RESEARCH ARTICLE

EVALUATION OF NURSES' PRACTICE CONCERNING PULMONARY REHABILITATION TO REMOVE SECRETIONS FROM THE LUNGS OF A PERSON INFECTED WITH COVID-19

Ahmed Yassin Khadyer [1], Sabah Abbas Ahmed [2]

1. *Ministry of Health, Baghdad Health Directorate, Iraq;*
2. *Department of Fundamental Nursing, College of Nursing, University of Baghdad, City of Baghdad, Iraq.*

Corresponding author: Ahmed Yassin Khadyer
Email: ahmedyassenkhadyer@gmail.com

ABSTRACT

The study estimates nurses' practice regarding pulmonary rehabilitation to remove secretions from the lungs of a person infected with COVID-19 and to conclude the association between nurses' practice and their sociodemographic characteristics. Methodology: A descriptive study was carried out in isolation units of Al-Hussein Teaching Hospital from June 1, 2022, to January 27, 2023. A non-probability (purposively) sample of 41 nurses working in isolation units from the Al-Hussein Teaching Hospital in Thi-Qar, Iraq, was selected. The data was collected using the observational checklist, which consists of two parts: (1) a demographic data form consists of (8) items and (2) nurse practice checklists consisting of (3) parts that contain (19) procedures, by means of the direct observational technique with nurses in isolation units. The validity of the checklists was determined by presenting them to (13) specialist experts, and their reliability was determined through a pilot study from April 1, 2022, to April 28, 2022. Data were analyzed using descriptive and inferential statistical analysis approaches. Results: The study results show that most of the study sample are in the age group (20-30) years, women, married, have a Bachelor's degree in nursing, work 6-12 hours, with 1 to 5 years of experience, and 56.1% (23/41) did not participate in COVID-19 training sessions. Furthermore, nurses' practice was insufficient and the evaluation shows a clear failure in most responses for 19 procedures in pulmonary rehabilitation for patients with COVID-19. Conclusions The study concluded that nurses' practice toward lung rehabilitation for patients with COVID-19 is inadequate during evaluation. Furthermore, there is no statistical association between nurse practice and sociodemographic characteristics. Recommendations: The study recommends the use of health intervention programs to increase nurses' practice and skills in lung rehabilitation for patients with COVID-19.

Keywords: practice, pulmonary rehabilitation, COVID-19

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INTRODUCTION

Several mysterious pneumonia cases have been recorded in Wuhan, China, since late December 2019. A new coronavirus was found to be the etiologic agent of this mystery pneumonia a few days later. The World Health Organization has given the relevant infected diseases the temporary names coronavirus disease 2019 (COVID-19) and coronavirus two of severe acute respiratory syndrome. The COVID-19 pandemic is spreading throughout the world and China (He et al., 2020).

The virus that causes COVID-19 most likely originated from an animal source but is currently circulating among humans. When an infected individual coughs or sneezes, respiratory droplets are released, which are thought to be the major way the virus spreads, primarily amongst people close to one another (within roughly 6 feet). Although this is not believed to be the primary method of virus transmission, it is nevertheless possible for someone to contract COVID-19 by touching a surface or object with the virus on it and then touching their own mouth, nose, or eyes (VDI, 2020).

The Iraqi Ministry of Health has verified that COVID-19 has infected many people, about 394,566, with 9,683 deaths in May 2020. The average age of the deceased in Iraq is 71 years

and most of them also had other chronic diseases such as diabetes, cardiovascular disease, cancer, or smoking. As a result, the fact that these individuals had preexisting medical conditions was evidence that they needed support for breathing due to respiratory distress syndrome (ARDS), which was caused by pneumonia caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Mohammed & Bakey, 2021).

The clinical symptoms of COVID-19 have been described, ranging from asymptomatic infection to acute respiratory failure. The main symptoms include self-reported fever, fatigue, dry cough, myalgia, and dyspnea. Some strange symptoms include diarrhea, hemoptysis, headache, and sputum production. Only a few patients with SARS-CoV-2 infection reported pleuritic chest pain even though most of the patients had pneumonia (Li et al., 2020; Chan et al., 2020; Chen et al., 2019).

People can help protect themselves from lung disease with daily preventive activities. Avoid close contact with people who are sick. Avoid touching the eyes, nose, and mouth with unwashed hands. Wash your hands often with soap and water for at least 20 seconds. Use an alcohol-based hand sanitizer that contains at least 60% alcohol if soap and water are not present (VDI, C. 2020).

