Enhancement of Nurses Performance Regarding Physiotherapeutic Techniques Provided to the Bed Ridden Children in the Pediatric Intensive Care Units

Abeer Elsaid Mahmoud Nga, M.Sc Pediatrics Nursing
Faculty of Nursing, Tanta University

Rahma Soliman Bahgat, Prof. of Pediatric Nursing
Faculty of Nursing, Tanta University

Ebtisam Mohmmad EL-Sayed, Prof. of Pediatrics Nursing
Faculty of Nursing,Tanta University

Khaled Talaat Muhammad, Prof.. of Pediatrics Medicine
Faculty of Medicine, Tanta University

Mohammad Mohammad Elasmey, Assist. Prof. of Pediatrics Medicine
Faculty of Medicine, Mansoura University

Abstract

Physiotherapy in pediatric intensive care units aims to prevent or minimize the effects of altered mucociliay clearance on pulmonary function and prevention of dysfunction of the musculoskeletal system for bedridden children. Physiotherapy is therefore concerned with the prevention of secondary complications due to immobilization, surgery, intubations. The nurse must be knowledgeable about how mobility and immobility affect the body systems and the psychosocial and developmental aspects of patients. **Aims of the study:** to assess nurses' knowledge regarding physiotherapeutic techniques for the bed ridden children and evaluate the effect of the educational training program on the nurses performance regarding physiotherapeutic techniques for bed ridden children in the intensive care units at Tanta and Mansoura University children Hospital. **Materials and Method: Sixty** nurses working at intensive care units with bed ridden children who had respiratory and musculoskeletal problem. Two tools were used; A questionnaire sheet and observational checklist. **Results** indicated that there was lack in knowledge of nurses about physiotherapeutic techniques as well as lack in practice which included chest physiotherapy and range of motion for bed ridden children in intensive care units. **Conclusion:** The training program is effective in increasing nurses' knowledge and practices in implementation physiotherapeutic techniques for bedridden children .There was a significant positive relation between pre –program nurses' knowledge and practices about physiotherapy, immediately and after implementation of the program of three months .

Keywords: Pediatric Intensive Care Units, Physiotherapeutic techniques, bed ridden children

Introduction

Pediatric intensive care unit defined as a specialized section of a hospital containing the special equipment, medical and nursing staff, and monitoring devices necessary to provide intensive care for bedridden children who have illness , surgery or chronic diseases(1,2) . In many pediatrics intensive care units, it has been usual practice to manage critically ill patients with deep sedation and bed rest. However, an increasing body of literature has documented the complications associated with bed rest, which affect virtually every body system(2) . These complications as reduces patients' cardiopulmonary fitness, causes various musculoskeletal adaptations to occur, and predisposes patients to pulmonary dysfunction (3). Physiotherapy is therefore concerned with the prevention of the secondary complications brought by immobilization, surgery, intubation or the medical management of pathology . The process of physiotherapy clinical decision making in the critical care environment also depends on careful analysis of dysfunction occurring in one system (or component of one system) to cause changes in another system (4). The concept of problems analysis based on knowledge of human body system integration is also applied to the selection of physiotherapeutic techniques (5). Types of physiotherapeutic techniques in PICU the physiotherapeutic included chest physiotherapy to prevent pulmonary complication, regular graded mobilization with proper positioning of children and range of motion exercises to prevent musculoskeletal complications(2) . Also Chest physiotherapeutic techniques included, postural drainage, percution, and vibration

Chest physiotherapy is a group of physical techniques that improve lung function and help breathe better. It expands the lungs, strengthens breathing muscles, and loosens and improves drainage of thick lung secretions. Chest physiotherapy helps treat such diseases as cystic fibrosis and COPD (chronic obstructive pulmonary disease). It also keeps the lungs clear to prevent pneumonia after surgery and during periods of immobility [6,7]. Types of physiotherapy for musculoskeletal system included range - of- motion (ROM),moving and positioning to prevent musculoskeletal complications ,and back rub to prevent bed sores[23] .Child patient who are bedridden need to exercise to prevent their muscles from atrophy and shortening. Muscle atrophy occurs when the muscles become thin and weak. The muscles shorten when they are not stretched or moved.

