

Improving Nurses' Performance Regarding Physiotherapeutic Techniques for Bed Ridden Children: Nursing Educational Intervention

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Abstract: Physical therapy is a branch of rehabilitative health that use specially designed exercise and equipment's to help pediatric patients regain or improve their physical abilities and to prevent pulmonary complications for them in the pediatric intensive care units. Aim of the study was improve nurses' performance regarding physiotherapeutic techniques for bed ridden pediatric patients. Design: A quasi-experimental was utilized in the current study. Settings: this study was conducted in PICUs at Benha Specialized Pediatric Hospital and Benha University Hospital. Sample: A convenience sample of all available nurses in the previously mentioned settings. Tools of data collection: A structured interviewing questionnaire sheet, Physiotherapeutic techniques checklist and Physiotherapeutic Techniques Attitude Questionnaire (PTAQ). Results: The majority of the studied nurses had good knowledge, competent practice and positive attitudes regarding physiotherapeutic techniques for bedridden children post-educational program intervention compared with pre-educational program intervention. Also, there was a highly statistically significant in the total nurses' knowledge and practice scores regarding physiotherapy for bedridden children post-educational program intervention when compared with pre-educational program intervention. Conclusion: Nurses' performance was improved regarding to physiotherapeutic techniques for bedridden children. Recommendations: Provision of continuing educational programs for nurses working in PICU to improve their knowledge and practice regarding physiotherapeutic techniques for bedridden children.

Keywords: Educational intervention program, nurses, physiotherapy, Pediatric intensive care unit, bedridden pediatric patients.

1. INTRODUCTION

Bedridden children with critical illness in Pediatric Intensive Care Units (PICU) influence on their health status and leads to many complications such as, impaired pulmonary function, greater healthcare utilization, neuromuscular weakness and impairments in both physical function and quality of life are common and may be long-lasting. Also, ineffective positioning and limited mobility contribute to a high incidence of pressure ulcers in both infants and children in PICU (Fuhrman et al., 2017). Pediatric patient when prolonged stay in the intensive care unit and mechanical ventilation causes functional decline and increased morbidity, mortality, cost of care and length of hospital stay. The evidence concerning physiotherapy for intubated pediatric patients receiving mechanical ventilation demonstrating that multimodality physiotherapy may result in short-term improvements in the pulmonary function of Pediatric Intensive Care Unit (PICU) (Gallon, 2018).

Physiotherapy defined as a treatment method that focuses on the science of movement and helps people to restore, maintain and maximize their physical strength, function, motion and overall well-being by addressing the underlying physical issues(Woodbury and Houghton ., 2017).

Physiotherapy in PICU consists of chest physiotherapy, musculoskeletal physiotherapy that known as orthopedic physiotherapy. The treatments that fall under this category focus on restoring function to the musculoskeletal system, including all muscles, joints, tendons, ligaments and bones (**Gomez and Bach., 2017**).

Physiotherapeutic techniques in Pediatric Intensive Care unit (PICU) included chest physiotherapy (CPT) and musculoskeletal physiotherapy. CPT is important to prevent pulmonary complications, this included postural drainage, percussion and vibration. Also, musculoskeletal physiotherapy or regular graded mobilization with proper positioning of children and range of motion exercises, it is important to prevent musculoskeletal complications (**Craig et al., 2018**).

Nurses in PICU provide direct and individualized nursing care to the pediatric patients based on the application of scientific nursing principles. Physiotherapy may be one of the duties of the PICU nurse which requires good training and understanding of its principles. The nurse should be aware of the pediatric patient's diagnosis as well as the lung lobes or segments involved the cardiac status and any structural deformities of the chest wall and spine. Auscultating the chest before and after the procedure helps to identify the areas needing drainage and to assess the effectiveness of treatment (**Patricia et al., 2017**).

Significance of the study:

Prolonged bedridden in the pediatric intensive care unit (PICU) is associated with functional decline and increased morbidity, mortality, cost of care, and length of hospital stay (**Fuhrman et al., 2017**). In Egypt, the incidence of bedridden children in PICUs constituted 35% on the average (**El-Tallawy et al., 2013**). While, the most complication of bedridden children is bedsores which constitute 25% in acute care, 30% in non-acute care, 22% in mixed health-care setting and 15% in community care (**Woodbury and Houghton., 2017**). Therefore this study aimed to improve nurses' performance regarding physiotherapeutic techniques for bed ridden children.

