ORIGINAL ARTICLE

Perception of patient of quality of life after Covid-19

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ABSTRACT

OBJECTIVE: To evaluate patients' perceptions of quality of life after COVID-19. **METHODS:** This descriptive, exploratory study employed a cross-sectional, mixed-methods approach. The sample consisted of 22 patients who tested positive for COVID-19, recovered, and received follow-up care at a specialized medical clinic in Maringá-PR, under the supervision of a pulmonology specialist. Data were collected using two instruments. The first was a registration form with structured questions regarding sample characterization, clinical data, and post-COVID-19 symptoms, utilizing the Modified British Medical Research Council (mMRC) scale to assess perceived exertion. The second instrument collected data related to quality of life using the WHOQOL-bref. The data obtained from the questionnaires were then statistically analyzed using R statistical software (R Development Core Team, 2016), version 3.6.2. **RESULTS:** Among the domains assessed, the psychological domain had the highest average score (15.61 points), while the lowest average was in self-assessment of quality of life (14.82 points). The most common post-COVID sequelae reported by patients were coughing, shortness of breath, memory loss, difficulty concentrating, anxiety, and depression. **CONCLUSIONS:** The reported sequelae primarily affected the physical and psychological domains, consequently impacting the patients' quality of life. A multidisciplinary post-care team is essential for improving these patients' quality of life. This study contributes to the understanding of patients' perceptions and expectations, offering strategies for health promotion and care.

Keywords: COVID-19, Rehabilitation, Quality of life, Dyspnea.

INTRODUCTION

The global pandemic caused by the SARS-CoV-2 virus (COVID-19) has affected millions of people, leading to countless deaths worldwide, while also resulting in a large number of recovered patients who have been discharged from hospitals. As of May 7, 2023, over 765 million confirmed cases of COVID-19 have been reported globally, with more than 6.9 million deaths, according to the World Health Organization.

Despite the significant focus of the scientific and medical community on COVID-19, the long-term effects post-infection, beyond the acute phase, remain not fully understood. Individuals who have recovered from the acute phase of the disease continue to experience a variety of symptoms for months, with most patients experiencing at least one symptom during convalescence. Although post-COVID-19 sequelae are more common in patients who developed severe forms of the disease, those who had moderate symptoms without requiring hospitalization may also experience some degree of functional impairment.

Symptoms persisting for more than four weeks after the initial COVID-19 infection, known as post-COVID-19 syndrome or long COVID, include fatigue, dyspnea, cardiac abnormalities, cognitive impairment, sleep disorders, stress disorder symptoms, muscle pain, concentration problems, and headaches. Dyspnea is the most common persistent symptom following acute SARS-CoV-2 infection, with prevalence ranging from 42% to 66%.

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According to the World Health Organization, quality of life reflects individuals' perceptions that their needs are being met or, conversely, that they are being denied opportunities for happiness and self-fulfillment, regardless of their physical health or social and economic conditions. Therefore, the quality of life of post-COVID-19 patients has been compromised, both due to physical deterioration (e.g., shortness of breath) and emotional factors, such as isolation, distress, decreased self-esteem, slow thinking, and anosmia. In this context, it is important to assess whether patients who have recovered from COVID-19 exhibit symptoms like dyspnea, in addition to other common post-COVID symptoms, and to determine whether these symptoms have affected their quality of life. Therefore, the aim of this study was to evaluate patients' perceptions of their quality of life after recovering from COVID-19.

METHODS

This research employed a descriptive, exploratory study with a cross-sectional design and a mixed-methods (qualitative and quantitative) approach at a specialized medical clinic. The project was approved by the Research Ethics Committee in accordance with Resolution 466/2012, under report number 5.446.897. All research participants signed an Informed Consent Form, ensuring their rights to anonymity and the ability to withdraw from the study at any stage.

A total of 35 patients were invited to participate in the study, but 13 declined, resulting in a final sample of 22 patients who tested positive for COVID-19, recovered, and were under follow-up at a specialized medical clinic in the city of Maringá, PR, under the care of a pulmonology specialist. The inclusion criteria were as follows: participants who presented post-COVID-19 sequelae between July and December 2021, were aged 18 years or older, and were willing to participate voluntarily in the project. Participants who did not complete the questionnaire after three email attempts and patients who passed away after the start of specialized medical care were excluded.

