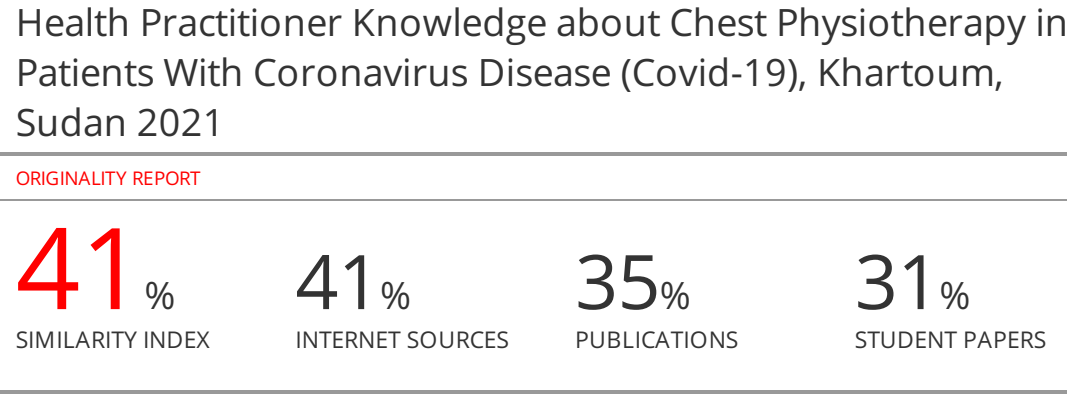
**Reviewer’s Comments**

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**Health Practitioner Knowledge about Chest Physiotherapy in Patients With Coronavirus Disease (Covid-19), Khartoum, Sudan 2021**

**Abstract:**

**Background:**

COVID-19 is the disease caused by the new coronavirus that was first identified in December 2019. The current outbreak of coronavirus disease 2019 (COVID-19) originated in the Hubei Province of the People's Republic of China, and on March 11, 2020, it was declared a pandemic by the World Health Organization Emergency Committee. Physiotherapists are recognized in several countries as professionals working in primary and tertiary care who play a fundamental role in multi-professional teams providing ventilatory support during the acute illness phase and rehabilitation interventions thereafter to promote functionality.

**Aims**

**Methods**

An observational descriptive cross sectional intuitional — based study was conducted in 2021. A total of 109 participants were randomly selected in Jabra and universal isolation centers in Khartoum, Sudan. Data was collected using self-administered questionnaires. The data was entered and analyzed using SPSS version 23.

## Results

109 individuals participated in this study; females (56%) were more than males. The commonest age group was found to be 30-35 (35.8%), followed by 25-30 (27.5%). Regarding the occupation, (45%) were doctors, followed by nurses (33%). When asked about experience, the commonest answer was 5-10 years (49.5%), followed by 3-5 (33.9%).

Regarding the duration in which they have been working in the isolation centers, the commonest answer was 3-6 months (28.4%), followed by 6-9 months (23.9%). When asked about the commonest age group presenting to the isolation centers, (33%) said 40-50 years, followed by more than 60 years (23.9%). When asked in which part they apply chest physiotherapy, the commonest answer was ICU (41.3%). Regarding if there are any complications that happen to patients after the isolation period, the majority (59.6%) said yes, while (32.1%) said no. The most common complications mentioned were shortness of breath (37.6%), followed by repeated chest infections (22.9%). When asked about their favorite technique for chest physiotherapy, (30.3%) said cough, followed by vibration (23.9%) and then porn position (15.6%). Regarding the importance of chest physiotherapy, (53.2%) said it is very important, while (38.5%) said it is somehow important.

# Conclusion

As overall, COVID-19 is a new disease that presents challenges to inpatient care. Participants know that physiotherapy plays a fundamental role throughout patient hospitalization and can help patients prevent very serious complications. However, the

hospital physiotherapy team must be well-oriented regarding specific care to both reduce infection risk and provide the best patient care.

**Keywords:**

## Introduction

COVID-19 is the disease caused by the new coronavirus that was first identified in December 2019. (1)

COVID-19 appeared in Wuhan, a city in China, in December 2019. Although health officials are still tracing the exact source of this new coronavirus, early hypotheses thought it may be linked to a seafood market in Wuhan, China. Some people who visited the market developed viral pneumonia caused by the new coronavirus. A study that came out on Jan. 25, 2020, notes that the individual with the first reported case became ill on Dec. 1, 2019, and had no link to the seafood market. Investigations are ongoing as to how this virus originated and spread.[2]

COVID-19 symptoms include cough (68%), fever (89 %)or chills, shortness of breath or difficulty breathing (19%), muscle or body aches, sore throat, new loss of taste or smell, diarrhea, headache, new fatigue (38%), nausea or vomiting and congestion or runny nose. COVID-19 can be severe, and some cases have caused death [3]

The new coronavirus can be spread from person to person. It is diagnosed with a laboratory test.

