ORIGINAL ARTICLE

Relationship Between Resilience in COVID-19 Survivors and COVID-19-Related Fear, Happiness, Health Literacy, and Physical Activity

COVID-19 Geçirmiş Bireylerin Dayanıklılığı ile COVID-19'la İlgili Korku, Mutluluk, Sağlık Okuryazarlığı ve Fiziksel Aktiviteleri Arasındaki İlişki

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Abstract

Introduction: This study examined resilience levels in COVID-19 survivors and the relationship between resilience and COVID-19-related fear, happiness, health literacy, and physical activity.

Methods: The study utilized a cross-sectional design. The study population consisted of 403 COVID-19 survivors. Data were collected using the Personal Questionnaire, Short Psychological Resilience Scale, Fear of COVID-19 Scale, Subjective Happiness Scale, International Physical Activity Assessment Questionnaire, and Health Literacy Scale Short Form.

Results: Of the participants, 58.6% were aged 18–40, 66.3% had a medium social status, 48.4% did not exercise, and 90.8% had been vaccinated against COVID-19. The model– consisting of performing physical activity, COVID-19-related fear, and happiness –explained 23% of the resilience variance (adjusted R^2=0.23, F=18.081, p<0.001). Accordingly, performing physical activity (β=-0.91), COVID-19-related fear (β=-0.229), and happiness (β=0.326) were associated with resilience (p<0.05).

Discussion and Conclusion: The COVID-19 survivors in this study exhibited moderate resilience. The predictors of resilience were physical activity, COVID-19-related fear, and happiness. Strategies to increase psychological resilience should be planned to increase physical activity and happiness and reduce fear.

Keywords: COVID-19; Resilience; Fear; Happiness; Health literacy; Exercise

Traumatic events such as pandemics not only cause physical and mental health problems but can also increase or decrease a person's psychological resilience.[1]

Psychological resilience is an individual's ability to withstand adverse life conditions and is the main factor that protects individuals against mental health problems.[1,2]

Psychological resilience is a person's ability to overcome and successfully adapt to an adverse or stressful life event.[3,4] The risk of COVID-19 transmission and death continues to be the main source of stress and difficulty among individuals worldwide, causing fear and anxiety and negatively affecting life satisfaction and subjective happiness levels.[5–8] These negative effects, especially in COVID-19 survivors, may be deeper and affect the state of psychological resilience. Therefore, it is essential to determine factors predicting psychological resilience among COVID-19 survivors.

Physical problems such as fatigue, shortness of breath or muscle fatigue, sleep difficulties, and psychological health problems such as anxiety and depression have been observed in COVID-19 survivors.[6,9,10] In addition, increased mental health problems and reduced quality of life have been reported among COVID-19 survivors after being discharged from hospital.[11–13] One study conducted on COVID-19 survivors reported a decrease in people's capacity for physical activity.[14] Physical inactivity negatively impacts many systems, particularly the muscular, metabolic, and endocrine systems, as well as the nervous and cardiovascular systems, and it does so quickly.[15]

The COVID-19 pandemic has forced people to learn about the virus and quickly change their habits and behaviors. How society adapts to this change is closely related to people's health literacy.[15] Low levels of health literacy can lead to many problems, such as poor access to and use of health services, the inability to understand and implement proper medical advice, the adoption of incorrect health behaviors and society reacting incorrectly to the pandemic.[16] The effect of health literacy, the most important parameter in the etiology of these possible problems, on psychological resilience should also be investigated.

The COVID-19 pandemic has been a global public health problem for about 3 years.[17] Resilience studies focused on the general population, not Covid-19 survivors.[18–20] In studies conducted on the general population, factors affecting resilience included gender, COVID-19 fear and anxiety, COVID-19-related post-traumatic stress symptoms, intolerance of uncertainty, loneliness, living with children, higher education, and living in areas where the virus is spreading.[19,20] As psychological resilience varies depending on the individual, environmental characteristics, and time, determining the level of resistance and its predictors matters. There is a gap in the literature regarding a study examining the level of psychological resilience among COVID-19 survivors and key variables such as fear, subjective happiness, physical activity, and health literacy. This study should contribute to developing psychological resilience support programs for COVID-19 survivors by considering modifiable factors to optimize the effectiveness of such programs. This study examined psychological resilience levels among COVID-19 survivors and the relationship between resilience and COVID-19-related fear, happiness, health literacy, and physical activity.

