INTERVENTIONS FOR REHABILITATION OF POST COVID-19 CONDITION

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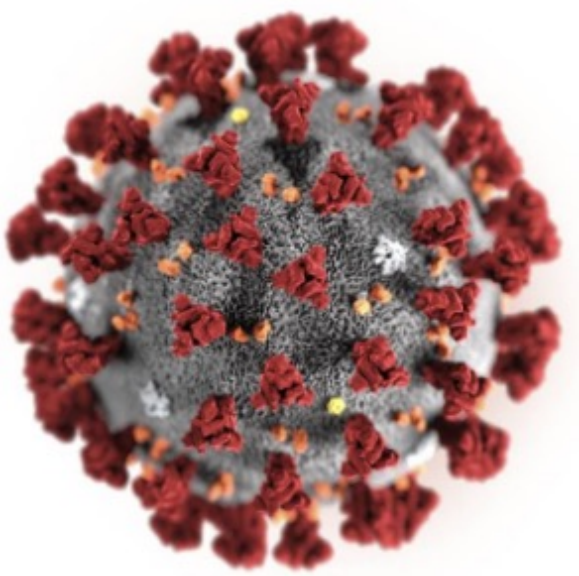

WORLD HEALTH ORGANIZATION GLOBAL WEBINAR SERIES
06-10-2021 (WEDNESDAY)

Highlight

- Introduction
- COVID-19 Rehabilitation Medicine response
- Rehabilitation framework model
  - Criteria, Assessment, Intervention, Mode of Delivery & Outcome Measures
- Outcomes data
- Interventions for common post-COVID condition

Introduction

03-10-2021 (Source:covidnow.moh.gov.my)

- Infected cases
  2,281,724
- Death
  26,801
- Recovered
  2,115,019

If lowest prevalence of 10% Long COVID applied→ at least 211,502 individuals are at risk!

Hospital Sungai Buloh (HSgB) 2006

- Malaysia COE for Infectious Disease
- First designated hospital for COVID-19
- Admission commenced 25-01-2020
- Total COVID-19 admission until Sept, 21 was **36,467**