Prevention involves frequent handwashing, coughing into the bend of your elbow, staying home when you are sick and wearing a cloth face covering if you can't practice physical distancing. (4)

Physiotherapists are recognized in several countries as professionals working in primary and tertiary care (6) who play a fundamental role in multi-professional teams providing ventilatory support during the acute illness phase and rehabilitation interventions thereafter to promote functionality (7-8).

To provide the maximum level of care and ensure staff protection, recommendations were developed regarding protective equipment, conventional chest physiotherapy, exercise and early mobilization, oxygen therapy, nebulizer treatment, non-invasive ventilation and high- flow nasal oxygen, endotracheal intubation, protective mechanical ventilation, management of mechanical ventilation in severe and refractory cases of hypoxemia, prone positioning, cuff pressure, tube and nasotracheal suction, humidifier use for ventilated patients, methods of weaning ventilated patients, and equipment and hand hygiene.

This research describes the different actions and practices adopted by the Rehabilitation Service in isolation centers in Khartoum to face the challenges in treating and containing the spread of COVID-19. Issues pertaining to clinical practice in the adult hospital setting were identified based on the experience and opinions of front-line experts as well as a review of the relevant literature. So, this study was done to raise the awareness of the community regarding chest physiotherapy and exercises to reduce complications in young people and adults to improve daily activities and productivity [ref].

During acute period of COVID-19, most patients have no exudation, and as such, chest physiotherapy may not be recommended (15). In addition, procedures such as diaphragmatic breathing, pursed-lip breathing, and bronchial hygiene/ lung re-expansion techniques are contraindicated during this stage (16). The priority here is the use of a mechanical ventilator, especially in those with severe symptoms (6, 16). For those with exudation and mild to moderate symptoms, it has been argued that chest physiotherapy can be used to relieve dyspnoea and depression and anxiety on a case-by-case basis (6, 15). However, to date, there are no studies reporting on the use of chest physiotherapy during the acute stage aside from a recommendation based on anecdotal evidence (16)

Under mechanical ventilation, patients may lose spontaneous breathing during chest physiotherapy (17). This can predispose the patients to developing lung collapse and ventilator-associated pneumonia. In such circumstances, chest physiotherapy can be used to reduce the length of stay in both a mechanical ventilator and ICU and prevent ventilator-associated pneumonia (18, 19). In addition, high-frequency chest wall oscillation for intubated patients resulted in increased dry sputum weight and PaO2 on day 3, decreased lung collapse on days 2 and 3, and culture positivity on day 3 (19). Similarly, in a patient who received 11 sessions of physical therapy consisting of upright body positioning, mobilization and exercise, and the active cycle of breathing exercise technique every 2 h for 12 h over his 48-h stay in the ICU (six sessions on day one and five sessions on day two), arterial oxygen level improved markedly, with radiographic resolution of infiltration (20). Therefore, since chest physiotherapy reverses pathological progression, prevents atelectasis, improves impaired gas exchange, and decreases culture positivity, which are also some of the pathological hallmarks of COVID-19, it can be utilized in patients with this disease.

Accordingly, the techniques recommended in patients who are on a ventilator include airway clearance techniques, lung maneuver recruitment, endotracheal suctioning, and change in posture (16, 21). The airway clearance techniques recommended include positioning, active cycle of breathing, manual and/or ventilator hyperinflation, percussion and vibration, positive expiratory pressure (PEP), and mechanical insuflation-ensufflation (15, 16). However, there are no details on how to perform these techniques aside from positioning therapy, and there have been no studies yet in patients with COVID-19 reporting on the efficacy of the techniques

Post-Extubation after discharge many patients may develop respiratory failure again after chest pysiotherapy (22). This can be prevented using chest vibration and percussion (23). In patients with COVID-19, there seem to be no reports on the use of chest physiotherapy immediately post-Extubation. However, following discharge, rehabilitation involving respiratory muscle training, cough exercise, diaphragmatic training, stretching exercise, and home exercise has been applied (24). These forms of training and exercise, when performed for two sessions per week for 6 weeks, resulted in improved FEV1 (L), FVC (L), FEV1/FVC%, diffusing lung capacity for carbon monoxide (DLCO%), endurance, and quality of life and a reduction in anxiety and depression symptoms.

