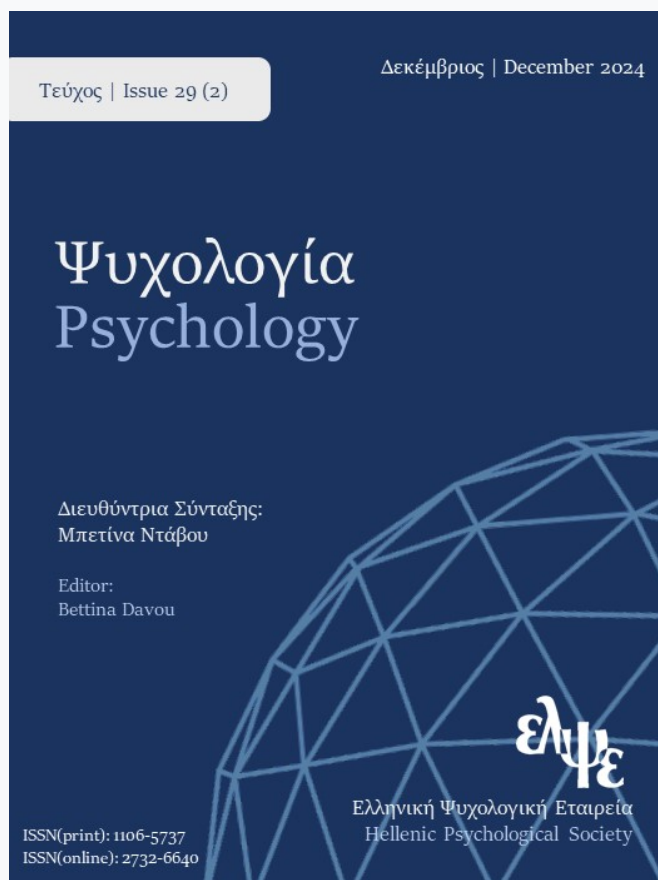


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ΕΜΠΕΙΡΙΚΗ ΕΡΓΑΣΙΑ | RESEARCH PAPER

Fear of COVID-19 and health-related quality of life: A cross-sectional study among healthcare professionals

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KEYWORDS

health-related quality of life
physical health
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fear of COVID-19
healthcare professionals

ABSTRACT

Healthcare professionals (HCPs) struggled on the front lines against the coronavirus disease 2019 (COVID-19) pandemic under unprecedented pressure. Fear was prevailing, bringing additional strain, as well as adverse effects on their mental health. The present study investigated the association between the fear of COVID-19 and health-related quality of life (HRQoL) in HCPs from two large peripheral hospitals in Greece during the pandemic (N=224). The Fear of COVID-19 Scale (FCV-19s) and the 36-item Short Form Health Survey (SF-36) were self-administered from October 2020 to May 2021. Demographic, occupational, and COVID-related information was also collected. Most participants were females (64.3%), and their mean age was 45.5 (± 9.7) years. They were medical doctors and nurses (65.6%), they had a mean working experience of 17.5 (± 10.1) years, and they were providing in-person care often or most of the time to COVID-19 patients (85.7%). Most (71.9%) reported adequate knowledge of COVID-19, yet about half (54.9%) scored above the FCV-19s cut-off point, indicating elevated fear. The mean physical health component score was 69.8 (± 19.5), and the mean mental health component score was 59.4 (± 22.2), suggesting a deteriorated HRQoL. Hierarchical linear regression analysis showed that fear of COVID-19 was significantly associated with physical and mental health above and beyond demographic, occupational, and COVID-related factors. The final model accounted for 18.2% of the variance in the physical health component score and 27.4% of the variance in the mental health component score. Results were consistent with previous findings and highlighted the need for targeted interventions to promote the health and well-being of healthcare professionals. In anticipation of future crises and their management, potential interventions for enabling adaptive coping and promoting resilience may be also important.

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Introduction

The coronavirus disease 2019 (COVID-19) outbreak created unprecedented challenges for healthcare professionals (HCPs) globally. During the initial stages of the pandemic, there was an urgent need to provide health care to the growing number of infected individuals requiring hospitalisation; yet, resources were limited, knowledge was inadequate, and no cure or vaccines for COVID-19 existed at the time. Working conditions and

the pandemic uncertainties placed a heavy burden on HCPs. Therewithal, the HCPs were at increased risk of contracting the virus, primarily due to a lack of personal protective equipment, exposure to infected patients, workload, poor infection control, and pre-existing medical conditions (Mhango et al., 2020). HCPs were, in fact, three times more likely to test positive for COVID-19 than the general population (Nguyen et al., 2020), with hospitalisation rates at 15.1% and mortality at 1.5% (Gholami et al., 2021). The World Health Organization (WHO, 2021) estimated that approximately 115,500 infected HCPs died between January 2020 and May 2021.

