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Subject and methods:

Contents

Effect of Massage Therapy on Vital Signs of Premature Infant at Neonatal Intensive Care Unitsin Sohag city

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Abstract:

In premature infants, weight gain becomes the main criterion for hospital discharge. Research shows that massage therapy had led to weight gain in premature infants when moderate pressure massage had been provided. **Aims:**The present study aimedto determinethe effect of massage therapy on vital signs of premature infant at Neonatal Intensive Care Units**.**The total sample included sixty low birth weight premature infants, who were selected from the Neonatal Intensive Care Units in Sohag Affiliated to the ministry of health hospitals. **Tools:**Two tools have been used: Structure Questionnaire Sheet about Socio-demographic data of low birth weight infants and General condition of premature infants. **Results:** The study revealed significant relation of weight and length of staying of premature infant at Neonatal Intensive Care Units. No significant relation on anthropometric measurements (length) and vital signs in relation to massage therapy. **Conclusion**: massage therapy has positive effect on weight of premature infants. **Recommendation:**nurses who work in Neonatal Intensive care units should receive training program of massage therapy to improve their practice regarding general condition of premature infants.

Keywords: Massage Therapy, Premature Infants, vital signs,Neonatal Intensive Care Units.

Introduction:

Premature infant survivors show a significant growth and development retardation, reflected by lower body weight, length and head circumference and poor motor, adaptive, social and language development in the first five years of life. Later in adult being, they remain at an upturn risk of cardiovascular and metabolic disorders (**Coutinho,et al.,2011**&**Velez ,et al., 2011**).

Premature infant is defined as all births before 37 completed weeks of gestation or less than 259 days since the first day of a woman's last menstrual period. Premature birth can be further sub-divided based on gestational age: extremely preterm (<28 weeks), very preterm (28 - <32 weeks) and moderate preterm (32 - <37 completed weeks of gestation). Moderate preterm birth might be additional part to concentrate on late pre-term birth (34 - <37 completed weeks). The 37 week remove is to some degree self-assertive, and it is currently documented that although the risks connected with premature birth are greater the lower the gestational age, even infants born at 37 or 38 weeks have higher dangers than those born at 40 weeks of gestation (**Marlow 2012)**.

Premature infant mortality for late preterm infants (34–36 weeks of gestation) is threefold greater than for full-term infants, often related to a mix of intra partum events (e.g., placental and umbilical cord injury) and postnatal problems (e.g., respiratory problems, sepsis, and metabolic instability such as hypoglycemia and hypothermia). The morbidity and mortality connected with late premature infants are especially magnificent a direct result of their vast quantities (**Heron M& Sutton 2011)**.

Massage therapy as a non-therapeutic interference may have positive effect on physical and developmental growth of premature and LBW newborn infants including weight gain, decreased stress behavior, promotion of neurologic and neuro-motor development, better infant-parent emotional bonding, improved sleep, reduced rates of nosocomial infection and along these lines, decreased mortality of hospitalized premature infants. A survey has recommended that massage has several beneficial properties in the form psychological relationship. Lubricant oil massage was more useful than simple touch therapy **(Kulkarni et al., 2010)**.

Massage therapy has not any harmful effects and it can enhanced weight rapidity of more than 30 weeks of gestation and physically stable premature infants by different mechanisms. Increase Weight is the most common reliable stricture which is connected with massage therapy in premature infants (**Samsamshariat&Pourmorshed 2011).**

The primary communication that parents can make with their infant is by method of touch, and massage is a standout amongst the most appropriate methods for touching a newborn infant. Therefore, infant massage is essential since because infants interpret touch as physical sign that they are loved. The impact of giving a newborn infant comforting skin massages is evident on several stages. For example, the brain contains psychological classifications that, from the first day of life, directly mediate social bonds and social feelings **(Cheng et al., 2011) & (Kulkarni et al., 2010**).

The care givers have to be properly instructed to avoid too strong a massage that may cause physical injury. Moderate pressure massage therapy and passive movement of the limbs have been shown to result in weight gain in premature infants. **(Field et al., 2010) & (Mukherjee et al., 2011)**.

Aim of the study:

The aim of this study was to: determine the effect of massage therapy on vital signs of premature infant at Neonatal Intensive Care Units.

Research hypothesis:

Premature infant who exposed to massage therapy will experience stable vital signs compared to premature infants who receiving hospital routines care.

Subjects and Method:

Research Design: Quasi experimental research design was used in this study.

Setting: The study was conducted at **Neonatal Intensive Care Units** at Sohag University Hospital and Children Specialized Hospital at Sohag which is affiliated to the Ministry of Health. The study was conducted from march 2015 to July 2015.

Subjects: Sixty premature infant in the above previously mentioned setting who admitted at Neonatal Intensive Care Units.The sample was divided into two equal groups: study group (30 premature infant)and control group(30 premature infant)whichselected by simple random sample by coin. Study group was received massage therapy while the control group: received routine hospital care

Inclusion Criteria of premature infant:

Gestational age ranged from 28-37 weeks of gestation, birth weight of premature infants ranged from 900 gm to 2000 gm, premature infant was stable condition, and both sexes (male and female).

Exclusion Criteria of premature infant:

Congenital anomalies such as congenital heart disease, cancer, sepsis, require surgery, and neurological disorder

Tools of data collection: Data was collected by using two tools**.**

The tools were designed by the researcher after reviewing the received literature to collect essential data about the premature infant.

Tool I: It was contained two parts:

Part I: Socio-demographic characteristics of premature infant as: age, sex and birth order, weight on admission, date of admission and such as discharge, reason for admission and diagnosis.

Part II: This part was included data about feeding assessment of premature infant as: types of feeding of premature (breast or bottle feeding or gavage feeding), amount of every feeding per time and 24 hour, frequency administration of gavage feeding and intra venous fluid.

Tool II: It was contained two parts:

Part I: Measuring vital signs: It included assessment of temperature, pulse and respiration for seven days.

Part II: included recording daily assessment the sign and symptoms of premature infant that was present from one to seven days.

Method for data collection:

An official permission was obtained from the director of intensive care units of premature infants in Sohag city.

Oral Consent was obtained from the mothers of low birth weight premature infants who agreed to participate in this study after explaining both the purpose and importance of this study.

Pilot study: It was carried out on 10 % of the study and control premature infant for the purpose of modification and clarification. The designed tool was tested on premature infant who fulfilled the inclusion criteria to evaluate the content validity and reliability of the tools and to estimate the time required to fill in the sheets. Unclear items will be clarified, unnecessary items will be omitted and new variables will be added. Those who shared in the pilot study were excluded from the study sample.

Premature infants' vital signs were measured daily to the study and control group for seven days.

Daily assessment of sign and symptoms of premature infant of both groups from one day to seven day.

Data collection was done daily according the availability of cases, socio demographic data was obtained for record of premature infants and was randomly selected according the diagnosis and was divided into study and control groups.

Assessment of general condition of premature infants daily (signs and symptoms) was done.

Measuring of vital signs was done twice daily to the study group during seven day before and after massage

Vital signs were measuring before conducting massage to premature infants from the first day of massage to the seventh day.

Daily observation and recording the data was done during one week, and compared between the control and study groups.

Massage sessions will be conducted one hour after feeding the premature infants in a quite

environment 5 minutes for rubbing the body, 5 minutes kneading the body and last minutes for kinesthetic stimulation and other supportive program for premature massage therapy from specialized internet.

-Implementation of massage therapy technique:

The massage will conduct to study group 15 minutes for two times daily for one week.

- Hands should be clean and fingernails short. All jewelers should be removed to avoid scratching, give you time to prepare, as being calm and focused will enhance the effectiveness of the massage, minimize noise, distractions and interactions. Ensure that the room i draught-free and that the temperature is appropriate (not too hot and not too cold) and constant.

The researcher first introduced herself to the care giver of intensive care of premature unit and then explained the purpose of the study at the beginning of interview , so the care giver were reassured that all gathered information will be confidential. The title and objectives 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 approval from the administrator of Specialized Hospital at Sohag which is affiliated to the Ministry of Health.

Each premature infant was conducted massage in first day for 15 minutes, twice daily for seven days, from the top of the head to the neck and back to the top of the head, and back to the neck; from the neck across the shoulders; from the upper back to the waist and back to the upper back; from the thigh to the foot to the thigh on both legs and from the shoulder to the hand to the shoulder on both arms. This is followed by passive movements of the limbs for 5 minutes.

The newborn is placed in a supine position and each arm, then each leg, and finally both legs together are flexed and extended (as in a bicycling motion). Each flexion/extension motion lasts 10 seconds. This is again followed by 5 minute massage as depicted above.

Massage sessions was conducted one hour after feeding the premature infants in a quite environment 5 minutes for rubbing the body, 5 minutes kneading the body and last minutes for kinesthetic stimulation and other supportive program for premature massage therapy from specialized internet

Evaluation of the effect of massage therapy on vital signs of premature infant:

Reassessment of general condition, vital signs after massage therapy was implemented and evaluated massage.

Ethical considerations:

Parent of premature infant consent for participation was obtained after explaining the purpose of the study privacy of their information obtained from their parent are protected and confidentiality of parent

premature infant, nature of the study and right to withdraw from the study at any time were explained.

Results:

Table (1): showed that the percentage distribution of premature infants was related to socio demographic characteristics in the study and control group. It has been found out that twenty percent (20.0%) of them gestational age is at 28 - <32 weeks in the study group of premature infants. Whereas half (50%) of the premature infants in the study group the gestational age is at32-<36 weeks of gestation. In the control group, it had been found out that more than forty percent (43.3%) is at32-<36 weeks of gestation. According to their sex it had been found out that more than half (53.3%) of them were males in the study group while more than thirty percent (63.3%) were females in the control group. As regards birth weight, it had been found out that forty percent (40.0%) of premature infants was 1200 – 1500gms in the study group and thirty percent (30%) of them in the control group while there was twenty percent (20%) 1800 -2000gms in the study group of premature infants. As regards to admission weight, it showed that more than thirty percent (33.3%) was from 1500 to 1800gms while only (13.3%) ranged from 1800 to 2000gms in the study group. It was observed that regarding diagnosis had showed that more than three quadrant (76.7%) of the premature infantswere diagnosed with jaundicein the study group, while half (50%) of the premature infants in control group were diagnosed with jaundice. The same table also showed that regarding residence, it had been found out that two thirds (60%) came from urban areas in the study group while more than one third (36.3%) in the control group belonged to rural areas. In the study group, forty percent (40%) of them came from rural areas and more than sixty percent (63.4%) of them were in the control group. Regarding the type of delivery, the majority of both groups were delivered caesarian section.

Table (2):- Showed that Percentage distribution of premature infant according to clinical manifestation assessment at day one and day seven of massage therapy in study and control groups. As regarding of cyanosis in day one it was founded that more than fifty percent (53.3%) present in study group on the seventh day only (6.7%) absent of cyanosis with there was moderate significance deference ($p<0.0$) at day one and day seven and control group was founded that more than fifty percent (56.7)in day one , on the seventh day it was founded that more than forty percent (46.7%) with no Statistical significance deference ($p>0.05$) at day one and day seven. while poor sucking in the study group was founded that there was more than forty percent (43.3 %) present in first day while on seventh day only (10.0%)present in

seven day of massage there was moderate significance deference (p<0.0) at day one and day seven and control group was founded that forty percent (40.0%)in day one , on the seventh day it was founded that more than thirty percent (33.3%) with no Statistical significance deference (p>0.05) at day one and day seven. As regarded tachycardia in the study group was founded that there was more than thirty percent (33.3 %) present in first day while on seventh day only (6.7%)present in seven day of massage there was moderate Statistical significance deference (p<0.0) at day one and day seven of massage therapy, and control group was founded that more than thirty percent (36.7%) In day one, on the seventh day it was founded that more than quadrant percent (26.7%) with no Statistical significance deference (p>0.05) at day one and day seven. As regarded apnea in the study group was founded that there was more than fifty percent (53.3 %) present in first day while on seventh day only (13.3%)present in seven day of massage there was Statistical significance deference (p<0.0) at day one and day seven of massage therapy, and control group was founded that fifty percent (50.0%) in day one , on the seventh day it was founded that (60.0%) with no Statistical significance deference (p>0.05) at day one and day seven.

Table (3):- showed that mean and standard deviation of premature infant according to investigation assessment at one and seven day in study and control group it showed that there was no significance deference (p>0.05)between study and control group in day one regarding the PaO_2, $PaCo_2$ and Total bilirubin , while there was Statistical significance deference (p<0.0) in PaO_2&$PaCo_2$In day seven in study and control groups except total bilirubin there was no significance deference (p>0.05) .But there was no Statistical significance deference (p>0.05) in day one in study and control groups.

Table (4):- Mean temperature of premature infants were measured from day one to day seven in the study and control groups., it was found out that Mean±SD of first day of massage was (36.8±0.5) in the study group and (36.9±0.4) in the control group and mean±SD (37±0.2) in the seventh day in study group of massage therapy. Whereas there was no significant statistical difference (p=> 0.05) in the control group (36.9±0.5)while the daily temperature was measured between the study and control group during one week. As illustrated in figure (5).

Table (5):- Mean temperature of premature infants was measured from day one to day seven of massage therapy in the study. It was found out that the mean and standard deviation in the first day before massage, it was (36.8±0.3) in study group, while after

massage it was (36.8±0.5).There was no significant statistical difference before and after massage. Whereas in the seventh day of massage, it was (37±0.2)before massage in the study group, while it was (37±0.2) after massage. There were no significant statistical differences before and after massage therapy.

Table (6): - Mean pulse rate of premature infants were measured from day one to day seven in the study and control groups.. It was found out that the Mean±SD of first day of massage was (125 ±14) in study group, while in the control group it was (124±17)in the seventh day of massage therapy. The mean±SD was (138±12) in the study group while in control group it was (132±15).There were no significant statistical differences (p=> 0.05) between the study and control group during the first four days of massage therapy. While there were significance statistical differences (p=> 0.05) of premature infant of the fifth, sixth and seventh day in the study and control groups.

Table (7):- showed that mean of pulse rate of premature infants was measured from day one to day seven in the study group. It was found out that the mean and standard deviation of day one before massage was (124 ±16) in study group, while after massage it was (125 ±14). There were no significant statistical differences before and after massage. Whereas in the seventh day of massage, it was (138±16) before massage in study group. After the massage it was (138±12). There were no significant statistical differences before and after massage.

Table (8):- showed thatthemean respiration rate of premature infants were measured from day one to day seven in the study and control groups. It was found out that the Mean±SD of the first day of massage was (38±5.5) in study group, while in the control group it was (38±9.2).In the seventh day of massage therapy the mean±SD was (39±5) in the study group while in the control group it was (31±7.5). There were no significant statistical differences (p=> 0.05) between the study and control group during first the fifth day of massage therapy. While there were significant statistical differences (p=> 0.05) of premature infant in the sixth and seventh days of massage in the study and control groups.

Table (9):- Mean respiratory rate of premature infants was measured before and after massage from day one to the day seven in the study group it was founded mean and standard deviation of day one mean and standard deviation of first day before massage (37±5.2) in study group, while after massage was founded (38±5.5)there was no statistical differences between before and after massage. While the seventh day of massage it was founded before massage (36±5.3) in study group, while after massage was founded (39±5)there was statistical differences between before and after massage.

Table (10):- showed that comparison between vital signs variation of studied premature infants before and after massage therapy, regarding the temperature variation it was founded that Mean±SD before massage was (36.8±0.5) and after massage was (37±0.2)there were statistical significance differences ($p<0.05$) . As regarded pulse rate it was founded that Mean±SD before massage was (125±14.7) and after massage was founded (138±12.2)there were statistical significance differences($p<0.05$) and respiration rate was founded that Mean±SD before massage was (28±5.5) and after massage was (39±5)there were moderate significance differences ($p<0.01$)before and after massage therapy. As illustrated in figure(8).

Table (1):Percentage distribution of premature infants is related to bio socio demographic characteristics in study and control group.

Characteristics of premature infants	Study group(n=30)		Control group(n=30)	
	No.	%	No.	%
Gestational age				
28 - <32	6	20.0	7	23.3
32- <36	15	50.0	13	43.3
36-<37	9	30.0	10	33.3
M±SD	**31.6±2.8**		**31.1±2.1**	
Sex				
Male	16	53.3	11	36.7
Female	14	46.7	19	63.3
Birth weight (gms)				
- 900- <1200	5	16.6	7	23.4
-1200-<1500	12	40.0	9	30.0
-1500-<1800	7	23.4	6	20.0
-1800-<2000	6	20.0	8	26.6
M±SD	1150.5±258.4		1154.5±262.1	
Admission weight (gm)				
- 900- <1200	7	23.4	8	26.6
-1200-<1500	9	30.0	9	30.0
-1500-<1800	10	33.3	8	26.6
-1800-<2000	4	13.3	5	16.6
M±SD	1144.8±257.3		1154.5±262.1	
Diagnosis				
Jaundice	23	76.7	15	50.0
Respiratory distress	7	23.3	15	50.0

Residence				
Rural	12	40.0	19	63.4
Urban	18	60.0	11	36.6
Type of Delivery				
Normal Vaginal Delivery	1	3.3	3	10.0
Cesarean Section	29	96.7	27	90.0

Table (2):- Percentage distributions of premature infant according to clinical manifestation assessment at one and seven day of massage therapy in study and control group.

Clinical manifestation	Study group (n=30)					Control group (n=30)				
	1st day		7th day		P. value	1st day		7th day		P. value
	No.	%	No.	%		No.	%	No.	%	
Cyanosis										
Present	16	53.3	2	6.7	<0.001**	17	56.7	14	46.7	0.772
Absent	14	46.7	28	93.3		13	43.3	16	53.3	
Poor sucking										
Present	13	43.3	3	10.0	<0.001**	12	40.0	10	33.3	0.451
Absent	14	46.7	27	90.0		18	60.0	20	66.7	
Tachycardia										
Present	10	33.3	2	6.7	0.021*	11	36.7	8	26.7	0.729
Absent	20	66.7	28	93.3		19	63.3	22	73.3	
Apnea										
Present	16	53.3	4	13.3	0.014*	15	50.0	12	40.0	0.827
Absent	14	46.7	26	86.6		15	50.0	18	60.0	

* Statistically significant difference (p<0.05)** Statistically significant difference (p<0.01)

Table (3):- Mean investigation assessment of premature infant at one and seven day of massage therapy in study and control group.

