وزارة الصحة
Ministry of Health

Physiotherapy Guidelines for Patients with COVID-19 in the Acute Hospital Setting

Introduction:

The novel coronavirus (COVID-19) is a new virus that emerged in 2019 led to global disaster affected on countries in terms of economy, health, and social life. Coronavirus can be transmitted from human to human by respiratory secretions of infected humans, which may occur by direct contact among people or hand contact on a contaminated surface then touching the mouth, nose, eye and Aerosol airborne transmission during a sneeze or cough. The main signs of the corona virus are fever, cough, fatigue, sputum production and shortness of breath. Physiotherapy plays a vital part of the treatment of COVID-19. For this reason, the potential role of physiotherapy in the management of hospital admitted patients with confirmed COVID-19 should be explained.

Summary of updates (Version 2)

Topics	Summary of changes
Target Audience	The guidelines regulated the role of physiotherapist and role respiratory therapists that may interferes with the role of respiratory physiotherapy for patients with COVID19.
Respiratory physiotherapy intervention for adult with confirmed COVID19.	The guideline added some information in respiratory physiotherapy intervention for adult with confirmed COVID19.
Respiratory physiotherapy intervention for adult with confirmed COVID19	The guideline added some information in respiratory physiotherapy intervention for adult with confirmed COVID19
Exercise Intervention for Adult patients with COVID19 in ICU or Medical Wards	The guidelines created new section clarify Exercise Intervention for Adult patients with COVID19 in ICU or medical wards.
infection control measures for physiotherapists	The guideline added some information in infection control measures for physiotherapists.

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Purpose:

General administration for medical rehabilitation and extended care in the Ministry of Health in KSA had issued these guidelines to clarify physiotherapy roles in confirmed adult and pediatric patients with Covid19 in the acute hospital setting in MOH, KSA.

Scope:

This document aims to provide fundamental information to physiotherapists as manual for treating adults and children with confirmed COVID-19 in the acute hospital setting including screening to determine indications for physiotherapy, respiratory physiotherapy, Exercises interventions and personal protection policy.

Sitting:

ICU and medical wards in the hospitals.

Methodology:

Topic and objectives were set by a group of experts members of the General directorate of medical rehabilitation and long term care MOH, members agreed that un urgent guidance is need for physical therapist practice and care for COVID 19 patients is needed and review of available guidelines and recommendation were gathered by the author followed by a review from a group of experts.

Target population:

Patient with confirmed diagnosis of COVID19 and Admitted in ICU or medical wards in the hospitals, clinically stable and there is indication for respiratory physiotherapy or exercise intervention.

Target Audience:

Physiotherapists who works in the intensive care unit (ICU) and hospitals medical wards and caring for adult or pediatric patients with COVID-19. Role Respiratory therapists may interfere with the role of respiratory physiotherapy for patients with COVID19, so that each health facility if does not have respiratory therapist, the physiotherapist will perform the role of respiratory physiotherapy. Physiotherapist ought to be trained before practicing respiratory physiotherapy.

Goal of physiotherapy intervention for patients with respiratory diseases.

The goal of physiotherapy in caring of respiratory diseases can be summarized to:

1. Improve lung function.
2. Decrease the patient's dependency on the ventilator and improve residual function.
3. Limit patient morbidity and mortality.
4. Optimize ventilation and oxygenation.

5. Reduce number of hospitalization days of patient.
6. Reduce complications and improve quality of life as much as possible.

Section 1: Considerations prior to respiratory physiotherapy interventions.

Physiotherapist should consider the following points before starting the physiotherapy intervention.

1.1	The respiratory infection linked with COVID-19 is mostly associated with dry non-productive cough and lower respiratory tract involvement, which usually involves pneumonitis rather than exudative consolidation. In these situations, respiratory physiotherapy interventions are not indicated.
1.2	Patients who have suspected or confirmed COVID-19 and concurrently or subsequently develop exudative consolidation, mucous hypersecretion and/or difficulty clearing secretion, Respiratory physiotherapy interventions in hospital wards or ICU may be indicated.
1.3	Respiratory Physiotherapy interventions must only be given when there are clinical indicators, this is to limit unnecessary physiotherapist exposure to patients with COVID-19
1.4	physiotherapist staff should not regularly go inside isolation rooms of patients with confirmed COVID-19.
1.5	physiotherapist should keep a safe distance from patients if there is no intervention by hand, such as education on airway clearance techniques.
1.6	Understanding the mechanism of infection of COVID-19.
1.7	In ICU, the physiotherapist must consult the medical team before starting the intervention.
1.8	It may be necessary to receive patients from acute care earlier than is generally done.
1.9	physiotherapy of a patient should be started only when all the following conditions are met: - Fraction of Inspired Oxygen (FiO2) ≤ 60%. (0.6). - Saturation (SpO2) ≥ 90%. - Respiratory rate: ≤ 40 breath/min. - Positive End-Expiratory Pressure (PEEP) ≤ 10 cmH2O. - Systolic Blood Pressure (BP) ≥ 90 mmHg and ≤ 180 mmHg. - Mean Arterial Pressure (MAP) ≥ 65 mmHg and ≤ 110 mmHg.