National Leprosy Centre Sungai Buloh 1930

- Tentative listing UNESCO
- Set up first Post COVID-19 Rehab Clinic Nov 2020

Hospitals with rehabilitation medicine services for Post COVID-19 conditions

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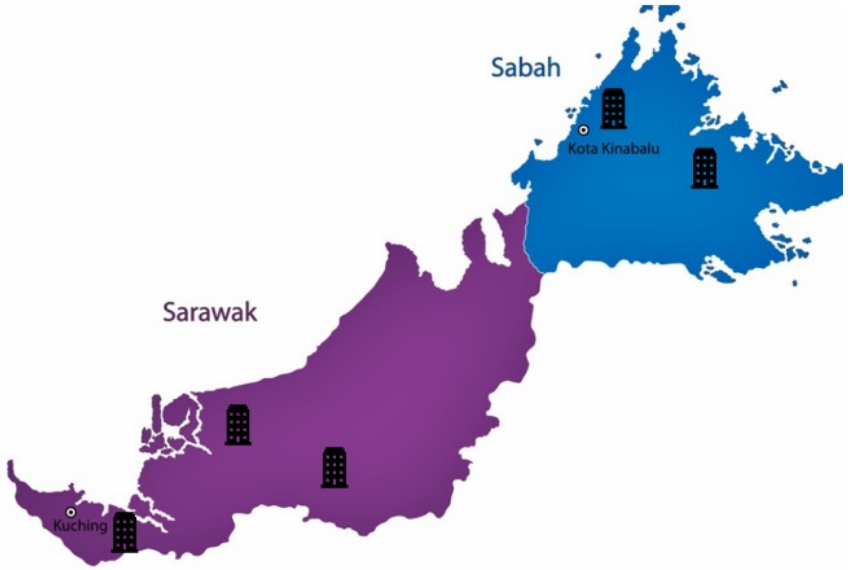
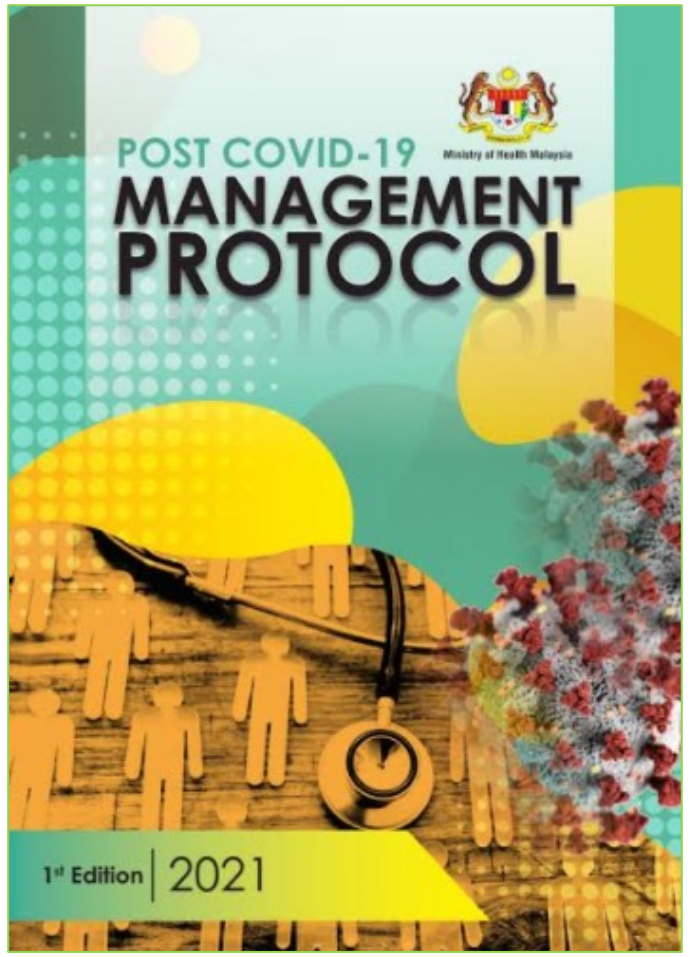


Malaysia



Total 32 Ministry of Health, 3 Ministry of Education & 4 Private hospitals and 1 Ministry of Human Resource Rehab Centre

Present list of healthcare facilities with rehabilitation medicine services for Post COVID-19 conditions

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- Federal territory- Hospital Rehabilitasi Cheras, Hospital Kuala Lumpur, University Malaya Medical Centre, Hospital Chancellor Tunku Mukhriz, Hospital Daehan Rehab (Putrajaya), Prince Court Medical Centre, Gleneagles Hospital Kuala Lumpur, Ara Damansara Medical Centre
- Selangor - Hospital Sungai Buloh, Hospital Serdang, Hospital Tengku Ampuan Rahimah, Hospital Shah Alam, Hospital Teknologi MARA, Hospital ReGen Rehab, Hospital Sunway
- Negeri Sembilan – Hospital Tuanku Jaafar Seremban, Hospital Rembau, Hospital Bandar Seri Jempol, Hospital Tuanku Ampuan Najihah
- Pahang - Hospital Tengku Ampuan Afzan, Hospital Sultan Haji Ahmad Shah
- Kelantan - Hospital Raja Perempuan Zainab II
- Pulau Pinang - Hospital Pulau Pinang, Hospital Seberang Jaya, Hospital Balik Pulau.
- Kedah - Hospital Sultanah Bahiyah, Hospital Jitra, Hospital Kuala Nerang, Hospital Sultan Abdul Halim
- Sabah - Hospital Sandakan, Hospital Queen Elizabeth
- Sarawak - Hospital Umum Sarawak, Hospital Miri, Hospital Sibu
- Johor - Hospital Sultan Ismail, Hospital Sultanah Aminah
- Terengganu - Hospital Kemaman, Hospital Sultanah Nur Zahirah
- Perak - Hospital Raja Permaisuri Bainun
- Melaka - Hospital Melaka, Pusat Rehabilitasi PERKESO Tun Abdul Razak