For data collection, two instruments were used. The first instrument was a registration form with structured questions regarding sample characterization, clinical data, and verification of post-COVID-19 symptoms. The Modified British Medical Research Council (mMRC) scale was used for assessing dyspnea, with participants asked to indicate "yes" or "no" for the occurrence of other symptoms. The mMRC scale ranges from 0 to 4: grade 0, no dyspnea; grade 1, mild dyspnea; grade 2, moderate dyspnea; grade 3, severe dyspnea; and grade 4, very severe dyspnea.

The second instrument was designed to collect data related to patients' quality of life using the WHOQOL-bref assessment. This instrument has been tested and validated in various cultures under the coordination of the World Health Organization Quality of Life Group (WHOQOL Group) of the World Health Organization (WHO). It consists of 26 questions on a five-point Likert scale, divided into four domains: physical, psychological, social relationships, and environment.

Both instruments were administered to all research participants. Contact was made via phone, WhatsApp, email, and in-person interviews conducted by the researcher. The data were tabulated in spreadsheets using Microsoft Excel, crea-

ting a database. Descriptive analysis of the results was performed to obtain frequency graphs and tables, aiming to characterize the research participants. Scores for the WHOQOL-bref were calculated using the manual scoring system provided by WHO, which includes a conversion table based on the mean values of each domain. Therefore, this study included a global score and four domain scores based on item means. There is no specific cutoff point for good or poor quality of life, but higher means suggest better quality of life.

The following descriptive statistics were used to describe the results: absolute frequency and percentage for categorical variables, and mean, standard deviation, minimum, median, and maximum for numerical variables. To compare the scores obtained from the instrument based on the presence or absence of symptoms, the non-parametric Wilcoxon test was used, which relies on the ranks of the ordered observations, a method appropriate for ordinal-level measurement. All analyses were conducted using the statistical software environment R (R Development Core Team, 2016), version 3.6.2.

RESULTS

Below, the frequency distribution of the data from the registration form is presented, concerning sociodemographic characteristics, clinical data, and the WHOQOL-bref instrument, according to the participants' responses in the survey.

Sociodemographic Characteristics

Table 1 displays the sociodemographic characteristics of the participants of the study.

Table 1. Frequency distribution of sociodemographic characteristics of the survey participants.

Variable	Absolute frequency	%
Age		
Below 50 y.o.	9	40.91%
51 to 60 y.o.	10	45.45%
Over 60 y.o.	3	13.64%
Sex		
Female	12	54.55%
Male	10	45.45%
Location		
Maringá	14	63.64%
Other	8	36.36%
Ethnicity		
White	21	95.45%

Asian	1	4.55%
Occupation		
Teacher	6	27.27%
Retiree	2	9.09%
Homemaker	2	9.09%
Businessperson	2	9.09%
Salesperson	2	9.09%
Other	8	36.36%

According to Table 1, nearly half of the respondents (45.45%) are between 51 and 60 years old, and 54.55% are female. The majority live in Maringá, Paraná (63.64%) and stated themselves as having white ethnicity (95.45%). As for occupation, the most frequent response was “teacher” (27.27%).

Clinical Data

Table 2 presents the variables, and their frequencies, of the clinical characteristics identified in and by the participants of the study.

Table 2. Distribution of frequencies of clinical characteristics of the survey participants.

Variable	Absolute frequency	%
Blood type		
A-	1	4.55%
A+	5	22.73%
AB+	1	4.55%
O+	7	31.82%
Not informed	8	36.36%
Comorbidities		
Yes	10	45.45%
No	12	54.55%
BMI		
Normal weight	5	22.73%
Overweight	6	27.27%
Obesity class I	8	36.36%

Obesity class II	3	13.64%
Smoking		
Yes	1	4.55%
No	21	95.45%
COVID vaccine doses		
Yes	21	95.45%
Not informed	1	4.55%
Flu vaccine		
Yes	17	77.27%
No	4	18.18%
Not informed	1	4.55%
Clinical development of the disease		
Mild	2	9.09%
Moderate	6	27.27%
Severe	14	63.64%
Need for hospitalization		
Yes	21	95.45%
Not informed	1	4.55%
Oxygen use		
Yes	17	77.27%
No	5	22.73%
ICU admission		
Yes	7	31.82%
No	14	63.64%
Not informed	1	4.55%
mMRC Scale		
Grade 0	6	27.27%
Grade 1	7	31.82%
Grade 2	3	13.64%
Grade 3	1	4.55%
Grade 4	0	0
Not informed	5	22.73%

