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Contents

Subject	Page
1- Occupational Safety Strategies for controlling and Management of Needle Stick Injuries among Nurses at Student University Hospital.	7
2- Effect of Intervention Guidelines on Nurses' Performance Regarding Prevention and Management of Intravenous Extravasation Chemotherapy for Children	28
3- Effect of Using Clinical Pathway on Nursing Care of Neonates with Respiratory Distress Syndrome	50
4- Knowledge and attitude of Mothers and Health Care Professional related to Autistic Children	73
5- Effect of a Clinical Pathway on Outcome of Children with Cancer Suffering from Neutropenia Undergoing Chemotherapy Treatment	101
6- Effect of Computer Based Learning Regarding Airway Suctioning On knowledge and Skill Retention of Pediatric Nursing Students.	128
7- Psychiatric nurse’s empathy, burnout and its relation with professional quality of life	162
8- Effect of Education Program about Psychiatric Outpatient Follow- up visit on Patient’s Awareness and Satisfaction of Outpatient Psychiatric Services	182

Occupational Safety Strategies for controlling and Management of Needle Stick Injuries among Nurses at Student University Hospital.

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Abstract

Occupational exposure to blood born pathogens from needle sticks injuries (NSIs) is serious problem. NSIs are primarily associated with occupational transmission of hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV). This highlights the necessity for application of occupational safety strategies for controlling and management of needles stick injuries **.Aim of the study:** to identify the effect of application of occupational safety strategies for controlling and management of needle stick injuries on nurses. **Study design:** Aquazi experimental study design. **Setting**: this study was carried out in student university hospital affiliated to Tanta University Hospitals. **Sample**: All nurses in direct contact with the patients, having no training course on infection control were involved in this study (280 nurses) they were divided to study and control groups each group contain 140 nurses. **Tools of the study**: Three tools were used. **Tool (1):** Structured questionnaire. It was developed to assess the sociodemographic data and knowledge of nurses regarding NSI. **Tool II:** Observational checklist was developed to assess safe work practices for preventing NSI among nurses. **Tool I1I:** WHO NSIs prevention assessment tool (2005) for health care facilities to assess the hospital supplies. **Result:** The majority of the study and control groups (93.6%, 94.3% respectively) had previous exposure to NSI. There was significant improvement in the total score of knowledge and performance of the study group about occupational safety for controlling and management of NSIs. immediately and 3 months after the program application. There was significant positive correlation between knowledge and performance immediately and three months after strategy application**. Conclusion: -** the strategy was effective in improving nurses' knowledge and practices regarding NSIs prevention. **Recommendations**: each health facility needs to establish occupational health and safety clinic, provide health care facilities with adequate supplies and safety devices to prevent NSI, establish in service training and educational center for hospital staff and development of reporting and analysis system for managing of occupational exposure to NSIs.

Key words :-Management of needle stick injuries, Occupational Safety , Health Administration

Introduction

Needle stick injuries (NSIs) are defined as an accidental skin penetrating stab wound caused by hollow- bore needle. Every day, health care workers are exposed to dangerous and deadly blood borne pathogens through contaminated needle sticks and sharps. It is one of the greatest risks faced by the front line health care workers. Every percutaneous needle stick and sharp injury carries a risk of infection from blood borne pathogen as HBV,HCV, and HIV. Nurses are at most risk for needle stick injuries [1- 3].

In general NSIs are caused by simple and preventable mistakes in handling sharps medical devices. According to the Center for Disease Control and prevention (CDC), the most common causes of NSIs are: lack of personal protective equipment, safety devices, and sharps disposal containers and lack of procedures for sharp injury reporting. Other causes include lack of awareness with occupational hazards, insufficiently trained staff, limited access to sharps disposal containers and shortage of staff, recapping of needles after use, and passing sharp instruments from hand to hand in the operating suite. Furthermore, unpredictable medical incidents and unexpected patient reaction can also cause these injuries [4-6] .

In Egypt, there are about 1 million people employed in the health care field. A study about safe injection practice among health care workers in Gharbiya Governorate, Egypt (2005), assessed safe injection practices among 1100 health care workers in 25 health care facilities reported that 66.2% of health care workers had experienced NSI and only 11.3% had received full course of hepatitis B vaccine[7] .

The true magnitude of risk isn't known because of widespread underreporting of exposures ranging from 29% to 98%. Failure to report most commonly resulted from a belief that the exposure wasn't significant, and being too busy[8].Reducing the risk of needle stick injuries include education and training on safe handling and disposal of sharp devices, awareness campaigns. More recently preventative strategies have focused on needle protective devices which may reduce the rate of injuries. Introducing needle protective devices should be considered particularly in high- risk areas, in service training, education, evaluation and cost-benefit analysis.[9,10].

Occupational safety and health (OSH) is generally defined as the science of the anticipation, recognition, evaluation and control of hazards arising in or from the

workplace that could impair the health and well-being of workers, taking into account the possible impact on the surrounding communities and the general environment[11].

More than 80% of needle stick injuries can be prevented through the use of safer devices and effective safety programs. Therefore the United States Department of Labor Occupational Safety and Health Administration (OSHA) has added needlestick prevention to its agenda in an attempt to reduce the number of injuries that health care workers get from needles[12]. The legislation provides that an exposure control plan where employers develop a written plan to identify and select needleless systems or sharps systems with safety features , sharps injury log where employers would be required to keep containing detailed information about sharps injuries; and training of health care workers on the use of needleless technologies and systems [13]. Employers must review their exposure control plans annually to reflect changes in technology that will help eliminate or reduce exposure to blood borne pathogens.[14]

Aim of the study: to identify the effect of application of occupational safety strategies for controlling and management of needle stick injuries on nurses.

Materials and Method:

Study design: Aquazi experimental study design was used in this study.

Setting and sample: this study was carried out in student university hospital affiliated to Tanta University Hospitals. All nurses in direct contact with the patients, have no training course on infection control were involved in this study (280 nurses), they were divided to study and control groups each group contain 140 nurses.

Tools of the study: Three tools were used in order to obtain the necessary data.

Tool (1): Structured questionnaire.

It was developed by the researcher to assess the sociodemographic data and knowledge of nurses regarding NSI; it was including three parts as follows:

Part (1): It includes items related to sociodemographic data such as: department name, age, level of education, years of experience, and training on occupational safety.

Part (2): personal history about NSI, it included:

Occurrence of NSI and its frequency causes of NSI, nature of needle sticks injury, immediate post exposure management after sustained NSI, reporting of NSI, hospital management of post exposure to NSI.

Part (3) Nurses' knowledge about:

Definition, causes, risk factors and consequences of NSI, primary pathogens can be transmitted by NSI, role of vaccination, reporting, management and post exposure prophylaxis of NSI, factors affecting application of occupational safety strategy for prevention and management of NSI, and nurses' role to prevent NSI. Each correct correct answer was given one point and incorrect answer was given zero.

Tool II: Observational check list:

Observational check list was developed by the researcher to assess safe work practices for preventing NSI among nurses [1, 2,14]. It included: Before a procedure that involves the use of needle or other sharp device, during procedure, and post procedure. Each nurse was observed three times and the average number of correct practice was calculated.

Tool I1I: WHO.NSIs prevention assessment tool (2005) for health care facilities [24].

Health facility assessment tool: This tool aimed to assess work environment. The assessment estimated the frequency of unsafe injection practices. It determined whether a facility where injections are given meets the necessary requirements for equipment, supplies and waste disposal. It included three parts as follows:

Part I: Structured observations of equipment and supplies available at the facility.

Part II: Interview of injection provider, phlebotomy practitioner, and or IV insertion provider.

Part III: Interview of injection supervisor.

Method

1) Obtaining approval

Official permission was obtained from the Dean of Faculty of Nursing, Tanta University to conduct the study, also to the medical director of student hospital Tanta University and ethical committee approval was obtained before conducting the study.

2**) Developing the tools**

- Tools (I, II) of the study were developed by the researcher based on literature review [1, 2, and 24]. The developed tools were submitted to five experts in the field of nursing for testing face and content validity. Face and content validity of the developed tools were calculated and found to be 97%.

3) – The pilot study

A pilot study was carried out on 10 nurses to test the clarity, applicability, relevance and organization of the tools and to determine the time needed to fulfill it. Accordingly modification was done. Those nurses were excluded from the sample.

4) - Ethical consideration:

All participants were notified about time, methods and anticipated benefits of the study, as well as confidentiality of information and the right to terminate participation at any time was respected. Informed consent was obtained from nurses to participate in this study.

5) Conducting the study:

1- Assessment phase

- Each nurse was observed three times by the researcher either in the morning or afternoon shift to assess their performance regarding needles use procedure (using tool II). The average number of observations was considered for each nurse.
- Structured questionnaire sheet was administered individually to each nurse, after completing the observation to assess their knowledge about occupational safety strategy for prevention and management of needle stick injuries. (using tool I).

WHO NSIs prevention assessment tool for health care facility was used to assess the student hospital work environment (using tool III), through observing equipment and supplies availability, then interviews with injection providers and injection supervisors were done.

2-planning phase:- -Developing the occupational safety strategy:-

Occupational safety strategy was developed by the researcher based on the analysis of nurses' knowledge and practices as well as on literature review.

The following steps were adopted to develop the strategy:-

a**) Formulating objectives**.

- Goal of the strategy:

The goal of the strategy was to improve nurses' performance related to occupational safety in order to prevent and manage needle stick injury.

-Specific objectives: by the end of the implemented strategy, nurses will be able to:-

1-Determine importance of the occupational safety strategies.

2-Define NSIs .

3-Enumerates needle stick injury causes, and risk of infection.

4-Identify risk assessment of needle stick injury and primary pathogens that can be transmitted.

5-Discuss HBV vaccination, its importance, and dose.

6-Describe reporting of NSIs, its importance, forms and method of application.

7-Discuss post exposure management measures of needle stick injuries.

8-Performe one hand technique for prevention of needle sticks injuries.

9-Realize the importance of nurses' role to prevent and control needle stick injuries.

b-Development of the strategy content:-

A review of the current available literatures covering the various aspect of the problem was done to assist in the development of the intervention strategy. The contents of the intervention plan were organized in seven consecutive sessions; the duration of each cession was 60 minutes.

Session 1: Program orientation and expectations as well as establishment of relationship with the participants and conducting pre test.

Session 2: An overview of needle sticks injury and its consequences.

Session 3: Risk assessment and blood born pathogens.

Session 4: Vaccination role and facts about HBV vaccination.

Session 5: Reporting of needle stick injury.

Session 6: Management and post exposure prophylaxis NSI.

Session 7: Case study presentation and post test.

c) Selecting teaching strategies and audio visual aids:

Appropriate teaching methods were used as: interactive lectures, group discussions, case studies, demonstration and role play. Power point presentations, videos, handouts and real materials as syringes, gloves, and safety boxes were used as teaching aids. A booklet was designed by the researcher and given to the nurses at the end of the sessions to refresh their knowledge and as future reference

3-Implementation phase

The field work of the study was done from May to September 2015, nurses were divided into 14 groups (10 nurses in each group).Seven teaching sessions were implemented for each study group.

4) – Evaluation phase

Assessment was done as follows:

- First time: Before implementation of the, occupational safety strategies to all subjects (using tool 1 part 3 and Tool II).
- Second time; immediately after the implementation of the occupational safety strategies to the selected number of nurses (study group) using tool part3, tool II).
- Third time; three months after the implementation of the occupational safety strategies to all the study subjects of nurses who was received the nursing intervention (using tool I part3, tool II).

6) Analysis of data

a) Statistical analysis

The collected data was organized, tabulated and statistically analyzed as

using mean, standard Deviation, unpaired student t-test, paired student t-test, linear correlation coefficient, ANOVA and chi-square tests by SPSS v.20 and.5% was used as a level of significance

Result

Table (1) represents the distribution of the studied and control group of nurses according to their sociodemographic characteristics. It shows that the means age of the study and control group were nearly equal (39.7 ± 9.14 years ,and 39.7 ± 8.4 years respectively). Regarding the place of work more than half of the control and study groups (54.3%) were working at in patient departments .The majority of the study and control groups were graduated of secondary nursing school (72.9%, 81.4% respectively).The mean of the years of experience for the study and control group were (19.5 ± 9.17 years and19.9 ± 8.12 years respectively).

Table (2): shows the distribution of nurses according to their history about NSI. The table shows that 93.9% of the study and control groups reported previous exposure of NSI. As for number of previous exposure to NSI , 58.2% of the nurses in the study and control groups reported 1-3 times . The main cause of previous exposure to NSI for both groups was recapping of the needles (89.8%).

The majority of the study and control group reported exposure to NSI during IV procedures (86.3% , 90.2% respectively) . As for incidence of injury, 80.2% of study group reported NSI after needle use compared to 90.9% of the control group. Around three quarters of the study group (74.8%) reported applying pressure on the site of injury as first aid carried out after NSI compared to (90.9%) of the control group.

Table (3): shows the distribution of the nurses according to their responses regarding the reporting system of NSI at the hospital. The table shows that 71.4% and 67.4%of the study and control groups reported absence of well known reporting system at the hospital. As regard to the presence of report nearly half (55.7% and 49.3%) of the study and control group respectively reported there was no report form. The majority (91.6% & 85.6%) of the study and control group respectively did not report NSI. Among those who reported, 63% of the study group reported after few days compared to 84.2% of the control group reported immediately. About 73.68% of the nurses at both groups with history of NSI reported there was no action taken after reporting.

Table (4): shows the distribution of observed occupational safety practices for prevention and management of needle stick

injuries at the study setting (Student hospital)

Regarding availability of safety syringes the table shows that they were never available in all unites it was sometimes at one unit available. Nurses at all units practiced reusing of syringe or needles for sometimes .As regard to vascular access items, safety vascular access were never available in all units as well as the blood drawing devices with integrated safety features, while blood collection vacuum tubes with plastic tubes were sometimes available in all units. Safety devices used in surgery as retracted blades were never available in all units. Safety boxes in areas where injections are given were always available in all units and some- times over flowing, open sharp boxes were available in all units and sometimes used sharps were available around the health departments in all units. While waste disposal facility (incinerator) were always available for all units. Exposure control plan (ECP) was never available in all units.

Table (5) shows the distribution of the studied sample according to their total knowledge score during different phases of the study . It shows improvement of total knowledge score of the study group during different phases of the strategy application as 86.4% of nurses had poor knowledge score before the application of the strategy and improved to good knowledge score (98.6% , 97.9%) immediately and 3 months post strategy application respectively with statistical significant difference ($P < 0.001$) .

Table (6) shows the means and standard deviation of total performance score during different phases of the study. It shows improvement of total performance score of the study group before and 3 months after strategy application (3. 6 ± 1.3 and 15.5 ± 2.9 respectively) with significant P value ($P = < 0.001$) .The control group had the same mean of total performance score (2.7 ± 1.0) with no significant statistical difference.

Table (7) shows the correlation between total knowledge and performance scores of the study group of nurses through the study period. It revealed that there was significant positive correlation between knowledge and performance immediately after and three months after strategy application.

Table (1): Distribution of the studied and control groups according to their socio demographic characteristics of studied and control groups (n= 280)

Items	Study group n= 140		Control group N= 140		Tests	
	N	%	N	%	X^2/t	P-value
Age						
<30	28	20.0	19	13.6	X^2=2.248	0.325
30-40	46	32.9	53	37.9		
>40	66	47.1	68	48.6		
Range	21-56		21-59		T=0.633	0.527
Mean±SD	39.07±9.14		39.7±8.4			
Place of work						
In patient	76	54.3	76	54.3	X^2=0.040	0.998
Cardiothoracic surgery	26	18.6	25	17.9		
O.R	2	1.4	2	1.4		
Out patient clinic	12	8.6	12	8.6		
Dialysis	24	17.1	25	17.9		
Educational level						
Secondary nursing school	102	72.9	114	81.4	X^2=3.957	0.138
Nursing technician	15	10.7	7	5.0		
Bachelor of nursing	23	16.4	19	13.6		
Years of experience						
<5	18	12.9	14	10.0	5.541	0.136
5-<15	15	10.7	8	5.7		
15-<25	60	42.9	78	55.7		
25 and more	47	33.6	40	28.6		
Mean±SD	19.5±9.17		19.9±8.12			
Previous attendance of occupational health and safety program						
Yes	11	7.9	11	7.9	X^2=0.000	1.000
No	129	92.1	129	92.1		

Table (2): Distribution of nurses according to their history about NSI (n= 280).

NSI history Items	Study n=140		Control n=140		Total n=280		Chi-square	
	No	%	No	%	No	%	X^2	P-value
Previous exposure to NSI.								
Yes	131	93.6	132	94.3	263	93.9	0.063	0.802
No	9	6.4	8	5.7	17	6.1		
Number of previous exposure to NSI.								
1-3	79	60.3	74	56.1	153	58.2	3.330	0.189
4-5	9	6.9	4	3.0	13	4.9		
more than 5 times	43	32.8	54	40.9	97	36.9		
Causes of previous exposure to NSI*	N=131		N=132		N=263			
-Recapping of the needle	117	89.3	114	86.4	231	87.8	0.535	0.464
-Binding the needle	6	4.6	11	8.3	17	6.5	1.532	0.216
-Entering the needle into test tube	41	31.3	30	22.7	71	27.0	2.450	0.117
- During waste disposal	26	19.8	37	28.0	63	24.0	2.417	0.120
-Sudden patient movement	10	7.6	25	18.9	35	13.3	7.285	0.007*
Procedures *								
I.M	43	32.8	54	40.9	97	36.9	1.842	0.174
I.V	113	86.3	119	90.2	232	88.2	0.958	0.328
wound suturing	7	5.3	2	1.5	9	3.4	2.916	0.088
central line insertion	7	5.3	7	5.3	14	5.3	0.000	0.988
Subcutaneous injection	9	6.9	11	8.3	20	7.6	0.200	0.654
Incidence of injury *								
During use of needles	23	17.6	24	18.2	47	17.9	0.017	0.895
After needles use	105	80.2	120	90.9	225	85.6	6.154	0.013*
During waste management	42	32.1	33	25.0	75	28.5	1.608	0.205
First aid you carried out after NSI*								
Apply pressure on the site of injury	98	74.8	120	90.9	218	82.9	12.017	<0.001*
Let the blood drain spontaneously	33	25.2	12	9.1	45	17.1		

*More than one answer was allowed

Table (3): Distribution of the nurses according to their responses regarding the reporting system of NSI at the hospital (n= 280).

Items	Study n= 140		Control n= 140		Total		Chi-square	
	No	%	No	%	No	%	X^2	P-value
Presence of well known reporting system at the hospital								
Yes	9	6.4	9	6.4	18	6.4	0.501	0.778
No	100	71.4	95	67.9	195	69.6		
I don't know	31	22.1	36	25.7	67	23.9		
Presence of report form								
Yes	7	5.0	4	2.9	11	3.9	2.550	0.279
No	78	55.7	69	49.3	147	52.5		
I don't know	55	39.3	67	47.9	122	43.6		
Reporting of previous NSI	N= 131		N= 132		n= 263			
Previous reporting of NSI:								
Yes	11	8.4	19	14.4	30	11.4	2.340	0.126
No	120	91.6	113	85.6	233	88.6		
Time of reporting NSI:	N=11		N=19					
Immediately	4	36.4	16	84.2	20	66.7	7.177	0.007*
After few days	7	63.6	3	15.8	10	33.3		
After a month	0	0.0	0	0.0	0	0.0		
After a year	0	0.0	0	0.0	0	0.0		
Action taken by the hospital after reporting	n= 11	n= 11	N= 19	n= 19				
Yes	1	9,9	5	26.3	6	20.0	1.292	0.256
No	10	90.9	14	73.68	24	80.0		

Table (4): Distribution of observed Occupational safety practices and availability of resources for prevention and management of needle stick injuries at the study setting (Student hospital) n=5

Occupational safety practices and availability of resources	availability		
	always	Sometime	Never
Injection			
1- Availability of Safety syringes (as safety-designed pre-filled syringes)	-	1	4
2-Reuse of syringes or needles	-	5	-
3- Availability of swabs used for skin preparation that are dirty, bloodstained or kept wet	5	-	-
Vascular Access:			
4-Hospital implemented safety vascular access catheters that provide a protective shield.	-	-	5
5- Presence of blood-drawing devices with integrated safety features designed to prevent percutaneous injury.	-	-	5
6- Hospital replaced glass blood collection vacuum tubes with plastic tubes.	-	-	5
Surgery			
7- Availability of safety devices (as-blunt-tip suture needles, scalpel blades with safety features, round-tipped scalpel blades and retracting-blade and shielded-blade).	-	-	5
Disposal of sharp medical wastes			
8-Presence of safety boxes in areas where injections are given.	5	-	-
9- Presence of overflowing, pierced, or open sharp box(es)	-	5	-
10-Sharps in plastic bottles, or open containers exposing staff to needle-stick injury	-	-	5
11-Evidence of used sharps around the health centre and/or the disposal site	-	5	-
12-Availability of waste disposal facility (Incinerator) used for the disposal of the majority of sharps	-	-	5
EXPOSURE CONTROL PLAN (ECP)			
13-Hospital has a written exposure control plan.	-	-	5
14-ECP includes a list of all jobs and tasks with potential for exposure to blood or bodily fluids.	-	-	5
15-ECP is accessible to workers.	-	-	5
16- ECP is reviewed and updated at least annually	-	-	5

Table (5): Distribution of the studied sample according to their total knowledge score during different phases of the study. (n=280)

		Knowledge							
		Before		After		After 3 mon.		Chi-square	
		No	%	No	%	No	%	X^2	P-value
Study (n=140)	Poor	121	86.4	1	0.7	0	0.0	379.790	<0.001*
	Fair	14	10.0	1	0.7	3	2.1		
	Good	5	3.6	138	98.6	137	97.9		
Control (n=140)	Poor	129	92.1			139	99.3	8.706	0.003*
	Fair	11	7.9			1	0.7		
	Good	0	0.0			0	0.0		

*significant at P<0.05

Table (6): Means and standard deviation of total performance score during different phases of the study. (n=280)

Total Practice	Study			Control			T-test	
	Mean	±	SD	Mean	±	SD	T	P-value
Before	3.6	±	1.3	2.7	±	0.8	7.806	<0.001*
After 3 mon.	15.5	±	2.9	2.7	±	1.0	49.583	<0.001*

*significant at P<0.05

Table (7) Correlation between total knowledge and performance scores of study group through the study period (n= 140)

Linear correlation coefficient		Knowledge	
		r	P-value
Practice	Before	0.011	0.855
	Immediately after	0.447	0.032*
	After 3 mon.	0.897	<0.001*

*significant at P<0.05

Discussion

Needle stick and sharp injuries (NSIs) are accidental skin penetration wound caused by sharp instruments (needles) in medical setting which can lead to transmission of pathogens causing infection and resulting in hazardous consequences for the health care workers .Hepatitis B, Hepatitis C , and human immunodeficiency virus (HIV) are of utmost concern because they can cause significant morbidity or death .It is estimated that half of injections infused in developing countries are unsafe for both patient and health care provider[(1)] .

The findings of this study revealed that, the majority of the studied nurses had history of NSI and there was noticeable shortage of the necessary safety requirement for prevention and management of NSIs. The strategy application was effective and improved the nurses' knowledge and practice in management and control of needle stick injuries at student hospital through significant improvements in the total knowledge and performance scores of the study subjects, immediately after strategy implementation and 3 months after.

Regarding sociodemographic characteristics of the studied sample. The findings of the present study revealed that around half of the nurses aged more than forty years in the study and control groups, around three quarters of them graduated from secondary nursing school and nearly half of the study sample had from 15<25 years of experience. This may explain the high rate of NSIs because of long duration of work and lack of recent knowledge and skills of professional practice. This is in contrast with the finding of Hussein Y.(2015),in a study conducted in maternal and child health centers in El-Minia governorate who reported that 53% of nurses' age was ranging from 30-40 years and more than half of them their years of experience ranged from 10-20 years , and all nurses had secondary school degree[(15).]

As regard to nurses' history about NSIs this study revealed that the majority of both the study and control group had previous exposure to NSI, and more than half of them had 1-3 times NSI in the previous year (table 2). This result comes in agreement with the finding of Mitra S.(2010),in a study conducted in India about injection safety : perception and practice of nursing student in tertiary care hospitals, who reported that the majority of the study sample had accidental needle stick injuries[(16)]. These results are also in agreement with Gholami A. et al, (2013), who conducted a study in Iran about risk factors of NSIs and sharps injuries among health care workers and found that 54.8% of health care worker reported having

sustained one injury and 45.2%reported more than one injury [17]. These results indicate high prevalence of NSIs and the lack of implementation of effective occupational safety strategies.

As regards to causes of NSIs, the present study revealed that the majority of the study and control groups had NSIs because recapping of the needle during IV procedure and after use of needles (table 2) .This result come in agreement with Arafa A . et.al (2012), in a study conducted in governmental hospital in Cairo about injection practices among health care workers and risk factors for hepatitis B virus, who found that the highest percentage of injuries occur during recapping of the needles[18] .These results highlight the lack of knowledge of nurses at the present study and their poor practices regarding the safe handling of needles and the need for in-service training and education.

As regard the first action carried out after NSI at the present study, the majority of nurses at study and control groups reported applied pressure on the site of injury which indicate the lack of knowledge and performance about post exposure management. This result come in agreement with Azab A. (2005), in a study conducted in Ankara about occupational exposure to blood and body fluids among health care workers who found that (67%) of the studied sample didn't seek any medical advice after injury.[19]

The finding of this study illustrated a high rate of under – reporting , absence of reporting system at the hospital and weakness of post exposure procedure (prophylaxis) among both groups of the study (table 3). This may be explained by the staff and hospitals' administrations were lacking the knowledge and awareness of the seriousness of NSIs. Under reporting may lead to inaccurate information regarding the overall risk of exposure to pathogens. Full documentation of exposure injuries would guide improvement in the prevention strategies. Post exposure prophylaxis has been shown to be effective after these injuries so that system should be introduced to ensure that all health care workers especially nurses know about where to seek medical treatment after occurrence of NSIs. The implementation of occupational safety strategy for prevention and management of NSIs may be due to the hospital administration wrong perception about the high cost of application of such measures. It should be enforced that actually the cost of application of NSI prevention strategies is much less than the cost of treating and managing complications of NSIs.

This current result comes in agreement with Lin et al. (2014),in a study carried out in China about the epidemiology of NSI , who found that more than half of the studied sample was gone to underreporting and poor post exposure treatment. [20] Another study of Makary M. (2007) , studied needle stick injuries among surgeons in training estimated that underreporting was about 50%of the study sample[21] .

Regarding the observed safety injection practices at the observed units, the present study revealed that among all the observed units sometimes syringes and needles were reused (table 4). This is in agreement with Loges S. et al.(2004), in a study conducted in Magnolia about rapid assessment of injection practices, who reported that needles were left in the septum of the multidose medication vials to be reused in the subsequent reconstitutions [22]

The present study revealed that always presence of safety boxes at the study departments all times (table 4). This is related to the effort of infection control committee which was established and actively working since a period of time. Meanwhile, there was no exposure control plan (ECP) in all departments .This highlight the need for the occupational and safety department to work actively to establish ECP. The urgent presence of ECP and training of staff on it is very important as it considered the main way to the control and proper management of NSIs through providing HCWs with measures that must be taken after exposure to NSIs according to the risk of infection and the patient status.

Regarding the disposal of sharp medical wastes the present study illustrated that most waste management activities still need improvement in most of the departments of the study, also availability of swabs used in skin preparation that are blood stained were always present at these units (table 4). This comes in agreement with Ismail N.A (2007), in a study conducted in Gharbiya governorate, Egypt, about safe injection practice among health care workers, who reported that most waste management activities were unsafe in most of the health care facilities as sharps were found lying down and not disposed in the proper container and also waste incineration was reported in a small proportion of health care facilities at that study [23] . This result may be because of the recent application of infection control program in the study setting and the need for follow up of waste disposal by the authorized organization in the government and community.

Concerning the total knowledge score of the studied sample during different phases

of the study the present study revealed that there was significant improvement of the mean knowledge score of the study group immediately after and after 3 months of strategy implementation (table 5), while among the control group there was no improvement in their mean total knowledge score. This could be explained by that nurses need training and direct supervision and follow up of their work to improve its quality. This finding is supported by Saleh D.(2009),in a study conducted in Cairo and Giza governorates, about improvement of knowledge, attitudes and practices of health care workers towards the transmission of blood borne pathogens: an intervention study, who reported that there was significant improvement of the participants' total knowledge score 3 months after the implementation of the educational program and application of the health education intervention which was successful in raising the knowledge of the nurses regarding transmission and prevention of blood born pathogens, improving the risk perception about NSIs [(24)].

Regarding the total performance score, the present study showed that there was significant improvement in the performance of the study group immediately after strategy implementation and 3 months after (Table 6). This finding is supported by Javadi A. et al (2007), in a study conducted in Asfahan province about evaluation of needle stick injuries among health care workers, who reported that implementing a suitable education program regarding NSI improves the participants' performance. [(25)] .This finding is also in agreement with Mobasherizadeh S. et. al., (2005), in a study conducted in Iran, about intervention study of needle stick injuries, who reported that educational health program improved the performance of the participants to avoid NSIs with the use of safety devices [(26)].

The present study revealed that there was significant positive correlation between knowledge and performance of the study group immediately and three months after strategy application (table7).This finding highlights the need of knowledge as a pre-requisit for practice improvement. This finding is supported by Saleh D. (2009), who reported an increase in the mean cumulative knowledge, attitude and practice score post intervention program application[(24)].The reported positive correlation are explainable by the theory of reasoned action. A person's intention to a specific behavior is function of their attitude toward that behavior[(27)]. Furthermore, the attitude toward the behavior is determined by the person's belief that given outcome will occur if the

person will perform the behavior. It is concluded that adequate knowledge can lead to appositive attitude, resulting in good practices [37-39] .

Finally, the present study highlights that NSIs still constitute a major challenge for hospital staff occupational safety. Hospitals need to take serious actions towards adopting effective strategies for prevention and management of this problem .A multi-disciplinary team implementing strategy for education, training, immunization, proper engineering control measures is highly needed. Nurses by their positions in hospitals are prepared to take an important role in this team.

Conclusion, Based on the findings of the present study, it can be concluded that the strategy application was effective and improved the studied nurses' knowledge and practice toward management and control of needle stick injuries in health care setting. There was a significant improvement in the knowledge and performance scores of the studied subjects about occupational safety strategies for controlling and management at three months after intervention.

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

1- Health care facilities should establish multidisciplinary injury-prevention teams with representatives of most departments as administration, pharmacies, nursing unit management, staff safety, quality management and infection control team.
2- Health care facilities should have written exposure control plan, it should be reviewed and updated routinely.
3- All employees at risk for occupational exposure to NSI should receive interactive training about occupational strategy strategies.
4- Establish in service training and education center in the health care facilities for appropriate training in order to increase awareness of health care workers with regard to this preventable occupational health hazard.
5- Health care settings must provide visible support and sufficient resources and necessary equipment's and safety devices to control and prevent NSI among health care workers.
6- Apply obligatory immunization program against hepatitis B. for all health care workers in health care facilities.
7- Application of strict regulations and supervisions and even application of specific reward and punishment a

schemes to encourage and / or enforce health care workers to follow up the occupational safety strategies.

8- Yearly screening of health care workers should be done in order to detect infection early and take early preventive and therapeutic measures well in time.

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Effect of Intervention Guidelines on Nurses' Performance Regarding Prevention and Management of Intravenous Extravasation Chemotherapy for Children

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Background: Extravasation of chemotherapy is accidental leakage of chemotherapy drugs into the subcutaneous tissue tissues surrounding the administration site. **Aim of the study** was to evaluate the effect of intervention guidelines for prevention and management of intravenous extravasation chemotherapy on nurses' performance. Quasi- experimental research design was used. It was carried out at Pediatric Hematology and Oncology Unit of Tanta University Hospital. A convenient sample of 20 nurses working in Pediatric Hematology and Oncology Unit and responsible for providing direct care for 50 children receiving chemotherapy. **Materials and Method:** Four tools were used to collect data: An assessment tool of nurses' knowledge about chemotherapy, chemotherapy administration observational checklist, extravasation scale and developed intervention guidelines. **The results** revealed that the total scores of knowledge for more than half of nurses were poor before the guidelines application while immediately and after one month from the guidelines application the total scores of nurses' knowledge improved and all of nurses and the majority of them obtained good scores respectively. The total score of practice for three quarter of nurses' performances were poor before the guidelines application while immediately and after one month from the guidelines application the nurses' performances improved and three quarter of nurses and more than half of them obtained good scores respectively. **Conclusion**: it can be concluded that there was a significant improvement in nursing staff knowledge and performance in relation to prevention and management of chemotherapy extravasation. **Recommendation:** In-service training program should be conducted periodically for teaching to the nurses the basic clinical skills.

Key words: Intervention Guidelines, Nurses' Performance, Intravenous Extravasation, Chemotherapy

Introduction:

A cancer is unexpected and difficult disease when is diagnosed in a child or adolescent. The cancers of children make up less than 1% of all cancers diagnosed each year. According to American Cancer Society about 10,380 children in the United States under the age of 15 will be diagnosed with cancer in 2016. While advances in treatment have increased the survival rate for many childhood cancers[1, 2].

Childhood cancer in Egypt is a growing concern for the society since its incidence has been increasing rapidly ,the high mortality rate from it in developing countries may be due to the inadequate access to medical care as there are very few hospitals or centers existing in these countries. Lack of education and knowledge of health concerns particularly relating to children have delayed many families from seeking medical help and treatment. In addition, lack of transportation for the children or obstacles concerning transportation from rural to urban places makes the available health care inaccessible [2].

Cancer begins when cells in a part of the body start to grow out of control. There are many kinds of cancer, but they all start because of out-of-control growth of abnormal cells. Cancer cell growth is different from normal cell growth. Instead of dying, cancer cells continue to grow and form new, abnormal cells. They can also invade or grow into other tissues, something that normal cells can't do [3].

The types of cancers that develop in children and adolescents differ from those that develop in adults. The predominant types of pediatric cancers are leukemia (26%), cancers of the brain and central nervous system (CNS) (18%), and lymphoma (14%) [4 5]. Treatments of cancer in children are include surgery, chemotherapy, radiation therapy, immunotherapy, and bone marrow transplantation or stem cell transplantation. Treatment's plan depends on the type of cancer. The majority of childhood cancer treatments consist of combination of two or more of these treatments to destroy cancer cells completely [6, 7].

Chemotherapy is a type of cancer treatment that uses drugs to destroy cancer cells. Among the most common complications associated with intravenous chemotherapy drugs administration are extravasation and infiltration. Extravasation is defined as the accidental leakage of a vesicant drug or fluid from a vein into the surrounding tissue during intravenous administration. A vesicant is defined as a drug or solution which has the potential to cause blistering, severe tissue damage and even necrosis if extra vasated.

Infiltration is the inadvertent administration of a non vesicant solution into surrounding tissues. While this may cause inflammation and discomfort, damage and necrosis rarely occurs [8, 9].

Children with cancer are at risk for extravasation because these patients often require multiple intravenous (IV) infusions, have malnourishment, need frequent administration of drugs via the IV route as well as other treatment related side effects (i.e. chemotherapy, radiation therapy) which may cause their veins to be thin, fragile and reduce the number of safe intravenous sites [10,11].

The incidence of extravasation or infiltration is scant due to the absence of a centralized reporting mechanism of chemotherapy extravasation events. It has been reported to occur in 0.1% - 7% of cases. In infants and children, the incidence of extravasation injury is estimated to be as high as 11% [12]. Younger children are more at risk of extravasation than adults as they have small, deep veins, and diminished ability to verbally communicate their pain[13].

Signs and symptoms of possible extravasation include:pain, stinging, burning ,Induration, erythema, swelling at the injection site, increased resistance to administration, andchanges in infusion rate [14,15].Extravasation injury is very dangerous. It increases morbidity and may be more disabling in long term and causes delayed treatment of the primary disease. Unfortunately, these patients are poor in terms of their general conditions and are suffering from primary diseases, so prevention of extravasation is the best thing to do [16].

Most extravasations can be prevented through the implementation of these guidelines. Chemotherapy should be given only by trained nurses and the patient should be observed frequently throughout the infusion. Patients should be informed to notify the nurse immediately if burning, pain or other unusual sensations are experienced at the infusion site. Prior to infusion, aspiration of blood is mandatory as well as flushing with saline which should be repeated at the end of the infusion. Small and fragile veins adjacent to tendons, nerves and arteries, or limbs affected by lymphoedema should be avoided [17, 18].

Nurses have a key role to play in identification and management of intravenous chemotherapy extravasation and of course in preventing it. From maintaining a high standard of care in the delivery of intravenous drugs to managing the treatment strategy for extravasation, they have many important duties in this area [19].

Aim of the study: was to evaluate the effect of intervention guidelines for prevention and management of intravenous extravasation chemotherapy on nurses' performance.

Research hypothesis:

The present study was hypothesized that nurses showed an improvement on their performance regarding to prevention and management of intravenous extravasation chemotherapy for children after intervention guidelines application.