Research Questions

1. What is the level of psychological resilience in COVID-19 survivors?

2. What are the factors that predict psychological resilience in COVID-19 survivors?

Materials and Methods

Population and Sample of the Research

This was a descriptive and cross-sectional study. The study population comprised individuals over 18 years of age who participated in vocational and hobby courses at 23 municipal cultural centers. The authors conducted a power analysis to determine the sample size using data from previous psychological resilience studies as a reference.[21] The power analysis had an alpha error rate of 0.05, power of 0.90, and effect size of 0.15, and it was calculated that the sample should consist of at least 362 people. The study was completed with 403 participants.

The inclusion criteria were the following: 1) over 18 years of age, 2) free of communication disabilities, and 3) agreed to participate in the study. The exclusion criteria were the following: 1) presence of audio-visual disability and 2) neuro-psychiatric disorder.

Setting

In the research centers, unemployed men and women sign up for courses to boost their family income and use their free time efficiently to find work or start a business by obtaining a certificate when they complete the course. The courses offered in these community centers include literacy, sports, photography, knitting, painting, instrument playing, jewelry design, computer skills, and skin care. Participants reside in the region in which the community centers are located and share similar socioeconomic and cultural characteristics with others in the same region.

Data Collection Tools

The data were collected using a personal questionnaire: Fear of COVID-19 Scale (FCV-19S), the Brief Psychological Resilience Scale (BPRS), the Subjective Happiness Scale (SHS), the International Physical Activity Assessment Questionnaire (IPAQ-SF), and the Health Literacy Scale Short Form (HLS-SF12).

Personal Questionnaire

The questionnaire asked about the participant's age, gender, marital status, education level, employment, income, and social status, whether they had any chronic disease, were using medication, whether they smoked, their physical activity, and whether they had been vaccinated against COVID-19.

Brief Psychological Resilience Scale

Smith et al.[22] developed this scale to measure individuals' psychological resilience. It was adapted into Turkish by Doğan.[23] The internal consistency coefficient of the adaptation study was 0.83. The BPRS is a self-reporting measurement tool with six items using a 5-point Likert scale. Its answer key is "Strongly Disagree" (1), "Disagree" (2), "Neutral" (3), "Agree" (4), "Strongly Agree" (5). Items 2, 4, and 6 on the scale are reverse-coded. After the reverse-coded items in the scale are translated, high scores indicate high psychological resilience.

Fear of COVID-19 Scale

The study used the FCV-19S developed by DK Ahorsu et al.[24] to determine people's fear of COVID-19 and adapted to Turkish by Haktanır et al.[25] The scale is one-dimensional and consists of seven items. The internal consistency coefficient of the adaptation study was 0.86. The scale is a five-point Likert scale, scored as "strongly disagree," 1'; "strongly disagree," 2'; "neither agree nor disagree," 3'; "agree," 4, and "strongly agree," 5. The total score ranged from 7 to 35 points. The cutoff point of the scale and the scores obtained indicate the fear of COVID-19.

Subjective Happiness Scale

The original version of the SHS is a seven-item scale,[26] but the Turkish version adapted by Doğan et al.[27] has only four descriptive items. The internal consistency coefficient of the scale in the adaptation study was 0.70. The fourth item is reverse-coded. Although the scale has no sub-dimensions, the minimum and maximum possible scores are 4 and 28, respectively. High scores obtained from the scale indicate that the subjective happiness of the individual is high.

