94%. Sever features as respiratory

spo_2 less than 89% on room air, lung infiltration less than 50% gray colored skin and pressure in the chest .[8,9]

Post covid-19 syndrome (PCS) is defined as an ongoing symptomatic illness in patients who have recovered from their initial COVID-19 infection. These persistent symptoms include fatigue, dyspnea. Also, the COVID-19 severity, as a risk factor for developing PCS and poor quality of life. [10-11]

pulmonary rehabilitation (PR) is defined as a comprehensive intervention based on patient assessment followed by patient-tailored therapies, which include, exercise training, education, and behavior change, designed to improve the physical and psychological condition of people with chronic respiratory disease which may be followed with patients through many technology and telehealth.[12]

Telerehabilitation is a method to overcome the limitations of traditional based pulmonary rehabilitation through the use of communication technologies to provide rehabilitation services from a distance, on the other hand traditional pulmonary rehabilitation is delivered care directly (face to face) to a patient's at home or a nearby healthcare facility, where nurses worked to improve the healthcare performance and monitoring patients for 24/h to provide early rehabilitation [13-14]

Benefits of telerehabilitation include reducing health care costs, improving treatment adherence, improving physical and mental function and quality of life, and be delivered in a manner that is satisfactory to patients.[13,14,15] Most of the telerehabilitation studies address outcomes of synchronous, real-time time rehabilitation, although there is some evidence that asynchronous telemedicine can also be effective for specific patient populations, as those following joint replacement. The payment methods is major factor in implementation[15,16]

Significance of the study

COVID-19 pandemic has created a complex scenario for global health, with various levels of functional impairment in millions of individuals recovering from the disease worldwide. The severe form of the disease causes lung damage. Subsequently, the affected patients may develop pulmonary fibrosis due to the process of lung injury repair. Patients, who recover from COVID-19 after a prolonged ICU stay should undergo pulmonary rehabilitation, initial in gradual manner during hospitalization and continuing after hospital discharge. [17, 18]. So the aim of this study is to evaluate the effect of implementing telerehabilitation versus traditional based pulmonary rehabilitation program on the clinical outcomes of patients post covid19.

The aim of the Study

Aimed to evaluate the effect of implementing telerehabilitation versus traditional pulmonary rehabilitation program on the clinical outcomes of patients post covid-19.

Research Hypothesis

-The patients who will receive pulmonary rehabilitation through telerehablitation will exhibit less dyspnea, fatigue and improve health related quality of life than who will receive traditional pulmonary rehabilitation program.

Subjects and Method

Research design

A comparative research design was utilized in this study.

Setting

The study was conducted in isolation department in Qutor Central Hospital affiliated to Ministry of Health and Population and Contiguous disease control center at Tanta Main University Hospitals, Tanta.

Subjects

A purposive sample of 60 post covid -19 patients, who admitted the above-mentioned settings during the period of data collection. The sample size estimated by power analysis of independent t tests [One tail, Effect size = 0.55; The significance level (α) at 0.05; Power (1-β) = 0.85].

Inclusion criteria

The subjects were recruited based on the following criteria:

- Adult patients (21-60 years), both gender
- Post- Acute covide 19.
-Physiological parameters (respiratory rate less than 30 cycles per minute and oxygen saturation ≥93% at rest).
- Access to a phone with personal device and reliable internet connection.

Tools of the study

Four tools were used to collect the required data as follow:

First Tool: "A Structure Interview Questionnaire: This tool was developed by the researcher after reviewing of the related literatures [(19)], it included three parts:

Part (I) Socio-demographic data" which included, patient code, age, gender, educational level, occupation and residence.

Part (II): Health relevant assessment sheet which includes diagnosis, past medical and surgical history, smoking history , vaccination of covid19, body mass index (BMI),vital signs and spo2.

Part (III) Lab investigations which includes: PCR, CBC and CRP.

Tool (II) : **Chronic Respiratory Disease Questionnaire (CRQ):**

This tool was developed by **Guyatt (1987)[(20)]** and was modified by **Valero-Moreno (2019)[(21).]**, it was modified by the researcher to measure the 4 important HRQoL domains associated with chronic respiratory disease:(dyspnea, fatigue, emotional functioning, and disease control). Higher score indicate high quality of life.

Total score ranged from (20 or less) indicting very poor HRQOL, (21-40) Poor HRQOL, (41-60) Moderate HRQOL, (61-80) Good HRQOL, (81-100) Very good HRQOL.

Tool (III) : **Fatigue Assessment Scale (FAS),** was developed by **by Michielson (2003)[(22)]** and was modified by **Horisberger (2019)**[(23)] and will be adopted by the researcher to assess severity of fatigue. The FAS is a 10-items general fatigue questionnaire, five questions reflect physical fatigue and 5 questions reflect mental fatigue, per statement take one out of five answer categories can be chosen from never to always (never=1), (sometimes=2), (regularly=3), (often =4) and (always =5) and an answer to each question has to be given, even if the person does not have any complaints at the moment.

Total score ranged from (10 – 21) No fatigue (normal), (22-34) Fatigue, (scores ≥ 35) Extreme fatigue.

Tool (IV) Modified Borg Scale (MBS), was developed by **Borg (1982)**[(24)] and was modified by **Mahler and Horowitz in 1994**[(25)] and was adopted by the researcher to assess severity of dyspnea. This modified 12 point scale consists (0, 0.5, 1-10) corresponds with increasing shortness of breath, patients were asked to mark the most appropriate description or number of their shortness of breath at rest and during exercise.

Total score ranged from (0 Nothing at all), (0.5Very very slight), (1 Very slight), (2 Slight), (3 Moderate), (4 somewhat sever), (5-6 Sever), (7-8 Very sever), (9 Very very sever), (10 Maximal)

Method:

Ethical and legal consideration

Official letters from the faculty of nursing were delivered to the appropriate authorities in the selected area of the study; Permission to conduct the study was obtained from the

directors of the Isolation department in Qutor Central Hospital affiliated to Ministry of Health and Population and Contiguous disease control center at Tanta Main University Hospitals. An Informed consent was taken from all participants in this research after explanation the aim of the study and the right to withdrawal at any time. Confidentiality and privacy were taken into consideration regarding data collection. A code number was used instead of names.

Methods of data collection

1. The tools of the study were translated to Arabic language and back to English by an expert in English and Arabic language. Content validity of the translated version was examined by 5 experts who are holding a PhD in Medical Surgical Nursing and chest disorder field physician. .The required modifications were conducted accordingly. The reliability of the tools reported as acceptable level of (.839).
2. The reliability for the study tools was calculated by Cronbach's alpha test; it was related to tool II: measuring health related quality of life (Chronic Respiratory Disease Questionnaire CRQ) is .937, tool III: Fatigue Assessment Scale (FAS) is .909, tool III: Modified Borg Scale (MBS) is (.839).
3. A pilot study was carried out on 10% of the total study sample to test the clarity and practicability of the tools. Participants in the pilot study were excluded from the study.
4. The current study data collected in the beginning of February until the end of September 2022, for about 7 months
5. The present study was conducted through four phases (Assessment, planning, implementation and evaluation) and it was continued with each patient individually through their follow ups.

Assessment phase; data collected from patient by different methods according to their groups (telerehabilitation group and traditional group) by using tools I, II, III and IV

Planning phase; the designed pulmonary rehabilitation program was planned based on the study subjects' needs. An illustrative structured colored booklet was prepared and written in simple and attractive language supported by illustrative pictures as a guide in addition to recorded video and power point for traditional and telehealth groups respectively . The rehabilitation program was carried out in (4) sessions individually for every patient. Researcher followed safety precautions before working with the patient according to world health organization recommendation such as wearing the face mask, gown, eye goggle, over shoes and gloves.

Implementation phase; the rehabilitation program was developed and carried out by the researcher for **(telerehabilitation group):** the group was received the pulmonary rehabilitation program post Covid-19 through three sessions and the duration of each session will be 30:40 minutes per day for three consecutive days by using different method (video call , whatsapp and videos recorded by the researcher). **For (Traditional group):** the group was received the same program with the same sequence as telerehabilitation group but the manner of teaching is face to face (traditional method).

I-On the first session included explaining how to perform **the** butyko breathing exercise. [26]

First step: "Control pause"; asking the patient to ;-

1. Sit up straight, close his or her mouth, and take a normal breath through the nose, then taking a control pause, after that , inhale for two seconds, followed by an exhalation (in 3 seconds) ,then hold his or her nose while exhaling , still having some air in the lungs.
2. Measure how long he can go without needing to breathe in again, then hold the

breath until he need to breathe in for the first time, after that ,open the nose and take a deep breath, be sure the first breath taken after the cp should be like normal breath.

Second step: Breathing shallowly; ask the patient to:-

1. Sit up straight and place a finger under his / her nose in a horizontal position to measure the amount of airflow, without obstruct the nose.
2. Take a small breath into nostril tips. For instance, only inhale enough air to completely fill her / his nostrils, with each breath, take in a flicker of air (about 1 cm), focus on calming the patient's breath to lessen the amount of warm air that is felt on the finger when the patient exhales; the warmer the air felt, the deeper the breathing.
3. Gradually reduce the amount of warm air applied to their finger until they start to feel the need or desire for air, then attempt to sustain the need for air for four minutes.

Third step: Consolidate the preceding steps (Shallow breathing and Control pause).

II- The second session included explaining the type, duration and how to perform the strength exercise that included upper limb strength and endurance exercise such as **light hand weights :-** asking the patient to take the start position (sitting or standing), then carry light weights in her / his hands ,after that moving the arms forward and sides, in addition to **wall press :-** asking the patient to stand up from the start position, after that lean into the wall then push up away from wall , then move feet away from the wall in addition to lower limb strength and endurance exercise such as **sit-to-stand :-** ask the patient to sit on the edge of chair , then stand upright without using the arms, in addition to **walking: -** ask the patient to walk daily . **Duration** for each exercise about 10 minutes at least twice a week [27]

III- On third session type and how to perform stretch exercise was explained which included: - **Side neck stretch:** asking the patient to slowly tilt head towards one shoulder and hold for 10 seconds, then repeat toward other shoulder for two to three times .**Shoulder rotation:** asking the patient to place hands on her/his shoulders, then slowly make forwards and backwards circles with the elbows and repeat five times each way. **Thoracic stretch** asking the patient to hold hands behind your back , then move your hands away from your back , after that hold for 20 seconds , and repeat two to three times**. Quadriceps stretch ;** asking the patient to pull her/ his foot towards the buttock until a stretch is felt in the front of the thigh, then hold for 20 seconds and repeat two to three times**.**[27] Diet recommendation for the patient, encouraged the consumption of fruits, vegetables and whole grain foods. Fruits (eg, orange, grapefruit) and vegetables such as broccoli, and carrots, avoiding the intake of salt, fat, and sugar and encouraged reductions in sugary drinks. [28]

Evaluation phase: the studied groups were evaluated by the following schedule; pre, immediately one week and one month post implementing the rehabilitation program by using tools (I, II ,III and IV) for evaluation by using different method (video call , whats app , phone call and videos for telerehabilitation group and by using face to face for traditional group)

Methods of data analysis

All data were collected, coded, tabulated and subjected to statistical analysis. Statistical analysis was performed by statistical Package SPSS in general (version 20), Data expressed as number and percentage. Qualitative data were described using number and percent. Chi-square test for categorical variables, to compare between different groups. P value was statistically significant at a level 0.05%.

Results

Table (1) illustrated the distribution of the patients according to their Socio demographic data. It showed that less than half (43.3%) of the studied groups were in the age group between (50≤60 years) and about quarters of them were in the age group between (31 ≤40 years) with their mean age 53.43±8.73 and 37.57± 11.46 among traditional and telehealth group respectively. **Also,** more than half (58.3%) of the studied groups were female and most of them (75%) were married. **In addition to**, more than two third (68.3%) of the studied groups were lives in rural areas and less than half (41.7%) and one third (33.3%) of the studied groups were employee and house wife respectively.

Figure (1): illustrated the distribution of the studied groups according to Patient's educational level .it showed that less than half (43.3%) of telehealth group were have university education, while about one third (30%) of the traditional group were diploma.

Table (*2*) illustrated the distribution of the studied patients according to their clinical data. Concerning to the hospitalized period, smoking, vaccination history and BMI. It showed that more than two third (71.7%) of the studied groups were stayed in hospital <10 days. **Also,** more than three quarter (76.7%) of the studied groups were non-smoker. **Moreover,** more than half (56.7%) of studied groups were vaccinated before and nearly one third (35.3%) and slightly less than one third (29.4) of studied groups were received astrazeneca and sinovac vaccine respectively. **Additionally,** about half (46.7%) and more than third (35%) of studied groups were have over and normal body weight respectively.

Figure (2): illustrated the distribution of the studied groups according to overall Chronic Respiratory Disease Questionnaire (CRQ) (HRQOL),it showed that less than half (40%) telehealth group have poor quality of life regarding chronic respiratory disease questionnaire pre implementing the program and more than two third (73.3%) of them have good quality of life one month after implementing the program . **Also,** about two third (66.7%) of the traditional group have poor quality of life regarding chronic respiratory disease questionnaire pre implementing the program and the most (63.3 %) of them have good quality of life one month after implementing the pulmonary rehabilitation program respectively.

Figure (3): illustrated the distribution of the studied groups according to total score of Fatigue Assessment Scale (FAS). It revealed that more than half (60%) and the majority (80%) of telehealth and traditional groups were suffering from extreme fatigue pre implementing the program respectively, **meanwhile** after one month of implementing the program, two third (66.7%) and more than half (63.3%) in the telehealth and traditional group were have no fatigue respectively.

Table (*3*) illustrated the distribution of the studied patients according to according to Modified Borg Scale (MBS), it showed that less than half (46.7%) and (43.3%) suffering from somewhat sever dyspnea during rest among telehealth and traditional group pre implementing the program respectively, **meanwhile** more than quarter (26.7%) and less than half (40%) have slight dyspnea in telehealth and traditional group after one month of implementing the program respectively. **Also,** it illustrated that more than half (53.3%) and about half (50%) have severe dyspnea during exercise among telehealth and traditional group pre implementing the program respectively, **meanwhile** less than half (36.7%) and (36.7%) have slight and moderate dyspnea in telehealth and traditional group one month after implementing the program respectively.

Table (4): illustrated the Correlation between Modified Borg Scale (MBS) with chronic respiratory disease questionnaire (CRQ) and fatigue assessment scale. It showed that there was a statistical negative correlation between chronic respiratory disease questionnaire (CRQ) health related quality of life and Modified Borg Scale pre implementing, week and one month after implementation of the program wherep_1= (<0.05) in traditional and telehealth group respectively. ***Moreover*** there was significant positive correlation between Modified Borg Scale and fatigue assessment scale pre implementing ,week and one month after implementation of the program where P = (<0.05) in telehealth and traditional group respectivel.

Table (1): Distribution of the studied groups according to patient's socio-demographic data.

	Traditional (n = 30)		Telehealth (n = 30)		Total (n = 60)		Test of Sig.	p
	No.	%	No.	%	No.	%		
Age (years)								
21- 30 years	0	0.0	11	36.7	11	18.3		
31 -< 40 years	4	13.3	9	30.0	13	21.7	χ^2=	<0.001
41-<50 year	5	16.7	5	16.7	10	16.7	22.769	
50-<60 years	21	70.0	5	16.7	26	43.3		
Mean ± SD.	53.43 ± 8.73		37.57 ± 11.46		45.50 ±12.88		U=142.50	<0.001
Sex								
Male	14	46.7	11	36.7	25	41.7	χ^2=	0.432
Female	16	53.3	19	63.3	35	58.3	0.617	
Marital Status								
Married	20	66.7	25	83.3	45	75.0		
Divorced	0	0.0	1	3.3	1	1.7	χ^2=	^{MC}p=
Single	1	3.3	4	13.3	5	8.3	12.961	0.002
Widow	9	30.0	0	0.0	9	15.0		
Residential								
Rural	23	76.7	18	60.0	41	68.3	χ^2=	0.165
Urban	7	23.3	12	40.0	19	31.7	1.926	
Occupation								
Manual work	10	33.3	2	6.7	12	20.0		
Employee	5	16.7	20	66.7	25	41.7		
Technical work	0	0.0	1	3.3	1	1.7	χ^2=	^{MC}p
House wife	14	46.7	6	20.0	20	33.3	20.490	<0.001
Student	0	0.0	1	3.3	1	1.7		
Not working	1	3.3	0	0.0	1	1.7		

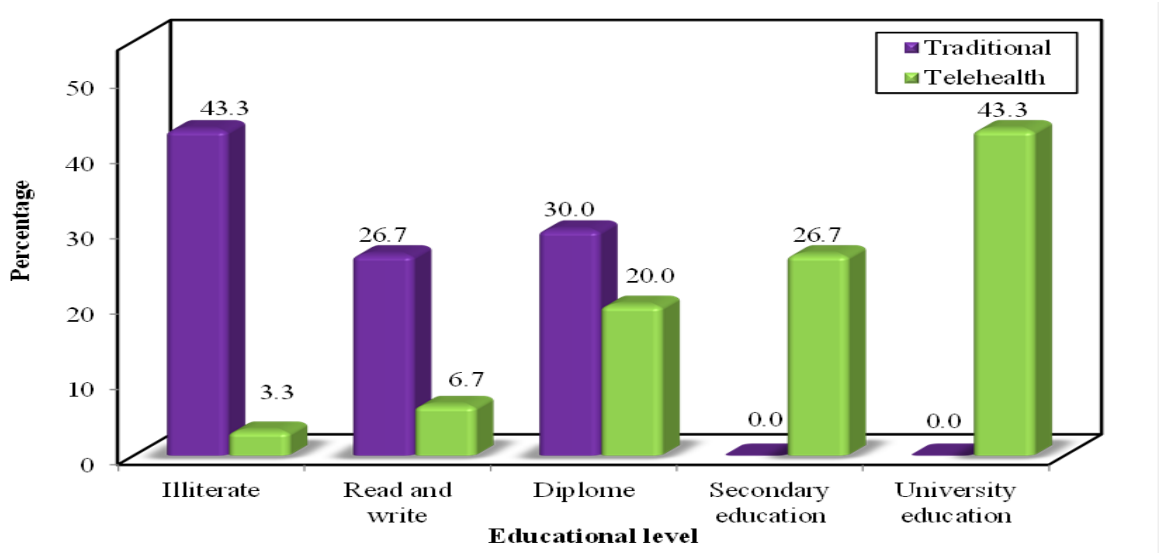

Figure (1): Distribution of the studied groups according to Patient's educational level..

