

## Clinical Manifestations of COVID-19 Infection in Persons with Disabilities (PWDs) at Inpatient Rehabilitation Center –A Hospital-Based Study

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### ABSTRACT

**Objective:** To describe clinical manifestations of COVID-19 infection in Persons with disability (PWD) in Pakistan.

**Study Design:** Cross-sectional study.

**Place and Duration of Study:** Inpatient Rehabilitation Facility (IRF) of Armed Forces Institute of Rehabilitation Medicine (AFIRM), Rawalpindi, from Feb to Oct 2021

**Methodology:** All PWDs admitted in IRF of AFIRM who tested positive for COVID-19 infection were included by convenience sampling. Patients who tested negative for COVID-19 by PCR were excluded. Data of patients and laboratory and radiological investigations, were recorded. Follow-up after one month was done via phone call.

**Results:** Twenty patients tested positive for COVID-19, of which 20(95%) were males. The mean age of patients was  $38.6 \pm 2.5$  years. Most patients had Spinal Cord Injuries followed by amputations, and five had co-existing disorders. 11(52.4%) of patients were asymptomatic. Fever, myalgias and cough were common among symptomatic patients. Those who were symptomatic had only one symptom at the time of presentation. All patients had mild disease and recovered gradually without complications at one month of follow-up.

**Conclusion:** A high index of suspicion of SARs CoV-2 infection should be kept when PWDs present with myalgias or fever in the current scenario and post-COVID-19 era since PWDs have fewer symptoms of COVID-19 as compared to their peers.

**Keywords:** Amputations, COVID-19, Pakistan, Persons with disability, Spinal cord injury.

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### INTRODUCTION

Clinical manifestations of COVID-19 are variable, and it involves multiple systems and organs. It may present as an asymptomatic illness in some cases. Fever is by far the most common symptom.<sup>1,2</sup> Respiratory manifestations include cough, dyspnea, pneumonia and acute respiratory distress syndrome (ARDS).<sup>3</sup> Nausea, vomiting, diarrhoea, anorexia and liver injury (raised serum alanine aminotransaminase (ALT) and aspartate aminotransaminase (AST) are the common gastrointestinal manifestations.<sup>4</sup> Headache, dizziness, ischemic stroke, cerebral venous sinus thrombosis and Guillianbarre syndrome are some neurological manifestations of this disease.<sup>5</sup> SARS-COV-2 also damages the kidney (acute kidney injury and rhabdomyolysis), heart (acute myocardial infarction, myocarditis, and rapidly progressing cardiac failure), skin (erythematic rash, urticaria and chicken pox-like vesicles) and eyes (chemosis and conjunctival injection).<sup>6</sup> It also causes limb and digital ischemia because infection with SARS-COV-2 results in a hyperinflammatory and hyper-coagulable state, predisposing to these conditions.<sup>7</sup>

The clinical manifestations of COVID-19 in persons with disabilities (PWDs) are under study. PWDs include patients with functional impairments due to neurological, neuromuscular, musculoskeletal and cardiopulmonary ailments.<sup>8</sup> Patients with Spinal Cord Injury (SCI) are susceptible to infections due to systemic immunosuppression from noradrenergic overactivity and increased glucocorticoid release from the hypothalamus-pituitary-adrenal axis.<sup>9</sup> Moreover, thoracolumbar weakness in SCI patients predisposes them to respiratory infections, especially in high thoracic and cervical injuries. Both systemic immunosuppression and weak respiratory muscles make SCI patients susceptible to COVID-19.<sup>10</sup>

Similarly, patients with amputations (especially of the lower limbs) have a poor nutritional status compared to their peers, predisposing them to infections and complications of immobility. We hypothesized that PWDs would have fewer symptoms of COVID-19 as compared to their peers because of systemic immunosuppression and poor nutritional status. To our knowledge, clinical manifestations of PWDs are not yet described in Pakistan. Here we present the first study on clinical manifestations of COVID-19 in PWDs in Pakistan.

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## METHODOLOGY

The cross-sectional study was conducted at the Inpatient Rehabilitation Facility (IRF) of the Armed Forces Institute of Rehabilitation Medicine (AFIRM), Rawalpindi, from February to October 2021. Permission from the Ethical Review Board of the Hospital was taken (Letter no. 01/Trg/AFIRM). The sample size was calculated using the OpenEpi' sample size calculator taking reported prevalence of Persons with disability as 0.48%.<sup>11</sup>

**Inclusion Criteria:** All persons with disabilities admitted in IRF of AFIRM who tested positive for COVID-19 infection were included.

