



## Original Article

# Nurses' Practice regarding Chest Physiotherapy in the Intensive Care Unit

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### Abstract:

**Background:** Chest physiotherapy has long been a cornerstone of respiratory care in the ICU, aimed at improving pulmonary function and preventing complications in critically ill patients. In the Intensive Care Unit, nurses are integral to the successful implementation of chest physiotherapy. Nurses are required to perform correct and advanced protocols to ensure the success of the procedure, clear the chest of secretions, and improve oxygenation to ensure patients' comfort and safety.

**Objective:** This study aims to assess nurses' practice regarding chest physiotherapy and its relationship with demographic characteristics.

**Methodology:** A quantitative observational design was used in this study from December 2024 to April 2025. a non-probability (purposive) sampling technique was utilized to collect data in intensive care unit at Kirkuk teaching Hospital and Azadi Teaching Hospital in Kirkuk City, Iraq. The study included (77) nurses. The researcher established an observational checklist to collect data about the chest physical therapy practices of nurses. To ensure the validity of the tool, the questionnaires were sent to a panel of ten experts in different specialties, and the questionnaires were modified according to the experts' instructions. The study's findings were analyzed utilizing statistical data analysis methods in the Statistical Package (SPSS) version 22.0. Frequencies, percentages, mean score (MS), and standard deviation (SD) are utilized in the descriptive analysis of data. Inferential data analysis is employed to derive logical inferences.

**Results:** Results show that the majority of the nurses are in the age category of 25-29 years old; also, most of the nurses are female. The nurse's practices of the "Pre Chest-Physiotherapy Procedure" were assessed at a moderate level (49.82%). Concerning "Chest Percussion and Vibration Technique, results showed that (40.44%) had assessed a moderate level. Also, "active cycle of breathing technique and incentive spirometer" results showed that (28.10%) had assessed at a low level. Finally, the finding of the study shows that the nurses' practices had a highly significant relationship with nurses' age, experience in the intensive care unit, and marital status.

**Conclusions:** The majority of the nurses demonstrated a moderate level of proficiency in chest physiotherapy practices. And there are relationships between nurses' practices concerning chest physiotherapy and nurses' age, experience in the intensive care unit, and marital status.

**Keywords:** Intensive Care Unit – Nurse - Practice - Chest Physiotherapy

**Introduction:**

Chest physical therapy is one of the most effective physical therapy methods for improving pulmonary efficacy, strengthening pulmonary muscles, promoting lung expansion, and removing secretions from the pulmonary system to avoid aspiration pneumonia. The primary goal of chest physical therapy is to make patients breathe easier so their bodies get more oxygen (Ullah et al., 2023). Chest physiotherapy (CPT) is a group of treatments aimed at improving respiratory efficiency, increasing lung expansion, strengthening respiratory muscles, and removing secretions from the respiratory tract (Mohamed et al., 2019). Chest physiotherapy is a method that includes clearing secretions from both major and minor airways and unventilated lung expansion (Chest Physiotherapy, 2021). Respiratory infections that lead to the buildup of secretions in the airway exacerbate clinical symptoms and cause increased airway resistance with each breath (Chaves et al., 2019). Critically ill patients in intensive care units and respiratory care units are more susceptible to several complications. Due to their health problems and prolonged immobility, such as respiratory problems or physical deconditioning. Chest physical therapy approaches are beneficial for RCU and ICU patients and recommended by guidelines, according to growing amounts of research, in addition to being safe and achievable (Shpata et al., 2021). In the intensive care unit, respiratory physiotherapy is crucial for preventing or reducing all of these pulmonary problems (Goñi-Viguria et al., 2018). Early application of chest physical therapy after patients are admitted to critical units can benefit patients as well as prevent or decrease certain complications related to respiratory care units and intensive care units (Elamia et al., 2020). In the intensive care unit (ICU), chest physical therapy (CPT) is considered an effective technique for lowering respiratory problems, helping to clear airways, and shortening hospital stays. Though chest physical therapy is still uncommon in intensive care units. One of the most common problems among critically ill patients in the intensive care unit (ICU) is