Exercises that stretch and strengthen the muscles help prevent or minimize these complications, though some exercises require assistance from a caregiver . Unconscious and paralyzed patients also need caregiver to move them into different positions throughout the day to prevent bedsores [8]

Prolonged stays in the intensive care unit and mechanical ventilation are associated with functional decline and increased morbidity, mortality, cost of care, and length of hospital stay [14]. Implementation of an early mobility and walking program could have a beneficial effect on all of these factors. The evidence concerning physiotherapy for intubated patients receiving mechanical ventilation. There are data demonstrating that multimodality physiotherapy may result in short-term improvements in the pulmonary function of Pediatric ICU [15]. The nurses' knowledge needs to be updated to be efficient through continuing nursing education for all nurses' level of education. Nurses who are working in PICUs are required to have a professional qualification about physiotherapy .The educational establishment linked to regional and sub regional units, acquired evidence. This has led to nurses becoming more aware of their accountability, professional liability and duty of care and has been the impetus for the development of specialist educational programs [9].

Nurses enter the field armed with the knowledge they need to excel at their jobs. However, health care is a changing field with constant new developments. Continuing education prepares nurses for these changes. Continuing education is also necessary for nurses who want to work as an advanced or specialized nurse[10-12].Nursing is a dynamic profession that is subject to rapid changes in health care provision, hence the need for in-service training program for nurses. Newly employed registered nurses require in-service training in order to update them regarding the latest developments in nursing practice. The researcher noted that some newly appointed registered nurses were not competent in all aspects relating to physiotherapy for bedridden children at Pediatrics intensive care unit [4,5].

This could have been due to a knowledge deficit relating to either new developments or of the procedure relating to a specific task. In some institutions newly-appointed registered nurses on probation reported not receiving in-service training for six months or longer, yet they were still expected to perform their tasks efficiently [13]. The objectives of the study were to, firstly, explore and describe the experiences of registered nurses regarding in-service training program in their institutions and, secondly, to make recommendations to nursing service managers relating to the

development of effective in-service training program in their institutions [1,2]. This article focuses on the experiences of registered nurses relating to in-service training program, as well as the formulation of guidelines to assist nursing service managers in the development of effective in-service training program [13,32] .

Aim of the study:

Identify the effect of upgrading nurses' concepts and skills about physiotherapy for bed ridden children in the Intensive Care Units.

Materials and Method:

Research Design :Aquis experimental research design was used in present study.

Setting: This study was conducted at Pediatric Intensive Care units at Mansoura University Children Hospital and Tanta University Hospital. .

Subjects: Convenient sample of 60 nurses working in the previous setting 30 nurses from Tanta and 30 nurses from Mansoura Pediatric Intensive Care units regardless of their level of education, experience and biosocial data variations.

Tools of data collection:

Two tools were used in the presented study to obtain the required data:

Tool I: Nurses 'knowledge structured questionnaire sheet (Appendix1)

A structured interview questionnaire was developed by the researcher after thorough review of relevant literatures. It included four parts:

Part I: Sociodemographic characteristics of the nurses including age, education, experience years, residence, and training program in or out the hospital.

Part II

a- Nurses' knowledge regarding Pediatric Intensive Care unit (PICU) included: definition of PICU, bed ridden child, physiotherapy, ventilator, bed sores, PICU cases, types of position in PICU, and nurses' ability to work during every shift.

b-Nurses' knowledge regarding pediatric respiratory diseases and chest physiotherapy was assessed. Questions included knowledge about indication of chest physiotherapy such as pneumonia and COAPD, methods of chest physiotherapy (postural drainage, percussion, and vibration and breathing exercises). It also included questions about equipment of chest physiotherapy (face mask and pillows), and its procedure chest physiotherapy (hand wash, preparing the equipment, detriment the affected lung, patient assessment, and duration of chest physiotherapy). The questions also included nurses' knowledge regarding causes leading to collection of secretion inside respiratory system in cases of weakness in respiratory system, coma, Gillian barre, and pneumonia.

Nurse's knowledge about symptoms and signs due to secretion collection in respiratory system in cases such as chest sounds, slow in respiratory cycle, dyspnea, cyanosis and disturbance in blood gases were also included. c-Nurses' knowledge regarding pediatric musculoskeletal physiotherapy in pediatric intensive care unit (PICU) was assessed. Questions included knowledge about equipment used for musculoskeletal physiotherapy (air matters, hand pressures, sand bag, and pillows) and instructions about preventing musculoskeletal deformities (changing position every two hour, limbs exercises, back rub, and using air matters, changing the bed ridden child's position during sleep, how the bed sores occur, sites of bed sores in elbow, shoulder, ankle, hip region, buttocks, and behind the head) and deformities in body bed ridden child (foot drop, joints stiffness, and sores in outer ears).

Tool II: Observational check list sheet.

Observational check list sheet was developed by the researcher after thorough review of relevant literatures. The check list assessed nurse's performance during pediatric chest and musculoskeletal physiotherapy which included:

- Postural drainage
- Percussion,
- Vibration,
- Range of motion exercises (ROM) for all body part such as neck, shoulders, elbow, fingers, hip, knee, ankle, toes and foots,
- Moving and positioning,
- Back rub.