##### Objectives

To describe the effect of chest physiotherapy in patients with COVID-19, to identify the complications in COVID-19 victims, and to observe the awareness and knowledge of practitioners about chest physiotherapy

**Materials and Methods**

##### **Study Design, population and study area: Observational descriptive cross sectional institutional — based study, conducted for 109 healthcare providers in Jabra and universal isolation centers in Khartoum, Sudan for healthcare providers during the period January to April 2021.**

##### **Data collection tool:**

The data was a structured self-administered questionnaire based on socio- demographic information. A 11-question questionnaire was administered including all the objectives of this study.

##### **Data analvsis:**

Data collected was computerized through Microsoft Excel and analyzed through SPSS Version 23. The data was presented graphically (frequency tables, graphs).

##### **Ethical consideration:**

It was sought from the research technical and ethical committee at the Faculty of Medicine. The participants' privacy and confidentiality were maintained.

## Results

109 individuals participated in this study; females were 56%. The commonest age group was found to be 30-35 (35.8%), followed by 25-30 (27.5%).

Regarding the occupation, (45%) were doctors, followed by nurses (33%). When asked about experience, the commonest answer was 5-10 years (49.5%), followed by 3-5 (33.9%).

Regarding the duration in which they have been working in the isolation centers, the commonest answer was 3-6 months (28.4%), followed by 6-9 months (23.9%). When asked about the commonest age group presenting to the isolation centers, (33%) said 40-50 years, followed by more than 60 years (23.9%).

When asked in which part they apply chest physiotherapy, the commonest answer was ICU (49.5%).

Regarding if there are any complications that happen to patients after the isolation period, the majority (67.9%) said yes, while (32.1%) said no. The most common complications mentioned were shortness of breath (37.6%), followed by repeated chest infections (22.9%), low oxygen (14.7%), and 7.3 % COPD.

The favorite technique for chest physiotherapy, (30.3%) said cough, followed by vibration (23.9%) and then porn position (15.6%). Regarding the importance of chest physiotherapy, (53.2%) said it is very important, while (38.5%) said it is somehow important.https://lh6.googleusercontent.com/JqyMytF2JNgIUOxdrIWAcuK9dArejibaUZFbx5C6Rs-aNfQEAmLIExkxPgXYAWTitjhcAz3lqaYS3tT3OhUt1DSiU7iPdMvCbU6OTrrbJjXslanPriO7iOUl6v4RO1IrpPaWoK2suQ0cke9zX70zk15I7sBluWoKZFlCwgMMwKiF4s6Tdtv62YUMZTMU51X8c9H22Qhttps://lh5.googleusercontent.com/nAqjh3aClEPEVvbs6w5IiVOJqA62-E1RBIkaSp6Jg9hAKLgeYa4URzBaVyssJJvslby_aTv3Saajui2nWBOb-PMuxp2eW-94jAaI30wJO5HP0-EGbLQMp-v5eWEl16vn2k2YhkneQPLWygd6DaH6fh52hAE9wWUFBPpQra9lNa1uALanctz8CgyImni_R2tAYFFV-Ahttps://lh4.googleusercontent.com/0b4kA3cxJmfA0Wxanl3uFP330OEY9NHQ30kMLYf2Jr0cYRBghLZhGFyOJUjX6zXfTup4jcDYKtjvn_L_AsK41tPoXZNFjYt6eXY4Nr038_8Txbbm-9VsD5aqy9_GTEDPNPDAoAb3VFmylt7HG3r-KP9hmulDhjxU6SUA2cGOjqd9UjVR4opLfdC6atZH8SldSIDR0Ahttps://lh5.googleusercontent.com/sxYWJ_z0oyY3EfpKlAKuFyqmTuScBoP0Fn5SjIuNipwjpSqvrkajMSThrBfuVmwLM3b1OqrVGZ4E9iCWbogruKE_wFkYGK2HbcH_W7GiGRuWbhIe4ORsuaRLB-VZqH-Ji_K6PmIPcNzacZFtjFQ0s7rtVxRdohtG247FHQfJiteIhjs5mj7SqYMmwfh9dpMaMLMDiwhttps://lh5.googleusercontent.com/zNjRPVFoy7e5ab3WIxRpjrp7LGYC_UsPsgFloGTeylVzkzZ08AnE1iGUBTbUbH2ZipwFg1takgYqCBIkv9FJGL9K-eK5XwOnCw6kodni7WgghNtkKYmRgbIPrEpcZeBu6XgAONkd1fyZtHw6rHHIRM141nz1ipPT_zixLAJQJ5sJU-Olxhm44kXkdYgUFWYYkIqpMwhttps://lh5.googleusercontent.com/tgLNtAFoWqo8N5zLTGGCMXsZ-RJhB5NT6HSXnFQ0IUx7fPi-VJruaNAGiS5dJ-Vdp3YckceVpAb2MOb6UCrcY_7uNzkjciYrvCKoZGDKgHtPr2hXh__nOpo0jHe8QaD05TB9ufpC2TTf1lpWYuIgRAAoFZwnqubMXfVN2fcAzbT6K8grtqowI8GrXBeJ0IwMzhtGEwhttps://lh4.googleusercontent.com/d_j_x1xSzi_wMrjEtTcwGD05QIA8bLDImP1Db8p5buY0JCDDyqlBxDjkStfFWGOVkkH9LY9VHiUTfRgAvP-imaGg6SZ6MC61vnQc0B2LD34It2ooApSQ16O9wte9yda87V-FhvwsBK6W2aupxCYJhZLwb0BjqP17sUmEpQGpoZPZ9LaO1ieqGkF5hCvEmuMHqCoHqQ