Materials and Method

Materials

Research design

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

Setting: The study was conducted at Pediatric Hematology and Oncology Unit at Tanta University Hospital

Subjects: Convenient sample of all nurses working in above previously mention setting regardless of their age, years of experience and level of education with the total numbers twenty nurses. The studied nurses were working with 50 children having the following criteria:

Age ranged from 3-15 years, both sexes, diagnosed with leukemia(ALL and AML) and lymphoma(NHL and HL), receiving chemotherapy.

Tools of data collection:

Four tools were used for data collection that involves

Toole I: Nurses' knowledge regarding to chemotherapeutic agents administration

A structure Questionnaire Sheet: It was developed by the researcher after reviewing the related literature to assess nurses' knowledge regarding to chemotherapeutic agents administration. It comprised of two parts:

Part (1):a- it was covered biosocial characteristics of the studied nurses which include: Age, educational level, years of experience inside oncology Department, marital status, and attendance of related training courses.

b- Data related to child such as: age, sex, birth order and diagnosis.

Part(2): a- it was covered the nurses' knowledge about chemotherapy administration, it included; definition, classification, action, preparation, precautions during administration, potential complications, documentation and nurses' role.

b- It was covered the studied nurses' knowledge about chemotherapy extravasation as a complication of chemotherapeutic agents administration. It included: definition of chemotherapy extravasation, causes, clinical presentation and nurses' role in its prevention and management.

The questionnaire sheet contained 11 questions about chemotherapy. The nurses were asked to respond to these questions

with only one correct response for each question before , immediately and after one month from the guidelines application . Three level of scoring for questions were be used: the correct and complete answer was scored (2), the correct and incomplete answer was scored (1), the incorrect answer and not known was scored (0).The total score was 22 which result from multiplying total number of questions , and then the result is divided by 100 to be converted into percentage. It was filled in the clinical area by the studied nurses in presence of researcher.

The total score of nurses' knowledge was calculated and classified as follow:

- ↓65% was considered poor
- 65- ↓75% was considered fair
- 75-100 % was considered good.

Tool II: Chemotherapy Administration Observation Checklist:

It was developed by researcher to assess nurses' practices before, during and after administration of chemotherapeutic agents.

Scoring system for each item of practice were be used:

- Adequately done was scored (2)
- Inadequately done was scored (1)
- Not done was scored (0)

The observational checklist was consisted of 20 items and the total score for all items in observational checklist was 40. It was filled out by the researcher.

The total score of nurses' practice was calculated and classified as follow:

- ↓65% was considered poor
- 65 -↓75% was considered fair
- 75-100 % was considered good.

Tool III: Infiltration and Extravasation Scale:

It was adopted from British Columbia Cancer Agency. It was filled by the studied nurses to assess signs of infiltration or extravasation at intravenous site during chemotherapy administration. The scale parameters namely: skin color, integrity, temperature, edema, mobility, pain and fever. the scale parameters were assessed by using afivelikert scale ranged from normal(zero) to worse (4 point) except for pain scale ranged from zero as no pain , and 10 for worst pain.

Tool IV: Developed Intervention Guidelines:

It was developed by the researcher after reviewing the related literature**.** It was covered the following information: definition, classification, action and preparation of chemotherapeutic agents; definition and risk factors of extravasation; its clinical signs and symptoms; specific measures followed by the nurse to prevent the risk of chemotherapy extravasation; contents of extravasation kit and general procedures for management of extravasation cases.

Method:

1- Official permission for data collection was obtained from the administrators responsible for Pediatric Hematology and Oncology Unit at Tanta University Hospital after explanation of the study aim.

2- Nurses' consent to participate in this study was obtained after explaining the aim of the study.

3- Ethical considerations: Nurses were informed about the confidentiality of the information obtained from them and nature of the study. Children were reassured that the obtained information was used only for purpose of the study, confidentiality and privacy was maintained.

4- Content validity: Tools of the study were tested for content validity by experts in the field of pediatrics. Modifications were carried out accordingly.

5- A pilot study: A pilot study was carried out on a sample of 5 nurses to test the clarity and applicability of the study tools then the necessary modification was done. This pilot was excluded from the study.

6- Tools development: Four tools were developed based on recent literature.

7- Phases of the study: The study was conducted on three phases:

Assessment Phase: It was carried out by the researcher for all study subjects to collect baseline data, to assess the child who meet the inclusive and exclusive criteria of this study and to assess nurses' knowledge about chemotherapy(Tool I).The researcher was available 2 days per week in the previously mention setting to assess the actual nurses' performance before and immediately and after one month from application of intervention guidelines (Tool II). As all the studied nurses were observed during administration of chemotherapy in all period of morning shift.

The implementation Phase was included the following steps:

- Setting objectives

-Preparation of the content which was covered the reasons behind the application of the session.

-The studied nurses were divided into five groups and each group was consisted of four nurses.

-The intervention guidelines were carried out for each group separately through conduction of successive sessions according to the actual need assessment of the studied nurses.

-The intervention guidelines were conducted in 6 sessions, two / week. The time of each session was about 30 minutes including periods of discussion

according to the nurses' progress and feedback.

-Different methods and media of teaching were used including lectures, group discussion and demonstration.

- The data was collected over a period of one year from April 2015 to March 2016.

-Each group attended the following sessions:

The First Session:-

It was covering the following topics: definition, classification, action and preparation of chemotherapeutic agents. By the end of first session nurses were able to define chemotherapy, mention classification and action, they were also able to mention and list all topic discuss in this session.

The Second Session:-

It began with a review of the concepts previously presented and progress to the next level which was focused on precautions during administration and nurses' role in administration of chemotherapeutic agents. Discussion and demonstration were used to explain the role to nurses.

The Third Session:-

It was concentrated on potential complications and documentation chemotherapeutic agents. At the end of the session mothers question were answered

The Fourth Session: It began with reviewing the points previously instructed and demonstrating about chemotherapy and was focused on definition, risk factors and clinical signs and symptoms of extravasation.

The Fifth Session: It was focused on demonstrating specific measures followed by the nurse to prevent the risk of chemotherapy extravasation and the contents of extravasation kit. The content presented to nurses through discussion of related concepts and demonstration of how to apply prevention of extravasation was done through simulation on the child.

The Sixth Session: It was concentrated on demonstrating general procedures for management of extravasation cases and documentation of chemotherapy extravasation. The content presented to nurses through discussion of related concepts and demonstration of management of extravasation was done through simulation on the child.

Evaluation Phase:

Evaluation had been done before, immediately and after one month from the implementation of the guidelines.

Statistical Analysis:

The collected data was organized, tabulated, and statistically analyzed using spss software statistical computer package version 20. For quantitative variables range, mean and standard deviations were

calculated. For qualitative variables, the number and percentage distribution were calculated. Chi-square test was used to examine the relation between qualitative variables. Fisher exact test (p) was used to compare observations before, immediately and after one month from the guidelines application. Significance was adopted at p< *0.05* for interpretation of results of tests of significance.

Results:

Table (1) shows the biosocial characteristics of the studied nurses. It was observed that half of the studied nurses (50%) their age were ranged from 30 to less than 35 years with mean ± SD (32.5±3.4**)**. Regarding their education, the table reveals that 65% of nurses are graduated from secondary nursing school while 20 % of them have completed their university nursing education and the rest of them have a technical nursing institute certification. Regarding their years of experience inside hematology and oncology unit it was observed that 35% of the studied nurses their years of experience were ranged from 5 years to less than 10 years with mean ± SD (12.44±3.52).In relation to their marital statusit was observed that most of them (90%) were married and 10% were single. Unfortunately, the same table indicates that all nurses (100%) didn't attend any conferences or training courses related to chemotherapy.

Table (2) illustrates Percentage distribution of the studied nurses' knowledge regarding chemotherapy before, immediately and after one month from the guidelines application. There were statistically significant differences in the studied nurses' knowledge regarding definition, action ,classification, side effects, precautions and documentation of chemotherapy in the child's sheet (P=0.001, P=0.001,P =0.001,P=0.017, P=0.001 and P =0.001) respectively before and immediately after the guidelines application. As regards the studied nurses' knowledge before and one month after the guidelines application it was found that there were statistically significant differences related to definition ,classification, precautions and documentation of chemotherapy in the child's sheet (P=0.001, P=0.001, P=0.011 and P =0.001) respectively.

On other hand there were no statistically significant differences related to the nurses' knowledge regarding action and side effects of chemotherapy (P=0.057 and 0.077) respectively before and one month after the guidelines application. In relation to the studied nurses' knowledge immediately and one month after the guidelines application it was observed that

there were statistically significant regarding definition, action ,classification, precautions and documentation of chemotherapy in the child's sheet (P=0.004, P=0.008, P=0.035, P=0.017, and P=0.004) respectively. While there was no statistically significant difference in the nurses' knowledge regarding side effects of chemotherapy (P=0.311) immediately and one month after the guidelines application. guidelines application it was observed that there were statistically significant regarding definition, action ,classification, precautions and documentation of chemotherapy in the child's sheet (P=0.004, P=0.008, P=0.035, P=0.017, and P=0.004) respectively. While there was no statistically significant difference in the nurses' knowledge regarding side effects of chemotherapy (P=0.311) immediately and one month after the guidelines application.

Table (3) represents Percentage distribution of nurses' knowledge regarding chemotherapy extravasation before, immediately and after one month from the guidelines application. It was found that there were statistically significant differences in the studied nurses' knowledge regarding definition, causes, prevention and management of chemotherapy extravasation (P=0.001) before and immediately after the guidelines application while there was no statistically significant difference in the studied nurses' knowledge regarding signs and symptoms of chemotherapy extravasation (P = 0.072) before and immediately after the guidelines application.

As regards the studied nurses' knowledge before and one month after the guidelines application it was noticed that there were statistically significant differences regarding definition , causes, prevention and management of chemotherapy extravasation (P=0.001, P = 0.002, P = 0.010 and P=0.001) respectively. Regarding the studied nurses' knowledge immediately and one month after the guidelines application it was observed that there were statistically significant differences regarding definition , prevention and management of chemotherapy extravasation (P = 0.008, P = 0.035 and P = 0.017) respectively. On the contrary there was no statistically significant differencein the studied nurses' knowledge regarding causes, signs and symptoms of chemotherapy extravasation (P = 0.072 and P = 0.147) immediately and one month after the guidelines application respectively.

Table (4) represents Percentage distribution of the studied childrenregarding chemotherapy extravasation before, immediately and after

one month from the guidelines application. There were statistically significant differences in the studied children's extravasation scale related to color , integrity , temperature of their skin, edema, mobility, pain and fever (P = 0.002, P=0.001, P=0.001 , P=0.001, P = 0.012, P=0.001 and P = 0.006)respectively before and immediately after the guidelines application.

As regards the studied children's extravasation scale before and one month after the guidelines application it was observed that there were statistically significant differences related to color , integrity , temperature of their skin, edema, mobility, pain and fever (P = 0.009, P = 0.007, P=0.001, P = 0.004, P = 0.032, P = 0.003 and P = 0.021)respectively. On the other hand it was found that there were statistically significant differences related to color , integrity , temperature of their skin, edema, mobility, pain and fever (P = 0.860, P =0.860, P =0.878, P =0.872, P =0.872, P =0.959 and P =0.629) respectively immediately and one month after the guidelines application.

Figure (1)represents the total scores of the studied nurses' knowledge regarding chemotherapy and its extravasation before, immediately and after one month from the guidelines application. It was observed that the total scores for more than half of nurses (55٪) were poor before the guidelines application while immediately and after one month from the guidelines application the total scores of nurses' knowledge improved and all of nurses (100 (٪and the majority(90٪) of them obtained good scores respectively .

Figure (2:)shows the total scores of the studied nurses' practice regarding chemotherapy administration before, immediately and after one month from the guidelines application. It was observed that three quarter of nurses' performances were poor before the guidelines application while immediately and after one month from the guidelines application the nurses' performances improved and three quarter of nurses (75٪)and more than half of them (55٪) obtained good scores respectively.

Table (1): Percentage distribution of the studied nurses regarding biosocial characteristics

Biosocial Characteristics of the Studied Nurses	(n=20)	
	No	**%**
Age in Years		
20->25	0	0.0
25->30	8	40.0
30->35	10	50.0
35->40	2	10.0
Mean ± SD	32.5±3.4	
Educational Level		
Secondary Nursing School	13	65.0
Technical Institute of Nursing	3	15.0
Baccalaureate Degree	4	20.0
Years of Experience in Hematology and Oncology Unit		
5- >10	7	35.0
10- >15	5	25.0
15- >20	3	15.0
20-	5	25.0
Mean ± SD	12,44 ±3.52	
Marital Status		
Single	2	10.0
Married	18	90.0
Attendance of any conferences or training courses related to chemotherapy.		
Yes	0	0.0
No	20	100.0

Table (2): Percentage distribution of the studied nurses' knowledge regarding chemotherapy

Nurses' Knowledge	Before Guidelines (n=20)				Immediately after Guidelines (n=20)		One Month after Guidelines(n=20)				X^2 P-value	X^2 P-value	X^2 P-value
	Incomplete answer		Complete answer		Complete answer		Incomplete answer		Complete answer				
	No	%	No	%	No	%	No	%	No	%			
Definition of Chemotherapy	18	90.0	2	10.0	20	100.0	7	35.0	13	65.0	*32.727 (0.001)#	**14.867 (0.001)#	***8.485 (0.004)#
Action of Chemotherapy	12	60.0	8	40.0	20	100.0	6	30.0	14	70.0	#17.143 (0.001)#	**3.636 (0.057)	***7.059 (0.008)#
Classification of Chemotherapy	15	75.0	5	25.0	20	100.0	4	20.0	16	80.0	*24.000 (0.001)#	**12.130 (0.001)#	***4.444 (0.035)#
Side Effects of Chemotherapy	5	25.0	15	75.0	20	100.0	1	5.0	19	95.0	*5.714 (0.017)#	**3.137 (0.077)	***1.026 (0.311)
Precautions during Chemotherapy Administration	13	65.0	7	35.0	20	100.0	5	25.0	15	75.0	*19.259 (0.001)#	**6.465 (0.011)#	***5.714 (0.017)#
Documentation of Chemotherapy in the child's Sheet	19	95.0	1	5.0	20	100.0	7	35.0	13	65.0	*36.190 (0.001)#	**15.824 (0.001)#	***8.485 (0.004)#

Significance at level P < 0.05

*Before and immediately after the guidelines application

**Before and one month after the guidelines application

***immediately and one month after the guidelines application

Table (3): Percentage distribution of the studied nurses' knowledge regarding chemotherapy extravasation

Nurses' Knowledge	Before Guidelines(n=20)				Immediately after Guidelines(n=20)		One Month after Guidelines(n=20)				X^2 P-value	X^2 P-value X^2	X^2 P-value
	Incomplete answer		Complete answer		Complete answer		Incomplete answer		Complete answer				
	No	%	No	%	No	%	No	%	No	%			
Definition of Chemotherapy Extravasation	16	80.0	4	20.0	20	100.0	6	30.0	14	70.0	*26.667 (0.001)#	**10.101 (0.001)#	***7.059 (0.008)#
Causes of Chemotherapy Extravasation	14	70.0	6	30.0	20	100.0	3	15.0	17	85.0	*21.538 (0.001)#	**12.511 (0.002)#	***3.243 (0.072)
Signs and Symptoms of Chemotherapy Extravasation	3	15.0	17	85.0	20	100.0	2	10.0	18	90.0	*3.243 (0.072)	**0.229 (0.633)	***2.105 (0.147)
Prevention of Chemotherapy Extravasation	12	60.0	8	40.0	20	100.0	4	20.0	16	80.0	*17.143 (0.001)#	**6.667 (0.010)#	***4.444 (0.035)#
Management of Chemotherapy Extravasation	18	90.0	2	10.0	20	100.0	5	25.0	15	75.0	*32.727 (0.001)#	**17.289 (0.001)#	***5.714 (0.017)#

Table (4):Percentage distribution of the studied children regarding extravasation of chemotherapy

Extravasation of chemotherapy	Before Guidelines (n=50)		Immediately After Guidelines (n=50)		One Month After Guidelines (n=50)		X^2 P- value	X^2 P-value	X^2 P-value
	No	%	No	%	No	%			
Skin Color									
Normal	23	46.0	40	80.0	38	76.0	*12.447 (0.002)#	**9.461 (0.009)#	***0.301 (0.860)
Pink	7	14.0	3	6.0	3	6.0			
Red	20	40.0	7	14.0	9	18.0			
Skin Integrity									
Unbroken	23	46.0	40	80.0	38	76.0	*13.263 (0.001)#	**9.956 (0.007)#	***0.301 (0.860)
Blistered	23	46.0	7	14.0	9	18.0			
Superficial Skin Loss	4	8.0	3	6.0	3	6.0			
Skin Temperature									
Normal	20	40.0	40	80.0	38	76.0	*16.695 (0.001)#	**13.300 (0.001)#	***0.261 (0.878)
Warm	20	40.0	7	14.0	8	16.0			
Hot	10	20.0	3	6.0	4	8.0			
Edema									
Absent	23	46.0	40	80.0	38	76.0	*13.161 (0.001)#	**10.837 (0.004)#	***0.274 (0.872)
Non Pitting	17	34.0	8	16.0	10	20.0			
Pitting	10	20.0	2	4.0	2	4.0			

Cont. Table (4):

Mobility									
Full	25	50.0	40	80.0	38	76.0	*10.987 (0.012) #	**8.783 (0.032)#	***0.274 (0.872)
Slightly Limited	17	34.0	8	16.0	10	20.0			
Very Limited	5	10.0	2	4.0	2	4.0			
Immobile	3	6.0	0	0.0	0	0.0			
Pain									
No Pain	20	40.0	40	80.0	38	76.0	*17.738 (0.001)*	**14.121 (0.003)#	***0.305 (0.959)
Mild Pain	5	10.0	3	6.0	3	6.0			
Moderate Pain	15	30.0	3	6.0	4	8.0			
Worst Pain	10	20.0	4	8.0	5	10.0			
Fever									
Normal	27	54.0	40	80.0	38	76.0	*7.644 (0.006)#	**5.319 (0.021)#	***0.233 (0.629)
Elevated	23	46.0	10	20.0	12	24.0			

#Significance at level P < 0.05

***Before and immediately after the guidelines application**

****Before and one month after the guidelines application**

*****immediately and one month after the guidelines application**

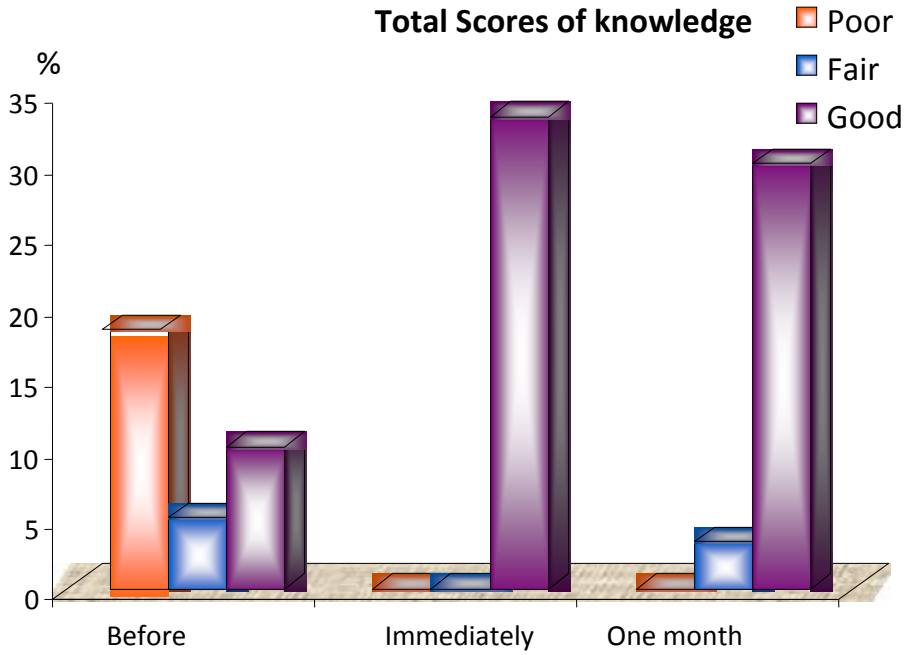

Figure (1): The total scores of the studied nurses' knowledge before, immediately and after one month from the guidelines application

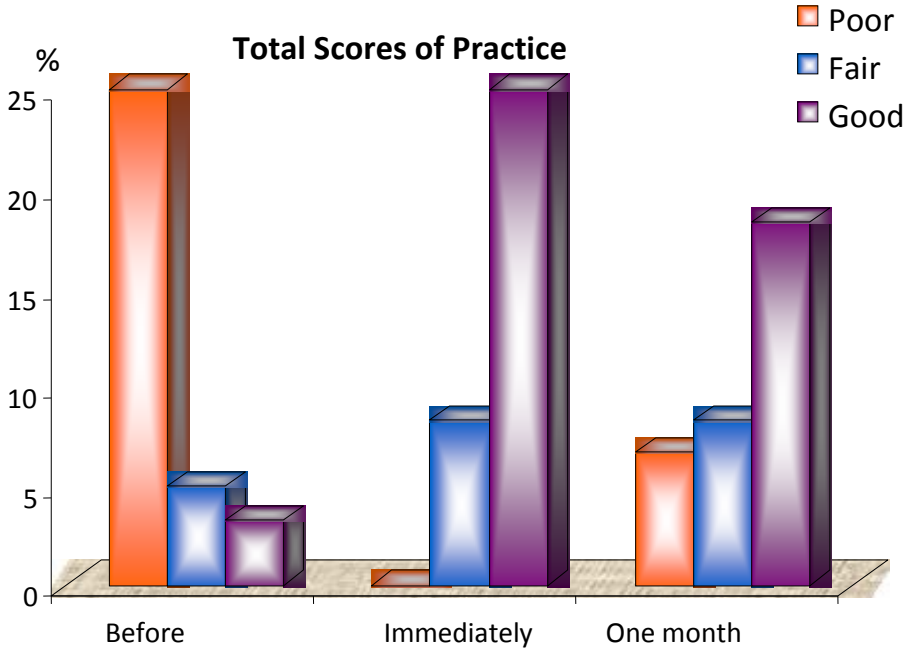

Figure (2): The total scores of the studied nurses' practice before, immediately and after one month from the guidelines application

Discussion:

Extravasation is a potential consequence of receiving intravenous chemotherapy, and it occurs when the chemotherapy drug accidently leaks into the surrounding tissue instead of the intended intravenous administration site. Extravasation is more likely to occur when a peripheral cannula is being used, and cause severe tissue damage, tissue necrosis, and blistering into the surrounding tissues rather than into the vascular pathway as intended [(17)].

Children with cancer are at risk for extravasation because they often require multiple intravenous infusions, have malnourishment, unable to complain of pain, and need frequent administration of drugs via the intravenous route. Children with cancer who receiving chemotherapy are also at a higher risk for extravasation because it may induce fragility to their veins' wall, cause their veins to be thin, and reduce the number of safe intravenous sites [(10, 11)].

Nurses' qualification enable them to expand their knowledge base, grow within their field and evolve as professionals. They also raise the standard of practice throughout the profession and in the long run improve patient's safety so a highly educated nursing staff is important for delivering safe and effective patient care without them the patient's health will be at risk. Moreover, the hospital with higher proportions of nurses educated at the baccalaureate level, patients experienced lower mortality and improved outcomes [(20, 21)].

The present study revealed that slightly less than two thirds of the studied nurses had secondary nursing school. This may due to decrease hospital authorities awareness about the importance of presence of highly educated nursing staff in this critical department as nursing graduate level qualification is a significant correct predictor because if oncology nurses didn't have a dvance knowledge and not competent in their skills they will be considered as unsafe for providing chemotherapy administration to cancer patients and chances for medication errors will be high this is supported by study carried out by **Corner and Barnett (2009)** who found that nurses with graduation were more competent than nurses with good experience in relation to peripheral intravenous cannulation [(22)].

The findings of the present study revealed that no in- service training program related to chemotherapy was given to the studied nurses. This result may be due to absence of in- service training department in the hospital, lack of motivation for training and increased workload in Pediatric Hematology and Oncology Unit.

orientation program The findings of this study are in line with **Mohsen and Fareed (2013)** who found that the majority of the studied nurses didn't receive any training program related to chemotherapy [(23)]. The main role of nurses in the oncology unit is chemotherapy administration which is sensitive domain in oncology nursing where little negligence or mistake may lead to adverse consequences for patients, staff and environment. Medication errors in chemotherapy are a common when there is a lack of specific knowledge and training of the staff about chemotherapy, prescription, preparation and administration. Therefore Nurses caring for patients receiving chemotherapy require specialized knowledge in order to ensure safety for both patients life and for their own safety[(7)].

As regards nurses' level of knowledge about chemotherapy and its extravastion. The current study revealed that total scores of knowledge for more than half of nurses before guidelines implementation were poor. This may be attributed to lack of prior to work as well lack of nursing care conference during work, invariability of procedure, and books especially in this area which help nurses to get the required knowledge whenever they need. This finding was in consistent with **Abd Al magid (2012)** who found that more than half of nurses were having poor knowledge scores before application of nursing care standards for cancer patients undergoing chemotherapy [(24)].

On the opposite immediately after implementation of guidelines the total scores of all nurses' knowledge were good. This could be attributed to the content of guidelines which was developed based on nurses' needs, its clarity and simplicity, using of audiovisual aids, availability of the teacher in the field for more clarification, using simple language, frequent repetition to fix the knowledge. This result was in line with **Potter (2008)** who describes that the nurse attains knowledge and competency through the standard application [(25)].

The time one month after the guidelines application, this percentage was slightly reduced as the majority of nurses were having good level in all items of knowledge. This indicates that the improvement in knowledge was partially lost one month after the guidelines application. This result might be explained by the fact that, knowledge retention is usually affected by time.

Regarding nurses' level of performance related to chemotherapy administration, the results of the present study revealed that the total score of three quarter of nurses' performance was poor before guidelines

application. This may be attributed to lack of proper equipment that needed to provide and improve nursing care and shortage of the Pediatric Hematology and Oncology Unit nursing staff. In addition to, lack of supervision and nurses' evaluation against identified standards of patient care, all these factors are behind this unsatisfactory level of practice. the of the current study was in agreement with **Mohamed** (2015) who found that the majority of nurses had poor practice score regarding chemotherapy administration [(26).]

On the contrary immediately and one month after guidelines implementation it is clearly obvious that the guidelines implementation had effectively achieved its expected objectives, nursing staff had significant higher performance score than before guidelines implementation. This can be attributed to the new knowledge and skills that the nurses acquire and they become able to apply it during their practice. The present study was in agreement with **Mohsen and Fareed (2013)** who noted that after implementation of chemotherapy safety protocol for oncology nurses there was an increase in the mean practice score of nursing staff [(23)] .

Regular training and education of all staff involved in the administration of chemotherapy and supported them by up-to-date institutional policies and procedures are important factors in providing nurses with essential knowledge and skills that enable them to minimize the risk of extravasation, detect early signs of it and manage it effectively [(27)].

The present study revealed that there were statistically significant differences in the occurrence of extravasation in the studied children's before and immediately after the guidelines application. Extravasation occurrence before the guidelines application may be attributed to lack of frequent nursing observation for intravenous chemotherapy infusion and also lack of nursing instructions to patient's family about how to observe an infusion.

On the other hand there is significant reduction in the occurence of extravasation in studied children immediately and one month after the guidelines application. This may be explained in the light of increase the nurses' knowledge, awareness about prevention of chemotherapy extravasation and the eagerness of nurses to become competent in their knowledge and practice. Furthermore, nurses had the liability to change by themselves but they need an instructor and a continuous evaluation.

The findings of the present study was in harmony with **El sherif (2014)** who found that the educational program had a

significant positive impact on nurses' knowledge and performance, especially in relation to objectives for minimizing chemotherapy extravasation [28]. This result was in incongruent with **Schulmeister (2011)** who recognised that despite healthcare providers taking every precaution and education to prevent extravasation and irrespective of the experience of the staff that administering the chemotherapy, extravasation will still occur [29].

Conclusion:

Based on the results of the present study, it can be concluded that there was a significant improvement on nursing staff knowledge, performance in relation to prevention and management of chemotherapy extravasation and significant reduction in extravasation occurrence in studied children.

Recommendations:

1. In-service training program should be conducted periodically and regularly for teaching to the working nurses the basic clinical skills.
2. Establishment of central in-service educational department in hospital to periodically refresh nurses' knowledge and practice regarding chemotherapy administration and stressing on the importance of documenting its extravasation
3. A special system for awarding, accreditation and certification should be taken into consideration to motivate nurses' participation and enrollment into the training and education programs which should be conducted in the work place.

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Effect of Using Clinical Pathway on Nursing Care of Neonates with Respiratory Distress Syndrome

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Abstract

Respiratory distress syndrome (RDS) considered one of the most serious disorders which leading to high morbidities and mortalities among neonates. It occurs when a neonate's lungs aren't fully developed and unable to gain enough oxygen. **The aim of this study** was to determine the effect of clinical pathway on nursing care of neonates with respiratory distress syndrome. **A quasi-experimental design** was used. **This study was carried out at** neonatal intensive care units affiliated to Benha University Hospital and Benha specialized hospital of children and Benha Teaching Hospital at Benha city. **A convenient sample** of (150) nurses and all the available neonates with respiratory distress syndrome (150 neonates**). Three tools** were used;ToolI- A structured interviewing schedule, which consists of four parts: Nurses' characteristics, neonates' characteristics, Nurses' knowledge regarding neonatal respiratory distress syndrome**,** and Nurses' Knowledge about nursing care of neonates with Respiratory distress syndrome. **Tool II**- Clinical pathway of care checklist**. Tool III-**Neonatal clinical outcome assessment sheet**. Results** of this study revealed that, there was statistically significant differences regarding the effect of clinical pathway on the clinical outcomes of studied neonates pre and post clinical pathway implementation. **This study concluded that:** Implementation of the clinical pathway improved nurses' knowledge and practice that reflecting obvious improvement in clinical outcomes of neonates with respiratory distress syndrome. **The study recommended that** Clinical pathway on nursing care of neonates with respiratory distress should be applied for neonates with respiratory distress at different settings.

Key words: Clinical pathway, nursing care, respiratory distress syndrome.

Introduction

Respiratory distress syndrome (RDS), formerly known as hyaline membrane disease. It is the most common cause of respiratory distress of the preterm neonates, because lung immaturity is associated with inadequate production of pulmonary surfactant. As, it is a result of surfactant deficiency, which causes increased surface tension in the air-liquid interface of the terminal respiratory units , which leading to atelectasis, increased ventilation perfusion mismatch, and potential lung injury due to a marked pulmonary inflammatory response [(1).]

Respiratory distress syndrome in neonates results from a combination of structural and functional immaturity of the lungs, as a result of the final unfolding of the alveolar septa, which increases the surface area of the lungs. Whereas, it occurs during the last trimester of pregnancy, Moreover, neonates are born with numerous underdeveloped and many uninflatable alveoli [(2).] Clinically, RDS presents with early respiratory distress comprising; cyanosis, tachypnoea, intercostals, subcostal, and sternal recession, expiratory grunting, and diminished breath sounds. So that, any delay in diagnosis of airway abnormalities may be a life threatening [(3).]

Respiratory distress syndrome primarily, considered a disease of preterm neonates, it also, can occur in those born close to or at term. It should be considered as a differential diagnosis in any neonate with early respiratory distress. In rare cases, neonates with RDS may suffer from genetic conditions such as; surfactant protein-B or ABCA3 deficiency. So, surfactant therapy considered one of the main parts of management [(4).]

There are many factors can increase the risk of RDS include; one sibling had RDS, mothers suffering from diabetes, cesarean delivery or induction of labor problems with delivery that reduce blood flow to the neonate and multiple pregnancies [(5).]

Management of RDS includes all the general measures required for any preterm infant, as well as those instituted to correct imbalances. There are many supportive measures most crucial to a favorable outcome which include; maintaining adequate ventilation and oxygenation with continuous positive airway pressure (CPAP), or mechanical ventilation, in addition to, maintaining acid-base balance, neutral thermal environment, adequate tissue perfusion and oxygenation, adequate hydration and electrolyte status and finally prevention of neonatal hypotension [(6).]

Despite recent advances in the perinatal management of neonatal respiratory distress syndrome (RDS), conflict still exists as respiratory distress syndrome

(RDS) is a major contributor to neonatal mortality worldwide. As the prevalence rate of neonatal respiratory distress syndrome in Egypt was 11,193.Whereas, the most cases of RDS occur in neonates born before 37 weeks. Additionally, the incidence of RDS increases with decreasing gestational age, especially infants born below 30 weeks gestation are at the greatest risk for RDS[7].

Clinical pathway care is a structured, multidisplinary plan of care designed to support the implementation of clinical guidelines and protocols of care. It is designed to support clinical management, clinical and non-clinical resource management, clinical audit and also financial management. It provide detailed guidance for each stage in the management of a patient whether adult or pediatric patient with a specific condition over a given time period and include progress and outcomes details. Moreover, it aims to improve particularly the continuity and co-ordination of care across different disciplines and sectors [8].

Nurses working at neonatal intensive care units have a great role in management of neonates with RDS involves all the observations and interventions described for high-risk neonates. In addition, the nurse is concerned with the complex problems related to respiratory therapy. Nursing care of neonates with RDS is demanding. Though, paying meticulous attention to subtle changes in the neonate's oxygenation status, particularly in regard to medication administration [9].

Significance of the Study:

The preterm birth is estimated by 10% - 12% from neonates born in Egypt[9]. Whereas, respiratory distress syndrome (RDS) is a problem often seen in premature neonates. This condition often gets worse for 2 to 4 days after birth and improves slowly after that. Some infants with severe respiratory distress syndrome may die. This most often occurs between the second day and the fourth day of birth. It can be fatal, it may also lead to long-term complications due to either receiving too much oxygen or because organs lacked oxygen. Therefore, this study hoping to reduce mortality and morbidity rates of neonates with RDS through enhancing nurses' knowledge and practice by using the clinical pathway nursing intervention [22].

Aim of the study:

The aim of this study was to: Determine the effect of clinical pathway on nursing care of neonates with respiratory distress syndrome

Research Hypotheses:

- Nursing care of neonates with respiratory distress syndrome

significantly will be improved after implementing the clinical pathway intervention.

- Neonates with respiratory distress syndrome who will exposed to the clinical pathway will have less demand of oxygen, decreased frequency of daily suctioning, and decreased length of hospital stay.

Subjects and method:

Research Design:

A quasi- experimental research design was utilized.

Settings:

The study was carried out at neonatal intensive care units at Benha city as the following:

- Benha Specialized Hospital for Children affiliated to Ministry of Health . It included two units. These units are for neonates having different diagnosis. One of them contained (14) incubators and the other unit contained (26) incubators.
- Benha University Hospital. As it include two NICUs contains (16) incubators in each unit 8 incubators.
- Benha Teaching Hospital. It includes one NICU composed of (15) incubators

Subjects:

It consisted of two groups:

Group1: The first group consists of a convenient sample consists of (150) male and female nurses who are working at the above mentioned settings were taken regardless their gender and years of experience at neonatal intensive care unit more than 6 months

Group 2: consists of a purposive sample of neonates with RDS (150- neonates) were included after fulfilling

-Inclusion criteria:

- Both sexes Gestational age 28≤ 36 weeks.
- The current weight from 1500 ≤ 2500 grams.
- Respiratory distress which manifested by the criteria

a-Tachypnea more than 60c/m

b-Having mild to moderate chest retraction.

Exclusion criteria:

Neonates with major malformation, congenital heart disease or on mechanical ventilation

Tools of Data Collection:

There were three tools utilized to collect the required data. Those tools as the following:

Tool I: A structured interviewing schedule: It was developed by the researchers after reviewing the related literatures (**Negi, et al., 2012, Martin and Fanaroff, 2013, and David et al.,2013)**, and it was written in Arabic language to suit study sample. It composed of four parts

Part (1): Assess nurses' characteristics, such as; age, gender qualifications, years of experience, attendance of training courses.

Part (2): Assess characteristics of the studied neonates such as; gestational age, gender, current age, weight on admission and current weight.

Part (3): Nurses' knowledge related neonatal respiratory distress syndrome, which includes their knowledge about; definition, causes, clinical manifestations, diagnosis and management of neonates with RDS. The total questions were 7 and in a form of multiple choice questions.

Part (4): Nurses` knowledge regarding nursing care of neonates with RDS, such as; knowledge about maintenance of body temperature, proper fluid management, good nutritional support, circulation, oxygen therapy and suctioning of the neonate with RDS, care of neonate on ventilator, blood gases estimation, prevention of nosocomial infection, medication administration and prognosis

Nurses' knowledge will be scored as following:

- Correct and complete answer was scored (2)
- Correct and incomplete answer was scored (1)
- Wrong answer or don't know and was scored (0)

The total score of nurses' knowledge were calculated and classified into three levels as following:

- 60% ↓ will be considered poor knowledge.
- 60- ↓ 75% will be considered fair knowledge.
- 75-100 % will be considered good knowledge.