Method

1- An official permission to conduct the study was obtained by submission of an official letter issued from Faculty of Nursing Tanta University to the director of Tanta Mansoura University Children Hospital.

2- Based on review of literature, the researcher constructed an interview questionnaire sheet and observational cheek list which included the majority of items related to physiotherapeutic techniques performed by nurses in pediatric intensive care unites.

3- Continuous validity to the tool was done by 5 experts.

4- Ethical consideration: privacy and confidentiality of data and results were considered. The researcher explained the purpose of the research to the participants and informed them that they can withdraw from the study at any time .

5- Oral consent was obtained from nurses for agreement to participate in the present study after explanation of the study's purpose.

6- Pilot study was conducted on 10% nurses to ensure reliability and validity of tools.
7- Each nurse was individually interviewed to collect necessary data using tool I. The time consumed to answer each questionnaire sheet ranged from 5 – 10 minutes.
8- Each nurse was observed 3 times during every shift using tool II. The time consumed to observe each nurse ranged from 30- 45 minutes.

Program description:

This program was specifically designed as evidence based nursing for pediatric physiotherapy to provide nurses' knowledge and practice related to definition ,indication, complications and important physiotherapeutic procedures for bedridden children at PICU.

The program was implemented for 60 nurses through two strategies:

1-Educational session for evidence based guideline.

2-Training session including teaching and learning methods which is lecture ,video , power point presentation ,and book hand out.

I -Objectives of program :

1- General objective

By the end of this program nurses will acquire knowledge and practices related to physiotherapeutic techniques for bedridden children in PICU.

2- Specific objectives :

At the end of training program sessions, the nurses will be able to:

Points and distributed as:

-Define physiotherapy and bedridden child.

-List PICU cases.

-list positions for moving and positioning.

-Mention chest and musculoskeletal physiotherapy procedure .

-List physiotherapy equipment

-List bedridden complication and how to prevention

II – Implementation phase:

The program was carried out at pediatric intensive care units in Mansoura University Children Hospital and Tanta University Hospital.

The implementation was applied to the studied nurses and divided into 4 session:

Session 1:

1- Information regarding definition of physiotherapy and bedridden children.
2- Anatomy and functions of respiratory and musculoskeletal system
3- Effect of immobilization on bedridden child.
4- Causes and define of complication in respiratory and musculoskeletal system.

Session 2:

Demonstration of nursing procedures related to role of nurse in physiotherapeutic techniques for bedridden children at PICU.

This procedure includes:

1- Musculoskeletal physiotherapeutic techniques as ROM exercises ,moving and positioning ,and back rub .
2- Chest physiotherapy procedure as ,percussion, vibration ,and postural drainage.

Session 3:

Universals precaution equipments to prevented of complication as pillows ,air mattress , face mack ,feet supported and physiotherapy and massage machine .

Session 4:

Actual nurses' performance for chest and musculoskeletal physiotherapeutic techniques for children in pediatric intensive care unit through demonstration and redemonstration.

Evaluation phase :

Evaluation of effectiveness of the program on nurses' knowledge and practices about physiotherapeutic techniques for bedridden children at PICU and evidence based practice through the following :

1. Pretest questioners and observational chick list to assess nurses' knowledge and practices about physiotherapy for bedridden child and evidence based procedures.
2. Post- test (same as pre- test).
3. Re- demonstration of procedures.
4. Return test (same as post test)after 3 month to evaluate retention of knowledge.

5-Data was collected through 7 months starting from September 2013 to February 2014.

Statistically data Analysis

The collected data were coded and entered in a data base file using the One Way Anova program. After complete entry, data were transferred to the SPSS version 12 program by which the analysis was conducted applying frequency tables with percentages cross tabulations. The tests of significance used were the t-test for trend is used for assessing trend and Chi-square exact tests. Data is qualitative variables presented as number and percent. The result was considered significant if p value <0.05 .

Results:

Table (1) shows that a total number of 60 staff nurses were included in this study. Those who aged 20 - 25 years constituted 30% of the studied nurses, and 43% were in the age group of 25-30 years old, as well as 5% belonged to age < 20 years with a mean age of 27.3 ± 3.2 years old.

As regards qualification, 30% of studied nurses had diploma degree, and 3.3% of them had diploma and specialty. The majority of the studied nurses had bachelor degree in nursing (66.7%). Regarding years of experience, 45% of the studied nurses had less than 5 experience years, 38.3% had less

than 5- 10 years, and 10% had 10-15 years. Those who had more than twenty years of experience constituted 3.3%, with mean of 8.2 ± 2.3 years. Among studied nurses 53.3% were from urban area, and 46.6% were from rural area. The same table portrays that none of the studied nurses attended any previous training programs about children physiotherapeutic techniques in intensive care unit.