	Study (n=30)	Control (n=30)	P. value
	Mean±SD	Mean±SD	
Day one			
PaO_2	62.1±8.3	62.8±7.8	0.737
$PaCo_2$	48.2±3.7	47.9±4.1	0.767
Total bilirubin	16.1±1.4	16.3±1.5	0.595
Seven day			
PaO_2	79.4±5.6	71.3±6.7	<0.001**
$PaCo_2$	41.3±2.6	43.8±5.5	0.028*
Total bilirubin	5.4±2.1	5.6±1.9	0.701

* Statistically significant difference (p<0.05)** Statistically significant difference (p<0.01)

Table (4):-Mean temperature of premature infants was measured from day one to day seven in the study and control groups.

Temperature	Study Group (n=30)	Control Group (n=30)	P. value
	Mean±SD	Mean±SD	
1st day	36.8±0.5	36.9±0.4	0.473
2nd day	36.9±0.3	36.9±0.4	0.970
3rd day	36.9±0.3	36.9±0.5	0.835
4th day	36.9±0.2	36.9±0.3	0.705
5th day	36.9±0.2	36.9±0.4	0.717
6th day	37±0.2	36.8±0.5	0.126
7th day	37±0.2	36.9±0.5	0.597

Ns: No statistically significant difference (p>0.05)

Table (5):- Mean temperature of premature infants was measured from day one to day seven of massage therapy in the study.

Temperature	Before massage therapy	After massage therapy	P. value
Day one	36.8±0.3	36.8±0.5	0.999
Day two	36.8±0.5	36.9±0.3	0.228
Day three	36.9±0.2	36.9±0.3	1.000
Day four	36.9±0.2	36.9±0.2	1.000
Day five	36.9±0.2	36.9±0.2	1.000
Day six	37±0.2	37±0.2	1.000
Day seven	37±0.2	37±0.2	1.000

* Statistically significant difference (p<0.05)Ns: No statistically significant difference (p>0.05)

Table (6):- Mean pulse rate of premature infants were measured from day one to day seven in the study and control groups.

Pulse	Study Group (n=30)	Control Group (n=30)	P. value
	Mean±SD	Mean±SD	
1st day	125 ±14	124±17	0.157ns
2nd day	131±13	124±16	0.084ns
3rd day	133±12	126±16	0.069ns
4th day	134±11	127±16	0.084ns
5th day	137±12	128±17	0.039*
6th day	138±11	130±17	0.042*
7th day	138±12	132±15	0.048*
P. value	<0.001**	0.072	

Ns: No statistically significant difference (p>0.05)* Statistically significant difference (p<0.05)

Table (7):- **Mean pulse rate of premature infants was measured from day one to day seven in the study group.**

Pulse rate	Before massage therapy	After massage therapy	P. value
Day one	124 ±16	125 ±14	0.740
Day two	126±13	131±13	0.057
Day three	131±15	133±12	0.463
Day four	133±13	134±11	0.679
Day five	134±12	137±12	0.214
Day six	137±11	138±11	0.650
Day seven	138±16	138±12	1.000

Ns: No statistically significant difference (p>0.05)

Table (8):-Mean respiratory rate of premature infants were measured from day one to day seven in the study and control groups.

Respiratory rate	**Study Group (n=30)**	**Control Group (n=30)**	**P. value**
	Mean±SD	Mean±SD	
1st day	38±5.5	38±9.2	0.131
2nd day	39±5.5	39±9.1	0.133
3rd day	39±5.3	39±8.6	0.124
4th day	41±5.3	40±8	0.086
5th day	42±5	41±9.1	0.463
6th day	36±4.8	31±7.4	0.003**
7th day	39±5	31±7.5	0.001**

Ns: No statistically significant difference (p>0.05)** Statistically significant difference (p<0.01)

Table (9):- **Mean respiratory rate of premature infants was measured before and after massage from day one to day seven in the study group.**

Respiration	Before massage therapy	After massage therapy	P. value
Day one	37±5.2	38±5.5	0.353
Day two	38±5.7	39±5.5	0.374
Day three	39±6.2	39±5.3	0.995
Day four	39±5.7	41±5.3	0.072
Day five	31±4.8	42±5	0.310
Day six	32±4.6	36±4.8	0.001**
Day seven	36±5.3	39±5	0.005**

Ns: No statistically significant difference (p>0.05)* Statistically significant difference (p<0.01)

Table (10):- Comparison between vital signs variation of studied premature infants before and after massage therapy (n=30).

Vital signs	Before massage	After massage	P. value
Temperature	36.8±0.5	37±0.2	0.046*
Pulse	125±14.7	138±12.2	0.001**
Respiration rate (RR)	38±5.5	39±5	<0.001**

* Statistically significant difference (p<0.05)

Discussion:

Premature infant massage is beneficial and gratifying for the infant and family. It produces numerous positive emotional and behavioral effects in infants, such as enhances sleep quality, improvement in circulation and improvement in immunological responses. Also, the massage facilitates the mother–infant relation and helps reduce anxiety for both. The first communication that parents can create with their infant by means of touch, and massage, is one of the most suitable ways of touching an infant. Therefore, premature infant massage is important because infants interpret touch as physical evidence that they are loved (**Cetinkaya&Basbakkal 2012)**

The first part that explored in the present study was the socio-demographic characteristics of premature infants it included gestational age, sex, birth weight (gms), admission weight (gm), residence, diagnosis and type of delivery.

The findings of the present study show the socio-demographic characteristics of the studied premature infants according to their gestational age, it was found out that half (50%) of the premature infant their

gestational age was32-<36 weeks of gestation, the same mentioned by**Tekgündüzet al., (2014)** who reported that the infants' average birth weight and their average gestational age.

The current study shows that more than half of premature infants were male in the study & control groups respectively. This finding is congruent with **Lee (2005)** who evaluates the effect of infant massage on weight gain, physiological and behavioral responses in premature infants, the children, and point of view and reported that, there were less than half of them boys and more than half of them girls who received massage therapy.

In the present study, it is concluded that caesarean section (CS) is the most common method of delivery; it can lead to many health problems including preterm delivery and low birth weight; it is also in agreement with **Lee, (2005)& Hyde and Berrington(2012)**who mentioned that infants born by cesarean section have a significantly different physiology at birth compared to those born by vaginal delivery. The finding is also consistent with **Choi et al., (2015**) who mentioned that the most common as delivered cesarean section compared to those born by normal vaginal delivery. This is may be due to the most common premature infant is born by caesarean section due to maternal and newborn problem.

As regards the characteristics of the studied infants, the result of the current study reveals that the temperature variation during one week between the study and control group of premature infant has no significant difference. This finding is opposite to (**Leduc Det al., 2009)**who said that the finding with greater increase in temperature had been noted in premature infants who received massage therapy and was most likely due to the therapist's hands transferring heat to the infant or may be due to the massage facilitates neurological regulation of temperature. This is may be due to premature infant had a little of subcutaneous fat that leading to facilitated heat loss to surround environment.

The present thesis explores that there is significant difference as regards the pulse variation during one week between the study and control group of premature infant. These results agree with**Field et al., 2008&Diego et al2014** who mentioned that physiologic conducted parameters included heart rate variability (HRV) showed significant improvements. But this result is opposite to that of (**Lee 2005)** who stated that there were no significant differences in heart rate after massage. However, this is may be due tofrequency of massage improving the circulation is reflected in the pulse variation.

The present study shows that respiration rate variation during one week between the study and control group of premature infant with

has significant difference. This finding is in agreement with **De Almeida et al., (2014)**who said that regarding the effect of applying massage therapy on pre-mature neonates' physical and physiological states pre and post, results of the study demonstrated that, were statistical significant differences concerning heart rate, temperature and occurrence of apnea respectively. There is a highly statistical and significant difference regarding respiratory rate before and after applying the massage therapy. This is may be due to the effect of massage therapy on premature infants that enhances oxygen saturation can lead to improve respiration.

In this study, however, it is observed that clinical manifestation assessments are found in day one and day seven of the massage therapy in the study and control group. As regarding of apnea, cyanosis it reflected that there is moderate significant difference at one day and seven day. These results were agreed with **Baghcheghieta l., (2007)** who found out positive significant relation between touching an infant and increased oxygen saturation.The effect of massage therapy on premature infant that enhanced oxygen saturation that leads to improve cyanosis

The present study noticed that, clinical manifestation assessments are founds in day one and day seven of massage therapy in study and control group. As d to tachycardia it reflected that there is significant difference in day one and day seven. This finding agreed with **Hardin (2009)** who argued that decreased oxygen saturation and pulse rates in preterm neonates were exposed to massage. Similarly, **(Field et al., 2010**) showed that the pressure utilized those infants who received moderate pressure stroking giving greater weight gain and increasing cardiac vagal activity. This is may be due to daily massage therapy to premature infants increase cardiac output that leads to the improvement of tachycardia.

The present study showed that, investigation assessment in day one and day seven of massage therapy in study and control group is no significant difference ($p>0.05$) in day one regarding the PaO_2, $PaCo_2$, while there was significance difference ($p<0.0$) in PaO_2&$PaCo_2$ in day seven in the study and control group. This finding is in agreement with **Livingston et al., (2009)**who mentioned that the significant differences in oxygen saturation were found assessed the effects of touch and massage on medically fragile infant groups. The same explanation mentioned by**Verklan (2010)** who found out that massaging the skin leads more oxygen to enter the lungs and the oxygen transportation increases. This process finally leads to an improvement in the mean oxygen saturation.This is may be due to, the therapeutic benefits of massage therapy on

premature infant enhance circulation that can lead to improve oxygen saturation.

As regards the relation between the gestational age and birth weight of premature infant in the study group, the research revealed that there is highly significant statistical difference.

Conclusion:

Premature infant who exposed to massage therapy experienced better weight gain and short duration of stay at NICU compared to premature infant who received routine hospital care.

Recommendations:

Nurses in neonatal intensive care unit should receive training program related to massage therapy to improve their practice regarding general condition two times of premature infants during hospitalization.

Further studies are required to evaluate alternative methods to meet the needs of premature infants during transition from intra utrine life to extra utrine life.

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The Effect of Massage Therapy on Weight and Length of Staying Premature Infant at Neonatal Intensive Care Units of Sohag city

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Abstract

In premature infants, weight gain becomes the main criterion for hospital discharge. Research has shown that massage therapy has led to weight gain in preterm infants when moderate pressure massage was provided. **The present studyaimed** to determine the effect of massage therapy on weight and length of staying of premature infant at Neonatal Intensive Care Units. The total sample included sixty low birth weight premature infants, who were selected from the Neonatal Intensive Care Units of Sohag Affiliated to the ministry of health hospitals. **Two tools were used**: Two tools were designed by the researcher, **Tool I:** Socio-demographic characteristics of premature infants and their feeding assessment of premature infant.**Tool II**: Measuring premature infant weight and recording premature infant daily physical assessment from one to seven days and measuring length stying at Neonatal Intensive Care Units.**Results:** The study revealed significant relation between infant massage and weight and length of staying of premature infant at Neonatal Intensive Care Units. **Conclusion**: massage therapy has positive effect on weight of premature infants and short thier length of staying at the hospital. **Recommendation** nurses who work in Neonatal Intensive care unit should receive training program on massage therapy to improve their practice which reflect on the general condition of premature infants.

Keywords: Massage Therapy, premature infants, weight, Length of staying, Neonatal Intensive Care Units.

Introduction

Premature infant survivors show a significant growth and development retardation, reflected by lower body weight, height and head circumference and poor motor, adaptive, social and language development in the first five years of life. Late in adult being, they remain at an upturn risk of cardiovascular and metabolic disorders (**Coutinho P,et al.,2011**)&(**Velez M,et al., 2011**).

Premature infant is defined by WHO as all births before 37 completed weeks of gestation or less than 259 days since the first day of a woman's last menstrual period. Premature birth can be further sub-divided based on gestational age: extremely preterm (<28 weeks), very preterm (28 - <32 weeks) and moderate preterm (32 - <37 completed weeks of gestation). Moderate preterm birth might be additional part to concentrate on late pre-term birth (34 - <37 completed weeks). The 37 week remove is to some degree self-assertive, and it is currently documented that although the risks connected with premature birth are greater the lower the gestational age, even infants born at 37 or 38 weeks have higher dangers than those born at 40 weeks of gestation (**Marlow N 2012)**.

Massage therapy as a non-therapeutic interference may have positive effect on physical and developmental growth of preterm and LBW newborn infants including weight gain, decreased stress behavior, promotion of neurologic and neuro-motor development, better infant-parent emotional bonding, improved sleep, reduced rates of nosocomial infection and along these lines, decreased mortality of hospitalized premature infants **(Kulkarni A et al., 2010)**.

Massage therapy has not any harmful effects and it can enhanced weight rapidity of more than 30 weeks of gestation and physically stable premature infants by different mechanisms. Increase Weight is the most common reliable stricture which is connected with massage therapy in premature infants (**Samsamshariat S & Pourmorshed P 2011).**

The primary communication that parents can make with their infant is by method of touch, and massage is a standout amongst the most appropriate methods for touching a newborn infant Therefore, infant massage is essential since because infants interpret touch as physical sign that they are loved. The impact of giving a newborn infant comforting skin massages is evident on several stages. For example, the brain contains psychological classifications that, from the first day of life, directly mediate social bonds and social feelings **(Cheng J et al., 2011) & (Kulkarni A et al., 2010**).

The care givers have to be properly instructed to avoid too strong a massage that may cause physical injury. Moderate pressure massage therapy and passive movement of the limbs

have been shown to result in weight gain in premature infants. **(Field T et al., 2010) & (Mukherjee S et al., 2011)**.

Aim of the study:

The study aimed to: Determine the effect of massage therapy on weight and length of staying of premature infant at Neonatal Intensive Care Units. .

Research hypothesis:

Premature infant who exposed to massage therapy was weight gain at neonatal intensive care units compared to premature infants who receiving hospital routines care.

The length of staying at the hospital were short among infant who exposed to massage therapy.

Subjects and Method:

Research Design:

Quasi experimental research design was used in this study.

Setting:

The study was conducted at Neonatal Intensive Care Units in the following setting:

Sohag University Hospital

Children Specialized Hospital at Sohag which is affiliated to the Ministry of Health.

Subjects:

Sixty premature infant in the above previously mentioned setting who admited at Neonatal Intensive Care Units.

The sample was divided into two equal groups: study and control group were randomly selected

Study group was received massage therapy while the control group was received the routine hospital care.

Inclusion Criteria of premature infant: Gestational age ranged from 28-37 weeks of gestation, birth weight of premature infants ranged from 900/gm to 2000/gm, premature infant with stable condition and both sexes (male and female).

Exclusion Criteria of premature infant: Congenital anomalies such as congenital heart disease cancer**,** sepsis**,** require surgery, and neurological disorder.

Tools of data collection:

Data was collected by using two tools**.**

The tools were designed by the researcher after reviewing the received literature to collect essential data about the premature infant.

Tool I: It was contained two parts:

Part I: Socio-demographic characteristics of premature infant as: age, sex and birth order, weight on admission, date of admission and such as discharge, reason for admission and diagnosis.

Part II: Feeding assessment of premature infant. This part was included: types of feeding of premature breast or bottle feeding or gavage feeding .Amount of every feeding per time and 24 hour, frequency, administration of gavage feeding and intra venous fluid .

Tool II: It was contained two parts:

Part I: - Measuring premature infant weight for seven days

Part II: Recording premature infant daily physical assessment from one to seven days and measuring length staying at hospital.

Pilot study: It was carried out on 10 % of the study and control premature infant for the purpose of modification and clarification. The designed tool was tested on premature infant who fulfilled the inclusion criteria to evaluate the content validity and reliability of the tools and to estimate the time required to fill in the sheets. Unclear items will be clarified, unnecessary items will be omitted and new variables will be added. Those who shared in the pilot study were excluded from the study sample.

Method for data collection:

Administrative process: An official permission will be obtained from the director of intensive care units of premature infants in Sohag city.

Informed Consent: mothers of low birth weight infants agreed to participate in this study after explaining both the purpose and importance of this study.

The study was conducted through data collection was started from march 2015 to July 2015

Data collection was done daily according the availability of cases, socio demographic data was obtained for record of premature infants and was randomly selected according the diagnosis and was divided into study and control groups.

Assessment of general condition of premature infants daily (signs and symptoms) was done.

Measuring of weight of study group twice daily during seven day before and after massage

Measuring anthropometric measurement (length, head and chest circumference) was taking before conducting massage to premature infants in the first day of massage and daily record and observation during one week, and compare between control and study groups.

Massage sessions will be conducted one hour after feeding the premature infants in a quite environment 5 minutes for rubbing the body, 5 minutes kneading the body and last minutes for kinesthetic stimulation and other supportive program for premature massage therapy from specialized internet

Implementation of massage therapy technique:

The massage will conduct to study group 15 minutes for two times daily for one week as the following technique:

Hands should be clean and fingernails short. All jewelers should be removed to avoid scratching, give you time to prepare, as being calm and focused will enhance the effectiveness of the massage, minimize noise, distractions and interactions. Ensure that the room i draught-free and that the temperature is

appropriate (not too hot and not too cold) and constant.

The researcher first introduced herself to the care giver of intensive care of premature unit and then explained the purpose of the study at the beginning of interview , so the care giver were reassured that all gathered information will be confidential. The title and objectives 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 approval from the administrator of Specialized Hospital at Sohag which is affiliated to the Ministry of Health .

Each premature infant was conducted massage in first day for15minutes , twice daily for seven days ، From the top of the head to the neck and back to the top of the head, and back to the neck,from the neck across the shoulders; from the upper back to the waist and back to the upper back; from the thigh to the foot to the thigh on both legs and from the shoulder to the hand to the shoulder on both arms.

Followed by passive movements of the limbs for 5 minutes.

The newborn is placed in a supine position and each arm, then each leg, and finally both legs together are flexed and extended (as in a bicycling motion). Each flexion/extension motion lasts 10 seconds. This is again followed by 5 minute massage as depicted above.

Massage sessions was conducted one hour after feeding the premature infants in a quite environment 5 minutes for rubbing the body, 5 minutes kneading the body and last minutes for kinesthetic stimulation and other supportive program for premature massage therapy from specialized internet

Evaluation of the effect of massage therapy of premature infant:

Reassessment of weight monitoring during and after massage therapy session.

Reassessment of general condition, vital signs after massage therapy was implemented and evaluated massage**.**

Measuring long staying of the premature infants at the hospital.

Ethical considerations:

Parent of premature infant consent for participation was obtained after explaining the purpose of the study privacy of their information obtained from their parent are protected and confidentiality of parent premature infant, nature of the study and right to withdraw from the study at any time were explained.