Table (2): Distribution of the studied groups according to clinical data.

	Traditional (n = 30)		Telehealth (n = 30)		Total (n = 60)		χ^2	p
	No.	%	No.	%	No.	%		
Duration of hospital stay								
<10	20	66.7	23	76.7	**43**	**71.7**	χ^2= 2.852	^{MC}p= 0.334
10-<20	7	23.3	7	23.3	14	23.3		
≥20	3	10.0	0	0.0	3	5.0		
Mean ± SD.	9.53 ± 5.86		7.47 ± 2.05		8.50 ± 4.47		U=411.50	^{MC}p=0.544
Smoking history								
Smoke	5	16.7	5	16.7	10	16.7	4.101	^{MC}p= 0.178
Non smoking	**21**	**70.0**	**25**	**83.3**	**46**	**76.7**		
Ex smoking	4	13.3	0	0.0	4	6.7		
Previous Vaccine intake								
Yes	11	36.7	**23**	**76.7**	**34**	**56.7**	9.774	^{MC}p= 0.002
No	**19**	**63.3**	7	23.3	26	43.3		
If yes mention type of vaccine								
AstraZeneca	1	9.1	**11**	**47.8**	**12**	**35.3**	7.770	^{MC}p= 0.101
Sinopharma	**4**	**36.4**	4	17.4	8	23.5		
Sinovac	**4**	**36.4**	**6**	**26.1**	**10**	**29.4**		
Johnson	0	0.0	1	4.3	1	2.9		
Pfizer	1	9.1	1	4.3	2	5.9		
Other (moderna)	1	9.1	0	0.0	1	2.9		
BMI								
BMI less than 18.5 is under weight	0	0.0	2	6.7	2	3.3	χ^2= 4.068	^{MC}p= 0.382
BMI of 18.5 to 24.9 is normal	**12**	**40.0**	**9**	**30.0**	**21**	**35.0**		

BMI of 25 to 29.9 is overweigh	**12**	**40.0**	**16**	**53.3**	**28**	**46.7**		
BMI of 30 to 39.9 is obesity	5	16.7	3	10.0	8	13.3		
BMI greater than 40 is extreme obesity	1	3.3	0	0.0	1	1.7		
Mean ± SD.	26.84 ± 4.69		25.74 ± 4.51		26.29 ± 4.59		t=0.927	0.358

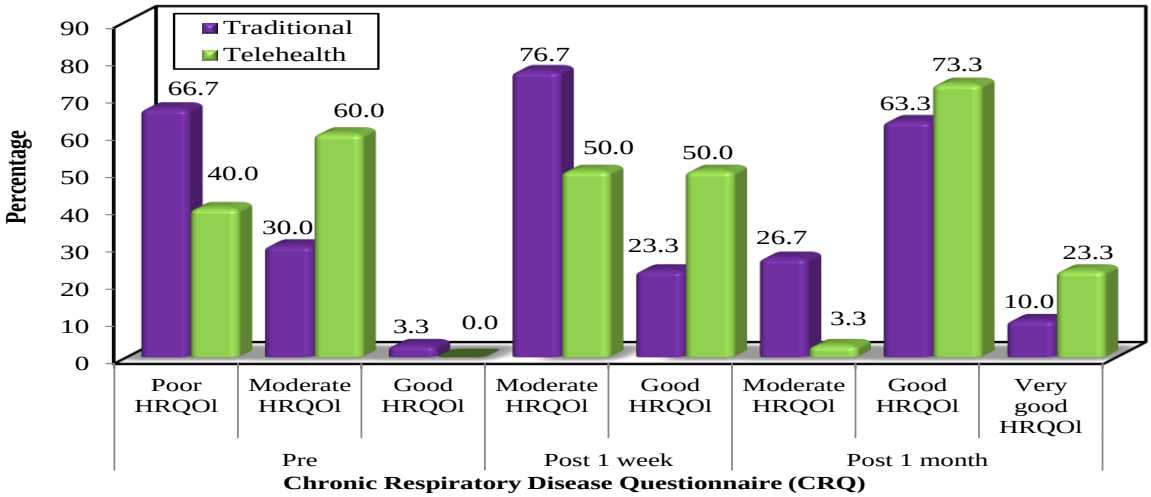

Figure (2): Distribution of the studied groups according to overall Chronic Respiratory Disease Questionnaire (CRQ)(HRQOL) .

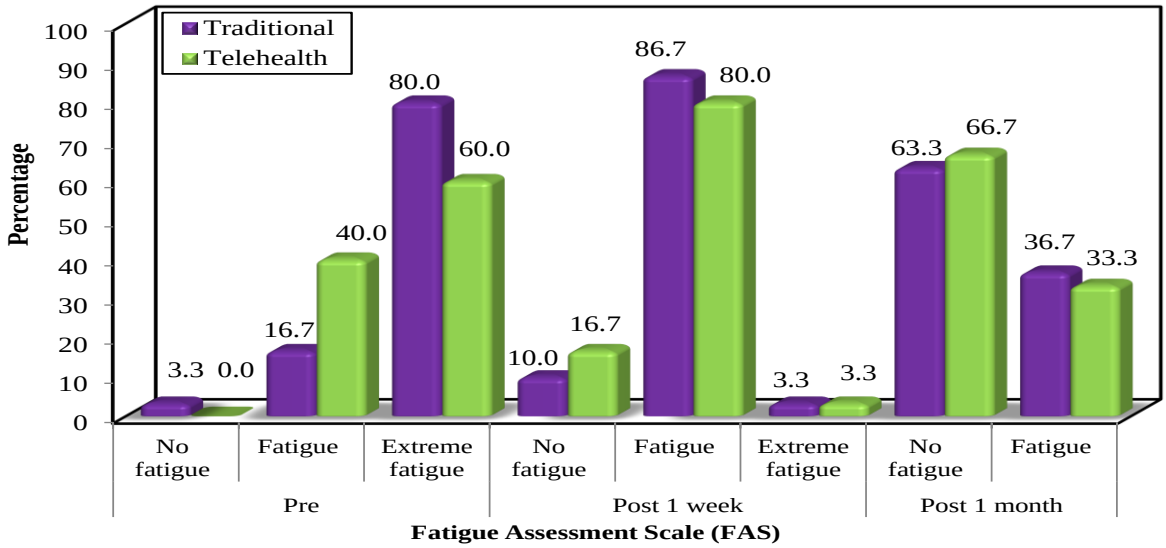

Figure (3): Distribution of the studied groups according to total score of Fatigue Assessment Scale (FAS).

Table (3): Distribution between the studied groups according to Modified Borg Scale (MBS)

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Tool (IV) Modified Borg Scale (MBS)	Traditional(n = 30)						Telehealth (n = 30)						$\chi^2(p_1)$	$\chi^2(p_2)$	$\chi^2(p_3)$
	Pre		Post 1 week		Post 1 month		Pre		Post 1 week		Post 1 month				
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%			
At rest															
Nothing at all (0)	0	0.0	0	0.0	1	3.3	0	0.0	0	0.0	2	6.7			
Very very slight (0.5)	0	0.0	0	0.0	0	0.0	0	0.0	2	6.9	5	16.7			
Very slight (1)	0	0.0	2	6.7	7	23.3	0	0.0	3	10.3	7	23.3			
Slight (2)	0	0.0	7	23.3	12	**40.0**	7	23.3	11	37.9	8	**26.7**	13.887*	5.263	6.607
Moderate (3)	8	26.7	14	**46.7**	8	26.7	8	26.7	11	**36.7**	7	23.3	(^{MC}p=	(^{MC}p=	(^{MC}p=
Somewhat sever (4)	13	**43.3**	5	16.7	2	6.7	14	**46.7**	3	10.3	1	3.3	0.002)	0.369)	0.237)
Sever (5–6)	9	**30.0**	2	6.7	0	0.0	1	3.3	0	0.0	0	0.0			
Very sever (7–8)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0			
Very very sever (9)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0			
Maximal (10)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0			
During exercise															
Nothing at all (0)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0			
Very very slight (0.5)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0			
Very slight (1)	0	0.0	0	0.0	1	3.3	0	0.0	2	6.7	3	10.0			
Slight (2)	0	0.0	0	0.0	7	23.3	0	0.0	0	0.0	11	**36.7**	9.077*	5.303	4.680
Moderate (3)	0	0.0	6	20.0	11	**36.7**	0	0.0	12	**40.0**	7	23.3	(^{MC}p=	(^{MC}p=	(^{MC}p=
Somewhat sever (4)	1	3.3	7	23.3	6	20.0	8	26.7	5	16.7	7	23.3	0.022)	0.244)	0.450)
Sever (5–6)	15	**50.0**	13	**43.3**	4	13.3	16	**53.3**	9	30.0	1	3.3			
Very sever (7–8)	9	30.0	4	13.3	1	3.3	5	16.7	2	6.7	1	3.3			
Very very sever (9)	5	16.7	0	0.0	0	0.0	1	3.3	0	0.0	0	0.0			
Maximal (10)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0			

Table (4):Correlation between Modified Borg Scale (MBS) with chronic respiratory disease questionnaire (CRQ) and fatigue assessment scale.

	Modified Borg Scale (MBS) (during exercise)			
	Traditional (n = 30)		Telehealth (n = 30)	
	r_{s1}	P_1	r_{s2}	P_2
Chronic Respiratory Disease Questionnaire (CRQ) (HRQL)				
Pre	-0.475	0.008	-0.442	0.014
Post 1 week	-0.590	0.001	-0.473	0.008
Post 1 month	-0.654	<0.001	-0.540	0.002
Fatigue Assessment Scale (FAS)				
Pre	0.580	0.001	0.396	0.030
Post 1 week	0.315	0.091	0.717	<0.001
Post 1 month	0.574	0.001	0.487	0.006

Discussion

The most frequent long-term COVID-19 squeals, known as Post COVID Syndrome (PCS), include fatigue, dyspnea and poor health-related quality of life. After 12 weeks following infection, these symptoms may still be present. Despite the fact that healthcare systems may be overburdened and rehabilitation may be disrupted, early and effective rehabilitation interventions are urgent.[29] Telerehabilitation is defined as rehabilitation services that provided at a distance using communication technologies. Telerehabilitation primarily developed to provide a suitable access to individuals who are geographically remote, to improve the quality of rehabilitation health care , to optimize the timing, intensity and duration of therapy that is often not possible within the constraints of face-to-face treatment protocols in current health systems [13,14,15] So this study was aimed to evaluate the effect of implementing telerehabilitation versus traditional pulmonary rehabilitation program on the clinical outcomes of patients post covid-19. **Concerning to Socio demographic characteristics of the studied groups, it revealed that** less than half of the studied groups were in the age group (50 ≤60 years) and more than half of them were female and the most were married. **As regard to residence, occupation and educational level,** more than two third of the studied groups were lives in rural areas, while less than half of them were employee. **Also,** less than half of telehealth group were bachelor degree, while about one third of the traditional group were diploma. This finding may be attributed to covid-19 can affect more old adult due to decrease the immunity level, physiological change and presence of chronic disease such as DM and hypertension. The current result was in agreement with **keating (2020)** [30] who stated that coronavirus effect on the young and old people in Italy the median age of the population is 46.5 years . **Also, this finding was consistent** with **Purba (2021)** [31] that described marriage and quality of life during the Covid-19 pandemic where the majorities were female ,while **this findings wasn't in the same line with Li (2021)**[32] who recorded that more than half

were males diagnosed with Covid -19 during early transmission. **Also, Lawal (2020)**[33] reported that married : single ratio of approximately 2:1 throughout the explanation of differential effect of marital status and education on mental health during covid-19.**In addition to, this finding wasn't consistent** with **Parizad (2021)**[34] who found that about two third of confirmed covid-19 cases lives in urban area . **Moreover,** this result was in the same line with **Rozenfe (2020)** [35] who reported that less than half of the studied group affected by Covid-19 were employed and health care provider. **Furthermore,** this finding was in agreement with **Parizad (2021)** [34] who reported that one quarter of patients with covid-19 were diplome.

Regarding hospitalized period , smoking , vaccination and body mass index, the current study results revealed that more than two third of the studied groups were hospitalized <10 days and the most of studied groups were nonsmoker, while more than half of studied groups were vaccinated in addition to , less than half of studied groups have over body weight, this result similar to **Shah (2022)**[36] who reported that the average length of hospital stay for Covid -19 patients was (8.1±5.9) days and the majority of their studied sample of covid-19 patients were nonsmokers. **Also**, **this result was in the agreement with Patel (2022)**[37] who reported that the majority of studied groups were vaccinated in her study about long-term protection associated with covid-19 vaccination and prior infection . **Furthermore,** the study result wasn't in the same line with **Betschart (2021)**[38] **and Dalbosco-Salas (2021)** [39] who reported that the body mass index mean and SD were (25 ± 4) and (30.7 ± 5.3) in covid-19 patients respectively.

As regard to chronic respiratory disease questionnaire which measure health related quality of life the result of study revealed that less than half and about two third of them were have poor quality of life among the telehealth and traditional group pre implementing the pulmonary rehabilitation program respectively, while **one month** after implementing the pulmonary rehabilitation program shows that more than two third in telehealth group comparing to more than half in traditional have good quality of life according to chronic respiratory disease questionnaire were have good quality of life respectively. This improvement may be due to the effect of the rehabilitation program via using the information technology such as (whatsapp text messaging, video and audio calls) , most of telerehablitation group were health care provider and highly educated in addition to, using the traditional colored educational booklet with clear, attractive and simple written information and sending the colored educational photo and recorded video to the studied group .**This finding was in agreement with Malik (2021)**[10] **, Arab-Zozani (2020)** [11] and **Navarro (2020)**[40] who stated that more than half of the post-COVID-19 patients had reported poor quality of life. **This finding was in agreement with Li (2021)** [18] who reported that HRQOL also improved in post-discharge COVID-19 patients by using telehealth. **Moreover, Gilmutdinova (2021)**[41] who stated that the well-being improved in the majority of patients who participated in an intervention involving telerehabilitation and telemonitoring after COVID-19. **Also, Betschart (2021)** [38] and **Benzarti (2022)** [42] who reported that there was a statistically significant improvement in HRQoL from more than half before the program to the majority after implementing the program in

postcovid-19 patients through traditional method.

Regarding the fatigue. the study results revealed that more than half and the majority were suffering from extreme fatigue among telehealth and traditional group pre implementing the program respectively. **Meanwhile, one month** after implementing the program about two third in telehealth group and more than half in traditional were have no fatigue. This finding may be attributed to the effect of Covid-19 on the respiratory system that affect lung tissue and decrease o2 saturation so, patients complain from extreme fatigue.**Additionally**, this improvement may be due to the effect of the rehabilitation program via using the information technology such as (whatsapp text messaging, video, and audio calls) , most of telerehablitation group were health care provider and highly educated in addition to, using the traditional colored educational booklet with clear, attractive and simple written information and sending the colored educational photo and recorded video to the studied group. **Moreover,** this finding was in consistence with **Graham (2021)**[43] and **de Sire (2022)** [44] who reported that the most of post covid-19 patients experienced fatigue. **Meanwhile, in telehealth group one month after implementing the pulmonary rehabilitation program** the finding was in agreement with **Bickton (2021)** [45] who reported that the fatigue score was decrease to normal fatigue level in post-acute COVID-19 who utilized the qualified physiotherapist's supervision via whatsapp text messaging, video and audio calls for (telerehablitation) for 3 weeks. **Furthermore, in traditional group** the finding was in the agreement with **de Sire (2022)** [45] who reported that after the rehabilitation program in post-covid-19 patients for three to five weeks more than two third didn't have fatigue.