Table (2) shows that nurses knowledge about chest physiotherapy. It was found 53% of nurses preprogram, 90 % immediately after program, and three month post program 66% reported percussion as a methods of chest physiotherapy. Additionally 66% of nurses immediately after program ,and 30% after three month mentioned vibration as a methods of chest physiotherapy compared to none of them preprogram. There was statistical significant difference at X=26.30 ,P =0.0001. Regarding nurses' knowledge about equipment of chest physiotherapy , it was found that 56% 0f nurses pre program , 73% immediately post program, and 66% after three month reported face mask as equipment of chest physiotherapy compared to 6.6% of them pre program ,100% immediately post program, and 40% after three month mentioned Chest physiotherapy machine . Concerning the basics of chest physiotherapy procedure ,12% 0f nurses pre program, 66% immediately post program and 50% after three month reported correct answer. There was statistical significant difference at X=8.92 ,P =0.0005.

Table (3): present nurses' knowledge about bed sores at pediatric intensive care unit (PICU) ,it was found 13% of nurses pre program , 66% immediately after program, and 50% post three month mentioned correct answer for first stage 0f bed sores reddened area on the skin. While none of nurses pre program , 100% immediately after program , and 30% after three month reported second stage the skin blisters or forms an open sore and third stage the skin breakdown and damage tissue below the skin. There was statistical significant difference atX=52.26 ,P =0.0001

Table (4): Show nurses knowledge about causes ,sites of bed sores and Sits of deformities for bed ridden child' body. Regarding nurses' knowledge about causes of bed sores ,it was found none of them pre program, 90% of nurses immediately after program , and 66% of them post three month mentioned no change position every two hour and bad nutrition as a causes of bed sores for bed ridden child at PICU. There was statistical significant difference at X=52.65 ,P =0.0001.

Table (5) shows to total nurses' knowledge score ,it was found none of nurses pre

program, 33% immediately after program, and 10% post three month had good knowledge score about chest physiotherapy. While 10% 0f nurses pre program , 50% immediately after program, and 17% post three month had fair knowledge score about chest physiotherapy , there was statistical significant correlation between nurses' knowledge score pre, immediately after program and after three month where p=0.002

Concerning to nurses knowledge score related to musculoskeletal physiotherapy, it was found 6.6%, of nurses preprogram, 53% immediately post program, and 27% post three month had good knowledge score. Also 83% of nurses preprogram, 20% immediately post program , and 50% post three month had poor knowledge score , there was statistical significant correlation between nurses' knowledge score pre, immediately after program and after three month where p=0.002.

Table (6) shows nearly all the studied nurses had poor performance for physiotherapeutic measures in PICU pre program ,and improved immediately after program implementation and decrease in post three month after program in all practices related to physiotherapy for bed ridden child to prevent complication .

The finding of nurses performance for those practices throughout the training program statistically was significant p < p0.001, except in moving and positioning was not significant p > 0.05 ,and feet ROM exercises also was not significant p>0.05.

Table (7) present relation between nurses' knowledge about physiotherapy at pediatric intensive care unit (PICU) and pre- program , immediate post program, and post three month for Tanta group (N1) ,it found that highly significantly relationship between nurses' knowledge about physiotherapy pre program and immediately after program , where(X = 4.774 ,P = .000) .

Regarding the relationship between pre and post three month nurses 'knowledge score ,it was found highly significantly relationship ,where X= 3.346 ,P= .000 .Also highly significantly relationship was clear between immediately post program and post three month program nurses' knowledge score where (X= 4.021 ,P= .000).

Table (8) Present relation between nurses' practice about physiotherapy at pediatric intensive care unit (PICU) and pre- training program, immediate post program and after 3 month ,it found that highly significantly relationship between nurses' practice score about physiotherapy pre program and immediately after program , where X = 4.849 ,P = .000 .

Regarding the relationship between pre and post three month nurses 'practice score ,it was found highly significantly relationship ,where X= 4.243 ,P= .000 .Also highly significantly relationship was clear between immediately post program and post three month program nurses' practice score where X= 3.697 ,P= .000.

Table (1): Percentage Distribution Of Studied Nurses Related To Sociodemographic Characteristics.

