

## BRIEF ARTICLE

# Assessment of health-related quality of life of COVID-19 patients during follow-up

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## ABSTRACT

**Background:** The COVID-19 pandemic has had a significant impact on the quality of life of individuals worldwide. The aim of this study was to assess the health-related quality of life (HRQOL) and its associated factors among COVID-19 patients discharged from hospital.

**Methods:** This facility-based cross-sectional study was conducted among laboratory confirmed COVID-19 patients who were discharged from the Department of Medicine of Bangabandhu Sheikh Mujib Medical University and did their first-month follow-up from April to September 2021. A validated Bengali version of International Quality of Life Assessment, Short form – 36 (SF-36) questionnaire was used to assess the HRQOL status. Univariate and multivariate analyses were done for identifying factors associated with low HRQOL.

**Result:** Out of 225 patients, the mean (standard deviation) age was 36.9 (14.2) years and four in every ten patients were women. HRQOL was measured under eight subgroups. The overall mean score of HRQOL was 79 out of maximum achievable score, 100. Older age, rural residence and severe to critical disease was reported as factors for low physical and mental component summary of SF-36.

**Conclusion:** COVID-19 patients with older age, rural residence and having severe to critical disease condition need to be addressed critically as they have a higher chance of having low HRQOL status after COVID-19 infection.

**Keywords:** COVID-19, Bangladesh, BSMMU, SF-36 Bengali version

## INTRODUCTION

The coronavirus disease 19 (COVID-19) is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) primarily transmitted through respiratory droplets and close contact.<sup>1</sup> While some individuals remain asymptomatic, others experience symptoms of acute respiratory infection in the early stages of the disease.<sup>2</sup> However, certain patients develop severe manifestations of the disease, such as acute respiratory distress syndrome, as well as life-threatening complications including cytokine storm, leading to death.<sup>3</sup>

COVID-19 not only affects the respiratory system but also has reported implications on various other organ systems, including the nervous system, cardiovascular system, hematological system, and mental health.<sup>4-7</sup> Despite extensive research on COVID-19, there is limited information available on the impact of the disease on patients' quality of life, psychological health, and life expectancy.<sup>8</sup>

Studies have shown that COVID-19-related pneumonia in adults can lead to a decline in activities of daily living (ADL) and the overall quality of life accompanied by reduced physical and mental function.<sup>9</sup> Moreover, the circulation of myths and misinformation about the epidemic, coupled with travel bans and executive orders for quarantine, can have a detrimental effect on people's psychological well-being, further influencing their health and quality of life.<sup>10</sup>

In light of these factors, it is essential to investigate whether patients who have recovered from COVID-19 experience depression and have lower health-related quality of life (HRQOL). Therefore, the objective of this study was to assess the HRQOL in patients who have undergone follow-up after recovering from COVID-19.

## METHODS

### *Study design and participants*

This cross-sectional study was done on COVID-19 patients discharged from Bangabandhu Sheikh Mujib

## HIGHLIGHTS

1. This study evaluated the health-related quality of life (HRQOL) among laboratory confirmed COVID-19 patients who were discharged from hospital.
2. Patients who were older, resided in rural area and had severe disease condition had high chance of low HRQOL status.

Medical University (BSMMU) who did their first-month follow-up. Patients who reported at BSMMU between April and September 2021 were enrolled in the study. COVID-19 was diagnosed in patients based on clinical characteristics and subsequent laboratory confirmation of SARS-CoV-2 infection. On the basis of the clinical presentation of the patients as documented in hospital records, the SARS-CoV-2 infection was further classified as mild, moderate, severe, and critical. Research assistants and data collectors were medical personnel who received training from the investigators of this study.

### Data collection tools

The Bangla version of the SF-36 (Short Form-36) used in this study was translated from the International Quality of Life Assessment (IQOLA) SF-36 Standard Version 11 after taking permission from the author of the English version. The questionnaire consists of a single item on health transition and 35 items which were further divided into eight subscales: physical function, limitations due to physical health problems, bodily pain, general health, vitality, social functioning, limitations due to emotional health problems, and mental health. Each domain of the SF-36 was assigned scores ranging from 0 to 100, with higher scores indicating better functional status. The eight subdomain scores were combined into two summary measures: the physical component summary (PCS) scores, and the mental component summary (MCS) scores. A low MCS or PCS score (<50) indicated poor health-related quality of life (HRQOL).

### Data analysis

Categorical variables were summarized using frequency and percentage, while quantitative variables were described using mean and standard deviation.