dysfunction in the respiratory system (Connolly B, et al., 2020). In intensive care units, critically ill patients often remain in bed. This leads to general deterioration, which affects the respiratory system as well as other body systems. As the most common cause of hospital morbidity, pulmonary problems are therefore a major concern for patients in intensive care units. Reduced lung volumes and expiratory airflow rate, weakened respiratory muscles, decreased lung and chest wall compliance, and compromised gas exchange are common complications subsequent to bed rest (Malone DJ et al., 2020). Complications include secretion retention, atelectasis, ventilator-acquired pneumonia, restricted lung expansion, increased respiratory effort, ventilation-perfusion mismatch, inspiratory muscle weakness, and weaning failure are always possible for intensive care unit patients (Spapen HD et al., 2017). Nurses utilize several types of techniques to treat lung problems, such as suctioning, breathing exercises, and postural drainage. The diagnosis and general health of the patient determine the therapy to be performed (RNspeak, 2020). In the intensive care unit, nurses play a critical role in providing suctioning therapies and chest physical therapy, which enhance respiratory function and prevent respiratory complications. In critical care settings, nurses have a variety of responsibilities that include assessment, intervention, education, and evaluation. Their roles allow them to provide evidence-based care, tailored to each patient's individual needs. Ultimately, this leads to better outcomes and higher-quality treatment (Melnyk & Fineout-Overholt, 2019). Thus, the purpose of this study is to assess nurses' practice concerning chest physiotherapy in hospitals in Kirkuk City, Iraq.

**Subject (Material and Methods):**

A quantitative observational design had been used through the present study with the application of the approach for the participant group during the period from December 2024 to April 2025. The study was conducted in intensive care units at Kirkuk Teaching Hospital and Azadi Teaching Hospital in Kirkuk City, Iraq.

To ensure a representative sample, a non-probability sampling method (Purposive

sampling) was employed. Specifically, a total of 77 nurses were selected as the study sample size based on the subsequent sampling method. The researcher constructed an observational checklist form to gather data on nurses' practices of chest physiotherapy.

The tool consists of three parts: the first part is socio-demographic characteristics, which contain four items, which are age, gender, marital status, and educational level; the second part is professional background, which contains three items, which are experience in intensive care, working shifts, and participating in chest physiotherapy training; and the third part is nurses practices, which contains 33 items that are subdivided into three subdomains: pre chest-physiotherapy procedure, chest percussion and vibration technique, and active cycle of breathing technique and incentive spirometer.

To ensure the validity of the tool, the observational checklist was sent to a panel of ten experts in different specialties, and the

observational checklist were modified according to the experts' instructions.

After that, the reliability of the tool was achieved to determine the reliability of the research tools and confirm the clarity & adequacy of the instrument structure through subjects' understanding and to determine the required modifications; the reliability of the study was 0.94.

Following approval by the relevant hospital authorities, the data were collected through the constructed questionnaire and checklist technique; each checklist is carried out individually and took approximately 40-60 minutes. The checklist items are evaluated using three classification scales: Not Perform, Partially Perform, and Completely Perform. The study's findings were analysed utilizing statistical data analysis methods in the Statistical Package (SPSS) version 22.0. Frequencies, percentages, mean score (MS), and standard deviation (SD) are utilized in the descriptive analysis of data. Inferential data analysis is employed to derive logical inferences.

**Results:**

**Table 1: distribution of socio-demographic characteristics of studied sample (n=77)**

Socio-demographic	Classes	No.	%
Age in years	20 - 24	17	22.1
	25 - 29	52	67.5
	30 - 35	8	10.4
	Mean ± SD	26.2± 2.56	
Gender	Male	25	32.5
	Female	52	67.5
Marital Status	Single	41	53.2
	Married	36	46.8
Educational Level Status	Diploma	2	2.6
	Bachelor	74	96.1
	Master'	1	1.3