Sociodemographic characteristics	Studied nurses (n=60) No	%
Age:		
-↓ 20	3	5.0
20-↓25	18	30.0
25-↓30	26	43.3
30-↓35	10	16.7
35-↑	3	5.0
-Mean ±SD:	27.3 ±3.2	
Nurse's education :		
Diploma	18	30.0
Diploma + specialty	2	3.3
Bachelor	40	66.7
Experience (years)		
↓ 5	27	45.0
5 – 10	23	38.3
10 – 15	6	10.00
15 – 20	4	6.6
- Mean ±SD:	8.2 ±2.3	
-Residence		
- Urban	32	53.3
- Rural	28	46.6
Attending training program		
- Yes	0	0.0
- No	60	100

Table (2): Percentage distribution of studied Nurses knowledge regarding chest physiotherapy

Knowledge items	The studied nurses						X	P value
	Pre test (I) (n=60)		Immediate Post test (II) (n=60)		3month after implementation program (III) (n=60)			
	No	%	No	%	No	%		
Methods of chest physiotherapy								
- Percussion	32	53.3	52	90	40	66.7	26.30	0.0001
-vibration	0	0	40	66.7	18	30		
-Machine	30	50	60	100	2	3.3		
-Don't know	24	46.7	0	0	0	0		
Equipment of chest physiotherapy								
-Face mask	34	56	44	73	36	46	24.88	0.0003
-Pillows	0	0	30	50	26	40		
-Chest physiotherapy machine	4	6.6	60	100	26	40		
-Don't know	30	50	0	0	2	3.3		

***More than correct answer**

Significant at level 5%

Table (3): Percentage distribution of studied Nurses Knowledge regarding Stages of Bed Sores At Pediatric Intensive Care Unit (PICU)

Knowledge items	The studied nurses						X	P value
	Pre test (I) (n=60)		Immediate post test (II) (n=60)		3month after implementation (III) (n=60)			
	No	%	No	%	No	%		
Stages of the bed sores#								
-Stage1 reddened area on the skin.	32	13	40	66	30	50		
-Stage2 the skin blisters or forms an open sore	0	0	60	100	18	30	52.26	0.0001*
-Stage3 the skin breakdown and damage tissue below the skin.	0	0	60	100	18	30		
-Stage 4 the ulcer has become so deep that there is damage to the muscle, bone, tendons and joints.	8	13.2	40	66	20	33		
-Don't know	60	100	20	33	8	13.2		

#More than correct answer.

***Significant P<0.05**

Table (4): Percentage Distribution Of Studied Nurses Knowledge Regarding Causes ,Sites Of Bed Sores And Sits Of Deformities For Bedridden child' body

Nurse's Knowledge	The studied nurses						X	P value
	Pre test (n=60)		Immediate Post test (n=60)		3month after program implementation (n=60)			
	No	%	No	%	N0	%		
Causes of bed sores #								
-No change position\2h	0	0	52	90	40	66.7		
- Bad nutrition	0	0	40	66.7	36	30	52.65	0.0001*
- Weak Body build	32	53.3	40	66.7	24	3.3		
-Uncompleted	28	46.7	10	17	40	30		
-Don't know	20	30	0	0	10	17		
Sites of bed sores # :								
-Head region	18	30	60	100	28	46.7		
-Elbow region	14	24.7	60	100	30	50		
-Ankle region	16	26.3	60	100	20	33.3	71.43	0.0001*
- Hip region	30	50	60	100	60	100		
- Back region	40	66.7	60	100	20	33.3		
-Shoulder &batouces	20	33.3	18	30	20	33.3		
-Uncompleted	40	66.7	0	0	0	0		
-Don't know	60	100	0	0	0	0		
Sits of deformities in body#								
-Feet drop	18	30	60	100	40	66.7		
-joints stiffness	0	0	60	100	18	30		
-Muscles atrophy	0	0	60	100	14	23.7	35.30	0.0003*
-Ear Erosion	30	50	60	100	40	66.7		
-Bed sores	40	66.7	60	100	60	100		
-uncompleted	32	53.3	0	0	10	17		
-Don't know	40	66	0	0	6	10		

#More than correct answer

***Significant P<0.05**

Table (5) : Percentage Distribution Of Studied Nurses Knowledge Regarding Total Nurses' Knowledge score :

Nurse's knowledge	Pretest		Immediate post		After 3month		X	P value
	No	%	No	%	No	%		
-Chest physiotherapy:								*
Good	0	0.0	20	33	6	10	18	0.0001
Fair	6	10	30	50	10	17		
Poor	54	90	10	17	44	70		
Musculoskeletal physiotherapy								*
Good	4	6.6	32	53	16	27	17.1	0.002
Fair	6	10	16	27	14	24		
Poor	50	83	12	20	30	50		

*Significant P<0.05

Table (6) :Percentage distribution of studied nurses level of performance regarding physiotherapeutic techniques measures at the PICU through the training program