**Table1:Chestphysiotherapy stage n (109):**

|  |  |
| --- | --- |
| Chest physiotherapy stage | Frequency (%) |
| ICU | 54 (49.5) |
| HDU | 16 (14.7) |
| After danger zone | 27 (24.8) |
| All stages | 12 (12) |
| Total | 109 (100) |

**Table2: complications that happen to patients after the isolation period n(109)**

|  |  |
| --- | --- |
| Complication happened to patients after isolation period | Frequency (%) |
| Yes | 74 (67.9) |
| No | 35 (32.1) |

### Discussion

The main anticipated outcome of this study was to examine the knowledge regarding chest physiotherapy in patients with COVID-19 among health practitioners. In addition to describing the effect of chest physiotherapy in patients with COVID-19 and identifying the complications in COVID-19 victims. To our knowledge there were no previous studies done in this area.  109 individuals participated in this study; females (56%) were more than males. The commonest age group was found to be 30-35 (35.8%), followed by 25-30 (27.5%). Regarding the occupation, (45%) were doctors, followed by nurses (33%). When compared to the previously done studies on the same topic, the results of this study agree with them.

### When asked about experience, the commonest answer was 5-10 years (49.5%), followed by 3- 5 (33.9%). Regarding the duration in which they have been working in the isolation centers, the commonest answer was 3-6 months (28.4%), followed by 6-9 months (23.9%).

### The commonest age group presenting to the isolation centers, (33%) said 40-50 years, followed by more than 60 years (23.9%). This result can be logical, in which these age groups are the most affected age groups according to the latest studies.

When asked in which part they apply chest physiotherapy, the commonest answer was ICU (41.3%). This result actually disagrees with the previously done studies, in which in other countries physiotherapy is done in all stages and not just in the ICU, and it can be explained by the fact that in Sudan there aren't enough well-trained physiotherapist in hospitals and isolation centers.

Regarding if there are any complications that happen to patients after the isolation period, the majority (59.6%) said yes, while (32.1%) said no. The most common complications mentioned were shortness of breath (37.6%), followed by repeated chest infections (22.9%). This result once again agrees with the other done studies on the same topic.

When asked about their favorite technique for chest physiotherapy, (30.3%) said cough, followed by vibration (23.9%) and then porn position (15.6%), same as the previously done studies.

Regarding the importance of chest physiotherapy, (53.2%) said it is very important, while (38.5%) said it is somehow important.

Coronavirus disease 2019, is pandemic has a respiratory complication after months of the initial illness. So, this study was done to raise the awareness of the community regarding chest physiotherapy and exercises to reduce complications in young people and adults to improve daily activities and productivity.

**LIMITATIONS OF THE STUDY**

## Conclusion

As overall, COVID-19 is a new disease that presents challenges to inpatient care. Participants know that physiotherapy plays a fundamental role throughout patient hospitalization and can help patients prevent very serious complications. However, the hospital physiotherapy team must be well-oriented regarding specific care to both reduce infection risk and provide the best patient care.

### Recommendation

Chest physiotherapy should be added to the COVID-19 protocols in isolation centers, special courses should be provided to physiotherapists regarding how to deal with COVID-19 patients, awareness regarding the importance of chest physiotherapy in COVID-19 patients should be raised, and more studies regarding this topic should be done to help assess the situation.

**Author’s Contribution**

**Acknowledgements**

**Conflict of interest**

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