Based on Table 2, it was observed that 36.36% of the survey participants did not know their blood type. Among those who were aware, the most common blood type was O+. Regarding comorbidities, 45.45% reported having at least one, with hypertension being the most frequent (22.73%). Other reported comorbidities included diabetes (18.18%), obesity (9.10%), cardiac arrhythmia (9.10%), thyroid disorders (9.10%), gout (4.54%), high cholesterol (4.54%), and acid reflux (4.54%).

In terms of BMI, only 22.73% of participants had a normal weight, while the majority were classified as overweight. The most frequent BMI category was obesity class I (36.36%). As for smoking habits, only one participant (4.55%) identified as a smoker.

Regarding vaccination, all but one respondent provided information about their COVID-19 and influenza vaccinations. Among those who did, all had received at least one dose of the COVID-19 vaccine, and 77.27% had received the flu vaccine.

Nearly two-thirds of the respondents (63.64%) experienced a severe form of COVID-19. Among them, 95.45% required hospitalization (one participant did not provide this information), 77.27% needed oxygen, and 31.82% were admitted to the ICU (one participant did not provide this information). Concerning shortness of breath, 31.82% of respondents reported mMRC Grade 1 (22.73% did not provide information), which corresponds to “I get short of breath when hurrying on the level or walking up a slight hill.”

The main post-COVID symptoms reported by participants are illustrated in Figure 1. The most frequent symptoms were coughing (82%), shortness of breath during COVID (73%), memory loss (73%), and difficulty concentrating (73%). The least frequent symptoms included post-COVID heart disease (23%), digestive problems (27%), current shortness of breath (2%), thrombosis (36%), and hair loss (reported by 12 participants, 55%). reported hair loss.

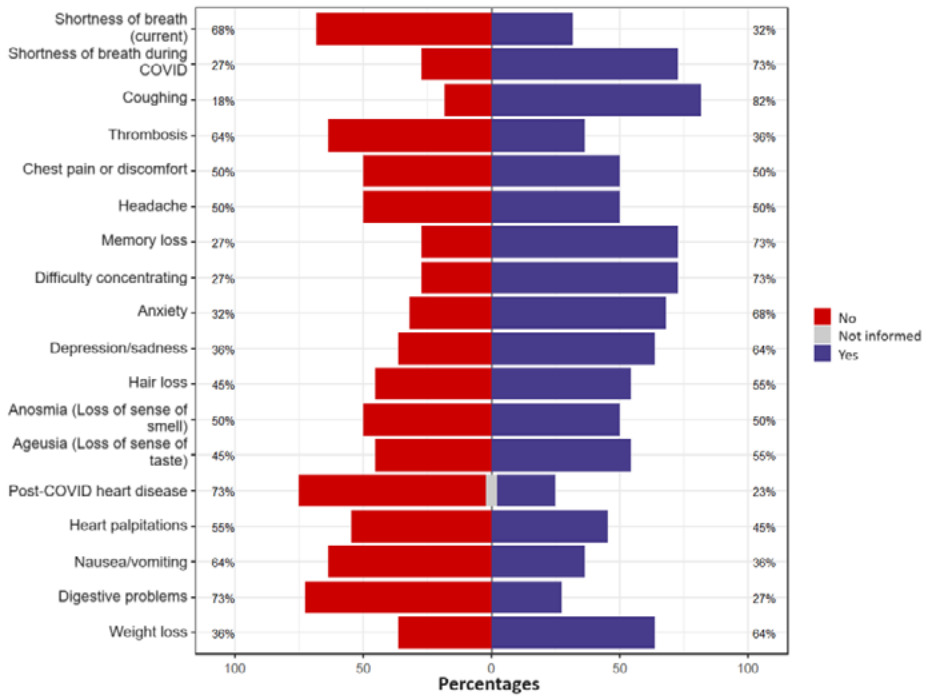

Figure 1. Frequency distribution of the presence of symptoms among respondents.