There are many procedures to prevent the spread of COVID-19; Nurses use personal protective equipment for a prolonged period while providing care to patients with COVID-19, despite the problems caused by personal protective equipment. Therefore, constant vigilance in terms of infection control and follow-up rehabilitation procedures is essential to improve the morale and efficacy of nurses (Ahmed, SA (2022).

Currently, a variety of therapeutic options are available that include antiviral medications (e.g., molnupiravir, paxlovid, remdesivir), anti-SARS-CoV-2, monoclonal antibodies (e.g., bamlanivimab/etesevimab,casirivimab/imdevim,sotrovimab, bebtelovimab), anti-inflammatory drugs (e.g., dexamethasone), immunomodulator agents (e.g., baricitinib, tocilizumab) are available under FDA issued Emergency Use Authorization(EUA) or are being evaluated in the treatment of COVID-19 (Cascella et al., 2022).

The clinical utility of these treatments is specific and based on the severity of the disease or certain risk factors. The clinical course of the COVID-19 illness occurs in 2 phases: an early phase when SARS-CoV-2 replication is greatest before or shortly after the onset of symptoms. Antiviral drugs and antibody-based management are likely to be more effective during this stage of viral replication. The later phase of the illness is driven by a hyper-inflammatory state induced by the release of cytokines and activation of the coagulation system that causes a prothrombotic state. Anti-inflammatory drugs such as corticosteroids, immunomodulating therapies, or a combination of these therapies may help combat this hyperinflammatory state more than antiviral therapies. Below is a summary of the latest potential therapeutic options proposed, authorized, or approved for clinical use in the treatment of COVID-19 (Cascella et al., 2022).

Provision of a respiratory rehabilitation program (RRP) in patients with severe ARDS from COVID-19 involves risks to operators and organizational problems, especially in rehabilitation centers; however, its continuity is important to prevent the improvement of permanent disability in previously healthy subjects. Limited to only one patient, we could carry out a safe RRP during the COVID-19 pandemic, promoting complete functional recovery of a young patient with COVID-19 (Pancera et al., 2020).

During hospitalization, patients with COVID-19 are characterized primarily by respiratory dysfunction. Rehabilitation intervention (including positioning and respiratory management, traditional Chinese medicine, physical therapy, and psychological support) should be provided along with routine treatment, which can reduce hospital stay and improve patient status and quality of life (Sun et al., 2020).

Pulmonary rehabilitation should be provided throughout the illness control process, regardless of whether the patient is hospitalized or at home. Additionally, rehabilitation preparations should be individualized according to the patient's condition. The effective incorporation of pulmonary rehabilitation into disease management and a patient's daily life, so that it becomes a conscious behavior, can provide long-term benefits to the patient and his family. With the deepening of the understanding of COVID-19, more patients have recovered. Pulmonary rehabilitation for these recovered patients has become a major challenge for medical personnel, which requires multidisciplinary collaboration and joint exploration to provide evidence-based and high-quality support (Nanjappan et al.,2021).

METHOD

A descriptive study was carried out to achieve the previously stated objectives. This descriptive study aimed to conclude the practice of nurses in lung rehabilitation to remove secretions from the lungs of a person infected with COVID-19 and to determine the relationship between the practice of nurses and their sociodemographic characteristics. The study was carried out in

isolation units of Al-Hussein Teaching Hospitals in Thi-Qar, Iraq, from June 1, 2022, to January 27, 2023. These units were selected because they care for patients at risk of developing COVID-19. - The probability (purposively) sample included 41 nurses. An observational checklist was developed based on the opinions of experts and a concentrated review of relevant literature and studies to measure nurses' practice regarding pulmonary rehabilitation to remove secretions from the lungs of a person infected with COVID-19. The observational checklist was accessible to nurses who consented to contribute to the study; the nurses were evaluated using the observational checklist in the presence of the investigator. The final study instrument consisted of two parts.

Part I: Sociodemographic Characteristics: The sociodemographic characteristics of nurses include age, gender, educational level, work time, number of years of experience, nursing training sessions on COVID-19 and social status.