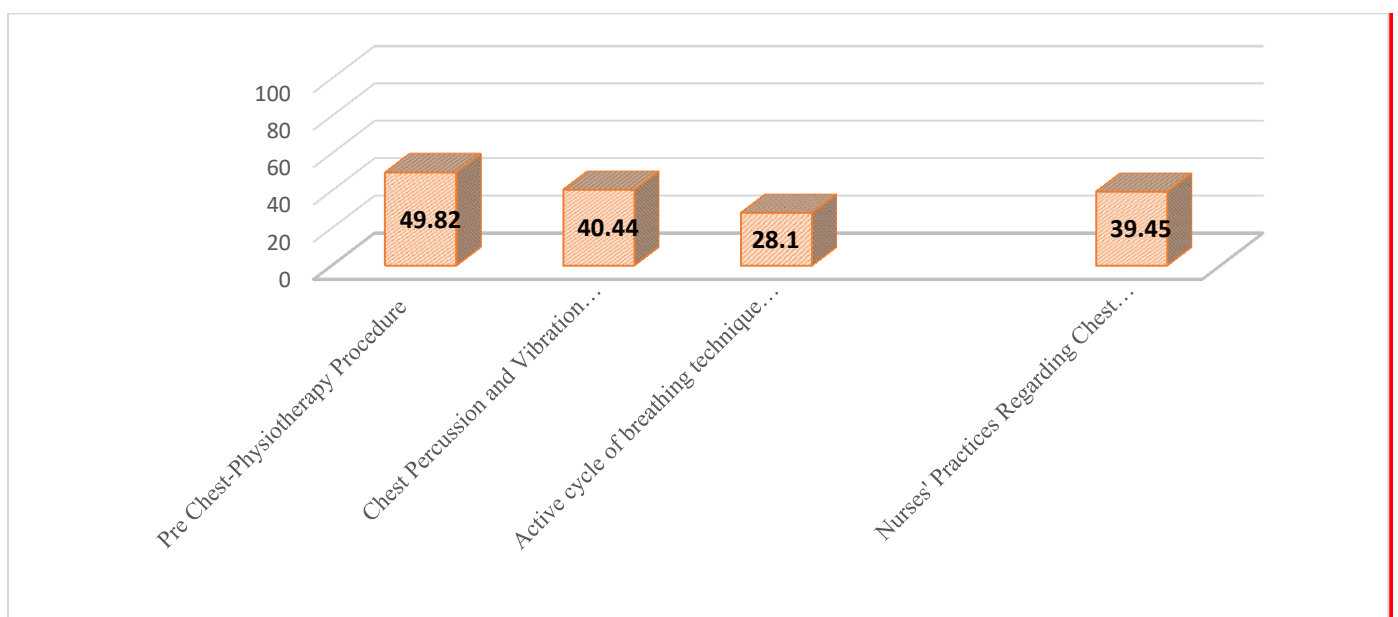
**Table 2: Distribution of the studied sample professional background**

Professional background	Classes	No.	%
Experience in Intensive Care	1 _ 2	58	75.3
	3 _ 4	13	16.9
	> 4 yrs.	6	7.8
Working Shifts	Morning	31	40.3
	Evening	46	59.7
	Total	77	100
Have you participated in chest physiotherapy training?	No	58	75.3
	Yes	19	24.7

**Table 3: Nurses' practices regarding of Chest Physiotherapy**

Sub & Main Domains	No.	Min.	Max.	PGM S	PPS E	PPS D	Ev.
Pre Chest-Physiotherapy Procedure	77	9.09	90.91	49.82	2.61	22.91	M
Chest Percussion and Vibration Technique	77	4.55	86.36	40.44	2.54	22.30	M
Active cycle of breathing technique and Incentive Spirometer	77	4.55	68.18	28.10	1.79	15.67	L
Nurses' Practices Regarding Chest Physiotherapy 's main domain	77	9.09	78.79	39.45	2.15	18.91	M

Ev.: Evaluated by: (0.00 – 33.33) Low (L); (33.34 – 66.66) Moderate (M); (66.67– 100) High (H).



**Figure 1: Grand mean of score concerning nurses' practices regarding chest physiotherapy**

**Table 4: Relationships between 'Nurses' practices regarding Chest Physiotherapy and their socio-demographic variable**

Socio-Demographical Characteristics variables	Groups	Practices				C.S. P-value
		Under		Upper		
		No.	%	No.	%	
Gender	Male	15	35.7	10	28.6	CC = 0.076 P=0.505 NS
	Female	27	64.3	25	71.4	
	Total	42	100	35	100	
Age Groups	20_24	17	40.5	0	0.00	CC = 0.466 P=0.000 HS
	25_29	24	57.1	28	80	
	30_35	1	2.4	7	20	
	Total	42	100	35	100	
Educational Level	Diploma	1	2.4	1	2.9	CC = 0.126 P=0.538 NS
	Bachelor	41	97.6	33	94.3	
	Master	0	0.00	1	2.9	
	Total	42	100	35	100	
Marital Status	Single	27	64.3	14	40	CC = 0.236 P=0.033 S
	Married	15	35.7	21	60	
	Total	42	100	35	100	

(\*) HS: High Sig. at P<0.01; S: Sig. at P<0.05; NS: Non-Sig. at P>0.05; Testing is based on a contingency coefficient.