Participants' quality of life evaluation through WHOQOL-bref questionnaire

Considering the evaluation of quality of life, Table 3 shows respondents' domain scores of the WHOQOL-bref instrument, and Table 4 presents the scores for each question in the questionnaire. The average score of the WHOQOL-bref was 15.25, with a standard deviation of 1.65, considering a scale ranging from 4 to 20 points.

Table 3. Summary of the WHOQOL-bref domain scores obtained from respondents.

Domain	Average	Standard deviation	Coefficient of variation	Minimum value	Maximum value	Range
Physical	15.14	2.16	14.25	11.43	19.43	8.00
Psychological	15.61	1.96	12.55	12.00	18.67	6.67
Social relationships	15.45	3.04	19.68	9.33	20.00	10.67
Environmental	15.11	1.96	12.99	12.50	19.50	7.00
QoL self-assessment	14.82	1.82	12.26	12.00	18.00	6.00
TOTAL	**15.25**	**1.65**	**10.83**	**12.00**	**17.85**	**5.85**

Table 4. Score averages for each question of the WHOQOL-bref from the respondents.

Question	Average	Standard deviation	Coefficient of variation	Minimum value	Maximum value	Range
Q1	3.77	0.61	16.22	2	5	3
Q2	3.64	0.58	15.98	2	4	2
Q3	2.09	0.97	46.46	1	4	3
Q4	2.32	0.89	38.55	1	5	4
Q5	3.73	0.88	23.68	2	5	3
Q6	4.41	0.91	20.60	1	5	4
Q7	3.73	0.70	18.85	2	5	3
Q8	3.64	0.79	21.71	2	5	3
Q9	3.50	1.06	30.22	1	5	4
Q10	3.45	0.74	21.38	2	4	2
Q11	4.05	0.79	19.41	3	5	2

Q12	3.41	0.85	25.05	2	5	3
Q13	3.82	0.80	20.82	2	5	3
Q14	3.45	1.06	30.59	1	5	4
Q15	4.50	0.51	11.37	4	5	1
Q16	3.55	0.96	27.15	2	5	3
Q17	3.68	0.95	25.68	2	5	3
Q18	3.73	0.94	25.09	2	5	3
Q19	3.73	0.77	20.59	2	5	3
Q20	4.00	0.87	21.82	2	5	3
Q21	3.59	0.96	26.71	1	5	4
Q22	4.00	1.02	25.59	1	5	4
Q23	4.45	0.60	13.38	3	5	2
Q24	3.86	1.08	28.01	1	5	4
Q25	4.09	0.97	23.75	1	5	4
Q26	2.23	0.69	30.77	1	4	3

Regarding the physical domain, the average score on the participants' quality of life questionnaire was 15.14. This domain encompasses the following facets: pain and discomfort, energy and fatigue, sleep and rest, mobility, activities of daily living, dependence on medication or treatments, and working capacity10.

The average scores obtained from participants for the physical domain questions were as follows: question 3 = 2.09; question 4 = 2.32; question 10 = 3.45; question 15 = 4.50; question 16 = 3.55; question 17 = 3.68; question 18 = 3.73. Questions 3 ("To what extent do you feel that your physical pain prevents you from doing what you need to do?") and 4 ("How much do you need medical treatment to function in your daily life?") had lower values, but their negative impact on quality of life is minimal since the scoring for these questions is reversed. Questions 10, 16, 17, and 18 had average values close to 3.5. Notably, question 15 ("How well are you able to get around?") had the highest average score (4.5 ± 0.51), suggesting a better quality of life in this aspect.

The psychological domain includes facets such as positive feelings, thinking, learning, memory and concentration, self-esteem, body image and appearance, negative feelings, and spirituality/religion/personal beliefs10. In this domain, participants scored the highest average on the quality of life questionnaire, with 15.61 points. The most reported symptoms were chest pain or discomfort, anxiety, palpitations, and digestive problems, indicating that these symptoms impacted the psychological quality of life.

Participants' average scores for the psychological domain questions were: question 5 = 3.73; question 6 = 4.41; question 7 = 3.73; question 11 = 4.05; question 19 = 3.73; question 26 = 2.23. Questions 6 and 11 had higher average scores. Question 26 ("How often do you have negative feelings such as blue mood, despair, anxiety, depression?") had a lower average, indicating a low impact on quality of life. However, since the scoring for this question is reversed, an average value of 2.23 suggests that participants only occasionally experience negative feelings. Lastly, question 6 ("To what extent do you feel your life to be meaningful?") had the highest average score, reflecting that participants find significant purpose in their lives.