Results:

Table (1): showed that Percentage distribution of premature infants related to biosocio demographic characteristics in study and control group it has founded that twenty percent (20.0%) of them gestational age at 28 - <32 weeks in study group of premature infant. while half (50%) of the premature infant in the

study group the gestational age at32-<36 weeks of gestation while in the control group it has founded that more than forty percent (43.3%).According to their sex it has founded that more than half (53.3%) of them were males in study group while more than thirty percent (63.3%) were female in control group. As regard birth weight it has founded that forty percent (40.0%) of premature infant 1200 – 1500gms in study group and thirty percent (30%) of them in the control group while twenty percent (20%) 1800 -2000gms in study group of premature infant. As regarded to admission weight it showed that more than thirty percent (33.3%) from 1500 to 1800gms while only (13.3%) ranged from 1800 to 2000gms in study group. It has observed that regarding diagnosis it has showed that more than three quadrant (76.7%) of the premature infant diagnosed Jaundice in study group, while half (50%) of the premature infant in control group. The same table also showed that regard to residence it has founded two third (60%) were come from urban area in study group while more than one third (36.3%) in control group. While forty percent (40%) of them come from rural area in the study group and more than sixty percent (63.4%) of them in the control group. As regard type of delivery, majority of both groups delivered caesarian section.

Table (2): Showed Percentage distribution of the premature infants according tomethod of feeding in study & control groups it was focused that the majority of the premature infants (96.7%) who giving artificial feeding in study group while (90%)in the control group. while only (20%) who given in the study group and it was founded thirty percent (30.0%) given gavage feeding in control group. While breast feeding it was observed most of them (83.3%) in study group, while in control group (73.3%) of premature infant.

Table (3): It was observed that at day seven in the study group and control group had were amount of feeding per one time therefore there was statistical significant difference between study and control group at moderate level of significant

Table (4): It was observed that at day seven in the study and control groups had amount of feeding per 24 therefore there was statistical significant difference between study and control group at moderate level of significant**.**

Table (5): showed the mean weight of premature infant of one day to seven day in the study and control groups it has founded with no significance difference in 1^{st} day, 2^{nd} day and 3^{rd} day (p=> 0.05) but there were statistical significance difference in 5^{th} day, 6^{th} day and 7^{th} day (p < 0.00) between study & control group, while there were moderate significance difference in 4^{th} day (p < 0.00) between study & control groups.

Table (6): Described that weight gain of premature infants of study and control group at

one and seven day, it showed that Weight in 1st day mean±SD of the study group(1544.7±225.3) and control group (1639.5±200.2) , on Weight in 7th day was founded that mean±SD of the study group(1807.4±192.2) and control group (1650.2±250.8)with highly Statistical significance deference in the seventh day of massage between study and control groups study group. While no significance deference in day one in study and control groups.

Table (7): showed that the two thirds (60.0%) were discharged of the study group and forty (40.0%) stayed, and in the control group it was found out that only (3.3%) were discharged while the majority of them (96.7%) stayed. There was a highly significant difference in the length of stay ($p < 0.00$) between the study & control groups.

Table (8): Mean length of staying of hospitalization of studied premature infants in study and control groups, it reflected that mean of staying in hospital decrease among study group than control group with statistical significant differences ($p<0.01$) between study and control groups

Fig (1):-It was observed that the mean and standard deviation of length of premature infant of one day to seven day in the study and control groups with no statistical significance difference of length during one week ($p=> 0.05$) between study and control group.

Fig (2): Described that weight gain of premature infants of study and control group at one and seven day, it showed that Weight in 1st day mean±SD of the study group (1544.7±225.3) and control group (1639.5±200.2) , on Weight in 7th day was founded that mean±SD of the study group(1807.4±192.2) and control group (1650.2±250.8)with highly Statistical significance deference in the seventh day of massage between study and control groups study group. While no significance deference in day one in study and control groups.

Table (1): Percentage distribution of premature infants related to biosociodemographic characteristics in study and control group.

Characteristics of premature infants	Study group (n=30)		Control group (n=30)	
	No.	%	No.	%
Gestational age				
28 - <32	6	20.0	7	23.3
32- <36	15	50.0	13	43.3
36-<37	9	30.0	10	33.3
M±SD	31.6±2.8		31.1±2.1	
Sex				
Male	16	53.3	11	36.7
Female	14	46.7	19	63.3
Birth weight (gms)				
- 900- <1200	5	16.6	7	23.4
-1200-<1500	12	40.0	9	30.0
-1500-<1800	7	23.4	6	20.0
-1800-<2000	6	20.0	8	26.6
M±SD	1150.5±258.4		1154.5±262.1	
Admission weight (gm)				
- 900- <1200	7	23.4	8	26.6
-1200-<1500	9	30.0	9	30.0
-1500-<1800	10	33.3	8	26.6
-1800-<2000	4	13.3	5	16.6
M±SD	1144.8±257.3		1154.5±262.1	
Diagnosis				
Jaundice	23	76.7	15	50.0
Respiratory distress	7	23.3	15	50.0
Residence				
	12	40.0	19	63.4
Rural	18	60.0	11	36.6

Urban				
Type of Delivery				
Normal Vaginal Delivery	1	3.3	3	10.0
Cesarean Section	29	96.7	27	90.0

Ns: No statistically significant difference (p>0.05)

Table (2): Percentage distribution of the premature infants was checked according to method of feeding in the study & control groups.

Method of feeding#	Study Group (n=30)		Control Group (n=30)	
	No.	%	No.	%
Breast Feeding	25	83.3	22	73.3
Artificial feeding	29	96.7	27	90.0
Gavage feeding	6	20.0	9	30.0
Intravenous fluid	18	60.0	9	30.0

 # More than one answer might be given **Ns: No statistically significant difference (p>0.05)**

*** Statistically significant difference (p<0.05)**

Table (3):- Mean amount of feeding per one time for studied premature infants were checked in the study & control groups.

Amount of feeding per one time	Study Group (n=30) Mean±SD	Control Group(n=30) Mean±SD	P. value
Day one	30±6	30±7	1.000
Day Seven	45±4	35±6	<0.001**

Ns: No statistically significant difference (p>0.05) **** Statistically significant difference (p<0.01)**

Table (4):Mean amount of feeding per 24/hours for studied premature infants in the study & control groups.

Amount of feeding per 24hours	Study Group (n=30) Mean±SD	Control Group (n=30) Mean±SD	P. value
Day one	180±36	180±42	1.000
Seven day	270±24	210±36	<0.001**

Ns: No statistically significant difference (p>0.05) *** Statistically significant difference (p<0.05)**

** **Statistically significant difference (p<0.01)**

Table (5):Mean weight of premature infants was checked from day one to day seven in the study and control groups.

Weight (gram)	Study Group (n=30)	Control Group (n=30)	P. value
	Mean±SD	Mean±SD	
1st day	1544±225.3	1639 ±200.2	0.090
2nd day	1662±200.7	1582±217.5	0.146
3rd day	1698±205.5	1608±227.9	0.113
4th day	1745±202.8	1581±260.9	0.009**
5th day	1760±185.5	1607±257.3	0.012*
6th day	1789±181.1	1676±265.1	0.022**
7th day	1807±192.2	1650±250.8	0.017*

Ns: No statistically significant difference (p>0.05)

* Statistically significant difference (p<0.05)

** Statistically significant difference (p<0.01)

Table (6): Mean and standards' deviation of studiedpremature infants accords toweight gain in study and control group at one and seven day.

weight gain	Study Group	Control Group	p. value
Weight in 1st day	1544.7±225.3	1639.5±200.2	0.090
Weight in 7th day	1807.4±192.2	1650.2±250.8	0.008**

** Statistically significant difference (p<0.01)

Table (7):- Percentage distribution of premature infants was measured according to the length of stay of hospitalizations of premature infants between the study and control groups.

	Study group (no=30)		Control group (no=30)		p. value
	No	%	No	%	
Discharge	18	60.0	1	3.3	<0.001**
Not Discharge	12	40.0	29	96.7	

** Statistically significant difference (p<0.01)

Table (8):- **Mean length of staying of hospitalization of studied premature infants in study and control groups.**

	Study Group (n=30)	Control Group (n=30)	P. value
	Mean±SD	Mean±SD	
Length of staying	4.2±2.1	7.0±0.0	<0.001**

* Statistically significant difference (p<0.05)

Fig (1):-Mean and standard deviation of Length of premature infant of one day to seven day in the study and control groups.

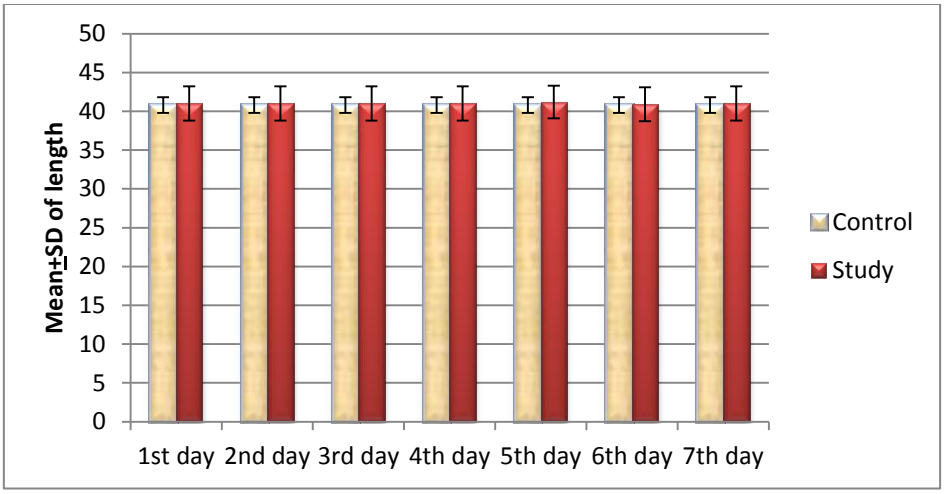
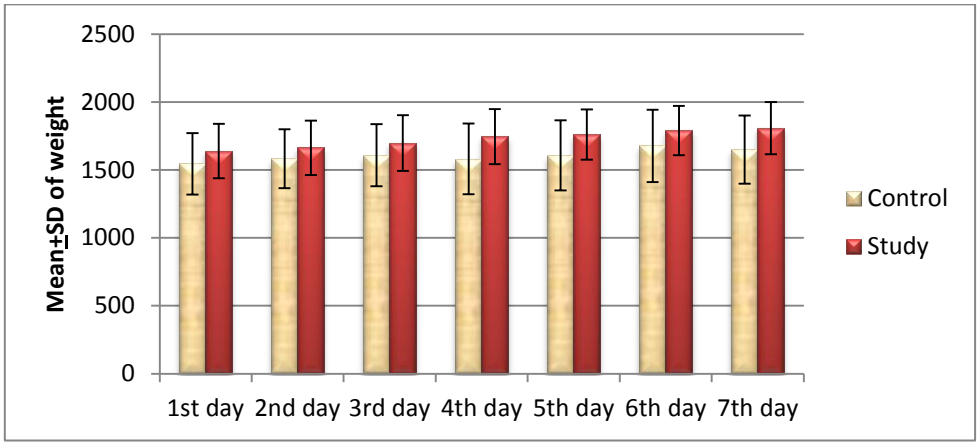


Fig (2): Described that weight gain of premature infants of study and control group at one and seven day.



Statistical Analysis:

Statistical presentation and analysis of the present study, the data were tested for normality using the Anderson-Darling test and for homogeneity variances prior to further statistical analysis. Categorical variables were described by **number and percent**, where continuous variables described by mean and standard deviation **(Mean, SD)**. **Chi-square test** and fisher exact test used to compare between categorical variables where compare between continuous variables by **t-test** and ANOVA. **A two-tailed p < 0.05** was considered statistically significant. All analyses were performed with the **SP SS 20.0** software.

Discussion

Premature infant massage is beneficial and gratifying for the infant and family. It produces numerous positive emotional and behavioral effects in infants, such as enhances sleep quality (**Ferber et al., 2002**), improvement in circulation and improvement in immunological responses. Also, the massage facilitates the mother–infant relation and helps reduce anxiety for both .The first communication that parents can create with their infant is by means of touch, and massage is one of the most suitable ways of touching an infant .Therefore, premature infant massage is important because infants interpret touch as physical evidence that they are loved (**Cetinkaya &Basbakkal 2012)**

The first part that has explored in the present study was tosocio-demographic characteristics of premature infants it includes, Gestational age, sex, Birth weight (gms), Admission weight (gm),Residence, Diagnosis and type of delivery.

The findings of the present study showed the socio-demographic characteristics of the studied premature infants according of gestational age founded that half (50%) of the premature infant the gestational age at 32-<36 weeks of gestation the same explanations mentioned by **Tekgündüz et al., (2014) who** reported that the infants' average birth weight and their average gestational age.

The current study is showed that more than half of premature infant male in study & control groups respectively. This finding is in congruence with **Lee (2005)** who reported that evaluate the effect of infant massage on weight gain, Physiological and behavioral responses in premature infants, the children, and point of view and reported that, there were less than half of them boys and more than half of them girls who received massage therapy.

In the present study, it is concluded that caesarean section (CS) is the most common method of delivery; it can lead to many health problems including preterm delivery and low birth weight; it is also in agreement with Lee, (2005)& Hyde and Berrington(2012)who mentioned that infants born by cesarean section have a significantly different physiology at birth compared to those born by vaginal delivery. The finding is also consistent with Choi et al., (2015) who mentioned that the most common as delivered cesarean section compared to those born by normal vaginal delivery. This is may be due to the most common premature infant is born by caesarean section due to maternal and newborn problem.

The present study illustrates that the majority of the premature infants who are given artificial feeding in both study and control group. On the other hand, breast feeding is more than eighty percent in the study group; but in the control group, it is about more than seventy percent of premature infants. It can be

argued that the majority of premature infants are given artificial feeding because their hospitalization and special formula are given by physician.

The current study shows that the mean and standard deviation of the studied premature infants is in accordance with the amount of feeding in the study & control groups. This indicates that there is moderate statistical significant difference. The results are also in accordance with **Tekgündüz et al., (2014)** who mentioned that when daily weight gain, abdominal circumference and gastric residual volume excess measurements which were analyzed, the differences between the first day and last day of the study were statistically significant in the massage group of premature infants. This is may be due to daily abdominal massage that increased gastric residual volume reflected that amount of feeding respectively.

The study shows the distribution of the premature infants according to the amount of feeding per 24hrs in the study & control groups; it shows that there is a moderate statistical significant difference of premature infants between the study and control group in the amount of feeding per 24hrs. The same finding has been identified by **Harrington &Haskvitz (2006**), who stated that the abdominal massage fast-tracks peristalsis by changing intra-abdominal pressure and creating a mechanical and reflexive effect on the intestines, decreasing abdominal distension and increasing intestinal movements. This is may be due to premature infant especially abdominal massage that increases peristalsis by changing intra-abdominal pressure in order to enhance abdominal capacity.

As regards anthropometric measurements (weight) of premature infant, the study illustrates in the study and control group during one week; it has no significant differences in first three days, but there is significant difference during last fourth day. This result agreed with **Dieter (2003) & Diego et al., (2006),** who found out that statistical significant difference in weight gain in the fifth day of the massage. The same finding also has been mentioned by **Field et al., (2010**) In terms of the frequency and duration of massage, greater weight gain had been consistently observed when administering for 15 min 3 per day. Frequency of massage therapy to premature infant abdominal capacity and circulation reflect that weight gain.

Also this study is similar to the result of **Miguel et al., (2014**) who reported that massage and exercise led to increased weight gain, through exercise which was associated with increased calorie consumption; massage was related to increased vagal activity. The finding is aggreement with **Deigo et al. (2006)** who suggested that moderate pressure

massage stimulates vagal activity and leads to increased weight gain through two mechanisms, increased vagal activity and gastric motility leading to increased food absorption and increased weight gain and to the release of insulin and Insulin-like growth factor directly leading to greater weight gain.**Khan (2015**) stated that most of the earlier conducted studies had used only weight gain as their outcome variable.

As regards the characteristics of the studied infants, the result of the current study reveals the length during one week between the study and control group of preterm infant in the study & control groups with no significant difference of length during one week. This finding is in agreement with **Mendes& Procianoy,(2008)** who failed to demonstrate any significant change in these anthropometric parameters (length). This study is also in agreement with **Schulzke et al., (2007) & Karbas etal., (2013)** who said that body massage for premature infant was not effective on length growth. But these results are opposite to **Khan (2015)** who stated that most of the earlier conducted studies had used only weight gain as their outcome variable as in the study, reported a significantly greater increment in length. Difference in head circumference was not significant. This may be due to greater increment of length need more time to increase in length.

This study illustrates that there are highly statistical significant differences in chest circumference of premature infant in the study group in the sixth and seventh day while there is statistical significance difference in fifth day, but there are statistical significance differences in the 3rd day and 4thday. This may be due to premature infant response to massage therapy after the second day is related to increase of calories consumption reflected through increase in chest diameter and weight gain.

Again, the current study shows that head circumference of premature infant in the study and control group during the one week with significant difference in the 2nd day. Also there are high statistical significant differences during the last fifth day between the study & control groups. It is opposite to the result of **Miguel et al, (2014**) who stated that head circumference is not significant difference between the study and control groups. The premature infant response to massage therapy after the second day related to increase of calories consumption reflected through increase of head circumference and weight gain.

According to **Rangey &Sheth (2014)** who pointed that moderate pressure massage with tactile stimulation can improve weight gain of premature neonates, alsoemphasized that, premature neonates with initial poor motor performance had significantly more

improvement in motor and neurologic outcomes and decrease length of stay after applying massage when compared to those not receiving massage, also massage therapy was associated with shorter hospital stays in premature every low birth infants. These findings also agreed with **Diego et al. (2014)** who suggested that tactile and kinaesthetic components are effective for promoting premature infant weight gain. The massage therapy enhances circulation so as to increase weight.

The present study described that, weight gain of premature infants of study and control group at one and seven day, it shows highly statistical significant significance difference in day one in study and control group. The same explanation was mentioned by **Moyer-et al., (2008**) &**Ragaaet al., (2015**) who documented moderate massage therapy increased weight within 5-10 days and less hospital stays than the control groups. Hospital stay for premature infants in the massage group was significantly shorter. The same explanations mentioned by **Mutlu et al.,(2011)**&**Ang et al., (2012)** whom revealed that, massage therapy enhanced immune system and less sepsis that leading to decrease length of hospital stay. Massage therapy improved immune system and less sepsis that leading to decline length of hospitalization.