RESEARCH Hypothesis

Nurses' performance was improved after applying the nursing educational intervention.

2. SUBJECTS AND METHOD

Research Design

A quasi-experimental research design was used to carry out this study.

Research Setting

The current study was carried out at Pediatric Intensive Care Units at Benha University Hospital and Benha Specialized Pediatric Hospital

Subjects

Two subjects were included in the study: the subjects consisted of two types of sample.

Sample (I): A convenient sample of all available nurses (n=60) who were working at the previously mentioned settings (28 nurses at Benha University Hospital and 32 nurses in Benha Specialized Pediatric Hospital) regardless their level of education, years of experience and personal characteristic.

Tools of data collection

Data were collected by using the following tools:

Tool I: A structured interviewing questionnaire sheet. It was developed by the researcher after reviewing the related literatures and written in a simple Arabic language. It consisted of two parts: **Part I: Personal data of studied nurses:** which included; age, educational level, years of experience, place of work and previous training program regarding physiotherapy. **Part II: Nurses' knowledge questionnaire regarding to musculoskeletal physiotherapy, respiratory diseases and chest physiotherapy,** it was developed by the researcher based on review of literature ,in the form of multiple choice questions , this part was classified into:

A: Nurses' knowledge regarding to musculoskeletal deformities and bedridden children , it consisted of 8 questions in the form of multiple questions which included ; definition of bedridden child, the factors that cause musculoskeletal deformities to child, causes of bed sores for bedridden child, types of musculoskeletal system deformities for bed ridden child, the sites of bedsores for bedridden child, the complication of bedridden child , the universal precautions and prevention of the complications for bedridden child, the types of range of motion exercises.

B: Nurses' knowledge regarding respiratory diseases, it consisted of 4 questions in the form of multiple questions which included; indication of chest physiotherapy, causes of collecting the secretions , signs and symptoms of collecting secretions and the effects of secretion collection in respiratory system.

C:Nurses' knowledge regarding to chest physiotherapy and it's technique ,it consisted of 5 questions in the form of multiple questions which included; definition of chest physiotherapy, importance of chest physiotherapy ,techniques of chest physiotherapy (types or methods of chest physiotherapy techniques , the periods of chest physiotherapy for children) , the position of child in pediatric intensive care unit and appropriate position for children to facilitate the diversion of accumulated lung secretions.

Score system:

The studied nurses' answers were compared with model key answers, where scored as two points for correct and complete answer, one point for correct and incomplete answer and zero for incorrect or don't answer. Accordingly, the total knowledge score which was classified as the following:

Satisfactory: $\geq 80\%$ of total knowledge score.

Unsatisfactory : $< 80\%$ of total knowledge score.

Tool II: An observational checklist sheet: it was adopted from **Wheeler and Shnley, (2016)** to assess nurses' practices regarding pediatric chest and musculoskeletal physiotherapy which including; 9 steps for postural drainage, 10 steps for percussion, 9 steps for vibration, range of motion (ROM) exercises for all body parts such as; 4 steps for neck, 5 steps for shoulders, 2 steps for elbow, 2 steps for forearm, 2 steps for wrist, 5 steps for fingers, 5 steps for thumb, 7 steps for hip, 2 steps for knee, 2 steps for ankle, 4 steps for toes and 8 steps for feet, 6 steps for moving & positioning and 16 steps for back rub.

Scoring system:

Total of nurses' practice score was developed by the researcher. Each item was checked as two point for done and correct, one point for done incorrectly and zero for not done According the total practice score which was classified as the following:

Competent: $\geq 80\%$ of total performance score.

Incompetent : $< 80\%$ of total performance score.

Tool III: Physiotherapeutic Techniques Attitude Questionnaire (PTAQ): It was adapted from **Halar and Bell (2017)** and was translated into Arabic language by the researcher to assess Nurses' attitude regarding physiotherapeutic techniques for bedridden children.