Regarding dyspnea level during exercise, the result of the study revealed that more than half and half have severe dyspnea during exercise among telehealth and traditional group pre implementing the pulmonary rehabilitation program. **Moreover, one month after implementing the pulmonary rehabilitation program** showed that less than half have slight dyspnea in telehealth group and less than half have moderate dyspnea in traditional group. This results because of the effect of Covid-19 on the respiratory system. **Additionally** , this improvement may be due to the effect of the rehabilitation program via using the information technology such as (whatsapp text messaging, video, and audio calls) , most of telerehablitation group were health care provider and highly educated ,in addition to ,using the traditional colored educational booklet with clear, attractive and simple written information and sending the colored educational photo and recorded video to the studied group. **This finding was in consistence with Fernández-de-las-Peñas (2021**)[46] who reported that dyspnea as main persistent post-covid-19 symptoms. **Furthermore, Prescott (2021)**[47] who reported that less than half to half of patients suffering from dyspnea post-COVID-19. **Additionally, Bastola (2021)** [48] **and Carfì (2020)**[49] who reported that less than half of patients complain from dyspnea post-COVID-19. **Additionally, Calvo-Paniagua (2022)** [50] who found that dyspnea severity with using telehealth rehabilitation program improves self-perceived exertion in covid-19 survivors experiencing post-covid. **Moreover,** in traditional group the finding was in agreement with **Zampogna (2021)**[51] **and Spielmanns (2021)**[52] who reported that pulmonary rehabilitation program is possible

and effective in reducing dyspnea level in patients recovering from COVID-19 .**The result of current study revealed that** there was significant positive correlation between dyspnea and fatigue pre implementing, week and one month after implementation of the program. This results in the same line with **Fernández-de-las-Peñas (2021**) [46] who found that there was a significant positive correlation between the presence of fatigue/dyspnea (either at rest or with activity). In addition to those patients with higher levels of fatigue or dyspnea exhibited more severe limitations on daily living activities (HRQOL) according to the chronic respiratory disease questionnaire.

Conclusion and recommendations

Based on the findings of the current study, it can be concluded that the pulmonary rehabilitation through telerehablitation effective in reducing dyspnea, fatigue and improving health related quality of life than who received traditional pulmonary rehabilitation program through the traditional method. **It was recommended that** nurses should follow pulmonary rehabilitative program as a routine care for patients based on each individual needs and limitations during physical exercise **References:**

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Effect of Mayan Abdominal Massage Technique on Sexuality and Quality of Life among Women with Uterine Prolapse

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Abstract:

Pelvic organ prolapse dramatically compromises sexual, bowel, and bladder function and lowers quality of life. Mayan abdominal massage is a form of non-invasive external self-treatment that promotes the natural healing of the abdomen and pelvic organs. **The aim of this study** was to evaluate the effect of Mayan abdominal massage technique on sexuality and quality of life among women with uterine prolapse. Research **design**: A quasi experimental design was utilized to fulfill the aim of the study. **Sample**: A purposive sample of 75 women was selected according to the inclusion criteria. **Setting**: In gynecological outpatient and the family planning clinics at Teaching University Hospital, Menoufia Governorate. Egypt. **Tools used to collect the data were** the Structured Interview Questionnaire, Female Sexual Function Index, and Health-related Quality of life tool. **Results**: The total mean scores of female sexual function index were significantly improved after three months of intervention from 18.7 ± 4.5 to 28.1 ± 4.3. Also, there are statistically significant differences of the mean scores of Health-related Quality of life domains between before and after three months of intervention. **Conclusion**: Mayan abdominal massage significantly improves sexual function and quality of life after three months' intervention among women with uterine prolapse. **Recommendation**: Mayan abdominal massage is considered one of the most effective therapeutic options accompanied with changing lifestyle for improving sexual function and quality of life among women with uterine prolapse should be used as an integral part of the gynecological treatment in the maternity hospitals**.**

Keywords: Pelvic organ prolapse, Sexual function, Quality of life, Mayan abdominal massage.

Introduction

Uterine prolapse (UP) results from a weakness of its surrounding support structures, allowing the uterus to descend down the vaginal canal. Typically prolapse is not a life-threatening, however it can cause various prolapse symptoms as well as bladder, bowel, and sexual dysfunction in women [1&2].

The incidence and prevalence of Pelvic organ prolapses (POP) is estimated that closely 50% of women will develop some form of prolapse and merely 10–20% of them seek medical help. POP prevalence rises with age, with an incidence peak in women aged 60–69 years. POP can be recognized in up to 50% of women upon vaginal birth [3]. It is difficult to accurately determine the incidence of uterine prolapse because many women with stage 0 uterine prolapse are asymptomatic. While women in other stages are less likely to seek medical help because they are shy about discussing their concerns with their doctors [4].

A combination of physiological, anatomical, genetic, lifestyle, and reproductive factors that interact during a woman's life can cause pelvic floor dysfunction. Frequently reported risk factors to include multiparty, excessive intra-abdominal pressure, tissue atrophy due to aging and loss of estrogen, joint hypermobility, congenital ligament weakness, as well as direct and indirect injuries to the muscles, ligaments, and nerves related to the pelvic floor/organs which also appears to be the cause of uterine prolapse [5]. Other reported risk factors are Age, high parity, obesity, cigarette smoking/chronic cough, constipation, and estrogen deficiency [6].

Manifestations of uterine prolapse vary depending on the stage, but in general, symptoms include the following: pelvic heaviness, vaginal bleeding or increased vaginal discharge, difficulty in sexual intercourse, urinary incontinence, cystitis, incidence of constipation, low back pain, and the presence of a protrusion in the vaginal opening by prolapsed uterus, feeling sitting on a ball or something falling from the vagina, and weakening of the vaginal tissues [7]. In the early stages of uterine prolapse, there may be no symptoms, but they appear and worsen with poor posture and increased severity of infection [1&8]. Mostly, sexual dysfunction and changes in body image are associated with prolapse. For some women, sexual intercourse may be painful or the belief that their anatomy is "abnormal" may make them feel too embarrassed or ashamed to have sex. Women may also fear that sexual activity will damage the organs involved in prolapse [9].

Conservative management for uterine prolapse is mainly used to treat the first stages of uterine prolapse as; practicing Kegel exercises continuously, preventing and treating constipation immediately, not lifting heavy things, treating chronic cough, maintaining normal and ideal weight gain, undergoing alternative hormone therapy in a menopause stage [10].

The treatment of uterine prolapse depends on changing the daily lifestyle such as; Losing excess weight, consuming healthy foods, and practicing physical activities that help the uterus return to its original position [11]. Therefore, the intervention to foster a healthy lifestyle is essential and must be adapted to tighten the loose muscles and improve women sexual function [12].

Mayan abdominal massage technique is considered one of the conservative treatments for the early stages of uterine

prolapse. It is a non-invasive external massage used to strengthen ligaments and muscles as well, to support the uterus and ovaries. Also, it is a simple abdominal massage that women can do at home as a "self-care" to keep muscles and ligaments healthy. This technique may take from a few minutes to a few months for the uterus to return to its original position [13]. Moreover, arvigo maya abdominal massage addresses the position and health of pelvic and abdominal organs and improves their function by releasing physical and emotional congestion from the abdomen [14].

Maya abdominal massage is performed deeply, slowly, and in a penetrating manner in the abdomen and lower back helping to direct the internal genital organs into their proper position by softening deep muscle tissue spasms. It also helps to release muscular tension in the trunk and diaphragm. Moreover, it is effective in correcting poor blood flow in the abdomen and vital organs for digestion, elimination, excretion, and reproduction. [4.14&15].

The nurses' role contributes to the initial assessment, management, and ongoing support of women with prolapse. They should be able to identify women who are at risk of developing pelvic organ prolapse (POP) or uterine prolapse, and they should be able to adopt preventive strategies to prevent the problem. Also, nurses should have a critical role in serving as health educators and counselors to impart important health education instructions to women with pelvic organ prolapse (POP) or uterine prolapse problems, by helping women adopt a healthy lifestyle. It is important to increase women's knowledge and awareness of uterine prolapse and encourage them not to be shy about reporting it and seeking medical help, which helps them improve their health by reducing the occurrence of uterine prolapse and its complications, as well as improving their sexual function [4].

Significance of the study

World Health Organization [WHO] [16] estimated that genital prolapse which is a common health problem affecting about 33% of women between 20-59 years of age. The prevalence of uterine prolapse (UP) is estimated to be 2-20 % in women under age 20 years old; the prevalence in Egypt was 56. 3%. It is a complex condition that is often in secret because of the shame of the condition affecting a sensitive part of the women's body that affects women sexual function, quality of life (QoL), and psychological state negatively. Women with weakness of the vaginal wall and failure to support the soft tissues in the pelvis, complain of urinary, bowel and sexual symptoms resulting in a profound impairment in their quality of life [17].

Non-surgical therapies such as the Mayan abdominal massage which is effective for relieving early degrees of uterine prolapse, are safe, affordable, and are used to tighten the lower abdomen and pelvic muscles to improve women's health, improve their sexual function and quality of life. A limited number of studies have contributed data regarding effect of uterine prolapse on women quality of life and sexual function and on the nonsurgical interventions used to improve them.

In Egypt, there is sparse research being conducted examining the effect of a non-surgical intervention on women with POP. Women shy away from seeking medical help to improve their sex lives. On the other hand, studies have proven that surgery and herbal remedies have many complications. All cited may be reasons

for women to try non-invasive methods such as pelvic floor muscle training exercises, arvigo techniques such as the "Mayan abdominal massage" which are effective and safe methods without risks. In this context, the current study applies an evidence-based nursing intervention such as the Mayan abdominal massage technique to improve sexual function and quality of life among women with first- and second-degree uterine prolapse.

The aim of the study

The aim of the current study is to evaluate the effect of Mayan abdominal massage technique on sexuality and quality of life among women with uterine Prolapse.

Research hypothesis

The current study hypothesized that:

H1. Women with uterine prolapse who will practice Mayan abdominal massage technique will improve the sexual function after three months of intervention than pre intervention.

H2. Women with uterine prolapse who will practice Mayan abdominal massage technique will improve the quality of life after three months of intervention than pre intervention.

SUBJECTS AND METHODS

Research Design

A quasi-experimental research design was utilized to obtain the aim of the study.

Sampling

A purposive sampling of 75 women who were suffering from stage I, or II of uterine prolapse and were recruited for the current study according to inclusion and exclusion criteria. **The inclusion criteria**; married, educated women in reproductive age who had diagnosed with stage I, or II of uterine prolapse with low or no sexual pleasure associated. Otherwise, women who had a history of urogenital infections, had experienced recent stressful events in their life, suffered from chronic diseases, pelvic organ prolapse with stage 3 & 4 or urinary incontinence, were under medication that affects sexual function (e.g. antihypertensive drugs, cimetidine, and antidepressants), smokers, pregnant women. Moreover, those whose husbands had a history of sexual disorders, previous vaginal, perineal or anal surgery, and the presence of neurological condition, intrauterine device (IUD) is present, abdominal surgery recently, or hiatal hernia **were excluded** from the current study.

Sample technique

Seventy-five women who had first and second stage of uterine prolapse (75) were selected according to the following statistical formula: n = Z2p (1-p), where Z is the level of confidence according to the standard normal distribution (for a level of confidence of 95%, Z = 1.96); p is the estimated proportion of the population that presents the characteristic (when unknown, we used p = 0.5), (P is considered 0.05).

Setting

The current study was conducted at the gynecological outpatient clinics and the family planning clinics at Teaching Hospital affiliated to the Ministry of Health and gynecological outpatient clinics at University Hospital, Ministry of Higher Education, Menoufia Governorate. Egypt.

3. Tools for data collection: three tools were used for data collection:

Tool 1. Self-Administered Questionnaire Sheet: This tool was developed by the researchers to collect data based on literature review [11]. It was divided into two parts; **First part**; included data related to socio-demographic characteristics as; age, current marriage period, parity, BMI. **Second part: included data related to symptoms of utrine prolapse. It**

consisted of six questions related to uterine prolapse; the score was (1) for answer with yes and (0) for answer with no.

Tool 2. Female sexual function index (FSFI): A standardized tool [18] with six-domains contains 19-questions; libido domain had (two questions), sexual arousal area had (four questions), lubrication area had (four questions), and three questions each for orgasm, sexual satisfaction and pain. Scoring by a 5-point Likert scale was used: it was ranged from (0-36), a score ≤ 26.55 is classified as female sexual dysfunction. Two domains of FSFI; "the individual domain scores and full-scale scores" were originated from the computational formula outlined in the table below. The individual domain scores were achieved by compile the individual items scores that include the domain and multiplying the sum by the "domain factor". Moreover, the full-scale score was achieved by adding the six domain scores.

Domain	Questions	Score range	Factor	Minimum score	Maximum score	Score
Desire	1,2	1-5	0.6	1.2	6.0	
Arousal	3,4,5,6	0-5	0.3	0	6.0	
ubrication	7,8,9,10	0-5	0.3	0	6.0	
Orgasm	11,12,13	0-5	0.4	0	6.0	
tisfaction	14,15,16	or 1)-5	0.4	0	6.0	
Pain	17,18,19	0-5	0.4	0	6.0	
Full scale score range				1.2	36.0	Total

Tool 3. Prolapse Quality of Life Scale (P-QOL); It was developed by **Lenz, et al** [19]. P-QOL survey consisted of twenty items (20) as the following; general health perception (one question), the effect of prolapse (one question), the limitations of functions (two questions), psychical limitations (two questions), social limitations (three questions), personal effects (two questions), emotions (three questions), sleep/ energy (two questions) and the level of severity (four questions). The score of each sub parameter was calculated by using different formulas (15). Responses ranged from 'none/not at all', through 'slightly/ a little' and 'moderately' to 'a lot' to produce a four-point scoring system for each item. Scores in each domain ranged between 0 and 100. Having a result closer to 0 was evaluated as that the life quality of the participant was good, while the higher scores indicate the impairment of quality of life.

Content validity and reliability

Study tools were submitted to a panel of five experts in the field of maternity nursing and community health nursing to test the content validity. Modifications were done according to the panel's judgment on the clarity of sentences and content appropriateness. Reliability analysis was conducted to investigate the instrument internal consistency, which used in the study, and labels the extent to which all the questionnaire items measure the same concept or construct. Reliability was calculated using Cronbach alpha coefficients to examine the measurement reliability with multipoint items. The accepted values of Cronbach alpha coefficient range from 0.60 to 0.95 **(Tavakol and Dennick)** [20]**.** The questionnaire items of the present study tools (tool 1, 2, 3 and 4) were proven reliable where α = 0.92, 0.96, 0.92 and 0.95.

Pilot Study

It was conducted on 10% of the study sample, were selected randomly and excluded from the main study sample. Its aim was to evaluate the simplicity and clarity of the tools. It also helped in the estimation of the time needed to fill in the tools. According to the results of the pilot study, simple modifications were done as

rephrasing questions and canceling some questions.

Ethical consideration

Upon receiving the formal approval from the Research Ethics Committee of the Faculty of Nursing at Menoufia University (Ethics code, 901), the researcher introduce herself to women who met the inclusion criteria and inform them about the purpose of this study in order to obtain their acceptance to participate in this study. A written consent was obtained from the women who agree to participate in the study. Also anonymity and confidentiality are assured through coding the data. Women were assured that participation in this study is voluntary and they have the right to withdraw from the study at any time without affecting on the healthcare service that she will receive.

4. Fieldwork

Recruitment and follow-up of the participants will be carried out three months from (May 2022 to July 2022). The researchers attended the gynecological outpatient clinics three days per week starting at 9.00 a.m. to 2.00 p.m. to collect the data. Two periods of data collection: pre-test and post-test periods; in the pretest, data was collected from the women with uterine prolapse, then at the same time the researcher began the intervention for and follow-up them after three months, the researchers collected the data as a posttest. During the three months, the participants were free to contact the researchers in case they had any questions about their practices and sexual function. Data collection was carried out through three phases: assessment phase, implementation phase, and the evaluation phase.

I. Assessment phase: In this phase, the researchers met the participants at the gynecological outpatient clinics and the family planning clinics at Teaching Hospital Menoufia Governorate. Egypt; explaining to them, the study purpose and explain for each woman the proper way to fill the tools accurately after obtaining their acceptance to share in the study. The tools of data collection required approximately 20-30 minutes from the participants to complete the data collection forms, the tools filled in this phase (first tool, **FSFI**, and **P-QOL** before intervention), then the researchers recorded the women's' telephone number and address in order to follow-up them.

II. **Implementation phase:** In this phase, the intervention was administered through individual and group counseling according to the discussed topic such as the sexual relation topic and the women prefer to be in a group or alone. Three sessions (90 minutes for each session) followed by follow-up of data collection through face-to-face and telephone interviews, were conducted at the lectures room at previous setting according to the suitable time for each woman in the follow-up schedule in the outpatient clinics.

At the first session, after filling the tools, the researchers provided clear information for each participant regarding the uterine prolapse degrees and the associated symptoms, focusing on the sexual function. At the following 2 sessions, the researchers provided the women training on Mayan abdominal self-massage technique and taught them how to fill the schedule of weekly physical activity form. Different teaching methods were used in counseling sessions such as lectures, discussions, and videos to clarify how to practice Mayan abdominal massage. At the

end of each session, the researchers made a conclusion and took the feedback from each participant. In the third session, the researchers summarized all the information and techniques taught and took feedback from each participant. The researchers followed up the women at outpatient clinics through phone or WhatsApp massage if the woman had any problem during the follow-up.

The Mayan abdominal massage technique includes the following steps; Ask the women to empty their urinary bladder, wear loose clothing, then lie on their back and place a pillow under the head and knees (if desired), then raise their hips by placing a pillow under their pelvis and bring their hands together, not lifting but sliding over the pubic bones with constant pressure, resting on the soft tissues while slowly moving the fingertips towards the navel and stopping just below it; Then start again from the groin area on the right side up through the abdomen to the other side of the torso, and also repeat the method from the other side. Repeat this step five to ten times in each direction. This technique is done twice daily for a constant three months [15]. The following instructions as; avoid constipation, not lift heavy objects, avoid chronic cough, maintain a normal and ideal weight, eat healthy diet should be given for each woman through education and broacher.

III. Evaluation phase

In this phase, the researchers evaluated the sexual function by tool 2, and quality of life by tool 3, in the lecture room at previous setting. The Post-test consumed about 20-30 minutes for each woman, using the previous data collection tools. The researchers kept on a continuous telephone contact with women to determine the exact time for measuring the post-test.