Independent *t*-test was done to determine the differences of HRQOL outcome score between sexes. Multiple linear regression analysis was done to determine the influence of factors (background characteristics) on HRQOL outcome score (dependent variable). Logistic regression analysis was employed for assessing the relationship of the independent factors with PCS score <50 and MCS score <50. Alfa level of less than 0.05 was considered statistically significant. All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) for windows, version 21.

## RESULTS

### Background and clinical characteristics

A total of 225 COVID-19 patients were enrolled in the study where 100 (44.4%) were women. The mean (standard deviation) age of the patients was 36.9 (14.2) years and more than half of them aged between 40 and 60 years. More than four-fifth of them were from urban areas, had higher secondary or above education and were non-smokers. Five out of ten patients had severe to critical condition health condition. The average length of hospital stay was 12.4 days (**TABLE 1**).

**TABLE 1** Background, health conditions and health-related quality of life (HRQOL) outcome score in men and women patients with COVID-19 (n=225)

Characteristics	Overall
<b>Background and health status</b>	<i>n (%)</i>
Age in years*	36.9 (16.4)
Sex (women)	100 (44.4)
Currently married	159 (70.7)
Urban residence	184 (81.8)
Education (higher secondary or above)	184 (81.8)
Current smoker	27 (12.0)
Chronic conditions†	90 (40.0)
Severe to critical condition of the disease‡	12 (5.3)
Poor health condition§	13 (5.8)
Duration of the hospital stay (days)*	12.4 (14.6)
<b>HRQOL outcome score</b>	<i>Mean (standard deviation)</i>
Physical function (PF)	85.5 (17.7)
Limitations due to physical health problems (RP)	83.9 (21.3)
Body pain (BP)	85.8 (20.8)
General health (GH)	76.9 (17.2)
Vitality (VT)	72.7 (21.7)
Social functioning (SF)	59.2 (7.5)
Limitations due to emotional health problems (RE)	87.9 (87.9)
Mental health (MH)	81.3 (20.9)

\*Mean (standard deviation)

†Had at least one chronic conditions

‡Assessed on the basis of the clinical presentation of the patients as documented in hospital records

§SF-36 score <10 considered as poor health condition

### Outcome of HRQOL

The mean score of physical function was 85.5, limitations due to physical health problems was 83.9, body pain was 85.8, general health was 76.9, vitality was 72.7, social functioning was 59.2, limitations due to emotional health problems was 87.9 and mental health was 81.3 (TABLE 1). The overall score of HRQOL was 79 out of maximum achievable score, 100. The physical function, limitations due to physical health problems and bodily pain subgroup showed significant statistical difference between men and women. For physical function and general health subgroups, sex and severity of disease; for social functioning, limitations due to physical health problems and mental health subgroups only sex was found to be associated in linear regression analysis (TABLE 2).

**TABLE 2** Factor associated with short form 36 item questionnaire (SF 36) among patients using linear regression analysis (n=225)

Model	Dependent variable	Independent variables	Beta (95% confidence interval)
Model 1	Physical function	Sex	9.0 (5.1 to 13.0)*
		Severity of disease	-3.9 (-6.3 to -1.6)*
Model 2	Limitations due to physical health problems	Sex	1.9 (0.6 to 3.2)*
Model 3	Social functioning	Duration of hospital stay (days)	0.02 (0.0 to 0.04)
		Sex	-3.0 (-5.0 to -1.0)*
Model 4	Mental health	Sex	1.8 (0.0 to 3.5)*
Model 5	General health	Sex	-1.5 (-2.8 to -0.3)*
		Severity of disease	0.8 (-0.0 to 1.5)

\*P<0.05

### Risk factors for HRQOL

Patients were divided into two groups according to the PCS and MCS with a cutoff point of 50 and then we explored the relationship between the PCS, MCS with the factors. Analysis showed that older age, rural residence and moderate to severe disease condition were significantly associated with a poor PCS and MCS score (TABLE 3).