International Physical Activity Assessment Questionnaire Short Form

The scale was prepared and standardized to measure the physical activities of people aged between 15 and 65. The questionnaire has long-form and short-form variants. Öztürk[28] conducted a validity and reliability study on Turkey's IPAQ-SF. The questionnaire included seven questions in four separate sections asking about activities carried out for a minimum of 10 min during the previous seven days. The first two questions are about vigorous physical activity, the next two are about moderate physical activity, the next two are about walking activity, and the last is about sitting time. The physical activity status was then classified into three categories: no activity (inactive), minimal physical activity (low level), and advanced physical activity (high level).

Health Literacy Scale Short Form

It is an abbreviation of the European HLS. The original version of the scale has 47 items. In its shortened form, the scale has 12 items. The development study for the short form of the scale, first called the "Short-Form Health Literacy Instrument," was carried out by Tuyen V. Duong et al.[29] in six different countries. The internal consistency coefficient for all six countries is ≥0.70. It was adapted to Turkish by Karahan Yılmaz et al.[30] The scale has three subdimensions: health care, disease prevention, and health promotion. The formula used to assess the scale is (Index=(Average−1)×50/3). The average is calculated by dividing the total score of the scale by the number of items in the scale. The index value calculated using the formula varies between 0 and 50, with higher scores indicating better health literacy. The scale is a 4-point Likert scale ranging from 1 (very hard) to 4 (very easy) for 12 items. Each item has four grades, 1 = Very difficult, 2 = Hard, 3 = Easy, 4 = Very easy. Code 5 was used for "I don't know."

Data Collection

Data were collected in August and September 2022. The data collection forms were prepared using Google Forms and delivered to the participants via e-mail and social media (Twitter, Instagram, WhatsApp, Messenger, etc.). Their answers were received online. An informed consent form was placed on the electronic questionnaire's first page. Only those who agreed to participate in the study by approving the consent form could see and answer the questions.

Data Analysis

The data obtained in the study were evaluated on a computer using the statistical package for the social sciences (IBM SPSS 14.0, Chicago, USA). The dependent variable in this study was psychological resilience, while the independent variables were descriptive characteristics, fear of COVID-19, happiness, health literacy, and physical

activity. Frequency, percentage, mean, and standard deviation statistics were used to present the descriptive characteristics. The suitability of the data for normal distribution was evaluated using skewness and kurtosis values (±2). Univariate and multivariate linear regression analyses examined the relationship between psychological resilience and the independent variables. Categorical data were coded as 0 and 1 for regression analysis. The backward method was used to select independent variables in multivariate linear regression analysis. The significance level was 0.05.

Ethical Consideration

Before data collection, Gazi University provided ethical approval (Date: July 27, 2022; No. E.417845), and the Mamak-Ankara Municipality granted written permission. The participants provided verbal and written consent after being informed about the study. The study was conducted taking into account the Declaration of Helsinki. Artificial intelligence-supported technologies were not used in this study. Usage permissions were obtained for the scales used in this study.

Results

Of the participants, 58.6% were aged 18–40, 85.9% were female, 77.9% were married, 22.8% were primary/secondary school graduates, 61.3% were unemployed, 42.7% declared that their income was less than their expenses, 66.3% had a medium social status, 33% had chronic disease, 36.2% were taking medication, 22.1% smoked, 48.4% were inactive, and 90.8% had been vaccinated against COVID-19 (Table 1).

The mean scores of the scale were 19.41 (SD=4.26) for the Resilience Scale, 15.29 (SD=6.32) for the FCV-19S, 17.60 (SD=4.77) for the SHS, and 37.52 (SD=12.94) for the HLS.

Age, gender, marital status, employment, social status, physical activity, COVID-19-related fear, and happiness were associated with resilience in the bivariate analyses ($p<0.005$). The model consisted of performing physical activity, COVID-19-related fear, and happiness, which explained 23% of resilience variance (Adjusted R^2=0.23, F=18.081, $p<0.001$). Accordingly, performing physical activity (β=-0.91), COVID-19-related fear (β=-0.229), and happiness (β=0.326) were associated with resilience ($p<0.05$). Factors such as education level, income, chronic disease, smoking history, COVID-19 vaccination, and health literacy did not affect resilience ($p>0.05$) (Table 2).