5. Statistical design

All statistical analyses were done using SPSS version 20. Initially, the internal consistency coefficients were examined to ensure the reliability of the used instrument for the present samples. Frequencies, means and standard deviations were calculated to describe the samples. T test and ANOVA test were used to compare the means of pre and post-intervention. Statistical significance was considered at p-value <0.05.

RESULTS

Table (1) revealed that the mean age of the women was 43.68±8.41 years and two-third of them had more than five years of marriage duration (65.3%). Moreover, most of the women were multipara and delivered by spontaneous vaginal delivery (SVD) (73.3%), meanwhile most of the women were moderately educated (80.2%) and not working (82.7%). In relation to anthropometrics measurement, it was found that, the mean weight of the women was 68.31±9.33 Kg, while the mean height of them was 1.58±0.05 meter, as well as the mean Body Mass Index of them was 27.03±3.27. About half of the women were diagnosed with stage I or II.

Figure (1) showed the percentage distribution of uterine prolapse symptoms as reported by women as; increase vaginal discharge (61%), low sexual self-esteem (60%), pain during intercourse (50 %), low back pain (37%), discomfort during walking (33%), vaginal flatulence (30%), constipation (20 %) and others symptoms (10%) as; heaviness in the pelvis, and urinary tract infections.

Table (2) revealed that there was a highly statistically significant improvement in all sexual function domains after three months of practice Mayan abdominal massage among the women as; sexual desire, arousal, orgasm, lubrication, satisfaction and pain during sexual relation ($p < 0.05$). In addition, there was statistically significant improvement in the total female sexual function index with mean score was 28.1 + 4.3 (t= 8.5 & P=0.005) after three months of intervention.

Table (3) illustrated the changes in health related quality of life as reported by women following three months of intervention, it was found that there were statistically significant improvements in general health and social limitation among the women (P<0.05), also there were highly statistically significant improvement in other domains after intervention as in negative effect of prolapse, role limitation, physical limitation, emotional stress, and sleep/energy with (P= 0.001).

Table (1). Frequency distribution of the demographic characteristics among the study sample.

Variable	N=75	
	X±SD or n (%)	
Age (year)	43.68±8.41	
Marriage duration		
≤ 5 years	**26**	**34.7%**
> 5 years	**49**	**65.3%**
Educational level		
- Can read & write	**12**	**16.7%**
- Preparatory/Secondary	**60**	**80.2%**
- High education	**2**	**3.1%**
Occupation:		
- Housewife	**61**	**81.3%**
- Working	**14**	**18.7%**
Residence		
Rural	**64**	**85.3%**
Urban	**11**	**14.7%**
Parity		
Primipara	**5**	**6.7%**
Multipara ≤ 3 times	**15**	**20%**
Multipara ≥ 4 times	**55**	**73.3%**

Degree or stage of prolapse **Stage I** **Stage II**	 **32** **43**	 **42.7** **57.3**
Mean Body weight (kg)	**68.31±9.33**	
Height (m)	**1.58±0.05**	
BMI (kg/m2)	**27.03±3.27**	

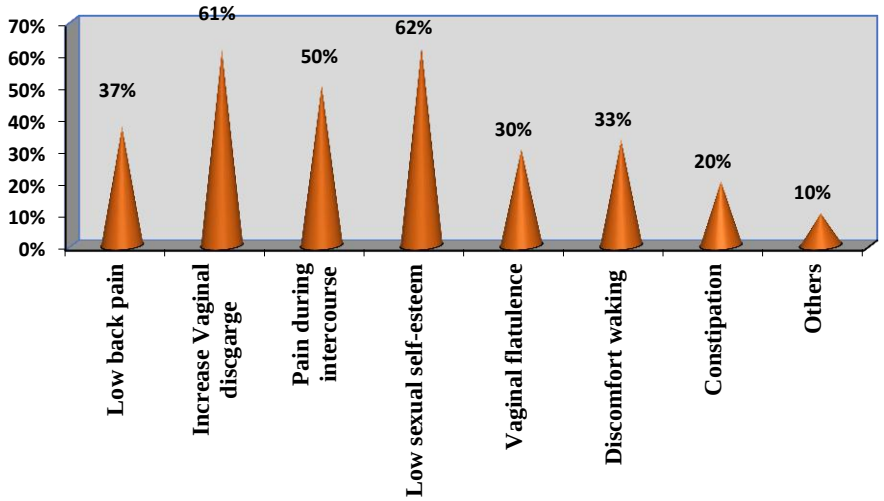

Figure (1). Percentage Distribution of uterine prolapse symptoms among the studied sample.

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Table (2). Mean scores of Sexual Function domains (FSFI) between pre and post intervention among the studied sample.

Sexual function domains	Pre-intervention	Post 3 months	*t*	*P*
	Mean ± SD			
Desire	**2.3 ± 0.77**	**4.5 ± 1.2**	**8.5**	**< 0.05***
Arousal	**2.8 ± 0.8**	**4.8 ± 1.0**	**8.4**	**< 0.05***
Lubrication	**3.3 ± 1.1**	**4.8 ± 1.0**	**5.8**	**< 0.05***
Orgasm	**2.6 ± 1.0**	**4.2 ± 1.1**	**6.0**	**< 0.05***
Satisfaction	**3.0 ± 0.8**	**4.4 ± 1.1**	**5.6**	**< 0.05***
Pain	**4.6 ± 1.4**	**5.4 ± 1.1**	**2.4**	**< 0.05***
Mean total scores (2-36)	**18.7 ± 4.5**	**28.1 ± 4.3**	**8.5**	**< 0.05***

Statistically significant differences at (p ≤ 0.05)

Table (3). Mean scores of quality-of-life domains between pre and post intervention among the studied sample.

P-QOL Domains	re-intervention	Post 3 months	*t*	*P*
	Mean ± SD			
General health perception	39.5±15.2	31.6±16.3	3.07	< 0.05*
Effect of prolapse (Negative)	47.4 ±40.4	10.5±19.4	7.13	< 0.001**
Role limitation	16.7± 31.9	2.6±8.4	3.7	< 0.001**
Physical limitation	19.3± 32.5	2.6±11.5	4.29	< 0.001**
Emotional stress	26.9±33.8	8.8±24.4	3.76	< 0.001**
Sleep/energy	22.8±25.6	6.2±16.9	4.67	< 0.001**
Social limitation	5.8±17.9	1.2±3.5	2.18	< 0.05*

***Statistically significant differences at ($p \leq 0.05$)*

****Highly Statistically significant differences at ($p \leq 0.001$*

Discussion

The sexual function of women with uterine prolapse may be altered when there are symptoms such as; a protrusion in the vagina, feeling of pressure and heaviness, painful intercourse, poor self-perception of their general health, and so on. These symptoms may generate consequences that can directly affect their well-being and influence their sexual response, negatively interfering with quality of life. The present study aiming to evaluate the effect of mayan abdominal massage technique on sexuality and quality of life among women with uterine Prolapse.

Regarding **to demographic characteristics of the study sample**, the findings of the current study pointed out that the mean age of the women was (43.7±8.4 years), most of them were moderately educated and housewives. Also, most of the women were multipara more than 4 times. This was in the same line with ***Fathi et al.,*** [21] who found that the mean age of childbearing women complaining of POP was (41.62 ± 5.0 years), most of women had moderate education and were housewives. Also the current finding was in agreement with ***Priyanka et al*** [22] who reported that uterine prolapse is most common in multiparous and post-menopausal women. While the prior study finding disagreed within Ethiopia by ***Mekonnen.*** [23] Who reported that about half of the studied women suffering from POP were in the age group of (20 to 35 yrs.) and reported that early marriage and high parity are the most leading determinants of POP among Ethiopian women. Also, the results of the current study were congruent with a study done by ***Puri,*** [24]**.** To determine prevalence, risk factors and traditional treatments of genital prolapse. The researcher found that more than three quarters of the studied women were multiparous, and more than two thirds of them had uterine prolapse after having more than four children.

This fact can be explained from the authors' point of view as aging is associated with falling in estrogen and collagen levels that result in weakened pelvic floor muscles and ligaments which consequently leading to an increase in the risk of uterine prolapse, also the high parity with vaginal delivery is a risk of uterine prolapse in younger people

that causes weakness and laxity of uterine support structures that represent precipitating factor of prolapse. Pelvic organ prolapse (POP) in Egypt tends to occur at earlier ages due to multi parity rate and early marriage.

Concerning anthropometric measurement, it was found that, the mean weight of the women was 68.31±9.33Kg, while the mean height of them was 1.58±0.05 meter, as well as the mean Body Mass Index of them was (27.03±3.27). **this was consistent with *Özengin, et al,* [11],** who found that there was no difference found in terms of age and height of women with POP, but there is a statistical difference was determined in body weights (p=0.003) and BMI (p=0.011) of women with apical and anterior compartment prolapses. The researcher concluded that, parity, normal vaginal delivery, increased in age and BMI are the main risk factors for occurrence of POP.

Regarding the symptoms of uterine prolapse as reported by women, the findgns of the current study showed that, more than half of the women were complaing from increase vaginal discharge, and low sexual self-esteem, and half of them were suffering of pain during intercourse, about one-third of them had low back pain, discomfort during walking, and vaginal flatulence, less than one-fourth of women were complaining of constipation, heaviness in the pelvis, and urinary tract infections, this symptoms were improvement after three month of practicing mayan massage technquie. This result was consistent with a randomized controlled trial study done by ***Glazener et al.,*** [25] to evaluate pelvic floor dysfunction, muscle training for stage I and II uterine prolapse . The reseracher reported that most of the studied women (above 80%) described their major manifestation of uterine prolapse as difficulty with sexual activity, which resulted in women's inability to perform home tasks or fulfil their husband`s sexual desires causing severe emotional stress. More two thirds of them complained from bulging sensation, lower back pain and a heavy feeling in their pelvic region, and increase in vaginal discharge.

Also the findings of current study was supported with ***Farag et al.,*** [26] who found that majority of the women reported decrease in vaginal, sexual, urinary and bowel symptoms (90%, 87.5%, 82.5%, and 80% respectively), and also 85% of the women reported reduced in the degree of uterine prolapse. Furthermore, there was improvement in the associated symptoms of the uterine prolapse 29.3±5.9, 18.6±4.8 and 12.1±3.3 at before, one and three months after the intervention with (f=67.5 p=0.001). As well as, ***Hagen et al.,*** [27] who studied the changes in POP symptoms with the POP-SS questionnaire. The reseracher shown that pelvic floor muscle training significantly improved the symptoms associated with POP at 6, 12, and 24 months ($p < 0.0001$, $p = 0.0053$). In addition, ***Saad et al.,*** [28] found that women's genital prolapse manifestation as general, urinary, bowel, and sexual symptoms were improved more than 90% after three months of intervention.

Concerning the sexual function, the current findings revealed that there was a highly statistically significant improvement in all sexual function domains following three months of intervention among the women as in sexual desire, arousal, orgasm, lubrication, satisfaction and pain at ($p < 0.05$). In addition, there was statistically significant improvement in the total female sexual function index mean score at (t= 8.5

& P=0.005) post three months of intervention. This finding was congruent with ***Abd elaziz,*** [29] who found that the means of the six domains of the female sexual function index (FSFI) and the total mean score were significantly different between study and control group (20.92, and 28.03 respectively) with (p <0.0001). Also, the researcher reflected that sexual complaints are common in women with pelvic floor disorders which has a major poor effect on the female sexual function.

Also, the present finding was agreement with ***Özengin et al.,*** [12] who reported that poor sexual function was more in anterior and apical compartments prolapse. Psychological factors such as change in body image that could occur in women with POP, physiologic factors such as anatomic anomalies and diminished sensitivity in the genital region can lead to stimulation and orgasm disorders in women. Furthermore, the present study finding was in agreement with ***Ali et al.,*** [4] who conducted a study on "effect of maya massage on relieving women's uterine prolapse manifestations", reported that 30.0% of the studied women have dyspareunia as severe manifestation of uterine prolapse. While, 40.0% of them have heaviness on pelvic area and back pain as moderate manifestation of uterine prolapse. Meanwhile, 30.0%, 70.0%, and 30.0% of them have feeling and seeing something on vagina and increase vaginal discharge as mild manifestation of uterine prolapse, and that there is a highly statistical significant difference between mean score of uterine prolapse manifestations before (13.8 ± 1.31) and 12 week after maya massage intervention (8.3 ± 0.48). The researcher add that, reducing sexual symptoms associated with prolapse leads to improved sexual function. This has been explained by the symptoms associated with uterine prolapse or displacement such as dyspareunia, feeling something in the vagina, and woman may feel of a lump/bulge in the vagina causing discomfort that can interfere with the entry of the penis into the vagina affecting orgasm and sexual function negatively. Displacement of the uterus coming down, pulling the ligaments, pedicles and peritoneum may also lead to a sensation of heaviness, which may interfere with sexual function.

Concerning the health-related quality of life; the present study findings indicated that uterine prolapse associated symptoms affect negatively the women quality of life. While, after three months of practicing mayan abdominal massage is associated with improvement in their quality of life with statistically significant improvements in general health and social limitation among the women at (P<0.05), also there were highly statistically significant improvement in other domains after intervention as effect of prolapse, role limitation, physical limitation, emotional stress, and sleep/energy at (P= 0.001). This finding was supported with a study conducted by ***Macêdo et al,*** [30] to determine factors associated with sexual activity for women with pelvic floor dysfunction. The researcher found that non-sexually active women with genital prolapse exhibited significantly impaired quality of life as compared to sexually active women. Also, it was similar with ***Due et al,*** [31] who conducted a study to evaluate the effects of structured lifestyle advice and pelvic floor muscle training for pelvic organ prolapse. The researcher reported that there was improvement in women quality of life after 3 and 6 months of intervention.

As well as, it was in accordance with ***Espiño-Albela, et al,*** [32] illustrated that the findings of their review showed a significant improvement in the symptoms associated with pelvic organ prolapse (POP) in women undergoing a pelvic floor muscle training (PFMT) protocol, including pelvic symptoms (pressure in the lower abdomen, feeling of heaviness in the pelvis, and feeling of a bulge in the vagina), urinary symptoms (stress urinary incontinence, urge urinary incontinence, sensation of incomplete bladder emptying, and pain when urinating), and bowel symptoms (constipation, fecal incontinence, gas incontinence, incomplete emptying of the bowel, pain when defecating, urgency, and bulging sensation in the anus). Improvements were also found in pelvic-floor function and in quality of life.

In addition to Özengin et al., [12] who conducted a study on a comparison between stabilization exercises and pelvic floor muscle training in women with pelvic organ prolapse, found that both training programs increased the pelvic floor muscle strength, provided a decline in prolapse stages, and has increased general health perception which improves quality of life. Furthermore, ***Panman et al,*** [17] reported that Pelvic organ prolapse (POP) is a serious public health problem that affects sexual function, quality of life, and psychological state; however, it is generally ignored by women. It was reported in that POP affected sexual function and life quality of women negatively. However, a limited number of studies have contributed data regarding how women are affected by POP in relation to the prolapse compartment.

Conclusion

Based on the results of the current study, it was concluded that Mayan abdominal massage technique, after three months of intervention, significantly improves sexual function and quality of life in women with uterine prolapse.

Recommendations

In the light of the present study finding, the researchers recommended that:

• Mayan abdominal massage, which is one of the most effective therapeutic methods for enhancing sexual function and quality of life for women complaining of uterine prolapse, should be discussed and trained in educational sessions.

- Other non-surgical therapies for relieving pelvic organ prolapse are still required.
- Further study is needed to evaluate the impact of sound body mechanics on second-degree uterine prolapse.

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Effect of Health Educational Guidelines on knowledge and Self Care Practice for Patients with Diabetic Ketoacidosis

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Abstract

Background: The role of the patient with diabetes is as an active decision-maker and the role of the nurse in this case is to provide information, direction and support. The study **aimed** was to evaluate the effect of the health educational guideline on knowledge and self-care practice for patient with diabetic ketoacidosis. **Subjects and method**: A convenient sample of (60) adult patients who are present at medical department and outpatient clinic mention in previous setting. **Three tools** were used for data collection: structured interview sheet tool, consisted of two parts as follow: patients' socio-demographic data and patients' self-care sheet. Observational checklist tool and activity daily living scale tool. **The results**: It was observed that the most of the studied patients (86.67%) had incomplete correct answer regarding to the patient' knowledge level of diabetes pre the program, while two thirds (66.67%) and 55.0% of them had complete and correct answer immediately and post the program. **The study concluded** that the patients showed an improvement in their knowledge level about diabetic ketoacidosis, self-care practice, and daily living activities level. There was a statistically significant difference for patients' knowledge level, self-care practice and daily living activities level before and after the health educational guidelines. **Recommended that**:. The patient should be given information about diabetic ketoacidosis. Booklet about self-care for diabetic ketoacidosis patients should be accessible in the Medical Department .

Keywords: Health educational guidelines, Knowledge, Self-care practice, Diabetic ketoacidos

Introduction

Diabetes Mellitus is the condition in which the body does not properly process food for use as energy. Most of the food eat is turned into glucose, for bodies to use for energy. The pancreas, an organ that lies near the stomach, makes a hormone called insulin to help glucose get into the cells of bodies. Diabetes, body either doesn't make enough insulin or can't use its own insulin as well as it should. This causes glucose to build up in blood. Diabetes can cause serious health complications including heart disease, blindness, kidney failure, and lower-extremity amputations (1).

The application of epidemiology of DM has provided valuable information on several aspects of this disease such as its natural history, prevalence, incidence, morbidity and mortality in diverse populations around the world.