The social relationships domain covers facets such as personal relationships, social support, and sexual activity10. In this domain, the average score on the quality of life questionnaire was 15.45.

The average scores for the social relationships domain questions were: question 20 = 4.00; question 21 = 3.59; question 22 = 4.00. Questions 20 ("How satisfied are you with your personal relationships?") and 22 ("How satisfied are you with the support you get from your friends?") had higher average scores.

The environment domain includes facets such as physical safety and protection, home environment, financial resources, availability and quality of health and social care, opportunities to acquire new information and skills, participation in and opportunities for recreation and leisure, and the physical environment (pollution, noise, traffic, climate, and transportation)10. In this domain, the average score on the participants' quality of life questionnaire was 15.11.

The average scores for the environment domain questions were: question 8 = 3.64; question 9 = 3.50; question 12 = 3.41; question 13 = 3.82; question 14 = 3.45; question 23 = 4.45; question 24 = 3.86; question 25 = 4.09. Question 23 ("How satisfied are you with the conditions of your living place?") had the highest average score. Conversely, question 12 ("Have you enough money to meet your needs?") had the lowest average score.

The self-assessment of quality of life, represented by question 1 ("How would you rate your quality of life?") and question 2 ("How satisfied are you with your health?"), had the lowest average score, with an average of 14.82 points.

