POST COVID-19 CONDITIONS MANAGEMENT PROTOCOL

Approach to Post COVID-19 conditions – A guide for Healthcare workers

Government of Nepal
Ministry of Health and Population
Department of Health Services
Curative Service Division
Kathmandu, Nepal

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Government of Nepal
Ministry of Health and Population
Department of Health Services
..... Division

4-261712
4-261436
Fax: 4-262268

Pachali, Teku
Kathmandu, Nepal

Ref No.:

Acknowledgement

I feel privileged to write a few words on the "Post COVID-19 Conditions Management Protocol". The focus of the COVID-19 response has been on the management of acute COVID-19 cases, management of hospitalized cases, beds, equipment, oxygen delivery systems, management of isolation centers for mild and asymptomatic cases, vaccination and preventive measures. However, evidence has shown that COVID-19 can cause persistent ill health after the resolution of an acute infection. The persistent symptoms include a variety of mid- and long-term effects such as anxiety, fatigue, breathlessness, and cognitive dysfunction, collectively known as the "post COVID-19 condition" or "long COVID." These affect a person's ability to perform daily activities such as household chores, return to work/school, or even have a social life. This makes proper identification and management of Post COVID-19 conditions important but challenging at the same time due to the growing burden. In such a backdrop, a national protocol to manage such conditions has become a necessity.

I believe this protocol will be a great resource for healthcare workers to facilitate prompt diagnosis and management of post COVID-19 conditions in Nepal. In addition, "Support for Rehabilitation: Self-management after COVID-19-related illness (second edition)"—published by the WHO Regional Office for Europe has been translated and adapted to fit Nepal's context, which is a useful supplement to this guideline.

I would like to express my sincere gratitude to Dr. Pawan Jung Rayamajhi and the team at Curative Service Division for taking the initiative in ascertaining the burden of Post COVID-19 conditions in Nepal and developing the management protocol. I would like to acknowledge all the experts for their contributions towards the finalization of this management protocol and would like to thank WHO-Nepal for their support.

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Dr. Dipendra Raman Singh
Director General
Department of Health Services

Government of Nepal
Ministry of Health and Population
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.....Curative Service..... Division

4-261712
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Foreword

With immense pleasure, I am writing these words of appreciation for the development of the "Post COVID-19 Conditions Management Protocol." Most of the COVID-19 patients recover after an acute infection with SARS-CoV-2. However, a significant proportion of them experience persistent symptoms such as fatigue, cardiovascular, respiratory, and cognitive/mental health issues that need medical, rehabilitative support and authentic self-care advice.

The national protocol is prepared with an objective to facilitate the care of Post COVID-19 cases. As a supplement to this protocol, the Nepali translation of the document, "Support for Rehabilitation: Self-management after COVID-19-related illness (second edition)" published by the WHO Regional Office for Europe has been adapted to fit Nepal's context. The protocol also includes the key findings from a large cross-sectional study done among the long/post COVID-19 cases. According to the data, 58.8 % of the cases experienced symptoms after recovery from the acute illness. This suggests that our health system needs to plan for the management of Post COVID-19 conditions in the days to come.

I would like to thank our team at Curative Service Division and all the contributors for preparing this important protocol. I am equally grateful to WHO-Nepal for their technical and financial support in the development of this concise yet comprehensive management protocol. I believe this management protocol will bring uniformity, clear ambiguities and guide healthcare workers for the management of Post COVID-19 cases in Nepal.

Dr. Pawan Jung Rayamajhi
Director
Curative Service Division
DoHS, Teku

World Health Organization
Nepal

UN House, Pulchowk, Lalitpur, Po Box: 108, Kathmandu, Nepal, Tel: +977-1-5523200 Fax: +977-1-5527756 E-mail: wrnep@ who.int

FOREWORD

For some people, coronavirus disease (COVID-19) causes persistent symptoms that last for weeks to months after the initial acute infection has gone. This is called post-COVID-19 condition or 'long COVID'. These persistent symptoms include but are not limited to, fatigue, shortness of breath, cognitive and mental health symptoms, and new or worsening conditions. While the burden of post-COVID-19 condition is not known, preliminary results from the UK Office for National Statistics estimate 1 in 10 respondents who test positive for COVID-19 may exhibit persistent symptoms, another recent study in the USA found that 30% of COVID-19 patients surveyed still had persistent symptoms after nine months (Who. int)

Globally, WHO has recognized the seriousness of the post-COVID-19 condition calling for more research and rehabilitation with "3Rs"—recognition, research, and rehabilitation. To respond to the issue of post-COVID-19 conditions, WHO Nepal has advocated and supported the Ministry of Health and Population and partners towards the development of a hospital preparedness and response program to include provision for those diagnosed with post-COVID-19 condition.

In Nepal, the Curative Service Division performed an ascertainment of caseload for post-COVID-19 conditions in 17 Unified COVID-19 Hospitals, the findings reveal that 59% had or continue to have at least one symptom of post-COVID-19 condition since their acute onset of COVID-19. Moreover, at least 15% of those recovered from their initial COVID-19 infection, have unmet rehabilitation needs related to musculoskeletal, cardio-respiratory, cognitive, psycho-social problems as well as in activities related to daily living.

This guideline, essentially a case management protocol for the management of post-COVID-19 condition, is a first of its kind in Nepal that will guide health workers at the primary, secondary and tertiary levels of the health system towards early identification, prompt management, and referral of patients with post-COVID-19 condition to the next level of health care. A self-care rehabilitation booklet – "*Support for Rehabilitation: Self-management after COVID-19-related illness (second edition)*" – published by WHO Regional Office for Europe has been translated and adapted to fit Nepal's context as a supplement to this guideline. The booklet is a great resource that provides support and advice to adults recovering from COVID-19.

I would like to thank the Curative Service Division for its continued efforts in facilitating the development of this guideline which began with the formation of a technical working group (TWG) comprising heads of divisions and relevant sections of the health ministry and department of health services and WHO officials under the leadership of Director of Curative Service Division. This initiative also prioritized multi-level and multisectoral collaboration with medical and rehabilitation experts at the federal and provincial levels. Intervening for post COVID-19 conditions in Nepal, shows a commitment that includes rehabilitation as part of health care services, a component of health care that is lacking in many low- and middle-income countries (LMIC).

I congratulate the officials of the Health Ministry and the various experts for their hard work in bringing out this crucial and timely guideline. This is a great step forward for Nepal towards strengthening rehabilitation, particularly in the COVID-19 context. I wish to thank the European Union for extending generous support towards this action.

Dr. Rajesh Sambhajirao Pandav
WHO Representative to Nepal

Technical Working Group (TWG) Members

- Director, *Curative Service Division (CSD), DoHS* - Coordinator
- Representative, *Quality Standard and Regulation Division, MoHP* – Member
- Representative, *National Health Training Centre* – Member
- Representative, *Epidemiology and Disease Control Division, DoHS* – Member
- Representative, *Nursing and Social Security Division, DoHS* – Member
- Representative, Family Welfare Division, DoHS – Member
- Representative, *Sukraraj tropical and Infectious Disease Hospital* – Member
- Representative, *World Health organization (WHO), Nepal* – Member
- Section Chief, *Basic and Emergency Service Management Section, CSD DoHS* – Member Secretary

Core Working Team – Contributed regularly to the development of post COVID-19 conditions management protocol

- **Dr. Sabin Thapaliya,** *Department of Internal Medicine (Infectious Diseases), TUTH*
- **Dr. Rachana Sharma,** *Asst. Professor, Department of Psychiatry, KMCTH*
- **Dr. Saket Jha,** Asst. Professor, *Rheumatology, Department of Internal Medicine, TUTH*
- **Dr. Prajwol Shrestha,** *Coordinator and Deputy Director – COVID, COVID-19 Unified Central Hospital, Bir Hospital*
- **Dr. Shital Adhikari,** *Clinical Specialist Officer, WHO Nepal*
- **Mr. Kamaraj Devapitchai, Consultant,** *WHO Nepal*
- **Dr. Pomawati Thapa,** *Section Chief, CSD*
- **Dr. Lila Bahadur Basnet,** *Community Physician, CSD*
- **Dr. Sudesha Khadka,** *Field Medical Officer, WHO Nepal*

Scope of the document

- This document contains information for Healthcare workers who are providing care for patients previously diagnosed as COVID-19 (tested positive for SARS-CoV-2 or history suggestive of COVID-19 but not tested) or those who are at risk of developing Post COVID-19 conditions.
- This document will be updated as and when new evidence becomes available.

Objectives

1. This document provides a plan of action for a comprehensive multidisciplinary approach and coordinated care for patients with Post COVID-19 conditions.
2. It makes recommendations about Post COVID-19 care in all healthcare settings from community level health care settings to tertiary level.
3. It makes recommendations about Post COVID-19 care for adults, children, elderly and pregnant women.

Operational definition

- The case definition for Post COVID-19 condition shall be as per WHO (October 2021, Delphi Consensus) as described in Page 3.
- The terms Post COVID-19 condition or Post COVID-19 conditions in the document mean post COVID-19 condition as defined by WHO.
- However, for patients presenting with similar symptoms within the 4-12 weeks period to our healthcare facilities shall be evaluated and given similar care and support.

List of Abbreviations

1RM	One-repetition Maximum
1STST	1-minute Sit-to-Stand Test
6MWT	6 Minute Walk Test
ACE-2	Angiotensin-Converting Enzyme 2
ACLS	Advanced Cardiac Life Support
ACPA	Anti-Citrullinated Protein/Peptide Antibody
ADL	Activities of Daily Living
AIDP	Acute Inflammatory Demyelinating Polyneuropathy
AKI	Acute Kidney Injury
ANA	Antinuclear Antibody
ANCA	Antineutrophil Cytoplasmic Antibodies
ARDS	Acute Respiratory Distress Syndrome
BP	Blood Pressure
bpm	Beats per minute
CBC	Complete Blood Count
CBT	Cognitive Behavioral Therapy
CDC	Centers for Disease Control and Prevention
CECT	Contrast Enhanced Computed Tomography
CKD	Chronic Kidney Disease
CNS	Central Nervous System
COVID-19	Corona Virus Disease 2019
CPK-MB	Creatine Phosphokinase-Myocardial Band
CPR	Cardiopulmonary Resuscitation
CRP	C-reactive Protein
CSD	Curative Services Division
CSF	Cerebrospinal Fluid
CT	Computed Tomography
CTD	Connective Tissue Disorder
CTPA	CT pulmonary angiogram
DASS-21	Depression, Anxiety and Stress Scale-21 items
DM	Diabetes Mellitus
DMARD	Disease-Modified Antirheumatic drugs
dsDNA	Double stranded Deoxyribonucleic Acid
ECG	Electrocardiogram
EEG	Electroencephalogram

ESR	Erythrocyte Sedimentation Rate
ESRD	End Stage Renal Disease
EU	European Union
GBV	Gender Based Violence
GER	Gender, Equity and Human Rights
GERD	Gastroesophageal reflux disease
GLP-1RA	Glucagon-like peptide-1 receptor agonists
HDU	High Dependency Unit
HLAB27	Human Leukocyte Antigen B27
HRCT	High Resolution Computed Tomography
HRR	Heart Rate Reserve
ICU	Intensive Care Unit
ID	Infectious Diseases
IL-6	Interleukin-6
IVIG	Intravenous Immune Globulin
LFT	Liver Function Test
MACE	Major Adverse Cardiovascular Events
MIS-A	Multisystem Inflammatory Syndrome in Adults
MIS-C	Multisystem Inflammatory Syndrome in Children
mMRC	Modified Medical Research Council
MMSE	Min- Mental State Examination
MoHP	Ministry of Health and Population
MRI	Magnetic Resonance Imaging
NDHS	Nepal Demographic and Health Survey
NFDN	National Federation of Disabled Nepal
NSAID	Non-steroidal anti-inflammatory drugs
NT-pro-BNP	N-terminal pro b-type Natriuretic peptide
PCPF	Post COVID-19-19 Pulmonary Fibrosis
PCR	Polymerase Chain Reaction
PE	Pulmonary Embolism
PEM	Post-Exertional Malaise
PEP	Positive Expiratory Pressure
PICS	Post-Intensive Care Syndrome
PoTS	Postural Tachycardia Syndrome
PPE	Personal Protective Equipment
PTSD	Post-Traumatic Stress disorder
QoL	Quality of Life
RAAS	Renin-Angiotensin-Aldosterone System

RF	Rheumatoid Factor
RFT	Renal Function Test
ROM	Range of Motion
RPE	Rating of Perceived Exertion
SARD	Systemic Autoimmune Rheumatic Diseases
SARS-CoV-2	Severe Acute Respiratory Syndrome Corona Virus 2
SGLT2i	Sodium-Glucose transport protein 2 inhibitors
SLE	Systemic Lupus Erythematosus
TLR	Toll-like receptor
TMPRSS2	Transmembrane Serine Protease 2
TMT	Treadmill Test
UK	United Kingdom
Urine R/M/E	Urine Routine and Microscopic examination
USA	United States of America
USG	Ultrasonography
VAWG	Violence against women and girls
WHO	World Health Organization
WHODAS	World Health Organization Disability Assessment Schedule

Table of Contents

Summary and Recommendations

For Healthcare providers

- Suspect Post COVID-19 conditions if patients present with new or ongoing symptoms
- Use screening questionnaire along with clinical assessment – comprehensive clinical history (physical, cognitive, psychiatric symptoms) and appropriate examinations.
- Assess functional abilities and limitations – Listen emphatically
- Use holistic, patient-centered approach
- Shared decision - Involve patients in the decision making process
- Provide support for people with disabilities, underserved and vulnerable groups
- Offer tests and investigations tailored to patient's symptoms and signs
- Rule out other differentials and manage pre-existing comorbidities
- Provide time for follow up in person/remotely of admitted patients during discharge
- Refer if patient can't be managed at the facility or doesn't improve with treatment
- Refer urgently, after initial resuscitation, if – hypoxemia or severe respiratory distress, cardiac chest pain, pediatric inflammatory multisystem syndrome or organ dysfunction requiring acute care, sudden deterioration and worsening of symptoms
- Ensure effective information sharing between services – maintaining clinical records

For Policy makers

- Special multidisciplinary Post COVID-19 clinics ('one stop' clinics) or special hours, dedicated patient care pathways or online support tools
- Surveillance and record keeping – using standardized questionnaires and assessment tools, as well as International Collaboration for research
- Use of telemedicine and non-profit organizations for patient support
- Funding for Post COVID-19 programs
- Educational documents, videos both for public and health care providers through national portals and trainings of healthcare personnel for Post COVID-19 care and rehabilitation
- Feedback of Post COVID-19 care and care pathways and updates as required

Introduction

With over 440 million people with documented COVID infections worldwide as of 4th March 2022 (WHO) and many others with possible COVID infections without documentation, there is a growing population of people who recover from acute COVID but are at risk of having persistent or relapsing symptoms. The persistence or new occurrence of symptoms in these patients, which has been termed long-COVID, or Post COVID-19 condition is seen even in those without hospitalization for acute COVID.

The estimation of the prevalence of long-COVID is not easy because of the variability in the demographics and the survey methods used in different studies. However, a significant proportion (10-20%) of those with acute COVID experience long-term symptoms, some of which can be very debilitating with significant economic consequences. It has been observed more frequently in those with multiple symptoms during acute COVID, in women and middle aged individuals. Also, studies done in the UK and the USA showed that hospital readmission rates, and even mortality, were more common in patients treated for acute COVID compared to match controls (Ayoubkhani et al. 2021, Donnely JP et al) which highlight the need for further research and timely diagnosis, treatment as well as prevention of the Post COVID-19 condition.

The symptoms developed may or may not always be causally linked to SARS-CoV-2 virus infection or our immune response to it. The devastating effects of the pandemic, lockdowns and isolation in multiple aspects of life could lead to some of the symptoms seen in these patients. No single test or questionnaire can accurately diagnose Post COVID-19 condition and there is variability in the definition and terminology used as this is a rapidly changing field and data is growing rapidly. The recent definition developed by Delphi consensus method by the WHO shall help bring uniformity in the research and hence the data related to Post COVID-19 condition.