Tool II: Clinical pathway for care of neonates with RDS checklist:

It was adopted from (**European Consensus Guidelines on the Management of Neonatal Respiratory Distress Syndrome in Preterm Infants, 2013**). It was applied to assess daily nursing care provided to neonates with RDS inside the incubator. The total practices were 10 practices. It included the following practices: which include 64) items as the following:

1- Assess respiratory status by counting for full one minute with a timer and when the baby is quiet and preferably when baby is not hungry or immediately after feeds (3items)

2-Maintain thermo neutral environment by caring the infant under radiant warmer or in incubator (2 items)

3- Ensuring normal blood glucose levels (6 items)

4-Monitoring the vital parameters (9items).

5-Provide supplemental oxygen and ventilation (10 items)

6-Provide good nutritional support with intravenous fluids and electrolytes (5items)

7- Suctioning of the neonate either through oral or nasal suctioning (10items)

8- Check regularly blood gases (5items)

9-Prevent nosocomial infection and apply a septic technique (7items)

10- Communicate effectively with parents through out length of hospital stay of the neonate and at discharge care and follow-up care (7items)

-Scoring System for practice of the studied nurses.

Scoring system for nurses performances will be as follows:

- Done correctly and complete will score (1)
- Done incorrect or not done well will score(0)

The total score of nurses' practice will calculated and classified as follow:

- 60 to less than 75 will be considered unsatisfactory.
- 75-100 % will be considered satisfactory

Tool III- Neonates' medical outcomes assessment sheet: It was developed by the researchers to assess the improvement of neonates' condition after application of the clinical pathway. It included; feeding improvement, O_2 requirement, and length of hospital stay.

Preparatory phase:

Validity and Reliability

The researchers reviewed the past, current regional and international related literatures covering all aspects of the study using textbooks, articles, journal and scientific magazines. This helped the researchers to be acquainted with the research problem and guided them in developing the study tools. To measure content validity of the study tools, the researchers assure that items of the tools were adequately represent what are supposed to measure by presented it to five experts including; three in Pediatric nursing from the Faculty of Nursing Cairo, El-Menofia, Benha University, and two in neonatal medicine from the Faculty of medicine Benha University, to test the content validity. Modifications of the tools were done according to the experts' judgment on clarity of sentences, appropriateness of contents and sequence of items. The experts' agreed on the content, but recommended minor language changes that would make the information

clearer and more precise. The suggested changes were made. Internal consistency reliability of all items of the tools was assessed using Chronbach's Alpha test. It was 0.83 for the structured interviewing schedule, and 0.86 for nurses' observation checklist.

Method:

Exploratory phase:

Ethical considerations and human rights:

An official permission to conduct the study was obtained from the hospital mangers. Then participation in the study was voluntary; each nurse was informed about the purpose, procedure, benefits, and nature of the study and each nurse had the right to withdraw from the study at any time without any rationale, then oral/written consent obtained from them. Subjects were informed that obtained data will not be included in any further researches. Confidentiality and anonymity of each subject was assured through coding of all data and all information has taken was protected.

Pilot Study:

It was conducted on 10 % of the total study sample (15 nurses) to evaluate the feasibility, reliability, and clarity of the tools .It was conducted to test the applicability of the tools, find out the possible obstacles and problems that might face the researchers and interfere with data collection. Additionally, detect any problems peculiar to the statements as sequence of questions and clarity. It was also helped to estimate the time needed for data collection, as it was 20 minutes.

Field of Work:

Data were collected from the beginning of January 2016 to the beginning of August 2016. Immediately after the ethical approval was obtained; the researchers obtained oral consents from nurses who included in the study after an explanation of the aim, tools, benefits and the duration of the study to gain their cooperation. The researchers then started to interview each nurse individually and this took about 15-20 minutes for assessing knowledge. The researchers then started to assess care provided by nurses during their actual work for each neonate (routine care) 3days / week with follow up of neonates progress condition before and after the clinical pathway. The researchers were available by rotation 3 days per week: Sunday in Benha University Hospital, and Monday in the Specialized Pediatric Hospital and Tuesday in Teaching Hospital in Benha City. At the beginning of the first session, an orientation of the contents was listed and then explanation, demonstration and re demonstration were done. After finishing data collection the actual nursing care was

assessed and the clinical pathway intervention applied to nurses about care of neonates after one or two days of admission of neonates.

Procedure:

- **Preparation phase:**

It was concerned with designing and testing different data collection tools, in addition, the administrative arrangements to carry out the study as well as to conduct the pilot study. In the beginning, the researchers introduce themselves to the nurses. Nurses who accept to participate in the study individually interviewed by the researchers to explain the nature, purposes, and the desired outcomes of the study and an oral consent was obtained from these nurses.

- **Implementing phase:**

Data were collected from the beginning of January 2016 to the beginning of August 2016. The researchers were available by rotation 3 days per week: Sunday in Benha University Hospital, and Monday in the Specialized Pediatric Hospital and Tuesday in Teaching Hospital in Benha City during their working shifts (Saturday, Monday, and Tuesday) in the morning and afternoon shifts by rotation in the previously mentioned study settings. Each nurse was interviewed individually for 15 – 20 minutes to fill out the structured interviewing questionnaire schedule (Tool 1). The researchers clarified and answered any related questions. Then, each nurse was observed during their practice on morning and afternoon shifts using nurses observational check list by the same researcher (Tool 2). The time needed for each observation for each nurse was 20-25 minutes for three times during providing of care for neonates with RDS.

Clinical Pathway Application, Implementation, and Evaluation:

Clinical Pathway intervention was designed based on the actual needs assessment of nurses then implemented and evaluated. The aim of this intervention was to upgrade nurses' knowledge and improve their practice regarding care of neonates with RDS. The application of the clinical pathway intervention was carried out in the previously mentioned study settings with the studied nurses whereas, the theoretical contents were provided through three teaching sessions; each session took 20-25 minutes.

As, the contents related to RDS (definition, causes, clinical manifestations, diagnosis and management). The studied nurses were divided into (30) groups, each group consisted of 4-5 nurses. The researchers gave each nurse a clinical pathway guidelines related to care of neonates with RDS in addition to the teaching sessions to

assure understanding and clear any misunderstanding.

Training of nurses was conducted using a laptop with MS Power Point presentations 2010 made from contents of the clinical pathway guidelines. according to working circumstances, there mental and physical readiness.

The clinical pathway intervention was implemented over three weeks period in addition to one week for pre and post-test. A time schedule suitable for nurses was developed to conduct the clinical pathway that included; date, place, topic, time and duration of each session.

At the beginning of the first session an orientation to the clinical pathway intervention and its importance and outcomes were explained. In addition, a feedback about the previous session was done and the objectives of the new topic were explained. Simple words and Arabic language were used to suite the nurses' level of understanding. At the end of each session, nurses' questions were discussed to correct any misunderstanding.

In addition to re-demonstration for practical procedures.As regards the practical sessions, the nurses' practices were assessed through pre test during their actual care. The pre determined procedures before provision of any information (pretest) utilizing the clinical pathway of care of neonates with RDS checklist, in the form of short sessions from 30-35 minutes for each practical session. The total practical sessions composed of 6 sessions divided on the nurses' groups and related to nurses' actual care of neonates with RDS. The contents of these sessions include; proper fluid management, oxygen therapy care and ventilation, suctioning of the neonate with RDS, care of neonate on ventilator and blood gases estimation

Different teaching strategies were used for implementation of the clinical pathway intervention such as lectures, small group discussion, brain storming, role play, demonstration and re-demonstration using real objects. Suitable teaching aids as booklet, colored posters, doll and real objects were prepared especially for practice. Nurses were motivated to cooperate and participate actively in different stages of the study.

Administrative design

An official permission for data collection was obtained from the hospitals' managers through submission of official letters issued from the dean of Benha faculty of nursing. The title, objectives, and outcomes of the study were illustrated as well as the main data items to be covered, and the study was carried out after gaining the necessary permission. The study was carried out

during the period from beginning of January 2016 to the beginning of August 2016.

Statistical design

The collected data revised, organized, tabulated and analyzed by using SPSS (Statistical Package for the social Science Software) statistical package version 20 on IBM compatible computer. Numerical data (Quantitative data) was presented in tables by using Mean, Standard deviation (X ± SD) and analyzed by applying t-test for normally distributed variables, while qualitative data were expressed as frequency and percentage and chi-square was used. Additionally, other statistical tests such as Independent t test was used as a parametric test of significance for comparison between two samples means. Pearson correlation (r) was used to measure the correlation between quantitative variables.

P-value at .05 was used to determine significance regarding:

- P-value > .05 to be statistically insignificant.
- P-value ≤ 05 to be statistically significant.
- P-value ≤ 001 to be high statistically significant.

Evaluation Phase:

Upon the completion of the clinical pathway implementation, the post test evaluation was conducted to evaluate the outcomes by using the same pre test tools

Results:

Table (1) :Shows that, half of the studied nurses (50 %) had age between 20< 25 years with mean age of 25.46±5.262 years, with mean years of experience was 5.65±4.671 years. While, more than two thirds (70%) of them had diploma of secondary school of nursing. Also, half of them (50%) had attended training programs related to NICU.

Table (2): Represents that, more than two thirds (70%) of the studied neonates were males. While, the rest of them were females. Also, more than two thirds (69.30%) of them had

current age in days of 1 <5 days.

Table(3) :Illustrates, distribution of the studied nurses according to their knowledge about RDS before and after clinical pathway implementation. As, there was an improvement in their knowledge in most items on post clinical pathway implementation phase compared with pre clinical pathway implementation phase knowledge with high statistical significant difference (p <0.001).

Table(4) :Views, distribution of the studied nurses according to their knowledge about nursing care of neonates with RDS before and after clinical pathway implementation whereas, there was a highly statistical significant difference (p <0.001) in the studied nurses' post clinical

pathway implementation knowledge scores compared with pre clinical pathway implementation knowledge scores regarding their nursing care of neonate with RDS.

Figure (1) :Reveals, percentage distribution of total knowledge scores of the studied nurses about RDS before and after clinical pathway implementation.As,more than two thirds(69%) of them had poor knowledge pre clinical pathway compared with more than three quarters(78%) of them had good knowledge post clinical pathway

Table (5) :Shows distribution of the studied nurses regarding their competent practice scores before and after the clinical pathway implementation. As, there was a statistical significant difference ($p < 0.05$) in the studied nurses' post clinical pathway implementation practice scores compared with pre clinical pathway implementation.

Figure (2): Shows percentage distribution of total practice scores of the studied nurses before and after clinical pathway implementation. As, the majority of them(91.2%) had incompetent practice pre clinical pathway compared with 78% of them had competent practice post clinical pathway implementation

Table (6) :Clarifies, percentage distribution of the studied neonates regarding the effect of clinical pathway on their condition. Whereas, increased o2 requirements of the majority the studied neonates(89.3%) before implementation of clinical pathway compared with post clinical pathway. On the other hand, more than half (54%) of them had length of hospital stay less than 10 days after implementation of clinical pathway compared with the pre implementation of pathway.

Table (7):Shows, percentage distribution of the studied nurses' total knowledge and practice scores before and after clinical pathway implementation As, the more than two thirds of them had poor knowledge (69.3%) before clinical pathway implementation while more than three quarters(78.00 %) of them had good knowledge post clinical pathway implementation. Regarding their practices' total scores, the majority (78.2%)of them had competent practice post clinical pathway implementation compared with 91.4% of them had incompetent practice pre clinical pathway implementation.

Table (8): Shows highly statistical significance relations between the studied nurses' knowledge and practice and their age, educational level and years of experiences. On the other hand, there was no statistical significance between gender and their knowledge and practice.

Table (9):Shows correlation between studied nurses' knowledge and practices pre and post clinical pathway implementation, it was revealed that there were a highly statistical significance correlation between them pre and post program implementation.

Table (1): Percentage Distribution of the studied nurses according to their characteristics (no=150)

Nurses' characteristics	No(150)	%
Age in years		
- < 20	5	3.3
- 20 < 25	75	50.0
- 25<30	45	30.0
- ≥ 30	25	16.7
X ± SD	25.46±5.262	
Gender		
male	13	8.7
Female	137	91.3
Years of Experience		
< 3	58	38.7
3 < 6	35	23.3
6 <9	28	18.7
≥ 9	29	19.3
X ± SD	5.65±4.671	
Academic Qualification		
- Diploma of Secondary Nursing School	105	70.0
- Diploma of Technical Institute of Nursing	40	26.7
- Bachelor degree of Nursing Science	5	3.3
Place of work:		
-Benha University hospital	22	14.7
-Benha Teaching Hospital	24	16.0
-Benha Children Specialized Hospital	104	69.3
Training programs related to NICU		
-Yes	75	50.0
- no	75	50.0

Table (2): Percentage Distribution of the studied neonates according to their characteristics (no=150)

Neonates; characteristics	No(150)	%
Gestational age (weeks) 28< 30 30 <32 32 <34 34≤36	 0 42 96 12	 0.00 28.0 63.0 8.0
X± **SD**	33.65±6.98	
Gender Male Female	 106 44	 70.7 29.3
Current age in days <5 5<10 10≤20	 40 104 6	 26.7 69.3 4.0
X± **SD**	9.87±6.56	
Weight on admission in grams 1500 <2000 2000 <2500 ≥2500	 66 55 29	 44.0 36.7 19.3
X± SD	1980±298.68	
Current weight in grams 1500 <2000 2000 <2500 - ≥2500	 56 67 27	 37.3 44.7 18.0
X± SD	2370±150.89	

Table (3): **Percentage Distribution of the studied nurses according to their knowledge about RDS before and after clinical pathway implementation (no=150).**

Nurses' knowledge	Pre clinical pathway						Post clinical pathway						X^2	P value
	Correct answers		Incorrect answers		Don't know		Correct answers		Incorrect answers		Don't know			
	No	%	No	%	No	%	No	%	No	%	No	%		
Definition of RDS	17	11.3	119	79.3	14	9.3	142	94.7	5	3.3	3	2.0	21.19	<0.001**
Signs and symptoms of RDS	19	12.7	118	78.7	13	8.7	37	24.7	108	72.0	5	3.3	9.76	<0.05*
Leading causes of RDS	27	18.0	111	74.0	12	8.0	80	53.3	68	45.3	2	1.3	43.72	<0.001**
Diagnosis of RDS	58	38.7	83	55.3	9	6.0	31	20.7	118	78.7	1	0.7	20.68	<0.001**
Treatment of RDS	14	9.3	108	72.0	28	18.7	51	34.0	99	66.0	0	0.0	49.45	<0.001**
Prevention	78	52.0	72	48.0	0	0.0	42	28.0	105	70.0	3	2.0	19.95	<0.001**

Table (4): Percentage Distribution of the studied nurses according to their Knowledge about nursing care of neonates with RDS before and after clinical pathway implementation (no= 150)

Nurses' knowledge	Pre clinical pathway						Post clinical pathway						X^2	P value
	Correct answers		Incorrect answers		Don't know		Correct answers		Incorrect answers		Don't know			
	No	%	No	%	No	%	No	%	No	%	No	%		
Maintainace of body temperature	31	20.7	58	38.7	61	40.7	136	90.6	8	5.3	6	4.0	80.8	<0.001**
Proper fluid management	27	18.0	42	28.0	81	54.0	103	68.6	22	14.6	25	16.7	25.8	<0.001**
Good nutritional support	35	23.3	10	6.6	105	70.0	115	76.6	20	13.3	15	10.0	98.84	<0.001**
Support of circulation	33	22.0	51	34.0	66	44.0	112	74.6	21	14.0	17	11.3	177.02	<0.001**
Oxygen therapy care	28	18.7	11	7.3	111	74.0	118	78.6	11	7.3	21	14.0	91.59	<0.001**
Suctioning of the neonate with RDS	17	11.3	50	33.3	83	55.3	109	72.6	20	13.3	21	14.0	21.27	<0.001**
Care of neonate on ventilator	39	26.0	20	13.3	91	60.7	101	67.3	20	13.3	29	19.3	190.80	<0.001**
Blood gases estimation	36	24.0	4	2.6	110	73.3	116	77.3	4	2.6	30	20.	108.67	<0.001**
Prevention of nosocomial infection	33	22.0	12	8.0	105	70.0	101	67.3	12	8.0	37		215.98	<0.001**
Medication administration	44	29.3	100	66.7	96	64.0	110	73.3	30		10		122.06	<0.001**
Prognosis	13	8.7	55	36.7	82	54.7	125		13		12		60.47	<0.001**

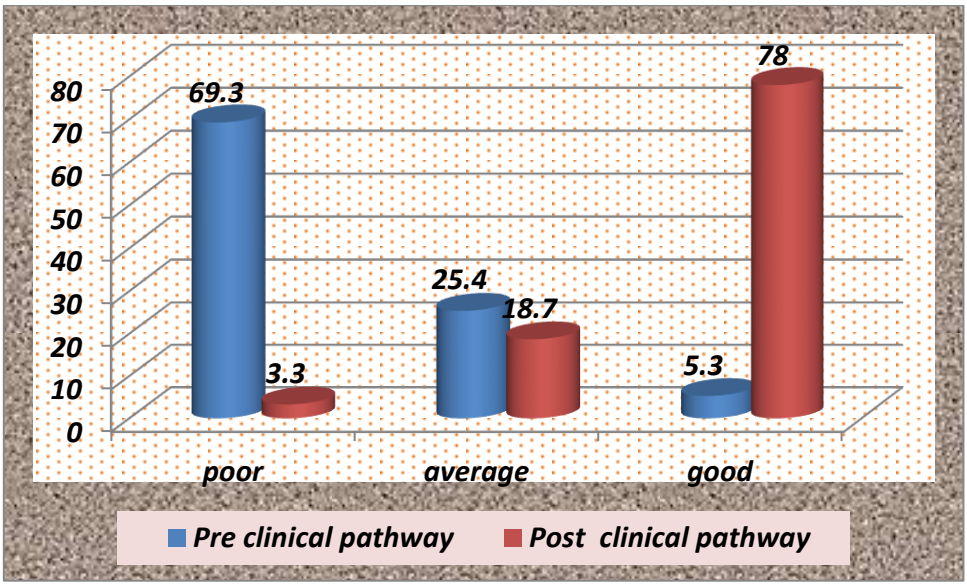

Figure (1): Percentage distribution of total knowledge scores of the studied nurses about RDS before and after clinical pathway implementation

Table (5): Distribution of the studied nurses regarding their competent practice scores before and after the clinical pathway implementation (No=150)

Number of Studied Nurses =(150) Competent practice						
Items	Before clinical pathway Done correctly and complete (total=150)		After clinical pathway Done correctly and complete (total=150)			
	No	%	No	%	X^2	P value
Assess respiratory status	96	64.00	136	90.70	30.42	<0.05*
Maintain thermo neutral environment	4	2.70	142	94.70	254.10	<0.05*
Ensuring normal blood glucose levels	20	13.30	142	94.70	199.73	<0.05*
Monitoring the vital parameters	100	66.70	78	52.00	6.68	<0.05*
Provide supplemental oxygen and ventilation	12	8.00	94	62.70	98.09	<0.05*
Provide good nutritional support with intravenous fluids and electrolytes	24	16.00	142	94.70	187.79	<0.05*
Suctioning of the neonate either through oral or nasal suctioning	64	42.70	82	54.70	4.32	<0.05*
Check regularly blood gases	54	36.00	110	73.30	42.18	<0.05*
Prevent nosocomial infection and apply a septic technique	16	10.70	111	74.00	123.23	<0.05*
Communicate effectively with parents through out length of hospital stay and at discharge	50	33.30	86	57.30	17.43	<0.05*

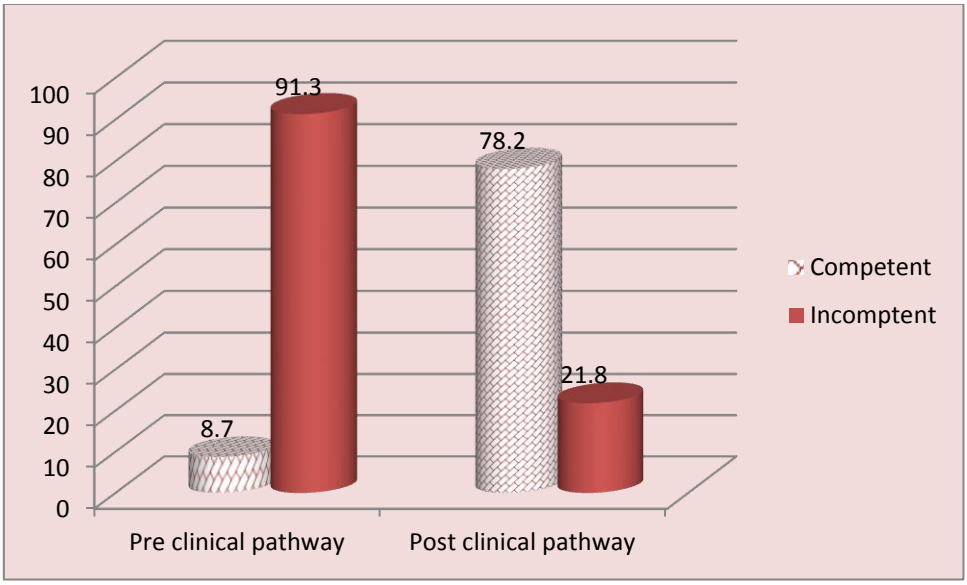

Figure (2): Percentage distribution of total practice scores of the studied nurses before and after clinical pathway implementation

Table (6): Percentage distribution of the studied neonates regarding effect of Clinical Pathway on their condition(No=150)

Number of the Studied neonates=(150)						
Items	**Before application of the clinical pathway**		**After application of the clinical pathway**			
	No	**%**	**No**	**%**	**X^2**	**P value**
Feeding improvement					32.78	<0.05*
Normal	70	46.7	104	69.3		
Hypoactive/ hyperactive	80	53.3	46	30.7		
Increased O2 requirement					109.71	<0.05*
Yes	134	89.3	45	30.0		
No	16	10.7	105	70.0		
Length of hospital stay in days					112.52	<0.05*
10-	10	6.7	81	54.0		
20-	55	36.7	58	38.7		
≥30	85	56.7	11	7.3		

***P Value ≤ 0.05 Statistical significant differences (S);**
****P value ≤ 0.001 high Statistical significant differences (HS)**

Table (7): Percentage distribution of the studied nurses total knowledge and practice scores before and after clinical pathway implementation (No=150)

Items		Pre clinical pathway (150)		Post clinical pathway (150)		X^2	P value
		No	%	No	%		
Knowledge	- Poor	104	69.3	5	3.3	186.48	0.001**
	- Average	38	25.4	28	18.7		
	- Good	8	5.3	117	78.0		
Practice	Competent done	13	8.70	118	78.20	89.83	0.000**
	Incompetent done	137	91.30	32	21.80		

***P Value ≤ 0.05 Statistical significant differences (S);**
****P value ≤ 0.001 high Statistical significant differences (HS)**

Table (8): Relation between studied nurses' knowledge and practices and with their characteristics (No=150)

Personal data	Knowledge		ANOVA		Practice	ANOVA	
	N0: 150	x ± SD	F/T test	P value	x ± SD	F/T test	P value
Age in years							
- < 20	5	28.00±1.000	F test 3.24	>0.05	38.74±2.34	F test 0.852	0.001**
- 20 – < 25	75	27.36±1.842			40.81±3.28		
- 25 - <30	45	26.53±3.341			52.22± 1.86		
- ≥ 30	25	25.64±3.302			43.23± 2.28		
Gender							
Male	13	27.6±2.39390	T test 1.18	0.058	49.55+4.28	T test 0.806	0.062
Female	137	26.74±2.706			55.32+ 3.62		

Educational level							
Diploma of secondary nursing school	105		F test 4.02	0.00	36.14±4.32	F test 0.738	0.001**
Diploma of Technical institute of nursing	40				48.61±3.88		
Bachelor degree in nursing science	5				53.62± 2.82		
Years of experience							
< 3	58	27.36±1.970	F test 5.42	0.00	40.70±3.39	F test 0.842	0.001**
3 < 6	35	27.65±1.6967			42.48±3.46		
6 <9	28	26.25±2.939			53.12± 2.88		
≥ 9	29	25.41±3.850			55.12± 2.88		

Table (9): Correlation between Total Knowledge and Total practice Pre and Post Clinical Pathway implementation (150)

Items	Pre clinical pathway (150)		Post clinical pathway(150)	
	R	p	r	p
Knowledge	0.764	0.000**	0.668	0.000**
Practice	0.960	0.000**	0.790	0.000**

***P Value ≤ 0.05 Statistical significant differences (S);**
****P value ≤ 0.001 high Statistical significant differences (HS).**

Discussion

Respiratory distress is a common symptom affecting neonates. It is a condition of pulmonary insufficiency that in its natural course commences at or shortly after birth and increases in severity over the first 2 days of life**.** It usually affects premature neonates **(10).**

Clinical pathways have been developed in health care as multidisciplinary care plans that outline the sequence and timing of actions necessary for achievement of expected patient outcomes and organizational goals regarding quality, costs, patient satisfaction and efficiency. Additionally, the concept of clinical pathway refers to specific guidelines for care which describe patient treatment goals and define the sequence and timing of intervention for meeting those goals efficiently**.** So, the aim of this study was to evaluate the effect of clinical pathway on enhancing nursing care of neonates with respiratory distress syndrome (11).

Regarding personal data of the studied nurses, the results of the present study revealed that, the mean age of the studied nurses was(25.46±5.262).This may be attributed to the lack of nurses' knowledge .This result was similar to the results of study by **El Baz, et al.,(2007))**, who found in her study that age groups of nurses were between 20 -<25 year.

Concerning gender of the studied nurses, it was observed from the results of the current study that, the majority (91.3%) of them were females. Moreover, the majority of them had diploma in nursing school. These results agreed with results found by **Mohammed, (2007)** (12) who found that the majority of studied nurses were females, and had diplomas in nursing school.

Regarding to characteristics of the studied neonates with RDS, the present study found that, the mean gestational age was 33.65±6.98 weeks and the mean weight of neonates on admission was 1980±298.68. While, the current mean weight was2370±150.89. According to gender of the studied neonates. This might be due to respiratory distress syndrome affecting mainly preterm infants. This finding was supported by **Mohamed (2010)**(13) who found that, more than half of neonates (59.3%) were males. Also, stated that, In the modern era of neonatal management, male infants still have higher mortality and poorer long-term neurologic outcome(14).

In relation to knowledge of the studied nurses, it is obvious from the current study that, the total knowledge scores post clinical pathway implementation about RDS had significant differences towards definition of RDS, leading causes, diagnosis, prevention and treatment compared with pre clinical pathway

implementation knowledge scores. This result is supported by **Amin,(2004)**[15] who reported a higher increase in study group subjects' knowledge mean scores immediately post nursing clinical pathway implementation than before, with a highly significant statistical differences. From the researchers' points of view this may due to lack of training courses related to neonatal nursing care.

Regarding to improvement of nurses' knowledge after intervention of clinical pathway on neonates with RDS. The results of the current study agreed with what reported by **Refai, (2010)**[16] who found that in their study that there was a statistically significant difference between total mean scores of nurses' knowledge regarding meningitis pre and post CP guidelines implementation. The result of the current study matches with a study had done by **Hussein, (2014)**[17] who found that there was a statistically significant difference regarding mean scores of nurses' knowledge about pneumonia between pretest and posttest scores.

The current study revealed that, there was a high statistical significant difference (P <0,001) among nurses competent practices regarding nursing care of neonates with RDS before and after applying clinical pathway. This is in accordance with **Mahmoud and Abd-El Sadik, (2013)**[18] who found that an obvious improvement in practice scores of the study group subjects immediately post nursing clinical pathway implementation than pre-nursing clinical pathway implementation. Additionally, **Hussein, (2014)**[17] who found that clinical pathways embody practice guidelines, while at the same time allowing variations in the activity of the provider and in patient response.

Regarding the effect of clinical pathway on the studied neonates. The current study revealed that, there was an obvious improvement of neonates' condition. Whereas, increased o2 requirements of the majority of the studied neonates before application of clinical pathway compared with post test. Additionally, more than half of them had length of hospital stay less than 10 days after application of clinical pathway compared with the pre application of pathway. This may be due to the effect of newly techniques in application of care especially critically ill neonates. This was in accordance with **Rhew et al., (2011)**[19] who found that, in their study that their findings in the CP group are including improving respiratory signs and/or symptoms and decreasing o2 daily requirements, increasing the ability to take oral medications and decreasing I.V. fluids faster than non- CP group and these were common criteria for early switch and early

signs for neonates' discharge from hospital and reduce level of consciousness.In the same context **Cheney, (2012)**[20] stated that, Clinical pathways are paths that health care professionals can follow which enable them to provide the best possible outcomes for the patients.

The results of the current study are supported by **Patrick (2006)**[21] who found that in her study that there was a statistical significant difference between control group and pathway group regarding frequency of o /day from second till fifth day and the same picture was observed regarding to grand mean scores of frequency of o_2 /day. Also **Rhew et al., (2011)**[19] who found in the study that there was a statistical significant difference between control group and pathway group regarding supplemental oxygen needs, as control group require more oxygen frequency than pathway group. From the researchers' point of view this may be due to competent practices of nurses regarding fluid management provision and frequency performance of suctioning procedures/day as prescribed for the neonates with RDS and regular follow up to neonates which lead to general improvement in outcomes of neonates' condition and early discharge from hospital.

Conclusion

Based on the findings of this study, we can conclude that:

Implementation of the nursing clinical pathway is highly effective method to improve nurses' knowledge and can enhancing nursing care of neonates with respiratory distress by raising nurses' knowledge, enhancing their practice regarding O^2 requirement, improved neonatal outcomes and reduces their length of hospital stay.

Recommendations:

Based on the results of the current study, the following recommendations were reached:

- Clinical pathway on nursing care of neonates with respiratory distress should be applied for neonates with respiratory distress in different settings
- Provision of regular training programs for nurses about CP of care of neonates with RDS on a wider scale in similar settings to further confirm its utility and benefits in improving nurses' knowledge and practice.
- The clinical pathway approach of care can be generalized for utilization by health team members in different pediatric healthcare settings.

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Knowledge and attitude of Mothers and Health Care Professional related to Autistic Children

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Abstract

The increase in reported Autism spectrum disorder (ASD) prevalence may reflect greater increased awareness of ASD among professionals and the mothers'. Therefore, it is important that there is awareness and accurate understanding of ASD which can help individuals with ASD to be identified and receive appropriate supports as early as possible. **The aim of** the study was to assess Knowledge and attitude of mothers and Health Care Professional toward Autistic Children. A descriptive exploratory research design was utilized. This study was conducted at the Abassia mental health hospital, outpatient clinic of autism and psychiatric clinic at pediatric out- patient clinic pediatric hospital of Cairo University. **A convenient sample** consists of (55) 40 mothers' and 15 health care professionals were working in outpatient clinics in the previous settings. **Three tools were used to collect** the data for the present study. personal data sheet for mothers and their autistic children , and health care professional, Mothers knowledge and attitude toward autistic child questionnaire and Health professional' knowledge and attitude toward autistic child questionnaire. **Study's results** revealed that most of mothers' had positive attitude toward their autistic children regarding their role in care and effectiveness of treatment with no significant difference between mothers' and Health care professional in total attitude scores. On the other hand there was statistical significant difference between mothers' and health professionals in total knowledge scores. **The study concluded** that, the issue of knowledge and attitude toward child with autism and perceptions regarding their abilities to be included in the community are complex. **The study recommended** that need for further researches in order to find out the most effective way to induce positive changes in this area, and how treatment decisions are made particularly with regard to the importance of mothers' attitude.

Key words: Health care professional, autism, attitude, knowledge

Introduction:

Autism spectrum disorder (ASD) is a neurodevelopment disorder in which individuals show persistent deficits in social communion and interaction (such as difficulties with sustaining conversations and developing friendships) and restricted, repetitive patterns of behavior or interests (such as stereotyped movements, insistence on routines, and narrow preoccupations) [1].

. Epidemiological studies have reported an increasing prevalence of ASD. In the United States in 2008, the Autism and Developmental Disabilities Monitoring Network estimated that 1 in 88 children had an ASD, with prevalence rates being five times greater in boys than girls [2].The increase in reported ASD prevalence may reflect greater inclusion of individuals with milder ASD as well as increased awareness of ASD among professionals and mothers'. Therefore awareness and understanding can help children with ASD to be identified and receive appropriate supports as early as possible. Despite increasing awareness of ASD, recent studies of both professionals and mothers' find continuing misconceptions or inadequate training regarding the causes, symptoms, and treatments of ASD [3].

Children with ASD depend on their families for daily care and support that are essential for the successful implementation of any therapeutic intervention. Therefore, it has been acknowledged that the needs of all the family members should be taken into consideration when designing an intervention. The author stressed the importance of active parental participation in the therapeutic process, which results from the proper cooperation with mental health professional. However, many mothers' claim that their participation in their children's therapy is minimal and restrained to six-monthly briefing meetings, while they are not informed that they could be more actively involved in the treatment process. Mothers' must be treated as partners during the planning, implementation, and evaluation of the therapeutic approach and not just as observers or clients [4]

Care givers\ mothers are the decision makers in matters of health care for children with special health care needs; thus, they play an important role in achieving the best oral health outcomes for their children. Since mothers' are responsible for almost all health issues related to their children, their role in modeling their children toward practicing preventive oral health throughout life is crucial. Thus, mothers' should be educated about importance of oral health care that in turn also influences general health of their children. There is a lack of studies which

have elicited parental knowledge, attitudes, and practice (KAP) behaviors towards children with ASD [5]

According to, the mothers' first reaction following a diagnosis is to look for information and practical advice. This response, be it immediate or gradual, brief or intense, is thought to facilitate adjustment and adaptive coping. Searching for information may also be an alternative way of handling the diagnosis as opposed to seeking emotional support. It may help mothers' to respond more effectively to a range of life-changing events that may invoke stress. It may also give mothers' a greater sense of empowerment in managing daily routines and activities as well as increase family adaptation [6].

Researchers stated that mothers' of children diagnosed with ASD often have concerns about their children's development long before their children receive a formal diagnosis. Their concerns often begin during the first two years of their children's life and include concerns about: (a) language development (e.g., little babbling by 12 months of age), (b) atypical social development (e.g., reduced shared attention, weak eye to-eye gaze), and (c) challenging behaviors (e.g., tantrums, crying, and sleep issues) [7]. Other researchers added that many mothers' first seek answers for their concerns from their family physician. They are often told there is “no need to worry” or that their children “will grow out of it”. Frequently, mothers' experience long wait lists because of referrals to a variety of professionals before they finally obtain a diagnosis of ASD for their children. Consequently, many children are not diagnosed with ASD until 4- 6 years of age, missing the benefits of early intensive intervention [8].

American Academy of Pediatrics (AAP) [9] emphasized that children with ASD have unique abilities and needs which require special considerations in designing, implementing and evaluating their educational programs. Educators need a better understanding of the educational approaches and program structures that are effective for these children. In recent years, research in neurobiological, behaviorist, and developmental approaches has emphasized the critical period of major brain development in the first five years of life when development has more plasticity and stimulation plays an important role. This has led to an interest in the concept of "Early Intervention" throughout the world. [10]

Children with ASD may experience high levels of stigmatization in society. Stigma may affect not only autistic individuals but also the family as well. Such families often

find that public reaction to them is stereotypical and negative. [11]

Child's disability tended to produce feelings of shame and guilt among Arab societies. Parental perceptions about the causes of disability have a tremendous impact on mothers' behaviors in terms of seeking help or intervention for their children or the kind of help they look for, and their support of the treatment process, disagreements may exist between the mothers' attitude about physical, supernatural, and metaphysical causes of disability, and the professionals' beliefs [12]. This conflict may lead the mothers' to seek some alternative cures like sociocultural, folk, or religious remedies. Studies also reveal that even mothers' from the same cultural backgrounds may hold different beliefs, based on their level of acculturation, socioeconomic status, and education. [11,12]

In addition, Mothers' of young children with disabilities had to face major challenges in seeking help and supports from professionals, because society viewed children with disabilities as unworthy people that made mothers' feel devalued, services available to children with disabilities during tat period were short in supply and low in quality [13]

Health care professionals need to understand parental attitude about autism and use that understanding to foster a mutually trusting, and collaborative approach to the child's medical care. The attitude and the assumptions that health care professional hold regarding parental contribution to the appearance and maintenance of their children's problematic behaviors and disorders greatly affect their choice of offered therapies and the intervention strategies that they use when interacting with the specific families. [14]

Caring for children with autism requires the services of health care professional as pediatricians, psychiatrists, nurses, clinical psychologist and social worker. Nurses are usually members of multidisciplinary team; they play the most significant role in autism recognition and diagnosis, this places nurses at a critical juncture because they must be increasingly knowledgeable, understanding and supportive of the mothers' and children afflicted with this condition. The nurses' level of understanding of autism can have a great impact on the prognosis of autism. [15,16]

Mothers' of children with autism have the right to choose the appropriate services and interventions for their children. Health care professional recognize that mothers' possess specialized knowledge that they lack. Mothers' use their knowledge to decide what they want and what they need

for their children. The role of Health care professional is guiding mothers' to make more effective and appropriate decisions. Also it is necessary that, mothers' and Health care professional play an active role in promoting positive attitude toward autistic children. [17]

Therefore, the aim of the current study is to investigate mothers' and health care professionals' knowledge and attitude toward autistic children.

