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Association between resilience and severity of symptoms of Covid-19 disease in patients admitted to hospitals affiliated to Babol and Semnan Universities of Medical Sciences

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ABSTRACT

Background: Covid-19 is a disease with different characteristics, ranging from symptomless carriers to death due to complications, which can induce a significant amount of stress. Resilience is very important for coping with stress and maintaining balance. The aim of this study was to investigate the relationship between resilience and clinical symptoms in patients with Covid-19.

Methods: This cross-sectional descriptive analytical study was conducted in 2022, with the participation of 100 patients hospitalized at Shahid Beheshti, Yahya Nejad, and Rouhani hospitals in Babol city, as well as Kausar hospital in Semnan city, who had received positive PCR test results and a definite diagnosis of Covid-19. They were selected using a convenience sampling method. Data collection tools included demographic information, a symptom checklist, clinical information, the Mini Mental Status Questionnaire (MMSE), and the Connor-Davidson Resilience Scale (CD-RISC)-10.

Results: The mean age of the patients was 53±15.3 years, and 91% of them were married. Seventy-eight percent of the patients had a headache, 83% had a cough, and 88% had dyspnea. There was no significant difference in resilience scores between patients with symptoms and those without symptoms (P>0.05). The multiple regression model revealed no significant relationship between disease symptom severity and resilience levels, even when considering the confounding variables (P>0.05).

Conclusion: The absence of a relationship between Covid-19 symptoms and resilience may be attributed to the complex nature of the disease and the multidimensional aspect of resilience. We suggest conducting more comprehensive research on various facets of resilience and its mechanisms of impact on diseases in diverse contexts, with larger sample sizes.

Keywords: Resilience, Patients, Hospitals, Symptoms, Covid-19.

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Introduction

The outbreak of the novel coronavirus began in China in late 2019 and subsequently escalated into an epidemic, impacting approximately 118,000 people across 114 countries by March 11, 2020 (1). On January 30, 2020, the Director-General of World Health Organization declared the coronavirus as an international emergency. Six weeks after its onset, this disease was officially labeled a pandemic (2). A study assessing the clinical characteristics of COVID-19 pneumonia revealed that the most common symptoms include infection, fever, and cough. Radiologic signs were observed in approximately half of the cases. This virus can be transmitted by infected individuals with mild symptoms or during the incubation period (1). This disease infects human respiratory epithelial cells, leading to symptoms of lower respiratory tract infection, including fever, dry cough, and dyspnea. However, upper respiratory symptoms are less common. While most COVID-19 patients exhibit respiratory symptoms such as dyspnea, there is evidence that the disease can also manifest with non-respiratory symptoms. Han et al. reported a range of respiratory and digestive symptoms, as well as involvement of other body organs, with variations (3).

Up to this point, the majority of new studies have concentrated on patients with severe or highly sensitive symptoms, yet it's important to note that more than 80% of patients experience mild disease (4). Governments implemented strict measures such as social distancing, quarantine, and economic shutdowns, which have resulted in negative and unavoidable long-term economic and health effects (5).

Modern psychology and social sciences define resilience as 'the process of adapting well in the face of disaster, trauma, tragedy, threat or significant sources of stress' (6). Resilience is a construct that focuses on the human ability to respond positively to adverse situations that a person faces (7). Resilience can alleviate anxiety and depression in patients with chronic diseases, and it is also positively associated with improved self-efficacy, social support, and overall quality of life in various health conditions (8). Resilience means resistance to environmental risk experiences or to stress and incompatibility, and, it is also related to protective factors and individual differences in response to stress (7).

The COVID-19 outbreak has emerged as a global public health emergency, with severe multifaceted consequences affecting people's lives and their mental health. Resilience plays a pivotal role in helping individuals cope with stress and maintain balance during these challenging times. Moreover, resilience is a fundamental strength that aids people in overcoming chronic diseases (9). Research on stress and resilience suggests that people cope better with stressful situations when they perceive those situations as more controllable (5). Resilience is inherent, varying in intensity among individuals, and it can also be strengthened. Different resources are available to enhance resilience, and focusing on these resources can both strengthen resilience and improve mental health (6).