Scoring System:

The PTAQ has a three point Likert-type scale ranging from 1 (agree), 2 (neutral) and 3 (disagree). An overall score of the PTAQ was a calculation of the mean of responses from all items. Total attitude score was classified as the following:

Negative attitude when the total score was less than 60%.

Neutral attitude when the total score was 60% to less than 75%.

Positive attitude when total score was 75% to 100%.

Validity and Reliability:

Tools of data collection were investigated for their content validity by three experts in the field of Pediatric Nursing, Benha University, one expert was professor in pediatric nursing and other two experts were assistant professor in pediatric

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nursing. The experts reviewed the content of the instruments and to judge its clarity, relevance, comprehensiveness, simplicity and applicability. This phase took around one month (April 2019) and there was no change in tools at the end of this phase except arrangement of some questions in tool.

Testing reliability of proposed tool was done using the Chronbach's Alpha coefficient test to measure the internal consistency of the tools. It was found that, the reliability for the structured questionnaire sheet for assessment of nurses' knowledge was ($\alpha = 0.842$) and for the observational checklist used to assess nurses' practice regarding to physiotherapeutic technique was ($\alpha = 0.894$).

Ethical consideration and human rights:

The researcher explained the aim, nature and expected outcomes of the study to the studied nurses before their participation in order to obtain their acceptance. The studied nurses were informed that the study was harmless and all the gathered data were confidential and were used for the research purpose only. The studied nurse's participation in the study was voluntary and nurses were informed that they had the right to withdrawal from the study at any time. An oral consent was taken from studied nurses who accepted to participate in the study.

Pilot study:

A pilot study was done on 10% (6 nurses of total sample size and 4 bedridden children) to test clearness and applicability of the study tools and to assess the time required for fulfilling the tools. No radical modifications were done according to the results of pilot study. Participants involved in the pilot study were included in the study sample; this phase took around one month (May 2019).

Field of work:

The following phases were adopted to achieve the aim of the current study; assessment, planning, implementation and evaluation phases. These phases were conveyed from the earliest starting point of June 2019 to the end of February 2020 covering 9 months.

Assessment phase

This phase involved interviews with nurses to collect baseline data. The researcher was available four days/week; (Saturday, Monday, Tuesday and Thursday) during morning shift (from 8.00 am to 11 am hour) & afternoon shift (from 3 pm to 6 pm hour). Data was obtained from average number 2-3 nurses per /day. At the beginning of interview; the researcher welcomed each nurse, explained the purpose, duration and activities of the study and took written consent from nurses. After that, pre-test was done using the study tools. The time required for finishing each tool was around (30-45 minutes).

Planning phase

Based on baseline data obtained from pre-test assessment and relevant review of literature, the educational intervention program was developed by the researcher.

General objective of the nursing educational intervention:

The nursing educational intervention aimed to improve nurses' performance regarding to physiotherapeutic techniques for bedridden children in PICU.

Specific objectives:

At the end of nursing educational intervention sessions, the nurses working in PICUs will be able to:

- Explain the anatomical structure of respiratory and musculoskeletal system.
- Identify the complications of respiratory and musculoskeletal system occurring for bedridden children.
- Recognize the preventive measures of respiratory and musculoskeletal complications.
- Demonstrate the chest percussion for bedridden children in PICU.

- Demonstrate the chest vibration for bedridden children in PIC.
- Demonstrate the postural drainage for bedridden children in PIC.
- Demonstrate the technique of musculoskeletal physiotherapy including ROM exercises.
- Demonstrate the technique of musculoskeletal physiotherapy including moving and positioning technique.
- Demonstrate the technique of musculoskeletal physiotherapy including back rub technique.
- Describe how to assess the health status for bed ridden children in PIC.