Spectrum of COVID-19 Rehabilitation Medicine Response

Acute Rehabilitation Services Single discipline physiotherapy	Intensive Care Unit / Acute Medical Wards
COVID-19 Rehabilitation Inpatient Specialized Services (CRISS) Interdisciplinary rehabilitation	Off-tagged Medical Wards
COVID-19 Rehabilitation Outpatient Specialized Services (CROSS) Interdisciplinary rehabilitation	Rehabilitation Specialist Clinic

Inpatient Rehabilitation Framework Model

COVID-19 Rehabilitation Inpatient Specialized Services (CRISS)

Entrance Pathway	▪ Category 4 & 5 COVID-19 automated referral ▪ Other categories of COVID-19 with identified rehabilitation needs ▪ Off tagged by the infectious disease/ medical team
Rehabilitation Process	Evaluation ▪ Interdisciplinary team - Rehabilitation Clinician, Physiotherapist, Occupational Therapist and nurses ▪ Goals setting – Short and intermediate term Functional assessment ▪ Physical – Bed mobility, lying to sitting, sitting balance, transfers, standing, ambulating ▪ Activities of Daily Living (ADL) - Modified Barthel Index (MBI); Post COVID-19 Functional Scale (PCFS) Specialized test as tolerated performed in phases with vital signs monitoring ▪ 1 Minute Sit To Stand (1MSTS); Timed Up & Go (TUG); 2 Minutes Walking Test (2MWT); 6 Minutes Walking Test (6MWT) Rehabilitation prescription ▪ Conservative, intermittent, graded and personalized program ▪ Education and skills empowerment: o Breathing techniques such as pursed lips, diaphragmatic, incentive spirometer o Muscle strengthening such as biceps curl, arm reach, alternate punch, knee extensions o Aerobic activities such as cross body movement, knee lifts, marching on the spot, walking o Intensity threshold setting using Borg Scale Rating of Perceived Exertion and heart rate response o Gradual return to Activities of Daily Living
Pre-hospital Discharge	Early supported discharge ▪ Personalized prescription of home based pulmonary rehabilitation program ▪ Caregiver training as indicated ▪ Equipment and assistive devices prescription such as walking frame, specialized wheelchair and orthoses ▪ Facilitate long term oxygen therapy procurement as required ▪ Organize referral to other rehabilitation center if required ▪ Transfer of care to community
Exit Pathway	▪ Achieved immediate and short term rehabilitation goals ▪ Procurement of immediately required assistive and adaptive devices ▪ Medical discharge ▪ Automated activation of COVID-19 Rehabilitation Outpatient Specialized Services (CROSS) pathway

Multidisciplinary discussion and referral for complex cases, review of clinical process with emerging evidence are done as indicated

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Long COVID: Rehabilitation Framework Model

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COVID-19 Rehabilitation Outpatient Specialized Services (CROSS)