Shah et al., in a review study, emphasized the mental health of the population and taking preventive measures to minimize the harmful effects of COVID-19 during the pandemic (1). Vinkers et al focused on the urgent need to emphasize resilience during the pandemic and stated that resilience is crucial for coping with stress and maintaining balance (4).

Cal et al. noted that the development of disease symptoms in chronic conditions may be associated with psychological processes like stress and resilience, which can affect the functioning of the body's immune system and increase vulnerability to disease. They clearly highlighted the positive impact of resilience on symptom severity and disease progression (6). In Killgore et al.'s study, lower resilience was associated with increased concern about the effects of COVID-19, and individuals with lower resilience reported greater difficulty coping with the emotional challenges of the epidemic crisis (9).

Studies conducted on cancer patients have consistently found that individuals with high levels of resilience experience fewer negative emotions, including anxiety and depression, report fewer physical, spiritual-emotional, and informational needs, and exhibit reduced psychological distress (10). The results of the conducted studies suggest that psychological interventions aimed at enhancing resilience

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in Covid-19 patients can assist them in coping with the disease. Given the widespread impact of the virus on people around the world, it is essential to explore potentially effective methods that can influence the severity of symptoms and treatment outcomes. Therefore, this study aims to investigate the relationship between resilience levels and clinical symptoms in patients with COVID-19.

Methods

This cross-sectional, descriptive, analytical study was conducted in 2022 with the participation of 100 patients hospitalized in Shahid Beheshti, Yahyanejad, and Rohani Hospitals in Babol, as well as Kausar Hospital in Semnan city. The participants were confirmed to have Covid-19 through a positive PCR test, and the study was approved by the Ethics Committee of Babol University of Medical Sciences under the code IR.MUBABOL.REC.1400.237

The researcher first presented a letter of introduction from Babol University of Medical Sciences. After coordinating with the managers of the mentioned hospitals, patients with a positive COVID-19 test were selected using a convenience sampling method. The exclusion criteria included a positive PCR test, stable clinical condition of the patient, obtaining a minimum score of 23 on the Mini-Mental Status Questionnaire (MMSE), and obtaining consent to participate in the study. Additional exclusion criteria encompassed individuals with a negative PCR test and those who had experienced the death of a family member due to COVID-19.

The researcher visited the wards of the aforementioned hospitals and coordinated with the head nurse one day before the patient's discharge. After obtaining informed consent and evaluating the cognitive status of each patient using the Mini-Mental Status Questionnaire (MMSE), if a patient scored at least 23 on this questionnaire, they were included in the study. Subsequently, the researcher completed the demographic and clinical information checklist as well as the resilience questionnaire for each eligible participant.

Data collection tools was included:

1. Demographic information, comprising questions related to age, gender, education level, job and marital status, etc.

2. A checklist of symptoms and clinical information pertaining to the patients, which covered conditions such as headache, dyspnea, cough, arterial blood oxygen level (measured with a pulse oximeter), and anorexia. Additionally, it included details regarding the treatment measures received during hospitalization, such as oxygen therapy, ICU admission, respirator use, and other relevant interventions. This information was extracted from the patients' medical records.

3. Mini Mental Status Questionnaire (MMSE): The Mini-Mental State Examination (MMSE), also known as the short mental state test, is a widely used tool for dementia diagnosis and screening in Western countries. It is currently the most commonly employed screening tool for assessing an individual's cognitive function and determining the severity of cognitive disorders. This test consists of 11 items grouped into five categories: awareness, recall, attention and calculation, recall, and visualization. Scores on this assessment range from 0 to 23. A score between 24 and 30 suggests the absence of cognitive impairment, while a score between 17 and 23 indicates mild cognitive impairment. A score below 17 indicates severe cognitive impairment (11). The validity and reliability of the Standard version of this questionnaire were 0.97 in the study of Baek et al. (12).