The COVID-19 pandemic has undoubtedly posed a considerable threat to physical health and provoked fear. This primary, intense emotion is distinguishable from anxiety, aroused by imminent threat and mobilises the organism to take action (American Psychological Association, n.d.). Fear is considered a unique feature of pandemic viral infections (Ahorsu et al., 2020). Previous outbreaks of emerging infectious diseases (e.g. severe acute respiratory syndrome) have been associated with fear, particularly when substantial illnesses and deaths occurred (Person et al., 2004). During the COVID-19 pandemic, there has been widespread and intense fear (Luo et al., 2021), which has been linked to limited knowledge about the virus (Ishizuka-Inoue et al., 2023) as well as the perceived risk of contracting the virus and experiencing severe health consequences for oneself and loved ones (Mertens et al., 2021). HCPs were found to be at a greater risk of increased fear than the general population (Quadros et al., 2021). A longitudinal study conducted in Spain revealed further that nurses experienced heightened pandemic-related fear in December 2021 compared to December 2020, despite the availability of vaccines and decreased COVID-19 morbidity and mortality rates (González-Nuevo et al., 2024). This intense and increasing fear among HCPs could be possibly attributed to their persistent exposure to traumatic situations as well as to their increased risk of contracting and transmitting the virus.

Although fear is an adaptive reaction to threatening situations that promotes health-protective behaviours (Harper et al., 2021), excessive or prolonged fear may adversely affect health (Foa et al., 2006; Garcia, 2017; Shevlin et al., 2020). Indeed, several meta-analyses of an extended number of studies reported moderate to strong associations between fear of COVID-19 and mental health problems, including stress, anxiety, depression, insomnia and impaired psychological well-being (Alimoradi et al., 2022; Luo et al., 2021; Şimşir et al., 2022). In addition, COVID-19 fear was found to have stronger associations with stress and depression among HCPs compared with the general population (Alimoradi et al., 2022). Mental health problems were also linked to somatic symptoms during the pandemic, including headaches, tiredness, dyspnea, palpitations and physical pain (Chew et al., 2020; Huang et al., 2020; Theocharis et al., 2023). However, research on possible connections between COVID-19 fear and physical health has been rather lacking. Meller and colleagues (2022) used data from two population-based studies in Southern Brazil and found that higher levels of COVID-19 fear were associated not only with poor mental health but also with worse general health perception. Shevlin and colleagues (2020) investigated anxiety related to COVID-19 rather than fear and its association with somatic symptoms. They assessed a representative sample of the UK adult population and found that anxiety associated with COVID-19 contributed to somatisation above and beyond the effect of generalised anxiety disorder, pre-existing health problems, age and gender.

Undoubtedly, the effects of pandemic fear on mental health have been well-documented. However, studies examining its impact on physical health or embracing a multifaceted approach to health are scarce. WHO (1948) defines health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (p. 100). In light of this definition, assessing health-related quality of life (HRQoL) seems essential since it encompasses physical and mental health as well as social functioning. HRQoL is measured based on self-assessed health status, which has proven to be a critical indicator of the burden imposed by preventable health conditions and a significant predictor of morbidity and mortality (Centers for Disease Control and Prevention, 2000).

Evidence from Japan and Alberta province in Canada suggests that during the pandemic, the HRQoL of the general population declined (Ishikawa et al., 2021; Wen et al., 2022). A cross-country survey of 15,536 people indicated an 8% reduction in the perceived HRQoL, with the health burden from morbidity being considerably higher than that due to COVID-19-related mortality (Violato et al., 2023). Considering these findings in light of the well-documented impact of COVID-19 fear on mental health, it is worth noting that there is only very little research explicitly examining its role in HRQoL decline. Kontodimopoulos and colleagues (2022) investigated this association in a large sample of the Greek general population. They found that fear of COVID-19 was a risk factor for diminished physical and mental HRQoL. Their findings confirmed the ones of Aksoy et al. (2021), who had previously examined the association of COVID-19 fear with HRQoL in the Turkish general population. To our knowledge, however, no study has focused on HCPs, despite their well-recognized strain. Expanding our understanding of the role of fear in health seems essential for effectively managing future health crises.

On these grounds, the present cross-sectional study aimed to explore the levels of COVID-19 fear among HCPs during the pandemic and to assess its association with physical and mental HRQoL. It was expected that higher levels of fear would be associated with lower levels of physical and mental HRQoL. To our knowledge, this is one of the few studies encompassing a multifaceted health approach. Additionally, it is the first study, at least in Greece, exploring the aforementioned associations in the overburdened group of HCPs.

Method

Participants and Procedure

HCPs from two large hospitals in North Greece were invited to participate voluntarily in the study. The sample size was determined based on Green's (1991) criteria, requiring at least 178 participants for a moderate correlation. Due to health policy restrictions at the time of the study, data were collected online, and a snowball convenience sampling method was employed to overcome data collection difficulties and recruit as many eligible participants above the predetermined number as possible.