	- Heart rate (HR): ≥ 40 BPM and 120 ≤ BPM. - No new arrhythmias or myocardial ischemia. - No sign of shock with concomitant lactic acid ≥ 4 mmol/L. - No new unstable deep vein thrombosis and pulmonary embolism. - No suspected aortic constriction. - No serious liver and kidney disease - Body temperature ≤ 38.5°C.
1.10	physiotherapy session must be stopped when the following situation occurs and inform nurse in charge – High intensity of fatigue and intolerance of physical activity of the patient. – The Patient is anxious. – Start of arrhythmia or developing myocardial ischemia. – Systolic blood pressure: <90 mmHg or > 180 mmHg. – Unsealing of the closed respiratory system. – Blood oxygen saturation: < 90% or drop > 4% from the baseline – No synchronization between patient and ventilator. – Respiratory rate > 40 breaths/min. – Mean Arterial Pressure (MAP) less than 65 mmHg or more than 110 mmHg or a change of more than 20% from the baseline or > 120 BPM.

Section 2: Screening recommendations for physiotherapy involvement with confirmed COVID-19 adult patients

COVID-19 patient presentation (confirmed or suspected)	Physiotherapy referral
Mild symptoms without significant respiratory compromise e.g. fevers, Dry cough, no chest x-ray abnormality.	– **Respiratory Physiotherapy interventions are not required for sputum samples or airway clearance.** – **No physiotherapy contact with patient.**

Pneumonia presenting with features: A low-level oxygen requirement (e.g.oxygen flow ≤5L/min for SpO2 ≥ 90%.(non-productive cough or patient coughing and able to clear Secretions independently.	– Respiratory Physiotherapy interventions are not required for sputum samples or airway clearance. - No physiotherapy contact with patient.
Mild symptoms and/or pneumonia and co-existing respiratory or neuromuscular comorbidity e.g. Cystic Fibrosis, neuromuscular disease, spinal cord injury, bronchiectasis, COPD and current or anticipated difficulties with secretion clearance.	– Respiratory Physiotherapy referral for airway clearance – Airborne precautions – patients must wear a surgical mask
Mild symptoms and/or pneumonia and evidence of exudative consolidation with difficulty clearing or inability to clear secretions independently e.g weak, ineffective and moist sounding cough, tactile fremitus on the chest wall, moist/wet sounding voice, audible transmitted sounds.	– Respiratory Physiotherapy referral for airway clearance. – Airborne precautions. – Patients must wear a surgical mask
Severe symptoms relate to pneumonia / lower respiratory tract infection e.g. increasing oxygen requirements, fever, difficulty breathing frequent, severe or productive coughing episodes, chest x-ray / CT / lung ultrasound changes consistent with Consolidation.	– Physiotherapy referral for airway clearance. – Physiotherapy may be indicated particularly if weak cough, productive and/or evidence of pneumonia on imaging and/or secretion retention. – Staff use airborne precautions where possible. – Patients should wear a surgical mask during any physiotherapy. – Early optimization of care and Involvement of ICU is recommended
Any patient with a significant risk of developing or with evidence of significant functional limitations e.g. patients who are frail or have multiple comorbidities impacting their independence e.g. mobilization exercise, and rehabilitation in ICU patients with significant functional difficulties and or at risk for ICU-acquired weakness.	– Physiotherapy referral – Use droplet precautions – Use airborne precautions if close contact required – If not on mechanical ventilation, patients should wear a surgical mask during any Physiotherapy session.

Section 3: referral system

Patients are referred to physiotherapy services by a pulmonologists or pediatric pulmonologist, an internal medicine, Critical Care Consultants or ICU physician. After the referral, the physiotherapist will review the eligibility of the patient condition and select the suitable intervention.