Significant of the study:

The Centers for Disease Control and Prevention (CDC) (2014) estimates that 1 in 68 children (or 14.7 per 1,000 eight-year-olds) in multiple communities in the United States has been identified with ASD. This new estimate is roughly 30 percent higher than previous estimates reported by CDC (2012) of 1 in 88 children (11.3 per 1,000 eight year olds) being identified with an autism spectrum disorder [18]

In Egypt, [19] reported that in the society's early years, nearly 80 percent of children with autism had been previously incorrectly diagnosed with intellectual disabilities or cerebral palsy, which is not even similar. The biggest pediatricians of Egypt tend to misdiagnose and tell mothers' to leave their children in an institute and forget about them. Although there is no official data on the number of Egyptian children with autism, the international rate of approximately 1 in 68 children to come up with an estimate of 1 million. If diagnosed early enough, children with autism may have a better chance of "mainstreaming" going to regular schools and adapting to society. Age 18 months is the ideal to begin working with these kids.

In Egypt, There are lots of gaps in Egyptian understanding of autism. The public seems to have lack good information or experience with children with autism. A lack of knowledge can lead to the negative attitudes towards autistic individuals and families. Also, lack of knowledge about autism is major barrier to improve the health and wellbeing of children with autism [12 &19]. Thus, this study sought to assess

The results of the current research will be beneficial in nursing as one of the health care professional team in education, practice and care to develop and apply programs for autistic children and their mothers'.

Aim of the Study:

The aim of the current study is to assess mothers and Health care professional 'knowledge and attitude toward autistic children.

Research questions:

-What are mothers and Health care professional' knowledge and attitude related autistic children?

- What is the difference between mothers and Health care professional in knowledge and attitude regarding autistic children?

Subjects and Method

Research design:

A descriptive exploratory research design was utilized to investigate knowledge and attitude of mothers' and health care professional toward Autistic Children

Setting:

The present study was conducted at Abassia mental health hospital, outpatient clinic of autism and psychiatric clinic in the pediatric out- patient clinic pediatric hospital at Cairo University.

Subjects

A convenient sample consists of (55) mothers and health professional. 40 mothers and 15 health care's professional were working at outpatient clinics in the above previous mention settings. All participants were informed that the study hasn't any risk for them. After have been exposed to the rules of ethics, the participants were briefed on the objective of the study and encouraged to actively participate.

Data collection tools:

Three tools were used for data collection was developed by the researchers after extensive reviewing of related literature using structured interview scheduled included:

1-Personal data sheet: It included two parts.

Part one: It included data about the Health professional' personal data (3 questions): gender, job and years of clinical experience**.**

Part two: mothers data sheet include (6 questions) : mothers' age, level of education, residence, child age, gender and child 's rank.

2- Mothers' Knowledge and Attitude toward Autistic Child Questionnaire:

It is composed of 37 items (15 items to assess mothers' knowledge about Behaviors Characteristics to diagnose autism as language delays, Autism is a neurological disorder that affects the functioning of the brain , Social interaction difficulties and 22 statements to assess mothers' attitude about ASD as my child's autism will last for a short time, autism is a serious disorder. Answers were rated on a 5-point Likert scale ranging from 1 (Strongly Disagree) to five (Strongly Agree). It takes 45-60 minutes to be completed. Total score ranged from 37 to 185.

3- Health professional' knowledge and attitude related autistic child questionnaire:

It is composed of 37 items categorized into two domains. First domain behaviours/characteristics to diagnose autism included 15 items related to diagnostic criteria of autism. Second one refers to professionals' attitude about autism. This domain included 22 items. Answers were rated on a 5-point Likert scale ranging from 1 (Strongly Disagree) to five (Strongly Agree). It takes 45-60 minutes to be completed. Total score ranged from 37 to 185.

Validity and reliability

The content validity of this questionnaire was checked by five experts in the field of mental health, pediatric nursing and statistics. Necessary modifications were done. The reliability of the scale was measured by alpha coefficient and it was equal to 0.80.

Pilot Study

A Pilot study was carried out with 5 of mothers' and Health care professional to test the clarity, feasibility and the applicability of the study tools. Some items required specific clarifications and explanations from the researchers, those participants whom involved in the pilot study weren't included in the actual study.

Ethical Consideration

An official permission was obtained from directors of Abassia mental health hospital and pediatric hospital Cairo University also from the head of directors of outpatient clinic of autism and psychiatric outpatient clinic for pediatric to conduct the study**.** The ethical rules of research are guaranteed for each participant not to refrain. The subject was assured that the data are confidential and used only for research purposes. The researcher arranged time with health care professional and mothers' after finishing her child follow up. Researchers made full description of the study aim and procedures, written informed consents were introduced by Health care professional and mothers' of autistic child who agreed to participate. Reliability, confidentiality and privacy were assured. Researcher assured Health care professional and mothers of autistic children that no harm will expose if they express his / her opinion regarding knowledge and attitude toward autistic child.

Procedure:

Data collection was conducted over a four months period extending from February to May 2016. Researchers introduced themselves to Health care professional and mothers' of autistic child and explained the

aim of the study and the content of the tools to establish an initial rapport between Health care professional and mothers' of autistic child and researchers. All questions were answered and detailed explanation was given to obtain their acceptance and cooperation during conducted the interview session. Data collected through individual interview with Health care professional and mothers' of autistic child using different tools.Mothers' knowledge and attitude toward autistic child questionnaire and Health professional' knowledge and attitude toward autistic child questionnaire.

Statistical analysis

The data were analyzed using the Statistical Package for the Social Sciences statistical software (SPSS 20). Descriptive data were expressed as mean and standard deviation. Qualitative data were expressed as frequency and percentage. Chi-square was used to detect the relation between mothers' knowledge based on their selected personal variables. Comparison of means was performed using paired-sample t-test. Correlation among variables was done using Pearson correlation coefficient. Level of significance at $p<0.05$, 0.001 were used as the cut of value for statistical significance

Results

The results of the current study are divided into three parts: the first part refers to the results pertinent to personal characteristics of mothers', autistic children, and health care professional .As regards personal characteristics of mothers', table (1) reveals more than one third of mothers' level of education was bachelor degree (37.5%) and one quarter of them were illiterate, their mean age was 31.6± 8.9 years old. According to mothers' place of resident 75% of mothers' were from urban area. Regarding child gender, more than two thirds half of children were males (67.5%) while the rest of them were females (32.5%). Their mean age was 5.2± 3.1 years old. About more than half of the children (55%) were first child in their family.

Table (2) represents that more than half of Health care professional were females (60%) and 40% were males, 40% of them were psychologist, about more than one quarter of them were nurses (26.7%). According to years of experience in autistic child care, more than one third two fifths (40%) had more than 10 years and one third (33.3%) had from 1-5 years of experience.

The second part of the study results evident that there was no significant differences between mothers' and health care professional regarding knowledge about autism in some items as child's Autism will last for a short time, it will last for a long time, and it does not have much effect on mothers' life (0.476,0.116,0.084,0.553,0,111 respectively), while there was highly statistically significant differences in other items as child's Autism is likely to be permanent rather than temporary, will last for the rest of his/her life, and it is a serious disorder, has major consequences on mothers' life, and it has serious financial consequences(0,001,0.084, 0,014, 0.000,0.045, 0.000 respectively) . As regard to autism symptoms most of mothers' and Health care professional (45%,40% , 55%, 40% , respectively) disagree about "The symptoms of autistic child change a great deal from day to day , and come and go in cycles, with no statistically significant differences (1.24, .430 respectively). (Table 3)

As clarified in table (4) there was significant difference in attitude of mothers' and health care professional regarding mothers' role in care of their autistic children as nothing mothers' do will affect child's autism , the course of child's autism depends on mothers', (.040, .021, respectively), and highly significant difference toward effect of treatment as most of mothers' strongly agree (42%) about treatment will be effective in curing child's autism, while more than of Health care professional (53.3%) strongly disagree (p= .000).

Regarding the impact of treatment in prevention of negative effects of child's autism , table (5) revealed that more than one third of mothers' (37.5%) strongly agree, on the other hand ,less than half of health professional strongly disagree about the same item, with high statistically significant difference (p= .000) . More than half of mothers disagree about 'child's Autism doesn't make sense to his/ her mothers', while more than one third of health care professional (33.3%) agree about the same item, a highly statistically significant difference was found (p=.000). Concerning to mothers' understanding of autism, less than half of mothers' (42.5%), select somewhat, while two thirds of health care professional (66.7%) agree about the same item with high statistically significant difference (p=.000).

Regarding to mothers' reaction in relation to mothers' and health care professional attitude toward autistic child, table (6) revealed that more than one third of both think that autism is very unpredictable, also half of mothers' and more than one

third of Health care professional think that child's autism gets mothers' upset and makes them feel anxious to somewhat, (35%, 33.3%, 50%,40% 52.5%,40% respectively), with no significant difference (p= .881, .093, .372, respectively). Both of mothers' and health care professional disagree about child goes through cycles in which the symptoms of autism get better and worse, and autism makes mothers' feel angry, (30%, 53.3%, 45%,46.7% respectively) with no significant difference(p=.276, .,595, respectively).

- As noted from results regarding relation between mothers ' education, residence and their total attitude and total knowledge scores, there was no significant difference relation among mothers' personal data as , residence, education and their mothers total attitude and total knowledge scores (.175, .269, .085, and .921 respectively).
- It is evident from study results that there was significant difference relation between child's gender, rank in the family and mothers' total attitude scores (p= 0.034, 0.040 respectively), and no significant difference relation among child's , age, , and their mothers total attitude and total knowledge scores (p= 0.84 0.86, 0.732,0.476,. respectively).
- Regarding relation between health care professionals' personal data and their total attitude and total knowledge scores, results revealed that there was no significant difference relation among health care professionals' gender, job differences, and years of experience and their total knowledge and attitude scores (.981, 804,.074, .440, .065 respectively).

The third part of results proved that there was high statistically significant difference in knowledge total mean scores between mothers' and health care professional (P .136) . The results highlighted also that, there was no statistically significant difference concerning attitude of mothers and health care professional toward autistic children (P 0.000). (table7)

Table (1):Percentage distribution of Mothers and their Autistic Children related to personal characteristic (n=40)

Mothers' characteristic	**No**	**%**
Age/ years		
21-30	25	62.5
31+	15	37.5
Mean ±SD 31.6± 8.9		
Level of education		
Illiterate	9	22.5
Elementary School	5	12.5
Secondary School	11	27.5
Bachelor Degree	15	37.5
Residence		
Rural	10	25.0
Urban	30	75.0
Child's characteristics		
Age/ years		
<6	28	70.0
6+	12	30.0
Mean± SD 5.2± 3.1		
Gender :		
Male	27	67.5
Female	13	32.5
Birth order:		
First	22	55.0
Second	10	25.0
Third	8	20.0

Table (2): Percentage distribution of the Health Care Professionals related to Personal Characteristics (n=15)

Personal characteristics	**No**	**%**
Gender:		
Male	6	40
Female	9	60
Job:		
Psychiatrist	2	13.3
Nurse	4	26.7
Psychologist	3	20
Social worker	6	40
Years of experience:		
less one year	2	13.3
1-5 years	5	33.3
5-9 years	2	13.3
+10 years	6	40

Table (3): Percentage distribution of Mothers and Health Care Professionals related to Knowledge about Autism (n=55):

Items	Strongly Disagree	Disagree	Somewhat	Agree	Strongly Agree	X^2	p
	No (%)	No (%)	No (%)	No (%)	No (%)		
Child's Autism will last a short time.							
Mothers	3 (7.5%)	4(10.0%)	11(27.5%)	10(25%)	12 (30%)	3.511	.476
HCP	0	0	4 (26.7%)	6(40%)	5(33.3%)		
Child's Autism is likely to be permanent rather than temporary.							
Mothers	4 (10%)	20 (50%)	5 (12.5%)	3 (7.5%)	8 (20%)	19.748	.001*
HCP	0	0	1 (6.7%)	4(26.7%)	10(66.7%)		
child's Autism will last for a long time							
Mothers	1 (2.5%)	8 (20%)	8 (20%)	12 (30%)	11(27.5%)	7.400	.116
HCP	0	1 (6.7%)	2 (13.3%)	2(13.3%)	10(66.7%)		
child's Autism will pass quickly							
Mothers	3 (7.5%)	9 (22.5%)	5 (12.5%)	12 (30%)	11(27.5%)	9.714	.084
HCP	0	1 (6.7%)	7 (46.7%)	5(33.3%)	2 (13.3%)		
I expect child has Autism for the rest of his/her life							
Mothers	2 (5%)	12 (30%)	12 (30%)	5(12.5%)	9 (22.5%)	12.546	.014*
HCP	0	1 (6.7%)	2 (13.3%)	1 (6.7%)	11(73.3%)		
Autism is a serious disorder							
Mothers	0	15(37.5%)	11(27.5%)	10 (25%)	4 (10%)	26.190	.000*
HCP	1 (6.7%)	0	0	4(26.7%)	10(66.7%)		
child's Autism has major consequences on mothers' life							
Mothers	3(7.5%)	19(47.5%)	6 (15%)	3 (7.5%)	9 (22.5%)	9.740	.045*

HCP	1 (6.7%)	3 (20%)	3 (20%)	6 (40%)	2 (13.3%)		
Child's Autism does not have much effect on mothers' life.							
Mothers	6(15%)	15(37.5%)	9(22.5%)	5(12.5%)	5(12.5%)	3.029	.553
HCP	2(13.3%)	3 (20%)	6 (40%)	1(6.7%)	3 (20%)		
Child's Autism strongly affects the way others see him/her.							
Mothers	2(50%)	10 (25%)	14(35%)	8(20%)	6(15%)	7.524	.111
HCP	0	2 (13.3%)	2(13.3)	8(53.3%)	3(20%)		
child's Autism has serious financial consequences							
Mothers	2(5%)	9(22.5%)	15(37.5%)	8(20%)	6(15%)	21.455	.000*
HCP	0	0	2 (13.3%)	1(6.7%)	12 (80%)		
Child's Autism causes difficulties for those who are close to him/her.							
Mothers	2(5%)	8 (20%)	13(32.5%)	11(27.5%)	5(15%)	6.691	.153
HCP	0	2 (13.3%)	4 (26.7%)	2(13.3%)	7 (46.7%)		
There is a lot which mothers can do to control child's Autism symptoms.							
Mothers'	5(12.5%)	14 (35%)	12(30%)	0	9(22.5%)	3.056	.383
HCP	0	7 (46.7%)	6 (40%)	0	2 (13.3%)		
The symptoms of autistic child change a great deal from day to day.							
Mothers'	3 (7.5%)	18(45%)	15(37.5%)	2(5%)	2(5%)	7.240	.124
HCP	5(33.3%)	6(40%)	2(13.3%)	1(6.7%)	1(6.7%)		
Child's Autism symptoms come and go in cycles.							
Mothers	1(2.5%)	22(55%)	7(17.5%)	6 (15%)	4(10%)	3.828	.430
HCP	1(6.7%)	6(40%)	1(6.7%)	5 (33.3%)	2(13.3%)		

*significant <0.05 HCP Health Care Professionals

Table (4): Percentage distribution of Mothers and Health Care Professionals related to Attitude about Autism (n=55)

Items	Strongly Disagree	Disagree	Somewhat	Agree	Strongly Agree	X^2	p
	N (%)	N (%)	N (%)	N (%)	N (%)		
What mothers do can determine whether child's Autism gets better or worse.							
Mothers	1(2.5%)	6(15%)	11(27.5%)	14(35%)	8(20%)	9.996	.040*
HCP	2(13.3%)	6(40%)	5(33.3%)	1(6.7%)	1(6.7%)		
The course of child's Autism depends on mothers'.							
Mothers	3(7.5%)	11(27.5%)	15(37.5%)	5 (12.5%)	6 (15%)	11.579	.021*
HCP	0	0	4 (26.7%)	6 (40%)	5 (33.3%)		
Nothing mothers' do will affect child's Autism							
Mothers	10(25%)	18(45%)	8(20%)	0	4 (10%)	4.857	.183
HCP	3(20%)	3(20%)	7(46.7%)	0	2(13.3%)		
Mothers have the power to influence of child's Autism.							
Mothers	1(2.5%)	7(17.5%)	16 (40%)	12(30%)	4(10%)	9.233	.056
HCP	1(6.7%)	0	2(13.3%)	8(53.3%)	4(26.7%)		
Mothers' actions will have no effect on the outcome of child's Autism.							
Mothers	6 (15%)	17(42.5%)	9 (22.5%)	6(15%)	2(5%)	.985	.912
HCP	2(13.3%)	8 (53.3%)	3(20%)	1(6.7%)	1(6.7%)		
Child's Autism will improve with time.							
Mothers	0	5(12.5%)	5(12.5%)	16(40%)	14(35%)	16.378	.003*
HCP	2(13.3%)	6(40%)	4(26.7%)	2(13.3%)	1(6.7%)		
There is little that can mothers' do to improve child's Autism.							
Mothers	0	9(22.5%)	16(40%)	6(15%)	9(22.5%)	17.874	.001**
HCP	4(26.7%)	7 (46.7%)	3(20%)e	0	1(6.7%)		
child's treatment(s) will be effective in curing his/her Autism							
Mothers	0	3(7.5%)	5(12.5%)	15(37.5%)	17(42.5%)	30.600	.000**
HCP	8(53.3)	2(13.3%)	3(20%)	2(13.3%)	0		

Table (5): Difference between Mothers and Health Care Professional Regarding Attitude toward Autism (cont'd.) (n=55)

Items	Strongly Disagree	Disagree	Somewhat	Agree	Strongly Agree	X^2	p
	N0 (%)	N0 (%)	N0 (%)	N0 (%)	N0 (%)		
The negative effects of child's Autism can be prevented (avoided) by his/her treatment(s).							
Mothers	0	7(17.5%)	9 (22.5%)	9 (22.5%)	15(37.5%)	22.781	.000**
HCP	6 (40%)	5(33.3%)	1(6.7%)	2(13.3%)	1(6.7%)		
Child's treatment(s) can control his/her Autism.							
Mothers'	1(2.5%)	6 (15%)	10(25%)	10(25%)	13(32.5%)	7.111	.130
HCP	3(20%)	4(26.7%)	3(20%)	3(20%)	2(13.3%)		
There is nothing which can help child's Autism.							
Mothers	8(20%)	21(52.5%)	6(15%)	4(10%)	1(2.5%)	19.457	.000**
HCP	0	1(6.7%)	8(53.3%)	4(26.7%)	2(13.3%)		
The symptoms of child's Autism are puzzling to his/ her mothers'							
Mothers	5(12.5%)	8(20%)	16(40%)	9 (22.5%)	2(5%)	3.878	.423
HCP	3(20%)	6(60%)	4(26.7%)	2(13.3%)	0		
Autistic child is a mystery to his/ her mothers'							
Mothers	4(10%)	11(27.5%)	11(27.5%)	11(27.5%)	3(7.5%)	2.297	.681
HCP	1(6.7%)	4(26.7%)	7(46.7%)	2(13.3%)	1(6.7%)		
I don't understand child's Autism							
Mothers	4(10%)	10(25%)	15(37.5%)	6 (15%)	5(12.5%)	2.047	.727
HCP	2(13.3%)	2(13.3%)	8(53.3%)	1 (6.7%)	2(13.3%)		
child's Autism doesn't make sense to his/ her mothers'							
Mothers	6 (15%)	24(60%)	8(20%)	0	2(5%)	25.672	.000**
HCP	1(6.7%)	1(6.7%)	4(26.7%)	5(33.3%)	4(26.7%)		
Mothers' have a clear picture or understanding of child's Autism							
Mothers'	0	10(25%)	17(42.5%)	3 (7.5%)	10(25%)	25.618	.000**
HCP	1(6.7%)	1(6.7%)	1(6.7%)	10(66.7%)	2(13.3%)		

*significant<0.05 ** High Significant < 0.001

Table (6): Difference between Mothers and Health Care Professional regarding Attitude Toward Autism (cont'd.) n=55

Items	Strongly Disagree	Disagree	Somewhat	Agree	Strongly Agree	X^2	p
	N (%)	N (%)	N (%)	N (%)	N (%)		
Child's Autism is very unpredictable							
Mothers'	2(5%)	13(32.5%)	14(35%)	8(20%)	3(7.5%)	1.181	.881
HCP	2(13.3%)	4(26.7%)	5(33.3%)	3(20%)	1(6.7%)		
Child goes through cycles in which the symptoms of his/her Autism get better and worse.							
Mothers'	2(5%)	12(30%)	12(30%)	5(12.5%)	9(22.5%)	5.112	.276
HCP	1(6.7%)	8(53.3%)	4(26.7%)	2(13.3%)	0		
I get depressed when I think about child's Autism.							
Mothers	4(10%)	8(20%)	14(35%)	6(15%)	8(20%)	7.040	.134
HCP	0	6(40%)	5(33.3%)	4(26.7%)	0		
When I think about child's Autism I get upset.							
Mothers	4(10%)	4(10%)	20(50%)	6(15%)	6(15%)	7.963	.093
HCP	0	3(20%)	6(40%)	6(40%)	0		
Autistic child makes mothers' feel angry.							
Mothers	4(10%)	18(45%)	9(22.5%)	5(12.5%)	4(10%)	2.784	.595
HCP	3(20%)	7(46.7%)	4(26.7%)	1(6.7%)	0		
Child's Autism does not worry mothers'.							
Mothers	3(7.5%)	10(25%)	12(30%)	7(17.5%)	8(20%)	5.334	.255
HCP	0	1(6.7%)	5(33.3%)	6(40%)	3(20%)		
Autistic child makes mothers' feel anxious.							
Mothers	3(7.5%)	5(12.5%)	21(52.5%)	7(17.5%)	4(10%)	4.260	.372
HCP	0	1(6.7%)	6(40%)	6(40%)	2(13.3%)		

*significant<0.05

Table (7): Mothers and Health Care Professionals Differences regarding Total Knowledge and Attitude Mean Scores

Variables		Mean	SD	t	p
Total knowledge scores	Mothers	83.57	9.03	4.173	.000**.
	H C P	79.73	7.97		
Total attitude scores	Mothers	32.37	6.35	1.533	.136
	H C P	40.33	6.27		

*significant<0.05 ** high significant ≤ 0.001

Discussion

The current study aimed to investigate mothers' and health care professional knowledge and attitude toward autistic children. The distribution of the sample according to mothers' level of education, type of resident, child gender, child number in family showed that, more than one third of mothers' level of education were bachelor degree while others had elementary school, more than two thirds of mothers' were from urban, the rest of the sample was rural. Regarding child gender, more than half of the sample was males while the rest of the sample was females. About half of the children were first child in the family, while quarter of children was second child number in family. These results may be autism is pervasive developmental disorder occurs regardless mothers' education, and type of residence. Girls are less likely to develop autism, when they do they are more severely impaired.

In the same line autism is commonly reported in literature to have higher incidence in males than females. Previous studies had reported significant association of the ratio of 5.5:1 in Sweden Fernell, et al.(2010) [20]. In another study by Hussein, et al,(2011) [12] found that, the male to female ratio among their study sample in Egypt and Saudi Arabia was 1.6:1, being nearly equal in both groups (1.5:1 in Egyptian and 1.8:1 in Saudi group) which is less than that reported in other studies. Approximately the same ratio (1.6:1) was also found in another study on a sample of patients from Egypt, Saudi Arabia and Jordan in which the number of boys was 37 and the girls 23. In the same context, in the Saudi group, patients were significantly older in birth order when compared to the Egyptian group; also their results reported that High paternal and maternal education and high employment among mothers' of autistic children were significantly more preponderant in the Egyptian group

The importance of birth order was also emphasized in the study of Juneja et al (2005) [21] who reported that, the age of presentation was significantly earlier in firstborn children (2.28 years) as compared to later-born children (3.6 years). This observed difference might be attributable to mothers' spending more time with first born children.

Another explanation might be masculine cultural influence which is still especially evident in the same previous study. Another important finding was that the patients were significantly older in terms of birth order in the Saudi group than in the Egyptian group. Observationally, Saudi culture is characterized by younger age of marriage among males and females as well

as higher birth rate which is no longer the case except in rural Egyptian culture. Due to better educational background, the stoppage rule may be acting more in the Egyptian group.

These results in the current study should be taken with caution as the sample is not a community representative sample neither with respect to sample size nor methodology of recruiting patients, thus cannot be granted high value for discussing sex ratio. It might only indicate that families of patients are nearly equally concerned with affected male and female offspring and not essentially with males.

Regarding professional health characteristics include gender, type of job and years of experience, more than half of Health care professional were females, 40% of them were psychologist, about quarter of Health care professional were nurses. According to their years of experience in autistic child care more than one third had more than 10 years and one third had from 1-5 years of experience. These results were in agreement with Tipton and Blacher, (2014) [22] found that, the participants whose age ranged from 26 to 60 years. The years of practice ranged from 1 to 33 years. Most of the participants practiced in a tertiary health facility and the same number of participants were either specialists or specialists in training. Out of the participants who were general practitioners were females.

Regarding the first research question concerned with mothers' knowledge and attitude toward autistic child, the current research findings revealed that, the highest of mothers' knowledge and attitude toward autistic child were optimistic about the treatment effectiveness on their child, and their significant role toward their child which illustrate in the statements like, " child's Autism will pass quickly, child's treatment(s) will be effective in curing his/her Autism, child's Autism will improve in time, The negative effects of child's Autism can be prevented (avoided) by his/her treatment(s), child's treatment(s) can control his/her Autism, There is a lot which mothers' can do to control child's Autism symptoms, What mothers' do can determine whether child's Autism gets better or worse, while the lower mean scores were about child's Autism will last for a long time and there is little that can mothers' do to improve child's Autism. These findings could be interpreted as parental perceptions about the disability have a tremendous impact on mothers' behaviors in terms of seeking help or intervention for their children or the kind of help they look for, and their support of the treatment process.

These findings were congruent with Hebert and Koulouglioti (2010) [23] who revealed that, mothers' hold a wide variety of attitude about their child's autism. Some mothers' are pessimistic about their child's future while others are hopeful that new strategies will be developed. Some trust that society will become more accepting of their child's idiosyncrasies. Mothers' attitude about the cause of their child's autism has been found to have an impact on decisions regarding future health care, family planning, and maternal mental health. The link between parental attitude and their choices for interventions has not yet been empirically explored. Studies focusing on the importance of exploring parental attitude during the process of treatment planning is discussed.

But in many parts of Egypt, especially the poorest areas, lack of knowledge and access to resources about autism can have harmful consequences for the mothers' and delay treatment. In suburban or rural areas, people say children with autism have been touched by the devil or cursed — and sometimes mothers' even cage them, they're very poorly treated. The stigma doesn't stop after a child's diagnosis — especially in Egyptian culture, where reputation and status are important across all social classes. Mothers' hide it from the grand mothers' and other members of the family. They're worried that a diagnosis of autism could affect the child's marriage chances; or even discourage a prospective marital partner for a sibling. (Fathy ,2016) [24]

In the same context, in a recent research by Mire et al (2015) [25] they found that mothers' of autistic child have strong attitude about chronic nature of the condition, negative consequences of the illness, and the cyclical nature of the illness and indicate positive attitude about how controllable the illness is and how well the illness is understood.

Regarding to relation between personal data of mothers' and their knowledge and attitude toward scores toward autistic child, the current findings showed that, there was no significant differences detected regarding level of education , type of residence , while there was significant differences detected regarding child's gender and rank in the family and mothers' attitude toward autistic child . Studies by Amr, 2011 and Hadidi and Al Khateeb (2016) [26,27] indicate that mothers' perceptions of the nature of a disability may differ to some degree, based on their cultural values. In many Arab groups, violating a religious code is believed to be a cause of disability, especially when rational explanations of disability are not clear. The child's disability tended to produce feelings of

shame and guilt among Arab societies. In a study conducted by Daley, (2004) [28] regarding assessment of parent and professional perspectives about autism spectrum disorders in India reported that, over 50% of the mothers' of autistic child in India hoped that their children would be cured of their autism or that treatments would help them become normal. A majority of mothers' also spoke about their desire for the child to be accepted in the society.

As regards the factors such as socio-economic status, education levels, access to formal and informal support for families and their children with disabilities, place of living (e.g., city or village), support from immediate and extended families, and personal practices of faith, etc., Ravindran ,(2012)[29] reported that all have a significant impact on families' attitude about disabilities and their hope and expectations for their child with a disability. Thus, it is crucial to consider the demographics of the participants in various studies.

Concerning the rates of diagnosis across the genders, Kreiser and White,(2014)[30] proposed that ASD may be under identified in affected females without co-occurring intellectual impairment, owing to a pattern of subtle yet potentially meaningful gender differences in symptom manifestation (e.g.,less unusual stereotyped and repetitive behaviors in females, increased prevalence of internalizing problems in females) and gender inequities in research on the ASD phenotype that potentially contributes to biases in assessment tools and diagnostic practices. We recommended for future research directions on gender differences in ASD.

As regard to second research question of professional knowledge and attitude about Autism, the current study revealed that, the Health care professional had high knowledge about behaviours/ characteristics to diagnose autism, and they had positive professionals' attitude elated to mothers' behavior of autistic child and their effective role on child treatment, and also as to treatment options in statements as parental behavior has not been found to be a cause of autism.

In the same context Ravindran and Myers (2015)[31] reported that, the professionals identified the high level of focus on mothers' training and mother empowerment as being a unique feature. Mothers stayed with their children at school for the entire course of the day, and gained hands-on training in implementing treatment approaches with the children. According to, Christon et al (2010) [32] there is an overwhelming array of

treatments available for autism, including behavioral, cognitive, pharmaceutical, sensory, relational, vitamin, and diet therapies

The current study findings answered the third research question which showed that, there was no significant difference between mothers' and health professional's attitude about Autism. In the same context while parental hopes related to social mainstreaming and cure of their disabled child are often universal and seen in most mothers' of children with disabilities. In India a study conducted by DeLambo et al (2011)[33] found that less than half the mothers' believed that professionals had the ultimate say in decision making about or implementing treatments; however, these mothers', too, were positive and happy about this situation. Also the same study added thatm, disagreements may exist between the mothers' attitude and professionals' beliefs. This conflict may lead the mothers' to seek some alternative cures like sociocultural, folk, or religious remedies. Studies also reveal that even mothers' from the same cultural backgrounds may hold different beliefs, based on their level of acculturation, socioeconomic status, and education.

On the other hand, the findings of current study showed that there was statistical significant difference between mothers' and health care professionals in total knowledge scores. On the same context , in a study by Eseigbe et al, (2015) [34] to assess knowledge of childhood autism and challenges of management among medical doctors in Nigeria, The study showed a good knowledge of autism among medical doctors who are specialists particularly pediatricians and psychiatrists and in those who had seen a case of autism in the past. Knowledge was limited in general practitioners and the knowledge gap was mostly about onset and comorbidities of autism. Dearth of specialist services, cost of accessing care, and poor caregiver perspectives were major challenges of management. The study highlights the need to improve the knowledge of childhood autism among medical doctors and address the challenges hampering its management. These would increase the level of autism awareness and facilitate the achievement of better outcomes .

There has been evidence in the literature to suggest that professionals and families maintained a variety of attitude about autism, no single view of autism has emerged (Plumb AM and Plexico, 2013) [35]. Despite its limited scope and generalizability, the results of the current research provide evidence for the value of raising awareness and understanding about autism spectrum disorders among mothers',

professionals, and the larger society, and call to attention the need for more services and resources in local communities.

In another study by Zwaigenbaum,et al (2015) [36] for early screening of autism spectrum disorder: recommendations for practice and research , showed that, improvements over time in health care professional academic and clinical training related to ASD, but also continuing weaknesses in identifying ASD diagnostic criteria, and in self-efficacy for working with children with ASD and their mothers'

The American Academy of Pediatrics (2016) [37] had supplemented their current standards of care by providing both pediatricians and mothers' with comprehensive, up to date information on the screening, diagnosis, assessment, and treatment of autism. Underlying the presentation of factual data are the strong message to mothers' of hope and connection to others who have similar experiences, and focus on how mothers' and pediatricians can partner effectively to optimize developmental outcomes.

Conclusion:

The primary focus of this study was to investigate knowledge and attitude of mothers and heath care professionals toward autistic children. Overall, our results revealed that most of mothers' had positive attitude toward their autistic children regarding their role in care and effectiveness of treatment, and there was no significant difference between mothers' and Health care professional in total attitude scores. As expected there was statistical significant difference in total knowledge scores between mothers' and heath care professionals. The current study highlights the need to improve the knowledge and attitude of childhood autism among mothers and health care professionals. Children with autism require further researches in order to find out the most effective way to induce positive changes in this area and to increase the level of autism awareness and facilitate the achievement of better outcomes in the region.

Recommendations

- Design of future studies focused on how treatment decisions are made, particularly with regard to the importance of mothers' attitude.
- Involving of various professionals in ASD treatment, planning and delivery, ultimately mothers' assume primary responsibility for choosing, consenting for, and following through with treatments.
- Professionals can provide accurate information about ASD characteristics treatment options, disseminate up to-date research about evidence-based

therapies and news that may affect treatment recommendations, and advocate for whole-family needs.

- Exploring factors that influence mothers' treatment decisions will enhance professionals' abilities to support families experiencing ASD. As practitioners strive to collaborate with and meet the needs of affected children and their families
- Future studies will be implemented on larger representative samples of Egyptian autistic caregivers to settle the validity and reliability of the used Autism mother's knowledge Assessment Questionnaire.
- Establishment of different national autistic parental support groups seems very worthy to let them share their feelings, fears, concerns, and experiences in taking care of their children with each other and with members of the professional teams and society.

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Effect of a Clinical Pathway on Outcome of Children with Cancer Suffering from Neutropenia Undergoing Chemotherapy Treatment

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Abstract

The child suffering from neutropenia undergoing chemotherapy is demanding and requiring the integration of skills from numerous different specialties. These children often have prolonged hospitalizations, which may be marked by many complications. **The aim of this study** to design, implement and evaluate the effect of a clinical pathway for children with neutropenia undergoing chemotherapy.Quasi experimental research design was used. The study was carried out at Tanta Cancer Center Affiliated to the Ministry of Health. Out patient Clinic of Oncology and Inpatient Pediatric Oncology Department in Benha Children Hospital. 72 children with neutropenia undergoing chemotherapy was recruited for the study. Four tools were used for data collection, questionnaire sheet, Nutritional Assessment Sheets, Complication monitor sheet and follow pathway design for the study group. **The result** of the study revealed that there was no statistically significant difference between the study and control groups on admission but there was a statistically significant difference between the study and control groups after the implementation of the clinical pathway for the study group compared with the routine hospital policy care. **Conclusion:** Children with neutropenia undergoing chemotherapy to whom clinical pathway was applied fewer complications, less hospital stay and less readmission than those who received routine hospital care. **Recommendations:** Clinical pathway should be integrated into the routine nursing care for children with neutropenia undergoing chemotherapy.