Identification of the cause of the disease and the possible preventive measures that could be instituted to arrest or delay the onset of this disease which has reached epidemic proportions in both the developed and the developing nations. Unfortunately, the improvement in outcomes for individual patients with diabetes has not resulted in similar improvements from the public health perspective [(2)].

In Egypt, the prevalence of diabetes is around 15.56% among adults between 20 and 79 years of age, with an annual death of 86,478 related to diabetes. In 2021, 8.7 million individuals have diabetes and around 2.2 million have pre diabetes in Egypt. In Elmenshawy, hospital Diabetic ketoacidosis makes up an estimated at about 65 cases per month, and at about 700 cases per years [(3)].

Risk of getting diabetic ketoacidosis (DKA): When there is not enough insulin, body has to break down foods for energy. This creates ketones, which can make blood acidic. DKA happens when the acid levels in blood get too high. If not treated, DKA can be very dangerous. It can lead to a loss of consciousness, coma and even death [(5)].

In general, DKA is always described to be closely linked to type 1 DM. The occurrence of DKA has been thought to indicate the underlying significant and irreversible ß-cell damage that classifies these diabetic patients as type 1 DM However, many DKA patients do have clinical course and metabolic features of type 2 DM. There is a strong, almost dogmatic, errant perception by physicians that DKA is a complication that occurs only in patients with Diabetic ketoacidosis (DKA) is an acute, major, life-threatening metabolic complication of diabetes occurs mostly in type 1DM also it can occur in type II; it is characterized by hyperglycemia, ketonemia, ketonuria and metabolic acidosis [(6)].

Signs and symptoms of DKA include loss of consciousness, feeling dizzy, sudden loss of sight, slurred speech, polyuria, polydipsia, weakness, fatigue and weight loss. Vomiting and abdominal pain are frequently the presenting symptoms in DKA. On physical examination, signs of dehydration are often present, including dry mucus membranes, decreased skin turgor, tachycardia and hypotension. In addition, the smell of acetone on the breath and deep and labored breathing (Kussmaul breathing) may be observed, particularly in patients with severe acidosis[(7)].

Successful treatment of DKA involves identification of the precipitating factors, frequent patient monitoring, along with correcting dehydration, hyperglycemia and electrolyte imbalances. Correction of dehydration is aimed at restoring fluid volume by initial fluid replacement based on vascular status. Administration of regular insulin by IV infusion is the treatment of choice for DKA. Follow-up fluid replacement depends on the state of dehydration, serum electrolyte levels and urine output to prevent hypokalemia [(8)].

Many ways to prevent DKA; One of the most important ways is proper management of diabetes to prevent complications. Preventive measures include; keep blood glucose levels within normal range by checking them several times per day, never skipping insulin doses, developing an emergency or “sick-day” plan, testing urine for ketone levels during stress or illness, seeking medical care when blood glucose and ketone levels are higher than normal as early detection is essential [(9)]

The role of the patient with diabetes is play an active participation in treatment

and the role of the nurse in this case is to provide information, direction and support. The nurse will be assessing risk, so that appropriate interventions can be made at appropriate times. In addition, the nurse should regard every annual review or screening visit as an opportunity to find out what information the patient has and to fill in any gaps, supported by educational materials. Exploring why patients may not feel able to make changes to their lifestyle and to undertake suggested treatments may help the nurse to suggest actions that such patients are likely to follow [10]

Also, nurses must confirm that kidneys are functioning adequately with at least 30 ml of urine output/hour**.** Fluid resuscitation is reserved for patients requiring restoration of circulation. The possibility of over-hydration should be monitored. Nurses should also monitor for complications related to fluid volume excess. Once the blood glucose level decreases to about 250 mg/dl., glucose is added to IV solutions to avoid hypoglycemia and cerebral edema [11]

Nurses should connect with the medical team for appropriate adjustment to insulin doses as required. Monitoring of metabolic acidosis and electrolytes this involves liaising with the medical team to ensure blood gases and appropriate blood tests are carried out regularly, results interpreted and action taken, for example potassium being added to IV infusions if require after admission. Provide psychological support for patients this includes keeping the patient and relatives fully informed about the patient's clinical condition and the care given [12]

Patients should be taught how to manage blood glucose during periods of illness (sick-day management). This should include specific information about frequency of blood glucose monitoring, blood glucose targets, checking for ketones, taking extra quick-acting insulin, appropriate adjustment of insulin doses, identifying early signs and symptoms of Diabetic ketoacidosis (DKA) and knowing when to contact the diabetes specialist nurse [13]

Management of Diabetic ketoacidosis reduces the risk of mortality and improves clinical outcomes; this includes restoring circulatory volume, insulin therapy, correcting metabolic acidosis and electrolyte imbalance, identifying and treating precipitating factors and the early involvement of the diabetes specialist nurse [14]

Aim of the study

The aim of this study was to:

Evaluate the effect of the health educational guideline on knowledge and self-care practice for patient with Diabetic Ketoacidosis

Research Hypotheses

1. Post implementation of health educational guidelines, the patient is expected to have knowledge and self-care practice related to diabetic ketoacidosis.

Subjects

Research Design

Quasi-experimental research design was utilized in this study.

Setting of the study

This study was conducted at medical department and outpatient clinic of the El Menshawy hospital affiliated to Ministry of Health. Medical department consisted of four wards and each one contained of 6 beds.

Subjects

A convenient sample of (60) adult patients who are present at medical department and outpatient clinic mention in previous setting was selected based on

epidemiological information program and was evaluated**.**

Inclusion criteria: the subjects were selected according to the following criteria

1-Adult conscious patient, diagnosed with diabetic ketoacidosis.

2- Patient age 21 -55 years

2- Both sexes.

3-Free from any complications except diabetic ketoacidosis

Tools of data collection

Three tools were developed by the researcher and used to collect the data:

Tool (I): Structured Interview sheet [111, 112]: was developed by the researcher after reviewing relevant literature to collect data it consisted of two parts as follow:

Part one: Patient's Socio-demographic data it was including: patient' age, educational level, sex, marital status, occupation, residence, date of admission, diagnosis, mobility level, past medical history, prescribed medication and previous training program about self-care.

Part two: Patients' Self-care Sheet

It was developed by the researcher based on literature review [111, 112] to assess Patients' knowledge related to diabetic ketoacidosis before, immediately and after one month from implementation of health education program. It was including the following: diabetic ketoacidosis' definition, causes, and clinical manifestations, medication, exercises, diet, fluid, reporting unusual signs, symptoms, and time of follow–up.

Scoring system

The patient who responded by "correct and complete answer" was given a score 2, "correct and incomplete answer" was given a score (1) who responded "wrong and not answer" was given a score (zero).

Total level of patients' knowledge score was equal 24 as follow

- Less than 60% considered poor,
- from 60% to less than 75% considered fair,
- from 75% and more considered good.

Tool (II): Observational Checklist: to assess the actual patient self-care practice related to diabetic ketoacidosis. It comprised (5) main items: medication, daily living activity, hygienic care, diet, follow up.

Scoring system

Each item is divided as sub items in check list was scored as following: One scores for each step that was done correctly, zero score for incomplete done.

The total practice score will be calculated and equal 46 as follow

less than 70% of total score considered unsatisfactory, 70% and more considered satisfactory.

Tools (III): Activity Daily Living Scale

- Physical self-maintenance scale (Activities of Daily Living, Or ADLs A. Toilet, B. Feeding, C. Dressing, D. Grooming (neatness, hair, nails, hands, face, and clothing), E. Physical Ambulation and F. Bathing. In each category, circle the item that most closely describes the person's highest level of functioning and record the score assigned to that level (either 1 or 0) in the blank at the beginning of the category.
- Instrumental Activities of Daily Living, Scale (IADLs)

A. Ability to Use Telephone, B. Shopping, C. Food Preparation, D. Housekeeping, E. Laundry, F. Mode of Transportation, G. Responsibility for Own Medications.

The total score ranges from 0 to 4, and for IADLs, from 0 to 4. In some categories, only the highest level of function receives a 1; in others, two or more levels have scores

of 1 because each describes competence that represents some minimal level of function [113].

1- Official permission was obtained from the Faculty of Nursing of Tanta University to the responsible authorities and the head Elmenshawy hospital after explaining the aim of the study to facilitate the researcher implementation.

2- Ethical and legal considerations

- Written consent was obtained from every patient included in the study after explanation of the aim of the study and assuring them of confidentiality of collected data.
- Anonymity and confidentiality were maintained by the use of code number instead of name and the right of withdrawal is reserved.
- Privacy of the studied patients was maintained. study not produced harm full to the patient.

3- Tools validity: The tools of the study were tested for its content validity and reliability by nine experts in Medical-Surgical Nursing and and emergency field professors necessary modifications was done **Content validity index = 98.6%** and **alpha Cronbach's test (tool 1) = 0.791, alpha Cronbach's test (tool 2) = 0.823, alpha Cronbach's test (tool 3) = 0.783 and total alpha Cronbach's test (3 tools) = 0.856.**

4- A pilot study: It was carried out on seven patients to test the feasibility and applicability of the developed tools accordingly, needed modification was done. Subject of pilot study was excluded from the original sample.

5- The study was conducted on four phases which including the following:

Results

Table (1) : Illustrates percentage distribution of the studied patients with diabetic ketoacidosis regarding their total knowledge level about diabetic ketoacidosis throughout periods of study. It was observed that there was a statistically significant difference between the studied patients with diabetic ketoacidosis regarding their knowledge about diabetic ketoacidosis throughout periods of study while (P value= 0.0001).

Table(11) : Percentage distribution of the studied patients with diabetic ketoacidosis regarding their total level of self-care practice for the daily life throughout periods of study. It was observed that there was a statistically significant differences while ($\chi 2 = 63.03$ and P value= 0.001).

Table (3): Illustrates percentage distribution of the studied patients with diabetic ketoacidosis regarding their daily living activities for the daily life about feeding throughout periods of study. It was noticed that it was noticed that one third (33.33%) of them never eats without assistance pre the program, while one third of them (33.33%) and 28.33% do it all day immediately and post the program respectively. While 5.0% of them never eats with minor assistance at meal times and/or with special preparation of food pre the program, while 5.00% and 3.33% do it all day immediately and post the program respectively.

While 5.0% of them never feeds self with moderate assistance and is untidy r pre the program, while half 8.33% and 5.00 do it all day immediately and post the program. While 5.00% of them requires extensive assistance for all meals all day pre the program, while 5.00% and 8.33 never do it immediately and post the program respectively. While 5.00% of them does not feed self at all and resists efforts of others to feed him or her all day pre the program, while 5.00% and 8.33% of them do it rarely

immediately and post the program respectively. It was observed that there was a statistically significant differences while P value= 0.001.

Table (4) : describes mean scores of the Activities Daily Living (ADLS) domains of the studied patients with diabetic ketoacidosis for the daily life throughout periods of study. It was observed that there was a statistically significant differences between mean scores of the Activities Daily Living (ADLS) domains of the studied patients with diabetic ketoacidosis for the daily life throughout periods of study. while P value= 0.001.

Table (1): Percentage distribution of the studied patients with diabetic ketoacidosis regarding their total knowledge level about diabetic ketoacidosis throughout periods of study.

Total knowledge level	The studied patients (n=60)						
	Pre		Immediately		Post a month		χ^2 P
	N	%	N	%	N	%	
- Poor	56	93.33	18	30.00	24	40.00	56.13 0.000*
- Fair	0	0.00	1	1.67	1	1.67	
- Good	4	6.67	41	68.33	35	58.33	
Range	(0-24)		(12-24)		(0-24)		F=36.02
Mean ± SD	11.78±4.47		20.17±5.44		18.35±6.89		P=0.00*

<60% Poor (60-<75) % Fair ≥75% Good

(*) Statistically significant difference at level P < 0.05.

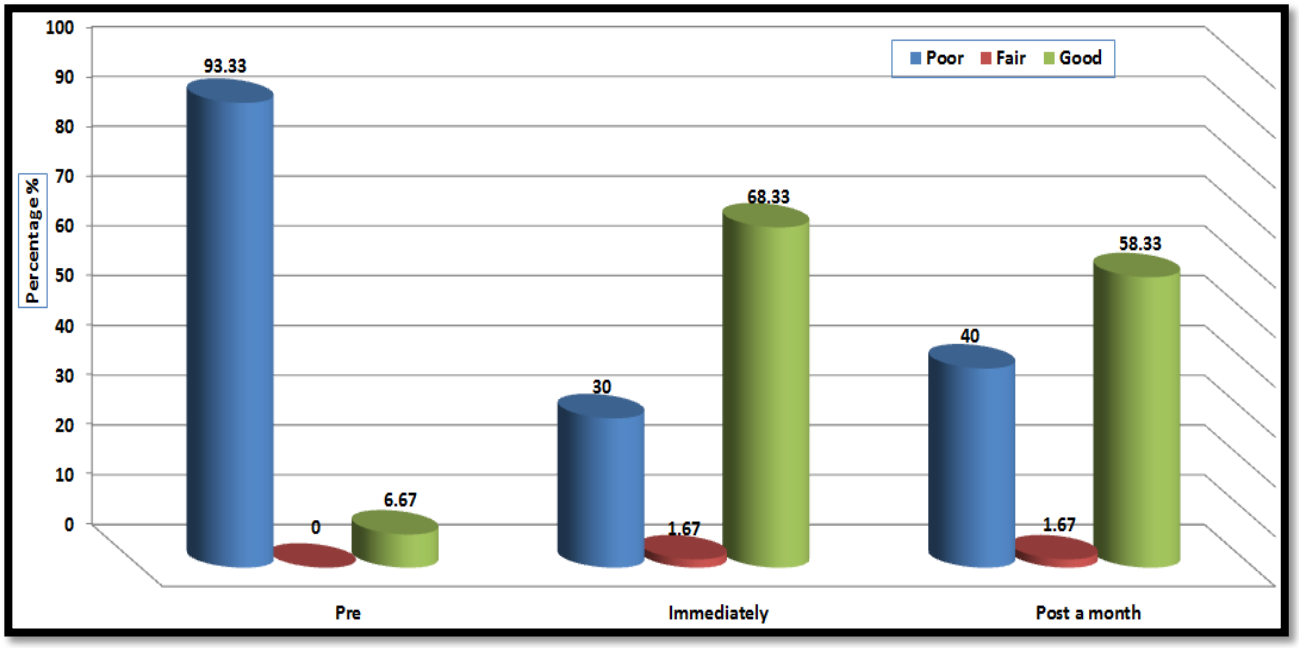
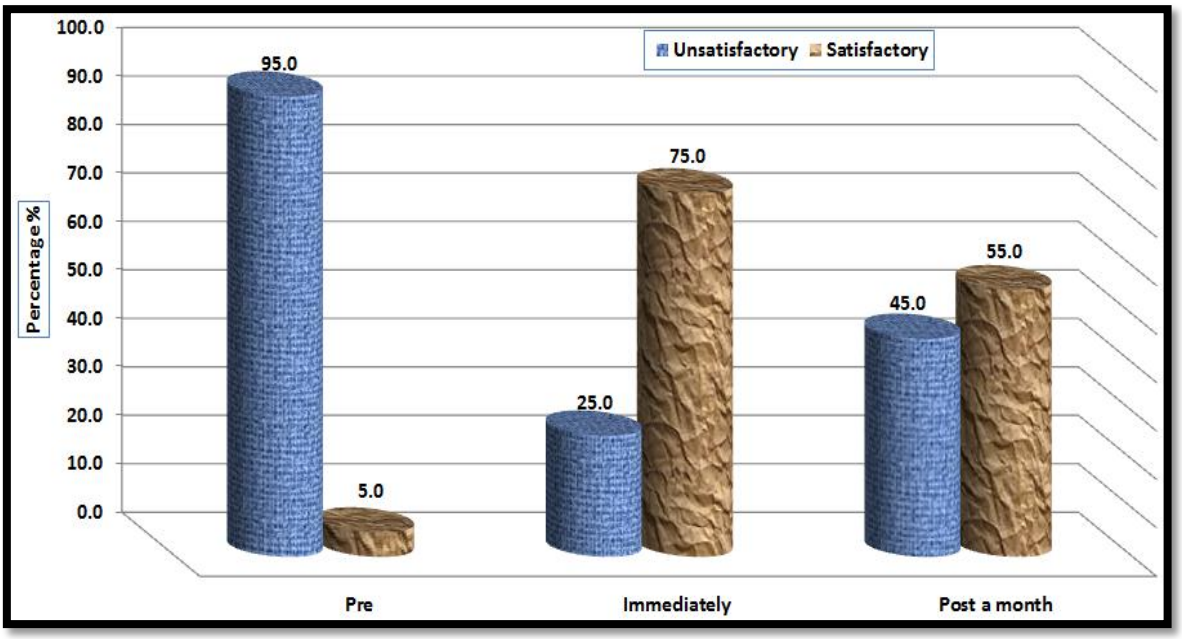


Figure (1): Percentage distribution of the studied patients with diabetic ketoacidosis regarding their total knowledge level about diabetic ketoacidosis throughout periods of study.

Table (2): Percentage distribution of the studied patients with diabetic ketoacidosis regarding their total level of self-care practice for the daily life throughout periods of study.

Total Practice Level	The studied patients (n=60)						χ^2 P
	Pre		Immediately		Post a month		
	N	%	N	%	N	%	
- Unsatisfactory	57	95.00	15	25.00	27	45.00	**63.03**
- Satisfactory	3	5.00	45	75.00	33	55.00	**0.001***
Range	**(3-28)**		**(0-37)**		**(0-37)**		**F=31.01**
Mean ± SD	**10.93±7.09**		**26.83±13.31**		**23.68±13.57**		**P=0.001***

≥ 80% Satisfactory < 80% Unsatisfactory



(*) Statistically significant difference at level P < 0.05.