Items and level	Pretest		Immediate post		After3 month		X	P value
	No	%	No	%	No	%		
-Postural drainage :								0.003*
Good	0	0.0	40	66	10	17		
Fair	10	17	10	17	10	17	16.1	
Poor	50	83	0	0.0	40	66		
-Percussion								
Good	20	33	30	50	10	17		
Fair	30	50	8	30	14	24	18.3	0.002*
Poor	10	17	12	20	36	60		
-Vibration:								
Good								
Fair	0	0.0	30	50	20	33		
poor	0	0.0	30	50	16	27	17.1	
	60	100	0	0.0	24	40		0.001*
Range of motion exercises(ROM)								
Good								
Fair	4	6.6	16	20	4	6.6		
Poor	10	17	16	20	16	20	5.22	
	46	76	24	60	40	66		0.004*
Moving and positioning :								
Good	0	0.0	20	33	8	13		
Fair	0	0.0	30	50	20	33	15.3	0.006*
Poor	60	100	10	17	32	54		
Back rub :	0	0.0	32	54	12	19	19.18	
Good	0	0.0	12	19	12	19		0.003*
Fair	30	100	16	27	36	62		
Poor								

* Significant P<0.05

Table (7) : Relation between nurses' knowledge about physiotherapy at Pediatric Intensive Care Unit (PICU) and pre-test, immediate post test and 3 month after implementation of the program .

Variables	(n=60)	
	X	P
Pre and post program Nurses 'knowledge	4.774	.000**
Pre and post 3m. Nurses 'knowledge	-4.021	.000**
Post program and post 3m. nurses' knowledge	4.264	.000**

*significant at P< 0.05
** Highly significant

Table (8) : Relation between nurses' practice about physiotherapy at Pediatric Intensive Care Unit (PICU) and pre- test, immediate post test and after 3 month .

Variables	(n=60)	
	X	P
Pre and post program Nurses 'practice	4.849	.000**
Pre and post 3m. Nurses 'practice	4.243	.000**
Post program and post 3m. nurses' practice	3.697	.000**

*significant at P< 0.05 ** Highly significant

Discussion:

Physiotherapy is defined as the treatment of disease, injury, or deformity by physical methods such as massage, heat treatment, and exercise rather than by drugs or surgery. The bedridden children at PICU are need musculoskeletal physiotherapy techniques as range of motion exercises, turning and moving procedures (1). These previous procedures are very important for prevent serious complications as bed sores, muscles atrophy and feet drop. Also they need to chest physiotherapy as percussion, vibration and postural drainage to airway clearance from mucus and remove lung secretion(14). Chest physiotherapy (CPT) is a technique used to mobilize or loose secretions in the lungs and respiratory tract. This is especially helpful for patients with large amount of secretions or ineffective cough. Chest physiotherapy consists of external maneuvers, such as chest percussion, postural drainage, vibration, to augment mobilization and clearance of airway secretions, diaphragmatic breathing with pursed-lips, coughing and controlled coughing(20).Nurses share responsibility with other health care personnel for bed ridden complication reduction for patient. So, it is important to evaluate nurse's knowledge and practice in this critical area about physiotherapy. The present study attempted to assess nurse's knowledge as well as monitor compliance to nursing care standards in performing chest and musculoskeletal physiotherapy procedures. All nurses in pediatric intensive care units PICU are required to have both knowledge and understanding fully theoretical rational underlying the application of physiotherapeutic intervention **Bowden v &Greenberg c., (2008)** [4]. The present study reported that all nurses had no training program in or outside the hospital. This result agrees with **(El-Ghalban, 2013)** [9] who found that there is absence of training program which maintain quality improvement. **Dureuil B & Viires (2006)** [20] who mentioned that untrained nurses who are working in an acute specialty area as PICU cannot be regard as a good practices. The present study revealed that nurses' knowledge about physiotherapy was poor . This may be due to the fact that nurses did not receive specified direct education about the physiotherapeutic techniques for bedridden children at PICU. These finding are in agreement with finding of **EL-Ghlban et al (2013)** who concluded that the causes of poor level in nurses' knowledge and practices due to not found continuous education and training for nursing staff especially about physiotherapy procedure. Results of the present study revealed an improvement in nurses' knowledge immediately after program

and post three month .Improvement in nurses' knowledge is due to active involvement of nurses in sessions and frequent review of knowledge. Nurses in the present study are interested in educatin and have an active role during implementation program .