C- Implementation phase:

At first, the nurses were informed about the time and place of sessions that were carried out at the PICU. Program was implemented through sessions. The studied nurses were divided into 10 groups each group consisted of 6 nurses, the program intervention has taken 9 sessions (13 hours) for each group, distributed as the following; (3) session for theoretical part and (6) session for practical part. The time of each session was ranged from 30-45 minutes, 4 days/week in the morning shift and were implemented according to nurses readiness. These sessions were repeated to each subgroup of nurses. **Theoretical part as the following;** the **first session** of program included Anatomy and functions of respiratory and musculoskeletal system, **second session** included Causes and definition of respiratory and musculoskeletal system complications occurring to bedridden children., **third session** included the preventive measures for the respiratory and musculoskeletal systems complications. As regards the **Practical part ,it was classified as the following;** **first session** included role of nurse in physiotherapeutic techniques for bedridden children at PICU including: Chest percussion for children in PICU., **second session** included Methods of chest vibration for bedridden children in PICU., **third session** included postural drainage for bedridden children in PICU ,then **fourth session** included Techniques of musculoskeletal physiotherapeutic including ROM exercises, **fifth session** focused on the techniques of musculoskeletal physiotherapeutic including moving and positioning technique, and **six session** included The techniques of musculoskeletal physiotherapeutic including back rub technique and the assessment of the health status for bed ridden children such as: skin health, if child have(bedsores , arthritis, respiratory status after chest physiotherapy and any deformities), child's conscious degree , vital signs for bedridden children and total hospital charges .

Teaching strategies & teaching methods and media are:

1. Educational session about chest and musculoskeletal physiotherapy.
2. Training session including teaching and learning methods that was lecture, video, power point presentation, and book hand out.

D- Evaluation phase:

After program implementation, the post test was carried out to assess nurses' performance regarding physiotherapeutic techniques for bedridden children by using the same pretest format.

Follow up test (Same pre, posttest) after one month to evaluate nurses' performance and evaluate the outcome of the intervention on the studied bedridden children in PICUs, using the pediatric assessment sheet.

III- Administrative design:

An official letter was issued from the Dean of Faculty of Nursing, Benha University, administrators and head of units of the previously mentioned settings to obtained their approval and cooperation which is needed for conducting this study. A clear explanation was given about the nature, importance and expected outcomes of the study.

IV-Statistical design:

The collected data were organized, coded, computerized, analyzed and tabulated by using electronic computer and Statistical Package for Social Sciences (SPSS) version 20, which used frequencies and percentages for qualitative descriptive data and chi square coefficient (χ^2) was used relation tests, mean and standard deviation was used for quantitative data, person correlation coefficient (r) was used for correlation analysis. Paired t- test.

A significant level value was considered when:

- P-value < 0.001 was considered as highly statistically significant.
- P-value < 0.05 was considered statistically significant.
- P-value > 0.05 was no statistically significant difference.

3. RESULTS

Table (1) demonstrates distribution of the studied nurses according to their personal data. This table shows that, nearly half (48.3%) of the studied nurses' aged ≥ 30 years with Mean \pm SD 29.35 \pm 7.92 years. Regarding to their educational qualification half (50%) of them had graduated from technical institute of nursing. While, more than half (56.7%) of the studied nurses had more than 9 years of experience with Mean \pm SD 8.35 \pm 2.25.

Figure (1) shows that, nearly three quarters (73.3%) of the studied nurses didn't attend any previous training courses regarding physiotherapy for bedridden children at PICU.

Table (2) represents that, more than half of the studied nurses (60.0%) had unsatisfactory level of knowledge regarding physiotherapeutic techniques pre-intervention. While, more than three quarters (76.7%) of them had satisfactory level of knowledge post- intervention compared with (73.3%) of them at follow up. The table represents a highly statistical significant between pre and post program of total nurses' knowledge level (P< 0.001) between their level of knowledge pre& post and follow up.

Table (3) represents that, two third of the studied nurses (66.7%) had incompetent level of practice regarding physiotherapeutic techniques pre-intervention. While, the majority of them (83.3%) of them had a competent level of practice post- intervention compared with 75.0% of them at follow up. The table represents a highly statistical significant (P< 0.001) between their level of practices pre& post and pre& follow up.

It is evident from table (4) that, there was a highly statistical significant as regard nurses' attitude pre and post program (p< 0.001). Also, there was statistical significant difference as regard their attitude pre and follow up program (p<0.001).

Table (5) reveals that, there was a positive correlation between total nurses' knowledge, practice and attitude scores pre intervention (P \leq 0.001) regarding physiotherapy.