4. Connor-Davidson Resilience Scale (CD-RISC): One of the most common scales for measuring resilience is the Connor-Davidson Resilience Scale (CD-RISC). This scale has been validated in many cultures with varying results. To enhance the validity of the CD-RISC further, a shorter 10-item version, the CD-RISC-10, was developed (13). Conner-Davidson questionnaire has 5 factors: perception of individual competence, trust in individual instincts, tolerance of negative emotion, positive acceptance of change and secure relationships, control and spiritual influences. This questionnaire was prepared by

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Connor and Davidson (2003) by reviewing the research sources of 1979-1991 in the field of resilience. Connor Davidson's resilience questionnaire has 10 items that are scored on a Likert scale between zero (never) and four (almost always). In this research, resilience refers to the score that the respondents give to the 10-item questions of the resilience questionnaire (14). Cronbach's alpha coefficients for resilience subscales ranged from 0.72 to 0.91 and for the total scale score from 0.81 to 0.93 (15).

Statistical analysis method

Descriptive statistical tests (mean and standard deviation), Chi-square, Two independent sample t-test, Multiple Logistic Regressions, considering the significance level of 0.05 have been used for data analysis using SPSS software version 22.

Results

A total of one hundred patients, with a mean age of 53 ± 15.3 years, took part in this study. Of these participants, 91% were married, and 88% were employed (Table 1). According to Table 2, 78% of patients experienced headaches, 83% had a cough, and 88% had dyspnea. Resilience scores did not show a significant difference between symptomatic and asymptomatic patients. (P>0.05). The multiple regression model showed that there was no significant relationship between the severity of the disease symptom and the level of resilience considering the confounding variables (Table 3).

Table 1. Demographic characteristics of the studied patients with Covid-19

Variables	Mean ± SD
Age	53 ± 15.3
	number (percent)
Sex	
Female	49(49)
Male	51(51)
Marital status	
single	9 (9)
married	91 (91)
Employment status	
Unemployed	12(12)
Employee	19(19)
worker	8(8)
housewife	27(27)
freelance	34(34)
Education status	
illiterate	18(18)
High school	19(19)
diploma	32(32)
Bachelor's degree	22(22)
Masters and Ph.D	9(9)
Number of children	
0	14(14)
1	14(14)
2	24(24)
3	19(19)
4	14(14)
>4	15(15)

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Table 2. Mean score of resilience according to the symptoms of the patients

Symptoms (%)		Resilience Score		
		Mean	SD	P-value [a]
Headache	No (22)	22.7	5.1	0.488
	Yes (78)	21.8	4.8	
Cough	No (17)	22.5	4.584	0.681
	Yes (83)	21.9	5.0	
vertigo	No (60)	22.2	4.6	0.645
	Yes (40)	21.8	5.3	
anorexia	No (47)	21.8	4.7	0.723
	Yes (53)	22.2	5.1	
nausea	No (57)	21.9	4.6	0.758
	Yes (43)	22.2	5.3	
Need for O2	No (15)	22.4	4.0	0.786
	Yes (85)	22.0	5.0	
dyspnea	No (12)	23.3	3.8	0.350
	Yes (88)	21.9	5.0	
fatigue	No (25)	23.2	4.9	0.160
	Yes (75)	21.6	4.8	
Smell impairment	No (70)	21.8	4.9	0.657
	Yes (30)	22.3	4.8	
other	No	21.3	5.0	0.271
	Yes	22.6	5.2	

a; Two independent sample t-test

Table 1: Association between resilience Score and having the symptoms of Covid-19

Dependent variables [a]	Odds Ratio[b]	P value	Lower CI	Upper CI
Headache	0.95	0.426	0.86	1.06
cough	0.96	0.461	0.86	1.07
Vertigo	0.98	0.646	0.90	1.06
anorexia	1.00	0.883	0.92	1.09
nausea	0.99	0.978	0.91	1.08
O2 therapy	0.99	0.985	0.88	1.12
dyspnea	0.95	0.448	0.83	1.08
Fatigue	0.93	0.193	0.84	1.03
Smell impairment	1.02	0.552	0.94	1.11
Other	1.05	0.274	0.96	1.15

a; Referenced group for logistic analyses is people who do not have symptom b; adjusted for age and sex
CI; %95 Confidence Interval
b; Beta Coefficient