Entrance pathway	▪ Post COVID-19 Rehabilitation Inpatient Specialized Services (CRISS) cases ▪ All category 4 & 5 automated referral ▪ Other categories with Long COVID symptoms ▪ Patients with existing rehabilitation needs whom contracted COVID-19
Teleconsultation	▪ Monitor progress at home such as home oxygen therapy, wounds ▪ Symptoms screenings using standardized questionnaire ▪ Real time database entry ▪ Medical advise and awareness for **red flags** symptoms ▪ Decide urgency for in-person review
Comprehensive in-person review	▪ **Interval**: 1 – 3 months; 3 – 6 months & 6 – 12 months as per attending clinician judgement ▪ **Method**: In-person evaluation by interdisciplinary rehab team members, then team discussion as required ▪ **Multi-system impairment evaluation**: Cognitive – Brief MSE, MMSE; Psychosocial – DASS, COVID-19 IES; Respiratory - Auscultation; Home oximeter diary, Incentive spirometer, PEFR; CVS - 1MSTS; 6MWT; MSK – FSS, MRC, TUG, Hand dynamometer; Others are based on comprehensive clinical evaluation. ▪ **Functional assessment**: MBI; PCFS ▪ **Quality of Life**: WHODAS 2.0; Community ADL - RTW, RTD ▪ **Other specialty referral**: Accessible as clinically required for further investigation & management including but not limited to pulmonologist, cardiologist, internal medicine, infectious disease, neurologist, psychiatrist, geriatrician ▪ **Other interdisciplinary team activation**: SLT, MSW, Dietician, Counsellor and others as required ▪ **Rehabilitation prescription**: Targeted, personalized, gradual increment; home based with monitoring log and access for medical advise; institutional based program on case to case basis; intensity based on Modified Borg Scale and THRR ▪ **Devices**: IMT, OPEP, ambulatory O_2 support TED stockings, abdominal binders
Exit Pathway	▪ Complete symptoms resolution ▪ Absence of new on-going symptoms or issues ▪ Full re-integration into society & pre-morbid life roles

Abbreviation: FSS- Fatigue Severity Scale; THRR-Target Heart Rate Response; MSK – Musculoskeletal; IMT- Inspiratory Muscle Trainer; OPEP- Oscillating Positive Expiratory Pressure; 1MSTS- 1 Minute Sit To Stand; TUG- Timed Up &Go; 6MWT- 2 Minutes Walking Test; RPE-Rate of Perceived Exertion; Modified Barthel Index; PCFS- Post C-19 Functional Scale; PEFR- Peaked Expiratory Flow Rate; PCF- Peak Cough Flow; RTW- Return to Work; RTD- Return to Drive; WHODAS- World Health Organization Disability Assessment Scale; DASS – Depression, Anxiety, Stress Scale; C-19 IES- Covid 19 Impact of Event Scale; PT- Physiotherapy; OT- Occupational Therapy, SLT- Speech Language Therapy

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Long COVID : Ongoing symptomatic COVID-19 (Persistent symptoms > 4 – 12 weeks)

COVID-19 Rehabilitation Outpatient Specialized Services (CROSS) database preliminary analyses
Nov 2020 – Sept 2021 (N=2,612)

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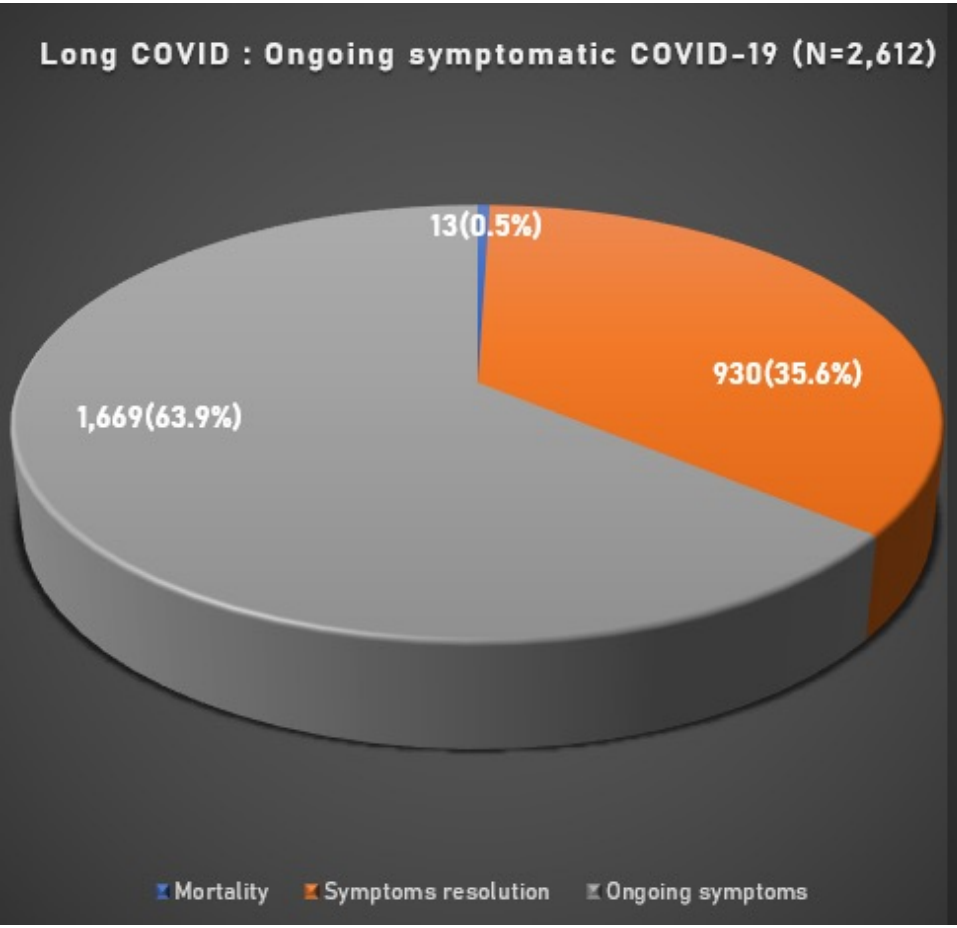