Section 4: respiratory physiotherapy intervention for adult with confirmed COVID19.

4.1	During respiratory physiotherapy intervention, personal Protective Equipment is recommended to assure airborne infection precautions.
4.2	Assessment and evaluation: -based on general clinical assessment, particularly functional evaluation, respiration and cardiac status, cognitive status, thoracic activity, respiratory pattern and frequency, Wheeze , Cough Sputum Chest pain,…etc. -past medical and drug history must be considered. -vital signs and other reports such as Chest X-rays must be considered -It is important for physiotherapists to be aware of the medical management for patients with COVID-19.
4.3	Where respiratory equipment is used, whenever possible, use a single-patient-use disposable option. Re-usable respiratory equipment should be avoided where possible.
4.4	As it involves disconnection/opening of a ventilator circuit, do not use manual hyperinflation and use ventilator hyperinflation if indicated (eg, for superlative presentations in ICU and if local procedures are in place.).
4.5	Sputum inductions should not be performed.
4.6	Breathing techniques should be performed in a sitting position or semi-supine position.
4.7	It should not implement non-invasive ventilation or other aerosol-generating procedures without the consultation and agreement of the treating physician.
4.8	Cough etiquette: Both patients and physiotherapist must practice cough etiquette and Hygiene. During techniques that may provoke a cough, education is given to enhance cough etiquette and hygiene. - Ask the patient to turn his/her head away during cough or spitting. - Patients should be advised to “catch their cough” with a tissue, and perform hand hygiene. If patients are unable to do this independently then staff Should help. -Tissues should then be disposed and hand hygiene performed.

	- If possible, therapist must take place themselves ≥ 2m from the Patient and out of the "blast zone" or line of a cough.
4.9	Aerosol-generating procedures Aerosol-generating procedures may occur during respiratory physiotherapy intervention. this includes – Cough-generating procedures (eg, cough during treatment or huff). – Positioning or gravity-assisted drainage techniques and manual techniques (eg expiratory vibrations, percussion and manual assisted cough) that may trigger a cough and sputum expectoration. – Use of positive pressure breathing devices eg, (inspiratory positive pressure breathing), mechanical insufflation-exsufflation devices, intra/extra pulmonary high-frequency oscillation devices eg, Percussionaire – Positive expiratory pressure therapy. – Bubble Positive expiratory Pressure. – Nasopharyngeal or oropharyngeal suctioning – Manual hyperinflation – Open suction. – Saline instillation via an open-circuit endotracheal tube. – Inspiratory muscle training, particularly if used with patients who are ventilated and disconnection from a breathing circuit is required. For this reason, there is a high risk of airborne transmission of COVID-19 during those interventions. -Where aerosol-generating procedures are indicated and considered essential they should be undertaken in a negative-pressure room, if available, or in a single room with a closed door. Only the minimum number of required staff should be present and wear personal protective equipment.
4.10	Tracheostomy management. – The presence of a tracheostomy and procedures related to it are potentially "aerosol Generating". – Inspiratory muscle training, speaking valves and leak speech should not be attempted until patients are over the acute infection and the risk of transmission has subsided. Airborne precautions are recommended with infectious COVID-19 patients who have a tracheostomy.therefore, practitioner should wear higher levels of Personal Protective Equipment.

4.11	Cleaning airway techniques can be performed but not recommended in acute phase in patients with COVID19 without major problems of bronchial obstruction The following techniques can be used when cleansing the airways – Manual techniques (percussion, chest compressions). – Active Cycle of Breathing Techniques. – Modified drainage positions. – Manual Assisted Coughing – Positive Expiratory Pressure with or without Oscillation. – Forced Expiration Technique.
4.12	Position Management: - Postural drainage limit the influence of sputum on the respiratory tract and Patients must learn to tip themselves into a position, which allows gravity to assist in draining excretion. -For patients using sedatives and suffering from consciousness disturbance, a standing-up bed or the bed head elevation (30°-45°-60°) may be applied. Standing is the best body position for breathing in a resting state and can increase the patient's respiratory efficiency and maintain lung volume. As long as the patient feels good, let the patient take a standing position and gradually increase the time standing. Patients with shortness of breath should be placed in a leaning forward position. Anti-gravity posture simulation is gradually increased until the patient can maintain an upright position. -Positional therapy (seated, semi-orthopnea, prone) with close monitoring is indicated to improve the ventilation/perfusion ratio and to prevent damage from immobilization
4.13	Respiratory exercises may consider including: -Deep-slow breathing: - Chest expansion breathing - Active cycle of breathing technique: Three stages: breathing control, thoracic expansion and exhalation. How to form a cycle of breathing should be developed according to the Patient's condition.
4.14	The following respiratory physiotherapy is not recommended on patients with COVID-19 during the acute phase -pursed lips breathing

	- incentive spirometer -bronchial hygiene/lung re-expansion techniques. -stretching of the rib cage. -nasal washings -respiratory muscle training.