The inclusion criteria were: (a) being a doctor, nurse, or other healthcare professional (e.g., physiotherapist, psychologist, social worker, etc.) or allied health personnel (nurse assistants and paramedics), (b) providing in-person health services to COVID-19 patients, and (c) providing informed consent. HCPs who met the inclusion criteria were approached by the researchers. After completing the survey, they were asked to recommend eligible colleagues. Data were collected between October 2020 and May 2021 in three waves. At first, a small-scale pilot data collection was conducted to test sample recruitment strategies. The full-scale study was conducted from January to February and April to May 2021. A total of 272 HCPs were invited via email to participate in the study. A consent and a survey form were developed, and the link was included in the invitation. The HCPs were informed about the objectives of the study and ethical issues, including the anonymous and confidential nature of the data provided, as well as that participation in the study was voluntary, with the right to withdraw at any time. They were then asked to give consent in order to proceed with the survey. Of the 272 HCPs invited, 46 did not respond, while two did not meet the second study criterion and were excluded. Thus, the study sample comprised 224 HCPs, with the majority being medical doctors and nurses (65.6%) and providing in-person care often or most of the time to COVID-19 patients (85.7%). To ensure data confidentiality, participants' email addresses were neither collected nor displayed on the filled form. The research was conducted in accordance with the Declaration of Helsinki and was approved by the scientific councils of both hospitals (approval reference numbers: 17065/2020 and 8/2021).

Measures

The 36-item Short Form health survey (SF-36) version 1 was adopted to assess HRQoL (Ware & Sherbourne, 1992). It is a self-administered generic measure of health status. It is widely used as an outcome measure in research with clinical and general populations and health policy evaluations. SF-36 assesses eight health domains (physical functioning, bodily pain, role limitations due to physical problems, role limitations due to emotional problems, emotional well-being, social functioning, vitality and general health perceptions), using Likert scales and yes/no options. These are standardised with a scoring algorithm to obtain a score ranging from 0 to 100. Two summary component scores are derived from the eight subscales: physical and mental health. Higher scores indicate better health status. SF-36 also includes a single item that assesses perceived health transition but is not used in the scoring process. A standard (4-week) time frame of recall was applied in this study. SF-36 has been translated and cross-culturally validated into several languages, including Greek (Pappa et al., 2005). In this study, the internal consistency of SF-36 subscales, measured by Cronbach's alpha, ranged from .65 (general health) to .89 (physical functioning). In all cases but general health, it exceeded the value of .70.

The Fear of COVID-19 Scale (FCV-19s) was used to evaluate fear-related aspects of COVID-19 (Ahorsu et al., 2020). These include fear of contracting the coronavirus, fear of transmitting the virus to others, fear of potential health consequences, as well as psychophysiological correlates of fear (Mertens et al., 2021). It is a self-administered instrument that has been widely used during the pandemic. It comprises seven items rated on a 5-point Likert-type scale (1 = *strongly disagree* to 5 = *strongly agree*) and yields a total score of the summed-up item scores. Higher scores indicate higher levels of fear. A cut-off point score of 16.5 has been proposed to predict anxiety, health anxiety, and post-traumatic stress symptoms, indicating elevated fear (Nikopoulou et al., 2022). FCV-19s has been translated and validated in several languages, including Greek (Tsipropoulou et al., 2021). A good internal consistency was demonstrated for FCV-19s in the present study (Cronbach α = .83).

A questionnaire was constructed to record demographic (age, gender, marital status, and education) and occupational information (occupation and years of working experience in the current position). In addition, COVID-related knowledge, beliefs and concerns were self-reported through five items that were constructed based on their association with fear and health (e.g., Ishizuka-Inoue et al., 2023; Mertens et al., 2021; Wang et al., 2020). Participants were asked to indicate the frequency of their contact with COVID-19 patients among four answer options (*never, rarely, often, most of the time*). This item was used to assess exposure to the virus and also to exclude participants who did not meet the second study criterion. In addition, participants were asked to indicate whether they had close family, friends, or colleagues at high risk for severe COVID-19 (*yes/no* options) and their level of adherence to the recommended self-protective measures for preventing the virus spread among three answer options (*less than recommended, as recommended, more than recommended*). They were also asked to indicate their perceived knowledge of COVID-19 (*adequate/inadequate* options) and their beliefs about the COVID-19 transmission rate (*low/high* options).

Statistical Analyses

Descriptive statistics were used to summarise data. Continuous variables were described as means and standard deviations, while categorical variables were reported as frequencies and percentages. Skewness and kurtosis values were used to determine whether the variables' distribution was normal. Pearson's coefficient was used to test correlations among study variables. Hierarchical multiple regression analysis was conducted to assess the association of COVID-related fear with physical and mental HRQoL while adjusting for demographic and other study variables. The Durbin-Watson statistic, the Variance Inflation Factor (VIF), and tolerance scores were calculated to test for independent errors and multicollinearity. The statistical significance level was determined at 0.05. Statistical analyses were carried out using IBM SPSS version 24.0.

Results

A total of 224 HCPs participated in the study. The demographic and occupational characteristics are presented in Table 1. Results showed that the majority of the participants were female (64.3%), married (62.9%), nurses (40.6%) and held a bachelor's degree (57.1%). Their mean age was 45.56 (± 9.79), and they had been working in their current position for 17.56 (± 10.19) years.