Table (6) reveals that, there was a positive correlation between total nurses' knowledge, practice and attitude scores post intervention (P \leq 0.001) regarding physiotherapy

Table (7) shows positive correlation and significant between nurses knowledge, practice and attitude regarding physiotherapy in follow-up intervention.

Table (1): Distribution of the studied nurses according to their personal characteristics (n=60).

Items	No.	%
Age (years)		
<20	4	6.7
20-<25	9	15.0
25-<30	18	30.0
≥ 30	29	48.3
Mean \pm SD 29.35\pm7.92 years		
Educational qualification		
Secondary school nursing education	14	23.3
Technical institute of nursing	30	50.0
Bachelor degree in nursing science	14	23.3
Post graduate in nursing science	2	3.3
Years of experience in PICU		
<3	10	16.7
3-<6	4	6.7
6-<9	12	20.0
≥ 9	34	56.7
Mean \pm SD 8.35\pm2.25 years		

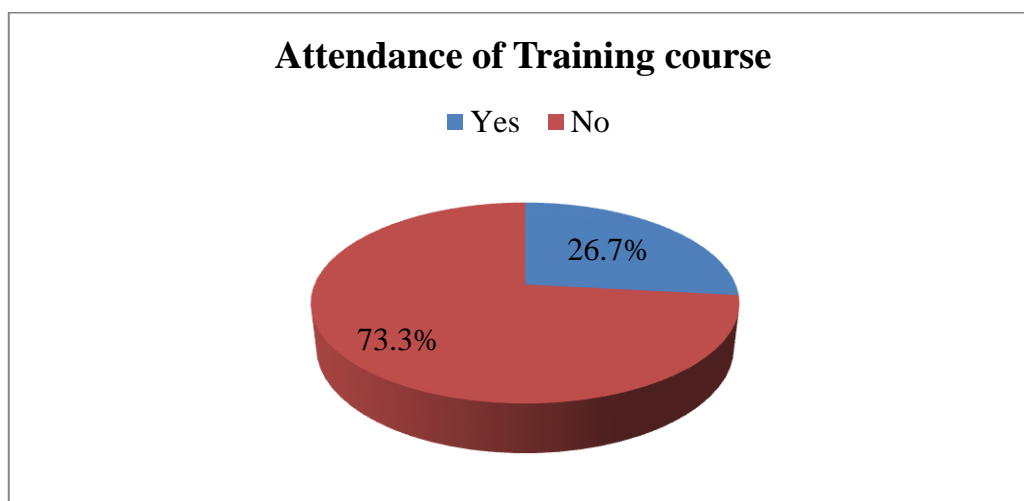


Figure (1): Distribution of the studied nurses according to their attendance of training courses.

Table (2): Distribution of studied nurses according to their total score knowledge regarding chest and musculoskeletal physiotherapy (pre, post and follow up intervention) (n=60)

Level of Knowledge	Pre (n = 60)		Post (n=60)		Follow Up (n = 60)		Pre & Post		Pre & Follow Up	
	No.	%	No.	%	No.	%	X ²	p-value	X ²	p-value
Satisfactory ≥80%	24	40.0	46	76.7	44	73.3	21.244	<0.001**	18.057	<0.001**
Unsatisfactory <80%	36	60.0	14	23.3	16	26.7				

p-value >0.05 NS; p-value <0.001 HS

Table (3): Distribution of studied nurses according to their total level practice regarding physiotherapeutic technique (n=60).

Level of practice	Pre (n= 60)		Post (n= 60)		Follow Up (n = 60)		Pre & Post		Pre & Follow Up	
	No.	%	No.	%	No.	%	X ²	p-value	X ²	p-value
Competent ≥80%	20	33.3%	50	83.3%	45	75.0%	37.324	<0.001**	31.725	<0.001**
Incompetent <80%	40	66.7%	10	16.7%	15	25.0%				

p-value >0.05 NS; **p-value <0.001 HS

Table (4): Distribution of the studied nurses according to their total level of attitudes regarding physiotherapeutic techniques for bedridden children (pre, post and follow up intervention) (n=60).