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Discussion

This study found no significant relationship between the severity of COVID-19 symptoms and patients' resilience levels, while considering confounding variables. The absence of a correlation between resilience and the severity of clinical symptoms in this study may be attributed to the complexity and unknown aspects of COVID-19. Additionally, resilience encompasses various aspects, including individual characteristics, skills, social support, study context, and patients' prior experiences with other diseases (16). The small sample size in this study and the selection of patients in the hospital setting could also be additional factors. Notably, only in the study conducted by Nishimi et al., resilience was found not to be related to the severity of COVID-19 or its long-term effects (17). Basharat and Ramesh's study revealed a significant negative correlation between resilience, spiritual health, and social support, and the severity of cardiovascular disease. This indicates that as resilience, spiritual health, and social support increase, the severity of cardiovascular disease decreases (15). Resilience is the ability of a person to establish biological and psychological balance in stressful conditions (18) and by facilitating the overcoming of adversity, problems, resistance to stress and eliminating their psychological effects, it helps to adapt positively in response to adverse conditions. (19). Resilience is linked to the modulation and reduction of negative emotions triggered by stress (20) and increasing positive emotions and facilitates the use of efficient coping strategies. Also, resilience is associated with dealing with difficult situations, psychological adaptation and satisfaction with life (21). Hence, healthcare professionals should assist individuals in enhancing their resilience skills when confronting severe stressors, such as the outbreak of the coronavirus.

Based on the review of research literature, there are very few studies on the relationship between resilience and the severity of the symptoms of Covid-19. Previous studies showed that patients who had more resilience had a higher ability to overcome stressful conditions and situations, and improving resilience seems to play an important role in improving the physical and mental health of patients (22). In a study of resilience in chronic diseases, Cal et al. reported an inverse relationship between resilience and depression. They found that a higher resilience score was associated with better disease progression and lower disease severity. Resilience emerged as a crucial factor in enhancing overall health 6). The progression of symptoms in chronic diseases may be influenced by psychological processes, including resilience, stress, and their impact on the immune system's function, which can contribute to increased vulnerability to disease (23, 24). The biological, neuroendocrine, and neurological changes linked to resilience may contribute to effective coping mechanisms, resulting in increased self-efficacy in managing illness, improved social skills, and a greater capacity to utilize social support (24, 25).

Researchers widely acknowledge that protective factors, including optimism, positive mood, self-esteem, self-care, independence, social support, and anxiety reduction, influence health through biological processes such as neuroendocrine and immune system functioning, and they play a significant role in fostering resilience (26،27). A study by Robottom et al. revealed a positive relationship between resilience scores and health-promoting behaviors, including practices such as maintaining adequate nutrition, stress reduction, self-realization, and engaging in appropriate exercise (28, 29). Rosenberg recommended the promotion of resilience resources during the COVID-19 pandemic. These resources encompass individual factors (such as personal characteristics and skills), social aspects (including social support and a sense of connection), and existential elements (related to a sense of meaning and purpose). Implementation of these resources is advisable not only at the individual level among healthcare personnel but also at the organizational level within healthcare institutions (30).

One of the study's strengths is its pioneering nature in Iran. Nonetheless, it's important to acknowledge certain limitations. The study suffered from a limited number of participants, primarily attributed to its timing at the conclusion of the COVID-19 pandemic. Additionally, the study encountered challenges related to patients' physical weakness and mental discomfort, resulting in reduced enthusiasm for participation.

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Conclusion

Contrary to the majority of previous studies, the results of this investigation indicate that there is no significant relationship between the severity of COVID-19 symptoms and patients' resilience. This lack of correlation may stem from several factors, including the elusive aspects of the COVID-19 disease, the multifaceted nature of resilience, the relatively small sample size, and the selection of patients within a hospital setting. Furthermore, the relationship between resilience and health, as well as its various dimensions, remains underexplored in diverse environments. Recent research has only started to delve into the biological processes associated with resilience. Therefore, it is recommended that future studies undertake a more comprehensive examination of the diverse facets of resilience and the mechanisms through which it affects health and disease in different contexts. Such investigations, whether analytical, longitudinal, or qualitative, should involve larger sample sizes to provide a deeper understanding.

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