Part II: Observational checklists related to nurses' practice on lung rehabilitation to remove secretions from the lungs of a person infected with COVID-19. The second part of the questionnaire consisted of (19) items that are concerned with nurses' practices toward pulmonary rehabilitation to remove secretions from the lungs of a person infected with COVID-19, including three sections. Section 1, which includes (4) items related to evaluating passive techniques to remove secretions from the lungs, (4) items related to evaluating positive techniques to remove secretions from the lungs, and (11) items related to the evaluation of practices related to breathing strategies. These items were graded on a Likert scale as follows: always (2), sometimes (1), and never (0). Three events were observed for each respondent to determine the scale levels: Rating and scoring. The items were rated and scored with (2) for correctly done, (1) for sometimes done, (0) for incorrectly done, and not done. Therefore, the level of practice is explained by the following: (never) = 0 - 0.66, (Sometimes)= 0.67 - 1.33 and (Always) =1.34 – 2 with the cutoff point 0.66.

Validity of the study: The validity of the content of the study tool is determined through the panel of (13) experts and the relevant previous literature to inspect the clarity, suitability, and adequacy of the tool to achieve the study objectives.

Reliability of the study: In five nurses, reliability testing was used as a statistical analysis method to determine the concordance between the items of the observational checklist using the reliability coefficient.

Data Analysis: Data from the present study are analyzed using the version of the Social Sciences Statistical Package (SPSS) (23). Researchers used descriptive and inferential data analysis to analyze the results.

Implications of the Study

To address the gap in the management of coronavirus disease, ensure that nurses are assessed in pulmonary rehabilitation for patients with COVID-19 and present the responsible health institutions to provide preventive and curative treatment of coronavirus disease.

Ethical Considerations: Ethical approval has been granted from the Scientific Research Ethics Committee of the Faculty of Nursing University of Baghdad before the initial conduct of the original study. Also, permission has been obtained from nurses at the Thi-Qar city hospital for data collection. To participate in the study, nurses in the isolation unit have been assigned a consent agreement. They have been introduced to the study objectives and are allowed to be aware of the study affairs. They also have the full right to withdraw from participation in the study.

RESULTS

The findings in Table (1) show that most women in the present study are 20-30 years old (68.3%). Females constitute the higher percentage (68.3%) of the study sample, and the remaining are males (31.7). The level of education among the nurses presented (48.8%) has a bachelor's degree in nursing. Duration of work time of nurses in the hospital The present study showed that 70.7% worked 6-12 hours. Regarding years of experience, 65.9 % worked in the range of 1 to 5 years in the hospital. The table mentioned above reveals that the majority of nurses in the study sample, 56.1% (23/41), did not participate in COVID-19 training sessions. Social status showed the distribution among nurses. The findings were married (51.2%) and 48.8% single.

Table (2) reveals the practice of nurses regarding lung rehabilitation to remove secretions from the lungs of a person infected with COVID-19. These results included passive techniques to remove secretions from nurse practice; these include postural drainage, percussion, and vibration. Practices related to positive techniques to remove secretions from the lungs include an active cycle of breathing procedures and controlled breathing. Practice practices related to breathing strategies regarding pursed lip breathing, segmental breathing, diaphragmatic breathing, slow and deep breathing, and alternate nostalgic breathing.

Table 3 shows that the majority of nurses' practices were never in part1 and part2, while the majority of nurses' practices were some time in part3 the majority of nurses' practices were never.

Table 4 validates that there is no statistically significant relationship between nurses' practice and their age, gender, social status, work time, level of education, years of experience, and number of training sessions at a P-value of more than 0.05, respectively.

Table 1. Sociodemographic characteristics of the participants (N = 41)

Variables	Frequency	per cent.
Age (years): Mean (SD) = 28.63± 6.032		
20-30	28	68.3
31-40	10	24.4
41 years and older	3	7.3
Gender		
Male	13	31.7
Female	28	68.3
Level of education		
Bachelor's degree in nursing	20	48.8
Diploma	10	24.4
Nursing school	11	26.8
Work time		
less than 6 hours	2	4.9
6-12 hours	29	70.7
12 hours and more	10	24.4
Years of experience		
1-5	27	65.9
6-10	7	17.1
More than ten years	7	17.1
Training session		
lack of training	23	56.1
1-2 training session	14	34.1
3-4 training sessions.	4	9.8
Social status		
married	21	51.2
single	20	48.8

Table 2. Evaluation of nurses' practice concerning lung rehabilitation to remove secretions from the lungs of a person infected with COVID-19