Table 1. *Demographic and Occupational Characteristics of Study Participants (N=224)*

Baseline characteristic	n (%) or M (SD)
Age	45.56 (9.79)
Gender	
Female	144 (64.3)
Male	80 (35.7)
Marital status	
Single	52 (23.2)
Married	141 (62.9)
Divorced	25 (11.2)
Widowed	6 (2.7)
Education	
Vocational training	17 (7.6)
Bachelor's degree	128 (57.1)
Master's degree	68 (30.4)
Doctorate	11 (4.9)
Occupation	
Medical doctor	56 (25.0)
Nurse	91 (40.6)
Other (physiotherapists, psychologists, nurse assistants and paramedic personnel)	77 (34.4)
Years of experience	17.56 (10.19)

*Note. M and SD indicate mean and standard deviation, respectively.

Table 2 presents information about COVID-19 knowledge, beliefs, and concerns in the study sample. Half of the participants reported being in direct contact with COVID-19 patients most of the time (50.0%) and using self-protective measures to prevent the virus spread not more than recommended (53.6%). The vast majority self-reported adequate knowledge of COVID-19 (71.9%), acknowledged a high virus transmission rate (92.9%), and reported having close family, friends, or colleagues at high risk for severe COVID-19 (79.0%).

Table 3 illustrates the descriptive statistics and correlation coefficients for the fear of COVID-19 and HRQoL domains and summary scores in the study sample. Mean physical health was 69.86 (± 19.57) and mean mental health was 59.47 (± 22.27), which were lower than the corresponding mean scores in the Greek general population (Pappa et al., 2005). Most participants (71%) reported that their overall health was about the same as one year ago, despite this period largely coinciding with the pandemic. More than half of the participants (54.9%) reported experiencing elevated fear of COVID-19, with a mean fear of 17.28 (± 4.95). Preliminary analysis showed skewness values ranged from -.030 to -.874, and kurtosis values were between -.002 and -.103. Hence, the values were within acceptable limits, and Pearson's correlation analysis was performed. Significant negative

correlations were obtained between the overall score of fear of COVID-19 and all HRQoL domains and summary scores ($p < .001$).

Table 2. *Knowledge, Beliefs, and Concerns Related to COVID-19 in Study Participants (N=224)*

Baseline characteristic	n (%)
Contact with COVID-19 patients	
Rarely	32 (14.3)
Often	80 (35.7)
Most of the time	112 (50.0)
Knowledge related to COVID-19	
Inadequate	63 (28.1)
Adequate	161 (71.9)
Beliefs about COVID-19 transmission rate	
Low	16 (7.1)
High	208 (92.9)
Use of COVID-19 self-protective measures	
As recommended	120 (53.6)
More than recommended	104 (46.4)
Close persons at high risk for severe COVID-19	
No	47 (21.0)
Yes	177 (79.0)

Hierarchical linear regression analysis was performed to estimate the relationship of study variables with physical and mental HRQoL. Table 4 presents the regression models for physical health. In the first step, demographic, occupational, and COVID-related variables were entered into the model. Gender ($b = 6.972$, $t = 2.327$, $p = .021$) was the only factor significantly associated with physical health. The overall regression was significant ($F_{(15, 208)} = 2.264$, $p = .006$) with an R^2 of 0.140, indicating that 14% of the physical health component score variance was explained. In the second step, the fear of COVID-19 total score was entered into the model, contributing an additional 4.2% to the score variance ($R^2 = .182$). This change was significant (F change_(1, 207) = 10.529, $p = .001$), and the overall fit of the final model was significant as well ($F_{(16, 207)} = 2.878$, $p < .001$). In the final model, fear of COVID-19 ($b = -.958$, $t = -3.245$, $p = .001$) and contact with COVID-19 patients ($b = 8.299$, $t = 2.065$, $p = .040$) significantly associated with physical health. The model met the assumptions for multicollinearity ($VIF \leq 4.091$, tolerance ≥ 0.244) and independent errors (Durbin-Watson = 1.882). The results indicated that an increase in fear of COVID-19 by one unit was associated with a decrease in physical health by 0.95.



Table 3. Descriptive Statistics and Pearson's Correlations for Physical Health, Mental Health and Fear of COVID-19 in Study Participants ($N=224$)