Section 5: respiratory physiotherapy intervention for Children with COVID19.

5.1	Children are less severely affected by COVID19 than adults.
5.2	High-flow oxygen or nebulized therapy, airborne precautions must be maintained in the highest level of isolation available.
5.3	The examination includes breathing/respiratory distress, breathing/respiratory distress and Cyanosis.
5.4	Assessment of severity includes severe respiratory, distress, hypoxemia or cyanosis, tachycardia and mental state.
4-4	Respiratory physiotherapy intervention should be managed as per disease severity according to severity of Bronchiolitis, Croup, and lung injury, which can be classified as follows:

Bronchiolitis			
	Mild	Moderate	Sever
Respiratory rate	Normal – mild tachypnea	Increased respiratory rate	Marked increase or decrease in respiratory rate
Accessory muscle	Nil to mild chest wall retraction	Moderate chest wall retractions Suprasternal retraction Nasal flaring	Marked chest wall retractions Marked suprasternal retraction Marked nasal flaring
Oxygen saturation oxygen requirement	O2 saturations greater than 92% (in room air)	O2 saturation 90 –92% (in room air)	O2 saturations less than 90% (in room air)
Apneic episodes	None	May have brief apnea	May have increasingly frequent or prolonged apnea

Feeding	Normal	May have difficulty with feeding or reduced feeding	Reluctant or unable to feed

Croup.			
	Mild	Moderate	Sever
Behavior	Normal	Intermittent/ mild agitation	Increasing agitation Drowsiness
Stridor	No stridor, or only when active or upset	Intermittent stridor at rest	Persistent stridor at rest
Respiratory Rate	Normal	Increased respiratory rate	Marked increase or decrease
Accessory Muscle	None or minimal	Moderate chest wall retraction	Marked chest wall retraction
Oxygen saturation			Hypoxia is a late sign which indicates life-threatening croup

Lung injury.			
	Mild	Moderate	Sever
(acute respiratory distress syndrome).	4<oxygen index<8	8<oxygen index<16	oxygen index >16

5.6	Mild to moderate cases, the respiratory physiotherapy intervention as the following:
	5.6.1-patent isolation.
	5.6.2- discusses with senior nurse clinician in ICU about using High-flow nasal oxygen therapy.
	5.6.3- non-invasive ventilation.
4-6	Severe cases the respiratory physiotherapy intervention as the following:
	5.7.1- respiratory support.
	5.7.2- patient isolation.
	5.7.3- Airborne precautions.
	5.7.4- high-flow oxygen, non-invasive ventilation or nebulized therapy if indicated.

Section 6: Exercise Intervention for Adult patients with COVID19 in ICU or Medical Wards.

6.1	Adhere infection control precaution during exercise session.
6.2	Training of the skeletal muscle and the maintenance/recovery of the activities of daily living are contraindicated in acute phase.
6.3	Session should be provided one-on-one in patients' rooms.
6.4	Exercise management may include passive range of motion (ROM) and therapeutic positioning if the patient is unconscious or unable to move his or her limbs in order to prevent ICU complication.
6.5	Physiotherapist provides active Early mobilization and free exercise for patient who is able to move his or her limbs include sitting out of bed, sit to stand, upper/lower limb ergometer and exercise programs.
6.6	Physiotherapy management also includes strengthening exercise, progress mobilization exercise according to patient state.
6.7	Exercise prescription depends on muscle power, functional independency, respiratory function, hemodynamic function and oxygen dependency.
6.8	According of the type of intervention, the intensity, timing and modality should be tailored to the individual patient's needs (severe/critical illness, obesity, elderly patients, comorbidity and other complications.
6.9	Intensity of exercise should not be hard leading to high breathing effort.
6.10	it can be used the next activity prescriptions but not usually intensity: Borg dyspnea score ≤3 points (total score: 10 points) Exercise frequency: one to twice a day, duration: 15–45 minutes/session.
6.11	Assessment and monitoring specially vital signs should continue throughout the entire exercise process and When a patient reports one or more symptoms during the therapy, it should be reported to the medical team: the symptoms are Heavy, sudden dyspnea, Compression or pain in the thorax, Vomiting, Dizziness, headaches, Blurred vision, Heart palpitations, Sweating and Inability to maintain balance.
6.12	Mobility aids should be preserve in isolation room for utilize of one Covid19 patient.
6.13	Mobility aids must be carefully cleaned and disinfected if it is used for another patient.