Various studies like PHOSP-COVID (UK), COVIDOM study (Germany) are ongoing in different parts of the world to better understand and plan the management of Post COVID-19 conditions. At present, there is very little concrete knowledge about Post COVID-19 conditions and their best management strategies and further research is required to answer the many questions physicians have while treating Post COVID-19 patients.

Because of the lack of established diagnostic and management strategies, many patients presenting with long-COVID symptoms felt being 'fobbed off' while some felt supported. (Ladds et al.). There are advocacy groups which have called for "Recognition, Research and Rehabilitation" through coordinated multidisciplinary, multispecialty studies to evaluate new models of care for long-COVID and their timely implementation.

At present, due to the paucity of data, approach to the various manifestations of Post COVID-19 conditions includes detailed history taking, elaborate clinical examination and a series of investigations to evaluate the different organ systems involved and to rule out or verify the coexistence of other diseases with similar presentations. The management should be tailored to the organ system involved and the manifestations of the disease. Because of the myriad of presentations of Post COVID-19 conditions, a coordinated multispecialty approach, including rehabilitation, is needed to treat these patients. Also, a care-pathway needs to be established for timely referral to and from various levels of health care services.

Due to the geographical challenges in Nepal for transportation, the recently strengthened Telemedicine facility under the Ministry of Health can be best used to support Post COVID-19 patients in remote areas, more so in the present context of travel restrictions.

This document shall be of help to the healthcare workers in various parts of Nepal who cater to the needs of the Post COVID-19 patients both for their management and timely referral.

This is a dynamic document and shall be updated as more data of the Post COVID-19 conditions are available. This guideline is expected to reduce the fear, uncertainty and the sense of limited information and knowledge (because of the changing nature of evidence as well as fluctuating nature of symptoms) faced by healthcare workers taking care of those with Post COVID-19 conditions.

Definition

Initially, there was no universally accepted definition for Post COVID-19 conditions. Different studies, and different organizations, have taken variable duration of symptoms and subsets of patients into account. So far, the persistence or new occurrence of symptoms beyond 4 weeks of acute illness is considered Long-COVID (by most, not all). Within long-COVID, two conditions are included – Ongoing symptomatic COVID-19 (4-12 weeks) and Post COVID-19 condition (>12 weeks).

In October 2021, a definition of Post COVID-19 conditions (PCC) with 12 domains was finalized by Delphi methodology by the WHO (Ref) -

> Post COVID-19 condition occurs in individuals with a history of probable or confirmed SARS-CoV-2 infection, usually 3 months from the onset of COVID-19 with symptoms that last for at least 2 months and cannot be explained by an alternative diagnosis. Common symptoms include fatigue, shortness of breath, cognitive dysfunction but also others which generally have an impact on everyday functioning. Symptoms may be new onset, following initial recovery from an acute COVID-19 episode, or persist from the initial illness. Symptoms may also fluctuate or relapse over time.
> (A separate definition may be applicable for children.)

Notes:

- There is no minimal number of symptoms required for the diagnosis.
- Fluctuate – a change from time to time in quantity or quality.
- Relapse – return of disease manifestations after period of improvement.
- Cluster – two or more symptoms that are related to each other and that occur together. They are composed of stable groups of symptoms, are relatively independent of other clusters, and may reveal specific underlying dimensions of symptoms.

As mentioned by WHO this definition 'is a first, necessary, step to optimize the recognition and care of persons experiencing post COVID-19 condition in community and health care settings' and shall reduce the patients' dissatisfaction that their symptoms are not being taken seriously.

Although this case definition is broad enough to capture most of those who need medical help and support, patients presenting with similar symptoms within the 4-12 weeks period to our healthcare facilities shall be evaluated and given similar care and support. Post COVID-19 condition is an umbrella term and it includes isolated symptoms or different clusters or syndromes within.

The clinical case definition of Post COVID-19 condition tends to exclude symptoms directly related to acute complications of COVID-19 (like post-intensive care syndrome, acute respiratory distress syndrome, stroke, acute kidney injury, myocarditis, thrombosis). However, these sets of patients will also get similar evaluation and care, either through Post COVID-19 care pathways or their disease specific care pathways.

Symptoms

A range of new or ongoing symptoms can be seen in Post COVID-19 patients. Unlike many other diseases where symptoms persist only in those who had severe illness or required hospitalization for the acute illness, Post COVID-19 symptoms can be seen even in those with asymptomatic or mild illness. More than 200 symptoms have been reported. (Davis et al. medRxiv,2020)

Patients commonly report different combinations of the following symptoms (Olalekan Lee Aiyegbusi et. al):

- Fatigue or tiredness – increased with exertion (post-exertional malaise)
- Shortness of breath
- Joint or muscle pain, muscle spasms
- Cough
- Headache, Dizziness
- Chest pain
- Decreased appetite, altered smell and taste
- Gastrointestinal problems – diarrhea, constipation, acid reflux
- Palpitations
- Difficulty thinking or concentrating (also referred to as “brain fog”)
- Sleep problems
- Tingling and numbness, pins-and-needles sensation
- Fever
- Abdominal pain, Throat discomfort
- Skin rashes
- New onset allergies
- Mood changes
- Fear and anxiety
- Menstrual and period problems
- Blurred vision

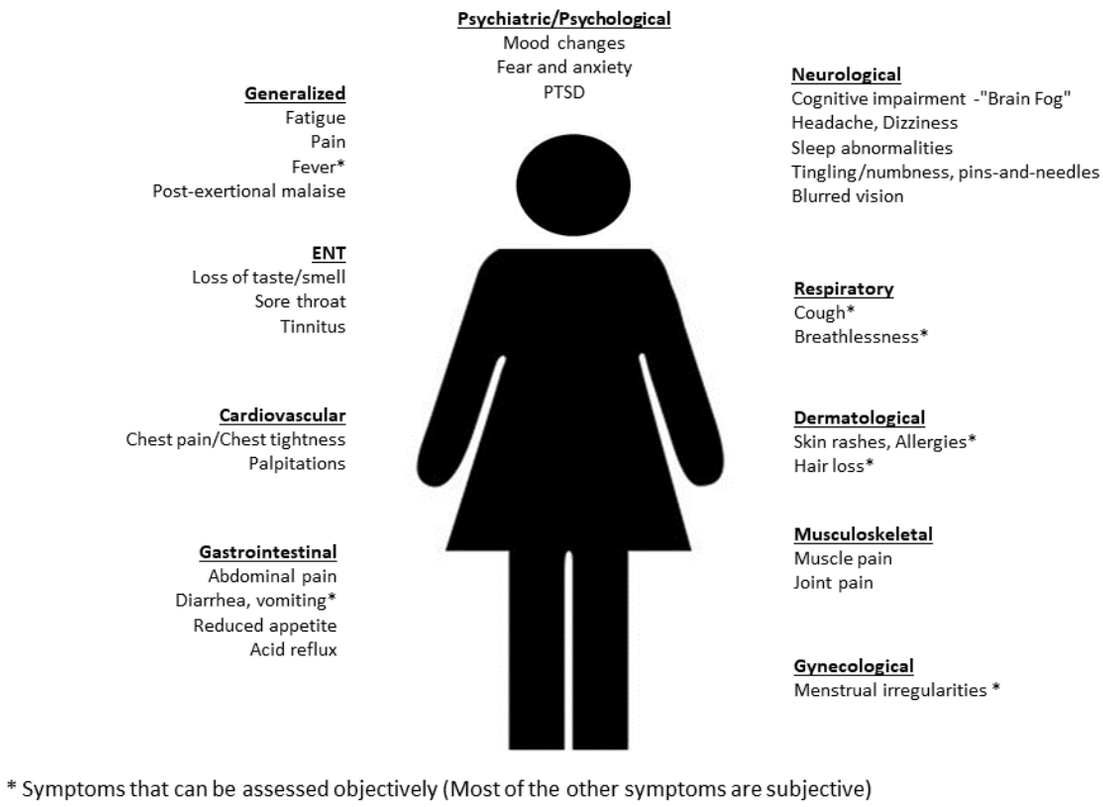


Figure 1: Common symptoms of Post COVID-19 condition

People may also report increased absence or reduced performance in their education, work or training. Older patients may have atypical symptoms which may be overlooked.

Children may present with tiredness, weakness, headache, abdominal pain, muscle pain, shortness of breath, loss of smell, dizziness, skin rashes and lack of concentration.

A study was conducted by the Curative Services Division, MoHP in coordination with WHO Nepal recently to find out the most common symptoms in six thousand Post COVID-19 patients in Nepal and their impact on activities of daily living. The most common symptoms reported were anxiety, loss of appetite, shortness of breath, fatigue, muscle pain, headache, and rashes. (Figure 2)

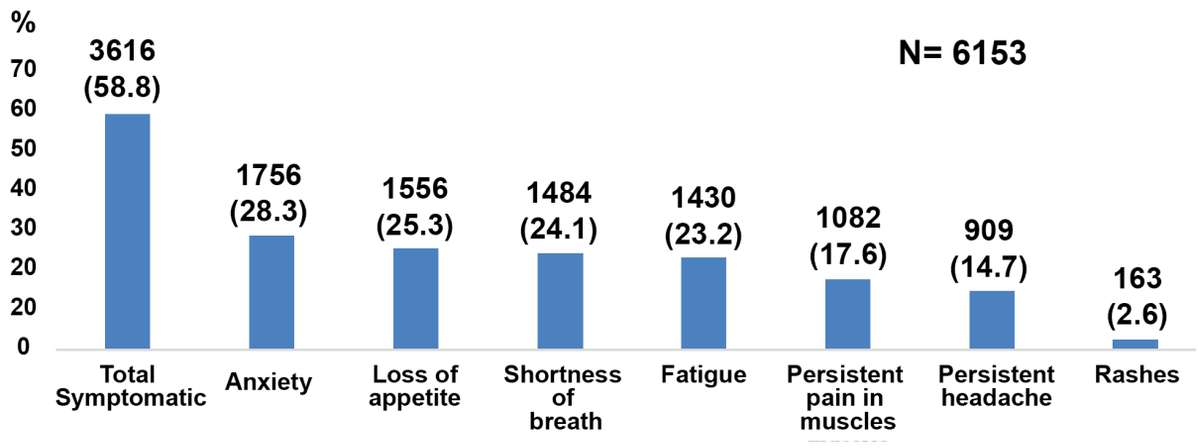


Figure 2: Most common symptoms among Post COVID-19 patients in Nepal (Source: CSD)

The Post COVID-19 patients in the study done by CSD reported variable difficulty in functioning / self-care of daily living as shown in table below.

SN	Functioning / Self-care	Mild Difficulty		Moderate to Severe Difficulty	
		No.	%	No.	%
1	Standing for long periods such as 30 minutes	927	15	162	3
2	Walking a long distance such as kilometer	946	15	230	4
3	Taking care of household responsibilities	772	13	143	2
4	Performing day to day work	526	9	122	2
5	Joining in community activities	439	7	122	2
6	Concentration on doing something for 10 minutes	435	7	116	2
7	Learning a new task	393	6	107	2
8	Being emotionally affected by own health problems	295	5	80	1
9	Taking bath	300	5	81	1
10	Getting dressed	266	4	79	1
11	Dealing with strangers	231	4	70	1
12	Maintaining a friendship	185	3	70	1

Table: Difficulty in functioning / self-care in Post COVID-19 patients(n=6153) (Source: CSD)

Pathophysiology

- Not fully understood, multiple possible
- Sequelae are seen in other viral infections like Subacute sclerosing panencephalitis (SSPE) in Measles, West Nile Virus-related sequelae and possible multiple sclerosis in Epstein Barr virus infection.
- The possible mechanisms of development of Post COVID-19 conditions are
    1. Direct effect of virus in different organs – widespread presence of ACE-2 receptors
    2. Persistent inflammation triggered by the virus
    3. Thrombosis due to endothelial dysfunction and hypercoagulable state
    4. Autoimmunity
    5. Adverse effects of treatment
    6. Inadequate treatment during acute COVID
    7. Effects of hospitalization or ICU admission
    8. The mental health effects of isolation, negative economic situations, lack of access to healthcare for other conditions, loss of family members, etc.

At risk population

- Anyone infected with SARS-CoV-2 is at risk of developing Post COVID-19 conditions irrespective of the severity during acute infection
- Risks inherent to certain conditions – e.g., PICS risk for those in ICU
- Association shown - Increasing age, female sex and higher number of COVID symptoms
- Under evaluation - increased levels of D-dimer or C-reactive protein, reduced lymphocyte count, pre-existing comorbidities, obesity, prior psychiatric disorder, increased levels of IL-6, procalcitonin, blood urea nitrogen and troponin I
- Genetic predisposition – theoretically possible, studies needed to verify

Equity

Health equity is achieved when everyone can attain their full potential for health and well-being. (WHO) COVID pandemic has exposed the inequalities in healthcare worldwide. Post COVID-19 conditions are expected to affect the livelihoods of the socially, economically, demographically or geographically deprived population to a greater extent because of the inability to resume work and earn. Moreover, awareness, access to healthcare, and utilization of services is lesser in these populations. Hence, the Post COVID-19 care in a country like Nepal should be made accessible to all, preferably free of cost like the treatment of COVID was made free of cost in all government healthcare facilities.

Approach to Post COVID-19 Manifestations

Although the symptoms in many studies were prone to recall bias as they were self-reported and documented retrospectively, the presence of these symptoms has been reported from almost all over the world with variable frequencies.

1. Any organ system may be involved both in acute SARS-CoV-2 infection and in Post COVID-19 condition.
2. Impairment in one or more organs.
3. Generalized symptoms more common – fatigue, muscle aches, breathlessness.
4. Most of these conditions impact on the patient's ability to continue their jobs or even day-to-day activities.

Evaluation and Necessary Investigations

The detailed description of the evaluation, investigation and management of each symptom is beyond the scope of this guideline. The general principles to be followed during evaluation and the common investigations required in the diagnosis and management of Post COVID-19 conditions are discussed here.

Ten Things to consider during evaluation of Post COVID-19 conditions:

1. Suspect ongoing symptomatic COVID-19 (4-12 weeks since onset) and Post COVID-19 (>12 weeks since onset) if patients present with new or ongoing symptoms.
2. Use a screening questionnaire for initial consultation, along with clinical assessment.
3. Use a holistic, patient-centered approach.
4. As most of the symptoms are subjective, whether to proceed for further assessment, investigations or referral should be a shared decision with the patient. If telemedicine is being used, take into account whether the symptoms need immediate medical care or investigations in person.
5. People with disabilities, underserved and vulnerable groups might have difficulty accessing services – consider providing extra time or additional support (like interpreter or volunteers) during consultations. As these vulnerable groups are less likely to attend healthcare facilities, including the local community leaders or organizations in raising awareness and referral process is commendable.
6. The symptoms can be wide-ranging and fluctuating and the diagnosis of Post COVID-19 condition is of exclusion. Investigations should be done accordingly to rule out the differentials at the same time keeping in mind the possibility of Post COVID-19 condition.
7. Due to the lack of specific symptoms or particular investigations to diagnose Post COVID-19 conditions, the diagnosis and approach depends more on the consideration of the healthcare worker. Thus, healthcare workers should be more vigilant while diagnosing Post COVID-19 conditions.
8. Include comprehensive clinical history (physical, cognitive, psychiatric symptoms) and appropriate examination. Always assess functional abilities and limitations - Listen emphatically to the patient's concerns.
9. Offer tests and investigations tailored to patient's symptoms and signs.

10. Refer the patient if he/she can't be managed at the facility or he/she doesn't improve with treatment in the expected duration. Tele-consultations should be used whenever feasible to avert the need for patient transfer.