It was noticed in the present study as regards the weight gain, there was a highly significance difference about increasing percentage of weight gain in premature infant in the study and control groups. The same explanations agreement with **Leonard (2008)**, who mentioned that the positive effects of massage therapy include increasing weight gain, this is the same way with **Diego et al., 2005**, who reported significantly differences related to weight gain and moderate pressure massage therapy leads to increased gastric motility and weight gain. The rational the massage therapy increase gastric motility and food consumption that reflected to weight gain.

Conclusion

Premature infant who exposed to massage therapy experienced better weight gain and short duration of stay at NICU compared to premature infant who received routine hospital care.

Recommendations

Nurses in neonatal intensive care unit should receive training program related to massage therapy to improve their practice regarding general condition two times of premature infants during hospitalization.

Further studies are required to evaluate alternative methods to meet the needs of premature infants during transition from intra utrine life to extra utrine life.

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Effect of Implementing Practice Guidelines Regarding Medication Administration Iatrogenic Events on Nurses' Performance at Neonatal Intensive Care Unit

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Abstract

Background: Medication errors are potentially more harmful and have a higher incidence rate in the pediatric population than adult population. Nurses frequently administer medications in inpatient healthcare settings,more errors occur in the intensive care unit. They are the last line of defense to safeguard against medication errors. **Aim of this study**: - was to determine the effect of implementing practice guidelines regarding medication administration iatrogenic events on nurses' performance at Neonatal Intensive Care Unit. **Subjects and method**: -The study was conducted at Neonatal Intensive Care Unit of El-Mabarra hospital .A quasi-experiment design was used. **Sample: -**all nurses working in the previously mention sitting were included in this study (50 nurses). **Tools**: - two tools were used to collect the required data; Structured questionnaire schedule to assess nurses' knowledge (tool I). Observational checklist to assess nurses' performance regarding medication administration (tool II). **Results** of the study revealed that, before practice guidelines the total knowledge scores of all nurses were poor while as all of them had good score immediately after and 70% after three months of implementing practice guidelines. Total practice scores of all nurses (100%) were good immediately and 50% after three months. **Conclusion**:- the practice guidelines program was effective in improving nurses' knowledge and their practice as well as reducing medication administration errors. **Recommendations:-** were suggested to establish continuous evaluation system to evaluate nurses' practice in pediatric care settings especially for medication administration; Medication administration educational program should be included in all nursing schools and curriculum.

Key wards: Practice Guidelines, Medication Administration, Iatrogenic Events, Nurses' Performance, Neonatal Intensive Care Unit

Introduction

Medication administration forms a major part of the clinical nurse's role. [1]. Medication administration aims to improve therapeutic outcome and quality of life while minimizing the risk of harm to the child. Medication is administered for its therapeutic effects through modification the body function to prevent, diagnose, and treat the disease. Medication can be administered by different routes; as oral, parental, topical and inhalation [2]. Hospitalized neonates, require treatment for conditions related to premature birth, and frequently exposed to invasive therapies thus, they are particularly vulnerable to iatrogenic events. The incidence of iatrogenic event was recently estimated to be 20 to 26 per 1000 child days, and many of these events were described as preventable, because 30% to 50% of such events are harmful, iatrogenic events may have a considerable impact on patient morbidity [3– 7]. Among the iatrogenic reported in the various studies reviewed, medication errors were the most frequent error type [8]. Such events may be related to professional practice, health-care products, and/or procedures and systems, and includes the following: prescription; order communications; product labeling, packaging and nomenclature; compounding; dispensing; distribution; administration; education; monitoring and use [9].

World Health Organization, 2007 was estimated that 1 in 10 patients worldwide are affected by medical errors [10]. Published studies indicate that medication errors in the NICU are common, ranging from 13 to 91 medication errors per 100 NICU admissions [11, 12]. In addition, NICU children are more likely to experience medication errorharm than other hospital patients [4].becausechild in an ICU receives a larger number of medications [13]. The incidence of medication errors occurring during the care of infants of 24–27 weeks' gestation age is reported as high as 57%, compared with 3% reported in the care of full-term infants NICUchild required additional system wide safeguards against medication errors and that healthcare providers must be especially vigilant when working with medications in the NICU [3].

Medication errors have serious direct and indirect results, and are usually the consequence of breakdowns in a system of care. Direct results include child harm as well as increased healthcare costs. Indirect results include harm to nurses in terms of professional and personal status, confidence, and practice [14].Nurse considers the first line of defense to prevent medication errors in medication order and administration [15]. Medication administration is one of the most important duties of nurses. It requires a particular set of knowledge and attitude if implemented correctly. It can put nursing practice at risk and create preventable risk for child. Nurses hold

responsibility for taking care of child and providing safety for them. Therefore, medication administration and preventing medication errors impose more obligations on them [16].

Nurse must aware about of the child's developmental age and the most effective methods for approaching each age group when administering medication. It is a challenge for health care provider especially pediatric nurse to ensure that children in hospital continued talking their regularly prescribed medicines when they entered the hospital till discharge. Also nurse has an important role in administration of medication and observation for any adverse reaction [17].

Aim of this study: - was to determine the effect of implementing practice guidelines regarding medication administration iatrogenic events on nurses' performance at Neonatal Intensive Care Unit.

Research hypothesis

Nurses' performance regarding medication administration iatrogenic events in neonatal intensive care unit expected to be improved after implementing practice guidelines

Materials and Method

Research design

Quasi-experimental research design was used in this study.

Setting

The study was conducted at Neonatal Intensive Care Unit of El- Mabarra hospital which affiliated to the Health Insurance at Tanta City.

Subject

All nurses working in the previously mentioned setting (50).were included in the study.

Tools of data collection:-

Two tools were used to collect the necessary data.

Tool I:- Structured questionnaire schedule. It was designed and developed by the researcher and includes two parts:

Part one: - Socio demographic data of the nurses (age – educational level –year of experience –marital status –attendance any conference related to medication administration).

Part two: -nurses knowledge about medication administration and its errors in pediatric care

setting, and factors contributing to medication errors. It includes definition, dose, types ,forms and methods of medication administration, pharmacodynamics, pharmacokinetic, sources of medication, factors affecting medication absorption, right storage of medication methods of calculation of medication dose , rules of infection control and documentation of medication administration

The total grades of nurses' knowledge were (48).

Scoring system for nurses' knowledge includes:

Correct and complete answer was scored (2)

Correct and incomplete answer was scored (1)

Incorrect or no answer was scored (0)

Total scores of nurses' knowledge were calculated and classified as follow:

More than 70% were considered good

60-70 % were considered fair.

Less than 60% were considered poor.

Tool II:- Medication administration iatrogenic events nursing observation checklists. It was developed by (Wong s' 2003) [16] and modified by the researcher to assess nurses' performance regarding medication administration .It includes the following procedures: administration of oral medication (48) scores, administration of medication through gastric tube (20) scores, administering parenteral medication: intramuscular (44) scores, intradermal (20) scores and intravenous injection (48) scores. Administration of topical medication: eye and ear drops (38) scores. Rectal suppository (36) scores and administration of inhalation medication (nebulizer) (34) scores.

The sum grades of practice were (288).

Scoring system for nurses' practice included:

Done correctly was scored (2)

Done incorrectly was scored (1)

Not done was scored (0)

Total scores of nurses' practice were calculated and classified as follow:

More than 70% were considered good.

60-70 % were considered fair.

Less than 60% were considered poor.

Method

An official permission to conduct the study was obtained from responsible authorities.

Ethical and legal consideration:

An informed consent for participation in the study was obtained.

Nature of the study was not caused any harm and/or pain for the entire sample.

Confidentiality and privacy was taken into consideration regarding data collection.

Two tools were used in this study Tool (I) to assess nurses' socio demographic data and their knowledge regarding medication administration. Tool (II) to assess nurses' performance in medication administration.

The tools of the study were introduced to ten juries' expert in the field of pediatric nursing to test its validity.Modification was done accordingly.

Pilot study was carried out on10%of study sampleto test tool reliability the necessary modification was carried and not excluded from the study.

Preparation of suitable media for teaching as lecture, data show, group discussion, doll for demonstration, book notes.Observe nurses for actual practices in NICU was done by the

researcher using observational checklists tool II . The researcher was observed the nurse in different nursing procedure during different shifts.

The nurses were divided into ten groups (each was compose of 5 nurses).

The educational program session was implemented (9 sessions) in front of all nurses included in the study.

The first session:

It was emphasizing on the explanation of the purpose of program, iatrogenic events of medication administration definition, common medication errors that occur in NICU, sources of errors, error reduction strategies for the neonatal and nursing care plane to prevent iatrogenic events of medication administration.

The second session:

It was focused on the concept of drug, factors affecting medication administration and methods of medication administration, factors affecting medication absorption, right storage of medication, correct order of medication administration, methods of calculation of medication dose.

The third session

About medication administration policies and roles as five right and instruction before preparing the medication, forms of calculation of infusion and the infection control during medication administration.

The fourth session:

About documentation of medication administration, complication of medication administrating.

The fifth session:

Concentrate on rout practice of oral medication administration.

The sixth session:

about intramuscular injection route practice.

The seventh session:

It was focus on intradermal and subcutaneous injection route practice.

The eighth session:

It was about intravenous injection route practice and methods of medication calculation.

The ninth session:

Emphasized on medication administration by inhalation, topical and rectal route practices.

The time required for each session ranged from 30 to 45 minutes. The theoretical part was given through the first 10 to15 minutes while the demonstration was carried out in remaining minutes by the researcher.

Re demonstration was done by nurses at the end of each session. The teaching sessions were carried out in conference place of hospital and NICU.

Evaluation phase: evaluation was done before immediately and after three months of the guideline program implementing for nurse' knowledge and practice using Tool I and II.

Data were collected over a period of six months from June to December 2016.

Results:

Table (1): shows percentage distribution of the studied nurse related to Socio-demographic characteristics. It was clear that , 52.0 % of the studied nurses from 20 < 25 years and 48 %.0 from 25 < 35 years old. The study showed that, 30 % of nurses had diploma degree ,while as nurses who had completed university nursing education and technical institute of nursing were 20.0% and 50% respectively. Regarding their year of experience 40.0% of the nurses had less than 5 years of experience, and 32.0 % from 5 to 10 years. 28.0% of them had more than 10 years. It was observed that, all nurses not attend any previously training program about medication administration.

Table (2) and figure (1): show Percentage distribution of the Effect of the Guidelines Program on Nurses' Total Score of Knowledge before practice guideline the total scores of nurses' knowledge were poor. Whereas, immediately after practice guidelines the total score for all nurses (100%) were good and 70% after three months.

Table (3) and figure (2): show percentage distribution of the Effect of the Guidelines Program on total Score of nurses' practice found that the total practice score of all nurses' (100%) were poor before implementing practice guidelines. While as immediately after guidelines all nurses' practice (100%) were good and 50.0%after three months with statistical significant difference.

Table (4): shows Nurses' opinions about different factors of medication errors. It was found that, nurses' opinions about factors related to children are the majority of them(92.0 %, 88.0 %,) stated that the health condition of the child and their age respectively were affect the occurrence of medication errors. Nurses' opinions about factors related to doctor it was noticed that, the majority of them(96.0%, 84.0%) mentioned that the medication orders and experience were affect the occurrence of medication errors respectively .Factors related to the nurses. It was observed that, the majority of them(94.0%, 92.0%, 90.0%) stated that nurses' experience, shortage of nurses, work load were affect the occurrence of medication errors respectively. Regarding to factors related to medication72.0% 52.0% and 50.0% of the study sample explained that medication sensitivity, expired date affect the occurrence of medication errors respectively. Regarding to nurses' opinions about factor related to hospital it was found that, 94.0%, 90.0%and 88.0% of nurses stated that alternative of medication, no policies and rules and no work shop about medication.

Table (5): illustrates common types of medication errors as reported by nurses before implementing practice guidelines. It was noticed that, 58.0 % and 52.0 % of study sample were stated that the prescription

andpreparation errors were the common types of medication errors occurrence respectively. Moreover, the majority of nurses (94.0 %) were cleared that the administration error was more common types of medication errors. Regarding to mistakes that occur when administrating not described medication by the doctor it was found that, 30.0 %, 60.0 % of nurses were mentioned that delayed calling doctor and no documentation of medication were the errors occur when administrating not described medication respectively. Furthermore, the majority of them (90.0%) were stated that no talking about errorwas more error occurs when administrating not described medication.

Table (6) presents committed errors reported by nurses regarding medication administration before and after three months of implementing practice guidelines**.** It was found that, most of nurses showed improvement after three months of practice guidelines in the history of committed errors which decreased from 40.0% before to only 2.0 % after three months of practice guidelines. There were statistical significant difference.

There was statistical significant improvement for the types of errors committed by nurses whereas before practice guideline it was 40.0% compared to only 2.0% after three months.(where p-values <0.001)

Regarding to causes of committed errors, it was found that, there was improvement after three months of implementing practice guidelines in the causes of committed errors decreased from 96.0% before to only 2.0% after three months of implementing practice guideline. (where p-values <0.001).

As regards nursing intervention after committed errorsit was observed that general improvement among study sample after practice guidelines74.0% before compared to only 4.0 % after three months. Regarding documentation of medication errors (incident report).Before guidelines program no incident report while as after three months of guidelines all medication errors occurred were reported. There were statistical significant difference (where p-values <0.001)

Table (1): Percentage distribution of the studied nurses related to socio-demographic characteristics (n=50)

Socio-demographic characteristics of nurses.	**No**	**%**
Age in years:		
20 < 25	26	52.0
25- 35	24	48.0
Mean ± SD	28.08±12.8	
Educational level:		
Bachelor degree	10	20.0
technical Institute of nursing	25	50.0
Diploma degree	15	30.0
Marital status:		
Married	46	92.0
Single	4	8.0
Attendance any conference or work shop related to medication administration:		
Yes	0.0	0.0
No	50.0	100.0
Years of experience :		
< 5	20	40.0
5-10	16	32.0
> 10	14	28.0
Total	50	100.0

Figure (1): Effect of the Guidelines Program on Total Score of Nurses' Knowledge before, immediate and after three months of the Guidelines.

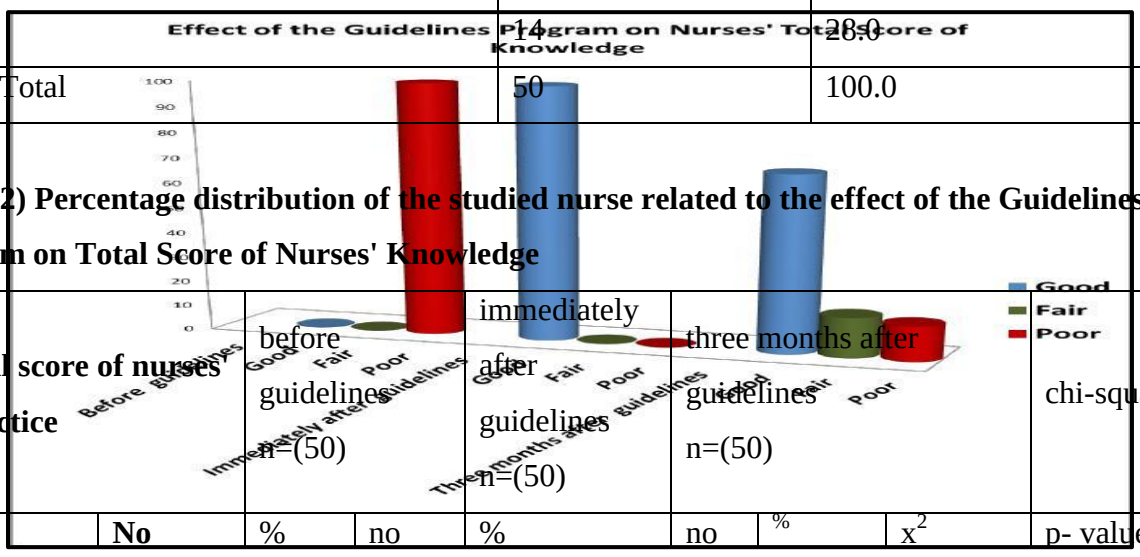


Table (2) Percentage distribution of the studied nurse related to the effect of the Guidelines Program on Total Score of Nurses' Knowledge

total score of nurses' practice		before guidelines n=(50)		immediately after guidelines n=(50)		three months after guidelines n=(50)			chi-square
	No	%	no	%	no	%	x^2		p- value

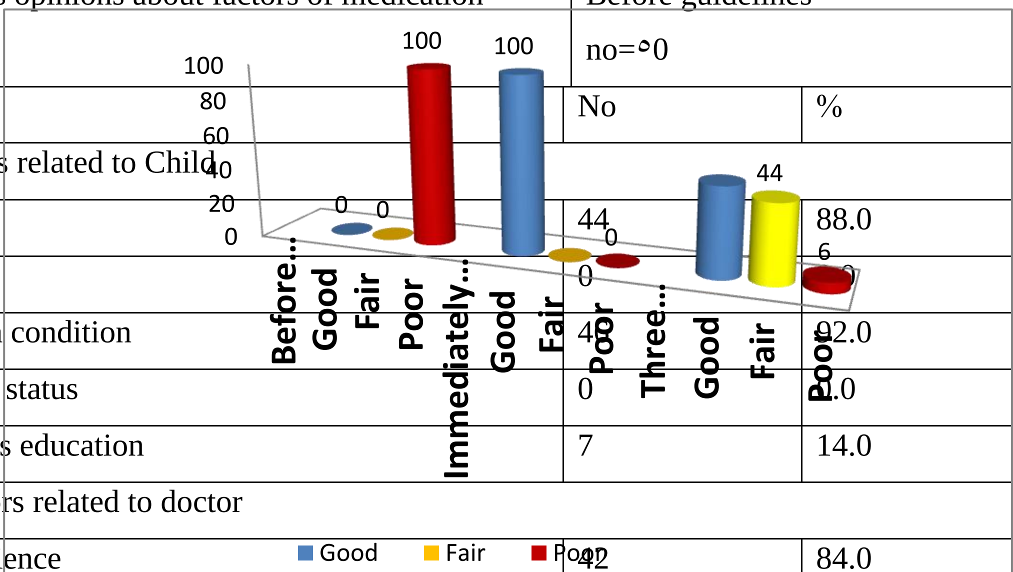
Table (3) Percentage distribution of the Effect of the Guidelines Program on Total Score of Nurses' practice before, immediate and after three months of the Guidelines.

			Three months	

.