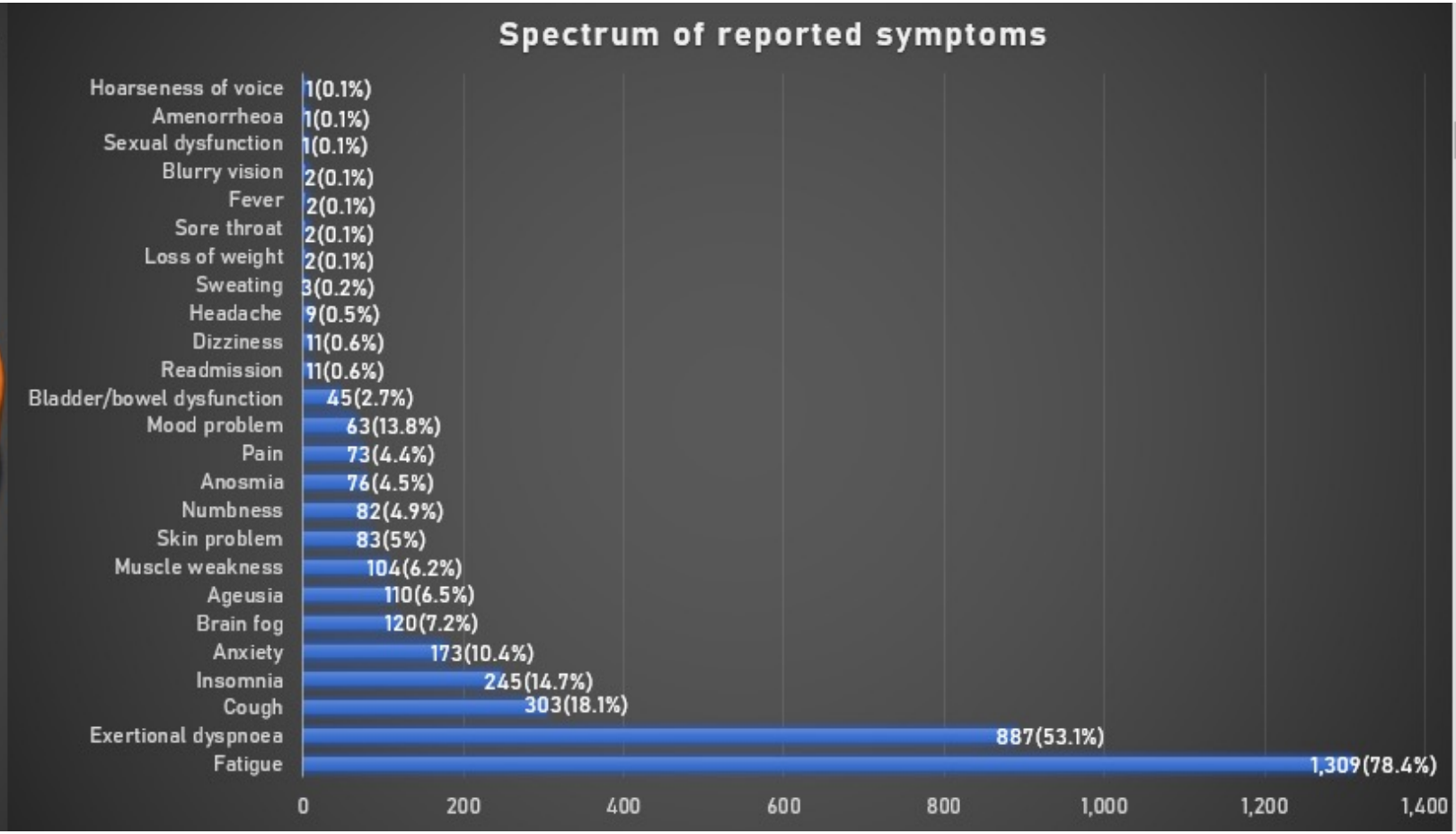

Note: Persistent symptoms timeline are from onset of initial acute symptoms. Most patients reported cluster of symptoms

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Long COVID : Post COVID-19 Syndrome (Persistent symptoms >12 weeks)