**Exclusion Criteria:** Patients who tested negative for COVID-19 by Reverse Transcription-Polymerase Chain Reaction (RT-PCR) were excluded.

Non-probability consecutive sampling was used. All patients admitted to the hospital for inpatient rehabilitation were quarantined for five days, and their sample for PCR for COVID-19 was taken on the first and fifth day of admission as per the local policy of the hospital. Strict infection control and preventive measures were followed in quarantine and IRF to curb the spread of infection.

The primary source of data collection was medical records of patients. In the case of SCI patients, their neurological level and Asia Impairment Scale grading were recorded per the principles of International Standards for Neurological Classification of SCI.<sup>12</sup> A detailed history was taken from patients regarding the symptoms of COVID-19 infection, and contact tracing was done to identify the source of infection and prevent the spread of infection. Various parameters of laboratory and radiological investigations were recorded from the medical records of the patient. In order to avoid bias, the medical records of patients were handed over for statistical analysis after removing the identity of patients from medical records. Follow-up after one month was done for all patients via phone call.

Statistical Package for Social Sciences (SPSS) version 25.0 was used for the data analysis. Quantitative variables were expressed as Mean $\pm$ SD and qualitative variables were expressed as frequency & percentages.

## RESULTS

During our study, 896 PWDs were admitted to the Inpatient Rehabilitation Facility of AFIRM, out of which 21 PWD got infected with SARs-CoV-2. 10 (48%) patients had Spinal Cord Injury, 9(43%) had

amputations, and 5(24%) patients had co-existing disorders (Table-I).

**Table-I: Demographic data of the Patients (n=21)**

Variables	n(%)
<b>Gender</b>	
Male	20(95.2%)
Female	1(4.8%)
<b>Education</b>	
Under matric	3(14.3%)
Matriculation	3(14.3%)
Intermediate	12(57.1%)
Graduation	3(14.3%)
<b>Impairment</b>	
Amputations	9(42.9%)
Unilateral	7(77.8%)
Bilateral	2(22.2%)
TTA (Right)	4(44.4%)
TTA(Left)	1(11.1%)
TTA (B/L)	1(11.1%)
TFA (B/L)	1(11.1%)
PFA (Right)	2(22.3%)
Spinal Cord Injuries (SCI)	10(47.6%)
SCI C1-C8	3(20%)
SCI T1-T12	6(60%)
CEL*	1(20%)
Traumatic Brain Injury	1(4.8%)
Stroke	1(4.8%)
<b>Etiology of impairment</b>	
Traumatic	16(76.2%)
Vascular	1(4.8%)
Infectious (Caries Spine)	3(14.3%)
Ruptured Aneurysm	1(4.8%)
<b>AIS Impairment Scale of SCI Patients</b>	
A	7(70%)
B	1(10%)
C	0(0%)
D	2(20%)
E	0(0%)
<b>Co-existing disorder (if any)</b>	
No co-existing disorder	16(76.2%)
Diabetes Mellitus	2(9.5%)
Pressure Injury	3(14.3%)

Foot note: SCI- Spinal Cord Injury, TTA- Transtibial amputation, TFA- Transfemoral amputation, PFA-Partial Foot Amputation, B/L-Bilateral, CEL- CaudaEquina Lesion, \*For the purpose of description CEL has been included in the group of SCI however it is a separate entity clinically

All these patients were already in quarantine at the time of admission when their test came out to be positive except three patients, who were in the ward and were exposed to a single asymptomatic COVID-19 patient and the whole ward was then quarantined. 11(52.4%) patients were asymptomatic. The most common symptoms among those who were symptomatic at the time when their PCR for COVID-19 came out positive were fever 6(28.6%), myalgias 6 (28.6%) and cough 6(28.6%). 10(47.6%) were symptomatic with COVID-19 infection, and all had only one symptom at

the presentation time. All patients had mild disease (Table-II). None of our patients was transferred to ICU or developed cardiopulmonary shock.

**Table-II: Features of COVID-19 in Persons with Disability (PWDs) (n=21)**

Variables	n(%)
Contact with COVID-19 patient	3(14.3%)
<b>Symptoms of COVID-19</b>	
Asymptomatic	11(52.4%)
Fever	6(28.6%)
Myalgias	2(9.5%)
Cough	2(9.5%)
Sputum	0(0%)
Gastrointestinal symptoms	0(0%)
Dyspnea	0(0%)
<b>Severity of disease</b>	
Mild	21(100%)
Moderate	0(0%)
Severe	0(0%)

The mean haemoglobin levels are shown in Table-III. All patients (100%) had normal echocardiography and HRCT chest findings, which were unremarkable in all patients. All patients recovered gradually without any complications at one month of follow-up. No death was recorded.