Table 1. Sociodemographic characteristics (n=403)

Sociodemographic characteristics	n	%
Age		
18–40 years	236	58.6
41–65 years	167	41.4
Gender		
Female	346	85.9
Male	57	14.1
Marital status		
Single	89	22.1
Married	314	77.9
Education level		
Primary/secondary school	92	22.8
High school	135	33.5
University and higher	176	43.7
Employment		
Yes	156	38.7
No	247	61.3
Income		
Income less than expenses	172	42.7
Income equal to expenses	187	46.4
Income more than expenses	44	10.9
Social status		
Low	112	27.7
Moderate	267	66.3
High	24	6.0
Having chronic disease		
Yes	133	33.0
No	270	67.0
Using medicine		
Yes	146	36.2
No	257	63.8
Smoking		
Yes	89	22.1
No	314	77.9
Physical activity		
Active	208	51.6
Inactive	195	48.4
Having COVID-19 vaccine		
Yes	366	90.8
No	37	9.2

COVID-19: Coronavirus disease 2019.

Discussion

Psychological resilience refers to the ability to recover quickly from illness, depression, changes, or adverse situations, pick oneself up, bounce back quickly to one's former state after being hurt or stressed, and to have elasticity.[31] Resilience is very important in overcoming challenging situations such as COVID-19. Little is known

Table 2. Predictors of the Brief Psychological Resilience Scale

Variables	Simple model (95% CI for B)					Multiple model (95% CI for B)				
	B	Lower	Upper	β	p	B	Lower	Upper	β	p
Age (Ref: 18–40 years)	1.10	0.27	1.95	0.128	0.010					
Gender (Ref: Female)	1.81	0.62	2.99	0.148	0.003					
Marital status (Ref: Single)	1.16	0.16	2.16	0.113	0.023					
Education (Ref: ≤High school)	0.80	-0.04	1.64	0.094	0.061					
Income (Ref: Less than expense)	0.81	0.03	1.65	0.094	0.059					
Employment (Ref: No)	1.26	0.42	2.11	0.145	0.004					
Social status (Ref: Low)	1.54	0.62	2.45	0.162	0.001					
IPAQ-SF (Ref: Inactive)	1.27	0.44	2.09	0.149	0.003	0.77	0.02	1.52	0.91	0.043
Having chronic disease (Ref: Yes)	0.57	-0.32	1.46	0.063	0.207					
Using medicine (Ref: No)	0.01	0.85	0.88	0.001	0.983					
Smoking (Ref: Yes)	0.80	-0.21	1.80	0.78	0.119					
Having vaccine (Ref: No)	0.10	1.35	1.54	0.007	0.896					
HLS-SF12	0.04	-0.01	0.09	0.094	0.060					
SHS	0.36	0.28	0.44	0.403	<0.001	0.29	0.21	0.37	0.326	<0.001
FCV-19S	-0.20	-0.26	-0.13	-0.291	<0.001	-0.15	-0.21	-0.09	-0.229	<0.001

Ref: Reference; B: Unstandardized coefficient; β: Standardized coefficient; CI: Confidence interval; FCV-19S: Fear of COVID-19 Scale; SHS: The Subjective Happiness Scale; IPAQ-SF: The International Physical Activity Assessment Questionnaire; HLS-SF12: Health Literacy Scale Short Form; Adjusted R=0.23; F=18.081; p<0.001.

about resilience in survivors of COVID-19.[1,32] Therefore, this study is thought to be an original research that will contribute to the field. However, since the literature is very limited in the discussion section, emphasis is placed on the authors' comments.

This study found that COVID-19 survivors had moderate levels (19.41; SD=4.26) of resilience. This finding suggests that the psychological resilience of individuals did not develop sufficiently after the disease. Similarly, in two separate studies conducted on COVID-19 survivors in Spain and Mexico, the participants demonstrated moderate levels of psychological resilience.[18,32] A study conducted on COVID-19 survivors in Italy reported that one-third of the participants had insufficient psychological resilience.[20] Resilience levels should be improved in COVID-19 survivors.