COVID-19 Rehabilitation Outpatient Specialized Services (CROSS) preliminary database analyses
Nov 2020 – Sept 2021 (N=2,043)

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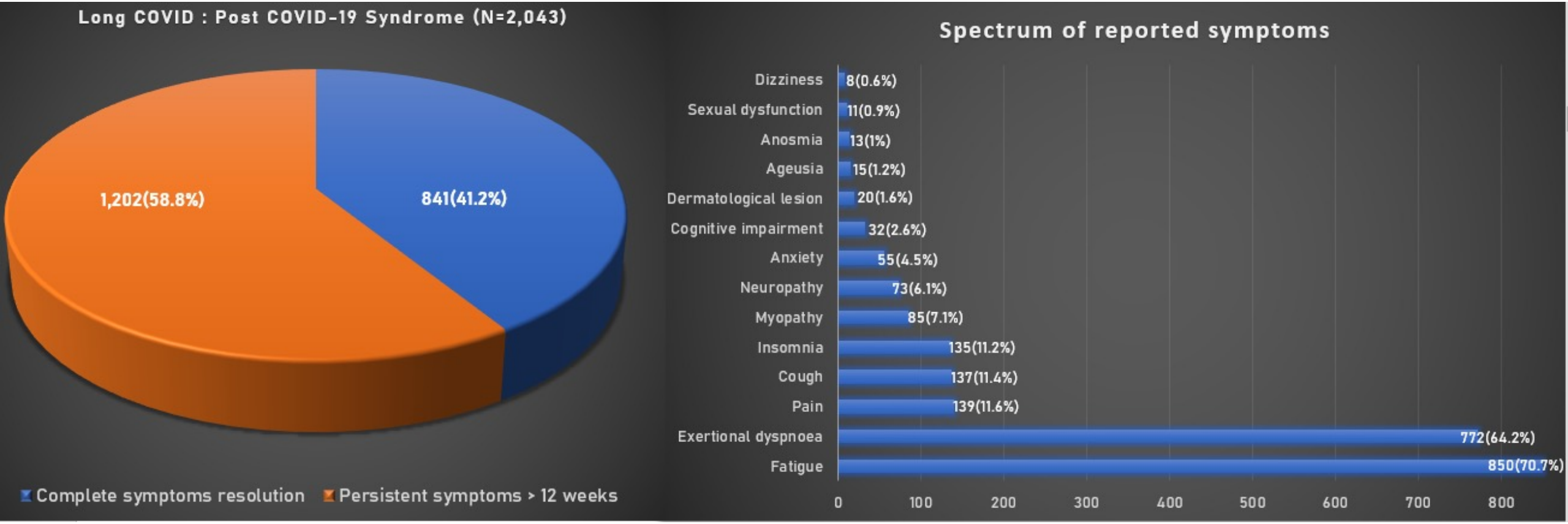

Note: Timeline categorization are from onset of initial acute symptoms. Most patients reported cluster of symptoms.