    Refer urgently to Emergency Services if patients have signs or symptoms of acute or life threatening complication, including (not exclusive):

    - Hypoxaemia or severe respiratory distress or desaturation on exercise
    - Cardiac chest pain
    - Paediatric Inflammatory Multisystem Syndrome
    - Organ dysfunction requiring acute care

Holistic assessment of Post COVID-19 condition should at least include:

1. Assessment and management of breathlessness
2. Assessment and management of oxygen requirements
3. Assessment and management of dysfunctional breathing
4. Consideration of a new diagnosis of venous thromboembolic disease (VTE)
5. Psychosocial assessment and onward referral where required
6. Assessment and management of psychological/psychiatric issues
7. Symptom or palliative care management where required
8. Consideration of rehabilitation needs and onward referral where required

Post COVID-19 condition is mostly a clinical diagnosis. There are some lab tests to particularly look for markers of inflammation and the symptoms guide the other investigations. Offer the tests only if clinically indicated. The investigations available at different levels of healthcare facilities are as follows:

At primary care centers	**CBC, Chest X-ray, ECG, Blood sugar, RFT, LFT, ESR, CRP, 6-minute walk test** ***Sputum culture, C-reactive protein, HbA1c, ABG**
At referral centers	**Lung function tests, Peak Expiratory Flow Rate, d-dimer, Thyroid Function Tests, Holter, Ambulator BP, Echo, Chest CT, MRI brain**

*** Where available**

1. Abnormal reports or chest X-ray appearances alone should not determine the need for referral for further care.
2. Normal laboratory reports and chest X-rays do not rule out Post COVID-19 condition.
3. If another diagnosis unrelated to COVID-19 is suspected, investigations and referral should be done in line with relevant national or local guidance.

- The assessment of Post COVID-19 patients is an ongoing process with possible upward and downward referrals and hence information sharing between services is very crucial.

Documenting the symptoms and the assessments (like resting SpO2, Heart rate, results of tests) is mandatory at each visit.

- Assessment of functional capacities and limitations in activities of daily living and consideration of the rehabilitation needs - at each visit.
- The patients should be taught how to manage the symptoms at home and who to contact for persisting or worsening symptoms. Wherever feasible, written information or links to such information should be provided.

Treatment

- No established pharmacological interventions for Post COVID-19 condition as a whole.
- Symptom specific management with a special emphasis on rehabilitation so that the patients can be fully reintegrated into the society.

The pandemic is far from over and these consultation visits are the best time to reinforce certain essential health habits:

1. Frequent hand washing and social distancing
2. Healthy eating habits
3. Adequate rest and sleep
4. Gradual restorative exercise, later Moderate intensity (≥ 5 days/week)
5. NO smoking or tobacco products
6. Avoidance of alcohol
7. Restructuring routines at home
8. Drinking adequate water and fluids
9. Healthy eating habits
10. Avoidance of self-medication
11. Reducing stress, protecting yourselves against misinformation

Nursing care

Nursing care has been most illuminated by the public since the COVID pandemic began. The role of nurses and nursing care in the management of acute COVID as well as Post COVID-19 conditions is pivotal. Besides the traditional role of patient care and support, nurses have been instrumental in raising awareness, counseling, early diagnosis and referral, documentation, as well as planning and policy making.

The nursing care of Post COVID-19 patients are individualized (based on diagnosis, age and disabilities) and can range from assessment, monitoring and routine care to provision of acute care and timely referral. Nursing care is also essential during all steps of rehabilitation.

Generalized symptoms

Post-exertional malaise (PEM)/ Post-exertional fatigue

- Abnormal response to minimal amount of physical, cognitive or emotional effort
- Similar to Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS)
- Pathophysiology - not yet clear
- Symptoms - physical fatigue, cognitive fatigue, fever, poor sleep, muscle pain, headaches, lightheadedness and breathing difficulties
- Worsening of symptoms - usually 12 to 48 hours after activity but can occur immediately after activity or be delayed by hours, days or longer
- Even minor physical or mental tasks like studying can trigger a big response
- Symptoms can be fluctuating and take days, weeks or even months to resolve
- Standard exercise recommendations can be HARMFUL to these sets of patients.
- Double edged sword - a little too much of physical or mental activity beyond the “energy envelope” can cause flares while persistently limiting activities can lead to deconditioning

Evaluation

Pre-illness functional status

- Differential diagnoses - including drugs, deconditioning, weakness, muscle atrophy, pain, sleep disturbances, endocrine disorders, mood disorders, and/or cardiopulmonary symptoms
- Laboratory evaluation - to rule out hypokalemia, renal abnormalities, anemia etc.
- Cardiopulmonary evaluation - if clinical findings like dyspnea, wheezes, chest tightness

Management

- Avoid PEM flare-ups and illness relapses by balancing rest and activity: adequate rest and good sleep hygiene.
- Mitigation - by gradually increasing activities cautiously called ‘Pacing’.
- Keeping symptom diaries, including heart rate monitoring, can help identify limitations and also see the triggers that cause flares.
- For patients with orthostatic intolerance (difficulty maintaining upright position compared to laying or reclined position), the patient’s capacity to tolerate standing position needs to be improved before planning other activities.
- Performing different activities in sitting position, avoiding standing wherever feasible and spreading out activities can help conserve energy.
- Healthy diet and good hydration. There is no evidence to support the use of specific nutritional supplement. Pharmacologic agents are not found to be helpful.

- The long-term goal of tolerance of aerobic exercise and normal levels of activities can be achieved by Problem identification, Planning, Positioning, Prioritizing activities, Pacing and Progressing.

Fever

- Could be because of persistent inflammation, autoimmune disorders, re-infection, infections related to the sequelae of COVID (e.g. infection in structurally damaged lung), other infections, or a part of post-exertional malaise.
- History and examinations to find potential diagnostic clues and investigations done accordingly.
- CBC, RFT, LFT, Chest-Xray, Urine R/M/E.
- High CRP levels can point towards persistent inflammation. However, it could be raised in many other conditions.
- Management based on the cause.
- NSAIDs (like naproxen) can be used in Post COVID-19 patients with high CRP levels.
- Antibiotics should be used ONLY when required (clinical or microbiological diagnosis of an infection, or patients presenting with sepsis or septic shock).

Organ system specific manifestations and Approach

Pulmonary manifestations

COVID-19 is a multi-system disease, but the lungs are primarily affected. The Post COVID-19 conditions of respiratory systems may represent heterogeneous conditions including both general complications of prolonged illness as well as hospitalization and post-acute sequelae of SARS-CoV-2 infection. The important conditions to consider are:

a. Sequelae of pneumonia (e.g., lung fibrosis), hypoxia, Postintubation tracheal stenosis, sepsis

b. Persistence of symptoms: cough, dyspnea, chest pain etc.

c. Part of multisystem involvement: fatigue, anxiety causing breathlessness

d. Post-intensive care syndrome

e. Exacerbations of previous disease or conditions

Breathlessness, chest pain, and cough are the most common symptoms reported in most studies. Based on clinical evaluation and response to treatment, healthcare professionals need to consider using a stepwise approach to other specialist referrals. In this chapter, initial approach to pulmonary symptoms, and assessment, initial management, and monitoring of a few common symptoms will be described along with conditions requiring for specialist referral. Management of lung fibrosis will also be discussed briefly.

Initial evaluation

History

- Symptoms during COVID-19, its course, severity, and treatments received.
- The impact on quality of life and functional ability, including interference with their ability to return to work.
- Prior laboratory investigations and chest radiology, if available, should be reviewed.
- Past medical history - bronchial asthma, chronic obstructive pulmonary disease, interstitial lung disease, sleep disordered breathing, autoimmune disease, mood disorders (e.g., anxiety or depression) etc.
- Patient's current and pre-infection level of activity (e.g., activities of daily living, nature of work or school activities,) should be established to plan the goals and management.

Physical examination and vitals

General appearance of patients, pulse rate, blood pressure, respiratory rate and pulse oximetry (SpO2%) along with signs of respiratory distress (given below) should be examined.

a. Tachypnea

b. Nasal flaring

c. Use of accessory muscles

d. Inability to speak in sentences

e. Paradoxical chest movements, etc.

Investigations

Investigations are done as per the presenting symptoms and signs, pre-existing conditions and co-morbidities, and organ involvement in acute COVID. Laboratory and imaging studies can often be normal or nondiagnostic in patients with Post COVID-19 conditions.

1. **Chest imaging**
    - Chest X-ray (useful in following conditions)
        a. Patients who had pulmonary infiltrates during acute COVID
        b. Patients with new or worsening respiratory symptoms
        c. Abnormal examination findings in chest examination
    - CT chest (especially high-resolution CT, HRCT)
        - For patients suspected with interstitial lung disease from severe pneumonia or abnormalities on Chest X-ray which is not clearly defined.
        - Abnormalities like consolidation, interlobular septal thickening resolve in 2-4 weeks, but full resolution may take 12 weeks or longer.
        - Exact timing of doing chest imaging is not clear but clinical conditions of the patients and suspected underlying pathology need to be considered.
2. CT pulmonary angiogram
    - Indicated in patients with unexplained cardiopulmonary symptoms and/or low peripheral oxygen saturation, tachycardia, etc. despite normal chest radiograph.
3. Spirometry
    - Useful to find out ventilatory defect: obstructive or restrictive. It may be useful in suspected cases of obstructive airway disease and lung fibrosis.

Initial conservative approach is preferred when potentially life-threatening clinical conditions (e.g., pulmonary embolism, pneumothorax, myocardial infarction, pericarditis etc.) are not likely. Persisting or worsening symptoms beyond three months should prompt further evaluation and specialist consultation including rehabilitation.

Breathlessness

Inconsistent relationship between pathology and breathlessness perception is common. This is the reason for difficulty in symptom control despite optimizing disease management alone. Pulmonary rehabilitation, involving exercise, education, and support over many weeks, leads to significant improvement in breathlessness, fatigue, emotion and quality of life.

The Breathing, Thinking, and Functioning clinical model is useful to understand and manage chronic breathlessness. These components are discussed briefly.

a. Breathing: insufficient breathing and increased work of breathing which manifests as increased respiratory rate, use of accessory muscles etc.

b. Thinking: thoughts of dying, misconceptions, and past experience leading to anxiety, distress and feeling panic. Anxiety increases the respiratory rate further increasing the work of breathing and respiratory demand.

c. Functioning: reduced activity, tendency to self-isolate can lead to deconditioning of limb, chest wall and accessory muscles worsening breathlessness.

Evaluation of breathlessness (Ref. Appendix –I)

1. The modified Medical Research Council (mMRC) Dyspnea scale - used to grade the severity of breathlessness and its impact on physical activities.
2. 6-minute walk test (6MWT)
3. 1-minute sit-to-stand test (1STST)

   Patients who have unstable respiratory status, or recent respiratory infection and patients on long-term oxygen therapy should be subjected for 1STST test.

Urgent referral to specialist with initial management

1. Any new onset of breathlessness or sudden deterioration and worsening of symptoms to exclude new pathology.
2. Any patient with severe hypoxemia (SpO_2 < 90%), or oxygen desaturation (by ≥3%) on exercise
3. With signs of severe lung disease, or
4. Chest pain that is cardiac in origin

The useful measures for breathlessness and its contributing components are given in table.

Breathlessness	Cognitive behavioral therapy	Functioning
Airway clearance techniques	Relaxation technique	Pulmonary rehabilitation
Inspiratory muscle training	Mindfulness	Activity promotion
Chest wall vibration		Walking aids
Respiratory support		

For all patients, we optimize pharmacotherapy for any identified underlying cardiac or pulmonary disease.

a. For those with mild symptoms, Borg score ≤3 who do not require oxygen, breathing exercise, behavioral therapy and pulmonary rehabilitation should be offered. (Table above)

b. For patients with moderate to severe dyspnea (Borg Score >3) with SpO_2 ≤92% and concerning respiratory symptoms and signs (described in criteria for referral to specialist), referral to specialist is recommended for further evaluation.

c. If there is evidence of physiological or functional impairment without evidence of significant interstitial lung disease or pulmonary vascular disease, other diagnoses should be considered.

d. If dysfunctional breathing is suspected, refer to specialist physiotherapy services.

Cough

- One of the most common presenting symptoms of COVID-19.
- Can persist for weeks or months after acute infection, even in those with mild COVID-19.
- Often accompanied by dyspnea, chest pain, or fatigue.
- Prevalence - 18% of hospitalized patients in pooled analysis of 14 studies (6 weeks to 4 months), variable depending up on patient characteristics, follow-up duration and outcome criteria.
- SARS-CoV-2 infection of the sensory nerves mediating cough leading to neuroinflammation and neuroimmune interactions are increasingly realized.

Evaluation

- Consider structural causes such as lung fibrosis (described later), airway damage either by SARS-CoV-2 or treatment (e.g., endotracheal intubation) and exacerbations of pre-existing pulmonary diseases.
- Different degree of lung fibrosis can occur in 10–20% of patients which could increase cough reflex sensitivity.
- Gastroesophageal reflux disease is another important differential to be considered.

Management

- Cough suppressants and antihistamines can be used with variable response.
- Antimuscarinic drugs, such as tiotropium (18µg/day), and inhaled corticosteroids (Budesonide up to 1600 mcg/day) can be tried to decrease cough sensitivity.
- To reduce the laryngeal and cough hypersensitivity due to neuroinflammation, gabapentin (maximum dose 800 mg/day) or pregabalin (maximum dose 300 mg/day) in divided doses can be used for refractory cough.

Chest pain

Chest pain has been found to affect up to 20-22% of patients even after two months of acute Covid-19. Post COVID-19 chest pain usually presents with other symptoms like cough, chest pain etc. Differential diagnoses of chest pain to be considered are

Respiratory origin	Cardiac origin
Pneumonia, Pneumothorax Musculoskeletal pain Pulmonary embolism	Acute coronary syndrome Myocarditis Pericarditis

History - Course of the COVID illness including complications, nature, site and duration of symptoms, effect of position and respiration, course of the pain, risk factors

Investigations

- Full blood count, Chest x-ray, ECG
- Cardiac markers: troponin, CPK-MB if cardiac origin is suspected

Criteria for referral after initial management

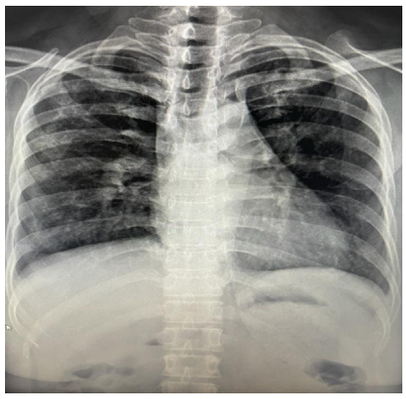
1. Cardiac origin of chest pain (acute coronary syndrome, pericarditis or myocarditis)
2. Pulmonary embolism

Management

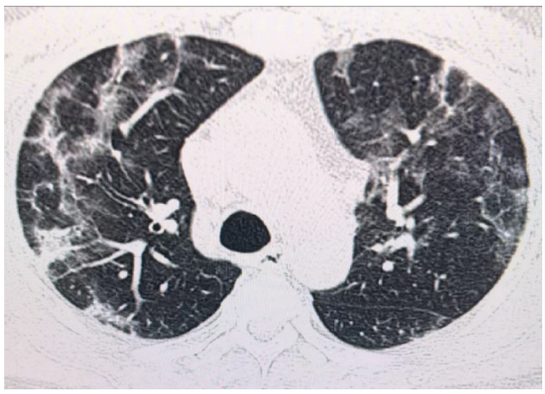
1. Musculoskeletal pain - Non-steroid anti-inflammatory medicines like ibuprofen.
2. Multidisciplinary assessment may be required if chest pain is associated with fatigue, cough and psychological conditions like anxiety, depression etc.

Post COVID-19 Pulmonary Fibrosis (PCPF)

- Given the scale of pandemic, the burden of fibrotic lung disease is high and will probably increase considerably.
- COVID-19 sequelae may range from mild form of fatigue to extensive pulmonary fibrosis requiring long-term oxygen therapy or even lung transplantation.
- Residual radiographic abnormalities found in Post COVID-19 patients - fibrotic changes, reticular opacities, and traction bronchiectasis with or without honeycombing.
- History of acute respiratory distress syndrome (ARDS), sepsis and clinical features like persistence of shortness of breath, tachypnea and requirement of oxygen support with chest imaging abnormalities suggesting fibrosis are useful to establish the diagnosis.
- Risk factors (Not yet fully understood) - Prolonged ICU admission with mechanical ventilation along with high CRP, low lymphocytes count, and hypertension.



Chest X-ray



HRCT chest showing lung fibrosis

Clinical features

- Dry cough
- Exertional dyspnoea
- Fatigue
- Chest pain
- Tachycardia
- Tachypnea

Investigations

- Chest X-ray, HRCT chest
- Spirometry (restrictive ventilatory defect)

Management

Patients with pulmonary fibrosis are better managed by specialist.