### DISCUSSION

The study findings indicate that COVID-19 patients even after one month of discharge, experience physical and psychological disturbances that affect their overall well-being. Evidence suggested that the physical

**TABLE 3** Odds ratio (95% confidence interval) of lower physical component summary (PCS) and mental component summary (MCS) with the background characteristics of the COVID-19 patients (n=225)

Factors	Low score PCS (score <50)	Low score MCS (score <50)
Age		
<45	1	1
45-60	2.99 (0.11 – 78.72)	0.06 (0.01 – 0.43)*
>60	0.03 (0.00 – 0.34)*	0.07 (0.01 – 0.91)*
Smoking status		
No	1	1
Yes	0.05 (0.00 – 1.40)	0.17 (0.01 – 2.86)
Chronic disease		
No	1	1
Yes	1.24 (0.75 – 1.57)	1.11 (0.65 – 1.30)
Residence		
Urban	1	1
Semi Urban	0.30 (0.01 – 6.26)	0.18 (0.02 – 1.38)
Rural	2.14 (1.44 – 3.21)*	1.98 (1.20 – 2.77)*
Sex		
Female	1	1
Male	5.05 (0.52 – 48.60)	2.21 (0.43 – 11.26)
Disease severity		
Mild	1	1
Moderate	0.13 (0.01 – 1.17)	0.58 (0.07 – 4.69)
Severe	0.0 (0.00 – 0.44)*	0.03 (0.00 – 0.30)*
Critical	0.0 (0.00 – 0.23)*	0.04 (0.00 – 1.59)

\*P<0.05

symptoms associated with COVID-19, such as headache, abdominal and chest pain, can persist for a significant period, potentially impacting the daily lives and functionality of the patients.<sup>11</sup>

The lower scores in various dimensions of SF-36, including physical function, general health, social functioning, mental health, and role-physical, indicate the effects of COVID-19 on different aspects of HRQOL. These findings are consistent with previous studies conducted in different populations, further supporting the notion that COVID-19 has a profound impact on the well-being of individuals.<sup>12</sup> We observed that female patients exhibited significantly lower scores in all dimensions of SF-36 compared to male patients, suggesting that impact on HRQOL may be related to gender. Similar finding was also observed in a study conducted by Qu et al.<sup>13</sup> Additionally, older age was identified as a risk factor for poor HRQOL aligning with previous research.<sup>12</sup>

The psychological burden experienced by COVID-19 patients including feelings of isolation, fear, and uncertainty, was found to be a significant factor affecting their HRQOL. These findings emphasize the importance of addressing not only the physical

symptoms but also the psychological well-being of patients during and after their illness.<sup>14-16</sup> Recent studies observed that during the early stage of the COVID-19 outbreak, patients were at higher risk for mental health issues.<sup>17</sup>

The differences in results observed between this study and previous studies conducted in China could be attributed to variations in population characteristics and healthcare systems.<sup>13, 14</sup> However, the overall consensus remains that COVID-19 has a negative impact on HRQOL across different populations.<sup>19</sup>

The study acknowledges the limitations of its cross-sectional nature, which prevents establishing causal relationships between the variables. Future longitudinal studies could provide a deeper understanding of the long-term effects of COVID-19 on HRQOL and explore potential interventions to improve patient outcomes. This study underscores the significant psychological and physiological disturbances experienced by COVID-19 patients impacting their HRQOL. These findings emphasize the need for comprehensive support and interventions to address the physical and psychological well-being of patients during and after their illness. Such efforts should consider the specific demographic factors and challenges associated with COVID-19 to optimize patient outcomes and facilitate long-term recovery.

### **Limitation and strength**

The study has limitations, such as reliance on self-reported measures, and a short-term follow-up. The study's strengths lie in its comprehensive assessment and recommendations for early interventions which can guide future research and support strategies for improving the well-being of COVID-19 patients.

### **Conclusion**

Our study highlights the HRQOL of COVID-19 patients in Bangladesh. The findings emphasized that the COVID-19 patients with older age, rural residence and having severe to critical disease conditions need to be addressed comprehensively as they have a higher chance of having poor HRQOL status after COVID-19 infection.

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### **Author Contributions**

Conception and design: AHK, SMA. Acquisition, analysis, and interpretation of data: ES, MAA. Manuscript drafting and revising it critically: AHK, SMA, MAA, ES. Approval of the final version of manuscript: AHK, SMA, MAA, ES. Guarantor accuracy and integrity of the work: SMA.

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### **Conflict of Interest**

The authors declare no conflict of interest.

### **Ethical Approval**

Ethical approval was taken from the Institutional Review Board of Bangabandhu Sheikh Mujib Medical University. Keeping compliance with Helsinki Declaration for Medical Research Involving Human Subjects 1964, all the study subjects was informed verbally about the study design, the purpose of the study and potential benefits derived from the study. They were assured that they had full rights to withdraw themselves from the study at any time for any reasons what-so-ever. Subjects giving informed consent to participate in the study were included as study sample. The IRB memo number was BSMMU/2020/10403; date: 08.12.2020 (Dr. Abed Hussain Khan).

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