6.14	Extra care must be taken for patient with mechanical ventilation to maintain ventilator circuit during exercise session.
6.15	The patient with COVID19 should stay in their rooms. However, he or she wear surgical mask when walk outside isolation room if needed.
6.16	Use equipment that can be single patient use. For example, use elastic resistance bands rather than distributing hand weights.
6.17	Prevent the transfer of equipment between infectious and non-infectious areas.
6.18	When performing activities with ventilated patients or patients with a tracheostomy, ensure that airway security is considered and maintained.
6.19	Advice nurses about contracture prevention during the first days (Support ankles in a 0°, support wrists in 30° extension, move shoulders to 80-90° abduction with external rotation).
6.20	Patients discharged home should receive indications on how to cope with physical activity, which need to be closely monitored regarding function, capacity and participation when the patient is cured with no longer risk of contagion and infection. -Active limb exercises post discharge suggested program: 8-12 repetition-maximum load for 8-12 repetitions, 1 to 3 sets with 2 minutes rest between sets, 3 sessions a week for 6 weeks. -Progressive aerobic exercise post discharge should be increased to 20-30 minutes, 3-5 times a week (14).

Section 7: infection control measures for physiotherapists

7.1	All physiotherapists must be trained for correct donning and doffing of Personal Protective Equipment.
7.2	Droplet precautions should be implemented.
7.3	Airborne precautions are followed, including: – An N95/P2 mask. – Fluid-resistant long-sleeved gown. – Eye protection or face shield. – Gloves. – Hair cover. – Gown.

	– Shoes cover.
7.4	Fit mask testing is an important part of planning.
7.5	Physiotherapists must wear personal protective equipment during the duration of exposure to potentially contaminated areas.
7.6	It is recommended that staff change their scrubs before leaving the health care facility and keep them in a bag for washing.
7.7	All personal items such as earrings, watches, mobile phones, pens, etc. should be away before entering the isolation area of the patient with COVID-19.
7.8	Hair should be tied back away from face and eyes
7.9	Staff must obey hand hygiene pre and post entering the isolation room.
7.10	If patients are placed into open rooms in ICU, staff working within the borders of the ICU but not directly in-contact with inpatient care should wear Personal Protective Equipment.
7.11	Staff must use plastic aprons, a change of gloves and practice hand hygiene in between patients in open areas.
7.12	Avoid sharing equipment. Preferably, use single-use equipment.
7.13	Carefully consider equipment use and discuss with infection control services to ensure it can be properly decontaminated.
7.14	Any extra items such as a stethoscopes, pulse oximeters, ultrasound taken into a room will need to be disinfected
7.15	a sealed plastic bag should be used by patient when coughing to avoid virus transmission
7.16	Use a waterproof apron for procedures with expected high fluid volumes that might penetrate the gown.
7.17	As possible, minimize the times of entry and exit during physiotherapy sessions.
7.18	As possible, minimize touching the surfaces in a patient environment.
7.19	Frequently perform hand hygiene especially after remove gloves and Make antibacterial hand rub available.
7..20	Avoid touching your eye, mouth, nose and ear during a session

7.21	Practitioner who are expected to be of high risk must not enter the COVID-19 isolation. This includes staff who are: - pregnant -severe chronic health conditions - more than 60 years of age -chronic respiratory illnesses - immunosuppressed. -immune deficiencies.
7.22	Time should be taken to train and retrain personnel in the use of personal protective equipment

Limitation and Recommendation:

Strengths of those guidelines are the first Saudi guideline responds to an urgent need for clinical instructions for acute care physiotherapy in Saudi Arabia and. In addition, the guidelines covered approximately most clinical aspect that physiotherapy needs related to COVID19 in acute care. The limitations to this recommendations includes the following: it may change over time as we learn more about COVID-19 and the recommendation also had been established with limited references due to insufficient published articles. Therefore, it is recommended that the guideline be reviewed when new evidence in physical therapy of COVID19 is available.

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