**Table 5: Relationships between 'Nurses' practices regarding Chest Physiotherapy and their professional background**

Professional background	Groups	Practices				C.S. P-value
		Under		Upper		
		No.	%	No.	%	
Hospitals	Azadi Teaching	27	64.3	25	71.4	CC = 0.076 P=0.505 NS
	Kirkuk Teaching	15	35.7	10	28.6	
	Total	42	100	35	100	
Working Shifts	Morning	15	35.7	16	45.7	CC = 0.101 P=0.373 NS
	Evening	27	64.3	19	54.3	
	Total	42	100	35	100	
Experience in Intensive Care Yrs.	1_2	41	97.6	17	48.6	CC = 0.494 P=0.000 HS
	3_4	1	2.4	12	34.3	
	> 4 yrs.	0	0.00	6	17.1	
	Total	42	100	35	100	
Have you participated in chest physiotherapy training?	No	32	76.2	26	74.3	CC = 0.022 P=0.847 NS
	Yes	10	23.8	9	25.7	
	Total	42	100	35	100	

(\*) HS: High Sig. at P<0.01; S: Sig. at P<0.05; NS: Non-Sig. at P>0.05; Testing is based on a contingency coefficient.

## Discussions:

### Socio-demographic and professional background characteristics:

Two-thirds of the studied samples are from the second age category (25–29 years). According to the report, this is due to the workload in these places. From the researcher's perspective, younger nurses prefer working in intensive care units and are enthusiastic about their work and willing to learn. In contrast, older nurses prefer less stressful jobs. The results of the current study agree with a study conducted in the intensive care unit at Kirkuk Teaching Hospital in Kirkuk city, Iraq, which revealed that the age group of (25–29) was the most common among the different age groups participating in the study (Raof & Baez, 2024).

Regarding of "Gender" variable, most of studied nurses' staff are female, and they are accounted 52(67.5%). These results are due to the policy of the Iraqi government's Ministry of Higher Education and Scientific Research to admit the highest number of female students into nursing colleges/Iraqi universities. For this reason, most of the nurses are female. The study conducted in the intensive care unit at Azadi Teaching Hospital in Kirkuk city, Iraq was conducted by (Rasheed & Baez, 2024), and this study agrees with the researcher's study as it showed that most nurses are female.

Marital status had distributed similarly between those of a single and married marital status, since they are accounted 41(53.2%), and 36(46.8%) respectively. The result finding is similar to a descriptive study conducted by (Yassen & Ahmed, 2023) in Al-Hussein teaching hospitals in Dhi-Qar/Iraq, which states that the percentage of single nurses was 48.8% and married nurses was 51.2%.

Concerning the level of education of nurses, almost all (96.1%) had achieved a college level. According to the decision of the Iraqi Ministry of Health, nurses working in intensive care units must have at least a bachelor's degree. The study was conducted in Kirkuk General Hospital in Kirkuk City, Iraq, by (Alwan and Kumait, 2023) and this study agrees with the researcher's study

as it showed that most nurses are graduates of the College of Nursing at a percentage of 83.3%. Also supported by (Sameen et al., 2019) which stated that the majority of nurses are also graduates of the College of Nursing at a percentage of 83.3%.

The current study's findings shows that 75.3% of the sample fell into the first experience group, which includes those with 1-2 years of experience. The researcher's explanation, this is because after spending two or three years in intensive care, the nurses feel tired and stressed during work, lacks support from the board of directors, and has conflict between nurses and patients' families. This result matches a study conducted at Kirkuk, Iraq, by (Raof & Baez, 2024) which was conducted at the intensive care unit in Kirkuk Teaching Hospital. Who stated that the majority of nurses experience ranging between 1-2 years with a percentage of 87.0%.

According to "Work Shifts," results showed that most nurses work in the evening shifts with a percentage of 59.7%. In the researcher's view, this is due to the number of nurses working in the evening shift being greater than the number of nurses working in the morning shift in Kirkuk city hospitals. Another study conducted in Al-Nasiriya City, Iraq, disagrees with the study results. Who mentions that records the highest study percentage of about 50% of morning shift workers (Shinjar & Khasal, 2025).

This study's findings indicate one quarter of the nurses had participated in the chest physiotherapy training. The researcher's explanation for low participation in chest physiotherapy courses may be due to the fact that these courses are not mandatory, are not facilitated by managers, and there is no coordination between the continuing education unit and the intensive care unit in hospitals. This result agrees with that conducted in Erbil, Iraq, by (Omar & Ahmed, 2022), who stated that a few nurses participated in training courses about chest physiotherapy.