Key words: Neutropenia, Chemotherapy, Prolonged Hospitalization, Clinical Pathway

Introduction

Cancer in children and adolescents is a life-altering event for them as well as their families. Although advances in treatment have increased the overall 5-year survival rate for childhood cancers to approximately 80%, cancer is still the second leading cause of death following accidents in children aged 5 to 14 years, however, little evaluation of the overall experience at the end of life of children who are dying of cancer or of their symptoms other than pain, cancer begins when cells in a part of the body start to grow out of control.(14)

Cancer, an abnormal growth of cells which tend to proliferate in an uncontrolled way and metastasize. Cancer is not one disease. It is a group of more than 100 different and distinctive diseases. Cancer can involve any tissue of the body and have many different forms in each body area. Most cancers are named for the type of cell or organ in which they start.(15)

Cancer is a generic term for a large group of diseases that can affect any part of the body. Other terms used are malignant tumors and neoplasms cancer is the creation of abnormal cells that grow beyond their usual boundaries, and which can then invade adjoining parts of the body and spread to other organs. This process is referred to as metastasizing. Metastases are the major cause of death from Cancer. (1)

Childhood cancer in Egypt is a growing concern for the society since its incidence has been increasing rapidly. The high mortality rate is assumed, due to the inadequate access to medical care in developing countries as there are very few hospitals or centers existing in these countries with the children cancer hospital being an exception to the rule. Lack of education and knowledge of health concerns particularly relating to children have delayed many families from seeking medical help and treatment. In addition, lack of transportation for the children obstacles concerning transportation from rural to urban places makes the available health care inaccessible. (34)

Leukemia is the most common type of childhood cancer, representing about one third of all cancers in children less than 15 years of age. Leukemia is a condition where too many underdeveloped white blood cells are found in the blood and bone marrow. Most of childhood leukemia's are acute lymphatic leukemias (ALL); other types include acute myeloid leukemia (AML) and chronic myeloid leukemia (CML). Brain tumors are the most common solid tumors in childhood.(3)

Chemotherapy is a chemical that binds to

and specifically kills tumor cells. Chemotherapy is usually systemic treatment, meaning that the drugs flow through the bloodstream to nearly every part of the body most cancer chemotherapeutic drugs are given intravenous or intramuscular. Some anticancer agents are taken orally.(4)

Side Effects of chemotherapy depend mainly on the drugs and the doses the child receives. Most anticancer drugs affect cells that divide rapidly. These include blood cells, which fight infection, help the blood to clot, or carry oxygen to all parts of the body. When blood cells are affected by anticancer drugs, children are more likely to develop infections, may bruise or bleed easily, and may have less energy. Cell hat line the digestive tract also divide rapidly resulting, loss of appetite, nausea and vomiting As a result of chemotherapy, child has side effects, such as, hair loss, or mouth sores. (7)

Cytotoxic chemotherapy suppresses the hematopoietic system, impairing host protective mechanisms so limiting the doses of chemotherapy that can be tolerated should be done. Neutropenia, the most serious hematologic toxicity, is associated with the risk of life-threatening infections as well as chemotherapy dose reductions and delays that may compromise treatment outcomes.(8)

Neutropenia is a condition where there are abnormally low levels of neutrophils in the blood supply. Neutrophils are an important type of white blood cell, vital for fighting off pathogens, particularly bacterial infections. Neutropenia can be caused by a decrease in neutrophils production, accelerated usage of neutrophils, increased destruction of neutrophils or a combination of all three factors. Neutropenia can be temporary (acute) or long-lasting .The condition is also split into congenital (present from birth) and acquired neutropenia (develops later in life).(105)

Neutropenic child their ability to mount an inflammatory response is limited. There are often few signs and symptoms of infection except for fever. Localized infections that appear minor can rapidly progress to a systemic infection, which may be fatal, therefore, considered a serious and potentially life-threatening complication in children undergoing systemic chemotherapy.(9)

Clinical pathway is a strategy that reduces resource utilization while maintaining the quality of care. The most popular methods intended to meet intense pressures to reduce the costs of health care. Clinical pathways are management plans that display goals for children and provide the corresponding ideal sequence and timing

of staff actions to achieve those goals with optimal efficiency. (11)

Clinical pathway is a tool for achieving coordinated care and desired health outcomes within an anticipated time frame, by using the appropriate resources available. A clinical pathway is a blueprint that guides the clinician in the provision of care.(13)

A clinical pathway is a method for the child -care management of a well-defined group of children during a well-defined period of time. A clinical pathway explicitly states the goals and key elements of care based on Evidence Based Medicine (EBM) guidelines, best practice and patient expectations by facilitating the communication, coordinating roles and sequencing the activities of the multidisciplinary care team, children and their relatives; by documenting, monitoring and evaluating variances; and by providing the necessary resources and outcomes. The aim of a clinical pathway is to improve the quality of care, reduce risks, increase children satisfaction and increase the efficiency in the use of resources and decrease length of hospitalization. (164)

Aim of the Study

The aim of the study was to determine the effect of clinical pathway on outcome of children with cancer suffering from neutropenia undergoing chemotherapy through. Design clinical pathway for children with cancer suffering from neutropenia undergoing chemotherapy Evaluate the effectiveness of clinical pathway on outcome of children with cancer suffering from neutropenia under going chemotherapy.

Research hypothesis

Children with cancer suffering from neutropenia undergoing chemotherapy treatment whom clinical pathway is expected to applied have fewer complications, less hospital stay ,less readmission and enhanced quality of care than those who will receive routine hospital care.

Materials and Method

Research Design:

A quasi -experimental research design was utilized in this study

Settings:

The study was carried out at Tanta Cancer Center Affiliated to the Ministry of Health (Pediatric Oncology department) - Out patient Clinic of Oncology and Inpatient Pediatric Oncology Department in Benha Children Hospital

Subject:

The subject of the study was consist of (72) children with cancer were selected from previously mention setting. The sample was randomly selected and divided into two equal groups.

Study group consist of 36 children were exposed to clinical pathway by the researcher, divided to Control group consist of 36 children were exposure to routine hospital care.

Tools of data collection:

Four tools were developed and used by researcher after reviewing the literature to collect information about.

Tool I:A questionnaire sheet

Part I- Bio socio demographic data

Data related to child: such as age, sex, birth order, level of education. This tool will be design by researcher in simple Arabic language after reviewing related literature.

Part II -Medical History:

Medical history was designed by the hospital policy (patient file), to identify eligible criteria for clinical pathway implementation, researcher will search for present diagnosis, main complain, past medical history and number of hospital admission for cycles of chemotherapy, cumulative dose toxicity on bone marrow of most chemotherapy treatment.

Part III-Dietary profile for the child included:

Feeding habits of the child such as, number of meals per day, their appetites, likes and un likes.

Feeding problem such as, nausea, vomiting, loss of appetite, difficulty in chewing and swallowing food, dryness of the mouth and change of food taste.

Part IV: Daily living activity as hyper activity, normal and limited activity, child play or not, types of play (quite play, active play, mixed play) and hours of play during the day.

Tool II: Nutritional Assessment Sheets:

It includes three parts:

Part I: Physical assessment sheet of cancer child which included:

Observation for general condition from head to toes includes hair, face, eye, lips, gume, skin, tounge, any gastro-intestinal tract problem, muscular-skeletal system and measurement of vital signs (temperature, pulse, respiration, blood pressure).

Part II: Anthropometric measurements sheet which includes:

Weight, height, body mass index, upper arm circumference and triceps skin fold thickness. Each of these measurements will be taken according to the standard procedure recommended by Jelliffe. (177)

Weight/age will be measured using bathroom scale and recorded to the nearest tenth of a kilogram. It is used as indicator of the nutrional status for the children.

Height /age will be measured and taken to the nearest 0.1cm and then recorded.

Body Mass Index (BMI) will be calculated as follow:

BMI=Weight in KG/(height in meter)2..

Mid arm circumference will be measured by placing the tape gently but firmly around the left upper am while hanging freely and on its mid point.The measurements will be recorded to the nearest 0.1 cm.

Skin –fold thickness: Triceps skin –fold thickness will be measured using harpenden caliper.

Part III: Laboratory investigations:

-Laboratory investigation included.Complet blood count.Renal function test. Liver function test.Lactate Dehydrogenises.Earthrocyte sedimentation rate. And Bone marrow aspiration.

Part IV: Daily dietary intake : to estimate the caloric intake by 24 hours recall method and fluid intake per day according to the food exchange list including the five main groups (milk group, meat, fruit, vegetable, bread, cereal. it will be calculated by number serving \ day and the average will be determined

Tool III: Complication monitor sheet:

This sheet will be designed by researcher for monitoring the presence of complication. It monitor complications which cover general and specific complications that resulting from administrating protocols of cycles chemotherapy. General complication included, pancytopenia, (bone marrow depression) ,Infection, anorexia, loss of weight, fever, mucositis, vomiting, diarrhea, hair loss and extra vacation. Specific complication included central nervous system as headache, muscle skeletal system as boneach, bleeding, cardiac complication as tachycardia and respiratory complication as tachyapnea.

Clinical pathway designed for children:

IV: Tool

The clinical pathway out come was designed by the researcher, implemented and evaluated for the clinical pathway included following items: -Feeding habit and problems. Daily living activity. Nutritional assessment sheet of cancer child .Physical assessment sheet of cancer child Anthropometric measurement Laboratory investigations Daily dietary intake

4-Safety measures for Medications intake which include the following :Blood transfusion (taken, not taken) Platelet intake (taken, not taken) .Antibiotic intravenous (oral, single, double) .Antipyretic (taken, not taken).Chemotherapy (taken, not taken) .Growth factors (taken, not taken) .Steroids: (taken, not taken)

Ethical and legal considerations

privacy and confidentiality was protected. Children were reassured that the obtained information were confidential and used

only for purpose of the study. Confidentiality and privacy were assured by code number on sheets instead name, Withdraw from the study was reserved at any time.

Procedure

The actual field work was carried out from May 2015 up to November 2015 for data collection. The researcher were available in the study settings four day per week, on Saturday and Tuesday at the mooring shift from 8.00 Am to 2.00 P.m in Out patient Clinic of Oncology and Inpatient Pediatric Oncology Department in Benha Children Hospital. and on Sunday and Wednesday in Tanta Cancer Center Affiliated to the Ministry of Health (Pediatric Oncology department),the researcher introduces herself to all hospital staff members in the two hospitals settings. The researcher explained the aim of the study and asked for the hospital team for cooperation. Children with cancer suffering from neutropenia undergoing chemotherapy were divided into two equal groups (study and control group). The researcher performs the research in the following phase:

1- Assessment phase:

Assessment of both study and control group of children with cancer suffering from neutropenia , socio demographic data, medical history , Dietary profile for the child Daily living activity nutritional assessment included, Physical assessment sheet of cancer child, Anthropometric measurements and laboratory investigation,Complication monitor sheet Pre-implantation of clinical pathway.

2- Implementation phase:

The researcher implement the clinical pathway step by step for the oncology staff consultant and nurse, Pharmacist, technician those responsible for providing clinical pathway.

The steps of intervention guidelines implementation.

The researcher will be available in the study settings four days per week consecutive, at the mooring shift from 8.00 A.M to 2.00 P.M in Tanta Cancer Center Affiliated to the Ministry of Health (Pediatric Oncology Department) and Out Patient Clinic of Oncology and Inpatient Pediatric Oncology Department in Benha Children Hospital.

The researcher explained the aim of the study and asked for the hospital team for cooperation.

Children with cancer suffering from neutropenia will be divided into two equal groups (study and control group).

The implementation of clinical pathway will be applied to all children in the study group and divided into 5 sessions. Each session will be expected to take duration of

30 minutes and will be given to each individually with family member

Discussion and power point for illustration will be used for each child individually.

The first session: It was focus on assess the children undergoing chemotherapy with neutropenia, assess all hematological system for study and control group .

The second session: It was concentrated on select the children which having neutropenia, assess all hematological system for study and control group.

The third session: Document all gathered data for comparison to evaluate the efficacy of clinical pathway.

The fourth session: Application of clinical pathway for study group only by all nursing staff included the following items :Feeding habit and problems, daily living activity ,nutritional assessment sheet of cancer child Physical assessment sheet of cancer child .Anthropometric measurement .Laboratory investigations Daily dietary intake

The fifth session :Safety practice during medication administration: that was included nine right, dose calculation, continuous monitoring and observation of side effect. - Medications intake which include the following .Blood transfusion (taken, not taken) .Platelet intake (taken, not taken).Antibiotic intravenous (oral, single, double).Antipyretic (taken, not taken).Chemotherapy (taken, not taken).Growth factors (taken, not taken)Steroids: (taken, not taken).

3- Evaluation phase:

Evaluate the effect of clinical pathway outcome on studied group and compare them with control group who received routine care by using the four tools three times pretest, immediate after clinical pathway implementation and follow up one month.

4-Statistical analysis:

An IBM compatible PC was used to store and analyze the data. Calculations were done by means of the Statistical Package for Social Sciences SPSS version 17. Data colleted were revised, coded and analyzed, and presented using descriptive statistics in the form of frequencies and percentages for qualitative variables; Means, standard deviations and z-score, for quantitative data. Test of significance was used for comparison between the study and control groups.Where ,P > 0.05 No statistically significant difference. P < 0.05* statistically significant difference.P < 0.001**highly statistically significant difference.

Results

Table (1) :Regarding to age, it was observed that nearly more than half of control group & half of the studied group age ranged between 8:10 year with mean

±SD 9.75 ±4.86,9.38±4.39 respectively. It was found that 61.1%, 50.5% were male in the studied and control group respectively. Regarding to educational level it was found that majority (94.4%) of the studied & more than three quarter (77.8%) of the control group had primary school level respectively .

Table (2): percentage distribution of studied children in relation to diagnosis it was found that two third (63.9%,72.2%) of the studied & control group suffering from leukemia .Regarding to time of hospital stay more than half 63.9% of the studied & most (86.1%) of the control group stay more than 10 days . in relation to school attendance it was found that (77.8%,66.7%)of the studied & control group not attended to school in relation to cause of absenteeism it was observed that more than half of the studed(85.3%)&nearly two third (66.7%)of the control group absent due to hospitalization . Their was a negative family history to cancer in children presented by (80.6%)of studied and control group respectively.

Table (4): Illustrates percentage distribution of studied children in relation to dietary profile , it was observed that in first five days, their were no statistically significant differences between the control and study group regarding to, feeding habits & problem including , feeding problem which, nausea, vomiting, loss of appitite, dysphagia and dry mouth were (p=0.003**, P=0.380, P=0.235, P=1.0, P=0.898, P=0.495, P=0.722) respectively. At second five days and third five days, it was observed that their were a highly statistically significant differences in the studied children between two groups were (p=0.001**) respectively .

Table (5): Illustrate percentage distribution of studied children suffering from neutropenia under chemotherapy related to daily activity, activity and physical examination. It was found that at first five days, there were no statistically significant differences between the study and control group regarding to, daily activity, level of activity and physical assessment of children which included, hair, face, lips, gums, gastrointestinal tract and skeletal system were (P=0.197, P=0.234, P=0.453, P=0.074, P=0.088,P=0.496, P=0.144, P=0.058) respectively. At second five and third five days, there were a highly statistically significant differences in the studied and control group were (p=0.001**) respectively

Table (6): Illustrate percentage distribution of studied children suffering from neutropenia under chemotherapy related to vital signs, it was found that at first five days, there was a statistically

significant differences between the study and control group regarding to body temperature (p=0.006**) ,but there were no a statistically significant differences between the control and study group regarding to pulse, respiration and blood pressure (p=1.0,p=0.751,p=0.892) respectively. At second &third five days, there were a highly statistically significant differences between study and control group (p=0.001**) respectively .

Table (7): Illustrate percentage distribution of studied children suffering from neutropenia under chemotherapy related to anthropometric measurements, it was found that at first five days, their was no a statistically significant differences between the study and control group regarding to weight, hight , arm circumference, subceatuous fat, body surface area (p=0.807,P=0.075,P=0.453, P=0.394,P=0.059) respectively. At second and third five days, their were a highly statistically significant differences in the studied children between two groups related to weight and body surface area were (p=0.002**, p=0.001**) respectively. Their was a statistically significant differences between study and control group in relation to height at second five days (p=0.013*). And their was no statistically significant differences in the studied children between between study and control group related to arm circumference at second and third five days were (p=0.088,p=0.077) respectively.

Table (8): Illustrate percentage distribution of studied children suffering from neutropenia under chemotherapy r related to laboratory investigation, it was found that at first five days, their were no a statistically significant differences between between study and control group regarding to complete blood count, lactic acid dehydrogenises, renal function test and bone marrow aspiration were (p=1.0, p=0.727, p=0.059, p=0.551) respectively. At second and third five days, their were a highly statistically significant differences in the studied children between study and control group related to lactic acid dehydrogenises, renal function test and bone marrow aspiration were (P=0.001**, P=0.005**) respectively .

Table (9): Illustrate percentage distribution of studied children suffering from neutropenia under chemotherapy r related to general complication, it was found that at first five days, their were no a statistically significant differences between the study and control group regarding to low platelet count, loss of appetite, loss of weight and hyperthermia were (P=1.0, P=0.285, P=0.280, P=0.058) respectively. At second and third five days, their were a highly statistically significant differences

in the studied children between study and control group related to all general complication were (P=0.001**) .

Table (10): Illustrate percentage distribution of studied children suffering from neutropenia under chemotherapy related to specific complication, it was found that at first five days, their were no a statistically significant differences between the study and control group regarding to specific complication which included, inflammation of mucous membrane, diarrhea, loss of hair, neurological system, level of activity, muscular and respiratory system, were (p=0.134, p=0.173, p=0.633, p=0.437, p=0.182, p=0.173, p=0.101, p=0.722 respectively. At second and third five days, their were a highly statistically significant differences in the studied children between two groups related to all specific complication were (p=0.001**)

Table (1): Percentage distribution of studied children suffering from neutropenia under chemotherapy related to Biosociodemographic characteristics.

Biosocio Demographic Characteristics	(n=36)		(n=36)	
	Study group		Control group	
	No	%	No	%
Age in years				
6>8< 8>10 10-12	8 25 3	22.2 69.4 8.3	14 18 4	38.9 50.0 11.1
Mean ±SD	9.75 ± 4.86		9.38 ± 4.39	
Sex **Male** **Female**	 22 14	 61.1 38.9	 18 18	 50.0 50.0
Educational level Primary school Preparatory school	 34 2	 94.4 5.6	 28 8	 77.8 22.2

Table (2): Percentage distribution of studied children suffering from neutropenia under chemotherapy related to medical history.

	(n=36) Study group		(n=36) (Control group		(n=72) Total	
	No	**%**	**No**	**%**	**No**	**%**
Diagnosis						
Leukemia	23	63.9	26	72.2	49	68.1
sold tumors	13	36.1	10	27.8	23	31.9
Time of hospital stay in days						
1-5	2	5.6	0	.0	2	2.8
>5	11	30.6	5	13.9	16	22.2
>10 days	23	63.9	31	86.1	54	75.0
Times of hospital admission						
Once	1	2.8	3	8.3	4	5.6
Twice more than twice	18	50.0	12	33.3	30	41.7
Others	17	47.2	21	58.3	38	52.8
School attendance						
Yes	8	22.2	12	33.3	20	27.8
No	28	77.8	24	66.7	52	72.2
Causes						
bad psychological status	4	11.1	3	8.3	7	9.7
hospitalization	21	58.3	24	66.7	45	62.5
general fatigue	0	.0	1	2.8	1	1.4
other	11	30.6	7	19.4	18	25.0
Hereditaryfactors						
Yes	7	14.9	21	19.4	38.9	29.2
No	29	80.6	15	80.6	61.1	70.8

Table (3): Percentage distribution of studied children suffering from neutropenia under chemotherapy related to dietary profile

		First five days no=72				Chi square		Second five days no=72				Chi square		Third five days no=72				Chi square	
		Study group		Control group		^2X	P value	Study group		Control group		X^2	P value	Study group		Control group		X^2	P value
		No	%	No	%			No	%	No	%			No	%	No	%		
Dietary profile																			
Number of meal per day	1	34	94.4	19	52.8	16.38	0.003**	0	.0	25	69.4	38.30	0.001**	0	.0	24	66.7	49.04	0.001**
	2	2	5.6	12	33.3			33	91.7	10	27.8			11	30.6	12	33.3		
	3	0	.0	5	13.9			3	8.3	1	2.8			25	69.4	0	.0		
Appetite																			
	Like	1	2.8	4	11.1	1.93	0.380	31	86.1	2	5.6	47.04	0.001**	36	100.0	0	.0	72.00	0.001**
	Dislike	35	97.2	32	88.9			5	13.9	34	94.4			0	.0	36	100.0		
Feeding problem																			
Nausea	Yes	31	86.1	25	69.4	2.89	0.235	5	13.9	34	94.4	47.04	0.001**	0	.0	32	88.9	57.60	0.001**
	No	5	13.9	11	30.6			31	86.1	2	5.6			36	100.0	4	11.1		
Vomiting	Yes	33	91.7	33	91.7	0.000	1.0	4	11.1	35	97.2	53.76	0.001**	0	.0	29	80.6	48.55	0.001**
	No	3	8.3	3	8.3			32	88.9	1	2.8			36	100.0	7	19.4		
Loss of appetite	Yes	33	91.7	34	94.4	0.215	0.898	8	22.2	34	94.4	38.62	0.001**	0	.0	31	86.1	54.43	0.001**
	No	3	8.3	2	5.6			28	77.8	2	5.6			36	100.0	5	13.9		
Dysphgia	Yes	32	88.9	30	83.3	0.465	0.495	5	13.9	33	91.7	43.69	0.001**	0	.0	32	88.9	57.60	0.001**
	No	4	11.1	6	16.7			31	86.1	3	8.3			36	100.0	4	11.1		
Dryness mouth	Yes	31	86.1	32	88.9	0.127	0.722	4	11.1	35	97.2	53.76	0.001**	0	.0	35	97.2	68.10	0.001**
	No	5	13.9	4	11.1			32	88.9	1	2.8			36	100.0	1	2.8		

At first five days: no significant
At second five days: highly significant at level p< 0.001**
At third five days: High significant at level p< 0.001**

Table (4): Percentage distribution of studied children suffering from neutropenia under chemotherapy related to daily activity, activity and physical examination.

		First five days no=72				Chi square		Second five days no=72				Chi square		Third five days no=72				Chi square	
		Study group		Control group		X^2	P value	Study group		Control group		X^2	P value	Study group		Control group		X^2	P value
		No	%	No	%			no	%	No	%			N o	%	No	%		
Daily activity						3.37	0.197					44.50	0.001**					52.72	0.001**
	hyper activity	0	.0	3	8.3			6	16.7	2	5.6			30	83.3	0	.0		
	Normal	4	11.1	5	13.9			28	77.8	4	11.1			3	8.3	7	19.4		
	limited activity	32	88.9	28	77.8			2	5.6	30	83.3			3	8.3	29	80.6		
Level of activity	no play	31	86.1	27	75.0	1.41	0.234	0	.0	24	66.7	36.05	0.001**	0	.0	23	63.9	61.26	0.001*
	Quite play	5	13.9	9	25.0			32	88.9	11	30.6			2	5.6	12	33.3		
	active play	0	.0	0	.0			4	11.1	1	2.8			32	88.9	1	2.8		
	group play	0	.0	0	.0			0	.0	0	.0			2	5.6	0	.0		
physical assessment for children hair	Yes	31	86.1	33	91.7	0.563	0.453	31	86.1	35	97.2	2.90	0.088	32	88.9	32	88.9	0.00	1.0
	No	5	13.9	3	8.3			5	13.9	1	2.8			4	11.1	4	11.1		
Face	Normal	4	11.1	10	27.8	3.19	0.074	32	88.9	6	16.7	37.67	0.001**	34	94.4	7	19.4	41.29	0.001**
	Abnormal	32	88.9	26	72.2			4	11.1	30	83.3			2	5.6	29	80.6		
Eye	Normal	2	5.6	8	22.2	4.18	0.041*	29	80.6	4	11.1	34.96	0.001**	36	100.0	10	27.8	40.69	0.001**
	Abnormal	34	94.4	28	77.8			7	19.4	32	88.9			0	.0	26	72.2		
Lips	Normal	1	2.8	5	13.9	2.90	0.088	30	83.3	2	5.6	44.10	0.001**	36	100.0	0	.0	72.00	0.001**
	Abnormal	35	97.2	31	86.1			6	16.7	34	94.4			0	.0	36	100.0		
Gums	Normal	4	11.1	6	16.7	0.462	0.496	34	94.4	2	5.6	56.88	0.001**	36	100.0	2	5.6	64.42	0.001**
	Abnormal	32	88.9	30	83.3			2	5.6	34	94.4			0	.0	34	94.4		
GIT	Normal	7	19.4	13	36.1	2.49	0.114	29	80.6	8	22.2	24.51	0.001**	35	97.2	7	19.4	44.80	0.001**
	Abnormal	29	80.6	23	63.9			7	19.4	28	77.8			1	2.8	29	80.6		
Skeletal system	Normal	27	75.0%	33	91.7%	3.60	0.058	11	30.6	30	83.3	20.45	0.001**	3	8.3	30	83.3	40.78	0.001**
	Abnormal	9	25.0%	3	8.3%			25	69.4	6	16.7			33	91.7	6	16.7		

Significant at level p< 0.001**

Table (5): Percentage distribution of studied children suffering from neutropenia under chemotherapy related to vital signs

		First five days no=72				Chi square		Second five days no=72				Chi square		Third five days no=72				Chi square	
		Study group		Control group		X^2	P value	Study group		Control group		X2	P value	Study group		Control group		X2	P value
		No	%	No	%			No	%	No	%			No	%	No	%		
Temperature	Normal	0	.0	6	16.7	10.28	0.006**	30	83.3	2	5.6	47.55	0.001**	36	100.0	9	25.0	43.20	0.001**
	Abnormal	36	100.0	27	75.0			3	8.3	31	86.1			0	.0	20	55.6		
Pulse	Normal	0	0	0	0			0	0	0	0			0	0	0	0		
	Abnormal	2	5.6	2	5.6	0.00	1.0	32	88.9	2	5.6	50.20	0.001**	36	100.0	15	41.7	29.64	0.001**
Respiration	Normal	0	0	0	0			0	.0	1	2.8			0	.0	1	2.8		
	Abnormal	27	75.0	29	80.6	0.321	0.571	35	97.2	15	41.7	26.18	0.001**	36	100.0	32	88.9	4.23	0.039*
Blood pressure	Normal	8	22.2	7	19.4	0.229	0.892	34	94.4	11	30.6	31.50	0.001**	36	100.0	13	36.1	33.79	0.001**
	Abnormal	20	55.6	22	61.1			2	5.6	19	52.8			0	.0	18	50.0		

Significant at level p< 0.001**

Table (6): Percentage distribution of studied children suffering from neutropeniaunder chemotherapy related to anthropometric measurements.

		First five days no=72				Chi square		Second five days no=72				Chi square		Third five days no=72				Chi square	
		Study group		Control group		X^2	P value	Study Group		Control group		X^2	P value	Study group		Control group		X^2	P value
		No	%	No	%			No	%	No	%			No	%	No	%		
Weight	Normal	13	36.1	14	38.9	0.059	0.807	27	75.0	14	38.9	9.57	0.002**	33	91.7	13	36.1	24.08	0.001**
	Abnormal	23	63.9	22	61.1			9	25.0	22	61.1			3	8.3	23	63.9		
hight	Normal	34	94.4	29	80.6	3.17	0.075	35	97.2	28	77.8	6.22	0.013*	36	100.0	28	77.8	9.00	0.003**
	Abnormal	2	5.6	7	19.4			1	2.8	8	22.2			0	.0	8	22.2		
Mid Arm circumference	Normal	33	91.7	31	86.1	0.563	0.453	35	97.2	31	86.1	2.90	0.088	36	100.0	33	91.7	3.13	0.077
	Abnormal	3	8.3	5	13.9			1	2.8	5	13.9			0	.0	3	8.3		
Subceatuous fat	Normal	34	94.4	32	88.9	0.727	0.394	36	100.0	33	91.7	3.13	0.077	36	100.0	19	52.8	22.25	0.001**
	Abnormal	2	5.6	4	11.1			0	.0	3	8.3			0	.0	17	47.2		
Body mass index	Normal	22	61.1	14	38.9	3.55	0.059	32	88.9	17	47.2	14.37	0.001**	32	88.9	17	47.2	14.37	0.001*
	Abnormal	14	38.9	22	61.1			4	11.1	19	52.8			4	11.1	19	52.8		

Significant at level p< 0.001**

Table (7): Percentage distribution of studied children suffering from neutropenia under chemotherapy related to laboratory investigation.

		First five days no=72				Chi square		Second five days no=72				Chi square		Third five days no=72				Chi square	
		Study group		Control group		X^2	P value	Study group		Control group		X2	P value	Study group		Control group		X2	P value
		No	%	No	%			No	%	No	%			No	%	No	%		
CBC	Normal	2	5.6	2	5.6	0.000	1.0	28	77.8	5	13.9	29.59	0.001**	36	100.0	5	13.9	54.43	0.001**
	Abnormal	34	94.4	34	94.4			8	22.2	31	86.1			0	.0	31	86.1		
LDH	Normal	2	5.6	4	11.1	0.727	0.394	29	80.6	2	5.6	41.29	0.001**	36	100.0	2	5.6	64.42	0.001**
	Abnormal	34	94.4	32	88.9			7	19.4	34	94.4			0	.0	34	94.4		
ESR	Normal	1	2.8	6	16.7	3.95	0.047*	28	77.8	3	8.3	35.40	0.001**	36	100.0	6	16.7	51.42	0.001**
	Abnormal	35	97.2	30	83.3			8	22.2	33	91.7			0	.0	30	83.3		
liver enzymes	Normal	27	75.0	11	30.6	14.26	0.001**	33	91.7	15	41.7	20.25	0.001**	36	100.0	17	47.2	25.81	0.001**
	Abnormal	9	25.0	25	69.4			3	8.3	21	58.3			0	.0	19	52.8		
kidney function tests	Normal	23	63.9	22	61.1	0.059	0.808	33	91.7	23	63.9	8.03	0.005**	36	100.0	22	61.1	17.37	0.001**
	Abnormal	13	36.1	14	38.9			3	8.3	13	36.1			0	.0	14	38.9		
bone marrow aspirations	Normal	11	30.6	14	38.9	0.551	0.458	31	86.	12	33.3	20.84	0.001**	36	100.0	15	41.7	29.64	0.001**
	Abnormal	25	69.4	22	61.1			5	13.9	24	66.7			0	.0	21	58.3		

Significant at level p< 0.001**

Table (8): Percentage distribution of studied children suffering from neutropenia under chemotherapy related to general complication.

		First five days no=72				Chi square		Second five days no=72				Chi square		Third five days no=72				Chi square	
		Study group		Control group		X^2	P value	Study group		Control Group		X^2	P value	Study group		Control group		X^2	P value
		No	%	No	%			No	%	No	%			No	%	No	%		
Anemia	Yes	33	91.7	24	68.6	5.95	0.014*	0	.0	26	72.2	40.69	0.001**	0	.0	25	69.4	38.29	0.001**
	No	3	8.3	11	31.4			36	100.0	10	27.8			36	100.0	11	30.6		
Immunity	mild	0	.0	8	22.2	20.16	0.001**	9	25.0	4	11.1	12.58	0.001**	9	25.0	5	13.9	34.45	0.001**
	modert	5	13.9	9	25.0			18	50.0	8	22.2			27	75.0	8	22.2		
	very low	20	55.6	19	52.8			9	25.0	24	66.7			0	.0	22	61.1		
	very veryu	11	30.6	0	.0									0	.0	1	2.8		
Low platelet count	Yes	21	58.3	21	58.3	0.000	1.0	1	2.8	20	55.6	24.26	0.001**	0	.0	21	58.3	29.64	0.001**
	No	15	41.7	15	41.7			35	97.2	16	44.4			36	100.0	15	41.7		
Loss of appetite	Yes	33	91.7	30	83.3	1.14	0.285	3	8.3	32	88.9	46.75	0.001**	1	2.8	32	88.9	53.76	0.001**
	No	3	8.3	6	16.7			33	91.7	4	11.1			35	97.2	4	11.1		
Loss of weight	Yes	21	57.1	25	69.4	1.16	0.282	7	19.4	24	66.7	16.37	0.001**	7	19.4	24	66.7	16.37	0.001*
	No	15	42.9	11	30.6			29	80.6	12	33.3			29	80.6	12	33.3		
Hyperthermia	>38.0	27	75.0	33	91.7	3.60	0.058	9	25.0	35	97.2	39.50	0.001**	4	11.1	34	94.4	50.15	0.001**
	hypothermia	9	25.0	3	8.3			27	75.0	1	2.8			32	88.9	2	5.6		

Significant at level p< 0.001**

Table (9): Percentage distribution of studied children suffering from neutropenia under chemotherapy related to specific complication.

		First five days no=72				Chi square		Second five days no=72				Chi square		Third five days no=72				Chi square	
		Study group		Control group		X^2	P value	Study group		Control group		X^2	P value	Study group		Control group		X^2	P value
		No	%	No	%			N o	%	No	%			No	%	No	%		
inflammation at mucous membrane	Yes	30	83.3	34	94.4	2.25	0.134	5	13.9	34	94.4	47.04	0.001**	4	11.1	34	94.4	50.15	0.001**
	No	6	16.7	2	5.6			31	86.1	2	5.6			32	88.9	2	5.6		
Vomiting	Yes	29	80.6	33	91.7	1.85	0.173	2	5.6	32	88.9	50.15	0.001**	0	.0	32	88.9	57.60	0.001**
	No	7	19.4	3	8.3			34	94.4	4	11.1			36	100.0	4	11.1		
Diarrhea	Yes	20	55.6	22	61.1	0.232	0.633	6	16.7	22	61.1	14.69	0.001**	6	16.7	21	58.3	13.33	0.001**
	No	16	44.4	14	38.9			30	83.3	14	38.9			30	83.3	15	41.7		
loss of hair	Yes	24	66.7	27	75.0	0.605	0.437	22	61.1	26	72.2	1.00	0.317	23	63.9	26	72.2	0.575	0.448
	No	12	33.3	9	25.0			14	38.9	10	27.8			13	36.1	10	27.8		
Neurological	Normal	8	22.2	3	8.6	3.41	0.182	25	69.4	6	16.7	20.74	0.001**	25	69.4	6	16.7	20.74	0.001**
	Headache	28	77.8	31	88.6			11	30.6	29	80.6			11	30.6	29	80.6		
	Paralysis	0	.0	1	2.9			0	.0	1	2.8			0	.0	1	2.8		
skeletal system	Normal	12	33.3	3	8.3	9.038	0.011*	27	75.0	1	2.8	40.04	0.001**	30	83.3	1	2.8	48.92	0.001**
	Pain	12	33.3	23	63.9			5	13.9	25	69.4			6	16.7	24	66.7		
	pain during examination	12	33.3	10	27.8			4	11.1	10	27.8			0	.0	11	30.6		
Bleeding	Yes	24	66.7	11	30.6	9.39	0.002**	11	30.6	12	33.3	0.064	0.801	5	13.9	12	33.3	3.77	0.052
	No	12	33.3	25	69.4			25	69.4	24	66.7			31	86.1	24	66.7		
level of activity	Normal	3	8.3	7	19.4	1.85	0.173	28	77.8	3	8.3	35.40	0.001**	29	80.6	3	8.3	38.02	0.001**
	Abnormal	33	91.7	29	80.6			8	22.2	33	91.7			7	19.4	33	91.7		
vascular system	Normal	8	22.2	3	8.3	2.68	0.101	35	97.2	3	8.3	57.06	0.001**	36	100.0	3	8.3	60.92	0.001**
	Abnormal	28	77.8	33	91.7			1	2.8	33	91.7			0	.0	33	91.7		
respiratory rate	Rapid	32	88.9	31	86.1	0.127	0.722	6	16.7	33	91.7	41.80	0.001**	0	.0	32	88.9	72.00	0.001**
	Slow	4	11.1	5	13.9			14	38.9	3	8.3			0	.0	4	11.1		
	Normal	0	.0	0	.0			16	44.4	0	.0			36	100.0	0	.0%		

Significant at level p< 0.001**

Discussion

As regards to biosocial characteristics, the present study showed that, about mean age of nine years of studied children was between 6-12 years. This result is in disagreement with **Legg et al. (2004)**) who found that the long-term incidence rates and trends (1975 to 2004) are adjusted for delays in reporting where possible. Delayed reporting primarily affects the most recent 1 to 3 years of incidence data (in this case, 2002 to 2004), especially for cancers such as melanoma, leukemia, and prostate that are frequently diagnosed in outpatient settings. (179)

Moreover, the male to female incidence in this study was exceed than female. This was in accordance with those of **Zelzar, (2000),** who pointed out that cancer, is more prevalent among male agreements with that study **American Cancer Society's Cancer Statistics Center (2012)** cancer is slightly more common among Hispanic and white children than among African-American and Asian-American children, and it is more common in boys than in girls. AML occurs about equally among boys and girls of all races. (33,180)

However no statistical significant difference was detected between both study and control groups of children regarding to sex.This study this result is in disagreement with **Fritz et al. (2008**)cancer incidence rates were stable in males from 1995 to 2008 and in females from 1999 to 2008, female exceed more than male. (181)

Regarding to educational level, the present study relieved that most of children with cancer at primary school, this result disagreements with **Ferlay et al. (2010),** cancer is being diagnosed more frequently during the child-rearing years. Sociodemographic and cancer-related information on families and minor (0–18 years). (182) Most of them were primary school in study group compared to control group were preparatory school. As regarding to setting it was equal percentage. So this table shows that there was no statistically significant difference between study and control group of children suffering from neutropenia under chemotherapy in relation to their age, sex, setting but level of education most of them were primary school.