Part 1: Passive techniques to remove secretions from the lungs	**An observation**			**Total mean**	**C.S.**
	MS1st observe	**MS 2nd observe**	**MS 3rd observe**		
Q1/ Perform postural drainage at least three times a day	0.49	0.29	0.68	0.49	N
Q2 / The percussion appears to be hollow, not a slap sound.	0.80	0.66	0.59	0.68	N
Q3/ Vibration: Ask the patient to inhale deeply and then exhale slowly through the chasing lips.	0.46	0.32	0.61	0.46	N
Q4/ The nurse encourages the patient to exert maximum effort on the inhale before shaking the chest wall.	0.54	0.34	0.44	0.44	N
Part 2: Positive techniques to remove secretions from the lungs	**MS 1ST observes**	**MS 2ND observe**	**MS 3RD observe**	**Total mean**	**C.S.**
Q1/ The patient is asked to place his hands below the level of the ribs from the front, then take a breath through his nose and get it out of his mouth with his hands pressed to the inside.	0.56	0.56	0.56	0.56	N
Q2/ The patient is asked to put his hands on the right and left sides of the chest (the ribs), then take a breath through his nose and get it out of his mouth	0.61	0.61	0.61	0.61	N

while pressing the palms inward.					
Q3/ In a sitting position, the nurse asks the patient to take a breath from his nose while raising his arms above shoulder level and then exhale the air from his mouth with his arms down.	0.44	0.44	0.44	0.44	N
Q4/ In a sitting position, the nurse helps the patient raise his knees and take a breath from his nose while keeping the arms above the shoulders level and then removes the air from his mouth while bending the torso forward and lowering the arms until they touch the ground.	0.46	0.46	0.46	0.46	N
Part 3: Practices related to breathing strategies	**MS 1st observe**	**MS 2nd observe**	**MS 3rd observe**	**Total mean**	**C.S.**
Q1 The nurse encourages the patient to perform the Pursed Lip Breathing exercise.	0.66	0.41	0.54	0.54	N
Q2/ Applying light hand resistance or a towel can be used on the lower ribs to increase sensory awareness as the patient breathes deeply, the chest expands, and the ribs relax.	0.37	0.37	0.37	0.37	N
Q3/ Diaphragmatic breathing (abdominal breathing) The nurse asks the patient to lie on his back in bed with his knees bent higher than the head.	0.54	0.63	0.44	0.54	N
Q4/ Breathe deeply and slowly through the nose, allowing the chest and lower abdomen to rise while the lungs fill.	0.76	0.68	0.83	0.76	S
Q5/ Glossopharyngeal breathing technique	0.61	0.61	0.61	0.61	N
Q6 / Nurse teaches patient to cough effectively	0.80	0.80	0.80	0.80	S
Q7/ Huff: The nurse teaches the patient to breathe in, hold it and exhale actively.	0.44	0.66	0.88	0.66	N
Q8 / Nurse teaches the patient to use the incentive spirometer, usually every one to two hours, with 10 to 15 breaths per session.	0.88	0.80	0.66	0.78	S
Q9/ The nurse asks the patient to hold his breath for 2-3 seconds. Then exhale through the balloon to generate resistance during exhalation.	0.71	0.90	1.10	0.90	S
Q10/ Effective cycle of breathing techniques: A controlled breathing technique, deep breathing, and blowing technique.	0.59	0.73	0.44	0.59	N
Q11 / autogenic drainage, where the nurse asks the patient to inhale as much air as possible and exhale slowly.	1.17	0.95	0.73	0.95	S
N=Never**S=Something=A=Always**			**C.C = continuous coefficient**		

Table 3. Association between sociodemographic characteristics and nurses' practice in lung rehabilitation

Demographic Characteristics ANOVA		Sum of squares	d.f.	Mean square	F	P-value
Age group	Between Groups	0.313	2	0.157	0.598	0.555 NS
	Within Groups	9.964	38	0.262		
	Total	10.277	40			
Educational level	Between Groups	0.130	2	0.065	0.243	0.785 NS
	Within Groups	10.147	38	0.267		
	Total	10.277	40			
Years of experience	Between Groups	0.124	2	0.062	0.233	0.794 NS
	Within Groups	10.153	38	0.267		
	Total	10.277	40			
Number of training sessions	Between Groups	0.063	2	0.031	0.117	0.890 NS
	Within Groups	10.214	38	0.269		
	Total	10.277	40			
Work time	Between Groups	0.124	2	0.062	0.130	0.878 NS
	Within Groups	10.153	38	0.267		
	Total	10.277	40			
Demographic data 'T.Test'		**Mean**	**S.d.**	**d.f.**	**T value**	**P-value**
Gender	Male	0.6846	0.37103	39	0.692	0.493 NS
	Female	0.5661	0.56109			
Social status	Married	0.5690	0.41094	39	0.443	0.66 NS
	Single	0.6400	0.60035			