Variables	M (SD)	n (%)	1	2	3	4	5	6	7	8	9	10	11
1. FCV-19s ^a	17.28 (4.95)	-	-										
Normal fear	-	101 (45.1)											
Elevated fear	-	123 (54.9)											
Health change ^b													
Better	-	18 (8)											
Same	-	159 (71)											
Worse	-	47 (20.9)											
2. PCS	69.86 (19.57)	-	-.32 ^{***}	-									
3. MCS	59.47 (22.27)	-	-.43 ^{***}	.61 ^{***}	-								
4. PH	84.02 (18.29)	-	-.30 ^{***}	.81 ^{***}	.50 ^{***}	-							
5. RP	68.53 (37.76)	-	-.24 ^{***}	.86 ^{***}	.54 ^{***}	.60 ^{***}	-						
6. BP	67.79 (25.06)	-	-.25 ^{***}	.80 ^{***}	.43 ^{***}	.61 ^{***}	.48 ^{***}	-					
7. GH	59.11 (14.27)	-	-.29 ^{***}	.73 ^{***}	.53 ^{***}	.53 ^{***}	.48 ^{***}	.59 ^{***}	-				
8. VT	54.91 (20.59)	-	-.34 ^{***}	.58 ^{***}	.78 ^{***}	.50 ^{***}	.39 ^{***}	.54 ^{***}	.53 ^{***}	-			
9. SF	59.31 (29.38)	-	-.44 ^{***}	.48 ^{***}	.85 ^{***}	.40 ^{***}	.44 ^{***}	.31 ^{***}	.45 ^{***}	.56 ^{***}	-		
10. RE	63.09 (38.88)	-	-.33 ^{***}	.50 ^{***}	.86 ^{***}	.38 ^{***}	.52 ^{***}	.28 ^{***}	.38 ^{***}	.47 ^{***}	.66 ^{***}	-	
11. MH	60.59 (19.06)	-	-.29 ^{***}	.47 ^{***}	.75 ^{***}	.39 ^{***}	.35 ^{***}	.39 ^{***}	.46 ^{***}	.74 ^{***}	.48 ^{***}	.47 ^{***}	-

*Note. M and SD indicate mean and standard deviation, respectively. PF = Physical functioning. RP = Role (limitations) - physical. BP = Bodily pain. GH = General health. VT = Vitality. SF = Social functioning. RE = Role (limitations) - emotional. MH = Mental health. PCS = Physical component score. MCS = Mental component score. FCV-19s = Fear of COVID-19 Scale. ^aA dichotomous variable was created from the total FCV-19s score using 16.5 as the cutoff to screen for cases of elevated COVID-19 fear. ^bSF-36 item measuring health transition over the past year used as a stand-alone variable that does not contribute to summary scores. *** $p < .001$.

Table 4. *Summary of Hierarchical Regression Analysis for Study Variables Predicting Physical Health (N=224)*

Effect	B	95% CI		SE B	β	R ²	ΔR^2
		LL	UL				
Step 1						.140	.140**
Age	.007	-.594	.607	.305	,003		
Gender (male)	6.972*	1.065	12.878	2.996	,171		
Marital status							
single	-2.709	-12.687	7.269	5.061	-,059		
married	-5.341	-12.923	2.241	3.846	-,132		
Education							
Bachelor's degree	2.730	-7.382	12.842	5.129	,069		
Master's degree/Doctorate	3.825	-6.973	14.623	5.477	,094		
Occupation							
medical doctor	4.637	-2.677	11.951	3.710	,103		
nurse	-.427	-7.028	6.174	3.348	-,011		
Years of experience	-.318	-.868	.231	.279	-,166		
Contact with COVID-19 patients							
rarely	7.748	-.347	15.843	4.106	,139		
Most of the time	.058	-5.770	5.887	2.956	,001		
Knowledge related to COVID-19 (adequate)	-4.982	-10.930	.967	3.017	-,115		
Beliefs about COVID-19 transmission rate (high)	-1.574	-11.670	8.521	5.121	-,021		
Use of COVID-19 self-protective measures (more than recommended)	-.819	-5.974	4.336	2.615	-,021		
Close persons at high risk for severe COVID-19 (yes)	1.180	-5.416	7.776	3.346	,025		
Step 2						.182	.042**
Age	-.030	-.617	.558	.298	-,015		
Gender(male)	5.321	-.541	11.184	2.974	,131		
Marital status							
single	-2.100	-11.864	7.664	4.953	-,045		
married	-4.408	-11.844	3.028	3.772	-,109		
Education							
Bachelor's degree	2.163	-7.731	12.058	5.019	,055		
Master's degree/Doctorate	1.189	-9.491	11.869	5.417	,029		
Occupation							
medical doctor	2.844	-4.390	10.078	3.670	,063		
nurse	.619	-5.867	7.106	3.290	,016		
Years of experience	-.224	-.764	.316	.274	-,117		
Contact with COVID-19 patients							
rarely	8.299*	.376	16.222	4.019	,149		
Most of the time	1.833	-3.967	7.634	2.942	,047		
Knowledge related to COVID-19 (adequate)	-4.803	-10.621	1.015	2.951	-,111		
Beliefs about COVID-19 transmission rate (high)	.016	-9.903	9.935		,000		
Use of COVID-19 self-protective measures	.490	-4.613	5.593		,013		
Close persons at high risk for severe COVID-19	1.316	-5.135	7.767		,027		
FCV-19s fear score	-.958**	-1.541	-.376		-,242		

*Note. CI = confidence interval; LL = lower limit; UL = upper limit. *p < .05. **p < .01. ***p < .001.