Regarding to diagnosis, the present study relieved that most of children would have leukemia of study group and less of them having solid tumors of control group, this result was in accordance with those of **American Cancer Society's Cancer Statistics Center, (2012).** (33), Leukemia is the most common cancer in children 70% of children and teens, accounting for almost 1 out of 3 cancers. Overall, peaking between 2 and 4 years of age. Cases of AML are more spread out across the

childhood years, but this type of leukemia is slightly more common during the first 2 years of life and during the teenage years. This result disagreement with my study **Raab, (2009),** in general, cancer in children and teenagers is uncommon, accounting for less than 1% of all cancer cases in the United States. This year, an estimated 10,380 children younger than 15 and about 5,000 adolescents aged 15 to 19 will be diagnosed with cancer in the United States. This study agreement with this research Mitchell et al. (2009, solid tumors make up about 30% of all pediatric cancers. The most common types of solid tumors in children include brain tumors, neuroblastoma, rhabdomyosarcoma, Wilms' tumor, and osteosarcoma. [45,46)],

The present study indicated that the disease process had effect on children educational level, most of children wasn't attended in study group of the studied children in both study and control group did not attended at the school. As well as the absenteeism rate was high, majority of children were absent school. However there was no statistical difference between the study and control group. This could by due to the fact. Those children have gone to hospital to receive their medication and bad psychological state, as illustrated for the reason of absenteeism. More than half of the studied children due to hospital admission. The result of the present study contrast the study performed for children with cancer in royal hospital service and Al Amire Rahme Hospital in Jordan **(Holloway, 2009)**[183]**.**

The result of the present study agree with the result of **Polovich et al. (2009)** .who explained that children with cancer have to received chemotherapy in a regular basis and **Gharaibeh, (2009)** , reported that education was one of greatest difficulties affected children with cancer. Similarly, **Abd-El Baset, (2003)**, mentioned that the education of two third of children with cancer at school age was influenced by their attendance. [67,184,185]**,**

Concerning hereditary and maternal history for cancer. The result of the present study was found that, 14% of study group having hereditary factors to cancer in children compared to 80.6% of control group have no hereditary factors to cancer in children. This study was disagreemements with **Goldgar et al. (2010)** ,both environmental and hereditary factors cause cancer. Studies of familial cancer aggregation have been the main approach in the assessment of the hereditary effects in cancer. [186],

El-Nagar, (2005) who stated that there is a broad consensus on the predominant importance of environmental factors and somatic events in human cancer agree that some 60–90% of the studied cancers can be explained by environmental factors

only. Not shared among family members .[187]

As regarding to daily activity, level of activity and physical examination at first five days, the current study showed that no statistically significant differences between two groups, the two groups not active, no play, and physical examination having many abnormalities, at second five days the current study showed that the improvement for children and the differences between two groups after implementation of clinical pathway there were highly statistically significant differences between two groups in second five days the children in study group become normal active, play in calme way and all physical examination were improvement for the study group, rather than the control group who received the routine hospital care finally the third five days all children in study group hyper active, play in a groups in gardens and the physical assessment differentiated after implementation of clinical pathway so there were a highly statistically significant differences between two groups

The result of the present study in accordance with **Gharaibeh, (2009)** who stated that the clinical pathway has direct and tangible impact on children care process and outcome for children with cancer under chemotherapy suffering from neutropenia. [184],

The child didn't play until recovered from neutropenia, neutropenia affect the psychological condition of the child which they prefers isolation during neutropenia. So application of clinical pathway assist them to reduce the length of time of neutropenia for return to normal condition.

The present study revealed that the clinical pathway implemented by the researcher with the hospital team had effect on the studied children in relation to physical assessment, face, eye, lips, gum, skin, gastrointestinal problems and skeletal system problem. Which all physical assessment improved after implementation of clinical pathway in first five days and second five days and reach to normal at second five days so their were a statistically significant deference between study group at first five days and second five day after implementation of clinical pathway and reached to a highly statistically significant deference between study group at first five days and third five day.

The recovery of children from neutropenia is gradual and take time to occur not sudden. The role of clinical pathway good quality of care in fewer times. Also used to minimize average length of stay without compromising the quality of care process and out come.

The finding was in accordance with the result, **Zezler, (2000)** ,who mentioned that

clinical pathway had effect on finding of the current study revealed that there was a highly statistical significant in physical assessment. There was a prognosis in the result as well as face, eye, lips, gum, skin, gastrointestinal problems and skeletal system problem. (180),

Concerning the effect of clinical pathway for the study groups of the responding of children to daily nursing care, our study revealed that their was statistically significant difference between study groups of children in relation to their response to daily nursing care, in first five days and second five days the response of children was fifty percent related to daily weight, monitor of urine out put, fever, paller, infection, pain, subsidetofiftypercent. Hematourea, tenderness, purbra, mucositis subside to hundred percent.

Concerning the effect of clinical pathway for the study groups of the responding of children to daily nursing care at third five days their was statistically significant difference between study groups of children in relation to their response to daily nursing care, their response to daily nursing care reached to hundred percent.

That study is in agreement with **Rekha, (2005) ,**who stated that Clinical pathway is a tool used in achieving coordinated care and desired outcomes within an anticipated time frame by utilizing the appropriate resources available. A clinical pathway is a blueprint that guides the clinician in the provision of care.(192),.

The present study revealed that the clinical pathway implemented by the researcher with the hospital team had effect on the studied children in relation to their nutritional habits and effect in reducing their problems and their response to medication, their was a statistically significant differences between study groups of children which all feeding habits improved at first five days then reached to normal at third five days. The number of meal increased from one to two meals and reached to three beer day, their appetite improved, all gastrointestinal problems disappear along fifteen days. .(192),.

Regarding to their response to medication in study groups of children their response to medication different from first five days rather than second five days, they improved on treatment and reached to normal in third five days.

the child when he admitted to hospital in neutropenia theses children is in a very bad general condition, is in needed emergency care and treatment include isolation, blood transfusion, intravenous fluid and antibiotic means high quality of care, the all team conceder this child is critical case. All team acting for saving his life.

That study is in agreements with Polit, (2009) who found that interventional

categories consist of groups of activities that make up a comprehensive treatment, these categories typically include, tests, treatments and nursing interventions, consultations, medications, diet, activity, child and family education, and discharge planning. Outcomes focus on child care activity and nutrition are defined for each time interval, realistic, reflect incremental progress, and achievable by 90% of the children. [193],

Conclusion

The study could be concluded that:

Based on the results of the present study it could be concluded that Children with cancer suffering from neutropenia undergoing chemotherapy, to whom clinical pathway was applied had fewer complications, less readmission after discharge compared with those who received routine hospital care.

Recommendations

Based on the findings of the current study, the following recommendation is needed:

- Application of clinical pathway for children suffering from neutropenia undergoing chemotherapy was essential for reducing complications and less readmission.
- Clinical pathway should be applied as a routine nursing care for children with neutropenia undergoing chemotherapy.
- Hospitals should establish a policy concerning clinical pathway that should be available to each hospital units.
- Further studies are needed in order to apply and demonstrate the research on a larger population for generalization of results.
- Establish training for medical and paramedical staff regarding application of clinical pathway.

Future recommendation:

- A future study can be conducted for large sample
- Establishing a health education unit in the hospital to provide health education sessions for all heath team member and children.

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Effect of Computer Based Learning Regarding Airway Suctioning On knowledge and Skill Retention of Pediatric Nursing Students.

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Background: Computer-Based Learning (CBL) is an educational method that has been formed by combining computer technology and learning principles by oneself. **The aim** of this study was to design, implement computer based learning regarding airway suction and evaluate its effect on knowledge and skill retention of pediatric nursing students. A quasi experimental research design was used. **The subjects**: 150 pediatric nursing students in the third year, Faculty of Nursing, Tanta University. **Materials and Method:** Two tools were used to collect data: students' knowledge regarding airway suctioning and airway suctioning observational checklist. **The Results** revealed that the total scores of students' knowledge and practice for majority of study and control groups were unsatisfactory before teaching interventions and improved for both groups immediately, 2weeks, and 8 weeks with higher scores for study than control group. **Conclusion:** it can be concluded that there was a significant improvement in knowledge and skill retention of students studied with computer based learning method in relation to airway suctioning than students studied with traditional learning method. **Recommendations**: Medical and nursing education programs should adopt computer based learning in undergraduate education, and should support the introduction of computer based learning as an important step in curriculum development.

Key words: Computer-Based Learning, airway suction, knowledge and skill retention

Introduction:

Most nursing education relies on two main modes of instruction: The traditional classroom instruction and the laboratory session; in each one, the teacher can do a number of things through continually observing students for check out their understanding. On the other hand, traditional classroom instruction is usually delivered by instructors through different types of learning, such as, lectures, discussions and demonstration. It requires a number of students to be active listeners; the role of the teacher is to educate the students on various subjects and life skills[(1)].

The learning technology is defined as the application of technology for the enhancement of teaching, learning and assessment. Learning technology includes computer based learning and multimedia materials and the use of networks and communication systems to support learning. Learning technology must become an integral part of the general education curriculum, where students' requirements and fundamental literacy expectations are quickly changing. So, education must change to meet future technology challenges [(2)].

Computer based learning is an educational method which uses computers as an environment in which learning occurs, which enhances the learning period and students' motivation, and can be useful for students because of their different learning speeds. This educational method has been formed by combining computer technology and learning principles by oneself[(3)].

Computer based learning is visually attractive, since it presents concepts using demonstrations that are made attractive by animation, color and sound. In addition, CBL captures and holds students' attention by providing opportunities for competition, with the students' previous performance as the opponent. [(4)]Computer based learning also eliminates misconceptions by providing immediate feedback, since immediate feedback prevents incorrect learning concepts. In Computer-Assisted Learning (CAL) rote learning is minimized and meaningful learning can occur. [(5)]

Computer assisted instruction software encompasses a variety of approaches, such as drill and practice, tutorial, simulation, and basic problem solving. The most valuable aspect of CAI is that is actively involves the learner in the learning process and instruction is individualized to meet learner needs. The student can set the pace, spend as much time on a subject as needed for mastery, and do so in a private, nonjudgmental environment. Computer programs have enormous possibilities for teaching fundamental as well as advanced

skills. The computer is a reliable, attentive, and tolerant drill and practice partner. Computer assisted instructions offer consistent presentation of material and round- the clock accessibility. They are a time efficient and effective instructional method that reduces student- teacher ratios [6,7].

Other advantages of computer instruction include interactivity, increased student motivation, increased access to information, instructional consistency, reduction of teacher's repetitive tasks, individualized instruction, time efficiency, and cost effectiveness. With computer use, educators can be freed from repetitive tasks that become burdensome and boring over time[8] .

Education in health care's today both patient education and nursing staff/student education is a topic of greatest interest to nurses in every setting in which they practice. Teaching is the major aspect of the nurse's professional role[9] . Findings indicate that nursing students had positive perception of the impact of using information technology on teaching and learning critical care nursing in Egypt [10]. Critical care nursing needs special skills and techniques for working with these patients, for who care can make a huge difference, often between life and death. [11]As well, it needs critical thinking and problem solving skills[12] .

Airway suctioning is commonly employed in respiratory care to promote optimal airway patency in critically ill patient. [13] Airway suctioning can prevent damage the cilia and interfere with mucus production leading to atelectasis, decreased oxygen saturation leading to hypoxemia, raised Intra Cranial Pressure(ICP), cardiac arrhythmias, respiratory arrest, and infection. [14]Also airway suctioning is needed to maintain the patency and integrity of the artificial airways, decreased Peak Inspiratory Pressure (PIP), increased Tidal Volume (TV), and to obtain sputum specimen to rule out or identify pneumonia, other pulmonary infection or for sputum cytology. [15,16]

Nurses plays an crucial role in performing airway suctioning include making appropriate assessment of the child before suction such as heart rate and rhythm, respiratory rate, breath sounds, PIP in mechanically ventilated patient, and capillary oxygen saturation(SPO2). Pre-oxygenation of children immediately prior to suction procedure and maintenance of asepsis through hand hygiene, wearing gloves and protective clothing are essential nursing considerations. [17,18,19]The nurse should select the appropriate suction

catheter based on child age and endotracheal tube if present and she should determine level of suction pressure used according child age [20,21] .

During suctioning the nurse should observe cardiopulmonary parameters .After suctioning the nurse should assess heart rate and rhythm, respiratory rate and oxygenation. Chest auscultation should also be performed. Sputum should be observed for color, amount and consistency and child reaction [22,23]. The nurse should document the specific suction procedure used as well as the effects or outcomes and side effects[24,25]

The aim of the study was to design, implement computer based learning regarding airway suction and evaluate its effect on knowledge and skill retention of pediatric nursing students

Research Hypothesis

Is computer based learning more effective than traditional training of airway suctioning regarding knowledge and skill retention on short and medium term follow up.

Materials and Method

Materials

Research design

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

Setting: The study was conducted at:

1- The clinical laboratory skills for third year pediatric nursing students contain pediatric simulators, equipment and supplies.

2- The computer laboratory where 50 personal computers are available at Faculty of Nursing, Tanta University.

Subjects: A total sample of 150 pediatric nursing students in the third year, Faculty of Nursing, Tanta University. Study subjects were recruited from total population of female and male gender (N=275) who were studying pediatric nursing in the second semester during the academic year (2015- 2016).The sample was selected randomly.

Group 1: Control group included 75 students studying with traditional training as lecture and demonstration methods.

Group 2: Study group included 75 students studying with computer based training module.

Tools of data collection:

Two tools were used to collect data. These tools included the following.

Tool l: Students' knowledge regarding airway suctioning.

A structured questionnaire sheet:

It was developed by the researcher after reviewing the related literatures to assess the students' knowledge regarding airway suctioning it compromised two main parts:

First part: It covered biosocial characteristic of the studied students which

include: Age, sex and attendance of related clinical training.

Second part: It covered the students' knowledge regarding airway suctioning. It was designed in multiple choice questions from (MCQ) and was revised by pediatric nursing experts. The test was composed of 28 multiple choice questions that covered all knowledgeable items of airway suctioning .This tool was used at 4 points of time. Fist time prior to teaching intervention (pretest) then repeat it immediately following sessions (immediate, follow up), 2weeks later (short term follow up) and a further 8 weeks later (medium term follow up).

Knowledge items covered in this tool were definition of airway suction, purposes of airway suction, assessment need for airway suction, preparation of airway suction, implementation of the procedure, post care, complications**,** contraindications**,** and documentation. The possible total score for the factual knowledge ranged from (0) to (28), one point (1) for each correct answer and the incorrect answer scored (0).

The total score of the students' knowledge equal 100% and accordingly the student's answers was classified as follows:

- Satisfactory knowledge (60% or more)
- Unsatisfactory knowledge (less than 60%)

Tool II: airway suctioning observational checklist:

An airway suctioning observational checklist developed by the researcher to assess the students' performance of natural and artificial airway suctioning that is already included in pediatric nursing clinical book developed by pediatric nursing staff which updated every year after reviewing related literature.

This tool was used at 3 points of time, first time immediately following sessions then 2 weeks later (short term follow up) and a further 8 weeks later (medium term follow up).

It consisted of 5 performance categories assessment, preparation of equipment and patient, implementation, post care and documentation that made together steps for each one of the procedures.

Each item of practice was evaluated as follows:

- Correct done was scored (1)
- Not done or incorrect done was scored (0)

The observational checklist was consisted of (40) items and the total score for all items in observational checklist was (40). It was filled out by the researcher.

The total score of the students' practice equal 100% and accordingly the student's answers was classified as follows:

- Satisfactory practice (60% or more)
- Unsatisfactory practice (less than 60%)

Method:

1- An official permission was obtained from the dean of Faculty of Nursing, Tanta University after clarifying the purpose of the study, setting the time for beginning the study.

2- Students consent to participate in this study were obtained after explaining of the aim of the study.

3- Ethical consideration: Ethical approval was obtained from the research ethics committee of faculty of nursing, Tanta University. The students were reassured that the obtained information was confidential and used only for purpose of the study and that results would not contribute to their grades or affect their academic progress. The content of the CBL module was given to control group after evaluation of both groups.

4- Content validity: The Tools of the study were tested for content validity by the supervisors of this thesis and the experts in the field of pediatrics nursing. Modifications were carried out accordingly.

5- Pilot study: Study was conducted on 10% of students (25students) were selected randomly (who studying pediatric nursing in the first semester 2015-2016) from the same setting and were excluded from the study sample to evaluate the clarity and applicability of the computer module and research tools, estimate approximate time required for data collection, identify problems may hinder data collection and measures to overcome them. Necessary modifications after pilot study were done. Some questions were added and others were omitted.

6- Tools development: Two tools were used in this study.

7- Phases of the study: The study was conducted on three phases:

1-Assessment Phase:

It was carried out by the researcher for all study subjects to collect baseline data of this study and to assess students' knowledge about airway suction (Tool I).

2-Implementation Phase was included the following steps:

Setting objective.

-The content in knowledge section consisted of definition, purpose, indication, contraindication, complication and principles of airway suction. The principle section includes information about assessment need, preparation, implementation, post care and documentation for airway suction.

-Performance section consisted of natural and artificial airway suctioning

procedures which classified into assessment, preparation, implementation, post care and documentation.

Preparation of the content which covered the reason behind the application of the sessions. The computer module was developed by the assistance of a technologist using a combination of tutorials (text only), interactive multimedia, high quality photographs were also included to stimulate interest. The theoretical content was identical of to that of the traditional teaching sessions. The airway suctioning demonstration videos were embedded within the module and could be viewed by participant as required.

- This computer module was composed: The content in knowledge section definition, purpose, indication, contraindication, complication and principles of airway suction. The principle section includes information about assessment need, preparation, implementation, post care and documentation for airway suction. Procedures for different types of airway suctioning that explained all the steps of the practice with each. This part was presented by using flash program that was containing text, pictures, and videos.
- Performance section consisted of oral, nasal, endotracheal and tracheostomy airway suctioning procedures which classified into assessment, preparation, implementation, post care and documentation. When playing the procedure movie, the student found flexible moving between the different videos (oral, nasal, endotracheal and tracheostomy airway suctioning procedures) by affixed play bar that enabled moving play, previous or next buttons.
- The test yourself-section was including 15 multiple choice questions about airway suction which was interactive part. The computer spoke the written statement of each question, and then the student had to choose the right answer. After finishing the answers and submitting them, the computer had to tell him his score with a comment of either praising or supporting him in addition to offering a review for the questions.

Frist, information about the study was provided which included an explanation of the purpose and design of the study.

Pretest of the knowledge part of airway suctioning was distributed on the whole of the students at the beginning of the second semester to the study subject sample and at the same time, it had been collected by the researcher.

Control group:

- The students in the control group were studying using traditional methods of teaching, face to face lecture for knowledge section and demonstration and remonstration for performance section in pediatric nursing laboratory. The students in control group was divided into two groups in two pediatric laboratory skill labs and received the content of airway suction by two pediatric staff at the same time, one of them was the researcher.
- The students in control group already had the clinical book which contain all pediatric nursing procedures including airway suctioning procedures
- Prior to immediate knowledge test the researcher explained the test instructions that included the following: Each item had only one correct answer to be chosen and no further comments were offered.

- Immediate knowledge test and immediate performance checklist were completed at the end of the teaching session. The researcher told the student the date and the time they had to attend for 2 weeks follow up.
- 2weeks follow up knowledge test and performance check list were completed in the same way and the researcher told the student the date and the time they had to attend for 8 weeks follow up.
- 8weeks follow up knowledge test and performance checklist was completed in the same way.

Study group:

- The students in study group worked independently using computer based learning module via an individual computer at the faculty computer laboratory. The students of the study group were divided into two groups as the computer lab only consists of 50 computers. The theoretical content was identical to that of the traditional teaching. The oral, nasal, endotracheal and tracheostomy airway suctioning demonstration videos were embedded within the module and could be viewed by participants.
- A brief explanation to the linked features using computer based learning module was done to participants in the study group. Participants in study group were instructed to work through the module independently for the duration of the session.
- Teaching sessions for study group were 4 sessions and these sessions were repeated 4 times prior to each period of data collection.
- First session: consisted of computer module and students were allowed to study the oropharyngeal suctioning video.

- Second sessions: consisted of computer module and students were allowed to study the nasopharyngeal suctioning video.
- Third session: consisted of computer module and students were allowed to study the endotracheal suctioning video.
- Fourth session: consisted of computer module and students were allowed to study the tracheostomy suctioning video
- Prior to immediate knowledge test the researcher explained the test instructions that included the following: Each item had only one correct answer to be chosen and no further comments were offered.

- Immediate knowledge test and immediate performance checklist were completed at pediatric lab at the end of the teaching session. The researcher told the student the date and the time they had to attend for 2 weeks follow up.
- 2weeks follow up knowledge test and performance check list were completed in the same way and the researcher told the student the date and the time they had to attend for 8 weeks follow up.
- 8weeks follow up knowledge test and performance checklist was completed in the same way.

3-Evaluation Phase:

- The evaluation had been done before, immediately, 2weeks follow up and 8weeks follow up for the knowledge items for study and control groups.
- The evaluation was done immediately, 2weeks and 8weeks after teaching interventions for performance section for both groups.

Statistical Analysis:

The collected data was organized, tabulated, and statistically analyzed using SPSS software statistical computer package version 20. For quantitative variables, mean and standard deviations were calculated. For qualitative variables, the number and percentage distribution were calculated. Chi-square test was used to examine the relation between qualitative variables. Fisher exact test (p) was used to compare observations before, immediately and 2weeks and 8 weeks following teaching interventions. Significance was adopted at $p< 0.05$ for interpretation of results of tests of significance.

Results:

Table (1) represents Percentage distribution of knowledge about airway suction for study and control groups before teaching intervention. This table shows that there were no statistically significant differences between the study and control

groups before teaching interventions regarding definition, purpose, assessment need, preparation, implementation, post care, complication, contraindication and documentation of airway suction in the students sheet (p=0.0109, p=0.236, p=136, p=0.941, p=0,101, p=0.139, p=0.513, p=0.611, and p=0.513) respectively. Regarding the relation between study and control group immediately after teaching intervention, it was observed that there were no statistically significant differences between the study and control groups regarding definition, purpose, assessment need, preparation, implementation, post care, complication, contraindication and documentation of airway suction in the students' sheet (p=0.281, p=1.000, p=1.000, p=0.689, p=0.151, p=0.554,p=0.844, p=0.739 and p=1.000) respectively

On the other hand there were statistically significant difference in the study group knowledge regarding definition, purpose, assessment need, preparation, implementation, post care, complication, contraindication and documentation of airway suction in the students sheet (p=0.000) before and immediately after teaching intervention. Also there were statistically significant difference in the control group knowledge regarding definition, purpose, assessment need, preparation, implementation, post care, complication, contraindication and documentation of airway suction in the students sheet (p=0.001, p=0.001, p=0.005, p=0.000, p=0.000, p=0.001, p=0.000, p=0.006 and p=0.001) respectively before and immediately after teaching interventions.

Table (2) illustrates Percentage distribution of knowledge about airway suction for study and control groups 2 weeks and 8weeks following teaching intervention. This table shows that there were statistically significant differences between the study and control groups regarding definition, purpose, assessment need, preparation, implementation, post care, complication, contraindication and documentation of airway suction in the students' sheet(p=0.000, p=0.012, p=0.027, p=0.001, p=0.003, p=0.014, p=0.008, p=0.004 and p=0.004) respectively before teaching intervention. Regarding the relation between study and control group 8 weeks follow up after teaching intervention, it was observed that there were statistically significant differences between the study and control groups regarding definition, purpose, assessment need, preparation, implementation, post care, complication, contraindication and documentation of airway suction in the students' sheet (p=0.000, p=0.001,

p=0.002, p=0.009, p=0.002, p=0.001, p=0.047, p=0.034 and p=0.006) respectively.

On the other hand There were no statistically significant difference in the study group knowledge regarding definition, purpose, assessment need, implementation, post care, complication, contraindication and documentation of airway suction in the students' sheet (p= 0.774, p=0.166, p=0.273, p=0.132, p=0.111, p=0.099, p=0.644 and p=0.545)respectively before and immediately after teaching intervention.There were statistically significant difference in the control group knowledge regarding purpose, preparation, and post care of airway suction in the students' sheet (p= 0.026, p=0.040 and p=0.013) respectively before and immediately after teaching intervention.

Table (3) shows percentage distribution of the study and control groups practice regarding assessment signs and symptoms indicating upper airway secretion during oropharyngeal and nasopharyngeal suction immediately and 2 weeks following teaching intervention. It was observed that the majority of the study group (81.1%) give correct answer about assessing signs and symptoms indicating upper airway secretion immediately after teaching intervention and (79.3%) for the control group with no statistically significant difference between two groups (p=0.503) after teaching interventions.

As regard the study group students practice 2weeks after the teaching intervention it was found that the majority of them(78.2%) give correct answer about assessing signs and symptoms indicating upper airway secretion during oropharyngeal and nasopharyngeal suction compared to more than half of the control group (54.4%) with statistically significant difference between two groups(p=0.000) at 2weeks following teaching interventions.

This table shows that there were no statistically significant difference in the study group practice regarding assessing signs and symptoms indicating upper airway secretion during oropharyngeal and nasopharyngeal suction in the students' sheet (p=0.282) immediately after and 2 weeks following teaching interventions. While there were statistically significant difference in the control group practice regarding assessing signs and symptoms indicating upper airway secretion in the students' sheet (p=0.000) immediately after and 2 weeks following teaching intervention.

Table (4) shows percentage distribution of the study and control groups practice regarding intervention and implementation

of airway suction during oropharyngeal and nasopharyngeal suction suction immediately and 2 weeks following teaching intervention. It was observed that the majority of the study group (79.5 %)did the steps correctly about intervention and implementation during oropharyngeal and nasopharyngeal suction immediately after teaching intervention and (74.5%) for the control group with statistically significant difference between two groups(p=0.003) immediately after teaching interventions .

It was observed that the majority of the study group (79.5%)did the steps correctly about intervention and implementation during oropharyngeal and nasopharyngeal suction at 2 weeks follow up after teaching interventions compared to more than half of the control group (57%) with statistically significant difference between two groups(p=0.000) at 2 weeks follow up after teaching interventions

It was observed that there were no statistically significant difference in the study group practice regarding intervention and implementation during oropharyngeal and nasopharyngeal suction in the students' sheet (p=1.000) immediately after and 2 weeks following teaching interventions. While there were statistically significant difference in the control group practice regarding intervention and implementation during oropharyngeal and nasopharyngeal suction in the students' sheet (p=0.000) immediately after and 2 weeks following teaching interventions.

Table (5)shows percentage distribution of the study and control groups practice regarding post care after airway suction during endotracheal and tracheostomy suction immediately after and 2 weeks following teaching interventions. It was observed that the majority of the study group (85.9 %)did the steps correctly about post care after airway suction during endotracheal and tracheostomy suction immediately after teaching intervention and (74.7%) for the control group with statistically significant difference between two groups(p=0.000) immediately after teaching interventions.

It was observed that the majority of the study group (92.5%)did the steps correctly about post care after airway suction during endotracheal and tracheostomy suction at 2 weeks follow up after teaching interventions compared to nearly two third of the control group (68 %) with statistically significant difference between two groups(p=0.000) at 2 weeks follow up after teaching interventions.

It was observed that there were no statistically significant difference in the study group practice regarding post care after airway suction during endotracheal

and tracheostomy suction in the students' sheet (p=0.194) immediately after and 2 weeks following teaching interventions. Also there were no statistically significant difference in the control group practice regarding post care after airway suction during endotracheal and tracheostomy suction in the students' sheet (p=0.264) immediately after and 2 weeks following teaching interventions.

Table(6) shows percentage distribution of the study and control groups practice regarding documentation after airway suction during endotracheal and tracheostomy suction immediately after and 2 weeks following teaching interventions. It was observed that the more than two third of the study group (77.5 %)did the steps correctly about documentation after airway suction during endotracheal and tracheostomy suction immediately after teaching intervention and more than two third of the control group (68.7%) with statistically significant difference between two groups(p=0.001) immediately after teaching interventions.

It was observed that more than two third of the study group (73.7%) did the steps correctly about documentation after airway suction during endotracheal and tracheostomy suction at 2 weeks follow up after teaching interventions compared to nearly two third of the control group (64 %) with statistically significant difference between two groups(p=0.000) at 2 weeks follow up after teaching interventions.

It was observed that there were no statistically significant difference in the study group practice regarding documentation after airway suction during endotracheal and tracheostomy suction in the students' sheet (p=0.122) immediately after and 2 weeks following teaching interventions. While there were statistically significant difference in the control group practice regarding documentation after airway suction during endotracheal and tracheostomy suction in the students' sheet (p=0.000) immediately after and 2 weeks following teaching interventions.

Table (7) represents the total scores of the control and study group knowledge regarding airway suction before, immediately after, 2weeks follow up, and 8weeks follow up. It was observed that the total score for the majority of the study and control group (94.7% and 86.7%) respectively were un satisfactory before the teaching interventions while the majority of the study and control group (98.7% and 92%) respectively were satisfactory immediatelyafter the teaching interventions.

In relation to the total score of the study and control group knowledge regarding airway suction at 2weeks follow up. It was

observed that the majority of the study group (98.7%) while two third of the control group (66.7%) were satisfactory. As regard the total score of the study and control group knowledge regarding airway suction at 8weeks follow up, it was observed that the majority of the study group (98.7%) while nearly two third of the control group(58.7)were satisfactory.

Table (8) represents the total scores of the control and study group performance regarding airway suction before, immediately after, 2weeks follow up, and 8weeks follow up. It was observed that the total score for the majority of the study and control group (93.3% and 80%) respectively were satisfactory immediately after the teaching interventions.

In relation to the total score of the study and control group knowledge regarding airway suction at 2weeks follow up. It was observed that the majority of the study group (90.7%) while one third of the control group (33.3%) was satisfactory. As regard the total score of the study and control group knowledge regarding airway suction at 8weeks follow up, it was observed that the majority of the study group (89.3%) while nearly one third of the control group(22.7%)were satisfactory

Table (1) Percentage distribution of knowledge about airway suction for study and control groups before and immediately after teaching intervention.

Students' knowledge	Before the teaching intervention									Immediately after the teaching intervention									P1&P2	P1&P2
	Study group (n=75)				Control group (n=75)				Chi p-value	Study group (n=75)				Control group (n=75)				Chi p-value	Study group	Control group
	Correct		Incorrect		Correct		Incorrect			Correct		Incorrect		Correct		Incorrect			Chi p-value	Chi p-value
	No.	%	No	%	No.	%	No.	%		No.	%	No.	%	No.	%	No.	%			
Definition of airway suction	33	44.4	42	55.6	39	52	36	48	2.572 0.109	68	91.1	7	8.89	66	88	9	12	1.164 0.281	112.182 0.000**	15.180 0.001*
Purpose for airway suction	39	52	36	48	42	56	33	44	0.242 0.236	61	81.3	14	18.7	61	81.3	14	18.7	0.001 1.000	43.042 0.000**	11.186 0.001*
Assessment need for airway suction	30	40	45	60	44	58.7	31	41.3	2.218 0.136	60	80	15	20	60	80	15	20	0.001 1.000	25.000 0.000**	8.027 0.005*
Preparation of airway suction	31	41.1	44	58.9	44	41.3	47	58.7	0.006 0.941	53	71.2	22	28.8	52	69.9	23	30.1	0.160 0.689	69.142 0.000**	61.837 0.000**
Implementation of the procedure	28	37.33	62.67	57.8	31	41.1	44	58.9	2.694 0.101	63	84.1	12	15.9	61	81.56	14	18.4	2.067 0.151	412.855 0.000**	310.82 0.000**
Post care	29	38.7	46	61.3	38	50.7	37	49.3	2.185 0.139	60	80	15	20	57	76	18	24	0.350 0.554	26.552 0.000**	10.364 0.001*
Complication	37	49.3	38	50.7	33	44	42	56	0.429 0.513	59	78.7	16	21.3	58	22.7	17	22.7	0.039 0.844	14.005 0.000**	17.461 0.000**
Contraindication	26	34.7	49	65.3	29	38.7	46	61.3	0.258 0.611	44	58.7	31	41.3	46	61.3	29	38.7	0.111 0.739	8.679 0.000**	7.707 0.006*
Documentation	38	50.7	37	49.3	42	56	33	44	0.429 0.513	61	81.3	14	18.7	61	81.3	14	18.7	0.001 1.000	15.716 0.000**	11.186 0.001*

*Significance at level P < 0.05

Table (2) Percentage distribution of knowledge about airway suction for study and control groups 2 weeks and 8weeks following teaching intervention

Students' knowledge	2 week after the teaching intervention									8 week after the teaching intervention									P3&P4	P3&P4
	Study group (n=75)				Control group (n=75)				Chi p-value	Study group (n=75)				Control group (n=75)				Chi p-value	Study group	Control group
	Correct		Incorrect		Correct		Incorrect			Correct		Incorrect		Correct		Incorrect				
	No.	%	No	%	No.	%	No.	%		No.	%	No.	%	No.	%	No.	%		Chi p-value	Chi p-value
Definition of airway suction	69	92.4	6	7.6	52	69.3	23	30.7	12.354 0.000**	68	91.1	7	8.89	50	66.7	25	33.3	12.871 0.000**	0.084 0.774	0.123 0.726
Purpose for airway suction	67	89.3	8	10.7	55	73.3	20	26.7	6.323 0.012*	61	81.3	14	18.7	42	56	33	44	11.186 0.001*	1.918 0.166	4.931 0.026*
Assessment need for airway suction	65	86.7	10	13.3	54	72	21	28	4.920 0.027*	60	80	15	20	42	56	33	44	9.926 0.002*	1.200 0.273	1.601 0.602
Preparation of airway suction	70	93.3	5	6.7	55	73.3	20	26.7	10.800 0.001*	58	77.3	17	22.7	43	57.3	32	42.7	6.820 0.009*	7.670 0.006*	4.239 0.040*
Implementation of the procedure	69	92.2	6	7.78	55	73.3	20	26.7	9.119 0.003*	63	84	12	16	46	61.3	29	38.7	9.700 0.002*	2.273 0.132	2.455 0.177
Post care	63	84	12	16	50	66.7	25	33.3	6.063 0.014*	55	73.3	20	26.7	35	46.7	40	53.3	11.111 0.001*	2.542 0.111	6.109 0.013*
Complication	59	78.7	16	21.3	44	58.7	31	41.3	6.972 0.008*	50	66.7	25	33.3	38	50.7	37	49.3	3.959 0.047*	2.719 0.099	0.968 0.325
Contraindication	65	86.7	10	13.3	50	66.7	25	33.3	8.385 0.004*	63	84	12	16	52	69.3	23	30.7	4.509 0.034*	0.213 0.644	0.123 0.726
Documentation	61	81.3	14	18.7	45	60	30	40	8.233 0.004*	58	77.3	17	22.7	42	56	33	44	7.680 0.006*	0.366 0.545	0.246 0.620

*Significance at level P < 0.05

Table (3) percentage distribution of the study and control groups practice regarding assessment signs and symptoms indicating upper airway secretion during oropharyngeal and nasopharyngeal suction immediately and 2 weeks following teaching intervention.

Students practice before oropharyngeal and nasopharyngeal suction	Immediately after the teaching intervention									2 weeks after the teaching intervention									P1&P2	P1&P2
	Study group				Control group				Chi p-value	Study group				Control group				Chi p-value	Study group	Control group
	Correct		Incorrect		Correct		Incorrect			Correct		Incorrect		Correct		Incorrect			Chi p-value	Chi p-value
	No.	%	No	%	No.	%	No.	%		No.	%	No.	%	No.	%	No.	%			
Assessment signs &symptoms indicating upper airway secretions																				
Assess patient restlessness	59	78.7	16	21.3	57	24	18	76	0.152 0.697	56	74.7	19	25.3	62	82.7	13	17.3	1.430 0.232	0.335 0.562	1.017 0.313
Auscultate gurgling sound during respiration	66	88	9	12	66	88	9	12	0.001 1.000	63	84	12	16	52	69.3	23	30.7	0.609 0.435	0.498 0.480	7.786 0.005*
Observe patient skin color	54	72	21	28	48	64	27	36	1.103 0.294	53	70.7	22	29.3	37	49.3	38	50.7	7.111 0.008*	0.033 0.857	3.285 0.070
Check respiration &auscultate lung sound	60	80	15	20	60	80	15	20	0.001 1.000	60	80	15	20	34	45.3	41	54.7	19.263 0.000**	0.000 1.000	19.263 0.000**
Check vital signs	67	89.3	8	10.7	69	92	6	8	0.315 0.575	63	84	12	16	37	49.3	38	50.7	20.280 0.000**	0.923 0.337	32.933 0.000**
Determine decreased oxygen saturation	59	78.7	16	21.3	57	76	18	24	0.152 0.697	57	76	18	24	23	30.7	52	69.3	30.964 0.000**	0.152 0.697	30.964 0.000**
Total	365	81.1	85	18.9	357	79.3	93	20.7	0.448 0.503	352	78.2	98	21.8	245	54.4	205	45.6	56.963 0.000**	1.159 0.282	

*Significanceat level P < 0.05

Table (4) percentage distribution of the study and control groups practice regarding intervention and implementation of airway suction during oropharyngeal and nasopharyngeal suction immediately and 2 weeks following teaching intervention.