Table (5): Percentage Distribution of the studied nurse related to Common Types of Medication Errors

Figure (2) Effect of Guidelines Program on Total Score of nurses' practice



Nurses opinions about factors of medication errors.	Before guidelines no=٥0	
	No	%
Factors related to Child		
Age	44	88.0
Sex	0	0.0
Health condition	46	92.0
Social status	0	0.0
Parents education	7	14.0
Factors related to doctor		
Experience	42	84.0
Medication order	48	96.0
Factors related to nurse		
Experience	47	94.0

Table (4): Percentage distribution of the nurses' opinions about different factors of medication errors before guidelines.

Common medication errors reported by nurses	Before guidelines

.

Table (6): Percentage Distribution of the Nurses' Committed Errors which reported by Nurses regarding Medication Administration before and after three months of implementing practice guidelines

Committed Errors Reported by Nurses	Before guidelines n=50)		Three months after guidelines n=50)		Chi-square	
	no	%	no	%	X^2	P-value
Reported	20	40.0	1	2.0		
Not reported	30	60.0	49	98.0		

DISCUSSION

Pediatric medication errors are different from adults because doses are individually based on child weight, age and body surface area. [18]. Medication errors are potentially more harmful and higher incidence rate in pediatric patient and contribute to child morbidity and mortality [19, 20]. Nurses play a major role in reducing medication errors. They are the last line of defense to safeguard against medication errors [21]. Nursing education focus on prepare nurses for the future, as health care is dynamic. They need for both strong theoretical background and an equal amount of hands-on clinical experience. This is only possible when the nurses are knowledgeable and well informed [22].

The result of the present study was found that, all nurses' knowledge scores were poor about medication administration before implementing practice guidelines. This may be attributed to the lack of in-service training programs and absence of related literature about medication which help nurses to get the required knowledge whenever they need. Furthermore, there was no motivation for the nurses to improve their practice.The lack of information may be as a result of stress on nurses and impact on their quality of care provided to children. This justification goes with **Harmina and Mustafa** (2000)[23]whostudied the effect of in-service education program on nurses' knowledge and application on the nursing process at Jordan university hospital and mentioned that, the importance of in-service education as cornerstone of total quality management, and continuous improvement was impossible without it. It was effective in changing the nurses' knowledge and practice.

It was noticed that, immediately after implementing practice guidelines, all nurses were good in their knowledge about medication administration. This improvement might be related tothe fact that, the majority of nurses were young, as their age between 20 to 25years and liable to learn and acquired knowledge through the practice guidelines program. Nurses need specific information about what constitutes medication errors to fill the gap between the nurses' perceived knowledge and their actual knowledge. This can be applied by educational programs designed to promote the recognition of these errors.

This finding is highly supported with **Armitage and Knapman (2010)**[24]who studied the effect of intervention program on nurses' knowledge about medication in Mexico University, and mentioned that, more than half of the nurses showed improvement post nursing intervention program .Another study done by **Koren. (2010)**[25], who studied the trend of medication errors in hospitalized children and mentioned that, nurses'

knowledge regarding medication errors were improved after nursing intervention program. The present study revealed that all nurses not receiving previous training program regarding medication administration. This could be explained that, the highly expressed need of this group of nurses to learn more about the technique of correct medication administration and its errors. The current study revealed that, all nurses had poor practice regarding medication administration. This is may be due to the fact that, the majority of nurses were young; that nurses new to hospital system were more likely to make medication errors, probably due to a different or new environment. Stress of work load, lack of knowledge, supplies, hospital policy and rules, lack of regular and update in-service training program under highly experienced supervision regarding medication administration. Present finding is highly supported by **Rizk (2004)**[26], who studied about assessment the actual nursing care for children under intravenous infusion therapy in pediatric unit at Shbeen El-kom University and mentions that, inadequate nurses' practice may be related to the fact that, nurses were not supplied with enough information and training about medication administration. On the contrary, immediately and after three month of practice guidelines all of nurses' practices were good. The enhancement in nurses' practice may be related to the organize and effective program sessions, regular and frequent demonstration of competence medication administration to ensure high levels of retention of psychomotor skills.The finding was congruent with **toomy et al**.(2003)[27], they cited that, nursing practice improved after receiving the educational program and they attributed that, this change to increased nurses' knowledge .The interpretation also was in the same line with **Gammon and Gould** (2005)[28], who showed that, specific intervention strategies such as education are influential in improving knowledge and compliance. Regarding nurses' practice of medication administration. The study figured out that, there was significant improvement after practice guidelines application. The finding of this study is accordance with **Selbest** (2009)[29], who studied the medication errors in pediatric emergency department. And mention that, the program of drug administration was affected positively the majority of the nurses' practice in the study sample. In addition **Mekinenet all,** (2010) [30]**,**illustrated that overall level of nurses'practice were significantly improved after program implementation.The relation between socio demographic characteristic of nurses and their knowledge and practice about medication administration and its errors before, immediate and after three months of implementing practice guidelines. Finding of

the study revealed that, no statistically significance relation between nurses' knowledge and practice and their socio demographic characteristic. This would seem to indicate that, any nurse was potentially at risk for making a medication error. Thus, all nurses in an organization need continuous in-service training program to avoid such errors about medication administration. This finding was supported by**Abdel Aziz. (2004)**[31]**,**who mentioned that, continuous production of new medication and substitute, lack of in service training program to follow up the new knowledge about medication lead to no significance relation between nurses' knowledge and their socio demographic characteristic. Also **Mahday.** (2003)[32]who studied the nurses' role in managing the patient in Ain shams university hospital. And found that, there is no significant relation between nurses' knowledge and their socio demographic characteristic, namely, experience, qualification and attending any training conference. The results of present study also revealed that, there was statistically significance correlation between nurses' practice and their knowledge immediate and after three month of implementing practice guidelines program. This may attributed to the improvement in nurses' knowledge and practices after implementing practice guidelines program. Knowledge and practice were improved parallel; this reflects the importance of integration between theory and practice providing an optimum learning and facilitates the acquisition of the clinical skills of nursing. This is highly supported with **Koren (2010)**[25]**,** who studied the trends of nurses regarding medication administration errors in pediatric hospital in Toronto. And mention that, there was significant relation between nurses' errors in practice before intervention program and poor knowledge which is improved after nursing intervention program. The improvement of nurses' knowledge and practice may be related to the highly expressed need of this group of nurses to learn more about medication administration and its errors. The finding of the present study showed that, regarding nurses' opinion about the factors affecting occurrence of medication errors. The health condition of the children is one of the most common factors of child's related errors. Physicians' writing was difficult to read or illegible which was the physician related factors. Whereas, nurses' experience, shortage of nurses number, work load and lack of knowledge about medication were the most common nurses' factors related errors. This result was accordance with a study done by **Balas M, Scott L and Rogers A. (2004)**[33]**,** And identified that, 33% of medication errors were due to late administration, with nurses expressing that high patient acuity and heavy workloads altered their ability to pass medications in an

efficient fashion. Another study done by **Mayo A &Duncan D. (2004)[34],** and found that the orders written by physicians were illegible and not clear. The current study indicated that, there was no significant relationship between number of errors and years of experience. The majority of nurses identified more than one factor contributed to medication errors the rate of potentially harmful medication errors may be three times higher in pediatric patients than adult patients. Medication errors may occur at any step in the process from ordering to transcription, dispensation and administration. The current study revealed that, the most common errors of medication were administration error .This may be attributed to nurse failing to check the child's name band with the medication administration record. Errors occur when the medication labels/packaging are poor quality or damaged. Also, medication errors occur when there was confusion between two drugs with similar names, when nurses are distracted by other patients, coworkers or events on the unit .In addition errors occur when nurses were tired and exhausted and manpower shortage, nursing workload, staffing and increasing workloads were the factors influencing accuracy of medication administration.

This finding accordance with a study done by **Fahimi et al, (2008)[35],** who found that, the error rates were higher in the administration process compared to the preparation process in intravenous medications. The current results revealed that, more than one type of error occurred per patient. Prescribing errors are the most frequently detected error after administration errors, this may be related to doctor's writing on the prescription chart that was difficult to read or illegible, or when the physician prescribes the wrong dose.

As regards indicators of the program effectiveness, an evaluation of the practice guidelines program was carried out before and after three months only. To give nurses the opportunity to implementing program guidelines and to determine the efficiency and effectiveness of the practice guidelines program regarding medication administration and it' errors. The present study revealed that, most of nurses in the study sample showed improvement in the history of committed errors and its' types. Also, the study clarified that majority of the nurses reported that, shortage of nursing staff were the most causes of their errors, this finding was highly supported by **AbdAlaziz.(2004)** (31), and **Pfeifer.(2011)** (36), they mention that, nurses' staff shortage leads to multiple role for nurses, which increase errors regarding medication administration · Regarding to the appropriate intervention for the committed

mention errors of nurses in the study sample reveled significance improvement in their intervention about medication errors after three months of practice guidelines compare with before implementing guidelines.

Conclusion

Nurses' knowledge and practice were improved regarding medication administration immediately and after three months of implementing practice guidelines.

Recommendations

Based upon the finding of the current study the following recommendations were suggested:

Establish continuous evaluation system to evaluate nurses' practice in pediatric care settings especially for medication administration

Educational program should be included in all nursing schools and curriculum,

Encourage nurses to updating their knowledge and practice about medication administration,

Further researches should be conducted about medication administration to assess nurses' knowledge and practice regarding medication administration and its' errors in pediatric care setting.

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Effect of Implementation of Teaching Program about Care of Children with Nephrotic Syndrome on Nurses Knowledge and Practice

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Abstract:

Nephrotic syndrome characteristic by proteinuria, hypoalbuminemia, edema, and hyperlipidemia**.** Certain complications can arise such as infection, thromboembolism, cardiovascular disease, respiratory distress and acute renal failure. Nurses play an important role in providing nursing care to those children and need continues teaching and training program to enhance their knowledge and improving their practice. **The aim of the study** was to determine the effect of implementing teaching program about care of children with nephrotic syndrome on nurse's knowledge and practice. **Method**: The study was conducted at Renal Pediatric Unit and Pediatric Intensive Care Unit of Tanta University Hospital.**Method**: a quasi-experimental design was utilized in this study **Sample** all available nurses working in the previously mentioned settings were included (40). **Tools:** two tools were used to called scoidemgraphic data related to nurses and children as well as Nurses Knowledge about nephrotic syndrome (Tool I) nursing observation checklist to assess nurses practice in providing care to children with nephritic syndrome(Tool II) **The results** showed that, before preprogram total nurses knowledge scores were poor while as (65%) had good scores immediately after program . The total practice scores of studied nurses before program either poor (40%) or fair (60.0%) .While immediately and one month post program, the total practice scores for all nurses were good. **Conclusion**: There was statistical significant difference before and after program implementation regarding to nurse's knowledge and their practice. **Recommendation**: were suggested that, the important of implementing in service training program about care of children with nephrotic syndrome to enhance nurse's knowledge and improve their practice. Written pamphlet or booklet containing information about care of nephrotic syndrome should be available in renal pediatric units.

Key words: Teaching Program, nephotric syndrome, Knowledge, Practice

Introduction

Nephrotic syndrome (NS) is a common renal problem in pediatric[1]. Nephrotic syndrome is a group of signs and symptoms including low blood protein, proteinuria and generalized edema[2]. It affects 16 in 100,000 children worldwide year, the ratio of males to females is approximately 2:1That is make this condition one of the common childhood kidney diseases[3, 4].

Nephrotic syndrome is associated with a high relapse rate[5].Caused by idiopathic renal diseases or by a variety of secondary causes[6].Such as infection e.g., infection of sore throat, use certain drugs, and immune disorders. Nephrotic syndrome can accompany kidney disorders such as glomerulonephritis[7].

Most of the children (90%) with nephrotic syndrome have a form of the idiopathic nephrotic syndrome. The remaining 10% of children with NS have secondary causes related to systemic or glomerular diseases[8]. The annual incidence of nephritic syndrome range from 2-7 per 100,000 children, and prevalence from 12-16 per 100,0001 worldwide[9]. There is epidemiological evidence of a higher incidence of nephrotic syndrome in children from south Asia[10]. The condition is primary (idiopathic) in 95 per cent cases. An underlying disorder that might be identified in less than 5 per cent cases[11].

The chief complication of nephrotic syndrome is infection, followed by thromboembolic events. Hypertension, hyperlipidaemia, features corticosteroid toxicity and behavioral disorders are less frequent[12].Treatment for NS include specific treatment and nonspecific treatment. Specific treatment focuses on the underlying causes of the condition, while nonspecific treatment includes corticosteroid,immunosuppressive, antihypertensive, diuretic medications and antibiotics for infections. Supportive treatment may also include diet, high in protein and fiber but low in saturated fat and salts[13].

The nurses has a vital rate in care of children with nephritic syndrome. Nurses should assess child's fluid status[14]. Nursing intervention involves administering of medications which are diuretics, antibiotics and corticosteroids as prescribed. A low salt diet is used to prevent fluid retention and odema. Fluid restriction may also be helpful in limiting the increase in odema. Moreover, weighing, encouraging activity and exercise, monitoring intake and output hourly is curcuial[15], skin care including

daily bathing. Special attention is given to the neck, under arms, groin and other moist area of the body. The male genitalia are bathed and dusted with a soothing powder. When necessary the scrotum is supported with a soft pad. Never use adhesive because it lead to scratching and infection[16].

The child is turned frequently to prevent respiratory infection. Diet should be high in protein, low in fat and salt[14]. The children urine must be carefully measured and the nurse must know how to test the urine for albumin using special reagent strips**.** The child is weighted daily to determine changes in the degree of edema.The nurse should explain the nature of the illness to the parents and the side effect of medication[16]. Therefore, this study aimed to determine the effect of implementation of teaching program about care of children with nephrotic syndrome on nurses knowledge and practice.

Aim of the Study:

The aim of this study was to: Determine the effect of implementation of teaching program abut care of children with nephrotic syndrome on nurses knowledge and practice.

2. Subjects and Method

Research Design

A quasi experimental research design was used in this study

Setting:

The study was conducted at Renal Pediatric Unit and Pediatric Intensive Care Unit (PICU) of Tanta University Hospital

Sample:

All nurses working in the previously mentioned settings were included in this study with the total numbers of 40 (30 nurses from Pediatric Intensive Care Unit and 10 nurses from Renal Pediatric Unit of Tanta University Hospital).

Tools of data collection:

Two tools were used to collect the necessary data Socio demographic data and Nurses

Knowledge Assessment Structured Questionnaire (tool I):-It was developed by the researcher after review the related literature to assess socio demographic data of nurses and children as well as nurses knowledge about care provided to children with nephrotic syndrome. The questionnaire consists of 16 questions with total. Score of 32.

The total scores of nurses knowledge were classified as follow:

-70 % and more were considered good level of knowledge.
- 60-to less than 70% were considered fair level of knowledge.
- Less than 60% were considered poor level of knowledge

Tool II: Nursing Practices Observation Checklist

It was developed by Bindleret al., (2007) and modified by the researcher after reviewing literature to assess nurses practice related to care provided to children with nephrotic syndrome It includes:-

Measuring vital signs ,intake and output, daily child weight, collect urine for 24 – hours, assessment child for edema, check urine for protein, obtaining blood sample for investigation, medication administration as order, provide psychological support for child and their families, prevent pressure sore by changing position, Infection control ,discharge plan and home care.

- The total grades of nurses practice were 408.

The total scores of nurses practice were calculated and classified as the follows.

- 70 % and more were considered good practice.
- 60 less than 70% were considered fair practice.
- Less than 60% were considered poor practice.

Method:

An official permission: was obtained from faculty of nursing Tanta University to responsible authorities of renal pediatric unit and intensive care unit of Tanta university hospital after explain the aim of the study.

Ethical and legal consideration: privacy and confidentiality were protected. Mothers were reassured that the obtaining information was confidential and used only for the purpose of the study.

A pilot study was carried out on 10 % of the study sample to evaluate the tools applicability. It was excluded from the study sample.

Meeting with nurses who were participated in the study in order to explain the purpose of the study.

Study tools were developed and tested by five jury experts in area of specialty to check content validity and reliability.

The reliability of the tools was evaluated by using test and retest method. The time interval between the test and retest was one month.

Nurses knowledge were assessed using (Tool I).

Nurses practices were assessed by using observation checklist (Tool II).

Implementation of educational program were conducted to all nurses in both setting using different teaching methods such as: small lecture, discussion, power point and book notes to facilities their learning.

Teaching program: was conducted through 4 phases.

-**Assessment phase:** Initial interview with nurses were done at renal pediatric unit and intensive care unit of Tanta University to explain the purpose of the study.

-**Planning phase**: program was developed by the researcher. Audiovisual materials were used.

-**Implementation phase:**

The researcher was available in the study settings four consecutive, days per week.

Nurses were divided into 4 groups each group consisted of:-

Two groups in intensive care unit. They were divided into 8 nurses at morning shift and 4 nurses at after noon shift.

The second two groups working in renal pediatric unit, the nurses were divided into 6 nurses at morning shift and 2 nurses at afternoon shift.

The implementation of the program was carried out in 9 sessions.

The time for each session were between 30 to 40 minutes.

Session I: it covered

Definition, anatomy and physiology of the kidney, causes of nephrotic syndrome, signs and symptoms and complications of nephrotic syndrome.

Session II: focused on diagnosis, investigation, management and how to monitor urine specimen for 24 hours.

Session III: concentrates on management of child with nephrotic syndrome, nutrition, and their activity.

Session IV: about guideline for parent about the management and treatment of children with nephrotic syndrome and the role of nurses on admission.

Session V: it was concentrates on physiological measurement such as: measuring vital signs, daily weight at morning, monitor intake and output, assessment and documentation of the child edema. Urine check for protein and obtaining blood sample for investigation.

Session VI: it was about medication administration, how to prevent sore pressure, diet for nephrotic children.

Session VII: focus on child teaching and home care of nephrotic syndrome, psychological support for children and their family, health teaching.

Session VIII: Infection controlling by fallowing aseptic technique during obtaining blood sample, Medication administration, Insertion of I V cannula and measuring vital signs.

Session IX: focus on discharge plan and home care.

Data were collected over a period of 4 months started from January to April 2016.Evaluationwas done after one month from May to August 2016.

Evaluation phase: The program implementation was evaluated immediately and one month after implementation of teaching program using constructed toolsII.

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using SPSS software. For quantitative data, mean and standard deviation were calculated. For qualitative data, using Chi-square test (χ^2). For comparison between means of two groups of parametric data Z value of Mann-Whitney test was used. F or comparison between more than two means of parametric data, F value of ANOVA test was calculated. For comparison between more than two means of non-parametric data, Kruskal-Wallis (X^2 value) was calculated. Correlation between variables was evaluated using Pearson's correlation coefficient (r).