Table 5 presents the regression models for mental health. In the first step, demographic, occupational and COVID-related variables were entered into the model. The overall regression was significant, with the model accounting for about 18.4% of the variance in the mental health component score ($R^2 = .184$, $F_{(15, 208)} = 3.127$, $p < .001$). Gender ($b = 6.593$, $t = 1.985$, $p = .048$), age ($b = 0.709$, $t = 2.100$, $p = .037$) and years of experience ($b = -0.724$, $t = -2.343$, $p = .020$) significantly associated with mental health. In the second step, the fear of COVID-19 total score was entered into the model, contributing an additional 9% to the score variance ($R^2 = .274$). This change was significant ($F \text{ change}_{(1, 207)} = 25.552$, $p < .001$), and the overall fit of the final model was also significant ($F_{(16, 207)} = 4.874$, $p < .001$). Fear of COVID-19 was the only factor in the final model significantly associated with mental health ($b = -1.601$, $t = -5.055$, $p < .001$). The assumptions for multicollinearity ($VIF \leq 4.091$, tolerance ≥ 0.244) and independent errors (Durbin-Watson = 2.054) were met. The results indicated that an increase in fear of COVID-19 by one unit was associated with a decrease in mental health by 1.6.

Table 5. Summary of Hierarchical Regression Analysis for Study Variables Predicting Mental Health (N=224)

Effect	B	95% CI		SE B	β	R^2	ΔR^2
		LL	UL				
Step 1						.184	.184***
Age	.709*	.043	1.374	.338	.312		
Gender (male)	6.593*	.046	13.140	3.321	.142		
Marital status							
single	3.907	-7.153	14.967	5.610	.074		
married	2.254	-6.150	10.659	4.263	.049		
Education							
Bachelor's degree	-4.593	-15.802	6.615	5.686	-.102		
Master's degree/Doctorate	.752	-11.217	12.721	6.071	.016		
Occupation							
medical doctor	.957	-7.150	9.064	4.112	.019		
nurse	-7.102	-14.418	.215	3.711	-.157		
Years of experience	-.724*	-1.332	-.115	.309	-.331		
Contact with COVID-19 patients							
rarely	7.506	-1.467	16.479	4.552	.118		
Most of the time	.146	-6.314	6.607	3.277	.003		
Knowledge related to COVID-19 (adequate)	-4.576	-11.170	2.017	3.345	-.093		
Beliefs about COVID-19 transmission rate (high)	-8.533	-19.723	2.657	5.676	-.099		
Use of COVID-19 self-protective measures (more than recommended)	-2.583	-8.297	3.131	2.898	-.058		
Close persons at high risk for severe COVID-19 (yes)	-1.956	-9.268	5.355	3.709	-.036		
Step 2						.274	.090***
Age	.648	.018	1.278	.319	.285		
Gender(male)	3.836	-2.448	10.121	3.188	.083		
Marital status							
single	4.924	-5.543	15.392	5.309	.094		
married	3.812	-4.160	11.785	4.044	.083		
Education							
Bachelor's degree	-5.540	-16.147	5.067	5.380	-.123		
Master's degree/Doctorate	-3.650	-15.100	7.799	5.808	-.078		
Occupation							
medical doctor	-2.038	-12.307	1.599	3.527	-.118		
nurse	-5.354	-1.145	.013	.294	-.259		
Years of experience	-.566						
Contact with COVID-19 patients							
rarely	8.426	-3.108	9.330	3.154	.070		
Most of the time	3.111	-10.515	1.959	3.164	-.087		
Knowledge related to COVID-19 (adequate)	-4.278	-16.511	4.757	5.394	-.068		
Beliefs about COVID-19 transmission rate (high)	-5.877	-5.867	5.075	2.775	-.009		
Use of COVID-19 self-protective measures	-.396	-8.645	5.186	3.508	-.032		
Close persons at high risk for severe COVID-19	-1.729	-2.225	-.976	.317	-.356		
FCV-19s fear score	-1.601***	.018	1.278	.319	.285		

*Note. CI = confidence interval; LL = lower limit; UL = upper limit. * $p < .05$. ** $p < .01$. *** $p < .001$.

Discussion

HCPs struggled on the front lines against the COVID-19 pandemic under great uncertainty and unprecedented pressure. Hospital admissions and care needs of COVID-19 patients escalated, leading to an overwhelming workload. Concurrently, HCPs faced a prolonged physical health threat due to the increased risk of being infected and also infecting others while lacking effective treatments. It has been well-documented by now that increased fear as a response to these experiences caused further strain on HCPs and brought adverse effects on their mental health (e.g., Alimoradi et al., 2022; Luo et al., 2021; Şimşir et al., 2022).