Students practice during oropharyngeal and nasopharyngeal suction	Immediately after the teaching intervention									2 weeks after the teaching intervention									P3&P4	P3&P4
	Study group (n=75)				Control group (n=75)				Chi p-value	Study group (n=75)				Control group (n=75)				Chi p-value	Study group	Control group
	Correct		Incorrect		Correct		Incorrect			Correct		Incorrect		Correct		Incorrect				
	No.	%	No	%	No.	%	No.	%		No.	%	No.	%	No.	%	No.	%		Chi p-value	Chi p-value
Intervention and implementation for suctioning																				
Perform hand hygiene	61	81.3	14	18.7	61	81.3	14	18.7	0.001 1.000	61	81.3	14	18.7	27	64	48	36	31.782 0.000**	0.000 1.000	31.782 0.000**
Place a towel across the child's chest	58	77.3	17	22.7	54	72	21	28	0.564 0.453	58	77.3	17	22.7	27	36	48	64	26.090 0.000**	0.000 1.000	19.565 0.000**
Turn suction to appropriate pressure	62	82.7	13	17.3	60	80	15	20	0.176 0.675	62	82.7	13	17.3	41	54.7	34	45.3	13.665 0.000**	0.000 1.000	10.942 0.001*
Open sterile catheter package on a clean	54	72	21	28	49	65.3	26	34.7	0.775 0.379	54	72	21	28	21	28	54	72	29.040 0.000**	0.000 1.000	21.000 0.000**
Connect it to the suction machine tube	59	78.7	16	21.3	57	76	18	24	0.152 0.697	59	78.7	16	21.3	59	78.7	16	21.3	0.001 1.000	0.000 1.000	0.152 0.697
Hyperventilate the patient with several breathes	48	64	27	36	32	42.7	43	57.3	6.857 0.009*	48	64	27	36	32	42.7	43	57.3	6.857 0.009*	0.000 1.000	0.000 1.000

Continue table (4)

Wear a clean disposable gloves in non-dominant hand and one sterile in dominant hand	53	70.7	22	29.3	45	60	30	40	1.884 0.170	53	70.7	22	29.3	34	45.3	41	54.7	9.880 0.002*	0.000 1.000	3.236 0.072
Check the equipment functioning properly	62	82.7	13	17.3	58	77.3	17	22.7	0.667 0.414	62	82.7	13	17.3	41	54.7	34	45.3	13.665 0.000** *	0.000 1.000	8.586 0.003*
Turn off the suction apparatus	55	73.3	20	26.7	52	69.3	23	30.7	0.293 0.588	55	73.3	20	26.7	66	88	9	12	5.172 0.023*	0.000 1.000	7.786 0.005*
Insert catheter into the tracheal tube gently and quickly until resistance is met then put it back.5cm	67	89.3	8	10.7	63	84	12	16	0.923 0.337	67	89.3	8	10.7	56	74.7	19	25.3	5.465 0.019*	0.000 1.000	1.992 0.158
Turn suction to appropriate pressure	55	73.3	20	26.7	48	61	27	36	1.518 0.218	55	73.3	20	26.7	41	54.7	34	45.3	5.671 0.017*	0.000 1.000	1.354 0.245
Rotate catheter gently in one smooth un interrupted motion	71	94.7	4	5.3	69	92	6	8	0.429 0.513	71	94.7	4	5.3	46	61.3	29	38.7	24.281 0.000** *	0.000 1.000	19.714 0.000**
Provide hyper ventilation in between and after suctioning	64	14.7	11	14.7	64	85.3	11	14.7	0.001 1.000	64	14.7	11	14.7	29	38.7	46	61.7	34.663 0.000** *	0.000 1.000	34.663 0.000**
Allow patient to rest 2-3 minutes in between suctioning	65	86.7	10	13.3	63	84	12	16	0.213 0.644	65	86.7	10	13.3	36	48	39	52	25.490 0.000** *	0.000 1.000	21.658 0.000**

Continue table (4)

Assess patient cardio pulmonary status in between suction	**54**	**72**	**21**	**28**	**54**	**72**	**21**	**28**	**0.001 1.000**	**54**	**72**	**21**	**28**	**45**	**60**	**30**	**40**	**2.406 0.121**	**0.000 1.000**	**2.406 0.121**
Flush the catheter with sterile water or normal saline	**62**	**82.7**	**13**	**17.3**	**60**	**80**	**15**	**20**	**0.176 0.675**	**62**	**82.7**	**13**	**17.3**	**61**	**81.3**	**14**	**18.7**	**0.045 0.832**	**0.000 1.000**	**0.043 0.836**
Repeat suctioning as needed	**64**	**85.3**	**11**	**14.7**	**61**	**81.3**	**14**	**18.7**	**0.432 0.511**	**64**	**85.3**	**11**	**14.7**	**65**	**86.7**	**10**	**13.3**	**0.055 0.814**	**0.000 1.000**	**0.794 0.373**
TOTAL	**1014**	**79.5**	**261**	**20.5**	**950**	**74.5**	**325**	**25.5**	**9.075 0.003 ***	**1014**	**79.5**	**261**	**20.5**	**727**	**57**	**548**	**43**	**149.127 0.000****	**0.001 1.000**	**86.617 0.000 ****

*Significanceat level P < 0.05

Table (5) percentage distribution of the study and control groups practice regarding post care after airway suction during endotracheal and tracheostomy suction immediately after and 2 weeks following teaching interventions.

Students practice after endotracheal and tracheostomy suction.	Immediately after the teaching intervention									2weeks after the teaching intervention									P2&P3	P2&P3
	Study group (n=75)				Control group (n=75)				Chi p-value	Study group (n=75)				Control group (n=75)				Chi p-value	Study group	Control group
	Correct		Incorrect		Correct		Incorrect			Correct		Incorrect		Correct		Incorrect				
	No.	%	No	%	No.	%	No.	%		No.	%	No.	%	No.	%	No.	%		Chi p-value	Chi p-value
Postcare																				
reassess the patient respiratory status, pulse oximatery and observe the patient for vital signs, cyanosis and restlessness	64	85.3	11	14.7	55	73.3	20	26.7	3.294 0.070	59	78.7	16	21.3	27	36	48	64	27.907 0.000**	1.129 0.288	21.090 0.000**
Comfort and reassure the patient	67	89.3	8	10.3	61	81.3	14	18.7	1.918 0.166	63	84	12	16	41	54.7	34	45.3	15.176 0.000**	0.923 0.337	12.255 0.000**
Return the equipment	67	89.3	8	10.3	66	88	9	12	0.066 0.797	75	100	0	0	63	84	12	16	13.043 0.000**	0.923 0.337	9.574 0.002*
Remove gloves	63	84	12	16	55	73.3	20	26.7	2.542 0.111	75	100	0	0	63	84	12	16	13.043 0.000**	0.000 1.000	23.077 0.000**
Wash hands	61	81.3	14	18.7	43	57.3	32	42.7	10.159 0.000**	75	100	0	0	61	81.3	14	18.7	15.441 0.000**	0.000 1.000	40.678 0.000**
TOTAL	322	85.9	53	14.1	280	74.7	95	25.3	14.849 0.000**	347	92.5	28	7.5	225	68	120	32	82.103 0.000**	1.688 0.194	1.250 0.264

*Significanceat level P < 0.05

Table (6) percentage distribution of the study and control groups practice regarding documentation after airway suction during endotracheal and tracheostomy suction immediately after and 2 weeks following teaching interventions.

Students practice before endotracheal and tracheostomy suction.	Immediately after the teaching intervention									2 weeks after the teaching intervention									P2&P3	P2&P3
	Study group (n=75)				Control group (n=75)				Chi p-value	Study group (n=75)				Control group (n=75)				Chi p-value	Study group	Control group
	Correct		Incorrect		Correct		Incorrect			Correct		Incorrect		Correct		Incorrect				
	No.	%	No	%	No.	%	No.	%		No.	%	No.	%	No.	%	No.	%		Chi p-value	Chi p-value
Documentation																				
Indication for suction	62	82.7	13	17.3	55	73.3	20	26.7	1.904 0.168	59	78.7	16	21.3	44	58.7	31	41.3	6.972 0.008*	0.385 0.535	3.595 0.058
Record vital signs before and after	57	76	18	24	49	65.3	26	34.7	2.058 0.151	57	76	18	24	38	50.7	37	49.3	10.364 0.001*	0.000 1.000	3.311 0.069
Pressure delivered for suction	45	60	30	40	43	57.3	32	42.7	0.110 0.740	45	60	30	40	28	37.3	47	62.7	7.712 0.005*	0.000 1.000	6.017 0.014*
Color, amount, consistency and Odor of secretion	60	80	15	40	51	68	24	32	2.807 0.094	56	74.7	19	25.3	53	70.7	22	29.3	0.302 0.583	0.609 0.435	0.125 0.723
Frequency of suction	57	76	18	24	53	70.7	22	29.3	0.545 0.460	55	73.3	20	26.7	18	24	57	76	36.533 0.000**	0.141 0.707	32.760 0.000**
Date and time	63	84	12	16	52	69.3	23	30.7	4.509 0.034 *	60	80	15	20	53	70.7	22	29.3	1.758 0.185	0.407 0.524	0.032 0.859
ABGs available	61	81.3	14	18.7	60	80	15	20	0.043 0.836	58	77.3	17	22.7	21	28	54	72	36.611 0.000**	0.366 0.545	40.821 0.000**
Presence of any complication	60	80	15	20	49	65.3	26	34.7	4.061 0.044 *	52	69.3	23	30.7	21	28	54	72	25.645 0.000**	2.256 0.133	21.000 0.000**
TOTAL	465	77.5	135	22.5	412	68.7	188	31.3	11.900 0.001*	442	73.7	158	26.3	276	46	324	54	95.549 0.000**	2.389 0.122	63.009 0.000**

*Significanceat level P < 0.05

Table (7): The total score of the students' knowledge regarding airway suction

Tool 1	Before the program				Immediately after the program				2 Weeks after the program				8 Weeks after the program			
	Satisfactory		Un Satisfactory		Satisfactory		Un Satisfactory		Satisfactory		Un Satisfactory		Satisfactory		Un Satisfactory	
	No.	%	No	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
study	4	5.3	71	94.7	74	98.7	1	1.3	74	98.7	1	1.3	74	98.7	1	1.3
control	10	13.3	65	86.7	69	92	6	8	50	66.7	25	33.3	44	58.7	31	41.3

Table (8): The total score of the students' performance regarding airway suction

Tool 2	Immediately after the program				2 Weeks after the program				8 Weeks after the program			
	Satisfactory		Un Satisfactory		Satisfactory		Un Satisfactory		Satisfactory		Un Satisfactory	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Study	70	93.3	5	6.7	68	90.7	7	9.3	67	89.3	8	10.7
Control	60	80	15	20	25	33.3	50	66.7	17	22.7	58	77.3

Discussion:

The use of technology in education provides the students with the most suitable environment to learn, serves to create interest and learning centered atmosphere, and helps increase the students' motivation. The use of technology in this way plays an important role in the teaching and learning process. The use of computers in the teaching and learning is defined as computer based instruction [(2)].

The computer based instruction makes teaching techniques far more effective than those of the traditional teaching method as it used for presenting information, testing and evaluation and providing feedback. It makes a contribution to the individualization of education. It motivates students and takes them to take an active part in the learning process. It helps to develop creativity and problem solving skills, identity and self-reliance in learners. Computer based instruction provides drawings, graphics, animation, music and plenty materials for the students to proceed at their own pace and in line with their individual differences. It serves to control lots of variables having an impact on learning, which cannot be controlled by means of traditional educational techniques[(26,27)].

Activities that the graduate of the baccalaureate programs in nursing is to do, provide an integrated program of theoretical knowledge from nursing, health sciences, and social sciences together with clinical practice in both hospital and community settings, provide professional nursing care based on knowledge derived from theories and researches; synthesize theoretical and empirical knowledge from nursing, scientific and humanistic discipline with practice. Graduates work as beginning practitioners in a wide range of health care setting [(28)].

Concerning acquisition of knowledge, it is releaved from the result that the students in both groups had nearly the same scores in airway suctioning knowledge test before teaching interventions and this may be explained by the same studying of adult airway suctioning in the previous year which is not greatly different than pediatric airway suctioning.

The finding of this study revealed that, that there were no statistically significant difference among the control group compared to study group regarding posttest mean scores of knowledge. The rational for why the control group achieved satisfactory score of knowledge in posttest in this study may be due to both groups were learned the same content regarding

airway suction by the same instructor. Additionally the low adaptability of the students in the study group in using computer based learning module, as it is the first time for them to deal with. Extra time may be needed by the students in the computer lab to revise the whole module again.

This finding was in agreement with Abdalla et al(2013) who reported in his study that there were no statistically significant difference regarding immediate posttest mean score of knowledge between both groups teached by E-learning and traditional teaching methods regarding critical care nursing [29].The finding was also similar to that of Udupa and Madhukar (2011) Who stated that no significant difference between traditional and computer assisted learning regarding immediate posttest mean scores acquiring knowledge [30].The previous finding was contradicting with Kinney and Henderson (2008) who stated that significant differences between traditional lecture and e learning regarding immediate posttest mean scores of knowledge [31].

Comparing between the two groups as regards knowledge pre/post module implementation by two teaching methods, the finding of current study showed that there were a highly statistically significant differences between pre and posttest mean scores of knowledge for the control and study groups. The finding indicated improvement of students' knowledge regarding airway suction. The improvement in the study group knowledge could be attributed to the effect of the module only, since the baseline knowledge in the two groups pre module implementation was the same. The module gave them the basic knowledge and the students in this young age have higher motivation and ability to acquire extra skills and knowledge.

The previous finding were in agreement with Abd Al-Rahman,(2009), who reported in here study that there were highly statistically significant differences between pre and posttest mean scores of knowledge for both lecture and computer assisted methods of learning cardiac disease [32]. Also the findings are in agreement with Abdalla et al(2013) who reported in his study that there were a highly statistically significant difference between pre and posttest mean scores of knowledge for both E-learning and traditional teaching methods regarding critical care nursing [29]. While, these findings are in contrast to the findings of Eaton-Spiva&Day (2011) and Durmaz et al (2012) who found no significant differences for experimental group who used computer assisted learning course and control group who used

traditional learning method in knowledge acquisition at immediate follow up [33,34].Also the finding of Sebraetal (2004) found that there were no statistically significant difference between computer aided multimedia group and lecture group in post test score of knowledge [35] . The finding of the study recorded by Remie (2008) stated that the lecture group had a higher some score in MCQ compared to e-learning group [36] .

Concerning retention of knowledge the present study found that the students who used computer based learning achieved higher scores regarding definition, purpose, methods, complication and principles for airway suction than in case of traditional learning methods at 2weeks and 8weeks follows up. These knowledge items were containing numbers and a lot of consecutive steps that made it more liable to be forgotten by time. This finding may be attributed to simulator like photos, audio, and videos in computer based learning module serves as cues to retrieve information.

Moreover, the findings in current study demonstrate that there were no statistically significant difference in the study group knowledge regarding all items of knowledge at immediate and 2weeks, immediate and 8weeks, and 2weekes and 8weeks periods .According to these results, it can be said that the knowledge level of the study group students were at the same level from the beginning of the periods so the instruction is so lasting. This may be attributed to computer instruction allows person to interact in the learning situation; he or she can find information, respond to questions, manipulate variables and solve problems. This point of view is in agreement with Smaldino et al(2012) and Deyoung (2009) who stated that computer assisted instruction makes learning more intereting and memorable and help the learner maintains control of the learning process, its speed and order[27,37].

These finding are in the same line with the results reported by Chiu et al (2009) and Bloomfield et al (2010) who found that nursing students achieved better knowledge retention when using computer assisted learning. These findings are in contrast to the finding of Kelly et al(2009) and Fernandz Aleman et al(2011) who reported that both teaching methods resulted in similar knowledge retention [38,39,40.41,].

Concerning the relation between study and control group regarding airway suction knowledge items, the current study reported that, there were statistically significant difference between them at 2 and 8 weeks follow up, this may be attributed to the students in the study group

take the advantages of computer based learning which include nonjudgmental approach, endlessly patience, setting the students own speed of learning, increased access to information, and instructional consistency. These findings are in agreement with finding of Kroncke (2010) who reported that students performing the computer based practical course(CPC) demonstrated a statistically significant knowledge retention compared to students who performed the laboratory experiment[42].

The results documented by Jenkens (2008) who found that there were no statistically significant difference between the score of the students in the intervention group (computer assisted learning) and control group (traditional lecture teaching).These findding was in the same line with Ricer (2005) who reported that there no statistically significant difference between both group who learned by computer and traditional learning methods in retention of materials [43,44].

With regard to acquisition of skill performance, the finding of the present study documented that there was improvement in performance level of both groups at immediate follow up using both teaching methods but computer based learning method produce significant gain in performance level than traditional method. The students learned with CBL achieved higher scores regarding skill performance of assessment signs and symptoms indicating upper airway for natural and artificial airway suction than in case of traditional teaching methods, at immediate follow up. This may be attributed to recording the procedure that allow students to review the demonstration as needed until they master the skill and more interest provoked by new learning environment. These finding are in agreement with McTigue et al (2009) who found that nursing students achieved better assessment scores for skin tears when using an e learning programs [45].

Also these findings are in agreement with Leflore et al (2011) and Guise et al (2012) who reported that students achieved higher skill performance scores using CAL compared to traditional learning methods[46,47]. While these findings are in contrast with the findings of Durmaz et al(2012) who found equivalent results in skill performance outcomes in both groups[34].

The finding of the present study illustrate that, students learned with CBL achieved higher scores regarding skill performance of implementation for natural and artificial airway suction than in case of traditional learning methods at immediate follow up.

It was clear that those students with CBL

were performing most of the procedure steps sequentially but in case of students with traditional teaching methods; the majority of them were forgetting to perform one step or more or were performing it in wrong sequence. This may be due to the students in CBL were able to repeat the demonstration at any point and for any number of times they want in contrast to the students in traditional group who are shyness to ask the instructor the repetition when losing their attention during demonstration.

The lower scores of the control group may be due to some limitations with demonstration method such as non-flexible pacing in which not all students may be able to follow the demonstrations pace of presentation, and students do not get direct hands on experience unless they are following along as the teacher demonstrates steps or skills, and limited view in which not all students have an equal view of the demonstration, thus possibly missing some aspect of the experience.

These findings are in agreement with the findings of Hou et al (2008) who reported that students achieved higher scores in skill performance in implementation and demonstration regarding cardiac auscultation when using computer aided auscultation learning system for using technique instruction at immediate follow up[48]. Also the finding are in agreement with Bruce et al (2009) who reported that students achieved higher scores in skill performance of implementation regarding nursing management of cardiac arrest when using computer assisted human patient simulator, at immediate follow up[49]. While these finding are in contrast to the findings of Bloomfield et al(2010) who found equivalent results at immediate follow up for CAI and conventional teaching methods groups[38].

The finding of the present study illustrate that, students learned with CBL achieved higher scores regarding skill performance of post care and documentation for natural and artificial airway suction than in case of traditional learning methods at immediate follow up .This may be attributed to the computers individualize learning to an extra ordinary degree as learners can repeat information and computer program never get tired of repeating the same information. These finding are in the same line with Tseng et al(2012) who reported that students achieved higher skill performance scores using CAL compared to traditional learning methods[50]. While these findings are in contrast with the findings of Eaton Spiva and Day(2011) and Bloomfield et al (2010) who found equivalent results in skill performance outcomes in both

groups[33,38].Also the finding of Shenetal (2007) reported that traditional mode students have achieved slightly better performance in examination in comparison with on line mode students [51] .

Regarding retention of performance, the findings of the present study documented that students who use CBL achieved higher scores regarding skill performance of assessment, preparation, implementation, post care, and documentation for natural and artificial airway suction than in case of traditional teaching methods at 2and 8 weeks follow upand this may be attributed to the ability of the CBL module to stimulate the learning environment through audio, videos, and graphics that help the students to build up the procedure steps in a chain that would strengthen the network of the memory. These findings were in agreement with Abdalla et al (2013) who documented that the students studied with E learning method achieved higher mean scores than traditional teaching methods group regarding oxygen therapy, suction, pulse oximetery and central venous pressure measuring and caring[30].

Conclusion:

Based on the results of the present study, it can be concluded that students studied with computer based learning method showed a significant improvement on knowledge and skill retention in relation to airway suctioning than students studied with traditional learning method.

Recommendations:

1. Medical and nursing education programs should adopt computer based learning in undergraduate education, and should support the introduction of computer based learning as an important step in curriculum development especially in training on high risk disciplines such as resuscitation, gavage feeding, and drug administration.
2. The use of computer based learning for the acquisition of specific clinical skills in specialties such as pediatrics, emergency medicine, intensive care, and obstetrics.
3. Computer based learning should be used in combination with traditional teaching method to further enhance the students' satisfaction and increase their skill acquisition level.
4. Establishing more training courses with university professors to develop their skills in electronic design and web applications that enable faculty member to use a variety of integrated strategies and employ these tools in the educational process.
5. This study should be replicated with more participants and at several universities with different cultures

and/or ages to determine measurable outcomes of computer based learning and to generate larger statistical power with a diverse group of students.

6. Replicate the study with more variables including attitude toward using computers and teacher and students motivation

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Psychiatric nurse's empathy, burnout and its relation with professional Quality of life

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Abstract; Empathy is considered a useful skill for psychiatric nurses. It is an essential component of a caring relationship and especially critical to the provision of professional quality of life. **The Aim** of this study is to assess Psychiatric nurse's empathy, burnout and its relation with professional quality of life. This study followed a descriptive design. The present study was conducted at Tanta mental health hospital, 84 nurses. **Three tools** were used to collect data for the study, **Tool 1:**t consists of two parts **Part 1**; a structured interview schedules use to socio-demographic data. **Part 2** Interpersonal Reactivity Index (Empathy), **Tool II** Maslach Burnout Inventory questionnaire and **Tool III** Professional Quality of Life Scale. **The result** reveled that there was a significant positive correlation between nurse's empathic concern and total burnout score at r=0.575, p=0.00 and significant positive correlation between the nurses' compassion satisfaction total score and their personal fulfillment at r=0.319, p=0.003. **Conclusion**; it was concluded that psychiatric nurses are at high risk for burnout related to imbalance between level of Compassion fatigue and satisfaction that affect the quality of life in addition to the nurses had high level of empathy concern with high level of distress .**The study Recommended** that the health care professionals realize what the causes and effects of burnout are, seems to be important. It is being planned to carry further, longitudinal research, in which causes of burnout will be investigated as far as correlation with empathy level is concerned. Developing educational intervention program for nurses about the empathy

Key words; Empathy, burnout, professional quality of life

Introduction

Empathy is essential component of the nurse-patient relationship and quality of nursing care. Empathy is a prosoically behavior that is beneficial to others and is fundamental to ethical nursing practice. Clinical empathy involves the ability to understand the patient's situation, his/ her perspective and feelings (and their attached meanings). Empathy capacity is a fundamental and essential instrument in all therapeutic relationships, allowing the professional to meet the needs of patients.(1)

Empathy has been described in various ways; Empathy has both affective and cognitive components, and includes recognition that the source of the emotion felt is not one's own. The affective component relates to sharing the emotions of the other person. Cognitive empathy is 'the capacity to understand others internal states. This perspective-taking ability requires an intentional process to occur, and engages executive resources such as self-regulation and cognitive flexibility. Other way described it as three components emotional, cognitive and behavioral, those relations come down to co-experiencing emotions with another person, understanding them, and also solving problems. (2-5).

Psychiatric nurses involved in direct patient care are exposed to suffering and negativity on a daily basis and face increasing demands in the workplace. They are vulnerable to the development professionals experiencing nightmares, grief, anxiety, depression, sleep disturbances, relational conflicts, and physical complaints often referred to as compassion fatigue. Compassion fatigue is defined as "a state of tension and preoccupation with traumatized patients by re-experiencing the traumatic events, avoidance/numbing of reminders and persistent arousal associated with the patient suffering from compassion fatigue can spill over into the development of burnout as a long-term impact. Ultimately, nurses may experience psychological, physical, and emotional exhaustion leading to a decrease in nursing professionalism, an increase in depersonalization and absence of individual achievement. Compassion fatigue addresses the close therapeutic interaction with traumatized patients in a certain caring condition whereas burnout is acquired from the environment or systemic clinical stressors (6-8)

Burnout is a state of emotional and physical exhaustion caused by excessive and prolonged stress. Burnout is

characterized by depersonalization, reduced sense of personal accomplishment and discouragement as an employee. The signs of burnout tend to be more mental than physical. They can include feelings of: powerlessness, hopelessness, emotional exhaustion, detachment, isolation, irritability, frustration, being trapped, failure, despair, cynicism, apathy. At the same time some physical symptoms are common: headaches sleep problems, gastrointestinal problems, chronic fatigue, muscle aches, high blood pressure, frequent colds, sudden weight loss or gain. There are consequences for patients too, such as increased medical errors, poor patient safety, decreased patient satisfaction, and decreased adherence to treatment plans. Professionals that have frequent contact with individuals are more sensitive to develop burnout. Among the different health professions, nursing has been considered a profession highly susceptible to stress. [9-11]

Professional quality of life refers to "the quality one feels in relation to their work as a helper" and is influenced by both positive and negative aspects of the work. Compassion satisfaction is considered as the defensive agent that can be used to alleviate or mediate the negative effect of both compassion fatigue and burnout. It is the positive aspects and potentially growth enhancing. Compassion satisfaction is a positive indicator of professional quality of life and refers to the pleasure derived from being able to do one's work effectively. Professional quality of life consists of a balance between compassion satisfaction and compassion fatigue of working in the role of a healthcare professional. Personal characteristics, work environment, and interaction with different types of patients affect healthcare provider's professional quality of life. "Professional quality of life is important for both nurses and patient [12-14] Nurses, in particular, are professionals highly likely to experience compassion fatigue which can negatively affect their mental and physical health as well as job performance. Compassion fatigue can also cause nurses to lose their objectivity and empathy for patients. Empathy becomes a double-edged sword for the nurse: on the one hand, empathy facilitates caring work; on the other hand, the act of caring leaves the nurse vulnerable to its very act". It is expected that improving recognition and awareness of compassion fatigue, burnout and compassion satisfaction as basic components of professional quality of life among psychiatric nursing may prevent emotional exhaustion, reduce withdrawal and help in identifying proper intervention. This will in turn help psychiatric nurse to

keep empathetic and compassionate professionals. [15-16]

Aim of the study

To evaluate the relationship between psychiatric nurse's empathy, burnout and its relation with professional quality of life

Research question;

Is there a relation between psychiatric nurse's empathy, burnout and professional quality of life?

Subjects & Methods;

Research Design

Descriptive research design was used

Setting-:

The study was conducted at the Tanta Mental Health Hospital which is affiliated to the Ministry of Health with a capacity of (107) beds, divided into four wards, two wards for male patients and two wards for female patients. This hospital serves three governorates; namely, El-Gharbeya. ElMenofeya, and Kafr-El-Sheikh.

Subject:-

A convenient sample of (84) nurses working at Tanta Mental Health Hospital The subjects of this study were selected according to the following criteria: both sexes All age group, Nurses who provide a direct care to hospitalized psychiatric patients and who agree to participate in the study.

Tools of the study:-

The data of this study was collected using the following tools:

Tool I: - it consists of two parts

Part one: socio-demographic data, encompassed age, sex, level of education, years of experiences, marital status, residency, occupation, and their income.

Part two: Interpersonal Reactivity Index (Empathy); Developed by **Davis M H (1980)** [17] Defines empathy as the "reactions of one individual to the observed experiences of another. It includes 28-items answered on a 5-point Liker scale ranging from (0) "Does not describe me well" to (4) "Describe me very well". The measure has **4 subscales**, each made up of 7 different items. These subscales are;

1-Perspective Taking – the tendency to spontaneously adopt the psychological point of view of others

2- Fantasy – taps respondents' tendencies to transpose themselves imaginatively into the feelings and actions of fictitious characters in books, movies, and plays

3-Empathic Concern – assesses "other-oriented" feelings of sympathy and concerns for unfortunate others

4- Personal Distress – measures "self-oriented" feelings of personal anxiety

and unease intense interpersonal settings

Scoring system; each subscale includes 7 questions maximum score 28

Tool II- Maslach Burnout Inventory questionnaire; It is measured by **Maslach 1986** [18], this scale has high internal consistency and reliability around 90%, It consists of 22 items in the form of statements about feelings and attitudes Professional in their work and to patients and their function is to measure burnout. Responses answered on a 5-point Liker scale ranging from (0) Never to (6) Everyday

measured 3 aspects of the syndrome:

Emotional exhaustion, **depersonalization**, **personal accomplishment**. Regarding the scores, they are considered low below the 34 high scores in the first two subscales and low in the third to diagnose the disorder.

1.Emotional exhaustion subscale

It consists of **9 questions**, the lassification of the statements is: 1, 2, 3, 6, 8, 13, 14, 16, 20. Values the experience of being emotionally exhausted by the demands of work. **maximum score 54**

2. **Depersonalization subscale**. It consists of **5 items**, the classification of the statements is: 5, 10, 11, 15, 22. Assesses the degree to which each recognizes attitudes of coldness and detachment. **maximum score 30**
3. **Subscale of personal fulfillment**. It consists of **8 items**, the classification of the statements is: 4, 7, 9, 12, 17, 18, 19, 21. Evaluates feelings of self - efficacy and personal fulfillment at work. **48 maximum score**.

Tool III -Professional Quality of Life Scale; was measured using the Professional Quality of Life Scale, version 5 (ProQual-5), developed by **Stamm (2005),** [19] This instrument is the most commonly used measure of both positive and negative consequences of working with people who have experienced exceptionally stressful events. The ProQOL-5 is a 30-item scale with three subscales to measure compassion satisfaction, burnout, and Trauma /Compassion fatigue Scale. Each subscale includes 10 items. Respondents were asked to rate how frequently they have experienced each item on 5-point Likert scale (1=never to 5=very often).

1-The compassion satisfaction scale measured the pleasure one derives from doing one's work well Compassion Satisfaction Scale include 10 items**:** 3, 6, 12, 16, 18, 20, 22, 24, 27, and 30. **Higher** scores on this scale represent a **greater professional satisfaction** from

job. **Scores** below **33**, means persons **find problems with** their **job**.

2-The burnout scale measured feelings associated with hopelessness and difficulty in dealing with work or doing one's work effectively. The Burnout Scale: 1, 4, 8, 10, 15, 17, 19, 21, 26, 29. The score items on the burnout scale is 10 items. **Score below 18**, reflects positive feelings about ability to be **effective in work**. Score above 27 means not effective in work. If **score above 57** means person may wish to think about what at work makes person feel **not effective** in **position**. The score may reflect the mood.

3- Trauma/Compassion Fatigue Scale it include10 items**:** 2, 5, 7, 9, 11, 13, 14, 23, 25, and 28. It measured work-related secondary exposure to people who have experienced trauma (α=0.93). " **score above 57**, means that person may want to take some time to think about what at **work may be frightening**. While higher scores do not mean that person do have a problem, they are an indication that you may want to examine how you feel about your work and your work environment. You may wish to discuss this with your supervisor, a colleague, or a health care professional.

The score for each subscale was used as, higher scores indicating greater compassion satisfaction, burnout, and trauma / compassion fatigue scale. The Score from 22 or less**; Low,** between 23 and 41**; Average** and 42 or more**; High.**

Method:

Ethical considerations:-A written official letters from the Faculty of Nursing, Tanat University was directed to the director of Tanta Mental Health Hospital that is affiliated to the Ministry of Health to take their permission to collect data after explaining the purpose of the study.

- The director was informed about the goal of the study, the data and time of data collection. Ethical consent will be obtained from every nurse after explaining the purpose of the study to participate in the study.
- Informing study subjects' that confidentiality and privacy of any obtained information will be ensured.
- Respecting the right of the study sample to be withdrawal from the study at any time.
- Tools I, II, III was translated into Arabic language by the researcher.
- Tools of the study were been tested for content validity by six experts three in psychiatric nursing and three in nursing services administration to

ascertain the clarity and Arabic translation of the tools.

- The empathy scale was found reliable in the original research and reliabilities for the subscales of burnout and for the subscales of PQOL also found reliable in the original research.
- Before embarking in the actual study a pilot study will be carried out on 10% of the subjects after taking their oral approval and explanation the purpose of the study to ascertain the clarity and applicability of the study tools and to identify obstacles that might be faced during data collection. Those subjects will be selected randomly and will be excluded later from the study sample. After its implementation and according to its results a necessary modification will be done.

Actual Study;

- A written consent was obtained from each selected nurse according to the previous criteria for participation in the study after explaining the aim of the study, establishing rapport and trusting relationship with the studied nurses.

-The form of the study tools was explained to the nurses and the nurses were reassured that all information will be confidential and used only for the purpose of the study and they were individually interviewed for keeping their privacy.

-Tools of the study were implemented by the researcher using the interview questionnaire sheet to determine the empathy level, burnout level, and their professional quality of life.

-Each interview was implemented on an individual basis and lasted for about 20-40 minute according to nurses' attention and willing to cooperate or talk with the researcher.

-Data were collected over a period of four months starting from July 2016 and ending in October 2016.

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using SPSS software statistical computer package version 23. For quantitative data, the range, mean and standard deviation were calculated. For comparison between means, student t-test was used. Correlation between variables was evaluated using Pearson’s correlation coefficient r. A significance was adopted at $P<0.05$ for interpretation of results of tests of significance

Table (1): Percentage distribution of the studied sample according to their socio- demographic characteristics.

Characteristics	The studied nurses (n=84)	
	No	%
Age (in years)		
18-25	17	20.2
26-35	42	50.0
≥36	25	29.8
Gender		
male	23	27.4
female	61	72.6
Marital status		
single	7	8.3
married	74	88.1
Divorced	1	1.2
Widow	2	2.4
Education level		
Diploma	37	44.0
Technical institute	27	32.1
Bachelor	17	20.2
Post graduate	3	3.6
Occupation		
Nurse	64	76.1
Supervisor	20	23.8
Experience in Psychiatric nursing		
< 5 years	26	31.0
5-10 years	13	15.5
11-20 years	28	33.3
> 20 years	17	20.2

Table (2) Percentage Distribution of the studied sample according to their empathy levels

Empathy levels	The studied nurses (n=84)	
	No	%
1. Perspective-taking (PT)		
▪ ≤13Low	00	00.00
▪ 14- 20 Average	11	13.1
▪ 21- 28 High	73	86.9
Range	**(17-27)**	
Mean ± SD	**22.65±2.051**	
2. Fantasy scale (FS)		
▪ ≤13Low	00	00.00
▪ 14- 20 Average	26	31.0
▪ 21- 28 High	58	69.0
Range	**(16-26)**	
Mean ± SD	**22.18±2.494**	
3. Empathic concern (EC)		
▪ ≤13Low	00	00.00
▪ 14- 20 Average	24	28.6
▪ 21- 28 High	60	71.4
Range	**(16-26)**	
Mean ± SD	**22.30±2. 882**	
4. Personal distress (PD)		
▪ ≤13Low	3	3.6
▪ 14- 20 Average	23	27.4
▪ 21- 28 High	58	69.0
Range	**(14-26)**	
Mean ± SD	**21.06±2.681**	
Total empathy score		
Range	**(69-96)**	
Mean ± SD	**88.19±7.503**	

Table (3): Percentage Distribution of the studied sample according to their total levels of the Maslach Burnout Inventory (MBI)

MBI levels	The studied nurses (n=84)	
	No	%
1.Emotional exhaustion level		
≤16 Low	13	15.5
17-26 Average	24	28.6
≥27 High	47	56.0
Range	**(12-37)**	
Mean ± SD	**25.42±6.830**	
2.Depersonalization level		
≤6 Low	7	8.3
7-12 Average	43	51.2
≥13 High	34	40.5
Range	**(5-14)**	
Mean ± SD	**10.98±2.702**	
3.Personal fulfillment level		
≤31 High	67	79.8
32-38 Average	14	16.7
≥39 Low	3	3.6
Range	**19-39)**	
Mean ± SD	**30.08±4.336**	
Total MBI score		
Range	**(40-82)**	
Mean ± SD	**66.48±10.526**	

Table (4) Distribution of the studied sample according to their total levels of the professional quality of life

PQL levels	The studied nurses (n=84)	
	No	%
1. Compassion Satisfaction level		
<33 Find problems	14	16.7
33-36 Average	18	21.4
≥37 Greater satisfaction	52	61.9
Range	**(28-50)**	
Mean ± SD	**37.13±4.802**	
2. Burnout level		
18-27 Average	15	17.9
>27 Not effective in job	69	82.1
Range	**(20-36)**	
Mean ± SD	**31.87±5.087**	
3.Trauma/Compassion Fatigue level		
<33 Find problems	74	88.1
33-36 Average	9	10.7
≥37 Work frightening	1	1.2
Range	**(13-37)**	
Mean ± SD	**28.46±5.093**	
Total PQL score		
Range	**(77-114)**	
Mean ± SD	**97.46±9.049**	

Table (5) Effect of the nurses' demographic characteristics on the total scores of empathy, burnout and their total levels of the professional quality of life

Characteristics	The studied nurses (n=84)					
	Mean ± SD					
	Total MBI score	t P	Total Empathy score	T P	Total PQL Score	T P
Age (in years)						
18-25	67.06±10.73	0.941 0.394	88.88±6.86	0.090 0.914	98.88±10.25	0.326 0.723
26-35	67.67±9.85		87.98±8.14		96.79±8.58	
≥36	64.08±11.50		88.08±7.06		97.64±9.22	
Gender						
male	68.13±9.58	0.780	91.04±5.41	**4.788**	99.87±7.96	2.272
female	65.85±10.87	0.380	87.11±7.93	**0.032***	96.56±9.33	0.136
Marital status						
single	64.71±12.87		87.00±9.73		95.43±10.33	
married	66.82±10.39	0.630	88.35±7.25	1.633	97.62±9.01	0.916
Divorced	53.00±0.00	0.598	74.00±0.00	0.188	87.00±0.00	0.437
Widow	66.50±10.61		93.50±0.71		104.00±1.41	
Education level						
Diploma	66.00±11.24		89.43±6.29		98.54±9.27	
Technical institute	67.74±9.52	0.201	88.96±7.46	2.035	98.93±8.73	1.966
Bachelor	65.47±11.02	0.895	84.29±8.58	0.116	92.82±8.27	0.126
Post graduate	66.67±11.85		88.00±12.12		97.33±8.96	
Occupation						
Nurse	66.72±10.43	0.389 0.679	89.02±6.82	1.670 0.195	98.88±8.89	2.860 0.063
Supervisor	66.41±10.59		85.73±8.95		94.23±8.23	
Other	60.00±18.39		90.50±7.78		90.50±16.26	
Experience in Psychiatric nursing						
< 5 years	68.12±9.44	1.589 0.199	88.19±7.85	0.204 0.893	97.65±9.24	0.006 0.999
5-10 years	69.54±9.74		89.15±9.19		97.31±8.09	
11-20 years	66.18±10.68		87.39±7.40		97.36±9.12	
> 20 years	62.12±11.82		88.76±6.14		97.47±10.09	

* Significant at level P < 0.05

Table (6) Correlation between empathy scale, Maslach burnout scale and professional quality of life total score

	Compassion Satisfaction total score		Burnout Total Score		Trauma/Compassion Fatigue total score	
	r	**P**	**r**	**P**	**r**	**P**
Empathy subscale:						
1. Perspective-taking (PT)	0.077	0.487	-0.053	0.633	-0.137	0.215
2. Fantasy score (FS)	-0.166	0.131	0.077	0.487	**0.219**	**0.045***
3. Empathic concern score (EC)	0.023	0.834	**0.575**	**0.00****	**0.311**	**0.004****
4. Personal distress score (PD)	-0.090	0.418	**0.683**	**0.00****	**0.522**	**0.00****
Maslach burnout subscale:						
1.Emotional exhaustion	-0.042	0.704	**0.695**	**0.00****	**0.605**	**0.00****
2.Depersonalization	**-0.220**	**0.044***	**0.661**	**0.00****	**0.758**	**0.00****
3.Personal fulfillment	**0.319**	**0.003****	**0.420**	**0.00****	-0.020	0.858

*. Correlation is significant at P < 0.05.