Figure (3): Percentage distribution of the studied patients with diabetic ketoacidosis regarding their total level of self-care practice for the daily life throughout periods of study.

Table (3): Percentage distribution of the studied patients with diabetic ketoacidosis regarding their daily living activities for the daily life about feeding throughout periods of study.

Feeding	The studied patients (n=60)						χ^2 P
	Pre		Immediately		Follow up		
	N	%	N	%	N	%	
1. Eats without assistance							
- Never	20	33.33	0	0.00	0	0.00	
- Do it rarely	10	16.67	0	0.00	5	8.33	**117.73**
- Do it some day	10	16.67	5	8.33	5	8.33	**0.00***
- Do it most day	0	0.00	15	25.00	13	21.67	
- Do it all day	0	0.00	20	33.33	17	28.33	
2. Eats with minor assistance at meal times and/or with special preparation of food,							
- Never	3	5.00	0	0.00	0	0.00	
- Do it rarely	2	3.33	0	0.00	0	0.00	**144.67**
- Do it some day	0	0.00	0	0.00	0	0.00	**0.00***
- Do it most day	0	0.00	2	3.33	3	5.00	
- Do it all day	0	0.00	3	5.00	2	3.33	
3. Feeds self with moderate assistance and is untidy							
- Never	3	5.00	0	0.00	0	0.00	
- Do it rarely	2	3.33	0	0.00	0	0.00	**141.63**
- Do it some day	0	0.00	0	0.00	0	0.00	**0.00***
- Do it most day	0	0.00	0	0.00	2	3.33	
- Do it all day	0	0.00	5	8.33	3	5.00	
4. Requires extensive assistance for all meals							
- Never	0	0.00	3	5.00	5	8.33	
- Do it rarely	0	0.00	2	3.33	0	0.00	**131.86**
- Do it some day	0	0.00	10	16.67	10	16.67	**0.00***
- Do it most day	2	3.33	0	0.00	0	0.00	
- Do it all day	3	5.00	0	0.00	0	0.00	
5. Does not feed self at all and resists efforts of others to feed him or her							
- Do it rarely	0	0.00	3	5.00	5	8.33	**146.36**
- Do it some day	0	0.00	2	3.33	0	0.00	**0.00***
- Do it most day	2	3.33	0	0.00	0	0.00	
- Do it all day	3	5.00	0	0.00	0	0.00	

(*) Statistically significant at level P< 0.05.

Table (4): Mean scores of the Activities Daily Living (ADLS) domains of the studied patients with diabetic ketoacidosis for the daily life throughout periods of study.

ADLS Domains	The studied patients (n=60) Range Mean ± SD			F P
	Pre	Immediately	Post a month	
1) Physical self-maintenance scale				
A. Toilet	(0-8) 4.18±2.39	(5-20) 13.67±5.47	(0-20) 13.07±5.85	**72.72 0.001***
B. Feeding	(2-11) 7.00±2.52	(13-20) 17.42±2.71	(8-20) 16.87±3.56	**234.58 0.001***
C. Dressing	(4-10) 6.90±1.97	(12-20) 17.42±2.90	(10-20) 16.37±3.46	**249.22 0.001***
D. Grooming	(0-10) 5.88±2.68	(13-20) 18.17±2.53	(12-20) 17.17±2.95	**376.41 0.001***
E. Physical Ambulation	(0-13) 6.18±4.27	(14-20) 17.67±2.23	(10-20) 16.62±2.88	**230.57 0.001***
F. Bathing	(4-7) 5.62±0.92	(8-20) 17.42±3.62	(8-20) 16.57±3.87	**269.06 0.001***
2) Instrumental Activities of Daily Living				
A. Ability to use telephone	(0-14) 5.62±3.91	(7-16) 13.50±3.01	(7-16) 12.80±3.18	**99.56 0.001***
B. Shopping	(0-8) 4.48±2.58	(10-16) 13.58±2.31	(10-16) 13.18±2.38	**269.84 0.001***
C. Food preparation	(0-11) 4.77±3.20	(11-16) 14.50±1.91	(8-16) 13.95±2.32	**279.39 0.001***
D. Housekeeping	(0-10) 5.05±3.03	(12-20) 17.92±2.65	(12-20) 17.32±2.93	**382.42 0.001***
E. Laundry	(0-6) 2.43±1.94	(7-12) 10.33±1.81	(7-12) 9.98±1.77	**352.02 0.001***
F. responsibility for own medication	(0-6) 2.35±2.20	(7-12) 9.83±1.48	(7-12) 9.63±1.40	**364.36 0.001***
G. Mode of transportation	(0-12) 4.15±3.79	(9-20) 16.83±3.21	(9-20) 16.48±3. 18	**269.94 0.001***

(*) Statistically significant difference at level P < 0.05.

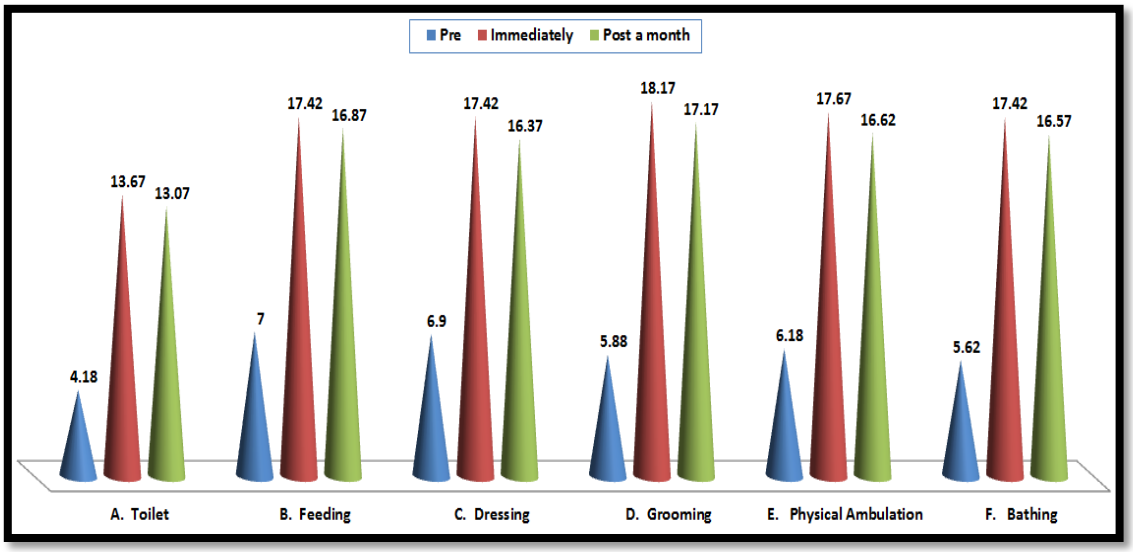


Figure (4): Mean scores of the Activities Daily Living (ADLS) domains of the studied patients with diabetic ketoacidosis for physical self-maintenance scale throughout periods of study.

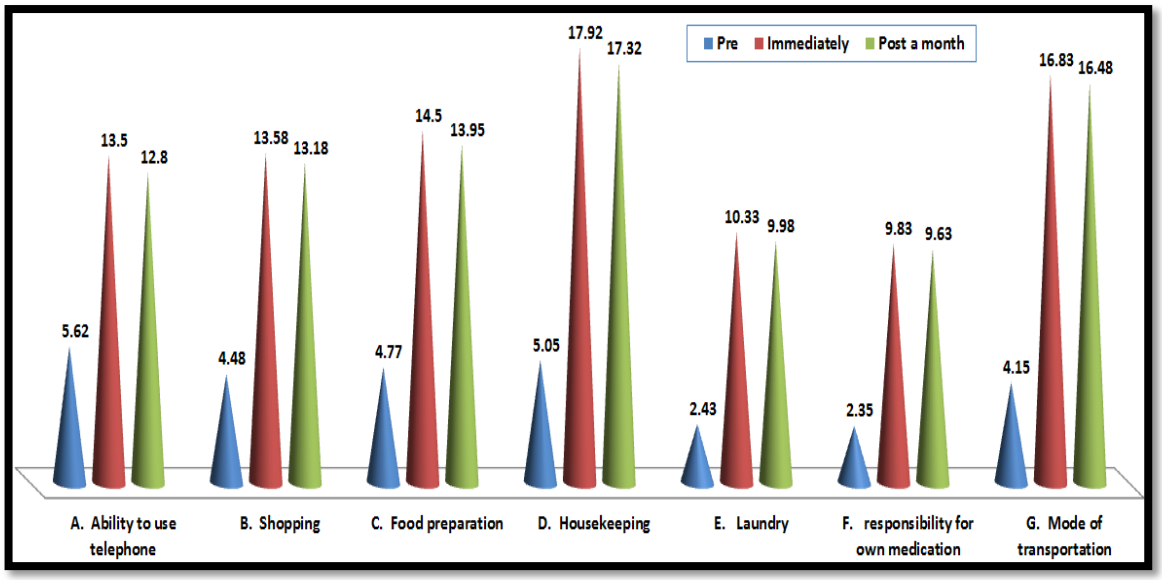


Figure (5): Mean scores of the Activities Daily Living (ADLS) domains of the studied patients with diabetic ketoacidosis for instrumental activities of daily living throughout periods of study.

Discussion

Diabetic ketoacidosis is a serious complication of diabetes that occurs when the body produces high levels of blood acids called ketones. The condition develops when the body can't produce enough insulin. enter cells. Without enough insulin, the body begins to break down fat as fuel. This process produces a buildup of acids in the bloodstream called ketones. [15]

The findings of the present study clarified that one third of the studied patients were read and write and had university education. Less three quarters of them were from rural area. Less than half of the studied patients had irregular employment. As regard to monthly income, it was noticed that less than half of the studied patient had no enough and enough monthly income. This finding matched with the results of the study from **Saleh et al. B. (2012) [16]** who observed in their study that about one quarter of study group were illiterate, had a primary through grade eight education and one third of them had secondary education. About half of the respondents lived in urban areas, and the rest lived in semiurban and rural areas. Half of the respondents were homemakers, and others were service providers, businesspeople, or either unemployed or laborers. Slightly more than half of the respondents belonged to the lower-middle-income group and one-fourth belonged to the low-income group.

The findings of the present study showed that regarding smoking, it was observed that nearly half of the studied patients were smokers, more than one third of them were smoking cigarettes. One quarter of them smoking from 5 to 10 years, with mean score of years were (7.93±9.189). This may be the cause of increase the risk of developing DKA for diabetic patient. **Yuan and Larsson (2019)** [17] were in line with the present study who reported that a causal association between smoking initiation and increased risk of type 2 diabetes. Most available studies found a consistent detrimental effect of current and past smoking on type 2 diabetes. [18, 19].

Related to clinical data, more than half of the studied patients had diabetes type II followed by one third of them had diabetes type I. Regarding to diagnosis, less than half 45.0% of them had DM only and DM with renal disease for both and the rest of them had DM and hypertension. Regards to duration of disease, half of the studied patients had disease from 5 to 10 years. About two thirds of them had past medical history of hypertension and one quarter of them had past medical history of cardiac disease. On the other hand, all and nearly half of them had current history of DM and hyper tension disease and also take medication of diabetic and hypertensive medication respectively. This may be a possible reason for this is that either diabetes is associated with recent changes in dietary habits and lifestyle modifications, or it is a reflection of a high patient mortality.

The current study was agreed with **Jackson et al, (2014)** [20] who stated that three quarters of the respondents had had diabetes for less than 10 years, while only one quarter of them had had it for more than 10 years. On the other hand, the current study was disagreed with **Rao V et al, (2012) [21]** who stated that the incidence of occurrence of DKA with infections was more in type I DM than type II. Infections as precipitating event was identified in two thirds of episodes of DKA in type 1 whereas only one third of patients with type 2 DM had infection. In type 2 DM some stressful events like associated medical conditions; family related matters were seen in majority of cases which eventually lead to development of DKA.

Knowledge deficits for many aspects of patients about diabetic ketoacidosis before the program, as evidenced by the low mean score, they achieved. This could be due to insufficient information about diabetic ketoacidosis. This is in harmony with **Jackson et al, (2014) [20]** who mentioned that the knowledge about glycosylated hemoglobin (HbA1c), physical activities, hypoglycemic symptoms, and medication-related items performed relatively poorly. Also, this finding matched with the results of the study from Romo-Romo et al (2021) [22] who

revealed that in his study, the variables related to diabetes education showed a deficiency in the patients' knowledge about their disease.

Moreover **,** this result was supported by **Taha et al (2016)** [23] they were in the same direction with this result and stated that patients' knowledge about DM was generally low at the pre-guidelines phase. The posttest showed significant improvements in all aspects of patients' knowledge about DM, reaching 100.0% satisfactory knowledge in almost all aspects. This persisted at the follow-up test, with minimal non-significant declines in some areas. In total, more than three quarters of the patients had unsatisfactory knowledge at the pretest, compared to none at the post and follow-up tests.

In congruence with this, **Kolb et al. (2014)** [24] in a study in the United States, reported low level of knowledge about diabetes among patients, and discussed the importance of sound patient information on success of management. Furthermore, **Liebhauser et al. (2014)** [25] in Austria, mentioned that diabetic patients' knowledge about specific dietary ingredients helps in improving their dietary habits. Also, in line with the current study results, **Lewis et al. (2015)** **[26]** in a study in the United States revealed a retention of the post-intervention improvement in patients' knowledge at follow-up testing.

Concerning patients' self-care practice domains related to the diabetic ketoacidosis, the result of the present study showed that the majority of them had unsatisfactory practice before guideline implementation while more than half of them had satisfactory practice one month after guideline implementation. This can be explained by the patients' full communication and co-operation to formal implementation of training guideline and the effect of the teaching methods and materials which were used in the training guideline.

Moreover , this result was supported by **Sherifali D et al, (2018)** [27] recommended a variety of education and support programs including group classes and individual counseling sessions, with technology-based strategies (e.g., Internet-based computer programs and mobile phone apps). Diabetics need self-management education and support when first diagnosed, as well as during times when there are changes in treatment, general health, or life circumstances. Diabetics were suggested to adhere to diabetes team with a trusting and collaborative relationship, set goals for caring for disease and health, and identify tailor-made strategies. [27]

In addition**,** this finding agreed with **Torres H et al, (2011)** **[28]** stressed on the importance of education and health communication guided dialogical relations and appreciation of popular knowledge, by reorienting the educational practices for self-care, to establish strategies for prevention in their study on knowledge, attitudes, and practices of self-care in individuals with DM. Bangladesh researchers feel that diabetes education improves knowledge and attitudes for self-empowerment regardless of the education program tools (workshop or training package), to promote self-care skills improving the quality of life.

Concerning the Activities Daily Living (ADLS) domains of the studied patients with diabetic ketoacidosis assessment, the result of the present study revealed that there was an improvement in the Activities Daily Living after guideline implementation compared before the health education implementation. This evidence by statistically significant difference between mean scores of the activities daily living domains of the studied patients with diabetic ketoacidosis for instrumental activities of daily living

before and after health education guideline. This could be due to their deficient knowledge, self-care practice domains related to the diabetic ketoacidosis before the guideline's intervention.

This finding is similar to **Istek and Karakurt, (2016)** [29] who found that A significant positive correlation was found between activities of daily living and self-care agency. As the level of independence of patients increased in their activities of daily living, their self-care agency behaviors also improved. Also, matched with the results of the study from **Taha et al, (2016)** [23] who stated that the model for the self-efficacy score indicates that the significant positive predictor of this score throughout the study phases was the intervention while the duration of DM was a negative predictor. As indicated by the standardized coefficient, the intervention was the most influential factor. As r-square indicates, 75% of the variance of self-efficacy score is attributed to the factors in the model.

The current study revealed that there was a statistically significant difference between daily living activities level, knowledge level and self-care practice level post month the program with positive correlation. Also, there was positive correlation between daily living activities level and knowledge level immediately after the program. These findings favor that diabetic ketoacidosis education should be included routinely in the integral care of patients with diabetes, promoting empowerment, and making informed and appropriate decision. This finding matched with the results of the study from Romo-Romo et al (2021) [125] who mentioned that patients attending the education sessions showed significant changes in components that promote self-management of their disease including knowing glycemic targets, and performing an adequate insulin injection technique.

This also, agree with **Flensner and Lindergrona, (2010)** [30] who mentioned that a significant positive correlation was found in this study between activities of daily living and self-care agency. A study showed that self-care was an important factor for patients in performing their activities of daily living and they needed adequate self-care agency to be able to perform these activities of daily living.

Finally, these findings may be explained in the light of the fact that better improvement of knowledge and self-care practice of patient with diabetic ketoacidosis after implementing educational program practice related to daily living activities intervention.

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Effect of Educational Program on Nurses' Performance regarding Intensive Care Units Induced Diarrhea among Critically Ill Patients

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Abstract

Background Acute diarrhea is described as the acute onset of three or more loose or watery stools a day lasting for 14 days or less. **The study aimed** to evaluate the effect of educational program on nurses' performance regarding intensive care units induced diarrhea among critically ill patient. **Design**: A quasi- experimental design was utilized in this study. **Subjects and method** A convenience sampling of (50) nurses participated in the study. The study was conducted at the Medical Intensive Care Unit and Cardio Care Unit of El-Menshawy General Hospital affiliated to Ministry of Health. **Tools of the study** were used for data collection **Tool (I)** Structural Interviewing Questionnaire. **Tool (II)** observational checklist regarding nurses' practice. **Results** The main results revealed that there was statistical significant improvement in total knowledge and practical level among studied nurses post implementation of educational program at $p<0.05$ about induced diarrhea in intensive care units. **Conclusion** The implementation of educational programme had positive effect on nurses' knowledge and practice regarding intensive care units induced diarrhea among critically ill patient. **Recommendation** It recommended that ongoing learning protocol of care must be designed regarding proper hygienic care, perineal care, and skin care during induced diarrhea and implemented for nurses at ICU& CCU for the importance of maintaining checkup.