Results

Table (1) shows percentage distribution of studied nurses according to their socidemographic characteristics. It was found that, 37.5% of nurses their age were from 25 to <35years old. Same percentage of nurses their age>35 years old. While 25.0% their age ranged between 20 to <25 years. Regarding to their education, half of studied nurses (52.5%) had diplome in nursing while 20.0% of had technical nursing institute and bachelor nursing science while 7.5% completed master degree in nursing. Furthermore, regarding to years of experience in renal pediatric unit, (70.0%) of nurses had >15 years While those who had 10-<15years of experience constitute 20%, only 5% of them had 1-to <10 years of experience. In relation to their attending any training program about nephrotic syndrome. The table reveals that, all nurses not attend any training program.

Table (2) shows percentage distribution of socio-demographic characteristics of studied children. It was found that, one third of studied children (37.5%) their age group between 7-12 years old and had primary school regarding to their sex two third (65%) of studied children were male. Nearly three quarters of them (70.0 %) suffer from primary disease.

Table (3) and figure (1)presents total nurses knowledge and mean scores about nephrotic syndrome. It was found that, preprogram the total knowledge scores for all nurses were poor. Whereas, immediately after program the total scores of about two thirds (65.%) of studied nurses were good. The mean scores of nurse's knowledge were 9.72±4.18, 24.92±3.88, and17.45±2.21pre, immediate post and one month post program

respectively. There were statistical significant differences ($p < 0.05$).

Table (4) and figures (2) presents total practice mean scores of the studied nurses about care provided to children with nephrotic syndrome It was found that, Preprogram the total practice scores for nurses either poor 40.0%, or fair 60.0%. Whereas, immediately, and one month post program, the total practice scores for all nurses (100%) were good. The mean of total practice scores pre, immediate post and one month later were 258.27±16.89, 407.90±19.91 and 352.00±7.40 respectively. There were statistical significant differences ($p < 0.05$).

Table (5) and figure (3,4) illustrates correlation between total scores of nurse's knowledge and practice. Pre, immediate and one month post program implementation It was found that, there were statistical significant difference between nurses knowledge and practice before program (p value <0.05).while as, immediate and one month post program no statistical significant different correlation (p value > 0.05).

The table also revealed that, the change of total nurses knowledge scores and total practice scores about nephrotic syndrome of children it was noted that there were statistical significant difference between nurses knowledge and practice scores immediately post program than preprogram. As well as there were statistical significant difference one month post program than preprogram ($p< 0.05$).

Table (1): Percentage Distribution of studied Nurses Related to their Socio-demographic Characteristics (n=40).

Nurses Sociodemographic Characteristics	The studied nurses providing care to children with nephrotic syndrome (n=40)	
	No	%
Age in years:		
20-<25	**10**	**25.0**
25-<35	**15**	**37.5**
≥35	**15**	**37.5**
Educational of qualification:		
Nursing diploma	**21**	**52.5**
Technical nursing Institute	**8**	**20.0**
Bechelor science of nursing	**8**	**20.0**
Master degree of nursing	**3**	**7.5**
Years of experience:		
1-<5	**2**	**5.0**
5-<10	**2**	**5.0**
10-<15	**8**	**20.0**
≥15	**28**	**70.0**
Attending any training program about nephrotic syndrome **Yes** **No**	**0** **40**	**100.0**

Table (2): Percentage Distribution of socio-demographic characteristics of studied children (n=40).

Children Sociodemographic Characteristics.	(n=40)	
	No	%
Age in years:		
1< 3 **3<6** **6<12** **>12**	**7** **13** **15** **5**	**17.5** **32.5** **37.5** **12.5**
Sex: **Males** **Female**	**26** **14**	**65** **35**
Educational level s		
Preschool **Primary school** **Preparatory education**	**19** **15** **4**	**47.5** **37.5** **10.0**
Secondary education	**2**	**5.0**
Diagnosisonadmission. **Primary disease.** **Secondary disease.** **Congenital nephrotic syndrome.**	 **28** **8** **4**	 **70.0** **20.0** **10.0**
	40	**100.0**

Table (3): Total nurses knowledge and mean scores about nephrotic syndrome of studied nurses.

Total nurses knowledge and mean Scores			The studied nurses providing care to children with nephrotic syndrome (n=40)						χ^2 P
			Preprogram		Immediate post program		One month post program		
			No	%	No	%	No	%	
Level of total knowledge scores:									
Poor	(<60%)	(0-19)	40	100	1	2.5	34	85.0	100.648
Fair	(60-<70%)	(20-22)	0	0	13	32.5	6	15.0	0.0001*
Good	(≥70%)	(23-32)	0	0	26	65.0	0	0	
Total knowledge scores: (0-32)									
Range Mean±SD			0-18 9.72±4.18		17-31 24.92±3.88		14-22 17.45±2.21		
F value P			185.08 0.0001*						
Change of knowledge scores post than preprogram:									
Change immediate post program than preprogram:									
Range Mean±SD			7-27 15.20±4.95						
Change one month post program than preprogram:									
Range Mean±SD			2-19 7.72±3.54						
Change one month post than immediate post program									
Range Mean±SD			↓16-↓1 ↓7.47±4.03						

*Significant (P<0.05)

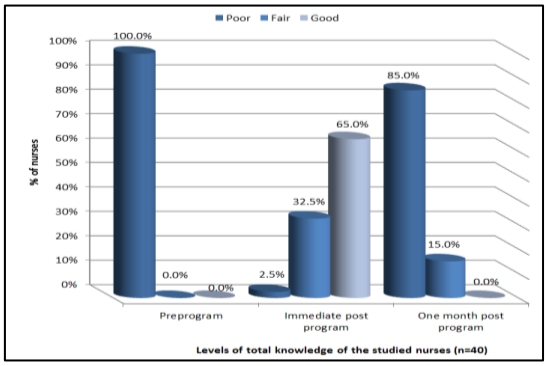

Figure (1): Total levels of nurses knowledge about nephrotic syndrome among studied children.

Table (4): Total practice and mean scores of studied nurses about nursing care provided to children with nephrotic syndrome.

Total practice and mean scores of nursing care procedures to children with nephrotic syndrome			The studied nurses providing care to children with nephrotic syndrome (n=40)						χ^2 P
			Preprogram		Immediate post program		One month post program		
			No	%	No	%	No	%	
Level of total practice scores:									
Poor	(<60%)	(0-259)	16	40.0	0	0	0	0	120.000
Fair	(60-<70%)	(260-303)	24	60.0	0	0	0	0	0.0001*
Good	(≥70%)	(304-434)	0	0	40	100	40	100	
Total practice scores: (0-434)									
Range Mean±SD			213-284 258.27±16.89		365-430 407.90±19.91		345-372 352.00±7.40		

F value P	932.996 0.0001*	
Change of practice scores post than preprogram:		
Change immediate post program than preprogram:		
Range Mean±SD	94.00-214.00 149.62±28.43	
Change one month post program than preprogram:		
Range Mean±SD	68.00-151.00 94.47±22.53	
Change one month post than immediate post program		
Range Mean±SD	↓79.00-↓3.00 ↓55.05±19.23	

*Significant (P<0.05)

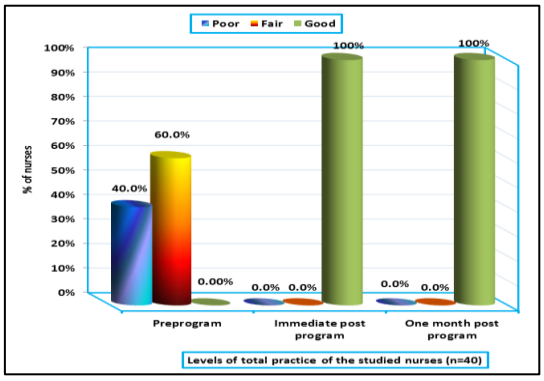

Figure (2): Total Nurses practice scores about care provided to children with nephrotic syndrome

Table (5): Correlation between Total Scores of Nurses Knowledge and total scores of nurses Practice pre, immediate and one month post program implementation.

Total practice scores	Total knowledge scores					
	Pre program		Immediate post program		One month post program	
	R	P	R	P	r	P
Pre program	0.514	0.001*				
Immediate post program			0.059	0.720		
One month post program					0.169	0.298

Nurses practice	Nurses of total knowledge scores of nurses about nephrotic syndrome of children . (n=40)					
	immediate post program than preprogram		one month post program than preprogram		one month post than immediate post program	
	R	P	R	P	r	P
Change immediate post program than preprogram	0.530	0.0001*				
Change one month post program than preprogram			0.469	0.002*		
Change one month post than immediate post program					0.127	0.437

*Significant (P<0.05) r=Correlation Coefficient

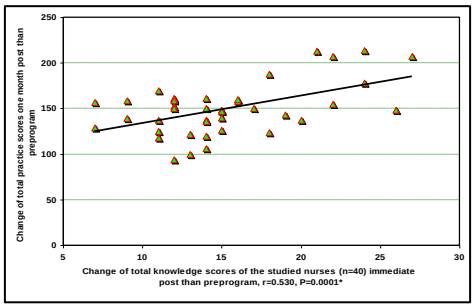

Figure (3): Correlation between Total Nurses Knowledge and Practice Scores pre and Immediate post program implementation (n=40).

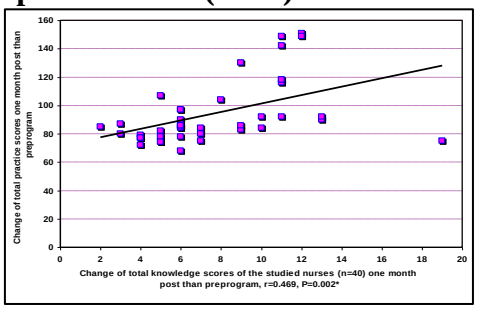

Figure (4): Correlation between Total nurses Knowledge and Total Practice Scores pre and one Month Post program implementation.

Discussion

The present study revealed that, all nurses do not attend any educational training program about care of children with nephrotic syndrome and they had poor knowledge. This result may be due to the absence of in-service training program department in the hospital and increased work load. This result was supported by **Mary et al., (2001)** [17] who study about nursing experience and education,effect on quality of care and found that, there was a positive relation between nurses' knowledge and practices and training courses.

On the other hand this result disagree with**Mukhlif, (2016); Hattab, (2016)** who study about assessment of nurses knowledge and practice toward children with nephrotic syndrome and revealed that, there was no significant association between nurses' knowledge and share in specialist courses[18,19].

Another study done by **Salih, (2007)** about assessment of nurses knowledge and practices toward oral mucositis under chemotherapy. Who indicated that, there was no significant relation between nurses knowledge based on scientific background and training course [20]. (table 1).

The present study found that, one third of studied children their age between 7-12 years old and had primary school. This finding on the same line with **Khider et al., (2017)**[21] who study about nephrotic syndrome knowledge and health care related practices among school age children and revealed that, less than three quarter of the children their age between 8> 9 years and most of them in primary school. Furthermore, the present study reveals that, regarding to their sex it was noticed that two third of studied children were male. It can be explained that, there was a male preponderance among young children, at a ratio of 2:1 to females[22].And agree with **Khider et al., (2017)**[21] who found that more than three quarters of studied children were male.

The present study shows that, nearly three quarters of them suffer from primary disease[23]. Approximately 85% of children with nephrotic syndrome had a type of primary disease called minimal change of nephrotic syndrome. The disease was rare in children younger than 6 months of age, uncommon in infants younger than 1 year of age and unusual after the age of 8 years**Robinson et al., (2003)**[23].

Furthermore, the finding of the present study revealed that, preprogram the majority of nurses knowledge were poor about nephrotic syndrome. Whereas,

immediately post program most of nurses knowledge were improved. whereas the answers of (65%) of nurses were good immediate and one month post program.[18,19] This result disagree with **Mukhlif, (2016)** [18] **and Hattab, (2016)**[19] who found that, throughout the study, the majority of nurses' answers were poor in relation to their overall knowledge about nephrotic syndrome before program (table 2).This may be attributed to the absence of resources which help nurses to get the required knowledge whenever they need. As well as there was no motivation for the nurses to update and improve their knowledge. It was noticed that, most of nurses knowledge (65%) were improved after implementation of teaching program from the researcher point view giving training program to the nurses in clinical area supported with booklets were necessary to improved nurses knowledge and their practice. It could be attributed also to the fact that, nurses are liable to learn and acquired knowledge through thetraining program. On the same line with **Saed, (2012)**[24] who study about nursing management of children with hemophilia according to basic standards and indicated that, almost of nurse knowledge before stander application were poor while immediately and after three month all nurses were good.

Before program implementation, the total practice scores for nurses either poor (40%) or fair (60%). Whereas, immediately and one month post program, the total practice scores for all nurses performance (100%) were good. This finding in the same line and agree with **Mukhlif, (2016)** [18] and **Hattab, (2016)** [19] who found that, nurses practices were poor about nephritic syndrome disease (table4).

There were no statistical significant correlation between the mean scores of nurses knowledge and attended any training program immediate and one month post program compared to preprogram. This finding agreed with **Mukhlif, (2016)** [18]**; Hattab (2016)** [19] who indicated that, there was no significant between nurses' knowledge and share in specialist courses. On the opposite side this result disagrees with **Abbar S** (**2015**) who study about effectiveness of health educational program on nurses' knowledge toward palliative care in pediatric and mentioned that, there was a significant association between nurses' knowledge and their share in specialist courses[25].

Conclusion:

Based on the finding of the present study, it can be concluded that there were improvement in nurse's knowledge and practice as there was statistical significant difference before and after program.

Recommendation:

Nurses should receive continuous in service training program about care of children with nephrotic syndrome to update their knowledge and improve their practice.

A written pamphlet or booklet containing information about care of nephrotic syndrome should be available in renal pediatric unit as a reference to nurses.

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Training the Trainer Nurses on Infection Control at Student Hospital

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Abstract ::

Healthcare-associated infection is one of the most common complications of health care management. **Aim of study**: Train the trainer nurses on infection control at student Hospital Mansura University. **Research Design**: Quasi research design was used to conduct this study. **Data collection**: the data was collected during the period of August to October 2015 from nurses. **Setting:** The study was conducted at Students Hospital affiliated to Mansoura University (emergency ward, clinics, inpatient ward, operating room and private ward). **Study sample**: convenient sample was used it consists of (70 nurses include 10head nurses, 60 staff nurses).**Tools**: **five** tools were used in this study: **tool I:**Self administrated questionnaire to assess socio demographic and professional characteristics. **Tool II:** Self administrated questionnaire to assess nurses' knowledge about infection control. **Tool III**: self-administrated questionnaire to assess nurses' subjective performance. **Tool IV:** An observation check list to assess nurses' performance **Tool V:** Nurses' acceptance and satisfaction scale. **Results:** reveals that the mean scores of nurse's knowledge before implementing the program was 15.22(7.25)while after program implementation the mean score improved to40.12(4.31). There was statistically significant difference between total mean score of nurses' knowledge pre and post training program p=0.00. Regarding subjective performance the mean scores of nurse's before program the implementing was 1.66 ± 1.39while after program implementation improved to 6.56 ± .77. There was statistically significant difference between mean score of nurses' subjective performance pre and post training program p=0.00. **Conclusion:** This study concluded that nurses' knowledge and performance were poor in pre-program and improved in post program.

Recommendations: continuous in-service training programs and refreshing courses should be conducted for nurses to update their knowledge and skills about infection control

Keywords: infection control, personal protective equipment's, hand washing, waste management.

Introduction:

Nosocomial Infections defined as "Any infection that is being acquired in a hospital, particularly when the source or the risk factor for it is one peculiar to the hospital". The matter of concern is that nosocomial infection or hospital acquired infection at the moment affect not less than 400,000 hospitalized patients at any time in the world and is direct or contributory causes of death for more than 80,000 cases a year in the USA alon ٣Billions of dollars are used annually in the developed countries alone for the control of just these hospital acquired inflection alone which reflect another aspect of the magnitude of the problem. (**Ingrid, 2009**&**Inweregbu et al., 2013**).

Nosocomial infection (Healthcare-associated infections) is a "localized or systemic condition occurring as an adverse reaction to the presence of an infectious agent(s) or its toxin(s) that was neither present nor incubating upon the patient's admission to the acute care facility" **(Centers for Disease Control and Prevention (CDC), 2013)**.These infections occur on or after 72 hours (three days) following admission to an acute care facility and are caused by infectious agents from endogenous or exogenous sources **.**It is considered one of the most common complications in hospitalized patients during the last 20 years.Nosocomial infections contribute to the overall morbidity of patients and increase the costs for health care systems **(Sax et al., 2011)**.A high frequency of nosocomial infections is evidence of a poor quality of health service delivery, and leads to avoidable costs. This is of extraordinary importance especially when caring for severely immune compromised patients such as on transplant units **(Alonso et al., 2012 & Linares et al., 2010)**.

In the United States, the Centers for Disease Control and Prevention (CDC) estimated roughly 1.7 million hospital-associated infections, from all types of microorganisms, including bacteria, contribute to 99,000 deaths each year. In Europe, where hospital surveys have been conducted, the category of Gram-negative infections is estimated to account for two-thirds of the 25,000 deaths each year **(Kleve's et al.,2007 & Central for Disease Control and prevention, 2014).**

Prospective surveillance was conducted from April 2011 through March 2012 in 46 from 11 hospitals in Egypt revealed that 472 HAIs out of 90,515 patient-days of surveillance data was identified as: 47% were pneumonia, 22% were bloodstream infections, and 15% were urinary tract infections; case fatality among HAI case patients was 43% **(See et al., 2013&Greinerw, 2007 &Breiman et al., 2013&Saied etal., 2011)**

The infection control team is responsible for the day-to-day activities of the infection control programme. Health care establishments must have access to specialists in infection control, epidemiology, and infectious disease, including physicians and infection control practitioners. In some countries, these professionals are specialized teams working for a hospital or a group of health care establishments; they may be administratively part of another unit (e.g. a microbiology laboratory, medical or nursing administration, public health services). The optimal structure will vary with the type, needs, and resources of the facility **(Wiggle & Neil,2013 & Nelson, 2014).**Training program are the organized procedure by which people learnknowledge and skills for a definite purpose. Training refers to the teaching and learning activities carried out for helping members of an organization acquire knowledge and attitude needed by a particular job in this organization. Health care workers training is important and essential to improve their competency and development self confidence that impact on work management. (**KUMAR, KATTA ASHOK**, 2013).The goal of continues education in nursing is to enhance knowledge, performance and attitude of nurses and ultimately to promote quality of healthcare delivered to the public. Keeping nurses' aware of the hospital polices and working conditions to have clear understanding of their responsibilities **(Ranking & stalling, 2008).**The trainer should communicate to the trainees about what is expected out of training in a simple and professional way**(Social CareInstitute for Excellence, 2014).**

Aim of this study: Train the trainers' nurses on infection control at Student Hospital Mansoura University.