**. Correlation is significant at P < 0.01

Table 1 presents the distribution of the studied sample according to their socio-demographic characteristics. The results revealed that the half of nurses (50%) had age ranging form26-35 years old. Concerning nurse' genders 72.6% were female and 88.1% of them were married. As regards their educational level 44% of them had diploma degree and worked as staff nurse, also 32.1% had technical institute and worked as staff nurse. 20.2 % of them had bachelor degree of nursing and worked as nurse supervisor, only 3.6% of them had post graduate degree of nursing. As regards experience in psychiatric nursing, 33.3% of nurse had experience from 11-20 years.

Empathy levels distribution of studied samples as shown in **table 2** revealed that the high score of the subscale perspective taking was 86.9% and the range was 17-27 with a mean of 22.65±2.051 indicating high level of empathy. High score of the subscale fantasy was 69% and the range was 16-26 with a mean range of 22.18±2.494 indicating high level of empathy. Concerning their empathic concern they were had high score at 71.4% and the range was 16-26 with a mean of 22.30±2.882 indicating high level of empathy. The personal distress level of nurses was 69% and the range was 14-26 with a mean of 12.06±2.681 indicating high level of personal distress.

Table 3 illustrates distribution of the studied sample according to their total levels of the Maslach Burnout Inventory (MBI). The results revealed that the high level of emotional exhaustion of the studied sample was 56% but the range was 12-37 with a mean of 25.42±6.830 which indicate moderate level of burnout. About 50% of nurses had average level of depersonalization and the range was 5-14 with a mean of 10.98±2.702 which indicate high level of burnout, regarding personal fulfillment level and the range was 19-39 with a mean of 30.08±4.336 which indicate high level of burnout.

Table 4 present the distribution of the studied sample according to their total levels of the professional quality of life, as the results revealed that most of the studied sample 61.9 % had high level of compassion satisfaction and the range was 28-50 with a mean of 37.13±4.802 which indicate high level of compassion satisfaction, the majority of the sample 82.1% had high level of burnout as the range was 20-36 with a mean of 31.87±5.087. Also the majority of the samples 88.1% find problem in their work as the range was 13-37 with a mean of 28.46±5.049 which indicate high level of

compassion fatigue level finally this lead to low level of professional quality of life.

Table 5 illustrates the effect of the nurses' demographic characteristics on the total scores of empathy, burnout and their total levels of the professional quality of life. The results revealed that there was a significant difference between males and females in their empathy level at p=0.032.

As shown in **table 6** which presents the correlation between empathy scale, Maslach burnout scale and professional quality of life total score for the studied sample, the results illustrate that there was a significant positive correlation between nurse's empathic concern and total burnout score at r=0.575, p=0.00 ,also between their empathic concern and total score of trauma/ compassion fatigue at r=0.311, p=0.045 .As regards personal distress, there was a significant positive correlation between the nurse' personal distress and their total burnout score at r=0.683, p=0.000. Also in their trauma/ compassion fatigue at r=0.522, p=0.000.

There was a significant negative correlation between the nurses' compassion satisfaction total score and depersonalization at r= - 0.220, p= 0.044, and positive correlation with their burnout level at r=0.661, p=0.00, and their trauma/ compassion fatigue at r= 0.758, p=0.000 . There was a significant positive correlation between nurse's personal fulfillment and their compassion satisfaction at r=0.319, p=0.003 also for their total burnout score at r=0.420, p=0.00.

Discussion

Empathy can be described as a cognitive or an emotional attribute or a combination of both. Empathy in humans is assisted by other abstract and domain-general high-level cognitive abilities such as executive functions and language, as well as the ability to differentiate another's mental states from one's own, which expand the range of behaviors that can be driven by empathy. The current study assess empathy by four components; perspective taking, fantasy, empathic concern and personal distress. This is multiple cognitive and affective components of dispositional empathy. Cognitive dimensions consist of Perspective-Taking (PT; considering others' viewpoints) and Fantasizing (FN; identifying with fictional characters in books and films). Affective dimensions include Empathic Concern (EC; sympathy for others in need) and Personal Distress (PD; self-oriented, negative arousal in response to others' distress). [7]

The present study revealed that most of the nurses reported a relatively high level of nurses' empathy related to the four dimensions (perspective taking, Empathic concern, Fantasy and Personal distress.

.This is agreement with the study by Alhadidi M.etal(2016) , about Nurses' caring and empathy in Jordanian psychiatric hospitals that showed they have high levels of empathy while working with patients in the psychiatric hospitals. This indicates that nursing has always centered on empathy as an important component of the therapeutic relationship and the core of caring, but the nurses in present study have experience in dealing with psychiatric patients without feeling of sympathy but to meet their needs related to hygienic care , feeding and giving medication[20]. This result is in disagreement with a study done by Hawamdeh S. et al (2012) , about Exploring Empathy: A Perspective of Arab Nurses who conceptualization and utilization of empathy in the psychiatric setting in United Arab Emirates (UAE).The major finding was that Arab nurses valued the concept of empathy, yet they considered the nurse's response– contradict and platitude to be an empathetic behavior and the nurse's responses–invite exploration or explanation, address precipitants of feelings and express care and concern, had different occurrence. In addition, Arab nurses believed that in general this nurse's responses to be less likely representing the way they respond to their patients and teaching to be more important than empathy[5]

The results of this study reveal high levels of burnout in the form two dimension depersonalization and personal fulfillment regarding the third dimension of burnout, emotional exhaustion , more than half of the psychiatric nurses had moderate level of burnout. Burnout may be a result of prolonged exposure to stressful working environments in psychiatric hospital .Nursing requires the delivery of humane, empathetic, culturally sensitive, proficient and moral care, in working environments with limited resources and increasing responsibilities. Stressors contributing to the experience of work related stress, including poor supervision, conflict with peers and patients, high job demands and overtime are all associated with one or more dimensions of burnout. The prolonged exposure to environmental and situational stressors resulting in work, contributes to emotional exhaustion, depersonalization and a lack of personal accomplishment.

This result is supported by a study done by Khamisa N.et al (2015) about Work Related Stress, Burnout, Job Satisfaction and General Health of Nurses. Burnout explained the highest amount of variance in mental health of nurses. Their findings

can be understood as the depletion of mental energy (emotional exhaustion) and mental distancing (depersonalization), thereby compromising nurses' ability to perform tasks and resulting in anxiety/insomnia[21]. On the other hand , this study is disagreement with The results Sahebalzamani et al.(2009) to determine the burnout and its relationship with social support nurses in psychiatric hospitals Tehran on 93 nursing intensity and frequency of emotional exhaustion and reduced personal accomplishment nurses who said they the cost is proportional to family income than nurses who said they were commensurate with the cost of family income. [22]

Regarding the total level of professional quality of life, this study revealed that most of the studied sample had high level of compassion satisfaction(CS) from their job , on the other hand it is observed that high level of both burnout and compassion fatigue which indicate low level of professional quality of life. CS arises from the positive feelings of being able to perform one's job well and to contribute to others through one's work Higher levels of CS are protective against the negative aspects of caring for people. More experience in nursing is associated with higher levels of CS satisfied with their work and find it meaningful, patient satisfaction increases [10]

Burnout is related to the work environment, but its effects extend into the personal lives of nursing professionals. The physical, psychological, and interpersonal/social effects of stress and burnout among nursing professionals can vary from those felt in the general workforce. Also the nurses feelings hopelessness and difficulty in dealing with work as related to stress and long interaction with psychiatric patient .this supported by Lasalvia et al. (2009) explored the relative weight of job related characteristics and perceived organizational factors in predicting burnout in staff working in community-based psychiatric services. Burnout was mostly predicted by a higher frequency of face-to-face interaction with users, longer tenure in mental health care, weak work group cohesion, and perceived unfairness [23].Yoder (2010) studied nurses who described factors that triggered CF or burnout. The factors were organized into three categories: caring for patients, system problems, and personal issues. The second category of trigger situations, system issues, included high census, heavy patient assignments, high acuity, overtime, and extra work days .[24] The present result

supported by a study by Ray S. L.(2013) about Compassion Satisfaction, Compassion Fatigue, Work Life Conditions, and Burnout Among Frontline Mental Health Care Professionals. The study provides some new insights in to how CS and CF are related to mental health professionals' work life and burnout[10]

Regarding the effect of the nurses' demographic characteristics on the total scores of empathy, burnout and their total levels of the professional quality of life. It is observed that there was a significant difference between males and females in their empathy level, the male had empathy more than female . This may be related to the culture , the female suffering from of a lot of load at home , in care of children and in work . This study was inconsistent with study by Ferri et al. (2015) who report on gender differences where females demonstrated a superior empathic predisposition in comparison to males . [1]

In the current study, there was positive correlation between nurse's empathic concern and total burnout score, also, between their empathic concern and total score of trauma/ compassion fatigue. As regards personal distress, there was a significant positive correlation between the nurse' personal distress and their total burnout .Also in their trauma/ compassion fatigue. This result may be due to the study subjects did not understand the meaning of the empathy as a method of therapeutic relationship ,they are interested by the basic care of the patients and control of psychotic symptoms , those suffer from stress, worry and work load responsibility . Also they did not aware by their own emotional response. In addition lack of facilities of care with patient .On the other hand the nurses did not have degree of support from their job. These lead to burnout and compassion fatigue.

This result come in line with a study of Lee et al. (2003) reported that nurses with empathy characteristics may not be able to deal effectively with the emotional burden of distressing clinical situations, thus increasing the risk of burnout[25]. **Tei et al. (2014)** found that nurses with greater self-reported empathic disposition did have higher burnout scores [26]. Also this result supported by study of Thomas J.T. (2012)who stated that higher level of personal distress were associated with higher compassion fatigue and burnout).[27]

But disagreement with a study of Rużyczka E.W.(2011),about Empathy vs. Professional Burnout in Health Care Professionals , he found that negative relation between level of empathy and professional burnout and existence of significant differences of these variables in

participants representing different specializations [(2)].

Conclusion

Psychiatric nurses are at high risk for burnout related to imbalance between level of Compassion fatigue and satisfaction that affect the quality of life in addition to the nurses had high level of empathy concern with high level of distress .

Recommendations

-The study recommended that the health care professionals realize what the causes and effects of burnout are, seems to be important.

- planned to carry further research in which causes of burnout will be investigated as far as correlation with empathy level is concerned.

-Developing educational intervention program for nurses about the empathy with patients

-Further support to the urgent need to probe and consider the factors influencing psychiatric nurse's satisfaction with professional quality of life

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Effect of Education Program about Psychiatric Outpatient Follow- up visit on Patient's Awareness and Satisfaction of Outpatient Psychiatric Services

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Abstract

Psychiatric patients' awareness regarding importance of outpatient's services has acquired great importance. Patient satisfaction is playing an increasingly important role in quality of care reforms and health-care delivery. The study **aimed** to determine the effect of educational program about psychiatric outpatient follow- up on patient's awareness and satisfaction of outpatient psychiatric services. Q**uasi experimental research design was used** . The present study was conducted at psychiatric outpatient clinic at Tanta Mental Health Hospital. Sixty of psychiatric patients attended to outpatient's clinic for six month. **Two tools** were used to collect data for the study .**Structured Interview** for patients' awareness of outpatient services and Client Satisfaction Questionnaire, to assess client satisfaction with treatment. **Results** of the study indicated that. There was a significant relation between the patient's level of satisfaction with outpatient's services before and after education program. **It was concluded that** the implementation of educational program about importance of outpatient services and follow up lead to improve the patient's level of awareness and satisfaction with these services. The study **recommended** Future research, to identify those specific factors, which this study could not probe into, to help devise plans for improving the service in accordance with expectations and needs of the patients and their caregivers, for better satisfaction with care and improved services.

Key words: psychiatric patient, satisfaction, awareness and outpatient services.

Introduction

Outpatient's services after a psychiatric hospitalization has been associated with reduced incidence of hospital readmission and could potentially reduce the risk of adverse outcomes. Transitions between inpatient and outpatient health care settings are associated with elevated risks of adverse events and, therefore, are a focus of quality improvement initiatives [1-3].

Patients with psychiatric disorders are seen usually use follow-up services after an in-patient admission. Also, the majority of psychiatrists do not necessarily offer ongoing follow-up appointments to their patients. [3,4]

Psychiatric Patient's involvement in the delivery and evaluation of mental and psychiatric health services is an important policy element in the development of services. Patient's satisfaction is an important area could be especially useful concerns care, and it is considered important service excellence indicators. Patient satisfaction and opinion are playing an increasingly important role in quality of care reforms and health-care delivery. [5,6]

Most resources are allocated to a few large centralized psychiatric hospitals". Also, the number of beds are still inadequate for acute inpatient care for psychiatric patients, particularly as 60% of the beds are occupied by long stay patients.[7] The concept of patient satisfaction is "the extent to which health care services meet predefined standards of acceptable or adequate care". Psychiatric out-patient services have special attention in creative thinking about the role of the out-patient clinic in modern mental health services.[8] there are many factor explain that most of psychiatric patient in need for long follow up plane; Most of mental disorders are chronic and has periods of relapse, cognitive problems and poor insight these make the. [8,9]

Medical and nursing staff relationship with patient would be a great help in improving patient satisfaction and compliance with treatment. A recent study identified that "the patients expected their psychiatrist to listen to them, explain the cause of their illness and offer appropriate symptomatic treatment". [8,9] Satisfied patients are more likely to complete treatment regimens and to be compliant and cooperative. Research on health system satisfaction, which is largely relative, has identified ways and means to improve health, reduce costs and implement reform. Thus satisfaction is associated with compliance and health outcome and its measurement may raise issues that are often overlooked by the service providers. [10,11]

There are many studies that have assessed the reasons that patient given non-

attendance stated that "there are differences between psychiatric and non-psychiatric patients regarding their attendance and satisfaction level , non-psychiatric patients are more likely to report that "they were unwell with symptoms unrelated to the condition when they miss appointments for which they were due to attend or that they were away on holiday".[12-14] .the measurement of patient satisfaction and effectiveness of psychiatric outpatient services allow easy identification of areas of service delivery that can be improved.

The aim of the study is to:

Determine the effect of education Program about Psychiatric Outpatient Follow- up Visit on Patient's Awareness and Satisfaction of outpatient psychiatric services

Research hypothesis:

Patients awareness and satisfaction with outpatient psychiatric service are expected to be improved after an implementation of the education session related to importance of the nature for their disease and the importance of treatment and follow up visits

Subjects and method:

Study design: Quasi experimental design was used in this study

Setting: Outpatient clinic in Tanta mental health hospital which is affiliated to the Ministry of Health and population and provides health care services to Gharbya, Menofia, and kafr Elsheikh governorates

Subjects: The target population of this study consisted of a convenient sample of 60 Psychiatric patients attended outpatient clinic for six month. They were fulfilling the following **inclusion criteria**; Age at least 18 years old, sexes, able to communicate relevantly, willing and agreement to participate in the study.

Exclusion criteria:-Having physical disability, chronic physical disease and mental retardation

Tools of the study: two tools were used in this study:

Tool I; part (1): Structured Interview for patients' awareness of outpatient services.

This part was developed by the researchers after review of recent and relevant literatures ([15-18] to assess patients' awareness of psychiatric outpatient service they were receiving. It composed of 22 items under four sub-categories which consists of 4 sub items; First,7 questions about the patient's follow up for psychiatric outpatient clinic. Second; 2 questions about the information that the hospital giving for patients in psychiatric outpatient clinic. Third; 4 questions about the availability of drugs in psychiatric outpatient clinic. Fourth; 9 questions about

the interaction, relation and the caring that patients receive in psychiatric outpatient clinic.

Each measurement was answered on categories the response will be (Yes or No) where NO scored "1" and Yes scored "2". The score ranged from 22 to 44.

Evaluation of these questions will be as follow: < 50%= low awareness, 50 – 75% = fair nd > 75% good level of awareness

Part two: Socio-demographic characteristics of patient include; age, sex, marital status, level of education, occupation, residency, income and cohabitation.

Clinical data sheet; which include; diagnosis, onset of illness in year ,duration of use of drugs , number of previous admission , number of follow up visits ,family history of psychiatric disease, Number of consultations in last three months

Tool II: Client Satisfaction Questionnaire

It developed **by Larsen, D.L., Attkisson, C.C., Hargreaves, W.A., and Nguyen, T.D.** (1979) [19] to assess client satisfaction with treatment. The Client Satisfaction Questionnaire (CSQ-8) is composed of 8 item scored from 1 to 4 (1=”Quite dissatisfied”, 2=”Indifferent or mildly dissatisfied”, 3=”Mostly satisfied”, 4=”Very satisfied"). It is easily scored by summing the individual item scores to produce a range of 8 to 32, with high scores indicating greater satisfaction.

Scoring; The scores ranged from 8–32, where minimum score was 8 signifying dissatisfaction and maximum score 32, signifying maximum satisfaction.

Twenty was the median score, so the final scores were interpreted as:

8-20 unsatisfaction ;

20 > satisfaction

Method

-Official permission for data collection was obtained from the director of Tanta mental health hospital

-Ethical considerations: - Informed consent to participate in the study was obtained from the study subject after explanation the purpose of the study. They were also assured about the confidentiality of the obtained data .As well, the patient privacy always respected. The study subjects were also informed that they have the right to withdraw from the study at any time if they wanted to.

-Tool I: was developed by the researcher, after a review of related literatures.

- The tool I part one & II of the study were translated by the researchers to Arabic language and presented to a jury composed of five experts in the psychiatric nursing to test their content validity.

-Before embarking on the actual study a pilot study was carried out on 10 patients were selected and excluded from the study subjects to ensure the clarity of the questionnaire, to test the visibility and applicability of the study tool**s** and to determine obstacles may be encountered during the period of data collection. In addition it serves to estimate the approximate time required for interviewing the study subjects. After its implementation and according to the result of the pilot study, the statements are suitable to ensure understanding of the studied patients

-Reliability; Internal consistency and reliability was excellent for tool I part 1 0.94 and tool II 0.88 with alpha Cronbach's test

An actual study was divided into four phases:

1-Assessment Phase:-

- The selected patients who meet the inclusion criteria were asked to participate in the study after establishing rapport and trusting relationship and explaining the aim of the study. The researcher continued to select from patients who visit outpatient clinic till reaching the desired subjects' number.
- The selected patients were undergoing a pre-test using Socio-demographic and Clinical data sheet, Structured Interview questioners and Client Satisfaction Questionnaire; it was applied through interviewing patient on an individual basis by the researchers.
- Each interview lasted for 25- 45 minutes, according to concentration, willingness to cooperate and talk, then know the next time of follow up visit of patients for the clinic and agree with them for implementing the program. Next visit usually after one month or 2 weeks according the hospital policy and the clinical condition of the patient.

2- Planning phase

- The program was developed by the researchers based on data from the assessment phase and literature review [4,8,10,13] . Priorities goals and expected outcome criteria were formulated

Expected Outcomes**:** Enhancing patients' awareness regarding the nature of their disease, the importance of treatment and follow up visit

The program content included knowledge about patient’s disease and signs and symptoms of relapse , treatment effect , side effect , precaution, and disturbance, heath education about schedule to follow up

The researchers prepared essential materials for conducting the implementation such as the colored pictures about their medication, written words for signs and symptoms of their diseases and

power point presentations to be used in the implementation phase.

-The colored booklets were developed to be distributed to every patient, for illiterate patient, researchers illustrate and distributed it for patients and their family caregiver.

-The researcher modified number of program sessions based on the assessment phase to be 2 sessions instead of 3 sessions according to the difficulty of presence and availability of patients and next time of follow up visit.

Implementation Phase*:-* The educational program was implemented by the researcher and these sessions aimed to increased patients' awareness regarding the nature of their disease, the importance of treatment and follow up visits.

-The contents of the Program were organized in 2 sessions provided for the studied subjects. The educational session took about 2 hours per day .The program was implemented on a small group basis. Each group was encompassing 5 patients attending a total of 2 sessions. These sessions were being scheduled as 2 sessions per week for duration of about 8-10 weeks as some patients were not complied with the date of the follow-up visit.

-First Session: the session was include an introductory talking that emphasizes acquaintance between the group patients as well as the researchers and also an explanation of the session's purpose and, availability of drugs, signs and symptoms of relapse by using colored pictures and data show and encouraging them for follow-up. At the end of session the researcher summarized all of the content outlines explained and asked them for any question.

-Second sessions: focused on the importance of drug, side effect and how to manage it in the home. Also giving information about the importance of follow up services, and how staff dealing with them. After each session, the researchers summarized the content outlines of the session in group discussions and distributed the booklet with helping the patients and his/her family to focus on the important points that should be reviewed at home.

Evaluation phase

-Two time assessments were done to the study subjects in order to evaluate their level of satisfaction and patient awareness regarding importance and the nature of disease, treatment and its effects, information received from the psychiatric outpatient clinic, the interaction of staff with them and the importance of follow up visits.

-First time (pre assessment) was done before implementation of the program using the two study Tools: Tool I only part one and Tool II.

-Second time**:** post assessment was done three months after implementation of the program using Tool I only part one and Tool II.

-The study was conducted during the period through May 2015 to October 2015.

Statistical analysis

The collected data were organized, tabulated and statistically analyzed using SPSS version 20 (Statistical Package for Social Studies) created by IBM, Illinois, Chicago, USA. For numerical values the range mean and standard deviations were calculated. The differences between mean values of total satisfaction score in relation to studied socio-demographic variables were tested using student's t test except for differences in relation to gender where the Mann-Whitney test was used due to small sample size of females. For categorical variable the number and percentage were calculated. The differences in each item of evaluation before and after the intervention were tested using Wilcoxon singed ranks test (Z). The relations between total satisfaction score and studied variables were tested by chi-square x2 and Pearson's correlation coefficient r. The level of significant was adopted at $p<0.05$.

Results

Table 1; **shows the socio-demographic characteristics of the studied subjects**. Regarding the range of patient's age in years was 17-60 and the mean age was 39.37±9.20 years.. In relation to gender 95% of studied subjects were male. Regarding marital status, 50% of patients were married and only 20% were single. In relation to their residency 70% of them live in urban, and most of them 96.7% live with their family. Regarding to the educational level of patients, 33.3 % of the studied subjects were illiterate, and concerning to occupational status 56.7% were unemployed. The table also showed that study patient had not enough income

Table 2; **represents the distribution of studied patients in relation to clinical data;** regarding to the patient diagnosis most of them 51.7% had diagnosed with schizophrenia, 40% diagnosed with epilepsy and 8.3% them were diagnosed with depression. In relation to the onset of illness, 53.3% of patient said that the onset of disease start at 5 years ago, but 18% of them said that the onset of disease start at 10 years ago. Regarding duration of use of drugs in months 60% of patients had used drugs from 6 months and 38% of them had used drugs for more than 6 months.

In relation to the number of follow up visits for psychiatric outpatient clinic, 43.3% of patients said that they had visited the psychiatric outpatient clinic four times for follow up, and 20% of them said that they had visited the psychiatric outpatient

clinic six times or more for follow up. The majority of patients 78.3% had positive past history of disease.

Table 3; shows the Comparison of Patients' level of knowledge and awareness about outpatient services before and after educational program. This table reflects that there was a significant improvement in the patients' knowledge and awareness in relation to; follow up services, the information that the hospital giving them and the availability of drugs in outpatient clinic where (X^2 = 55.150 , $p<0.001$; X^2 =117.00 , $p<0.001$ & X^2 =8.121 and $p<0.017$) respectively.

Table 4; presents total score of patient's level of satisfaction with Patients level of awareness about outpatient services before and after education program, as there was a significant difference in the level of patients' satisfaction with the outpatient's services before and after the educational program as X^2 =34.133 and $p<0.001$.As the patient's level of satisfaction had improved after the educational program.

Table 5: shows the relationship between socio-demographic characteristics of studied patients and total satisfaction score in which there was a significant relation between the total satisfaction score of patients and their residence and marital status at (p=0.006 and p=0.031) respectively . While there was no significant relation between the total satisfaction score of patients and gender and employment

Table (6): correlation between total satisfaction score, age, and onset of illness, duration of illness, and total number of consultations at last three months. This table illustrate that there was a positive significant correlation between the onset of disease in years, for patients and total score of their satisfaction, and there was a statistically significant relation between the onset of the disease for patients and their total satisfaction score at r=0.390 and p=0.002. While there was a negative significant correlation between the duration of illness for patients and their total satisfaction score at r= -0.275 and p= 0.033

Table 1: Distribution of studied patients related to Socio-demographic

Socio-demographic characteristics	(n=60) No	%
Age in years:		
<20	1	1.7
20-	9	15.0
30-	22	36.7
40-	20	33.3
50-60	7	11.7
Range	17-60	
Mean+SD	39.37+9.20	
Gender:		
Males	57	95.0
Females	3	5.0
marital status		
Single	12	20.0
Married	30	50.0
Divorced	18	30
Residency		
Urban	42	70.0
Rural	18	30.0
Co-habituation		
Alone	2	3.3
With family	58	96.7
Educational level		
Illiterate	20	33.3
Primary	24	40.0
Secondary	6	10.0
University	10	16.7
Occupation:		
Employed	26	43.3
Unemployed	34	56.7
Income		
Enough	18	30
Not enough	42	70

Table (2): Distribution of studied patients related to clinical characteristic

Clinical data	(n=60) No	%
Diagnosis:		
Depression	5	8.3
Epilepsy	24	40
Schizophrenic	31	51.7
Onset of illness in years:		
1-	10	16.7
5-	32	53.3
10-	11	18.3
15+	7	11.7
Duration of use of drugs in months:		
<1	1	1.7
1-6	36	60.0
>6	23	38.3
Number of follow up visits		
1	2	3.3
2	4	6.7
3	10	16.7
4	26	43.3
5	6	10.0
6+	12	20.0
Family history of psychiatric disease		
Yes	47	78.3
No	13	21.7
Number of consultations in last three months:		
Once	54	90.0
Twice	5	8.3
Thrice	1	1.7

Table (3): Comparison of Patients level of awareness about outpatient services before and after educational program

Level of patients awareness about outpatient services		Before		After		Total		Chi-square	
		No	%	No	%	No	%	X^2	P-value
Awareness of patient about follow up for psychiatric outpatient clinic	Low	41	68.3	2	3.3	43	35.8	55.150	<0.001*
	Good	17	28.3	51	85.0	68	56.7		
	High	2	3.3	7	11.7	9	7.5		
Awareness of patient about information that the hospital giving for them in psychiatric outpatient clinic	Low	59	98.3	0	0.0	59	49.2	117.000	<0.001*
	Good	1	1.7	3	5.0	4	3.3		
	High	0	0.0	57	95.0	57	47.5		
Awareness of patient about the availability of drugs in psychiatric outpatient clinic	Low	9	15.0	6	10.0	15	12.5	8.121	0.017*
	Good	5	8.3	17	28.3	22	18.3		
	High	46	76.7	37	61.7	83	69.2		
Awareness of patient about the interaction, relation and caring in psychiatric outpatient clinic.	Low	2	3.3	1	1.7	3	2.5	1.391	0.499
	Good	12	20.0	8	13.3	20	16.7		
	High	46	76.7	51	85.0	97	80.8		
Total level of patients' awareness about outpatient services	Low	47	78.3	1	1.7	48	40.0	73.774	<0.001*
	Good	12	20.0	50	83.3	62	51.7		
	High	1	1.7	9	15	10	8.3		

*Significant at $p \leq 0.05$

Table 4 : Total score of patient's level of satisfaction with Patients level of awareness about outpatient services before and after education program

	Patients level of awareness about outpatient services							
patient's satisfaction	Before		After		Total		Chi-square	
	No	%	No	%	No	%	X^2	P-value
Satisfaction	46	76.7	14	23.3	60	50.0	34.133	<0.001*
Satisfaction	14	23.3	46	76.7	60	50.0		
Total	60	100.0	60	100.0	120	100.0		

Table 5: Relationship between socio-demographic characteristics of studied patients and total satisfaction score

	Total satisfaction score		
Socio-demographic characteristics	Mean±SD	t	P
Gender :		0.424	0.773
Males	19.49±1.15		
Females	19.33±1.15		
Residency:		3.093	0.006*
Urban	19.83±0.70		
Rural	18.67±1.53		
Marital status:		2.216	0.031*
Single	1.2819.00±		
Married	19.69±1.02		
Employment:		0.582	0.563
Employed	19.38±1.33		
Unemployed	19.56±0.99		

Table (6): Correlation between total satisfaction score, age, and onset of illness, duration of illness, total number of follow up visits and number of consultations at last three months

Variables	Total satisfaction score	
	R	P
Age in years	0.131	0.317
onset of illness	0.390	0.002*
Duration of illness	-0.275	0.033*
Total number of follow up visits	-0.080	0.545
Total number of consultations at last three months	-0.055	0.676

Discussion

Outpatient health care after a psychiatric hospitalization has been associated with reduced incidence of hospital readmission and could potentially reduce the risk of adverse outcomes. Transitions between inpatient and outpatient health care settings are associated with elevated risks of adverse events and, therefore, are a focus of quality improvement initiatives. Measurement of patients' satisfaction in psychiatric clinics is important because patient's satisfaction has been correlated with improved clinical outcomes and administrative measures of high-quality care for example, fewer readmissions. In addition, measurement of patients' satisfaction allows organizations to identify areas of service delivery that can be improved. Ongoing improvement of service delivery and clinical outcomes is essential if a psychiatric clinic is to become and remain competitive in the current psychiatric settings [(20).]

The results of the present study indicated that the majority of psychiatric patient had low level of awareness about psychiatric outpatient's services. These results improved after implementation of educational program about importance of outpatient, where the majority of patients had good level of knowledge. Regarding the level of patient's awareness with psychiatric outpatient's services, the present study revealed that there were significant improvements of outpatient awareness regarding follow up for psychiatric outpatient clinic and about information that the hospital giving for them after educational sessions. This may be due to the researchers communicate with the patients and gave information about follow up visit as the important of this visit to each patient according his diagnosis and treatment , also the appropriate time to visit according the schedule of the outpatient .

As regards to awareness of patient about the interaction, relation and caring in psychiatric outpatient clinic the current study indicates that there is no enhancement after education program. This may be due to the overcrowded outpatient clinic with patients and they waiting long time to get their care and lack of the time that the staff spent with the patient. **Olsen et al 2010** (21), who disagreed with this result, in their study reported that patients are given time to talk with their clinicians and also high level of appraisal are relevant to positive evaluation of the quality of the information provided. Also **Davy B et al 2009** [(9),] in their study disagreed with this study, they stated that the majority of positive comments was obtained with respect to the

quality of the relationships between patients and staff, and positive comment about being listened to , understood, respected ,and also positive comments about giving information.

Regarding level of satisfaction with outpatient services, this study revealed low degree of patient satisfaction with outpatient's psychiatric care before implementation of the program but the level of satisfaction increased after educational session. This may be due to the developing trust relationship with the patients and researcher as researcher provide the acceptance atmosphere that characterized by respect, honesty, and security that allows patients to express their feeling and fell emotionally secure and gave them an enough time to ask questions regarding to their disease medication and appropriate time to follow up visit. What are the resources that can support the patients and their family? How to cope with their disease and side effect of medication?. In addition providing health education about services that offered to patients in outpatient clinic as follow up patient's progress, can stay with social worker to help them and provide essential medication that unknown to the patient .

These results were congruent with a study conducted by **Jabbar et al. (2011)** who evaluate "patient knowledge of and satisfaction with a psychiatric outpatient service", the result revealed that 86% of outpatients were satisfied with the out-patient service .he explained this result by most of definitely recalled being seen by their psychiatric consultant [22]. On the other hand, current study was inconsistence with the study by the **Yildrium et al** [23], and **Stengård et al** (24). They found "much high level of dissatisfaction, the most common reasons being lengthy waiting times and staff attitude". In the same stream, in assessing the quality of various aspects of nursing care. **Khan et al** " found 55%, of the patients' had dissatisfaction level" [25].

The present study illustrate that the total satisfaction score of patients had affected by patient's residence although most of them live in urban. And also the total satisfaction score of patients had affected by patient's marital status as about 50% of them were married and burned by family life. This low degree of patient satisfaction may be explained by a lot of factors; the patient can't see their consultant easily, poor communication, lack of prescribed medication, lack of knowledge about their disease and lack of psychiatric services near of patients residence. Similarly, **Davy B et al** (9) also agreed with this study as they approved that there was a week association between the higher satisfaction

and female living with spouse, and also their study showed significantly lower satisfaction in male single, thus living conditions and family environment have a significant impact on patient's evaluation of psychiatric services. Also, there were a positively significant relation between patient's level of satisfaction and on set of disease and their duration of psychiatric disease, on the other hand, **Blenkiron and Hammill** [13] they revealed "that the duration of an individual's mental health problems was not related to their service satisfaction scores". There are some studies with contradictory results; in The survey for **Bramesfeld** [14] he stated "the majority of patients being mostly satisfied with the performance of health care, particularly doctor patient communication and treatment" **Prasanna K**[26] stated in his study " 81% of the patients found good communication by the doctor, and the majority of them were satisfied about doctor explanation of the disease". Also, a cross-sectional survey by **Danish** [27] showed "that 34% patients perceived the care as excellent, 60% good and 6% unsatisfactory. Best aspect of service was the availability of doctors in wards". In a disceiptive study for **Hajifathali A et al 2008**, they stated that "the majority of patients were quite satisfied with the care received "(4). Similarly **Lally J et al 2013** [28] , in their study that demonstrated high levels of satisfaction for patients with outpatient services delivered in a university hospital.

Conclusion

The results of the present study indicated that the majority of psychiatric patient had low level of awareness and low satisfaction level with outpatient's psychiatric services. These results were improved after implementation of educational program about importance of outpatient, where the majority of patients had good level of knowledge and most of the studies patients had high satisfaction level.

Recommendation

The following are the main recommendations pertaining to this study:

- Future research, to identify factors, which this study could not probe into that hinder patients satisfaction , to help in planning to improve the out patients psychiatric service
- Further studies are required to assess how satisfaction level among long period of time (longitudinal studies) with changes in the severity of mental illness.
- Further studies that assess the patient –clinicians in different psychiatric settings may give further insights into potential service improvement. Application home visit service

- Application home visit service in the psychiatric hospital and encourage nurses to do it.

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