Keywords Educational program, nurses' performance, intensive care units, induced Diarrhea.

Introduction

Gastrointestinal tract has many important functions among critically ill patients especially to maintains immunological functions, decreases infection and promotes better survival rate. Gastrointestinal motility disorders are common among critical ill patients that are commonly observed in the intensive care units, which are occurring mainly due to physiological responses that are resulted from severe disease, enteral nutrition intolerance, use of medications, infection, and immunosuppression [(1,2,3)]. Bowel management is essential for the future wellbeing for critically ill patients in the intensive care units because of regular bowel movements interfere with an patient's quality of life [(4,5)].

Intensive care units induced diarrhea is the most frequent gastrointestinal complication that are observed among intensive care unit patients [(6)]. The reported incidence of intensive care units induced diarrhea varies widely in the literature, ranged from 2 to 95% depending on the criteria that are used

to define and quantify bowel movements [7,8]. The World Health Organization defines diarrhea as the passage of three or more episodes of liquid or loose stools per day. Usually, this definition is easier to apply in practice and compatible with the daily routine of the health care professional team in the intensive care units [9,10].

Intensive care units induced diarrhea is one of the leading clinical symptoms that are observed in intensive care units. The causes of diarrhea are divided into infectious and noninfectious that includes recent abdominal surgery, infection, decreased gastrointestinal perfusion, and administration of antibiotics [11]. Other factors include alterations in the colonic response, microbial contamination of enteral nutrition formulas, low-fiber diet, hypoalbuminemia, and disturbances of the intestinal flora, increased use of concurrent drug therapy, and Clostridium difficile infection. Furthermore, disease severity, and comorbidities may contribute to the onset of diarrhea among critically ill patients[12,13,14].

Critically ill patients are different from other patients; they have a life threatening problems that may inhibit starting feeding early, affect feeding route or type. These patients may suffer from dehydration, electrolyte disturbance that may affect gastrointestinal perfusion and motility [15, 16,17]. Developing and implementinga bowel management program is vital for individuals at risk for these conditions [18]. Critical care nurses provide care to these patients in a holistic approach. They formulate nursing care plan for them concentrating on interventions of life threatening problems as a priority and neglect problems regarding patients‟ elimination unless result in vigorous fluid or electrolyte disturbance[19].

Nursing care for intensive care units induced diarrhea for critically ill patients is aimed to enable the patients to be in control of his bowel function independently, promote his reintegration into society, achieve regular and predictable emptying of the bowel at a socially acceptable time and place, and maintain short and long term gastrointestinal health [20]. Critical care nurses in the intensive care units are in a key position to maintain patients' bowel status at an optimal level [21,22], establish appropriate interventions, perform initial assessment, clinical examination and management of diarrhea[23,24], ensure that timely treatment or intervention is performed, and minimize complications, with initial evaluations demonstrating a reduction in diarrhea that portion of the care pathway which is crucial [25,26].

Management of intensive care units induced diarrhea includes; perform hygiene care for patients (Perineal and sacral skin care), infection control measures and decontamination of the patient environment, emotional support, nutritional practices as (assess and management of dehydration and fluid and electrolyte disturbance, enteral nutrition) and preventing skin breakdown [27]. So critical care nurses are required to ensure that their knowledge and practice is up-to-date and informed by the latest evidence and address all areas of patient care post admission to intensive care units regarding intensive care units induced diarrhea.

Significance of the study

The level of knowledge and practice of intensive care units nurses are reflected on the critically ill patient care and their prognosis especially regarding serious issues like acute diarrhea. On the other hand insufficient understanding about management of intensive care units induced

diarrhea has led to the lack of detection methods and less clinical care for patients, So, developing of nursing educational training program regarding acute diarrhea is necessary to improve nurses' knowledge and practice, promoting quality of care and decreasing incidence of complications thereby patient outcomes[27]. So this study will be done to evaluate the effect of educational program on nurses' performance regarding intensive care units induced diarrhea among critically ill patients.

Aim of the Study

Evaluate the effect of educational program on nurses' performance regarding intensive care units induced diarrhea among critically ill patients.

Research design

A quasi- experimental research design was used

Setting

The study was conducted at the Medical Intensive Care Unit and Cardio Care Unit of El-Menshawy General Hospital affiliated to ministry of health.

Subjects

A convenience sampling of (50) nurses in the above previously mentioned settings. The sample size was calculated based on Epidemiological Information Program, based on the total nurses per year according to review of Tanta Main El_Menshawy General Hospital Statistical Records. They were divided into two groups; groups were consisted of (20) from CCU and (30) nurses from ICU as following:

Inclusion criteria

- Nurses both sexes.
- Working as fulltime nurse in ICU
- At least one year of experience

Research Hypothesis

Knowledge and Practice scores of critical care nurses are expected to improve post implementation of educational program regarding intensive care units induced diarrhea among critically ill patients.

Tools of the study

Two tools were used to evaluate the effect of educational program on nurses' performance regarding intensive care unit induced diarrhea among critically ill patients, which includes the following:

Tool (I): Structural Interviewing Questionnaire

It was comprised of two parts:-

Part (1): Socio-demographic data of nurses: which included; nurses code, age, sex, marital status, level of educational, Place of work, occupation, years of experience and previous training about ICU induced diarrhea management.

Part (2): Nurse's knowledge assessment sheet: It was developed by the researcher based on literature review [29-31], to gather nurses' knowledge pre, immediate and 2-months later post implementation of educational program regarding intensive care units induced diarrhea.

Three level of scoring for the questions it was scored as the following

Correct and complete answer scored (2)
Correct and incomplete answer scored (1)
Don't' know or incorrect answer scored (0)

The total scoring system of nurses' knowledge will be calculated (96) and classifiedas the following:

-More than 75% will be high level of knowledge.
-More than or equal 60% until 75% will be considered moderate level of knowledge.
-Less than 60% will be considered low level of knowledge.

Tool (II) An observational checklist regarding nurses' practice

This tool was developed by the researcher

based on literatures review [34-37] It was used for assess nurses' practice pre, immediate and 2 months later post implementation of educational program regarding intensive care units induced diarrhea; it was including the following:

- **Bowel assessment**; which included (14 steps)
- **Patients assessment;** which included (18 steps)
- **Application of stool charts care pathways** which includes (Bristol Stool Chart, King's Stool chart), food and fluid charts.
- **Managing the effects of diarrhea**; which included (88steps)

Scoring system of practice

- Two levels of scoring for questions were used as the following:
- Done practice take (1)
- Not done practice takes (0)

The total scoring system of nurses' knowledge will be calculated (88) and classifiedas the following

- More than 75% will be high level of knowledge.
- More than or equal 60% until 75% will be considered moderate level of knowledge.
- Less than 60% will be considered low level of knowledge

Ethical consideration

An official permission was obtained from the Faculty of Nursing Dean and head of the Orthopedic Department of Tanta Main University Hospital to conduct the study. Informed consent was taken from every nurse to participate in the study and included the right to withdrawal at any time. Confidentiality was taken into consideration regarding data collection. A code number was used instead of names.

Methods of data collection

1-Tool development

Tool (I) and tool (II) of the study were developed by the researcher after reviewingrelevant literatures [31-33-34-37] and used to collect data

2-Validity of Tools

All tools were tested by content validity by (5) experts in the field of Medical Surgical Nursing, Critical Care Nursing and Medical Biostatistics and accordingly needed modifications were done, it was calculated and found to be = (98%).

3- Reliability of the tool

The reliability of the study tools was calculated by Cronbach's alpha test; it was 0,845 for tool (I) and 0.728 for tool (II).

4- A pilot study

A pilot study was conducted before the actual study on (10%) of the total sample **(50 nurses)** in pervious mentioned setting to test the feasibility and applicability of the different items of the tools to determinate any obstacles that may encounter during the period of data collection, modification were done by the researcher before the main study and they were excluded and not included in the current study.

5-Data Collection

Data were collected over a period of 8 months, started from May, 2020 to December, 2020.

6- Educational program

The present study was carried out through four phases (assessment, planning, implementation, evaluation)

A. Assessment phase

Part (A): Assessment of nurses' knowledge related to patients about induced diarrhea in ICU was used three times pre, immediately and two month post implementation of educational program by using tool (I).

Part (B): Assessment of nurses' practice: Nurses was observed three times pre, immediately and two month post

implementation of educational program by using tool (II).

B. Planning phase

The nursing educational program was designed by the researcher to all nurses included in the study by dividing the nurses into 30 from CCU and 20 from ICU divided into five groups, each group will contain (10) nurses.

C. Implementation phase

The educational training program was presented to all nurses included in the study in five sessions and the duration of each sessions were 30 minutes per day for five consecutive days. Training included nurses in El_Manshawy General Hospital. The content of sessions was divided into two theoretical and three practical sessions as follows:

The theoretical part: included two sessions

The practical part: included three session

Time taken for sessions; 30 min

The teaching method used; power point presentation and video**,** booklet, group discussion

D. Evaluation phase

Evaluation was done for both theoretical and practical part three times pre, immediately after teaching and training.

6-After data collection, data was coded, analyzed then tabulated under the direction of a statistician to obtain results for testing the research hypotheses.

Statistical analysis, after completion of data collection, all questions in interview questionnaire sheet was coded, organized and categorized then the data was tabulated and presented into frequency distribution tables

Results

Table (1) shows the distribution of the studied nurses according to Their Socio–Demographic Characteristics. Concerning to age, the table illustrated that nearly more than one third (48%) of the nurses were in the age group (25- > 30) years, where (12%) of them were in theage group (35 or more) years. Regarding to sex and marital status, all of the studied nurses were females and about (90%) of them were married. In relation to educational level, the table showed that (50%) of the nurses had Baccalaureate degree nursing. Moreover, the majority (72%) of nurses were bed side nurse (critical nurse).

In addition to; it was found that more than one third (44%) of the studied nurses had (1-5) years of experience. According to their previous training regarding management of diarrhea, the majority of the studied nurses (78%) did not have previous training regarding diarrhea.

Table (2) shows the distribution of the studied nurses according to their knowledge about assessment of ICU induced diarrhea through all periods of the study. The table revealed that there was a highly statistically significant improvement of knowledge about ICU induced diarrhea among nurses throughout all intervention periods of the study at (p-value <0.001).

Table (3) shows the distribution of the studied nurses according to their knowledge about Management of ICU induced diarrhea Pre and Post Nursing Educational Program (n=50).

The table revealed that there was a statistically significant improvement in the knowledge about management of ICU induced diarrhea pre and post program among nurses throughout all intervention periods of the study at p value = (<0.001*)

Figure (1) Distribution of ICU & CCU nurses regarding to total level of knowledge pre and post nursing educational program. This figure showed that there was a statistically significant improvement

regarding nurses' knowledge where (46%) of the studied nurses had poor level of knowledge pre nursing intervention program, where (84%) of them had scored good level of knowledge post implementation of nursing educational program and about (82%) of them had scored high level of knowledge post 2 month of implementation of nursing educational program.

Table (4) shows the distribution of the studied ICU & CCU nurses according to their practice of patient assessment during induced diarrhea pre, post and 2 months after immediate educational program.

This table revealed that there was a statistically significant improvement in the practice of patient assessment during induced diarrhea pre and post nursing educational program among nurses throughout intervention periods of the study at (p value <0.001).

Table (5) shows distribution of the studied ICU & CCU nurses according to their practice regarding infection control measures during induced diarrhea pre and post and Post 2-month nursing intervention program. The table revealed that there was statistically significant improvement in the nurses' practice regarding infection control measures pre, post immediate and after 2-month nursing educational program at (p value <0.001).

Figure (2) Distribution of the studied ICU & CCU nurses according to their total practice domains levels throughout periods of study This figure illustrated that there were highly statistically significant improvement in the level of the nurses practice where (38%) of the studied ICU & CCU nurses had poor level of practice pre nursing educational program, whereas about (88%) of them had scored good level of practice post implementation of nursing educational program, in addition to(84%) of them had scored good level of practice post 2 month implementation of nursing educational program

Table (6) shows relation between socio demographic characteristics of studied ICU & CCU nurses' data and their total level of practice score throughout periods of study. There was highly statistically significant relation between total level of practice Pre, Post Immediate with age, educational level and years of experience when p-value <0.001. Statistically significant deference between total practice Post 2 months with age and Educational level when (p-value <0.05). Also, there was a statistically significant relation between total practice pre-Immediate, post and Post 2 months with Occupational level when (p-value <0.05). Also, statistically significant relation between total level of practice Post with training course when (p-value <0.05).

Table (1): Distribution of the studied nurses according to their Socio–demographic data in ICU& CCU

Socio–demographic data in ICU& CCU (n=50)		N	%
Age (years)			
	<25	11	22
	25- <30	24	48
	30- <35	9	18
	35 or more	6	12
	Mean±SD	27.94±4.37	
Sex			
	Female	48	96
	Male	2	4
Marital Status			
	Married	45	90
	Divorced	3	6
	Single	2	4
	Widow	0	0
Educational Level			
	Diploma in nursing	8	16
	Technical health institute	17	34
	Bachelor degree	25	50
	Post graduate (master or doctoral degree)	0	0
Occupational level			
	Bed side Nurse	36	72
	Nurse supervisor	6	12
	Head nurse	8	16
Years of experience			
	<1 years	17	34
	1-5 years.	22	44
	>5 years	11	22
Previous training course about Induced Diarrhea Management forcritically ill patient			
	No	39	78
	Yes	11	22
Duration of training course			
	Mean±SD	2.77±2.36	

Table (2): Distribution of the studied ICU&CCU nurses according to their knowledge about assessment of ICU induced diarrhea through all periodsof the study

Nurses knowledge about ICU induced diarrhea		The studied (50) nurses						Chi-square	
		Correct& complete		Correct& incomplete		Incorrect			
		N	%	N	%	N	%	X^2	P-value
Aim of management of ICUinduced diarrhea	Pre	8	16	32	64	10	20		
	Post Immediate	32	64	12	24	6	12	24.491	<0.001 *

	After 2 mon.	27	54	13	26	10	20	1.464	0.481
Definition of Bowel care	Pre	24	48	22	44	4	8		
	Post Immediate	34	68	11	22	5	10	5.502	0.064
	After 2 mon.	26	52	13	26	11	22	3.483	0.175
Bowel management for diarrhea include the following	Pre	21	42	20	40	9	18		
	Post Immediate	30	60	10	20	10	20	4.974	0.083
	After 2 mon.	24	48	14	28	12	24	1.515	0.469
Primary Assessment of ICUinduced diarrhea	Pre	18	36	25	50	7	14		
	Post Immediate	32	64	9	18	9	18	11.699	0.003*
	After 2 mon.	25	50	12	24	13	26	2.015	0.365
Problems which determinedduring ICU duration	Pre	20	40	21	42	9	18		
	Post Immediate	34	68	9	18	7	14	8.680	0.013
	After 2 mon.	31	62	9	18	10	20	0.668	0.716
During assessment of patient with diarrhea, it is necessary to determine the following Symptoms	Pre	16	32	23	46	11	22		
	Post Immediate	35	70	10	20	5	10	14.450	<0.001 *
	After 2 mon.	35	70	7	14	8	16	1.222	0.543
Pay attention regarding changes during ICU diarrhea as the following	Pre	15	30	25	50	10	20		
	Post Immediate	26	52	11	22	13	26	8.787	0.012*
	After 2 mon.	31	62	8	16	11	22	1.079	0.583
Physical examination for induced diarrhea	Pre	22	44	26	52	2	4		
	Post Immediate	35	70	5	10	10	20	22.524	<0.001 *
	After 2 mon.	30	60	10	20	10	20	2.051	0.359
Importance of abdominal examination due to induceddiarrhea	Pre	16	32	25	50	9	18		
	Post Immediate	36	72	7	14	7	14	18.067	<0.001 *
	After 2 mon.	34	68	10	20	6	12	0.663	0.718
Importance of rectal examination	Pre	15	30	26	52	9	18		
	Post Immediate	32	64	12	24	6	12	11.907	0.003*
	After 2 mon.	32	64	11	22	7	14	0.120	0.942
General diagnostic tests for Icudiarrhea	Pre	10	20	24	48	16	32		
	Post Immediate	30	60	6	12	14	28	20.933	<0.001 *
	After 2 mon.	26	52	9	18	15	30	0.920	0.631
Specific diagnostic test for ICUdiarrhea	Pre	9	18	28	56	13	26		
	Post Immediate	34	68	4	8	12	24	32.575	<0.001 *
	After 2 mon.	37	74	9	18	4	8	6.050	0.053

P1= Pre e& Post Immediate, P2= Post& Post 2 months, p value = (<0.001*)

Table (3): Distribution of the studied ICU&CCU nurses regardingknowledge about management of ICU induced diarrhea throughout allperiods of the study