In this study, individuals over the age of 40 demonstrated higher resilience. No research has been conducted examining the relationship between resilience and age in COVID-19 survivors. People gain various experiences and improve their crisis management skills as they age. Additionally, adults focus more on positive stimuli and less on negative stimuli than younger adults.[33] These situations may have increased the endurance of people over 40.

In the current study, men exhibited higher resilience. Similarly, two studies conducted during the COVID-19 pandemic reported that men's psychological resilience

was higher.[34,35] The increased burden of household chores and childcare due to gender roles may have negatively impacted women's psychological resilience scores. Intervention studies should be planned to enhance psychological resilience in women.

This study found that married individuals had higher psychological resilience. Similarly, a study conducted in Germany reported that single and divorced participants had lower resilience levels than those who were married and living with their spouses.[36] In marriage, partners enhance their psychological resilience by sharing emotions, solving problems, and providing social support during crises.[37]

In this study, individuals who were employed and those with higher social status had higher psychological resilience. A study conducted in the Netherlands during the COVID-19 pandemic reported that a higher socioeconomic status supported psychological resilience.[38] Policies increasing income levels will positively impact the psychological resilience of society.

Resilience is associated with happiness, fear, and hope.[39] This study revealed that happiness- and COVID-19-related fear predicted resilience in multiple models. This finding shows that individuals who are happy after COVID-19 and have little fear of COVID-19 are more likely to be resilient. Similarly, two studies conducted in Türkiye and the Philippines reported an inverse relationship between COVID-19-related fear and resilience.[19,40] A study

conducted on young adults in Peru reported that people with high levels of resilience had little fear of COVID-19 and that resilience predicted the fear of COVID-19.[21] Two studies conducted on adults in Turkey reported that subjective happiness increases with resilience.[34,41] To increase COVID-19 survivors' resilience, improve their coping skills for dealing with problems such as the fear and anxiety caused by pandemics and other crises, and design initiatives that increase their happiness.

The current study showed that physical activity is a significant predictor of resilience. This finding shows that those who engage in physical activity are more likely to be resilient. One study conducted in the UK reported that resilience increased with physical activity.[42] Although the previous two studies associated resilience with physical activity, the samples included the general population, not COVID-19 survivors.[42,43] The WHO recommends that all adults engage in at least 150 min of moderate-intensity physical activity during the week.[17] Regular physical activity should be considered when designing strategies to increase the resilience of COVID-19 survivors.

Information about the current state of the COVID-19 pandemic and treatment methods has spread rapidly through the internet, press, and social media, affecting the lives of individuals in a multidimensional way.[44] As a result, individuals' access to accurate healthcare information, ability to correctly understand such information, and, by extension, health literacy levels have become important.[45] Individuals with good infectious disease-specific health literacy are more likely to have high resilience.[46] Yet this study found that health literacy did not affect individuals' psychological resilience. This may be because the study employed a general HLS, not an infectious disease-specific HLS. The authors found only one study that examined health literacy and psychological resilience, suggesting that research involving large masses or with a larger sample and representation should be conducted on this subject.

Limitations

The results of this study can only be generalized to members of the center where the study was conducted. The other limitations are the inability to determine causal relationships in the cross-sectional pattern and the fact that this was based on the participants' self-reporting when the study was completed. One final limitation was that the study did not question the participants' psychiatric health.

Conclusion

COVID-19 survivors in this study exhibited moderate levels of resilience. Age, gender, marital status, employment status, and social status affected psychological resilience. In studies on increasing psychological resilience, priority should be given to individuals under 40, women, single individuals, unemployed persons, and those with low social status. The study found that physical activity, happiness, and fear levels related to COVID-19 predicted psychological resilience. The authors recommend considering physical activity status, COVID-19-related fear, and happiness when designing and preparing programs to develop psychological resilience. Prospective studies that monitor the psychological resilience of COVID-19 survivors and increase the evidence relating to predictive factors are recommended.

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