1. Supportive management with pulmonary rehabilitation
2. Corticosteroids

   Prednisolone 0.5 mg/kg/day for 3 weeks and rapid tapering has been shown to improve mMRC scale and forced vital capacity if organizing pneumonia is dominant pattern. Blood pressure and sugar need to be monitored closely.

3. Antifibrotic drugs: Pirfenidone, Nintedanib (To be used after pulmonologist consultation)

   These antifibrotic drugs are found to reduce progression of fibrosis in few patients if started early in the course. Hepatotoxicity is a concern with both the drugs. Nintedanib is associated with increased risk of bleeding.

Pulmonary Embolism (PE)

- COVID-19 is associated with increased risk of pulmonary embolism. Patients with severe disease are at the highest risk. Incidence of pulmonary embolism has been reported even after weeks to months of hospital discharge.
- PE should be considered in the circumstances like sudden worsening of hypoxemia, significant drop in blood pressure, new onset tachycardia, disproportionate oxygen requirement as compared to the severity of pneumonia on Chest X-Ray.
- Diagnosis of PE requires high index of suspicion. On clinical suspicion of PE, patients should be referred to specialist after initial dose of heparin (e.g., Enoxaparin 1mg/kg subcutaneous stat).

Investigations

1. Compression ultrasonography
2. Bed side echocardiography
3. CT pulmonary angiography (CTPA)

Management

1. Anticoagulation
2. Supportive management

Cardiovascular system

- Common cardiovascular symptoms - chest pain, palpitations, fatigue, dyspnea, postural tachycardia syndrome (PoTS) and syncope.
- Thromboembolism, increased cardio-metabolic demands, myocardial inflammation and fibrosis/scar, heart failure, stress cardiomyopathy, pericarditis, arrhythmias, inappropriate sinus tachycardia and autonomic dysfunctions are also seen.
- There is a significant overlap between the symptoms and presentations of pulmonary and cardiovascular manifestations and most of them are discussed in detail above. Only arrhythmias and PoTS are discussed in detail here.
- The presence of ACE2 receptors and hence direct cytotoxic effects, dysregulation of the RAAS, endothelial cell damage and thromboinflammation, as well as dysregulation of the immune response are said to cause cardiovascular symptoms. (A. Gupta et al.)

Postural Tachycardia Syndrome (PoTS)

- Condition that causes an abnormal increase in heart rate after sitting up or standing up.
- Patients have dizziness, palpitations and fatigue on standing.
- Abnormality in the autonomic nervous system causes decreased circulation to the brain and hence, PoTS.
- Some have mild symptoms, while others have reduced quality of life due to symptoms.
- Although there is no cure, symptoms can improve over time.

Evaluation

PoTS is diagnosed if heart rate increases by ≥ 30 beats per minute (bpm) (40bpm in those aged 12 to 19) usually within 10 minutes of standing. This increase continues for more than 30 seconds and is accompanied by other symptoms of PoTS. Tachycardia and narrowing of pulse pressure are adaptive responses to compensate for failure of autonomic nervous system.

Management

1. Lifestyle changes to improve symptoms – drinking plenty of fluids, sitting or standing up slowly, restricting caffeine or alcohol, avoiding long periods of standing, some may be advised to increase salt in their diet, compression clothing may help.
2. Some patients may need drugs like ivabradine, low dose beta blocker, or midodrine after consultation with cardiologist.

Arrhythmias and Heart failure

Palpitation is one of the most common presentations of Post COVID-19 condition. However, the different types of arrhythmias causing palpitations in these patients are not yet clear. Extrapolating the data from COVID studies, atrial fibrillation, non-sustained ventricular tachycardia, and bradyarrhythmias can be present. The management depends on the type of arrhythmia.

Heart failure should be suspected in Post COVID-19 patients presenting with shortness of breath and swelling. Myocardial injury during SARS-CoV-2 infection, arrhythmias and thromboembolic disorders could lead to deterioration of cardiac function. Cardiac consultation and echocardiography is required for management.

Investigations

ECG, Echocardiography, CXR, cardiac biomarkers - Troponins/NT-pro-BNP, Holter, cardiac MRI, TMT, Doppler USG of lower limbs

Management

1. According to symptoms
2. Starting newer drugs or stopping prior drugs should be done only after consultation with a physician or cardiologist – Continue statins and antiplatelet drugs as needed
3. Management of HTN, DM, dyslipidemia to prevent decompensation

Rehabilitation

The impact of cardiopulmonary exercise is not yet clearly known in Post COVID-19 conditions. However, graded exercise therapy should be done keeping in mind the adverse effects of sudden increase in activities on one hand and the deconditioning of prolonged inactivity on the other.

Nervous system

- The commonly reported neurological symptoms are headaches, difficulty thinking or concentrating (brain fog), fatigue, dizziness, sleep disorders (increased latency and/or maintenance), impairment in smell and taste, impaired memory, and sensory symptoms like paresthesias, tingling and numbness. (Liotta et al., 2020).
- Less common presentations reported include stroke, acute inflammatory demyelinating polyneuritis (AIDP), stroke, seizures, autonomic dysfunction, and movement disorders.
- Neurological complications are more common in younger patients with severe COVID-19, while those with encephalopathy are slower to regain their functional capacity.
- ACE2 receptors are expressed in neurons and glial cells. This could explain the olfactory neuropathy (anosmia), peripheral neuropathy and brain disorders seen in Post COVID-19 patients. Viral particles were also found in CSF, cytoplasm of neocortex and hypothalamus neurons.
- The possibility of reactivation of SARS-CoV-2 after latency in CNS like herpes viruses is being investigated.

Headache

- Common symptom
- Can be new onset or exacerbation of pre-existing headache like migraine
- Gradually improves with time in most patients (César Fernández-de-las-Peñas et al., 2021)
- Evaluation and management – similar to other headaches
- Indomethacin has shown better symptom control(Abouch V. Krymchantowski et al. 2021)

Evaluation of neurological manifestations

1. Cognitive assessment: Mini-mental status examination (MMSE). Detailed lobar function testing in those having an abnormal MMSE.
2. Detailed neurological examination (including sensory and motor examination) in those complaining of tingling, numbness, muscle aches, myalgias, persistent weakness in limbs.
3. Evaluation of autonomic dysfunction: resting tachycardia, orthostatic hypotension, subnormal sweating, etc.

Investigations

Persistent or worsening of symptoms may require referral to neurologist. Following investigation(s) may require depending upon clinical manifestation.

CPK, Nerve conduction tests, CSF analysis, MRI brain, EEG.

Management

1. Management is according to the symptom and diagnosis
2. Referral in those with red flag signs or for whom specialist consultation are required
3. Graded Exercise Therapy – Balance training, resistance strength training, breathing training (start low, go slow)

Renal system

- In Post COVID-19 patients, proteinuria, hematuria, AKI, acute-on-CKD, and glomerulopathy have been documented.
- Patients may present with swelling, hematuria, proteinuria or abnormal reports without symptoms.
- The need to increase anti-hypertensive dosage should raise suspicion of renal disease in a Post COVID-19 patient.
- Direct effects of the virus, inflammation, thromboembolism, kidney tubular injury (acute tubular necrosis) with septic shock, etc. are thought to cause damage to the kidneys in COVID patients.

Investigations

- CBC, Urine R/E, Spot urine Protein/creatinine ratio, 24 h urinary total protein, Serum creatinine and blood urea, Na/K, USG abdomen
- Estimated Glomerular Filtration Rate should be calculated (e.g., Cockroft-Gault formula)

Management

1. Renal impairment (AKI, Stable CKD, Worsened CKD or ESRD) or Proteinuria or hematuria or Renal transplantation patients should be referred to Nephrologist for further evaluation and management.
2. Risk factors for renal diseases should be assessed and managed prior to referral. Risk factors include – use of NSAIDs or nephrotoxic drugs, HTN, DM, Obesity, History of AKI, etc.

Endocrine system

Diabetes Mellitus

- There have been reports of new onset diabetes mellitus following COVID, an association that is plausible as the islet cells in the pancreas have ACE-2 receptors (Rubino et al., 2020). This is currently being studied in the COVIDIAB international study.
- Both during acute COVID and in Post COVID-19 condition, glycemic control is hampered in most patients with DM.
- Although the choice of drugs during acute COVID is guided by patient condition (e.g., use of insulin in hospitalized severe cases, stopping metformin in those at risk of lactic acidosis), the choice of drugs in Post COVID-19 patients is guided by the existing diabetes management guidelines.

The few things to consider during diabetes management in the Post COVID-19 patient are (C. Leszek et. al 2021)

1. Prevention with lifestyle changes in those at risk (pre-diabetes, obese, family history).
2. Early diagnosis and treatment in those presenting with symptoms of diabetes (dry mouth, polyuria/nocturia, weight loss).
3. The optimal timing to change the insulin regimen to oral glucose-lowering drugs is not yet clear. It is based on glycemic control and patient preference.
4. There is no preferred group of anti-diabetic drugs for Post COVID-19 patients. The choice is based on factors like risk of lactic acidosis (metformin avoided in hypoxemic patients), risk of MACE (SGLT2i, GLP-1RA, etc.) as well as affordability and availability.
5. Management of comorbidities (HTN, dyslipidemia) and complications of diabetes.
6. Refer patients with uncontrolled diabetes and complications of diabetes to endocrinologists.

Other endocrine abnormalities

- There have been reports of various thyroid disorders in Post COVID-19 patients including Hashimoto thyroiditis, subacute thyroiditis, and Graves' disease. (Karen Feghali et al. 2021) This could be due to the effects of COVID-19 on the immune system and thyroid gland. The management is similar to non-COVID patients.
- Autoimmunity as well as hemorrhage and infarction in the adrenals after COVID could lead to primary adrenal insufficiency. The presence of angiotensin-converting enzyme 2(ACE2) receptors and transmembrane serine protease 2 (TMPRSS2) receptors in adrenal could provide pathway for the virus to affect the adrenals. The use of steroids could lead to secondary adrenal insufficiency. Patients presenting with fatigue, weakness, abdominal pain, nausea, vomiting and those with hyponatremia and hyperpigmentation should be evaluated for adrenal insufficiency. (Julienne Sanchez et al. 2021).
- Sarcopenia and osteoporosis in Post COVID-19 patients could be multifactorial, with prolonged immobilization, use of steroids, lack of physical activity and inappropriate nutrition playing major roles. (Michael Anthonius Lim et al.) The role of COVID on growth and development in children is still not clear.

- Sexual dysfunction and menstrual disorders have also been reported in Post COVID-19 patients.

These patients should be referred to endocrinologists for evaluation and management.

Gastrointestinal system

- Post COVID-19 patients may present with ageusia, lack of appetite, nausea, vomiting, dyspepsia, diarrhea, abdominal pain and hepatitis, hematemesis, malena, GERD, constipation, etc.
- The presence of ACE2 receptors in GI tract epithelium could explain these symptoms. Also, many drugs used for the management of COVID can cause these symptoms.
- Although most of these symptoms are self-limiting, many patients need evaluation and care.

Dyspepsia

- Dyspepsia is pain or uncomfortable feeling in the epigastrium.
- The symptoms can be burning pain, bloating, heartburn, nausea, vomiting or reflux.
- Dyspepsia in Post COVID-19 patients can be due to the effects of the virus, drugs used in COVID or due to distress.
- Functional dyspepsia has been reported in Post COVID-19 patients. (Uday C Ghoshal et al, 2021).
- Stopping smoking, eating healthy foods, reducing stress, avoiding drugs causing dyspepsia can help improve symptoms.
- If needed, antacids, H2 receptor antagonists, proton pump inhibitors or prokinetics can be used.
- Persistent symptoms require referral to a gastroenterologist.

Diarrhea

- Diarrhea is also commonly reported in Post COVID-19 patients. (Weng Jingrong et al, 2021).
- It could be due to effects of the virus or the treatment during acute COVID.
- Evaluation and management is like any other patient with diarrhea.
- Probiotics may have a role in the management.

Investigations

CBC, RFT, LFT, Stool tests, serum lipase and amylase, UGIE, USG abdomen, CECT

Treatment

- Stop drugs if suspected
- As per disease and symptoms

Immunological and Rheumatological Manifestations

- Rheumatic disease-like manifestations are of concern in Post COVID-19 condition.
- Autoimmune manifestations may be due to unmasking of previously undiagnosed disease or de novo disease process.
- Viral infections like dengue, chikungunya, parvovirus B19 have been well known to induce autoimmunity.
- Viral infection has potential to, activate TLRs, complements, interleukin-6 (IL-6) leading to cytokine storm. Both innate and adaptive immune systems are involved.
- COVID-19 is associated with production of various anti-nuclear autoantibodies which have been reported in serological studies.

Rheumatic disease-like manifestations that have been reported in Post COVID-19 patients

1. Autoimmune hemolytic anemia
2. Immune thrombocytopenia
3. Arthralgia/myalgia
4. Inflammatory reactive arthritis
5. Inflammatory back pain
6. Vasculitis (Cutaneous and Urticarial)
7. Connective tissue disorders (SLE)
8. Inflammatory myositis
9. Antiphospholipid antibody syndrome
10. Multi-system inflammatory syndrome

- The most common rheumatologic presentations in Post COVID-19 patients are are arthralgia and arthritis (2.5-30%).
- There have been case reports of de novo as well as flares of CTD like SLE; ocular manifestations like retinal vein vasculitis, uveitis; hematological manifestations like Idiopathic thrombocytopenic purpura, Autoimmune Hemolytic Anemia, Hemophagocytic Lymphohistiocytosis (HLH); and multi organ dysfunction like in MIS-A.

Management of Rheumatic Symptoms in post COVID Condition

Arthralgia/Arthritis

- Detailed history, examination and focused investigation is needed to differentiate between de novo arthritis versus flare of pre-existing disease condition.

- Initial management can be done with NSAIDs.
- Persistent inflammation and joint pain may need evaluation by a rheumatologist.

Manifestations	Lab Investigations (Based on symptoms)	Treatment
Inflammatory arthritis	ESR, CRP RF, ACPA ANA Evaluation for crystals HLAB27	NSAIDs Intra-articular steroids DMARDs

Systemic Autoimmune Rheumatic Disease (SARD)

- Detailed history, examination and focused investigation are needed to find the organ involvement.
- De novo disease onset vs flare of preexisting systemic autoimmune rheumatic disease needs to be taken into consideration.
- Persistent symptoms, organ or life-threatening manifestations require referral for specialist evaluation at a tertiary referral center.

Manifestations	Lab Investigations (Based on symptoms)	Treatment
Multi system involvement	ESR, CRP ANA ANA Immunoblotting dsDNA C3, C4 Direct Coombs test ANCA	NSAIDs Intra-articular steroids DMARDs Mycophenolate Mofetil Cyclophosphamide Rituximab IVIG

Multisystem Inflammatory Syndrome in Adults (MIS-A) (Ref. CDC for criteria)

- It is a life-threatening complication of SARS-CoV-2 that can occur around 2–12 weeks after the initial infection.
- CDC has developed a working case definition for MIS-A, which includes.
  - Age more than 21 years
  - Life threatening illness requiring in hospital treatment
  - Recent positive test result for SARS-CoV-2 infection (PCR, antigen, or antibody)
  - Severe extrapulmonary organ system dysfunction
  - Markedly elevated acute inflammatory markers (CRP, Ferritin, IL 6 Levels) and/or
  - Absence of severe respiratory illness (to exclude patients where tissue hypoxia causes organ system dysfunction)

Management of MIS-A

- Currently there are no evidence-based recommendations for treatment of MIS-A.
- IVIG, Corticosteroids and supportive care has been suggested in current literature.

Other Manifestations

Ear, Nose and Throat manifestations

- Loss of taste, loss of smell as well as altered taste and smell has been commonly reported in Post COVID-19 patients.
- SARS-COV-2 invasion leading to persisting inflammation of the olfactory mucosa is seen in many patients with continuing loss of the sense of smell (De Melo et al., 2020).
- Loss of taste is difficult to assess as it relies on self-reporting of symptoms. Flavor perception is heavily influenced by the sense of smell and hence loss of smell could have some effect on the loss of taste.
- Although there is no definite therapy to help recover smell and taste earlier, smell training by repeated short-term exposure to smells are being tried.