**Table-III: Laboratory and Radiological Findings (n=21)**

Variables	n(%)
<b>Total Leukocyte count</b>	
<4000 per mm <sup>3</sup>	0
4000-10,000 per mm <sup>3</sup>	17(81%)
>10,000 per mm <sup>3</sup>	4(19%)
Hemoglobin <12 g/dL	5(23.8%)
<b>Platelet Count</b>	
<150,000 per mm <sup>3</sup>	0
Coagulation profile	-
Prothrombin time in sec	-
>14	0
<b>PTTK in sec</b>	
>32	1(4.8%)
INR >1	0
<b>Other findings</b>	
D-dimers >200-799	2(9.5%)
Ferritin >250 ng/ml	6(28.6%)
Plasma Fibrinogen >400 mg/dl	0
C-Reactive Protein >6 mg/L	8(31%)
Serum CK-MB >25 IU/L	2(9.5%)
Serum Creatinine Phosphokinase >308U/L	1(4.8%)
Lactate Dehydrogenase >250U/liter	4(19%)
Alanine Transaminase >42U/L	2(9.5%)
Serum Urea >7.1 mmol/L	1(4.8%)
Serum Creatinine >115 mmol/liter	3(14.3%)
<b>Radiological Findings</b>	
Abnormalities on HRCT	0
Echocardiogram	0

Foot note: CK-MB – creatinine kinase-MB, HRCT- High Resolution Computed Radiography, INR- International normalized ratio, PTTK- Partial thromboplastin time test kaolin, IQR-Inter quartile range

## DISCUSSION

The majority of PWDs with COVID-19 infections in our hospital were asymptomatic. Patients with SCI are susceptible to severe COVID-19 infection due to systemic immunosuppression and respiratory weakness.<sup>13</sup> Rodríguez-Cola *et al.* reported that most patients with SCI and COVID-19 infection had severe disease<sup>14</sup>. However, all patients of SCI with COVID-19 in our study had mild disease. In contrast, none of our patients had a tracheostomy, and most patients with Spinal Cord Injury had thoracic level injuries with preserved function of muscles of inspiration and expiration, resulting in better clearance of pulmonary secretions, which might have contributed to mild infection.

One study found that fever was the most common presentation of COVID-19 in SCI patients, followed by asthenia, dyspnoea and cough. Furthermore, most patients presented with two or more symptoms.<sup>15</sup> In our study, most patients of SCI presented with fever followed by myalgias, while two patients were asymptomatic. All our patients had only one symptom at the time of presentation. This contrasts with the general population, who had more than two symptoms at the presentation time. Cough and fever are most commonly presented as the initial presentation of COVID-19.<sup>16-18</sup> 52.4% of PWDs in our study were asymptomatic. We agree with the systemic review conducted in China, which showed that asymptomatic COVID-19 patients have viral loads similar to that of symptomatic individuals, and they have the potential to transmit them in the early course of the disease.<sup>19</sup> Moreover, the mean duration of PCR negativity in these asymptomatic patients is 9.5 days.<sup>20</sup> COVID-19 has disproportionately impacted many PWDs. Support and commitment are required to access essential services, including health, social protection and medical facilities.<sup>21</sup>

COVID-19 has disproportionately impacted the life of PWD. Health support and political commitment are required to ensure equity for these patients regarding access to a healthcare facility to cater for their social, medical and rehabilitative needs. A high suspicion of COVID-19 should be maintained in patients with SCI who present with fever, and COVID-19 infection should be ruled out along with other causes of infection in the current pandemic scenario. The same should be kept in mind by Physical Medicine and Rehabilitation physicians and general practitioners when encountering other PWDs in clinics.

## LIMITATIONS OF STUDY

Due to the pandemic, IRF had to be partially closed to accommodate patients of another speciality in the hospital; as a result, IRF was not working at its total capacity, so we could not include the paediatric population with disability.

## CONCLUSION

An evidence-based understanding of the symptoms of COVID-19 is needed to formulate guidelines for quarantining and testing PWDs to limit the spread of SARS-CoV-2 in this population. A high index of suspicion of SARS CoV-2 infection should be kept by PM&R specialists and general medical doctors when PWDs present with myalgias or fever in the current scenario and post-COVID-19 era since PWDs have fewer symptoms of COVID-19 as compared to their peers.

**Conflict of Interest:** None.

## Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

MTK: & UA: Conception, study design, drafting the manuscript, approval of the final version to be published.

KA: & RY: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

UY: & II: Critical review, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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