Total practice level of attitude	Pre (n = 60)		Post (n=60)		Follow Up (n = 60)		Pre & Post		Pre & Follow Up	
	No.	%	No.	%	No.	%	X ²	p-value	X ²	p-value
Negative Attitude < 60%	20	33.3	8	13.3	10	16.7	13.720	<0.05*	11.662	<0.05*
Neutral Attitude 60%-75%	10	16.7	4	6.7	6	10.0				
positive Attitude >75%	30	50.0	48	80.0	44	73.3				

p-value >0.05 NS; p-value <0.05 S; p-value <0.001 HS.

Table (5): Correlation between nurses’ knowledge, attitude and practice regarding physiotherapeutic techniques in pre-intervention (n=60).

Items		Total score knowledge	Total score of practice	Total score of Attitude
Total score knowledge	r		.639**	.479**
	p-value		0.000	0.000
Total score of Attitude	r	.479**	.480**	
	p-value	0.000	0.000	
Total score of practice	r	.639**		.480**
	p-value	0.000		0.000

r-Pearson Correlation Coefficient; **p-value <0.01

Table (6): Correlation between nurses’ knowledge, attitude and practice regarding physiotherapy in post-intervention (n=60).

Items		Total score knowledge	Total score of practice	Total score of Attitude
Total score knowledge	r		.705**	.755**
	p-value		0.000	0.000
Total score of Attitude	r	.755**	.751**	
	p-value	0.000	0.000	
Total score of practice	r	.705**		.751**
	p-value	0.000		0.000

r-Pearson Correlation Coefficient; **p-value <0.01

Table (7): Correlation between nurses’ knowledge, attitude and practice regarding physiotherapy of in follow-up intervention (n=60).

Items		Total score knowledge	Total score of practice	Total score of attitude
Total score knowledge	r		.742**	.767**
	p-value		0.000	0.000
Total score of Attitude	r	.767**	.825**	
	p-value	0.000	0.000	
Total score of practice	r	.742**		.825**
	p-value	0.000		0.000

r-Pearson Correlation Coefficient

**p-value <0.01

4. DISCUSSION

Physical therapy for bedridden children assists in early detection of health problems and uses a wide variety of modalities to treat disorders in the pediatric population. Treatments focus on improving gross and fine motor skills, balance and coordination, strength and endurance as well as cognitive and sensory processing/ integration (Delisa, 2016).

The study aimed to improve nurses’ performance regarding physiotherapeutic techniques for bed ridden children.

Regarding age of the studied nurses (table 1), the present study revealed that, nearly half of the studied nurses' age was ≥30 years. This result disagreed with Mahmoud, (2013) in study entitled "Physiotherapeutic Technique Performed by Nurses to children in Intensive Care Units" who found that, three quarters of the studied nurses aged less than 20 years. From the researcher points of view, the difference in the findings may be related to the difference in the study subjects and setting.

As regards the educational level of the studied nurses (table 1), the current study illustrated that, half of the studied nurses graduated from technical institute of nursing. This finding agreed with the result of the study done by **Ali, (2015)** in a study entitled "knowledge versus their Performance in Caring for Neonates having Respiratory distress syndrome", who found that, more than half of the studied nurses had graduated from technical institute of nursing

Concerning years of experience of the studied nurses (table 1), the current study indicated that, more than half of nurses had more than 9 years of experience with (Mean±SD8.35±2.25 years) . This result was in accordance with **Abd El- Aziz, (2015)** in a study entitled "Assessment of Nursing giving to Children under Mechanical Ventilation" who found that the majority of the studied nurses had 9 years of experience.

The current study reflected that, nearly three quarters of the studied nurses (figure 1), didn't attend training courses related to physiotherapeutic techniques. This finding was supported with **Ahmed, (2017)** who conducted a study to assess Nurses' Knowledge versus their Performance regarding Chest Physiotherapy for Children in Pediatric Intensive Care Units and found that the majority of the studied nurses didn't attend training courses related to chest physiotherapeutic technique. From the researcher points of view, lack of providing educational programs intervention about physiotherapeutic techniques for the studied nurses affected on lack of nurses' performance for bedridden children.