Sore throat is another common manifestation. Sore throat may range from mild discomfort in the throat to severe symptoms making swallowing painful. Direct effects of virus, inflammation, acid reflux, allergies, and intubation all can lead to sore throat in Post COVID-19 patients. Irritation in the throat is also common along with cough. The management is mainly supportive.

Symptoms like sense of lump in throat, runny nose, change in voice, ear ache, hearing impairment, facial numbness, tinnitus etc. have been reported.

Skin, ophthalmological and other manifestations

Post COVID-19 conditions have myriad of symptoms and symptom combinations. The skin manifestations of Post COVID-19 conditions are itchy skin, skin rashes, petechiae, peeling skin, COVID toes, herpes, new onset allergies, dermatographia, and brittle or discolored nails. Other commonly reported symptoms include hair loss and nocturnal sweating.

Ophthalmological issues like blurred vision, vision symptoms, sensitivity to light, dry eyes, pain in the eyes, itchy eyes, floaters, bloodshot eyes, conjunctivitis, double vision, etc. have been reported.

Post COVID-19 hematological disorders include COVID-19-induced coagulopathy (an immunothrombotic state linked to thromboembolic and hemorrhagic events), late onset thrombocytopenia, anemia, etc.

There is no standard management strategy for these different disorders and most of the management at present is symptomatic and based on clinical judgement.

Management of Mental Health issues in Post COVID-19

- Psychological impact of COVID - recognized increasingly
- Symptomatology - insomnia, and symptoms of PTSD, depression, and anxiety (Liu et al., 2020; Mazza et al., 2020; Tomasoni et al., 2020)
- Caused both by the associated psychological issues like isolation, lockdown, stigma, concerns about contracting the infection or infecting others or by the immune response to the virus itself.
- Stress, behavioral changes, sad mood, anhedonia, and decreased concentration - most common symptoms reported in Nepal (Curative Services Division, MoHP)

General guideline for evaluation and treatment of people with mental health issues:

1. A private and comfortable set-up, Confidentiality, Adequate time, COVID precautions
2. Communicate in a clear, empathetic, and non- judgmental manner
3. Take into consideration the information provided by the family members/caretakers
4. Perform a thorough physical examination to rule out physical illness, and refer if any
5. Enquire about psychosocial stressors and assist in providing psychosocial support.
6. Psycho-educate about the nature of illness, side effects of the drugs and total treatment duration to the patient and family members (when appropriate).
7. After initiating treatment advice for frequent follow ups whenever required.
8. Look for possibility of Tele-consultation whenever required

When to refer

1. All elderly, children, pregnant, post-partum and lactating women
2. Those with death wishes, suicidal thoughts and plans
3. When recommended drug dosing is not effective
4. When there are other co-morbid illnesses
5. When there are side effects for which treatment is not possible at the health center

Depression

- Can be new illness or exacerbation of previous depression
- May present with non-specific complaints like tingling, numbness, dizziness
- Diagnosis - at least 2 core symptoms and at least 2 other symptoms for at least 2 weeks

Core symptoms	Other features
• Depressed mood – persistent and pervasive • Loss of interest or pleasure in previously pleasurable activities • Easy fatigue or decreased energy	• Feelings of guilt or worthlessness • Poor attention and concentration • Low confidence and self-esteem • Negative view of the future • Ideas or attempts of self-harm • Disturbed sleep • Disturbed appetite

Additional Indication for referral

1. Prior manic symptoms - extremely expansive, elated, or irritable mood; increased activity and extreme talkativeness; flight of ideas; decreased need for sleep; grandiosity; extreme distractibility or reckless behavior

Management

- Psychosocial support – experience sharing, awareness activities, psychoeducation
- Addressing psychosocial stressors – actual and perceived stressors
- Support from family, friends and help groups
- Medication – after psychiatrist evaluation

Bereavement and Grief

- Normal and natural feeling precipitated by death of loved ones
- Varies from individual to individual
- More difficult during the pandemic as death is sudden and unprecedented
- Grief Cycle (Kübler-Ross) – Denial-Anger-Bargaining-Depression-Acceptance
- Complicated Grief (see table below)– is Abnormal and needs help
- Grief vs depression - Grief is experienced in waves and diminishes over time while depression is consistent sense of depletion with sense of worthlessness and pervasive hopelessness.

Normal Grief Reaction	Complicated Grief/ Bereavement
Self- limiting, normal grief Gradual easing of symptoms Gradual acceptance 6 months to 1 year following death	Abnormal, atypical, distorted, unresolved Loss is not accepted symptoms intensify/persist with time Prolonged (over 12 months)

Risk Factors for Complicated Grief in Post COVID-19

- Sudden death, isolation, lack of productive activities due to lockdown, associated stigma, limited social and familial support, bereavement guilt, survivor's guilt, etc.

Management of Grief

- Complicated grief requires specialist referral.

Prevention of Complicated Grief in Post COVID-19 patients

1. Good communication and meetings (in person or virtual) with family members and health care workers
2. Provide opportunity to Grieve - break bad news sensitively in a proper environment
3. Family members should be encouraged to verbalize their emotions and proper validation of their distress should be done
4. Participation (even if virtual) of family members in the rituals - increases acceptance of death
5. Minimizing stigma associated with COVID

If complicated grief or other co-morbid psychiatric illness is suspected/ present: Referral/ Consultation

Post- traumatic stress disorder (PTSD)

- Condition marked by the development of symptoms after exposure to traumatic life events
- Symptoms last for more than a month duration and cause substantial distress
- Both trauma of COVID infection and quarantine/isolation contribute to PTSD (Zhang et al)
- Symptoms from these 4 clusters need to be present to make a diagnosis of PTSD (DSM V)
    - Persistent re-experiencing of the event,
    - Avoidance symptoms,
    - Negative changes in cognitions and mood and
    - Increased arousal and reactivity.

Diagnostic criteria

A. Exposure to actual or threatened death, serious injury or sexual violence

B. Presence of recurrent, involuntary, and intrusive thoughts/symptoms associated with the traumatic event

C. Persistent avoidance of stimuli associated with the traumatic event/events, beginning after the traumatic event.

D. Negative alterations in cognitions and mood associated with the traumatic event, beginning, or worsening after the traumatic event

E. Marked alteration in arousal and reactivity associated with the traumatic event/events (eg: irritable, anger outburst, hypervigilant, exaggerated startle response etc.)

F. Duration of disturbance, more than one month

Management of PTSD

Referral/Consultation

- If patient does not improve with medicines or develops side effects
- Has co-morbid illness or symptoms are debilitating.

Sleep disorder

- The COVID pandemic has caused a significant impact on various aspects of sleep.
- Fear and anxiety of contracting the virus, lockdowns and quarantines have all contributed.
- The terms COVID-somnia or coronasomnia have been proposed to encompass the constellation of symptoms of sleep dysfunction such as insomnia, problem in continuity of sleep, non-restorative sleep, poor sleep quality and change in sleep-wake cycle.

Types of Sleep Dysfunction associated with COVID-19 (Sushanth Bhat et al. 2021)

- Insomnia – Acute and persistent
- Effect of COVID-19 on obstructive sleep apnea
- Circadian rhythm abnormalities
- Excessive daytime sleepiness related to sleep-wake impairment
- Post- traumatic like sleep dysfunction
- Abnormal dreams
- Transient restless legs associated with insomnia

Nonorganic Insomnia	Nonorganic Hypersomnia
• Individual complains of difficulty falling asleep, difficulty maintaining sleep, or non-refreshing sleep • The sleep disturbances results occur at least 3 times a week for at least 1 month • The sleep disturbances result in marked personal distress or interferes with daily activities • No known causative organic factors	• The individual complains of excessive daytime sleepiness or sleep attacks • The symptoms are present nearly every day for a duration of at least 1 month • There is no auxiliary symptoms of narcolepsy and no clinical evidence of sleep apnea • There is no known causative organic factor

Management:

- No standard treatment for Post COVID-19 sleep disorders yet.
- Manage co-morbid conditions like anxiety, depression, PTSD, and psychological distress.
- Role of cognitive behavioral therapy (CBT) is well established for treatment of Primary Insomnia, but its effectiveness in COVID related sleep disorder is yet to be studied.
- Short-term use of sleep medications (without notable hepatic metabolism and drug interactions) may be used in acute insomnia.
- Remember to REFER

Non- specific measures to Induce Sleep (Sleep Hygiene)

- Arise at the same time daily
- Limit daily in-bed time to the usual amount before the sleep disturbances
- Discontinue CNS stimulants if present (caffeine, nicotine, alcohol, etc.)
- Avoid day-time naps
- Physical exercise
- Avoid disturbances while sleeping
- Avoid evening stimulation, limit screen time
- Avoid heavy meals in the evening and eat at least 2-3 hours before bedtime
- Practice evening relaxation, like progressive muscle relaxation

Anxiety Disorder

- The prevalence of anxiety and depression in the general population during the COVID-19 pandemic was 31.9% and 33.7% respectively (Salari et al., 2020).
- Panic disorder is a common type of anxiety disorder commonly reported in Nepal and India during the pandemic.

Diagnosis of Panic Disorder

A. Both (1) and (2)

   1. Recurrent unexpected panic attacks
   2. At least one of the attacks has been followed by 1 month (or more) of one (or more) of the following:

      a. Persistent attack about having the attack

      b. Worry about the implications or the consequences of the attack (losing control, having heart attack, going crazy)

B. Absence of Agoraphobia

C. The panic attack is not due to substance abuse or general medical condition (hypothyroidism)

Criteria for Panic attack

- A discrete period of intense fear or discomfort, in which four or more of the following symptoms develop abruptly and reach peak within 10 minutes:

a. **Palpitation, pounding heart or accelerated heart rate** b. **Sweating** c. **Trembling or shaking** d. **Sensation of shortness of breath or smothering** e. **Feeling of choking** f. **Chest pain or discomfort** g. **Nausea or abdominal discomfort**	h. **Feeling dizzy, unsteady, lightheaded or faint** i. **Derealization (feeling of unreality) or desensitization (being detached from oneself)** j. **Fear of losing control or going crazy** k. **Fear of dying** l. **Numbness or tingling** m. **Chills or hot flushes.**

Management of Anxiety Disorder

1. Non-pharmacological Management:
    a. Encourage to continue routine activities, physical exercise and relaxation techniques (deep breathing, stretching exercise)
    b. Help patient and family member understand about the disease
    c. Advise to take precautions for the prevention of COVID-19
    d. Rely on authentic source for COVID related news and limit social media time
2. Pharmacological Management - after psychiatrist evaluation

Stigma associated with COVID and Post COVID-19 condition

- Social stigma in the context of health is the negative association between a person or group of people who share certain characteristics and a specific disease. (WHO)
- People are labeled, stereotyped and discriminated against because of a perceived link with COVID.
- Stigmatization or the fear of being stigmatized causes people to hide the illness, prevent them from seeking health care and discourage them from adopting healthy behaviors. These all lead to poor mental and physical health.
- There are different ways we can help combat stigmatization like creating an environment where disease and its impact can be discussed openly and honestly and sharing only relevant scientific data and only the latest official health advices. Supporting each other at times like these can have far reaching benefits.

Post Intensive Care Syndrome (PICS)

- Post Intensive Care Syndrome (PICS) is defined as new or worsening physical, cognitive or mental health status arising after critical illness that persists even after discharge from acute care setting.
- Symptoms can last over months to years.
- Prevalence - not known, estimated that >50% of those discharged from ICU will have at least one of the problems seen with PICS.
- More common in patients with severe infections, acute respiratory distress syndrome, delirium, hypoxia, or hypotension during acute illness.
- COVID-19 can cause ARDS requiring prolonged ICU care and PICS is an important condition to recognize early for effective management.

Clinical presentation of PICS is usually combination of physical, cognitive, and psychological signs and symptoms and includes

- Neuromuscular weakness,
- Fatigue, decreased mobility,
- Osteopenia
- Endocrine dysfunction
- Anxiety, depression
- Post-traumatic stress disorder
- Sexual dysfunction
- Sleep disturbances
- Poor concentration, memory disturbances, etc.

Clinical evaluation is the most important way to establish the diagnosis and impact on daily activities. Blood tests and radiology are useful only to rule out organ dysfunction or persisting infection.

Management

Treatment for PICS usually requires multi-disciplinary team. Physical therapy and exercise help for weakness and fatigue. Mental symptoms may require counseling and medications. Referral to specialist is advised for cognitive impairment.

Pediatrics

- Most common Post COVID-19 symptoms in children - tiredness, weakness, headache, abdominal pain, muscle pain, shortness of breath, loss of smell, loss of taste, dizziness, skin rashes and lack of concentration.
- COVID-19 can have effects on growth and development of children.
- Persistent cough, palpitations and chest pain are less commonly reported compared to adults.
- Rhinorrhea, nasal congestion, sore throat, sleep disorders, poor weight gain, and loss of appetite are also reported.
- Deterioration of school performance or reduction in physical activities in a Post COVID-19 child should raise the suspicion of Post COVID-19 condition.

Management depends on clinical presentation. Referrals should be made to specific subspecialties as indicated.

- Multisystem inflammatory syndrome in children (MIS-C) is a rare but serious complication that is seen weeks after acute COVID in which different body organs like heart, lungs, kidneys, brain, skin, eyes or gastrointestinal organs become inflamed.
- If a child with recent suspected or confirmed COVID or history of exposure to COVID presents with high fever without an obvious cause and sign/symptom of multiorgan (≥2 organs) involvement or dysfunction, and tests show elevated markers of inflammation, consider MIS-C and urgently refer the child to a specialist.
- Management is supportive with corticosteroids (Methylprednisolone 0.8 mg/kg/day).
  (WHO COVID-19 Clinical management: living guidance.23 November 2021)

Post COVID-19 Rehabilitation

Rehabilitation is a set of measures that assist individuals who experience or are likely to experience disability to achieve and maintain optimal functioning in interaction with their environment. (WHO) The goals of rehabilitation are to prevent or slow the rate of loss of function, improve and restore function, and to compensate for the loss of function and maintenance of current function. The ultimate aim is full reintegration of the individual into the society.

Post COVID-19 patients require rehabilitation for various reasons including impaired pulmonary function, muscle weakness/neurological problems, fatigue, body ache, anxiety, depression, job problems and reduced quality of life. Patients with severe COVID requiring prolonged ICU stay, elderly, those with pre-existing comorbidities and other disabilities require additional care and rehabilitation measures.

Rehabilitation, both during acute COVID and afterwards, is expected to improve the health outcomes of patients with COVID-19 by facilitating early discharge, reducing the risk of readmission, and optimizing health and functioning. Studies are ongoing to evaluate the benefits of rehabilitation in improving exercise capacity, muscle strength and physical component of quality of life in Post COVID-19 patients.

Post COVID patients can have multiple issues in the body and thus a patient-centered multidisciplinary approach to rehabilitation is required. The multidisciplinary team may include Strikethrough physician, pulmonologist, psychiatrist, clinical psychologist, rheumatologist, rehabilitation physician or physiatrist, physiotherapist, occupational therapist, speech and language therapist, rehab nurses, prothetist & orthotist, medical social worker, community health volunteer/ rehabilitation worker and other allied healthcare personnel. Referral to other specialists may be needed.

Assessment for rehabilitation needs

Rehabilitation assessment for the hospitalized patients may begin prior to discharge and/or at discharge and/or on follow-up visits depending on the referral by the physician or treating doctor for symptoms requiring/ rehabilitation. Some Post COVID-19 patients may present later with new symptoms that might require assessment rehabilitation services.

Assessment for rehabilitation needs requires a holistic approach with

- Comprehensive clinical history (nature and severity of symptoms, comorbidities, course during acute COVID, home, community and work environment and availability of psychosocial support)
- Relevant clinical examination (physical, cognitive and psychological evaluation and evaluation of functional abilities/limitations, activities of daily living, etc.)
- Assessment tools (mMRC, 6-minute walk test, 1STST, MMSE, DASS-21, WHODAS, etc.)