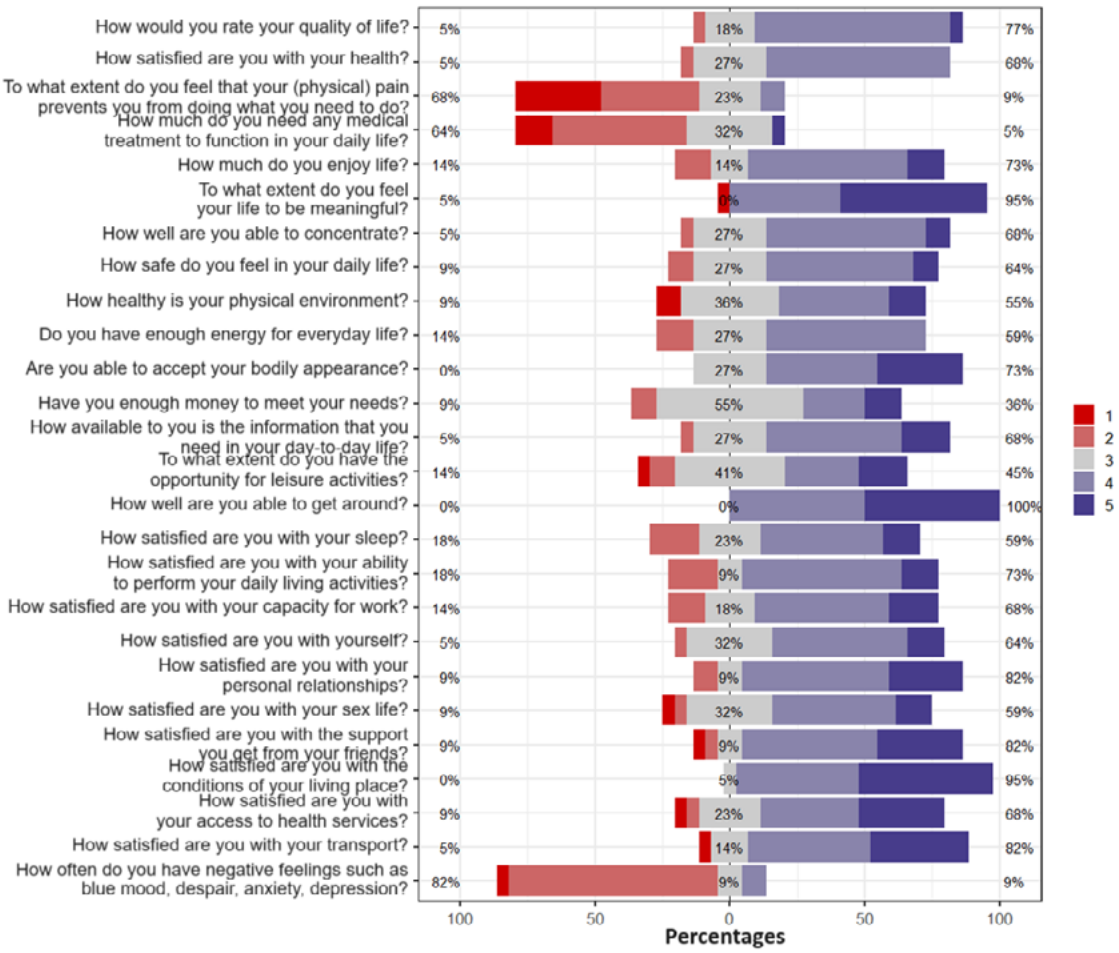

Figure 2 presents the frequency of responses for each of the five-point Likert scale options for the 26 questions in the WHOQOL-bref instrument.

Figure 2. Frequency distribution of the participants' responses to the WHOQOL-bref survey questions.

DISCUSSION

This study allowed us to evaluate patients' perceptions of quality of life post-COVID-19, demonstrating that certain sociodemographic and clinical factors may be related to risk factors for these patients. Many exhibited post-COVID sequelae, which likely affected their quality of life in various aspects, including physical, social, and psychological well-being.

Regarding age and the risk of contracting the virus, the majority of participants in this study were aged 51 to 60, which aligns with other studies where most patients were elderly1,11-15. In this context, it is important to highlight that older adults are at a higher risk for severe illness and death from COVID-1916. Due to the physiological changes that accompany aging and compromised immune systems, the elderly population has been particularly vulnerable to severe forms of COVID-19 and the risk of death from the disease13-14.

In relation to comorbidities, the Pan American Health Organization notes that

while any healthy person can be infected, those with comorbidities are at a higher risk of developing severe cases16. Several studies have indicated that comorbidities such as hypertension, obesity, and diabetes are associated with an increased risk of severe COVID-1917-19. In this study, nearly half of the participants reported having some comorbidity, with hypertension and diabetes being the most common. Regarding smoking as a risk factor, the low percentage of smokers in this study is noteworthy, as smoking has been linked to severe cases of COVID-19 in other studies20-21.

The importance and efficacy of vaccination are well-established, as demonstrated in several studies showing that fully vaccinated individuals are at a lower risk of developing severe illness22-25. In this study, 95% of participants had received at least one dose of the COVID-19 vaccine, which is significant considering that the vaccination campaign was just beginning at the time of the survey. This may explain why 63.64% of the patients experienced severe forms of the disease and required hospitalization.

Regarding post-COVID symptoms, the most frequent symptoms reported in this study were coughing, shortness of breath during COVID-19, memory loss, and difficulty concentrating. Several studies have reported similar post-COVID symptoms, including fatigue, headaches, attention disorders, hair loss, and most notably, dyspnea3,12,19,26,27. The high percentage of dyspnea observed in this study is consistent with the literature, which identifies acute respiratory failure as the primary cause of hospitalization for COVID-19 patients in critical care units, with progression to Acute Respiratory Distress Syndrome (ARDS)28.

According to Xiong et al.1, COVID-19 survivors are significantly more likely to develop clinical sequelae after discharge, including general conditions and respiratory symptoms, as well as cardiovascular and psychosocial issues. A study by Raman et al.27 assessed post-acute COVID-19 sequelae and detected abnormalities in almost all organs, correlating these with inflammatory markers and suggesting that chronic inflammation could hinder the full recovery of post-COVID-19 patients. Additionally, evidence suggests a possible association between elevated pro-inflammatory markers and fatigue or cognitive impairment in post-COVID-19 syndrome28.

This study found that post-COVID-19 symptoms are associated with worse outcomes in patients' quality of life across various domains, including physical, psychological, social relationships, and environmental factors10. In the physical domain, a study by Mitrovic-Ajtic et al.29 found that reduced mobility was three to four times more likely in elderly post-COVID-19 patients within five months of diagnosis. Additionally, the impact on daily activities and pain levels was greater after 2.5 and five months, respectively.