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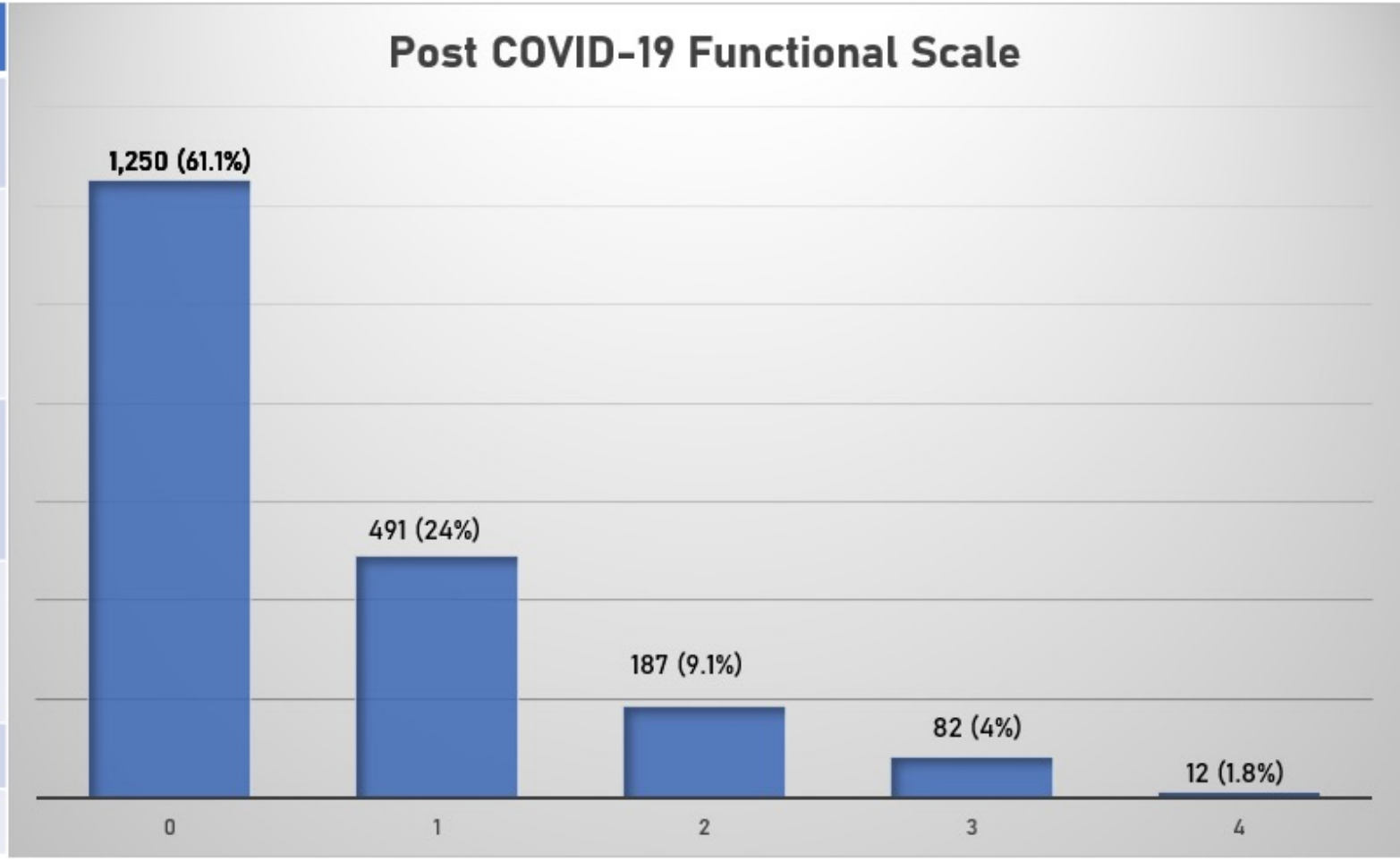
Basic characteristics		Frequency (%)
Gender	Male Female	1,214 (59.4%) 829 (40.6%)
Race	Malay Chinese Indian Others	1,347 (65.9%) 516 (25.2%) 132 (6.4%) 48 (2.5%)
Age (Years)	13 - 29 30 – 59 60 – 89	78 (3.8%) 1,224 (59.9%) 740 (36.3%)
Disease severity	Cat ≤ 3 Cat 4 Cat 5	14 (0.8%) 1,697 (83%) 332 (16.2%)
Co-morbidities	Presence	1,388 (67.9%)
Home O_2	Required	30 (1.5%)