A rehabilitation pathway is required for Post COVID-19 care. An integrated or individualized rehabilitation pathway with screening/pre-assessment tool, rehabilitation plans and models, expert rehabilitation professionals, and a proper follow up schedule is advised. Tele-rehabilitation, in-home rehabilitation services and mobile community can be integrated into the rehabilitation programs.

Indications for Post COVID-19 rehabilitation

1.	Dyspnea	if difficulty exists to perform activities of daily living and/or return to work
2.	Fatigue	if difficulty exists in work, community activities or activities of daily living
3.	Weakness	if reduced muscle strength and/or endurance & health related QoL
4.	Persistent cough	if reduced productivity, due to difficulty to perform activities
5.	Pain	if difficulty exists to participate in work, physical and recreational activities
6.	Cognitive dysfunction*	if difficulty exists to concentrate on a task or unable to multitask
7.	Mental health issues*	if difficulty exists to work or perform community roles, enjoy usual activities

*** These issues require clinical psychologists or trained rehab professionals/wokers for rehabilitation**

Physiotherapy in Post COVID-19 conditions

Screening prior to exercise (Pre-exercise testing) and Precaution during exercise

Cautions prior to initiating exercise	Termination criteria
1. **For patients who do not participate in regular exercise – medical clearance prior to initiation is required if history of Cardiovascular, metabolic or renal disease** 2. **For patients who participate in regular exercise, medical clearance is required for vigorous exercise** 3. **In symptomatic patients, who discontinued exercise, medical clearance prior to exercise is required**	1. **Chest pain suspicious for angina** 2. **Intolerable dyspnea or abnormal dyspnea for a given activity level** 3. **Sudden change in hemodynamics (HR, BP, SpO2)** 4. **Excessive sweating** 5. **Evolving mental confusion or lack of coordination** 6. **Increased temperature, lethargy, light-headedness, leg cramps and extreme muscle fatigue** 7. **Psychological distress** 8. **Any other clinically warranted reason**

Prerequisites for exercise

1. Pre-exercise testing
2. Informed consent
3. Calibration of equipment
4. Optimal temperature and environment
5. Training of physiotherapist/trainer with emergency response plan including Basic Life Support (CPR, ACLS)
6. Monitoring facility during exercise

Physiotherapy services hierarchy (based on human resources)

Level	Human Resources	Evaluation methods	Physiotherapy
Community level (Appendix III for exercises)	Community health workers	Dyspnea on mild exertion or at <1 flight of stairs (1 flight = 14 steps)	Advice on rest and mild to moderate level of physical activity, ROM exercises, deep breathing exercises, isometric quadriceps, etc.
		Dyspnea only on moderate exertion or ≥1 flight of stairs	Advice on active and moderate level of activity, walking exercises, ROM exercises, resistance exercises, etc.
Primary/ Secondary level (Appendix II for exercises)	Basic physiotherapy facility or other trained health care personnel*	Dyspnea grading assessment tools like mMRC and prescription accordingly (Table A)	Refer to exercises based on mMRC in Appendix II
Tertiary level (Tables below for exercise modules)	Specialized rehabilitation and specialized physiotherapy (like cardiopulmonary or neurological)	Detailed assessment and evaluation prior to physiotherapy – using 6MWT or 1STST and rating of dyspnea RPE** score 0-10 after test, RM, etc.	Physiotherapy training program based on Qualification Algorithm (Table B) Exercises based on phases (Table C)

*WHO Free Online course - https://openwho.org/courses/clinical-management-COVID-19-rehabilitation

** RPE (Rating of Perceived exertion) - Rated on modified Borg Scale

Table A: Physiotherapy interventions based on mMRC grading

Assessment	Intervention
Grade 0	Brisk Walking ≥ 30 mins, deep breathing exercises, 2 flights of stair climbing squats and lunges ≥ 1 min, resistance exercises with light weights Moderate to vigorous level activity
Grade 1	
Grade 2	Intermittent walking with rest, breathing exercises, ROM exercises, 1 min squat Moderate level physical activity
Grade 3	Supervised walking and stair climbing, deep breathing exercises, thoracic expansion exercises Mild to moderate level physical activity
Grade 4	

Table B: Qualification for physiotherapy training program (based on 6MWT)

Dyspnea RPE	6MWT distance			
	<320 m	320-434 m	435 -520 m	>520 m
7-8	Phase I	Phase I	Phase II	Phase III
4-6	Phase I	Phase I or II	Phase II or III	Phase III or IV
2-3	Phase I	Phase II	Phase III	Phase IV
0-1	Phase I	Phase II	Phase III	Phase IV

For those not able to complete 6MWT, Phase V is implemented (Refer to Table C for Phases).

The optimal exercise dosage with respect to time, frequency, and intensity is not known.

Table C – Exercise Training Phases

Exercise training		
Phases	**Exercise prescription**	**Exercise description**
Phase I Goal: very low to low intensity exercises Preparation for return to exercise	Supervised training Intensity -Suggested RPE 1-2 -peak HRR < 40 % -Assessment - weekly -Progression: when 30 minutes of exercise session is tolerated with no complaints the next day	-Therapeutics: Emphasis on rest, breathing exercises, coughing techniques if required -Flexibility/ stretching exercise: passive stretching progressive to active assisted static stretching - Active upper and lower extremity ROM exercises -Balance exercise: static balance progressive to dynamic balance -Aerobic: gentle walking -Muscle strength and endurance: Air Punch, Bicep curl, Wrist curl, Sit to stand, Shoulder shrugging exercise, Knee raise, Bridging, Straight leg raises, Marching - Functional activities related to Basic ADLs Equipment: free hand, resistance bands, light weights
Phase II Goal: low to moderate intensity aerobic and strength challenge	Supervised training to minimal unsupervised training Intensity - 30-50 % of 1RM -Suggested RPE 1-4 -Peak HRR < 60 % - Intervals of 5 minutes aerobic exercise separated by 1 block of recovery -Add one interval per day as tolerated -Progression: weekly assessment and when a patient can achieve 30-minute session, and feel recovered after an hour	-Circuit interval training -Therapeutics: Breathing exercises, coughing techniques if required -Flexibility/ stretching exercise: active dynamic stretching -Active upper and lower extremity ROM exercises -Balance exercise: dynamic balance exercises -Aerobic: progressive ambulation, brisk walking, light yoga, limited calisthenics including sit to stand, squats, lunges, vertical push up, etc. -Muscle strength and endurance: isometric strengthening, light weighted isokinetic strengthening - Functional activities: household activities, gardening, social visits, etc. -Equipment: free hand, resistance bands, Physio balls, canes, balance boards, weights. Patient with higher physical autonomy can be trained on cycle-ergometer, static bike, arm ergometer at low-intensity exercises
Phase III Moderate to high intensity aerobic and strength challenge with coordination and functioning skills	Minimal Supervised training to unsupervised training Intensity - 50-70% of 1RM -Suggested RPE 3-6 -peak HRR < 70 % - Exercise- rest interval 2:1 in improving -Progression: weekly assessment and when the patient's fatigue levels are normal	Circuit interval training -Therapeutics: Paced breathing techniques -Flexibility/ stretching exercise: active dynamic stretching -Balance exercise: dynamic balance exercises -Aerobic: brisk walking, jogging, yoga, light swimming, calisthenics- circuit training -Muscle strength and endurance: moderate weighted isokinetic strengthening -Functional activities: Instrumental ADLs, light recreational activities -Equipment: resistance bands, Physio balls, balance boards, weights, -Cycle-ergometer, static bike, arm ergometer, treadmill (non-graded protocol progressive to graded protocol) at moderate-intensity exercises

Phase IV High intensity exercises	Return to regular exercise pattern (pre-condition level) Intensity 70-80 % of 1RM -Suggested RPE >6 -peak HRR < 80 % -circuit interval progressive to continuous training as tolerated -Progression: weekly assessment to increase intensity as tolerated	Circuit interval training – continuous training -Therapeutics: Paced breathing techniques -Flexibility/ stretching exercise: active dynamic stretching -Balance exercise: dynamic balance exercises -Aerobic: jogging, running, cycling, swimming, other sports -Muscle strength and endurance: moderate weighted isokinetic strengthening - Equipment: resistance bands, Physio balls, balance boards, weights, -Cycle-ergometer, static bike, arm ergometer, treadmill (graded protocol) at moderate to high intensity exercises Precaution: Be mindful of fatigue and overtraining. Rest and recovery of the patient is as important as the training program
Phase V (Severely dyspnea patient) Preparation for return to exercise	Supervised training Intensity -Suggested RPE 1 -peak HRR < 30 % - Progression: weekly assessment and when patient can tolerate more than 30 meters of independent walking	-Therapeutics: Emphasis on rest, breathing exercises emphasis on inspiration and prolonged expiration, coughing techniques if required -Flexibility/ stretching exercise: passive stretching - Passive to active assisted upper and lower extremity ROM exercises -Balance exercise: static balance exercises -Aerobic: gentle walking with or without help of walking aid -Muscle strength and endurance: Air Punch, Bicep curl, Wrist curl, Shoulder shrugging exercise, Knee raise, Bridging, Straight leg raises, Marching - Functional activities related to Basic ADLs Equipment: free hand, resistance bands

ADL-Activities of Daily Living, HRR – Heart Rate Reserve, 1RM - One-Repetition Maximum

Preparations prior to exercise

1. The patient must have recovered from the previous day without any new or relapse of symptoms
2. 5-10 minutes to warm up before and cool down after exercise
3. Supervision by physiotherapist/trained health care worker
4. Individualized and tailored physical therapy program based on functional capacity towards gradually increasing the aerobic fitness, muscle strength and functional ability

Home based devices like sandbags, water filled bottles, weighted bags with books, sitting tools worn out bike rubbery tires, bubble PEP, pillows and sponges can be used for physiotherapy.

Physiotherapeutic modalities

Breathing Exercise	Aerobic exercises	Resistance exercise
• For dyspnea, wheezing, difficulty in sputum removal • Can use bronchodilators, humidification, etc. • Starting position: position which encourage diaphragmatic breathing and discourage accessory muscle • Emphasis on inspiration or/and expiration as per need, discourage abnormal pattern • Avoid prolonged session to prevent fatigue • Types: - Breathing control - Pursed lip breathing - Thoracic expansion - Mobilizing breathing - Paced breathing	• 8–12-week physical therapy program, 1 to 2 times per week • 3-4 days of unsupervised home program on other days • Start low, intensify gradually • Aerobic Training: • Intensity – 60-80% of 6MWT peak work rate or 60% to 80% of HR reserve for individuals unable to complete 6MWT • Increment : -10% every week. (limit 80% of the maximum HR reserve) • Intermittent exercise for those with fatigue • 5-15 minutes of constant or continuous variable work with exercise duration from 30- 60 minutes/day • Home walking program 3 to 4 days per week with a goal of walking for 20 to 30 minutes at RPE of 4 of 10. • Exercise type: Step exercises, static cycle, dancing, walking, brisk walking, jogging, swimming, bicycling, treadmill, upper and lower limb cycle ergometers, calisthenics, etc.	• Progressive resistance exercise 2 to 3 times per week for 6-8 weeks • 20 minutes of resistance training • 10-15 repetitions as per guidelines for older and/or deconditioned patients • Weight resistance is set at 30- 80% 1RM, with weekly increase of 5 to 10 %. • Perform 2 to 4 exercises initially and progress accordingly • If a patient rates an exercise, 4 of 10 on RPE and the patient is able to complete 3 sets of 15 repetitions - Progress • Assess weekly • Provide visual handout to the patient to perform at home

Sputum clearance	Balance exercises	Flexibility/ Stretching exercises
• For lung congestions, secretion retention, etc. • Auscultate for abnormal breath sounds • Breathing techniques to facilitate sputum clearance and energy conservation during forced expiration techniques • Sputum clearance devices (acapella, flutter, PEP, etc) • Forced expiratory techniques: huffing and coughing (self/ assisted)	• Perform 2 to 3 exercises initially and progress accordingly • Inclusion of static and dynamic balance exercises • Use of obstacles, unstable surfaces • Hands free training, balance training using device under supervision	• Stretching of major muscle group of upper and lower extremity -Side Stretch, -Shoulder stretch, -Hamstrings stretch, -Calf stretches, -Quads stretch, -Back stretch • Passive and active (static and dynamic) stretching is recommended • Hold the stretch for 15 to 30 seconds with 2- 3 repetitions

Exercise training model

- Combination of exercises can be performed in circuit program with either continuous or in interval training module
    - Interval training: To give adequate time for recovery in between exercises
    - Continuous training: Gradually decrease interval time to increase the intensity
- Re-assessment - 1-2 weeks to determine the patient's progression
- Home based exercise, Tele-rehabilitation physiotherapy - based on current training phase

If lack of home equipment - walking program and strengthening exercises using items such as rice bags/filled water bottles or own body weight are encouraged

Speech and Language Rehabilitation

Indications for Hearing, Speech and Language Referral

- Hearing problems (decreased hearing, tinnitus)
- Speech problems (hoarseness, breathiness, roughness of voice, fluency problems: inappropriate stops, pauses, repetition, dysphagia: swallowing disorder)
- Language problems

Referral required for patients with Stroke, Spinal Cord (higher level) and other conditions with risk of aspiration and choking, post-intubation dysphonia (voice disorder), bothersome tinnitus, etc.

Management of Psychological Issues in Post COVID-19 condition

Psychological and mental health related problems increased globally during the pandemic. Having had COVID-19 increases the likelihood for psychological distress, impaired emotional regulation, disorders due to sleep, anxiety, depression, grief and suicide.

Tools for psychological assessment - Generalized Anxiety Disorder/GAD Questionnaire, Patient Health Questionnaire for depression, etc.

Stress

Stress is psychological, physiological, and behavioral response perceiving a lack of equilibrium between the demands placed upon and ability to meet those demands, which, over a period of time, leads to poor health.

Stress management techniques:

1. Identifying stress sources
2. Learning to recognize stress signals
3. Recognizing one's own stress strategies
4. Finding healthy stress management strategies
5. Switching out one behavior at a time – most effective in creating positive change
6. Making self-care a priority
7. Asking for support
8. Information hygiene

Managing Activities of Daily Living and Improving Quality of Life

1. Adjust activities of daily living based on symptoms
    a. Phased return to work – increase hours gradually over several weeks
    b. Manage suitable shifts
    c. Take rest in between
    d. Work from home if feasible
    e. Delegate tasks whenever possible
2. Reduce stress and stressors
3. Adequate time for rest and sleep
4. Exercise (start low, go slow) – Do not overdo

Follow up schedule and Referral system

The assessment and management of Post COVID-19 should begin

- When symptoms arise and/or at screening, follow up visits - If not assessed hospitalized or assessed tested during acute illness
- During discharge - if admitted to General wards
    - Follow up visit at 12 weeks (earlier, if required)
- Prior to discharge/during transfer-out from the ICU/HDU – if admitted in ICU
    - Follow up at 4-6 weeks (earlier, if required) and at 12 weeks

Referral

- Should be based on need - difficulty in funtioning
- Should be both upward and downward - two way referral
- Should be done if telemedicine/telerehabilitation consultations are not feasible and if patient require higher level of care
- Should have proper documentation and support during transfer
- Ensure continuity of care with same healthcare provider as much as possible
- Should be a shared decision-making process
- Should be with prior notification if possible
- Use existing referral pathways or create new care pathways for Post COVID-19 conditions

*Multi/transdisciplinary assessment and management or Post Covid-19 Clinic (PCC) clinics including rehabilitation services are required for Post COVID-19 care wherever possible or integrate it with proper training and SoP

Frequently Asked Questions (FAQs)

1. **Does vitamin supplementation prevent or treat Post COVID-19 conditions?**

   It is not known if vitamins and supplements are helpful, harmful or have no effect in the treatment of COVID-19 or Post COVID-19 syndrome.

2. **Do the elderly get more severe Post COVID-19 conditions? Do they ever recover?**

   -Although the elderly have higher chances of developing Post COVID-19 conditions compared to the younger population, the severity doesn't just depend on age and most of the elderly who have Post COVID-19 conditions recover. (Sathyamurthy P. et al, 2021).