Regarding total score of the studied nurses' knowledge (table 2), the current study represented that, more than half of the studied nurses had unsatisfactory level of knowledge regarding physiotherapeutic techniques pre-intervention this increased to more than two thirds of them had satisfactory level of knowledge post- intervention. These results agreed to **Ali, (2017)**, who reported that, nearly one third of studied nurses had poor knowledge score in the pre-test before the intervention and more than two thirds of them had good knowledge score in the post-test after the intervention (P = 0.000). From the researcher point of view, poor knowledge level of the studied nurses in pre-educational intervention might be due to lack of opportunity for attending workshops, training courses and guideline booklet availability regarding physiotherapeutic technique in the hospital. On the other hand, the majority of the studied nurses had good knowledge level post-educational intervention. This could be attributed to the program content which was developed based on nurses' needs regarding care of bedridden children. The positive change in the total score of nurses' knowledge indicates that the educational intervention was effective in improving nurses' knowledge in relation to physiotherapeutic technique in PICU.

Regarding total score of the nurses' practice regarding physiotherapeutic techniques (table 3), the current study reflected that, two thirds of the studied nurses had an incompetent practice score regarding intervention. This increased to the majority of them had a competent practice post intervention (P< 0.001). These results were in accordance to some extent with **Ali, (2017)** entitled " Enhancement of Nurses Performance Regarding Physiotherapeutic Techniques Provided to Children in the Pediatric Intensive Care Units" who found that, more than half of the studied nurses was fair before the educational program. While, the total practice score of all nurses was good immediately after the educational program. From the researcher point of view, incompetent total level of practice regarding physiotherapeutic techniques before the intervention may be attributed to decline of nurses' knowledge, limited resources & training related to care the bedridden children in pediatric intensive care units. On the other hand, majority of them had a competent total level of practice score post-educational program intervention. This may be related to the educational sessions and the frequent demonstration of the related procedures during the period of the study.

As regards the nurses' attitudes in relation to physiotherapeutic techniques (table 4), it was noticed, a highly improved significant difference in their attitudes regarding physiotherapy post-educational program intervention, compared with pre-educational program intervention. This finding was supported by **Emmah et al., (2016)**, in a study entitled "Systematic review of Physiotherapy Interventions to Improve Gross motor Capacity and Performance in Children and Adolescents with Acquired Brain Injury" who revealed that, more significantly positive nurses' attitude regarding physiotherapy management after the intervention.

Concerning correlation between total nurses' knowledge & practice and attitude scores regarding physiotherapeutic techniques for bed ridden children (table 5&6 and 7), the current study showed that, there was a positive correlation between total nurses' knowledge & practice and attitude scores in pre &post and follow up the intervention (P≤ 0.001). This result agreed with the study done by **Al fadil, (2017)** in a study entitled "Knowledge ,attitudes and practices regarding physiotherapy management of patients admitted to Intensive Care Units in Khartoum state " who reported that,

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there was a positive correlation between total nurses' knowledge, attitude and practice scores in before & immediately after intervention and follow up the intervention ($P \leq 0.001$) regarding physiotherapy for pediatric patient.

From the researcher point of view, improve in nurses' knowledge lead to improvement in their practice and attitude. Education and training of the staff nurses on the practice of physiotherapeutic technique for bedridden children are fundamental tools in preventing and minimizing the complications of bedridden children in pediatric intensive care units.

5. CONCLUSION

Based on the findings of the current study, it was concluded that: The nursing educational program was effective in improving nurses' knowledge and practice regarding physiotherapeutic techniques .In addition, the current study revealed that, there was a positive correlation between total knowledge, practice and attitude of nurses' performance regarding physiotherapeutic technique after the implementation of the study.

6. RECOMMENDATION

Based on the results of the current study, it was recommended that,

1. Implementation of educational programs based on reduction the complication of bedridden children should be included in hospital policy.
2. Provision of continuing educational programs for all nurses working in PICU for updating their knowledge and practices regarding physiotherapeutic techniques for bedridden children.
3. Further studies about physiotherapeutic techniques performed by nurses to children in Pediatric Intensive Care Units at different settings.
4. Increase compliance with the established protocols on reduction of bedridden children complications in pediatric intensive care units should be discussed and updated on a regular basis.
5. Designing and distributing a manual procedures booklet to all nurses who were working in PICU including standards of physiotherapy techniques for bedridden children.

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