The present study adopted a multifaceted approach to health and utilised the assessment of HRQoL to explore the health impact of COVID-19 fear among HCPs in Greece. Data were collected during the second and third wave of the pandemic. The findings indicated that the study participants exhibited reduced physical and mental HRQoL relative to the Greek population norms pre-pandemic (Pappa et al., 2005). Most participants reported no alteration in their health status over the preceding 12-month period. This one-year interval predominantly occurred within the pandemic timeframe, suggesting a relatively stable health status for most participants throughout this duration. A plausible explanation could be that HCPs in the study effectively adapted to the extreme adversity of the COVID-19 pandemic, demonstrating psychological resilience; however, it is also conceivable that they may have underestimated potential concerns regarding individual health within the context of combating a widespread and highly threatening virus at the time. Still, one in five (20.9%) participants reported worse overall health over the past year. In contrast, the corresponding proportion in the Greek general population was approximately one in 10 (9.8%) during a time period close to that in the current study (Kontodimopoulos et al., 2022). Therefore, it can be inferred that HCPs in the study experienced a deterioration in their overall health at twice the rate of the Greek general population during the pandemic. This aligns with research on mental health outcomes among HCPs throughout the pandemic, which indicated that they experienced a greater health burden compared to the general population (e.g., Rossi et al., 2020).

Regarding fear of COVID-19, more than half of the study participants experienced elevated levels of fear, with a mean score of 17.28 (± 4.95). This finding is very close to that reported in a study of HCPs in Turkey (17.20 \pm 6.01, Ergin & Akkoyun, 2023). However, it was notably higher than the corresponding finding in a study of mental health workers in Greece (13.76 \pm 4.68, Stefanatou et al., 2022). Because all studies took place at overlapping periods, a possible explanation for this discrepancy may lie in the working conditions of the HCPs examined. In the present study and that of Ergin and Akkoyun, most HCPs had direct contact with COVID-19 patients, delivering physical healthcare services. This has been linked to a heightened perceived risk of infection and virus transmission, resulting in an increased fear of COVID-19 (e.g., Kumar et al., 2020).

Multiple regression analyses showed that fear of COVID-19 was a significant predictor for both the physical and the mental HRQoL of HCPs, above and beyond the effects of demographic, occupational, and COVID-related factors. This finding confirmed the study hypothesis and is consistent with prior research on the general population of Greece (Kontodimopoulos et al., 2022) and Turkey (Aksoy et al., 2021). As for physical health, it was found that higher levels of fear were associated with lower physical HRQoL, while less frequent contact with COVID-19 patients was linked to higher physical HRQoL. The effect of exposure to COVID-19 patients aligns with earlier studies indicating that HRQoL was lower in HCPs treating COVID-19 patients compared to their colleagues (Cruz-Ausejo et al., 2023). The effect of COVID-19 fear confirmed prior evidence for its connection with physical health, although this was scarce. High levels of COVID-19 fear have been associated with lower physical health (Aksoy et al., 2021; Kontodimopoulos et al., 2022) and poorer health perception (Meller et al., 2022) in the general population. Regarding possible mechanisms involved in those associations, it has been argued that fear can trigger psychological distress, which in turn is associated with somatic symptoms (Peiró et al., 2023; Theocharis et al., 2023). It has been further suggested that this relationship may be bi-directional (Chew et al., 2020). As for mental health, the results of the present study showed that the fear of COVID-19 was the only predictor of mental

health, with heightened levels of fear being associated with lower levels of mental HRQoL. This finding is in line with all previous studies documenting that fear triggers stress, anxiety, and depression, bringing adverse effects on psychological health and well-being (Alimoradi et al., 2022; Luo et al., 2021; Meller et al., 2022; Şimşir et al., 2022).

HCPs faced a health burden during the pandemic. However, estimating its magnitude is not possible due to the lack of baseline data. The results of this study suggest that fear of COVID-19 is a critical risk factor for both physical and mental HRQoL. While these findings are consistent with prior research, they should be considered cautiously due to certain limitations. First, the study was cross-sectional, precluding causal relationship establishment. Second, convenience sampling was utilised, and the sample was recruited from two peripheral hospitals in Greece, thereby limiting the generalisability of the findings. Finally, the study did not include important health-related factors, such as previous COVID-19 infection and chronic health conditions, which have been demonstrated to be associated with COVID-19 fear (e.g., Kontodimopoulos et al., 2022). Additionally, including psychological distress among the study variables would further have allowed us to examine its possible mediating effects on the association of COVID-19 fear with physical health, as suggested by previous studies.

Despite the previously mentioned constraints, it could be suggested that the present study sheds some light on the adverse effects of COVID-related fear not only on the psychological well-being of HCPs but also on their perceived physical health. In the post-pandemic era, there may also be ongoing secondary effects that could have a lasting impact on HRQoL. Our findings indicate the need for targeted interventions to address the psychological and physical manifestations that arose during the pandemic. Moreover, given that HCPs who bore the heaviest mental health burden were the least likely to seek or receive psychological support (Bell & Wade, 2021; Liu et al., 2020), it is critical to prioritise the provision of effective and accessible health and well-being promotion services.