   When the elderly present with a gradual decline in health, deconditioning, worsening frailty, dementia, and loss of interest in eating and drinking, we should suspect Post COVID-19 condition as one differential and evaluate accordingly.

3. **Does pregnancy increase the risk of developing Post COVID-19 condition? Does the management change for Post COVID-19 conditions in pregnant women?**

   At present, it's unclear whether pregnancy increases the risk of developing Post COVID-19 condition. The obstetric management and breastfeeding recommendations are not different for those with Post COVID-19 conditions.

   There is no need for additional obstetric monitoring or frequent ultrasound monitoring apart from those done for the usual obstetric indications.

4. **Does early exercise rehabilitation assist in improving symptoms of Post COVID-19 condition?**

   The optimal time to begin exercise rehabilitation in Post COVID-19 condition is not yet clear. It should be borne in mind that prolonged delay can cause deconditioning while too early interventions could exacerbate the post-exertional malaise.

5. **Does the presence of a symptom or a cluster of symptoms predict the possibility of getting Post COVID-19 condition?**

   At present, there is no data to support this. No individual symptom or symptom cluster can predict Post COVID-19 condition. It is being evaluated in certain studies.

6. **What should immunocompromised patients or patients on chemotherapy or immunosuppressants consider if they get Post COVID-19 condition?**

   The management is similar to others. However, the dosing of immunosuppressants and drug-drug interaction (if newer drugs are added) should be consulted with treating physician or transplant physician.

7. **Does vaccination or booster dose prevent against Post COVID-19 condition?**

   Vaccination or booster doses could prevent acquiring SARS-CoV-2 infection in the first place thus preventing COVID and its sequelae. It has been found out that people who had been fully vaccinated against COVID-19 were around half as likely to develop symptoms of post COVID-19 condition as people who had received only one dose of vaccine or were unvaccinated.

8. **Does vaccination or booster dose reduce symptoms or symptom duration in those with Post COVID-19 condition?**

   Although there are media reports of some people with Post COVID-19 conditions who found subjective improvement of symptoms following vaccination, studies are needed to determine the effects of vaccination.

   Very low-quality evidence from a cross sectional study found that patients with pre-existing long-term effects experienced improvement in symptoms 1 week or more post-vaccination with first doses of all vaccines.

9. **Is there any specific drug during COVID, the use of which can either prevent or lead to Post COVID-19 condition?**

   Although drugs could lead to certain Post COVID-19 conditions like diabetes, GI symptoms, etc., the prevention or progression to Post COVID-19 condition is not yet completely understood. Certain drugs are lifesaving during acute COVID and hence the fear of developing Post COVID-19 conditions should not deter physicians from using those drugs.

10. **Are there prognostic markers of developing Post COVID-19 conditions?**

    At present, there are no established markers for Post COVID-19 conditions. However, increased levels of D-dimer, C-reactive protein, IL-6, procalcitonin, blood urea nitrogen, troponin I and reduced lymphocyte count are being evaluated as predictors of Post COVID-19 condition.

11. **What is the natural history of Post COVID-19 conditions? How long do the symptoms last?**

    Most of the symptoms gradually get better with time and rehabilitation. However, the time is not constant and varies by symptoms, severity and from individual to individual.

12. **When can routine surgeries be done in Post COVID-19 patients?**

    The optimal time to surgeries is not yet clear. It depends on clinical judgment based on patient's symptoms and severity, physical deconditioning, drugs being used like blood thinners, and the urgency of surgery.

13. **How can Post COVID-19 condition be prevented?**

    The best way to prevent Post COVID-19 condition is to prevent SARS-CoV-2 infection in the first place. For this, vaccination and preventive measures like physical distancing, masking and sanitization of hands are essential.

14. **Are the tools used for screening of Post COVID-19 conditions validated?**

    The tools are being validated and at present are elaborate so as not to miss Post COVID-19 cases.

15. **Can other routine vaccines be used in Post COVID-19 conditions?**

    YES. The routine vaccines like influenza can be used in Post COVID-19 patients.

16. **The doctor said there is abnormality in my Chest X-ray even months after COVID-19. Do I need a CT chest done?**

    No, you don't need CT chest unless you have persistent shortness of breath or your treating physician advises for CT chest. Fibrotic changes may persist in the Chest X-rays.

17. **Is there any document we can refer to for Post COVID-19 self-care including physiotherapies and dietary advice?**

    Yes, the Ministry of Health, in coordination with WHO, has a document translated in Nepali for Post COVID-19 self-care.

18. **Do abnormalities in my chest x ray persist forever?**

    No. Lung fibrosis associated with Post COVID-19 pneumonia is non-progressive and resolves on its own in most of the cases. Only few cases require active treatment for Post COVID-19 lung fibrosis. However, you need to be in regular follow up with your physician if you have signs of fibrosis in your chest x ray.

Integrating Gender, Equity and Human Rights (GER) in Clinical Management (CM) of COVID-19

Gender, equity and human rights matter in health and clinical management. The men and women, girls and boys, or any individual of gender and sexual identity experience differences in health status, exposure to risk and vulnerability, access to and use of services, health-seeking behaviour, experiences in health care settings, and health and social outcomes due to their biological and social standing in the society. Health inequities manifest in differential exposure, vulnerability, access, health outcomes and consequences, so it is very important to recognize these aspects and provide health services from gender, equity, and human rights perspectives. In response to COVID-19, the following aspects are suggested to strongly consider while managing COVID-19 patients in health facility settings.

1. Providing respectful care towards all patients

Naturally, we envision a relationship between patients and service providers characterized by caring, empathy, support, trust, confidence, and empowerment, as well as gentle, respectful, and effective communication to enable informed decision making. While dealing with the patients of COVID-19 and non-COVID-19 at clinical sites, health workers/providers need to be aware about the differences, providing fair treatment and respecting and protecting the rights of an individual.

Health workers/providers need to:

- Demonstrate equal and fair treatment/ behavior irrespective of an individual's age, sex, caste, ethnicity, socioeconomic status, education, sexual orientation, family/ cultural background, disabilities or any other characteristics.
- Respect the right to information, informed consent and refusal; right to confidentiality, privacy, dignity, choices/ preferences, equitable care; and self-determination; right to freedom from harm, ill treatment and discrimination; and right to timely healthcare and to the highest attainable level of health.
- Avoid unintended biases towards women, girls, (with or without disabilities) or any clients based on their identity and socioeconomic backgrounds.
- Be aware of social stigma and Dos and Don'ts. Refer the box - there are some dos and don'ts on language[1] when talking about the COVID-19[2].
- Be aware of gender related biases, be non-judgmental.
- Be culturally sensitive and appropriate to age.

Managing social stigma - Dos and Don'ts

DO – Use respectful and dignified verbal, and body language
Don't – Use offensive verbal and body language.*
DO - talk about the new coronavirus disease (COVID-19)
Don't - attach locations or ethnicity to the disease, e.g., "Chinese Virus".

DO - talk about "people who may have COVID-19" or "people who are presumptive for COVID-19"
Don't - talk about "COVID-19 suspects" or "suspected cases".

DO - talk about people "acquiring" or "contracting" COVID-19
Don't talk about people "transmitting COVID-19" "infecting others" or "spreading the virus" as it implies intentional transmission and assigns blame.

DO - speak accurately about the risk from COVID-19, based on scientific data and latest official health advice.
Don't - repeat or share unconfirmed rumours.

DO - talk positively and emphasise the effectiveness of prevention and treatment measures.
Don't - emphasise or dwell on the negative, or messages of threat.

DO - emphasise the effectiveness of adopting protective measures to prevent acquiring the coronavirus, as well as early screening, testing and treatment.

For more information:
*National Guidelines for Disability Inclusive Health Services, 2019
covid19-stigma-guide.pdf (who.int)

1 Disability inclusive guidelines in English FINAL

2 covid19-stigma-guide.pdf (who.int)

- Be aware of rights of childbearing women and respect those while providing care to them.[3]
- Be aware on data for men and women on predisposing factors, delays in seeking care, co-morbidities for the COVID-19 and risk groups and link to diseases as well as possible biological differences in COVID-19 impact over men and women. Even though COVID-19 infections are distributed equally among men and women, evidence shows more deaths among men due to biological factors, resulting presumptively due to a more robust immune response among women.
- Be aware in regards with non-health effects of COVID-19 pandemic. Evidence suggests women have borne the brunt of non-health impacts, including job and wage losses, increases in unpaid work in homes including health work, increases in violence against women, especially intimate partner violence, and lack of adequate social protection. They have also faced lack of access to needed non-COVID-19 health services, especially sexual and reproductive health services.

2. Responding to gender-based violence (GBV)/violence against women and girls (VAWG)

The high prevalence of GBV/VAWG in Nepal is an ongoing challenge. NDHS 2016 reports 22% women experience physical violence. Global data show 1 in 3 women has experienced lifetime physical and/or sexual violence, mainly by an intimate partner. More importantly, available evidence points to significant increases GBV/VAWG increase in any emergency situation, and it has been exacerbated in COVID-19 situation and this has alarmed all actors working against GBV/VAWG.

The risks of violence that women and their children face during the current COVID-19 crisis cannot be ignored. **"There never are excuses for violence"**. Health systems have an important role in ensuring that services for survivors of gender-based violence remain accessible during the COVID-19 pandemic. The routine screening of GBV is NOT recommended by WHO during COVID-19 response. WHO guidance includes the dos and don'ts to be followed in this regard[4]. In case of a patient/client who comes to the health facility and discloses experience of violence, it is most important to respond.[5]

What is gender - based violence (GBV)?

Gender based violence refers to harmful acts directed at an individual based on their gender. It is rooted in gender inequality, the abuse of power and harmful norms. GBV is a serious violation of human rights and a life-threatening health and protection issue**.** GBV is committed in many forms such as physical, emotional/psychological, sexual, cultural/social, economic or any kind that endangers the safety, health and well-being of an individual.

Domestic Violence refers to violent or aggressive behavior within home involving intimate partner and immediate family members.

Five Actions for Health workers/providers to respond to GBV/VAWG

- ✓ Be aware of the increased risk and health consequences of GBV/VAWG in the context of COVID-19.
- ✓ Recognize the signs and know when and how to ask about violence.
- ✓ If violence is disclosed, act to provide timely care for physical, sexual, reproductive and mental health.
- ✓ If violence is disclosed, provide First-line support and medical care to survivors. The first-line support is most important, and it involves 5 simple tasks of LIVES:
  - **LISTEN:** listen to women, girls closely, with empathy, and without judging.
  - **INQUIRE:** assess, identify and respond to person's various needs and concerns.
  - **VALIDATE:** show that you understand survivor's experience, feeling and believe her.

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3 Microsoft Word - Final_Respectful_Care_Charter_12-15-11.docx (who.int)

4 See 2014, WHO, UNW, UNFPA. Health care for women subjected to intimate partner violence or sexual violence: A clinical handbook: https://www.who.int/publications/i/item/WHO-RHR-14.26

5 See 2020 WHO: COVID-19 and violence against women: What the health sector / system can do: https://www.who.int/reproductivehealth/publications/vaw-covid-19/en/

- **ENHANCE SAFETY:** discuss a plan to protect the survivor from further harm if violence occurs again.

- **SUPPORT:** support her by helping her connect to information, services, and social support.

✓ Share information about available support, identify referral pathways and refer to other essential services.

Health facilities can identify and provide information about services available locally (e.g., hotlines, shelters, psychosocial counseling) for survivors, including opening hours, contact details, and whether services can be offered remotely, and establish referral linkages. It is important to understand women and girls of marginalized groups and with disabilities are likely to have additional risks and needs. WHO-National Federation of Disabled Nepal (NFDN), Yes We Can Project has set-up district level virtual help desk with woman peer counselor to address the needs of women and girls with disabilities. The contact numbers are available on request from the National Coordinator of this project (nc@nfdn.org.np).

Remember: Safety, respect, confidentiality and non-discrimination in relation to GBV survivors and those at risk are vital considerations at all times.

3. Considerations for managers

Many women are at the forefront of the COVID-19 response. Study[6] shows globally, women make up 70 per cent of the health workforce, especially as nurses, midwives and community health volunteers, and account of the majority of service staff in health facilities as cleaners, launderers and caterers. This scenario obtains in Nepal as well. Despite the large number, women are often not reflected in decision-making in response to COVID-19. Further, women are still paid less than their male counterparts and hold fewer leadership positions in the health sector and enjoy lower job security and social protection. Masks and other protective equipment designed and sized for men leave women at greater risk of exposure. The lack of adequate attention to the menstrual hygiene needs of women health workers during long shifts is an added workplace-related challenge.

So, Managers need to be aware of the above gaps and ensure from management aspect if the needs of women especially who are at forefront are prioritized and fulfilled. This means:

- The health care workers and caregivers have access to women/gender-friendly personal protective equipment (PPE) and menstrual hygiene products, i.e., the different sizes and also the design of the PPE needs to be made available and accessible considering the feminine and menstrual hygiene need.
- Flexible working arrangements need to be made to balance the burden of care especially for pregnant and breastfeeding mothers.
- Women health workers take the leadership and decision-making roles.
- Equal treatment and pay, paid leave and other social protection measures are ensured to women health workers in the public and private sectors.

4. Managing disaggregated data (Sex and Age disaggregation of data)

While the COVID-19 pandemic has affected everyone, women and girls (with or without disabilities), people from marginalized groups have been facing specific and often disproportionate economic, health, and social risks due to deeply entrenched inequalities, social norms, and unequal power relations. Therefore, understanding the gender-differentiated impacts of the COVID-19 crisis through sex and age, caste/ethnicity, disability disaggregated data is fundamental to policy and program responses that can reduce vulnerable conditions and build the agency of girls and women and marginalized groups placing gender and equity at their center.

6 UN Women | Explainer: How COVID-19 impacts women and girls

To manage the disaggregated data, the case reporting form of clinical management as well as vaccine monitoring form should include at least sex, age, disabilities, caste/ethnicity, co-morbidities, and health care worker status, and this should be reported in regular reporting system. Analysis by this disaggregation should be prioritized by the health facilities and higher levels to identify any gaps and develop priorities for interventions. The same can be used to analyze health inequities among different vulnerable groups, and to review, take appropriate actions and report periodically.

5. COVID-19 vaccination

There is a gender gap in COVID-19 vaccination. Evidence shows that in low-income countries, like Nepal women (with or without disabilities) have lower access to mobiles or digital devices in comparison to men[7], as a result less women may face challenges in being able to register through online and digital portals for COVID-19 vaccination. Older women and people from rural, remote and urban poor households may be similarly disadvantaged. Similarly, women's typically lower levels of education and rates of access to radio, mobile, and/or internet or limited access to accurate and credible information can increase the risks of the spread of fear, rumors, and misinformation about vaccines reducing immunization uptake. And the same case might be for the elderly people.

For women, there are other factors that might act as barriers to access to timely and complete vaccination, such as women's care roles/ responsibilities and time poverty, decision-making power on health seeking and use of resources in households, lower education and literacy, limited mobility from access to safe transport and gender-related constraints on their ability to move about on their own, anticipated or perceived discrimination in health care settings, experience of harassment and violence etc. Older women may be particularly disadvantaged. Considering all these factors there needs to be ensured equitable access to vaccination:

- Compare the actual distribution of those covered by 1st and 2nd dose of the vaccine with the expected distribution, by age and sex of various eligible groups, if women and elderly prioritized for vaccine.
- Plan to offer vaccination to pregnant and lactating women in priority target groups.
- Be aware of the related barriers to vaccine enrolment/registration and follow-up
- Use differentiated vaccine delivery strategies to effectively reach women, elderly and gender-diverse people. For example, in a few places, designated vaccine counters were set-up for persons with disabilities including accessible transportation to vaccine facilities.
- Monitor vaccine implementation progress and equitable access through selected priority indicators disaggregated data by sex and age, disability, and caste/ethnicity.
- Promote leadership and encourage participation of vulnerable groups in COVID-19 service delivery. For example, in Nepal, the groups of disabled people have taken leadership and participation in successful vaccine advocacy, data-driven advocacy, risk communication, access audits, identification of vulnerable household of persons with disabilities etc.