Research Hypothesis

Trainers nurses'performance related to infection control will be improving after the training sessions.

Trainers' nurses will be able to train other health team members

on infection control after the training sessions.

Subjects and Method

1-**Research Design**

Quasi research design will be used to conduct this study.

2- **Setting**

The study was conducted at Students Hospital affiliated to Mansoura University.

3- Subjects

Nurses (bed side nurses and head nurses).

Sample convenient sample

Sample size

Total number of nurses working at the Students Hospital affiliated to Mansura University, was 70 nurses; 60 out of them were bed side nurses and the entire 10 were head nurses.

Tools: To achieve the aim of this study, five tools used for data collection.

Tool I:

Self-administrated questionnaire to assess socio demographic and professional characteristics:

Part I: It designed to assess the socio-demographic (e.g. age, gender, residence).

PartII: Professional characteristics of the nurses(e.g. qualification years of experience ,attending training courses about infection control, duration of the last training courses, organizers of the courses, axes of the courses.

Tool II: Self administrated questionnaire to assess nurses' knowledge about infection control.(eg.infection control team, infection control and its cycle, personal protective equipment, hand washing, disinfected and sterilization, waste management).

Tool III: self- administrated questionnaire to assess nurses' subjective performance

This tool consisted of five questions about technique of wearing gloves, action taken following needle use, needle stick, spilled blood on the floor and wastes segregation.

Tool IV: An observation check list to assess nurses' performance it concerned with nurses' performance related to infection control.

Tool V: Nurses' acceptance and satisfaction scale

It was four points Likert scale used to evaluate nurses' acceptance and satisfaction from the training.

Method

This study was accomplished throughout two main stages:

Preparation stage

1-Administrative process

An official letter was issued from the Faculty of Nursing Mansoura University to the director of Students Hospital affiliated to Mansoura University to permit the researcher to carry out the study.

2- Literature review

Review of national and international literatures on the ‘various aspects of the infection control using scientific published articles. This review was a guide for developing the study tools.

3-Developing of the study tools

Tools of data collection were developed by the researcher based on reviewing the relevant literature.

Validity content validity was done to the tools by submitting the tool to expertise in the field of community health nursing.

Reliability of tool V scale of acceptance and satisfaction was tested by using the Cranach’s alpha test in spss v0.61.

Pilot study

A Pilot study was conducted on 10 % of nurses (7nurses) who were selected randomly and excluded from the studied sample to evaluate the clarity, applicability, and reliability of the research tools and to estimate the approximate time required for data collection. Accordingly the necessary modification was done, some questions were added and others were clarified or omitted.

Stage II: Operational phase

1-Data collection

The data was collected from August to October 2015 from nurses working in four departments: inpatient, private and emergency departments and operation room and outpatient clinics at Students Hospital affiliated to Mansoura University.

2- Preliminary assessment

First, second, and third tools were usedto assess nurses’ knowledge and subjective, performance which revealed poor knowledge and performance related to infection control.

3-Developing training session Based on obtained data from preliminary assessment the researcher developed training sessionsto improve nurses' knowledge and performance related to infection control.

4-Implementation of training sessions

The training sessions implemented withinworking hours, for seven nurses per session.

The training sessions were done three times per week covering daily shifts. The duration of each session was 60- 90 mints. Ten sessions were applied in 10 days (10 groups of nurses, each included 7 nurses).

Each session started with a brief summary of the previous session and objectives of the new session.

Theoretical session’s conducted through group discussion using a very simple language, using power point that suits the level of nurses without ignoring motivation and reinforcement techniques.

Practical sessions started by using power point presentations followed by

demonstration and re-demonstration by using real materials and instruments.

5-Evaluation of the training sessions

The evaluation phase of the training sessions by usingfirst, second, third, and fourth tools immediately and after the sessions.

6- Data analysis

Data were collected, computed and statistically analyzed using Stands for Statistical Product and Service Solutions (SPSS) version16.0, which was applied to frequency tables, number and percentage, and standard deviation (SD), Significant at $p \leq 0.05$

Results:

Table (1) illustrates the socio demographic and professional characteristics of the nurses'. The professional categories of the studied nurses' including nurses' supervisors represent (14.3%).While nurses' represent (85.7%); nurses' age ranged from 25 up to 35 years, with a mean age 30.36 ± 5.96 years.

The majority of nurses' (85.7%) had nursing school diploma, while only (14.3 %) of them had bachelor degree in nursing.

As regard the nurses' years of experience,(44.3%) of nurses' had a working experience less than 10 years ,while (55.7%) of them had a working experience more than 10 years. with mean 12.61 ± 5.68years of experience .

7-Ethical consideration

An approval was obtained from Research Ethical Committee, Faculty of Nursing Mansoura University to accomplish this study.

Oral approval was obtained from the nurses. The researcher introduced herself and a simple explanation about the aim of the study would give to them. They assured that their participation in the study was voluntary and that collected data would treat confidentially and would be only used for the purpose of the study. Nurses would be informed that they had the right to withdraw at any time from the study.

All the studied nurses (100.0 %) attended training courses. which organized by faculty of medicine. The infection control courses were related topolicy and universal precautions for 2 days. There wasn't any pre-employment or post-employment medical checkup for the studied nurses'.

Table (2) reveals the mean score of nurse's knowledge pre and post program implementation. The mean scores of nurse's knowledge before implementing the program was 15.22(7.25)while after program implementation the mean score improved to40.12(4.31).There was statistically significant difference between total mean score of nurses' knowledge pre and post training program p=0.00. Regarding subjective performance the mean scores of

nurse's before program the implementing was 1.66 ± 1.39while after program implementation improved to 6.56 ± .77. There was statistically significant difference between mean score of nurses' subjective performance pre and post training program p=0.00.

Table (3) Distribution of the nurses' satisfaction regarding to training environment, training contents and trainer skills

Table (3) represents the distribution of the nurses' satisfaction regarding to training environment and training contents. This table Illustrates that more than half (57.1%)of the nurses' were highly satisfied with preparation of the surrounding environment**,** content of activity and methods used in the training activities. While less than three fourths(71.4%) of the nurses' were highly satisfied with time schedule. Regarding training content the majority (81.4%,81.4%,84.2%,87.1%,91.4%) of the nurses' were highly satisfied with program objectives and reported the objectives are important. While (57.1%) revealed the methods used in the training activities were interested. As regards to trainer skills the trainer (28.5 %) of nurses' reported that trainer explains the content training clearly and give time to discuss and ask questions. The majority (91.4) reported the trainer is good communicator.

Table (1) Socio demographic and professional characteristics ofthe studied nurses' (n=70)

Items	**n=70**	**%**
Professional categories		
Nurses supervisors	**10**	**14.3**
Nurses	**60**	**85.7**
Age in years		
25-< 30	**39**	**55.7**
30 - <35	**20**	**28.6**
≥35	**11**	**15.7**
Mean (SD)	**30.36 (5.96)**	
Qualification		
Baccalaureate of nursing	**10**	**14.3**
Nursing Diploma	**60**	**85.7**

Years of experience		
<10	**31**	**44.3**
≥ 10	**39**	**55.7**
Mean (SD)	**12.61 (5.68)**	

Table (2)Distribution of the studied nurse's according to their mean knowledge and their subjective performance about infection control precaution (n=70).

Item	Pre	Post	T	P
	Mean ±SD	Mean ±SD		
Total knowledge scores	15.22 (7.25)	40.12±4.31	26.877	<0.001*
Total subjective performance scores	1.66 (1.39)	6.56 ± .77	25.503	<0.001*

Table (3) Distribution of the nurses' satisfaction regarding to training environment, training contents and trainer skills

Items	Highly satisfied N=70		satisfied N=70	
	N	%	N	%
1-Training environment Preparation of the surrounding environment	40	57.1	30	42.8
Time schedule	50	71.4	20	28.5
2-Training content				
The program was organized	50	71.4	20	28.5
The objective was clear	45	64.2	25	35.7
Program objectives were important	57	81.4	13	28.5
Program objectives were achieved	50	71.4	20	28.5
Content of activity was relevant to nurses experiences and needs	40	57.1	30	42.8
Methods used in the training activities were interested	40	57.1	30	42.8

Trainer skills Trainer explain the content training clearly	50	71.4	20	28.5
Trainer give enough time to activities .	50	71.4	15	21.4
The trainer give time to discuss and ask questions	55	78.5	20	28.5
The trainer answered any questions.	50	71.4	11	15.7
The trainer re demonstrate the activity if the trainees do not understand	59	84.2	25	35.7
Trainer makes sure that trainees understand before moving to another part of the program	45	64.2	18	25.7
Create an atmosphere of trust between trainer and trainees	52	74.2	20	28.5
Trainer used available training methods	61	87.1	9	12.8
Good communicator	64	91.4	6	8.5

Discussion:

Infection prevention and control training program aim at ensuring the protection of those who might be vulnerable to acquire an infection in the general community and while receiving care, in a range of settings. The basic principle of infection prevention and control is hygiene. The goal of the Infection Prevention and control Program training is to provide support to the hospital in minimizing the risk of infection to patients, hospital staff, physicians, students, volunteers and visitors. Considering that nurses is in the constant touch with the patient and is also the important link between clinician and patient, the training program aims at creating large work force of empowered nurses, who can help in prevention and control of infection within the hospital, which has huge potential to improve theclinical outcomes **(WHO,2015).** World Health Organization (WHO), center for disease prevention and Control(CDC), Health Infection Control and Prevention Advisory Committee(HICPAC), (2015), stated that continuing education and training of nurses, as well as monitoring of infection control practices, will help to ensure that the progress is sustained. This is in agreement with the aim of the present study that was to train the trainer nurses on infection control.

This part will be concerned with nurses'**sociodemographicandprofessional characteristics.** The present study revealed that, the mean age of the studied nurses was 30.36(5.96) years (range 25-30 years). This result is in the same line with **Fahim et al.,**

(2011), who revealed that the mean age of the nurses whoperform infection control during vaccination at Menia, was 35.3(9.4) years. Concerning nurses' qualification, the current study illustrated that, the majority of the nurses' had nursing diploma. This result is in accordance with an investigation completed in Egypt by **Sreedharan and Venkatramana, (2011),** who reported that, majority of the studied nurses had nursing diploma.

As regard to the nurses' years of experience, more than half of the nurses had a working experience more than 10 years, with mean 12.61(5.68) years. This result matched with **Mohamed and Wafa, (2011),** who found that nurses had a working experience more than 10 years in Egypt, with the mean 10.31(4.60) years of experience.

Regarding to training programs, all the studied nurses attended training programs about infection control policy and universal precaution. This result agreed with **ElToukhy, (2006)**, who reported that, most of the studied nurses in Egypt attended

training courses about infection control.

Regarding the total mean score of nurses 'knowledge and performance pre and post program, therewas a high statistically significant difference between pre and post program implementation on nurses' knowledge and performance thisresultagreedwith**Roberts,(2009),Nelsing, (2009),**

Gijare, (2012), Hamid et al., (2010), Ndikom and Onibokun,(2007) and **Talaat and Shamia, (2010).**They stated that continuous inservice training program is very important to improve knowledge and performance of nurses because the nurses in their studies showed high improvement after having the program. This indicates the importance of educational program in improving nurses' performance.

Regarding nurses' satisfaction the objectives of the training program**,** this study showed that less than three fourths of the studied nurses were highly satisfied with program objectives .This was in the same line with **Williams et al., (2008),**who found that three fourths of nurses were highly satisfied with their purpose of training program .

Regarding nurses' satisfaction to **trainers' skills**, this study showed that themajority of the nurses were highly satisfied with the trainer nusing available training methods. This agreed with **chang et al., (2014),** who reported that the majority of nurses were highly satisfied with trainer used available training methods. Also this result showed that less than three fourths of the nurses were highly satisfied with trainer who explains the content clearly. This agreed with **De Silva et al., (2015**), who reported that three fourths of the nurses were highly satisfied with the

trainer skills, content training clearly and was effective.

The current study also showed that the majority of the nurses' **were** highly satisfied with trainer communication**.** This finding was consistent with **KOOL, Nienke, et al.,(2014)** result who reported that the majority of nurses in his study were high satisfied with good communication of researcher.

Conclusion

The main conclusion drawn from the present study revealed that nurses' knowledge and performance were poor related to infection control in the pre- program while their knowledge and performance improved in the post program.

Therewas a high statistically significant difference between pre and post program implementation on nurses' knowledge and performance.

Recommendations

Continuous in-service training programs and refreshing courses should be conducted for nurses to update their knowledge and skills about infection control.

Equipped hospital with standard of structure is needed to apply infection control to achieve desirable outcome.

Continuous supervision and evaluation of nurses in hospital to determine any defect related to performance.

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Knowledge and attitude of the first year student at Faculty of Medical and Applicable Sciences at Yanbu governorate about some aspects of reproductive health.

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Abstract

The aim of this study was to identify the knowledge and attitude of the first year students at Faculty of Medical and Applicable Sciences at yanbu governorate about some aspects of reproductive health **.Subjects and method** ; An exploratory study and a Convenience sample ware used (all the students in first year of the faculty **). Data collection tools:** A structured / questionnaire was used to collect students Knowledge about reproductive health and a likert - like scale was adopted to assess their attitudes towards reproductive health. Scores of knowledge and attitude were done. **The result:** reveled most of the study subjects shocked and cried as reaction during menarche. Also said that menstruation is spoiled blood the body get mid of it. There is a need for more improving student knowledge and attitude regarding RH through the following R**ecommendation** Strengthen the RH component in the school curricula, the role of the families ,mass media ,and school accurate information about RH must be enhanced, a program to educate parents on RH issues should be carried out, teachers should be well informed about RH issues , so they can prevent some of the problems by means of carful and open education.

Key wards: Applicable Sciences ,reproductive health

Introduction

Reproductive health (RH) is one of the center stone's of an individual's health and well-being, and an important component of country's human social development, limited access to RH information among female can increase their vulnerability to health problem. There for, it is important to provide them with accurate and age appropriate in formation"[1], adolescence is a period of transition from childhood to adulthood ,which status with the onset of puberty. The world health organization defines adolescence as the period of life between age 11 and 21 years adolescence is characterized by physical psychological ,and social change. It represents a window of opportunity to prepare for a healthy adult. The health adult population 1200 million persons or about 19% of the total population -faces a series challenges not only

affecting their growth and development but also their life hood as adults [(1)].

In many parts of the world adolescents are poorly informed about their health , bodies and physical well-being . Adolescent girls in particular are often kept away from learning about reproductive health issues because of a cultural and religious taboos. This is particularly in most of the Arab Countries , where adolescents are often reluctant to ask for RH information from adult in their families, communities ,or in professional settings. Furthermore social prohibitions and negative attitude of parents in discussing the related issue openly which has blocked the access of adolescent girls to connect information [(6)].

Adolescence and puberty can be difficult times for all young people, but for girls in many countries, puberty, ,especially the onset of menstruation, poses particular challenges. Menarche ,or the onset of menstruation is a landmark feature of female puberty and signals reproductive maturity. The menarche is often horrifying and traumatic to an adolescent girl because it usually occurs without her awareness about it. Anxiety ,fear ,confusion ,and even depression are frequently reportedas experiences of menarche.[(7)]

As menstruation play an important role in the health of female. It is crucial that the female obtain accurate knowledge about menstruation and learns to accept menstruation as a positive , natural part of her life ". Issues associated with menstruation are never discussed openly and this burdens young girls by keeping them ignorant of this biological function

Even after the attachment of menarche ,very little information is given to young girl about physiological processes involved and the hygienic practices to followed. It is obvious that the young youth receive inadequate information about puberty from parents and health professionals, so they resort to other sources such as fiends and media , which may be interpreted differently.[10]

As regarded premarital counseling is a type of therapy that helps couples prepare for marriage .Premarital counseling can help ensure that you and your partner have a strong healthy relationship giving you a better chance for a stable and satisfying marriage. Premarital counseling can also help you identify weaknesses that could become problems during marriage Premarital counseling is often provided by licensed therapists known about marriage and family therapists. These therapists have graduate or postgraduate degrees.[(12,14,15)]

Also premarital counseling can help couples improve their relationships before marriage .Through premarital counseling ,couples are encouraged to discuss topics related to marriage, such as Finances, Communication, Beliefs and values ,Roles in marriage, Affection and sex ,Children and parenting

,Family relationships , Decision-making, Dealing with anger, Time spent together

More ever Premarital counseling helps partners improve their ability to communicate, set realistic expectations for marriage and develop conflict-resolution skills. In addition, premarital counseling can help couples establish a positive attitude about seeking help down the road [16,17] .

Acquiring knowledge and developing attitude takes place during adolescence , which can have lifelong effects on the individual ; family and society , and also changes in the pattern of thinking , attitude , relationships , moral standards and abilities take place in this period . Therefore knowledge of reproductive health and the means to protect oneself against reproductive problems diseases should be available to adolescents . Better knowledge and education and counseling on human reproductive health and responsible parenthood among young adults will lead to correct attitudes and responsible reproductive health behavior . On the other hand Inadequate Knowledge in this area may lead to serious consequences in the reproductive health[1 3]. For all of these causes a prefer ,to search on this topic and also this is the first time for application at Yanbu City[9].

Aim of the study

This study aimed to identify the knowledge and attitude of the first year student at Faculty of Medical and Applicable Sciences at Yanbu governorate about some aspects of reproductive health.

Research questions:

What are the knowledge and attitude of the student about reproductive health.

Subjects and method

Research design : Descriptive research design was used in this study

Setting : The study was conducted in the faculty of medical and applicable sciences at Yanbu governorate.

Subject: convenience sampling of all student in the first year participate in the study , their number equal 200 student.

Tools of data collection : Two tools was designed and used by the research to collect the necessary data :

Tool I : Structure questionnaire schedule which entailed two parts :

Part (a) : Socio -demographic data.

Part (b): knowledge about menstrual period and premarital education as an aspect of a reproductive health.