Pediatric intensive care unit (PICU) is defined as medical staff and consulting services who are prepared for any medical and surgical diagnosis and/or crisis, and provide a full range of services and interventions for bedridden children. The present study revealed that (3.3%) of studied nurses knew this definition. This finding may be due to that all studied nurses didn't attend any training program concerning this subject. But this result improved after implementation of the training program were above (66%) of studied nurses immediate after program and (33.3%) post three month had complete answer about (PICU) definition. This finding agrees with **Abd El –Aziz (2011)** [6], **Salem (2005)** [5] and **El-Ghalban,(2013)** [9] who mentioned that most of nurses were unaware about meaning of pediatric intensive care unit. Nurses who work in PICU must know what is meant by bed ridden child to know how they assess his needs. **Lane et al.,(2010)** mentioned that the bed ridden child is defined as a child who is confined to bed because of illness or infirmity. The present study revealed that (16.8%) only of studied nurses pre-program had complete answer about bedridden child, this finding may be due to absence of booklets about bed ridden child and all studied nurses had no training program about this subject. While the current study revealed that about two third of studied nurses immediately after program , and about half of them post three month know the meaning of bed ridden child, this finding due to present of booklets about bed ridden child and all studied nurses had training program about this subject. **Ray et al (2009)** [10], defined the bedridden cases as this included all cases above who had been confined to bed for 15 days or more, for 90% of the time during the day and who were unable to get out of bed without assistance .Also **Halar et al (2005)** [8], concluded the bedridden patients have high rates of medical complications and they are needing for formal training for the caregivers as almost of them were untrained .The present study revealed that none of studied nurses before implementation of the program knew the definition of physiotherapy and more than two third of them had wrong answer. This finding may be due to absence of continuous education for nurses about physiotherapy for bed ridden children in intensive care units. Immediately after training program (66.7%),and(40%) of studied nurses mentioned correct answer about physiotherapy for bed ridden child at

PICU. Also **Mackenzie and Ciesla , (20011)** [11] mentioned that the physiotherapy is a health care profession which provides services to patients to develop, maintain and restore maximum movement and functional ability throughout life. This includes providing services in circumstances where movement and function are threatened by aging, injury, disease or environmental factors. Although common apparatus in an ICU includes mechanical ventilator to assist breathing through an endotracheal tube or a tracheotomy opening[3], the present study findings revealed that (16.8%) of studied nurses pre-program,(83.5%) immediately after program, and (40%) post three month had correct answer about definition of ventilator. **Bryan ., (2008)** [4], reported that the ventilator is a machine which mechanically assists patients in the exchange of oxygen and carbon dioxide (sometimes referred to as artificial respiration).

The body of bedridden child at PICU exposed to many complications due to immobilization as, bed sores ,muscles atrophy and joint stiffness.

The current study revealed that none of studied nurses pre-program had correct answer about bed sores' definition. This finding may due to that all studied nurses didn't attend any training program about this subject .These findings agree with **Saad (2002)** [2], who reported that knowledge of nurses about bed sores is very low because they didn't attend any training program . After implementation of training program (50%) of studied nurses, and (30%) post three month had correct answer about bed sores. The present study revealed that working with nurses at PICU to develop chest and musculoskeletal physiotherapy skills for bed ridden children , providing them with appropriate resources and teaching them to recognize the nature of physical therapy are very important element in successful management of bedridden child at PICU. According to **Potter Perry (2006)** [9], who mentioned that the chest physiotherapy is an effective procedure in chronic pulmonary disorders. This is especially helpful for patients with large amount of secretions or ineffective cough. It is performed by professionally trained nurses in most settings[8]. The present study revealed significant improvement in nurses knowledge and practices regarding managing bed ridden children with respiratory diseases. These improvement related to chest physiotherapy as percussion ,vibration, and postural drainage. Immediately after program (90%) of studied nurses , and(66 %) post three month of them had improvement in knowledge and practices of chest percussion compared with (53%)of them at preprogram.

These finding were in agreement with Williams **et al (2012)** [10] who stated that nurses' practice in the positioning of bed ridden patients can be improved through a formal teaching intervention. The present study revealed that significant improvement in nurses' practices regarding managing bed ridden child after the training intervention .This improvement may be due to many factors which are increased nurses' understanding about bedridden child nature and causes of complication and how to manage them, follow up and side effects and how to manage them. Another probable cause that nurses were received information about all issues revealed to bedridden children which lead to reduced complication from long term still in bed without movement .These findings are agreement with Lane et al, **(2007)** [17], who reported that if patient in bed for a long period of time he must get frequent care to his skin and help him change his position. To relieve pressure, help him turn over in bed, help move his arms, legs and body into different positions[11,12],.