7 Gavi_Guidance-to-address-gender-barriers-in-MRS-immunisation_ENG.pdf

Appendix

Appendix – I: Assessment of Breathlessness

mMRC dyspnea scale

Grade of Dyspnea	Degree of breathlessness related to activities
0	No breathlessness, except with strenuous exercise
1	Breathlessness when hurrying on the level or walking up a slight hill
2	Walks slower than contemporaries on level ground because of breathlessness or has to stop for breath when walking at own pace
3	Stops for breath after walking about 100m or after a few minutes on level ground
4	Too breathless to leave the house, or breathless when dressing or undressing

6-minute walk test (6 MWT)

- The 6-min walk test (6MWT) is the gold standard exercise test which has been validated for assessment of breathlessness in most chronic lung diseases.

This test is sensitive, easily reproducible, easy to perform, and does not required any specialized equipment. However, it requires 30-m corridor which may not be available in clinical settings.

To overcome the technical and spatial limitations, 1-min sit-to-stand test (1STST), can be used.

1-minute sit-to-stand test

1STST only requires a chair and can easily be performed in consultation room.

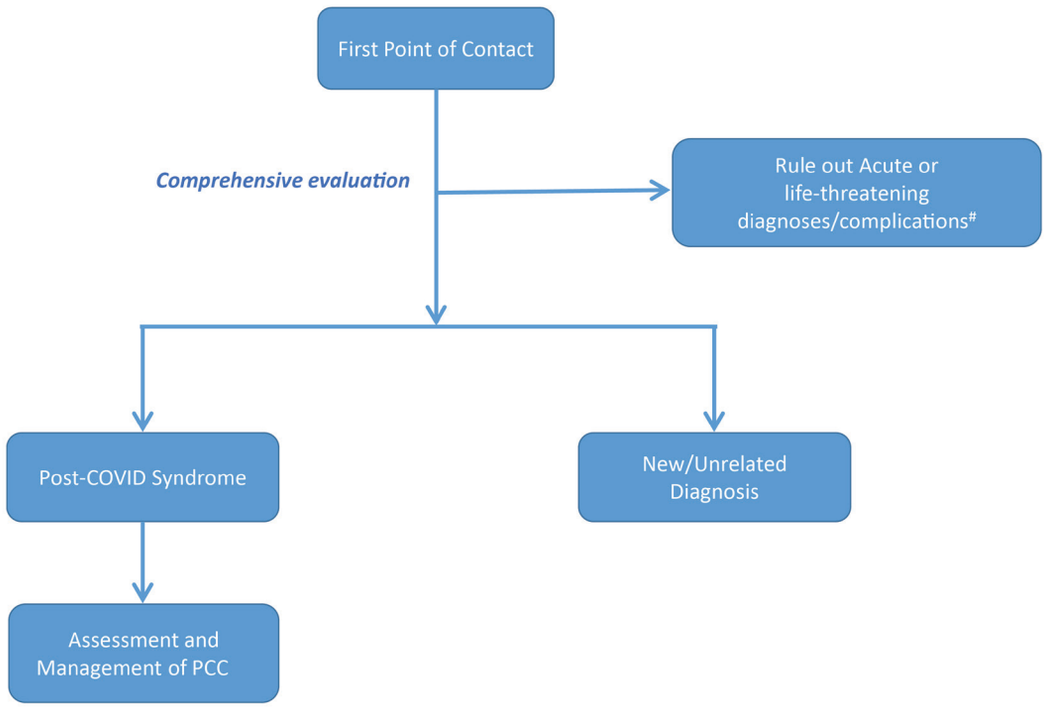
- It is found to be well tolerated, sensitive and reproducible in patients with chronic obstructive pulmonary disease.
- The patient is asked to sit upright on the chair with knees and hips flexed at 90°, feet placed flat on the floor a hip-width apart. Arms should be held stationary by placing their hands on their hips, not using them for support while rising or sitting. He/she is asked to perform standing upright and then sitting down in the same position at a self-paced speed repeatedly as many times as possible for 1 min.
- The number of repetitions will be recorded.

The modified Borg scale (0–10) is used to assess dyspnea and fatigue immediately before and after each test. Pulse oximetry is used to record SpO2 and pulse rate. Drop in SpO2 ≥ 4% is clinically significant.

Table: Modified Borg scale

Scale	Shortness of breath	At rest	During activity
0	Nothing at all		
1	Very, very slight (just noticeable)		
2	Very slight		
3	Slight		
4	Moderate		
5	Severe		
6			
7	Very severe		
8			
9	Very, very severe		
10	Maximal		

Flowcharts for evaluation and referral



Severe hypoxemia, cardiac chest pain, delirium, focal neurological deficit, thromboembolism, etc.
**Same protocol can be used for patients with similar sign/symptoms even after 4 weeks.

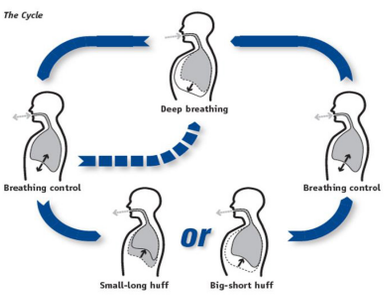
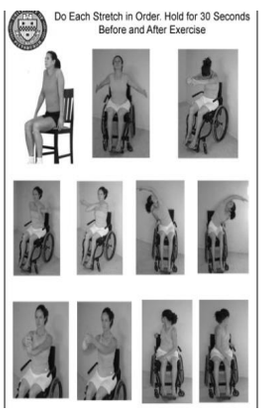
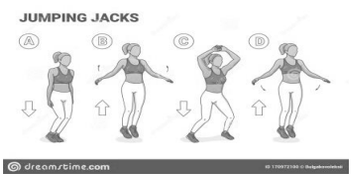
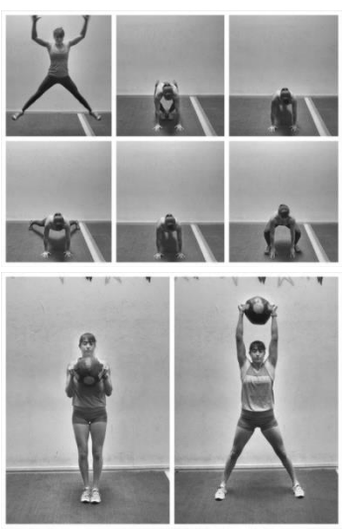
Do not exclude people based on the absence of a positive SARS-CoV-2 test (PCR, antigen or antibody) as long as the case definition criteria are met.

Questionnaire for screening of Post COVID-19 condition (✔That apply)

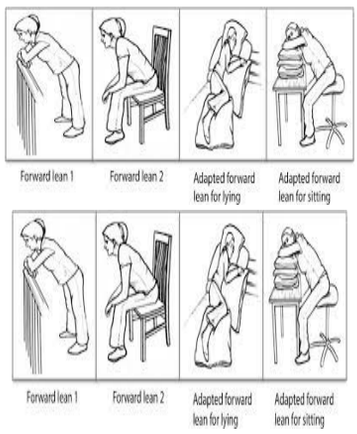
<table>
<tr><td>Patient Details</td><td colspan="2">Name –
Age –
Address –
Health care center of Convenience –
Telemedicine available ☐ Y/N ☐
Patient with special needs/ disability ☐ Y/N ☐</td></tr>
<tr><td>History of COVID infection
☐ Confirmed
☐ Suspected
☐ Exposed but not tested
☐ Not sure</td><td colspan="2">Red Flag Symptoms (For urgent management/referral)
New onset or Worsening or Severe
☐ Breathlessness or hypoxia
☐ Chest pain or heaviness, palpitations/ arrhythmias
☐ Delirium, or focal neurological symptoms or signs
☐ Syncope
☐ Organ(s) dysfunction</td></tr>
<tr><td>Time since infection/exposure
Days (Weeks)</td><td colspan="2">Treatment Received during COVID -</td></tr>
<tr><td rowspan="2">Current Symptoms</td><td>☐ Fatigue/Tiredness
☐ Shortness of breath
☐ Cough
☐ Muscle pain
☐ Headache
☐ Joint pain
☐ Chest pain
☐ Palpitations
☐ Dizziness
☐ Fever
☐ Mood changes
☐ Sore throat
☐ Running nose
☐ Tinnitus</td><td>☐ Difficulty thinking
☐ Altered smell
☐ Altered taste
☐ Sleep disturbance
☐ Tingling/Numbness
☐ Anorexia
☐ Nausea/Vomiting
☐ Diarrhea
☐ Heartburn
☐ Abdominal pain
☐ Skin rashes
☐ Fear and anxiety
☐ Blurred vision
☐ Hair loss</td></tr>
<tr><td colspan="2">☐ Others: (Mention)</td></tr>
<tr><td rowspan="2">Effect on Quality of Life</td><td colspan="2">Are you able to perform the following?</td></tr>
<tr><td>Self-care ☐ Y/N ☐
Climb stairs ☐ Y/N ☐
Office work ☐ Y/N ☐</td><td>Household chores ☐Y/N ☐
Drive ☐Y/N ☐
Hobbies ☐ Y/N ☐</td></tr>
<tr><td>Comorbidities</td><td colspan="2">(Mention)</td></tr>
<tr><td>Current Medications</td><td colspan="2">(Mention)</td></tr>
<tr><td>Compared to prior assessment</td><td colspan="2">Better ☐ Static ☐ Worse ☐</td></tr>
<tr><td>Referral</td><td colspan="2">Required ☐ Y/N ☐
Reason for referral –</td></tr>
<tr><td>Comments/Notes</td><td colspan="2"></td></tr>
</table>

Appendix II

Exercises based on mMRC

mMRC Grade 3 and 4 exercises	mMRC Grade 2 exercises	mMRC Grade 0 and 1 exercises
Active cycle of breathing exercise  5-10 cycles of breathing exercise every hour	**Hamstring stretch**  • 15 to 20 sec hold for 2- 3 set per session • 2-3 session per day	**Standing on one leg (balance)**  • Stand on one leg with or without eyes closed for one minute • 2-3 reps per setting
Extremity and spine exercises:   **Two sets of each exercise**	**Quadriceps stretch**  **Pectoral stretch**  • 15 to 20 sec hold for 2- 3 set per session • 2-3 session per day	**Jumping jack**   2-3 sets/ per day with different variations as tolerated

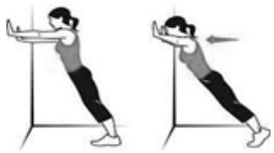
Dyspnea relieving positions



Marching

- March in one spot for one minute with 1-2 min break in between
- 5-10 repetition per setting
- 2-3 setting per day

Wall push up

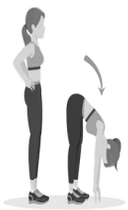


- Stand one feet away from a wall and do push up against the wall for one minute
- 2- 3 repetition with rest in between

Isometric quadriceps

Isometric Biceps

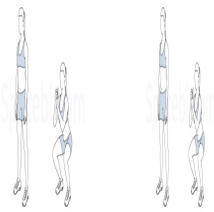
- Hold the contraction for 15- 20 sec
- 5-10 sets per setting
- 2-3 setting per day

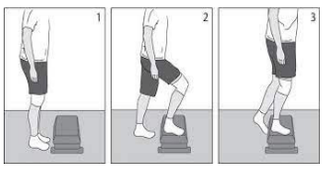


Forward bending

Arm punching

- 30sec - 1 minute continuous exercise with 2 minutes break in between
- 5- 10 set per setting
- 2-3 setting per day





Squat & Step up and down

One minute exercise per set

2-5 sets per settings

2-3 settings per day

Walking

10- 20 minutes walking everyday with normal speed

Progress to brisk walking with increase in walking duration

Appendix III

EXERCISES AT COMMUNITY LEVEL

1

CHEST EXPANSION EXERCISE
Begin and end with deep breathing. Perform this exercise 5-10 times and do 2-3 sets per day.

2

NECK MOVEMENTS
Repeat this 10 times per set and do 3-5 sets per day including all movements and directions.

3

TRAPEZIUS STRETCH
Hold each side for 15-20 seconds and report 3-5 times for both sides and do 2-3 sets per day.

4

ANKLE PUMP
Repeat this exercise 5-10 times per set and do 3-5 sets per day.

5

CALF STRETCH
Hold for 15-20 seconds and repeat 3-5 times for each leg and do 2-3 sets per day.

6

KNEE RAISE
Hold each leg for 10-15 seconds and repeat for both legs for 5-10 times per set and do 2-3 sets per day.

7

KNEE EXTENSION
Hold each leg for 10-15 seconds and repeat for both legs for 5-10 times per set and do 2-3 sets per day.

8

BICEPS CURL
Repeat 10-15 times in each hand per set and do 2-3 sets per day.

9

SIDE ARM RAISE
Hold each arm for 10-15 seconds and repeat each arm 10 times per set and do 2-3 sets per day.

10

MARCHING
Repeat each leg while standing and sitting down for 1-3 minutes and do 2-3 sets per day on alternating legs.

alternating legs.

11

WALL PUMP
Repeat for 1-3 minutes and do 2-3 sets per day.

12

ROTATING TOE TOUCH
Repeat each side for 10-15 times and do 2-3 sets per day.

13

SIT AND STAND
Repeat 10-15 times and do 2-3 sets per day.

14

SQUAT
Repeat for 5-10 times per set using a straight wall and do 2-3 sets per day.

15

WALKING
Walk for 5-10 minutes and at least 2 times per day.

16

MODIFIED PUSH-UP
Repeat 10-12 times per set and do 2 sets per day.

17

FIGURE OF 8
Repeat 3-5 times per set and do 2 sets per day.

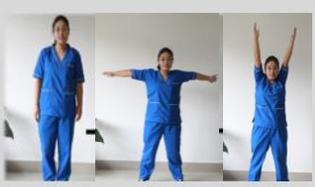
18

LUNGES
Hold each legs for 15-30 seconds while repeating 3-5 times for both legs, and do 2 sets per day.

19

STAIR CLIMBING
4 Flight Up and Down for 3 minutes and do 2 sets per day.

20



JUMPING JACK
Repeat for 2-3 minutes and do 2 sets per day.

21

CYCLING
Perform cycling for 5-10 minutes and do 2 sets per day.

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Picture Credits

Figure 1: Common symptoms of Post-COVID condition (Page 5) – **Dr. Sabin Thapaliya**

Chest –Xray and HRCT chest showing lung fibrosis (Page 17) – **Dr. Shital Adhikari**

Exercises at the community level (Page 61 & 62) – **BPT students (8th batch), KUSMS,** Dhulikhel Hospital – **Mr. Regan Shakya**

Design Credit: Ms. Shreya Shrestha, WHO Nepal

List of Contributors

Dr. Pawan Jung Rayamajhi, Director, CSD

Dr. Narendra Kumar Khanal, CSD

Dr. Prakash Budhathoki, CSD

Mr. Pan Bahadur Chhetri, MoHP

Ms. Bala Rai, NSSD

Dr. Rabindra Baskota, LCDMS

Dr. Hemanta Chandra Ojha, EDCD

Ms. Shila Shrestha, NHEICC

Mr. Bharat Mani Marhatta, CSD

Dr. Niranjan Pant, CSD

Mr. Bijay Raj Chapagain, CSD

Mr. Kamlesh Kumar Mishra, CSD

Ms. Uma kumari Rijal, CSD

Mr. Pradip Kumar Yadav, CSD

Dr. Shrikant Agrawal, CSD

Dr. Santosh Kumar Gupta, CSD

Ms. Kusum KC, CSD

Mr. Prabin Kumar Yadav, National Trauma Centre

Mr. Sagar Dahal, FWD

Dr. Raju Dhakal, SIRC

Mr. Regan Shakya, KUSMS, Dhulikhel Hospital

Mr. Raj Kaji Prajapati, KUSMS, Dhulikhel Hospital and Autism Care Nepal Society

Mr. Aakash Pradhan, KUSMS, Dhulikhel Hospital

Mr. Uday Mishra, Physiotherapist, Narayani Hospital, Birgunj

Mr. Shree Krishna, Physiotherapist, Dadeldhura Hospital

Mr. Pratik Pokhrel, Physiotherapist, Bagmati Province

Dr. Allison Gocotano, WHO

Ms. Shirley McQuen Patterson, WHO

Dr. Subash Neupane, WHO

Dr. Samiksha Neupane, UNICEF

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