Note: Research entitled "Long COVID Characterization and Prediction from COVID-19 Rehabilitation Outpatient Specialized Services (CROSS) database in a designated COVID-19 hospital in Malaysia" is presently in progress.

Management of Post-COVID 19 Condition

- Recognize symptoms
- Comprehensive clinical evaluation
- Rule out red-flags and other diagnoses
- Investigation as required
- Optimize medical co-morbidities
- Consultation / referral to other indicated medical specialties
- Supportive & symptomatic treatment

Intervention for rehabilitation of Post COVID-19 condition – An integrated approach

Post- COVID condition	Non-pharmacological	Pharmacological
Fatigue	▪ Energy conservation technique ▪ Sleep hygiene ▪ Graded return to physical activity & ADL ▪ Personalized graded aerobic exercise with pacing ▪ Breathing and relaxation technique ▪ Cognitive behavioral therapy ▪ Healthy life style ▪ Adaptive and assistive devices	▪ Stimulants Methyl phenidate D-amphetamine ▪ Analgesics Bupropion ▪ Anti depressants SSRIs TCAs
Exertional dyspnea	Personalized pulmonary rehab program ▪ Improve ventilation capacity: Breathing techniques, positioning, adjuncts- incentive spirometer, inspiratory muscle trainer ▪ Aerobic exercise- Conservative, intermittent, pacing gradual increment, intensity <60% max heart rate ▪ Muscle strengthening - Resistance and weights as tolerated	▪ Supplemental O_2 therapy ▪ Inhaler meds if bronchial hyperresponsiveness ▪ Anti-fibrotic if progressive FLD
Cough	Dry: Hydration, gargle, lozenges, menthol crystal steam inhalation Productive: Postural drainage, percussion, active cycle breathing technique, huffing methods	Dry: Suppressant, if sensory neural cough neuropathic medication Productive: Mucolytics, expectorants

Intervention for rehabilitation of Post COVID-19 condition – An integrated approach

Post- COVID condition	Non-pharmacological	Pharmacological
Anxiety	▪ Educate with facts on recovery process ▪ Cognitive Behavioral Therapy ▪ Sleep hygiene ▪ Relaxation and breathing techniques ▪ Psychoeducation & psychotherapy ▪ Facilitate access to mental health support	Anxiolytics Benzodiazepines Anti depressants SSRIs SNRIs TCAs
Brain Fog	▪ Sleep hygiene ▪ Breathing and relaxation technique ▪ Cognitive re-orientation ▪ Compensatory strategies - memory aids, checklist, alarm ▪ Brain exercise – puzzle, word and number game, gradual complexity ▪ Personalized graded exercise program	▪ Stimulants Methyl-phenidate if attention deficit
Chronic pain	Desensitization techniques Physical modalities – TENS, cryotherapy, ultrasound etcs Cognitive behavioral therapy Relaxation and breathing techniques Personalized graded exercise program	Neuropathic Gabapentin, Pregabalin Nociceptive NSAIDS topical / oral Opioids

Note : Integration of non pharmaceutical and pharmaceutical approach are adopted from alike symptoms management in other pathological condition. Effectiveness of its application in post-COVID-19 condition requires scientific validation.

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