Potential interventions may be equally important to focus on coping with fear and enhancing psychological resilience. Future crises may arise, and it is crucial to consider how to manage fear, drawing from the lessons learned during the COVID-19 pandemic. Fear is an adaptive emotion that motivates protective health behaviours (Harper et al., 2021). However, when fear is excessive and accompanied by repetitive negative thoughts, it becomes dysfunctional (Weigelt et al., 2019) and may trigger psychological distress and somatic problems (Peiró et al., 2023). It has been argued that psychological resilience –the ability to adapt to severe adversity and maintain mental health (Southwick & Charney, 2012)– moderates the association between fear of COVID-19 and psychological distress (Lu et al., 2024). It is also regarded as a protective factor for professionals involved in traumatic situations, including HCPs (Brooks et al., 2020). Promoting adaptive coping and resilience in HCPs may, therefore, mitigate the adverse effects of fear and enhance their health and well-being. It may also be implemented to support their patients during minor or major crises, such as the COVID-19 pandemic.

In conclusion, the present study contributed to the existing body of knowledge by examining various aspects of health in the overburdened cohort of HCPs. Consistent with previous findings, it provided some evidence regarding the influence of COVID-19 fear on both mental and physical HRQoL. Future research could examine the potential long-term consequences of this influence and identify effective interventions to promote health and well-being among HCPs. Evaluating whether psychological distress mediates the relationship between fear and physical health may further enhance our understanding of the underlying mechanisms. Qualitative research can also elucidate the subjective experience and reveal possible protective factors against excessive fear in traumatic situations. In anticipation of future crises and their management, potential interventions for facilitating adaptive coping and promoting resilience may be of importance.

Conflict of interest

The authors declare that there is no conflict of interest.

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Φόβος για τον COVID-19 και σχετιζόμενη με την υγεία ποιότητα ζωής: Μια συγχρονική μελέτη σε επαγγελματίες υγείας

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Σχετιζόμενη με την υγεία ποιότητα ζωής Σωματική υγεία Ψυχική υγεία Φόβος για τον COVID-19 Επαγγελματίες υγείας	Οι επαγγελματίες υγείας αγωνίστηκαν στην πρώτη γραμμή ενάντια στην πανδημία COVID-19 κάτω από πρωτόγνωρη πίεση. Ο φόβος που κυριάρχησε επέφερε πρόσθετη καταπόνηση και δυσμενείς συνέπειες στην ψυχική υγεία τους. Η παρούσα μελέτη διερεύνησε τη σχέση ανάμεσα στον φόβο του COVID-19 και τη σχετιζόμενη με την υγεία ποιότητα της ζωής σε επαγγελματίες υγείας δυο μεγάλων περιφερειακών νοσοκομείων της χώρας κατά τη διάρκεια της πανδημίας (N=224). Χορηγήθηκαν η Κλίμακα Φόβου για τον COVID-19 και η Επισκόπηση Υγείας, ενώ επίσης συλλέχθηκαν τα δημογραφικά, τα εργασιακά και σχετικά με τον COVID-19 στοιχεία. Η έρευνα διεξήχθη από τον Οκτώβριο 2020 έως τον Μάιο 2021. Η πλειονότητα του δείγματος ήταν γυναίκες (64,3%) και η μέση ηλικία τους ήταν 45,5 (±9,7) έτη. Ήταν ιατροί και νοσηλεύτριες (65,6%), είχαν μέσο χρόνο εργασίας τα 17,5 (±10,1) έτη, και εργάζονταν σε άμεση επαφή με ασθενείς COVID-19 συχνά ή τον περισσότερο χρόνο της ημέρας (85,7%). Η πλειονότητα ανέφερε επαρκή γνώση για τον COVID-19 (71,9%) αλλά και υπερβολικό φόβο, καθώς οι τιμές στην Κλίμακα Φόβου για τον COVID-19 ήταν υψηλότερες από την τιμή αποκοπής για το 54,9% του δείγματος. Η μέση τιμή της σωματικής υγείας ήταν 69,8 (±19,5) και η μέση τιμή της ψυχικής υγείας 59,4 (±22,2), υποδηλώνοντας χαμηλά επίπεδα. Τα αποτελέσματα της ιεραρχικής πολλαπλής παλινδρόμησης έδειξαν ότι ο φόβος για τον COVID-19 είναι στατιστικά σημαντικός παράγοντας κινδύνου για τη σωματική και ψυχική υγεία πέρα από την επίδραση των δημογραφικών, των εργασιακών και σχετικών με τον COVID-19 παραγόντων. Το τελικό μοντέλο της παλινδρόμησης εξήγησε το 18,2% της διασποράς των τιμών στη σωματική υγεία και το 27,4% της διασποράς των τιμών στην ψυχική υγεία. Τα αποτελέσματα επιβεβαίωσαν προηγούμενα ευρήματα και ανέδειξαν την αναγκαιότητα στοχευμένων παρεμβάσεων για την προαγωγή της υγείας και ευεξίας των επαγγελματιών υγείας. Επέστησαν, επίσης, την προσοχή σε παρεμβάσεις που προάγουν την προσαρμοστική αντιμετώπιση του φόβου και την ψυχική ανθεκτικότητα, καθώς είναι πιθανό στο μέλλον να προκύψουν καταστάσεις κρίσης αντίστοιχες με την πανδημία COVID-19.
ΣΤΟΙΧΕΙΑ ΕΠΙΚΟΙΝΩΝΙΑΣ	
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