### Nurses' practices regarding of Chest Physiotherapy:

Regarding the practices of the nurses in the pre-chest physiotherapy procedure, the results in table

(3) shows that nurses have a moderate level of practices. From the researcher's point of view, there is no protocol for chest physiotherapy in Kirkuk hospitals, which leads to nurses not adhering or not beginning correctly. This result disagrees with a descriptive cross-sectional study conducted by (Kheder, 2016) to assess the nurses' practices regarding chest physiotherapy in the intensive care unit and respiratory care unit in the Teaching Hospital and Elmek Nimes University Hospital in Shendi, Sudan. Which showed that the majority of nurses had good performance concerning pre-procedure practices.

Concerning chest percussion and vibration technique, the research results showed that nurses have a moderate level of practices. The researcher's point of view is that chest percussion and vibration, has traditionally been a key intervention in respiratory care, particularly for patients with conditions like pneumonia, chronic obstructive pulmonary disease (COPD), and cystic fibrosis. However, there has been a noticeable decline in nurses practicing for these techniques. And this decline in practice may be due to several factors contribute to this trend, such as nurses may lack confidence and proficiency in performing chest percussion and vibration, leading to a preference for alternative interventions. Advancements in technology and respiratory therapy, nursing roles and responsibilities, the lack of experience and limited training and skill retention, evidence-based practice and changing guidelines. The current study is in harmony with a study conducted by (Omar and Ahmed (2022) in the Intensive Care Unit and Respiratory Care Unit in Erbil City Hospitals/Kurdistan Region of Iraq, titled "Effect of Chest Physiotherapy Training on Nurses and Physiotherapist Performance at Critical Care Units in Erbil City," which found that the level of nurses' performance was poor.

Based on the result that showed nurses' practices related to the active cycle of breathing technique (ACBT) and incentive spirometer, nurses have a low level of practices. From the researcher's perspective, a decrease in nurses' practice regarding incentive spirometry, particularly in postoperative and respiratory care, is that most of

the nurses have not received training on the importance and proper use of incentive spirometry; new staff members are not familiar with incentive spirometry protocols, high workload, and limited resources as well as the lack of equipment availability. This finding aligns with a study conducted by (Waheed & Abdulwahhab, 2022) at the intensive care unit in the city hospitals of AL-Nasiriyah City, Iraq, titled "Effectiveness of Interventional Program on Nurses' Practices concerning Physiotherapy Protocol at Intensive Care Units in AL-Nasiriyah City." The aforementioned study reported that the majority of nurses have a low level of practice in incentive spirometry and deep breathing exercises.

### **Relationships between "Nurses' Knowledge regarding Chest Physiotherapy and their socio-demographic and professional background:**

The study's findings establish a relationship between the nurses' practice and a highly significant relationship with nurses' age and experience in the intensive care unit, as well as a significant relationship with marital status. From the researcher's point of view, most older nurses have more experience in intensive care, which leads to better practice, because they have worked longer in intensive care and seen more patients, especially in cases where patients need chest physiotherapy. They may also have learned from the exchange of information between nurses and from their previous nurses. In terms of marital status, single nurses may have more time to read and gather information or be interested in information and how to do practice compared to married nurses. The results of this study contradict with a descriptive study was conducted by (Khadyer & Ahmed, 2023) in Dhi-Qar/Iraq. It was discovered that there is no significant relationship between nurses' practice about chest physiotherapy techniques and their demographic features.

### **Conclusion:**

The study concluded that most of nurses are female. Almost all of the nurses had a bachelor's degree, and about three-quarters had one to two years of experience in intensive care units. Most

nurses have a moderate level of practice concerning chest physiotherapy. However, there are relationships between nurses' practices concerning chest physiotherapy with age, experience in intensive care units, and marital status. Moderate level chest physiotherapy practices which may lead to potential complications in patient treatment. Lack of participation in chest physiotherapy training courses and that most nurses are young and have less than three years of experience have been identified as the main factors influencing this. Future studies should be focused on determining what supports and impairs the application of evidence-based chest physical therapy techniques.

### Recommendations:

The hospital and relevant authorities should develop and provide an educational program based on new evidence, and a training program for chest physiotherapy should be conducted periodically. Appointing nurses with master's and doctorate degrees in nursing to supervise procedures in intensive care. conducting additional research on chest physical therapy techniques employed by nurses in the intensive care units in various places.

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