In the study conducted by Huang et al.11, all patients were interviewed using a series of questionnaires to assess symptoms and health-related quality of life. Six months after acute infection, COVID-19 survivors predominantly reported fatigue or muscle weakness, sleep difficulties, and anxiety or depression, all of which impacted their quality of life. In a study among healthcare professionals (doctors, nursing technicians, and nurses), the psychological domain was the most affected, particularly in doctors, covering aspects such as negative feelings, thinking, learning, memory,

and concentration10. Mitrovic-Ajtic et al.29 also observed that post-COVID-19 patients experienced long-term negative effects related to work, personal learning, and income.

Neuropsychiatric symptoms seem to increase in prevalence over time rather than diminish. In this regard, raising awareness about post-COVID-19 neurological and neuropsychiatric syndromes and researching intervention strategies to combat post-COVID-19 syndrome are necessary to improve quality of life and mitigate the disease's burden30.

In a study involving healthcare professionals, the environmental domain was the most affected for both sexes, while the psychological domain was the least affected10. According to Pires et al.10, these results may be related to the COVID-19 pandemic, which led to deprivation of leisure activities and financial resources, having a more significant impact compared to physiological changes caused by the disease. Conversely, another study suggested that physiological changes are less impactful than emotional and psychological issues31.

As is widely known, the virus primarily affects the lungs but can also target organs such as the heart, kidneys, ears, and systems including the endocrine, immune, gastrointestinal, and nervous systems. This can lead to post-COVID sequelae such as metabolic disorders, fatigue, depression, cognitive and memory difficulties, among others. Beyond health effects, these symptoms have social, emotional, and economic consequences. All these factors can significantly disrupt people's routines and influence their quality of life. In this sense, as reported by Silva et al.32, considering health promotion as a factor that highlights the determinants of people's health conditions, it is fundamental to improving the quality of life of those benefiting from the actions and activities of this strategy. Among these actions, vaccination against COVID-19 has proven to be an effective tool for prevention and health promotion over time.

A study conducted by Crema et al.33 underscores the importance of an interdisciplinary team for the rehabilitation of post-COVID-19 patients. The research evaluated the rehabilitation of patients with COVID-19 sequelae, with a core rehabilitation team composed of a physiatrist, physiotherapist, and occupational therapist, supported by other professionals such as a psychologist, speech therapist, social worker, and nursing technician. This study demonstrated that patient disability had a higher correlation with hospitalization duration, indicating that an interdisciplinary rehabilitation approach can improve functionality and quality of life for patients with post-COVID-19 sequelae.

In this study, patients were referred for joint follow-up with respiratory and motor physiotherapy, speech therapy, psychotherapy, and specialized medical monitoring (pulmonologist, cardiologist, neurologist, gastroenterologist, among others). This approach led to significant improvements in the long-term effects of COVID-19, reinforcing that health promotion strategies should address symptoms that affect patients' quality of life and provide comprehensive treatment, focusing on multidisciplinary rehabilitation and prevention, including vaccination.

As a limitation of this study, it should be noted that the number of participants was lower than expected, as some patients declined to participate. Additionally, the

convenience sampling technique used limits the generalizability of the data. However, the study contributes to advancing knowledge on patients' perceptions and expectations, offering strategies aimed at health promotion and care, and potentially improving quality of life across various aspects.

FINAL CONSIDERATIONS

This study observed that the most common post-COVID sequelae in patients were coughing, shortness of breath, memory loss, difficulty concentrating, anxiety, and depression. These symptoms primarily affected the physical and psychological domains, consequently impacting the patients' quality of life. Considering that quality of life is perceived when individuals' physical, social, and economic health needs are met, the patients in this study reported dissatisfaction due to the sequelae they experienced post-COVID-19.

Therefore, care for patients with post-COVID-19 sequelae should be provided by a multidisciplinary team, including psychologists, physiotherapists, and specialized medical professionals, focusing on neurofunctional, cardiopulmonary, mental, cognitive, and psychological rehabilitation strategies. Additionally, programs that raise awareness about the importance of complete vaccination among the population are crucial.

In the context of COVID-19, health promotion and its principles are highly relevant and essential, as they can empower individuals and groups to gain more control over their health and the various factors that influence it, leading to the development of therapeutic health actions targeted at individuals and communitie

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KASM: participated in the planning of the work; data collection, analysis, and interpretation; writing and revising the manuscript; and final approval of the version to be published.
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DFF: participated in the planning of the work, analysis and interpretation of the data; writing and revising the manuscript; and final approval of the version to be published.

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