The preset study revealed to improvement studied nurses' knowledge about musculoskeletal system complications related to immobilization. 100% of studied nurses immediately after program mentioned feet drop, joints stiffness, muscles atrophy ear erosion and bed sores as musculoskeletal complications for bed ridden patient at PICU. This result compared with 30% of them pre training program mentioned foot drop and none of them reported joints stiffness and muscles atrophy. This significant improvement due to increased nurses' knowledge after training program. This results in agreement with Browning , (2009) [14,24], mentioned that impact of immobilization on the musculoskeletal system where prolonged immobility can cause serious complications if no preventive measures are taken. It may cause amyotrophy (loss of muscle mass) or increase the muscle atrophy caused by neurological conditions, **muscle contractures**, and abnormal postures imposed by the muscles, at the same time, immobilized tendons become weaker. It may cause joint **ankylosis** by the retraction of the ligaments and tendons, and the proliferation of fibrous tissue may cause **compressive neurologic complications**, however the mechnism is still not understood. These complications affect nerves located near the osseous structures (radial nerve for the arm, ulnar nerve for the elbow[15,23].

The range-of-motion exercise programme for bed ridden patient aimed to improving joint flexibility, activity function, perception of pain, and depressive symptoms in a sample of stroke survivors in long-term care[16]. The present study revealed there was significant

correlation between level of nurses' knowledge about physiotherapy at pediatric intensive care unit (PICU) at pre- program, immediate post program and after 3 month. The improvement is due to increased awareness about physiotherapeutic nature and recognizing how to overcome the problems associated with bedridden cases .The education intervention presented facts about the movement of bedridden child who ventilated. that removes false believes which caused the nurses to be mistakes .Nurses more aware of the available services and reassured the bed ridden complication can be avoided if physiotherapeutic techniques is followed correctly .They were assured of the possibility of good prognosis and good future prospects if they manage bed ridden child comprehensively . In addition there was statistical significant correlation between nurses' practice about physiotherapy in PICU at pre- program, immediately post program and after 3 month .These finding were agreement with **Cheng (2007)** [13,22], who illustrated that effective educational intervention with a simple nurses-led range-of-motion exercise programme can generate positive effects in enhancing physical and psychological function of bedridden older patients . Further studies are needed to investigate the long-term effects of the programme in maximizing function, reducing care utilization and enhancing quality of life for this population.Could improve the management of bed ridden through improving knowledge and practices of bed ridden child care giver . In addition findings of **Craig et al ,(2009)** [2], **and Cochrance ,(2007)** [18,21] agree with findings of present study regarding that the level of knowledge and understanding about bed ridden child needs more and more education about bed ridden complication to fill the gaps of misconception and to minimize these complication .Those efforts will lead to improvement of nurses' knowledge and practices related to physiotherapeutic techniques for bedridden children at PICU, and prevent or minimize occur many complication[19,20]

Conclusion :

This study was undertaken to evaluate nurses' knowledge and performance about physiotherapeutic techniques for bed ridden children in PICUs. The present study concluded that pre-program knowledge of nurses about physiotherapeutic techniques in PICUs scored as unsatisfactory, as well as lack in their performance regarding chest physiotherapy (CT) and range of motion (ROM) for bed ridden children. In addition, it was concluded and clarified the prevalence of bed ridden hazards which was detected for patients at PICU.

The training program is effective in increasing nurses' knowledge and practices in implementation physiotherapeutic techniques for bedridden children .There was a significant positive correlation between pre – program nurses' knowledge and practices about physiotherapy, immediately after program and after three month.

Based upon the finding of the present study, the following recommendation can be deduced:

1. Pre- service training program should be conducted for all new nurses who joined the PICUs. The training program should include chest physiotherapy (CT) and range of motion (ROM) exercises for bed ridden children in PICUs.
2. Continuous in-service training programs for the purpose of refreshing and updating the knowledge and performance for nurses working with bedridden children patient in PICUs should be conducted.
3. Manual procedures should be available in each intensive care unit in order to provide the nurses with essential knowledge and guidance for what to know and how to do it, as well as it should be available in Arabic and English language and easy to use.
4. Qualified nurses for bedridden patients in PICUs should be available to provide optimal care.
5. Physiotherapists should be available in every PICU to cooperate and teach to nurses about all ideal physiotherapeutic techniques for bed ridden children.
6. Advices about new technology to reduce complications of immobilization for prevention of foot drop, muscle atrophy and recent machine for chest physiotherapy should be provided.
7. Physiotherapy should be included in the program of study of Faculty of Nursing and educated like other subjects Pharmacology, Microbiology....etc.
8. Periodic guidance and feedback as well as reinforcement for nurses about physiotherapy should be applied.

Recommendation for further researches :

1- Determine the contribution made by the pediatrics nurses related to physiotherapeutic techniques for bedridden patients at PICU.

2- Determine the impact of immobilization on bedridden patients at PICU.

3- Determine the most effective educational intervention for pediatrics nurses about physiotherapy and complications of immobilization.

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