Management of ICU induced diarrhea		The studied (50) nurses						Chi-square	
		Correct & complete		Correct & incomplete		Incorrect			
		N	%	N	%	N	%	X^2	P-value
Purpose of bowel carefor ICU diarrhea	Pre	16	32	27	54	7	14		
	Post Immediate	32	64	12	24	6	12	11.179	0.004*
	After 2 mon.	32	64	13	26	5	10	0.131	0.937
General management ofICU diarrhea included	Pre	20	40	27	54	3	6		
	Post Immediate	32	64	8	16	10	20	16.853	<0.001*
	After 2 mon.	31	62	9	18	10	20	0.075	0.963
Management of ICU induced diarrhea startedwith	Pre	15	30	31	62	4	8		
	Post Immediate	31	62	10	20	9	18	18.244	<0.001*
	After 2 mon.	35	70	11	22	4	8	2.213	0.331
Treatment of non-infective ICU diarrhea	Pre	9	18	32	64	9	18		
	Post Immediate	36	72	9	18	5	10	30.245	<0.001*
	After 2 mon.	34	68	10	20	6	12	0.201	0.905
Treatment of infectiveICU diarrhea	Pre	16	32	30	60	4	8		
	Post Immediate	32	64	13	26	5	10	12.165	0.002*
	After 2 mon.	31	62	14	28	5	10	0.053	0.974
Protection of integrity ofperianal skin include	Pre	18	36	26	52	6	12		
	Post Immediate	28	56	8	16	14	28	14.903	<0.001*
	After 2 mon.	37	74	9	18	4	8	6.861	0.053
Protection of neuro patients for perianal skin	Pre	12	24	28	56	10	20		
	Post Immediate	31	62	8	16	11	22	19.554	<0.001*
	After 2 mon.	34	68	10	20	6	12	1.831	0.400
Signs and symptoms ofdehydration included	Pre	18	36	24	48	8	16		
	Post Immediate	28	56	10	20	12	24	8.739	0.013*
	After 2 mon.	32	64	8	16	10	20	0.671	0.715
Nursing care of dehydration included	Pre	19	38	25	50	6	12		
	Post Immediate	34	68	12	24	4	8	9.213	0.010*
	After 2 mon.	36	72	10	20	4	8	0.239	0.887
Nursing care for electrolyte disturbance	Pre	18	36	26	52	6	12		
	Post Immediate	35	70	7	14	8	16	16.678	<0.001*
	After 2 mon.	29	58	9	18	12	24	1.613	0.447
The nurse control breaksdown around perianal area through	Pre	12	24	26	52	12	24		
	Post Immediate	36	72	8	16	6	12	23.529	<0.001*
	After 2 mon.	31	62	10	20	9	18	1.195	0.550
The nurse clean perianalarea through	Pre	11	22	32	64	7	14		
	Post Immediate	31	62	11	22	8	16	19.846	<0.001*
	After 2 mon.	33	66	12	24	5	10	0.798	0.671
Role of nurse to prevent infection in perianal area	Pre	18	36	29	58	3	6		
	Post Immediate	30	60	13	26	7	14	10.695	0.005*
	After 2 mon.	32	64	9	18	9	18	1.042	0.594
Prevention of diarrheathrough	Pre	20	40	24	48	6	12		
	Post Immediate	37	74	10	20	3	6	11.835	0.003*
	After 2 mon.	35	70	11	22	4	8	0.246	0.884

P1= Pre e& Post Immediate, P2= Post& Post 2 months, p value = (<0.001*)

Figure (1): Distribution of ICU & CCU nurses regarding to total level of knowledge pre and post nursing educational program

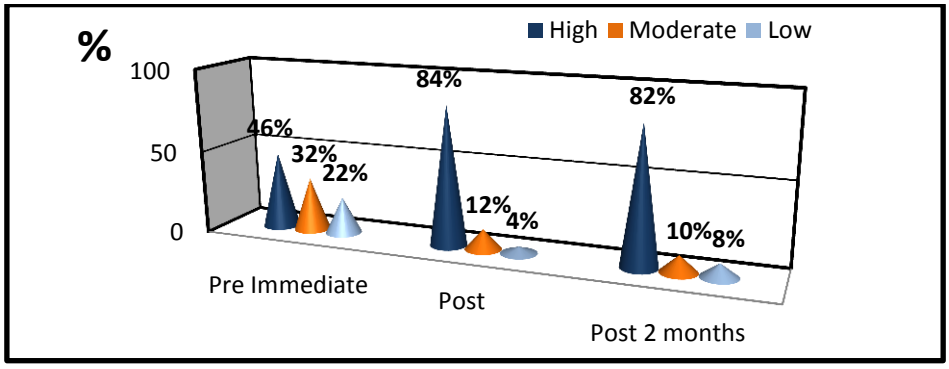

Table (4): Distribution of the studied ICU &CCU nurses according to their practice about patient assessment during induced diarrhea pre and post nursing educational program.

Patients' assessmentduring ICU diarrhea	The studied (50) nurses												Chi-square			
	Pre				Post Immediate				Post 2 month of program				P1		P2	
	Done		Not done		Done		Not done		Done		Not done					
	N	%	N	%	N	%	N	%	N	%	N	%	X2	P-value	X2	P-value
1. Assess general appearance of the patient	21	42	29	58	47	94	3	6	45	90	5	10	31.066	<0.001*	0.543	0.461
2. Assess sign and symptoms of diarrhea	16	32	34	68	43	86	7	14	42	84	8	16	30.136	<0.001*	0.078	0.779
3. Monitor vital signs:	18	36	32	64	44	88	6	12	43	86	7	14	28.693	<0.001*	0.088	0.766
4.Assess presence of pain during diarrhea	19	38	31	62	42	84	8	16	40	80	10	20	22.236	<0.001*	0.271	0.603
5.Assess severity of pain	18	36	32	64	40	80	10	20	39	78	11	22	19.869	<0.001*	0.060	0.806
6.Assess presence of bleeding	21	42	29	58	41	82	9	18	40	80	10	20	16.978	<0.001*	0.065	0.799
8.Assess change in intake and out put	20	40	30	60	44	88	6	12	43	86	7	14	25.000	<0.001*	0.088	0.766
9.Assess contributing factor of diarrhea	29	58	21	42	45	90	5	10	42	84	8	16	13.306	<0.001*	0.796	0.372
10.Assess hydration status of patient	17	34	33	66	41	82	9	18	40	80	10	20	23.645	<0.001*	0.065	0.799
11.Assess skin integrity around anus	26	52	24	48	43	86	7	14	41	82	9	18	13.511	<0.001*	0.298	0.585
12.Assess presence of cramping	23	46	27	54	44	88	6	12	43	86	7	14	19.946	<0.001*	0.088	0.766

13.Assess nutritional status for patient	26	52	24	48	41	82	9	18	40	80	10	20	10.176	<0.001*	0.065	0.799
14.Assess sign &symptoms of dehydration	20	40	30	60	45	90	5	10	43	86	7	14	27.473	<0.001*	0.379	0.538
15.Monitor presence of inflammatorybowel disease	21	42	29	58	44	88	6	12	41	82	9	18	23.253	<0.001*	0.706	0.401
16.Assess abdomen for any tenderness	18	36	32	64	46	92	4	8	43	86	7	14	34.028	<0.001*	0.919	0.338
17.Assess intake of medication that affect muscle tone	20	40	30	60	47	94	3	6	44	88	6	12	32.972	<0.001*	1.099	0.295

P1= Pre e& Post Immediate, P2= Post& Post 2 months, p value = (<0.001*)

Table (5): Distribution of the studied ICU &CCU nurses according to their practice regarding infection control measures during induced diarrhea pre, post Immediate and after 2-month nursing educational program.

Infection Control Measures	The studied (50) nurses												Chi-square			
	Pre				Post Immediate program				Post 2 month of program				P1		P2	
	Done		Not done		Done		Not done		Done		Not done					
	N	%	N	%	N	%	N	%	N	%	N	%	X2	P-value	X2	P-Value
1.Assess risk patient for infection in ICU	22	44	28	56	43	86	7	14	42	84	8	16	19.385	<0.001*	0.078	0.779
2.Wash Hands before and after deal with patient	21	42	29	58	45	90	5	10	44	88	6	12	25.668	<0.001*	0.102	0.749
3.Wear disposable gloves and Plastic apron whencontact with patients	11	22	39	78	47	94	3	6	43	86	7	14	53.202	<0.001*	1.778	0.182
4. Use proper towels to soak up excess liquid	21	42	29	58	46	92	4	8	44	88	6	12	28.268	<0.001*	0.444	0.505
5.Transfer any solid matterdirectly into a clinical waste bag	15	30	35	70	45	90	5	10	42	84	8	16	37.500	<0.001*	0.796	0.372
6.Clean the soiled area withdetergent (Dettol) and hot water, using a disposablecloth	21	42	29	58	43	86	7	14	41	82	9	18	21.007	<0.001*	0.298	0.585
7. Clean environment by using appropriate disinfectants	12	24	38	76	44	88	6	12	43	86	7	14	41.558	<0.001*	0.088	0.766

(chlorhexidine5%)																
8.Implement control measures for all patients with respiratory infectionin ICU	15	30	35	70	48	96	2	4	45	90	5	10	46.718	<0.001*	1.382	0.240
9.use separate equipment for every patient in ICU	12	24	38	76	46	92	4	8	44	88	6	12	47.455	<0.001*	0.444	0.505
10.Clean, disinfect reusableequipment appropriately before use with another Patients	15	30	35	70	43	86	7	14	42	84	8	16	32.184	<0.001*	0.078	0.779
11.Ensure safe waste management	24	48	26	52	46	92	4	8	45	90	5	10	23.048	<0.001*	0.122	0.727
12.Cover the nose and mouth when coughing, sneezing with mask	27	54	23	46	45	90	5	10	43	86	7	14	16.071	<0.001*	0.379	0.538

Figure (2): Distribution of the studied ICU &CCU nurses according to their total practice domains levels throughout periods of study

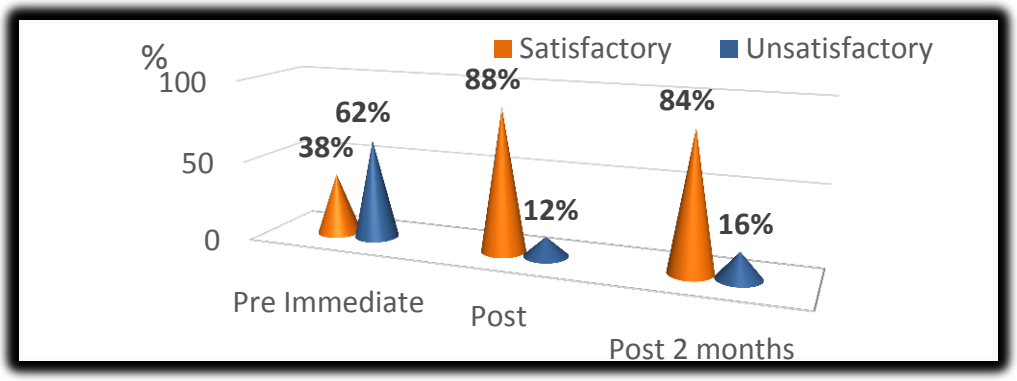

Table (6): Relation between socio demographic data of Studied ICU&CCU nurses' data and their total level of practice score throughout periods of study

Sociodemographic data	Total level practice score The Studied nurses (n=50)									
	Pre-Immediate			Post			Post 2 months		Tests	
	Mean	SD	P-value	Mean	SD	P-value	Mean	SD	t/ f	P-value
Age (years)										
<25	18.64	1.75	<0.001*	24.73	1.42	<0.001*	23.09	4.25	5.262	0.003*
25- <30	24.08	4.69		33.46	6.35		28.67	6.35		
30- <35	25.00	5.00		33.56	6.17		30.78	5.21		
35 or more	29.17	2.93		38.50	1.38		33.83	7.03		
Sex										
Female	23.67	5.17	0.964	32.25	6.66	0.644	28.44	6.66	0.013	0.990

Male	23.50	0.71		30.00	8.49		28.50	4.95		
Marital Status										
Married	23.51	5.20	0.720	32.00	6.80	0.549	28.58	6.55	0.159	0.854
Divorced	26.00	5.00		36.00	1.73		26.33	9.71		
Single	23.50	0.71		30.00	8.49		28.50	4.95		
Educational Level										
Diploma in nursing	19.00	2.62	<0.001*	25.50	2.14	<0.001*	22.88	3.44	3.872	0.028*
Technical health institute	21.00	3.51		29.38	4.87		28.88	3.91		
Baccalaureate degree	25.38	4.91		34.38	6.48		29.65	7.01		
Occupational level										
Bed side Nurse	22.56	4.55	0.002*	30.56	6.01	0.005*	27.61	5.84	3.804	0.029*
Nurse Supervisor	30.17	1.17		39.50	1.05		35.00	5.02		
Head Nurse	23.75	5.73		33.88	8.11		27.25	8.45		
Years of experience										
<1	20.41	3.08	0.002*	26.71	3.57	<0.001*	25.53	5.70	3.014	0.059
1-5 yrs.	24.64	4.92		34.23	5.87		29.36	6.15		
>5	26.73	5.42		36.45	6.62		31.09	7.48		

Discussion

Diarrhea continues to plague the developing world resulting in more than 3 million deaths annually. Diarrheal infections are the fifth leading cause of death worldwide**.** Critically ill patients, tend to be more susceptible to volume depletion as a result of vomiting, diarrhea, or increases in insensible water losses. Significant fluid losses may occur rapidly. Volume depletion is a common complication of illness observed in critically ill patients presenting to the emergency department. Early recognition and intervention are important to prevent progression to shock and cardiovascular collapse. [28,29]

The main role of nurses working at ICUs is 24-h monitoring of patients vital functions, nutritional management to prevent the development of malnutrition in unconscious patients, ensuring proper personal hygiene, and keeping records of hospitalized patients so the present study evaluate the effect of educational program on nurses' performance regarding intensive care units induced diarrhea among critically ill patients. [30]

Also, this finding were supported by **Anim-Larbi (2017**) who found that the majority of the nurses had a good knowledge about shock related diarrhea diagnosis and its prevention post-implementation of the study training program.[32]

Also, this finding was supported by **Anim-Larbi (2017**) who studied knowledge of nurses in management of diarrhea, and found that the majority of the nurses in ICU had a good knowledge about shock related diarrhea diagnosis and its prevention post-implementation of the study training program. [32]

Moreover, these results were in the same line with **Guddeti et al., (2019)** who found that most of nurse who are working in ICU were unaware of diarrhea (as bowel assessment and management of patients) and have poor skills preprogram which improved post- program. [35] These results were similar to results of **Shah et al. (2017)** who do study in India titled with home-based management of acute diarrheal

disease in an urban slum of Aligarh and found post providing structured education program to population, KAP toward diarrhea were significantly improved. [36]

This result was supported by **Babiker et al., (2019)** who showed that, most of nurses in ICU didn't use control precaution while this percent improved to all of nurses use infection control precaution during care of patients with induced diarrhea post nursing intervention**.** [33]

The current study result's revealed that there was a highly statistically significant improvement in the nurses practice regarding food and fluid management, prevent skin breakdown to the patient pre and post 2-month nursing intervention program. This may be due to increase the nurse awareness about the important patients care, and detecting the defects in their practice and identifying their responsibilities. This interpretation was supported by **Mohammed et al., (2021)** who revealed that, there was a statistically significant difference between nurses practice sub items scores regarding food &fluid management & skin care for patient with diarrhea before and after implementation of health education. [37]

Also, it was supported by **El-Sayed et al., (2018**) regarding care of ICU patients with diarrhea. Who illustrated that there was a marked improvement in the nurses' total practices regarding management of hypovolemic shock related to sever diarrhea pre- and post- implementation of the training guidelines. A statistically significant difference was detected in this current study because most of the participants' nurses demonstrated all procedures (practical skills) competently immediately post- implementation of the training on educational program compared to only one third of them pre-implementation of the educational program.[31]

Furthermore, this finding was supported with **Carson et al., (2017**) who carried out a study about evaluation of a nurse initiated acute gastroenteritis pathway in emergency department and found a highly statistically significant association between ICU nurses' knowledge and their practice in pre- and post- program implementation phases about management of ICU diarrhea. From the researchers' point of view, this finding proven that high level of nurses' scores of knowledges is usually associated with increased level of competent clinical performance. [38]

Also, this result was supported by **Bayoumi (2017)** and **O'Leary (2019)** who found that there were significant relationships between nurses' level of knowledge, and Practices and Their education level, workplace experience years, and previous attendance of training programs. [31,40] It's important to focus on the critical care nurses sense of competence is an important determinate of delaying institution allegation of the patient. [40]The present results documented an improvement in knowledge and practice skills of ICU induced diarrhea that support the hypotheses of educational program intervention.so that more attention needs to be given to effect of antibiotic resistance medication and infection control measures in ICU. [41]

Conclusion

Based on the findings of the current study, it can be concluded that:

The implementation of educational program had an effect on improving the nurse's knowledge level induced diarrhea in ICU in addition to improve their practice level. Post program nurse's expressed a wide

variety of expectations regarding to cope with induced diarrhea in ICU and give full performance for patients care which might have implications for patients satisfaction and delivery of the care. The impact of the disease on individuals and the society canbe minimized by early detection and appropriate therapeutic intervention.

Recommendations

- Nurses should be encourage to attend workshop and seminars held about induced diarrhea in ICU to be acquainted with the most common complications, recent advances and skills in the field.
- Acting as a resource, teacher, educationalist, researcher and mentor. Supporting visually impaired people and promoting their wellbeing.
- Ongoing learning protocol must be designed and implemented for nurses at ICU& CCU for the importance of maintaining checkup.

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