Scoring system for studied students knowledge included:

Correct and complete answer was scored (2)

Correct and incomplete answer was scored (1)

Incorrect or no answer was scored (0)

Total scores of students ' knowledge were calculated and classified as follow:

More than 70% were considered good.

60-70 % were considered fair.

Less than 60% were considered poor.

Tool II: (reproductive health attitude scale) likert like scale form of there continuum (agree, not sure, disagree) was adopted to assess the student, attitudes towards reproductive health [13]

- The total score of attitudes was classified as follow :

Positive attitude (75% or more), Neutral attitudes (50% : < 75%) and negative attitude (<50%).

Method

A approval of the directors of the faculty was obtained after explanation of the aims of the study.

Ethical and legal consideration:

An informed consent for participation in the study was obtained.

Nature of the study was not caused any harm and/or pain for the entire sample.

Confidentiality and privacy was taken into consideration regarding data collection.

Each student was individual interviewed and informed about the aim of the study in order to obtain her consent to participate in the study.

The tools of the study were introduced to ten juries' expert in the field of obstetric nursing to test its validity. Modification was done accordingly.

Pilot study was carried out on10%of study sample to test tool reliability the necessary modification was carried and not excluded from the study.

The questionnaire sheet and the attitude scale ware disturbed to the student during their free time between classes.

It look 10-15 minutes to voluntarily complete the tool

Statistical analysis :

Statistical analysis was done by the researcher. A scoring system for students' knowledge and attitudes regarding reproductive health was adopted. The correct answers was determined according to literature and the question were coded.

Results

It showed(table1) distribution of the study subjects according to their knowledge about menstrual period as regard the first reaction during menses 66% (less than two third) of study subjects shocked and cried and 34% (more than one third) where normal reaction . Regarding to information about menstruation onset 79.5% (the majority) of the study subjects where agree and about 20.5% (one fifth) where disagree . Concerning this awareness regarding menstruation process 43% (less than one half) said it is normal physical process and 57% (more than one half) said it is spoiled blood the body get rid of it . Among the knowledge about the normal duration of menstruation 47.5% (less than one

half) responded correctly and about 52.5% (more than one half)of the study subjects where responded wrongly or they don't know . Regarding to the knowledge about the normal interval between menstruation 69.5% (less than three quarter) of the study subjects where correct answer and 30.5% (more than one quarter) said wrong answer or don't know. Concerning the frequency of changing pad /day of the study subjects 4.5% (little of study subjects) one time , 8.5% (little of study subject) changing bad tow day and 87% (the majority of the study subject) change bad three or more day . In addition 86% (the majority of study subjects) agree with bathing during menstruation is necessary while 14%(one tenth) disagree about bathing during menstruation . In addition to causes about the bathing necessary during menstruation 4.5% (little of study subject) said correct answer 61% (three fifth) said correct but incomplete answer and 34.5% (more than one third)of study subjects said wrong answer or don't know . Regarding to causing about the bathing is unnecessary during menstruation all of them responded wrongly and don't known.

It showed table (2):distribution of the study subjects according to their sociodemographic characteristic as regard age 67% (less than tow third) of the study subjects were in the age group 20 or more . Concerning father education 33% (more than one third) of the study subjects were illiterate / read & write while 36.50% (about more than one third) were less than university also the same percentage were university . Regarding to father occupation 79% (three quarter) were work but ,only 21% (nearly to one quarter) were not work . Concerning mother education 63% (three fifth) of the study subjects were less than university and 38% (two fifth) were illiterate/ read &write also the same percentage were university . Regarding to mother occupation 71.5% (three quarter) were house wife but ,only 28.5% (more than one quarter) were worker . Among residence 75.5% (three qual)

It shows the knowledge about premarital counseling 88.5% of the majority of the study subjects mentioned that 20 or more is the suitable age for marriage while 11.5% (more than one tenth) of the study subjects mentioned less than 20 is the suitable age for marriage. Concerning hearing about premarital counseling all of the study subjects 100% mention yes . Regarding to important of premarital counseling 73% (less than three quarter) responded were correctly and incomplete answer or don't know , neither of them were written a correct answer. Regarding to contents of premarital counseling 77% the majority of the study subjects were show the wrong answer or don't know and 18.5% (less than one fifth) were correct but incomplete

answer, little of the them were written correct answer.

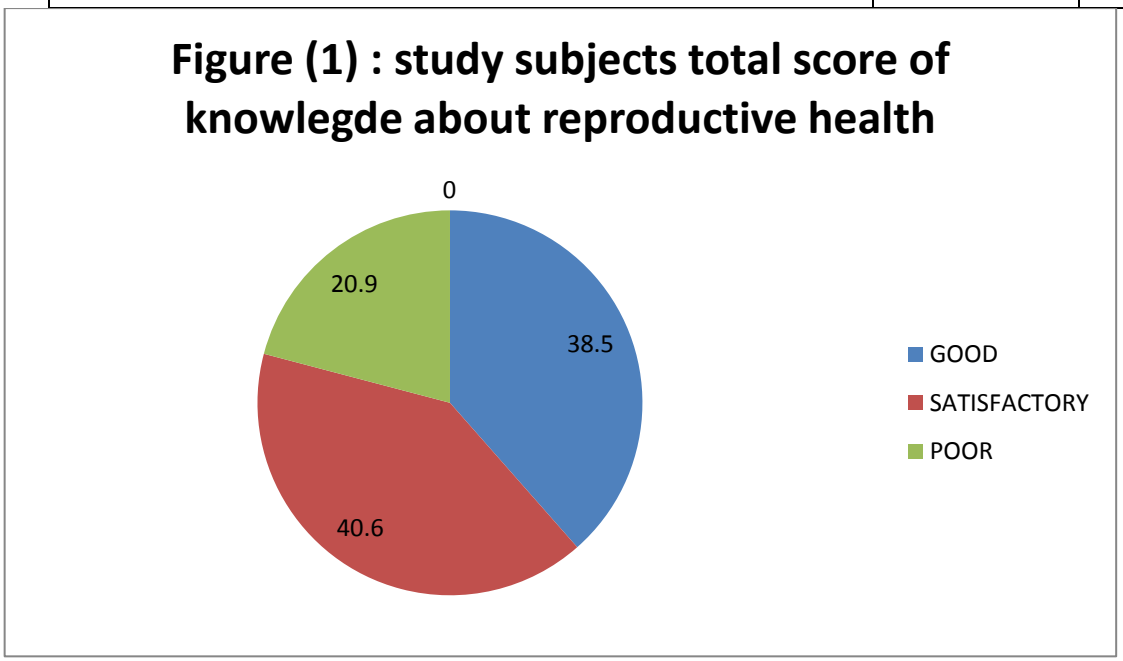
Table (1) : Distribution of the study subjects according to their socio demographic data

Social demographic data	**N =200**	**%**
Age:		
- Less than 20	134	67%
- 20 or more	66	33%
Father education :		
- illiterate /read &write	73	36.5%
- Less than university	66	33%
- University	61	30.5%
Father occupation :		
- Work	158	79%
- Not work	42	21%
Mother education :		
- Illiterate/read &write	38	19%
- Less than university	126	63%
- University	36	18%
Mother occupation :		
- Work	57	28.5%

Table (2):distribution of the study subjects according to their Knowledge about menstrual Period

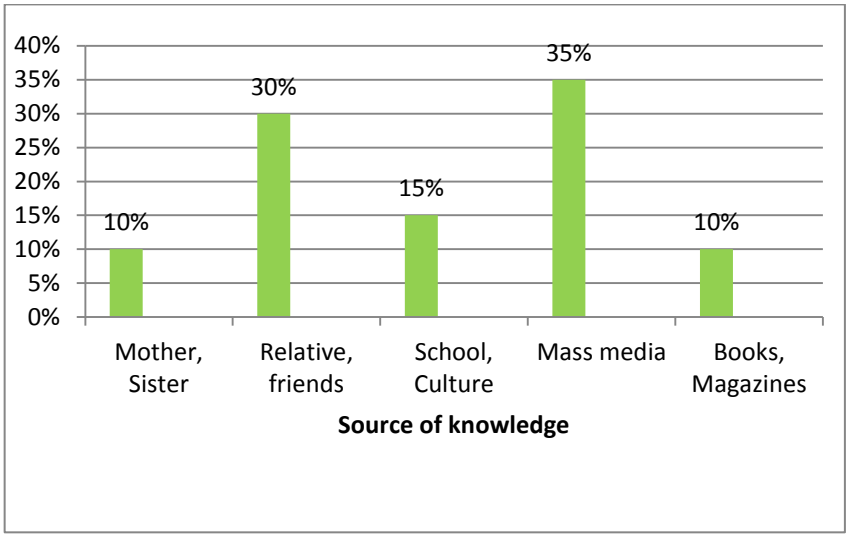
Knowledge about menstrual period	N =200	%
Reaction when the menarche occur :		
- Shocked and cried	132	66%
- Normal reaction	68	34%
Information about menarche before its onset:		
-Yes	159	79.5%
- No	41	20.5%
Awareness regarding menstruation process :		
- Normal physical process	86	43%
- Spoiled blood the body get mid of it	114	57%
Know the normal duration of menstruation :		
- Correct answer	95	47.5%
- Wrong answer or don't know	105	52.5%
Know the normal interval between menstruation:		
- Correct answer	139	69.5%
- Wrong answer or don't know	61	30.5%
Know frequency of changing pad /day:		
- One	9	4.5%
- Two	17	8.5%
- Three or more	174	87%
Is bathing during menstruation necessary :		
- Yes	172	86%
- No	28	14%
Why bathing during menstruation necessary :		
- Correct answer	9	4.5%
- Correct but incomplete answer	122	61%
- Wrong answer or don't know	69	34.5%
Why bathing during menstruation is unnecessary :		
- Correct answer	6	3%
- Correct but incomplete answer	17	8.5%
- Wrong answer or don't know	177	88.5%

Know suitable age for marriage :		
- Less than 20	23	11.5%
- 20 Or more	177	88.5%
Hearing about premarital counseling:		
-yes	200	100%
-no	0	0%
Important of premarital counseling :		
- correct answer	2	1%
- correct but incomplete answer	146	73%
- wrong answer or don't know	52	26%
Contents of premarital counseling :		
- correct answer	9	4.5%
- correct but incomplete answer	37	18.5%
- wrong answer or don't know	154	77%



Figure(1) Study subjects Total score of Knowledge about reproductive health

Figure 2 : Study subjects sources of knowledge about reproductive health



Figure(2) Study subjects sources of knowledge about reproductive health

It show that about one third 35% & 31 % of the stud subjects obtained their knowledge from mass media and relative or friend respectively and 15% from school classes while 10% from mothers &sisters and also 10% from books and magazines .

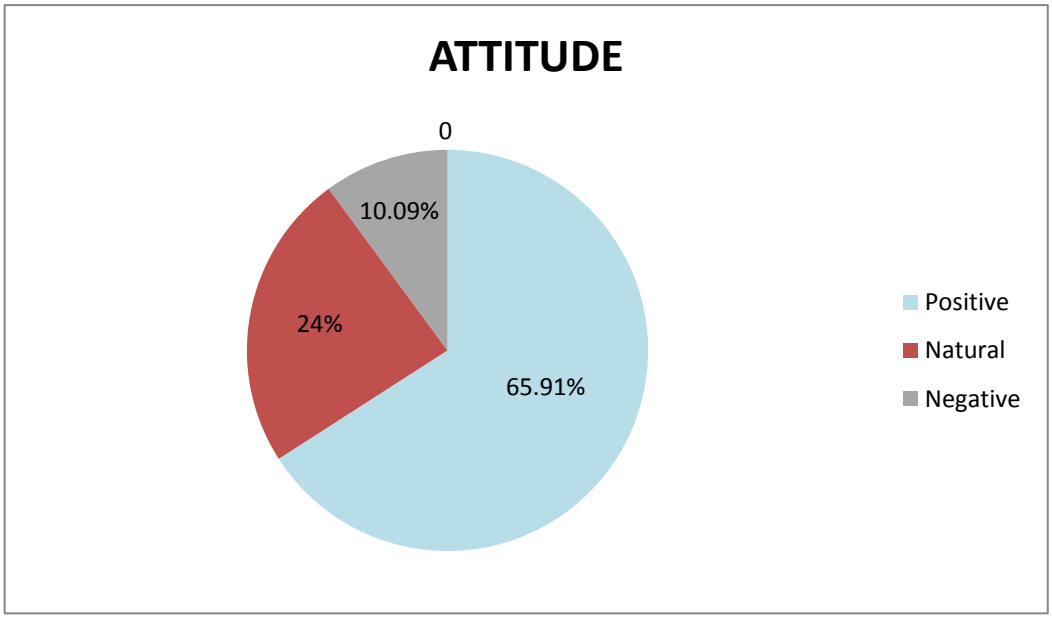


Figure (3) : Total score of attitude of study subject about reproductive health

It show total score of attitudes of study subjected about reproductive health, about tow third of the study subjects 65.91 % obtained positive score , while 24% (one quarter) obtained natural score and only 10.09% (one tenth) obtained negative score.

Discussion

A doles cannot represent one of the main pillars of any society , they form a large significant and growing population group in many countries. Despite that they do not

resave much attention and suffer from poor knowledge about reproductive health. This knowledge about reproductive health issue and health seeking behavior in the course of their future life is very important[18,19].

This study revealed general lack of knowledge about reproductive health among almost three fifth of the study subject this finding is more than to that of **EL Sadek et at (2008)** who found in Cairo , Egypt that more than one - half of the subject had poor knowledge about RH.[20] **Nezam (2010)** formed in Syria that slightly more than two third of the study subject had good knowledge about reproductive health[21], In particular the study subjects knowledge about menstruation revealed that more than two fifth said it is normal psychological process while more than one half said it is spoiled blood that the body gets rid of this finding is relatively similar to that of **Eswited (2013)** who found that more than half of the participants reported that menstruation is an event that happens to the girl during puberty, it occurs monthly and spoiled blood the body get rid of it [9]. **NagrandAimol (2011)** also found that in Tribal Areas of India , slightly more than half of the study subjects know that menstruation is unclean/dirty / bad blood .[22] In addition , **Adinma (2008)** found in his study that slightly less than two - fifth of study subjects perceived menstruation as a physiological process , while slightly more than one half viewed menstruation as release of bad blood [23]. On the other hand , the study conducted **by Kuwar and Kundon (2011)** in Urban Indian revealed that three - fifth of adolescent girls thought menarche to be a natural process [24]. The reaction to menstruation depends upon awareness and knowledge about the subject. The manner in which a girl learns about menstruation and its associated changes may have an impact on her response to the event of menarche. Although menstruation is a natural process , it is liked with several misconceptions and practice , which sometimes result into adverse health outcome[25]. Regarding reaction when the menarche occur. The present study revealed the two third of the study subject were shocked and cries while one third had normal reaction this may arise from an unexpected appearance of blood pre vagina at menarche and this finding is similar to that of **AbdelTwaab et al** (**2012**) who found in survey of young people in Egypt had two third were shocked and cries as well as being scared when the menarche occurred [11] also the finding is relatively similar to that of **Dube and Sharina(2012)** who found in India that fear and panic was the dominant reaction among the majority of the study subject when they had their first menses[26]**Bobhate (2011)** also found slightly less than two thirds agreed to being scared on their first menstruation while slightly less than one third felt irritated

[27]. In addition, **AbdAllah and Elsabagh(2013)**found that one half of the girls were scared from first menstruation, and the remaining were anxious and get syncope [28].

As regard awareness the majority of the study subject were informal about menarche and menstruation before its onset, the current finding is in agreement with that **of Eewietal (2012), Juyal et al (2012)** and **Omidvar ,25 (2010),** whose found that 14%, 66% and 64.5 of girls respectively had been informed about menarche before it's onset.[9,10,24] The current study in different with that of **bob hate (2011)** who found of that 80% of the participant were not aware about menstruation before menarche [27]. Also with that of **Abdullah E** (**2013**) in Zagazig City , Egypt which revealed that 65% of girls did not have preparation for menarche.[28] in addition the present study **on the convers with Sudehan and Aparaqita (2012)**[1] west Bengal , **Thakre et al (2011)** and as well as **Dhingra at (2007)** in India.[29-31] Which revealed that 58%, 30% and 43.5% of girls respectively had no - prior knowledge about menstruation before menarche.

Hygiene is one important aspect especially during menstruation proper understanding of menarche and personal hygiene during menstruation significantly influences reproductive health of adolescents.

The majority of the present study subject reported that sanitary pads should be used during the menstruation and changed three times/ day, while 4% , 8% respectively change the bad one and twice /day . This finding is in line with that of **MalleshAppaetale (2012)** who found in India that almost all the study subject (97.5%) reported that sanitary pad should be used during menses , and also it should be changed regularly [32]. Regarding bathing during menstruation the majority of present study subject menstruation that bathing menstruation is important and their reasons are for personal hygiene and reform ,to stimulate blood circulation ,help for sleep and relax ,and prevent the bad odor , and about more than one tenth of the study subject mentioned bathing is unnecessary and did not reported any reasons this finding is in line with Nager and Aimal who found that tow third of the responding considered having bath twice a day should be used during menstruation' . Also the present study show that majority of the study subject mention this result 20 or more is the suitable age for marriage. This result is online with agreement with that of **ELSadek et al (2008)** who found that (93.6%) of the study girls reported that they heard about pre-marital examination counseling [20]. Although the majority of the study subject heard about pre marital counseling yet almost mean to three quarter of the study subject and more than one quarter responded incomplete and wrong or did not know respectively regarded important of pre-

marital counseling and the majority of them mentioned wrong answer did not know as regard contact of pre-marital counseling. This finding **not on line with Lamada (2004)** who found that knowledge of adolescent girt about premarital counseling and examination was insufficient and a sizeable proportion of them did not know the important of premarital counseling [(33)]. In the current study the students got their knowledge about reproductive health from many sources ,the main sources ware mass media ,relatives and friend. This finding is **in line with Farag (2012)** who found that the main sources of knowledge about RH were mass media and internet [(34)] .

Conclusion

Based on the finding of the present study ,it can be concluded that only less than tow fifth of the students had good knowledge while tow third of the had positive attitude about reproductive health . the main sources of students' knowledge about RH were mass media and relatives and friends.

Recommendation :

Strengthen the RH component in the school curricula.

The role of the families , mass media ,and school accurate information about RH must be enhanced.

A program to educate parents on RH issues should be carried out.

Teaches should be well informed about RH issues ,so they can prevent some of the problems by means of carful and open education .

Further studies :

Assess male versus female secondary school students knowledge and attitudes regarding reproductive health .

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