DISCUSSION

The data analysis result shown in Table 1 distribution of the study sample according to sociodemographic characteristics presented the distribution of the study sample exposed, 68.3% are 20- 30 years old and constitute the majority of 28/41. This result was consistent with a survey Joseph (2011) conducted to determine the knowledge, attitudes, and practices of physiotherapists regarding their role in health promotion in Gauteng Province, South Africa, which found that the highest response rate of 45.1% (73/162) was from the age group 21-30 years. The result of the present study indicates that the majority, 68.3% (28/41) of nurses in the study sample, were females and the remaining were males, 31.7% (13/41) (Table 4.1). Saadeh et al. (2020), who researched "knowledge, attitudes, and behaviors about coronavirus disease 2019 (COVID-19) among 311 nurses in Lebanon", reported that about three-quarters of them were female, 79.4% (247/311). This study presents the educational level of the study sample: 48.8% of the 41 nurses had a Bachelor's degree in nursing and 26.8% were from a secondary school of nursing. The level of education with Jasem & Al-Jubouri (2021) found that most healthcare providers, 39.9% (99/248) in intensive care units for patients with COVID-19, had a bachelor's

degree in nursing. The study found that the majority of nurses, 70.7% (29/41), worked 6-12 hours daily in the isolation unit. Another research conducted in Australia by Newstead et al. (2017) to determine the attitudes of critical care nursing professionals toward the use of traditional chest physiotherapy techniques found that 76 (53%) of nurses were working full-time, while 59 (42%) were working part-time. The researcher believes that most of the employees work in private clinics, so they prefer to work part-time. Regarding years of experience, most nurses (65.9%, 27/41) had experience between 1 and 5 years. Also, this result agrees with a study by Abd ElAziz. et al. (2021), who showed that most nurses (60%, 18/30) had experience between 1- 5 years and 20% (6/30) from 5--10 years, and the remaining 20% (6/30) had experience between less than 5 years. The study findings reveal that the majority of nurses in the study sample, 56.1% (23/41), did not participate in COVID-19 training sessions. The study results agree with those of Mohammed & Atiyah (2022), who did not participate in any training courses in the control group (100%, 25/25). Finally, in terms of demographic characteristics, marital status showed the distribution between healthcare providers. The findings were married (51.2%, 21/41) and (48.8%, 20/41) of the single. These findings agree with Mohammed and Atiyah's (2022) results, which revealed that (55%) were married.

Table 2 shows the mean score for nurses' practice according to evaluation 19 procedure, failure or inadequate information, which indicates a low procedure level. This result was supported by Mohammed & Atiyah (2022), who showed in the submitted study the effectiveness of an educational program on nurse practice toward physical therapy for patients with COVID-19 that most nurses reflected fair practice during the pretest.

Table 4 The findings do not show statistical significance between nurses' practice and their age, sex, social status, work time, level of education, years of experience, and the number of training sessions in interventional programs at p-value > 0.05. Resham et al. (2021) found in their study "Evaluation of nurses' knowledge and attitudes about the prevention of Coronavirus disease 2019 in emergency units in government hospitals in Baghdad city / Iraq" that there is no significant relationship between nurses' knowledge and sociodemographic characteristics such as gender, hospitals, level of education, and social status, except age group and experience in work where there is a significant relationship at the p-value < 0.05.

CONCLUSIONS

The study concluded that the nurse's practice in pulmonary rehabilitation for COVID-19 patients is inadequate, and there is also no statistical association between the nurse's practice and their sociodemographic characteristics.

Ethical Approval Statement

This research study, titled " **Evaluation of nurses' practice concerning pulmonary rehabilitation to remove secretions from the lungs of a person infected with COVID-19** " conducted by [**Ahmed Yassin Khadyer [1], Sabah Abbas Ahmed [2]**], has received ethical approval from the [Ethical Committee of Scientific Research of Nursing College] at [University of Baghdad].

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AUTHOR'S CONTRIBUTIONS

All authors contributed equally to the conception and design of the study, data collection, and analysis, and drafted the initial manuscript. All authors critically reviewed and edited the manuscript. All authors approved the final version of the manuscript for submission.

DISCLOSURE STATEMENT:

The authors report no conflict of interest.

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