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Psychological Distress in Primary Healthcare Workers during the COVID-19 Pandemic in Greece

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Abstract

Objective. The present study aims to evaluate the symptoms of psychological distress during the COVID-19 pandemic, in Greek primary healthcare workers, correlating them with their individual characteristics. **Materials and Methods.** The research is based on a self-report questionnaire distributed to primary HCWs of Thessaloniki's public health care units. A sample of 143 respondents was gathered. The questionnaire consists of 21 items: 6 demographic questions, 9 on personal distress, 5 on work-related distress and 1 on one dominant feeling of the participants. These items were based on existing validated measures, such as the "Depression Anxiety Stress Scale-21", the "Kessler Psychological Distress Scale-10", "General Health Questionnaire-28" and "Hospital Anxiety and Depression Scale". The associations between participants' gender, education, specialty and parenthood were determined with Pearson's chi-squared (χ^2) test. **Results.** Overall, 70.4% of HCWs were generally affected by the pandemic. The personal distress factors revealed that the majority (67%) experienced distress due to routine changes. The effects on health behavior (sleep, eating behavior and substance use) were not high. Psychological/psychiatric needs were relatively low, while negative emotions and need of social support were high. 31.4% displayed intense emotional instability. All work-related distress factors were rated high. Worry about contracting COVID-19 in the workplace scored the highest (82.6%). Almost half of the participants felt exposed to COVID-19 infection (47.0%). Anxiety (47.2%) and burn-out (78.4%) symptoms were also revealed. Female participants appeared to be more anxious ($P<0.01$) and upset ($P=0.013$). **Conclusion.** The exposure to a constant risk could potentially lead to an increase in HCWs' psychological distress. Designing the right tools and organizing the right plans are of paramount importance to prevent the deterioration of their wellness and quality of life.

Key Words: SARS-CoV-2 ▪ COVID-19 ▪ Healthcare Workers ▪ Personal Psychological Distress ▪ Work-Related Psychological Distress.

Introduction

The COVID-19 pandemic was caused by a coronavirus known as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and has turned into an unprecedented health emergency (1). The outbreak of the first SARS epidemic in 2003 had a significant psychological impact on Healthcare Workers (HCWs). The need for addressing health professionals' distress was conspicuous then, as it is now (2). As the SARS-CoV-2 pandemic wreaks havoc throughout the entire planet, HCWs' psychological well-being seems to be at risk. Distress, interpersonal sensitivity and anxiety have already been revealed (3).

Outlining the numbers, one can understand the unprecedented pressure on all Health Care Systems. During the first month of the pandemic, Australia reported that HCWs were 2.69 times more likely to contract COVID-19 in comparison with the general population (4). Up to May 2020, there were 152,888 infections and 143 deaths among HCWs globally. Most of the infected HCWs were women and nurses, with the major-

ity reported in Europe. The Eastern Mediterranean region had 5.7 deaths per 100 HCWs, in the same period of time (5)information sources used, publication status and types of sources of evidence. The AACODS checklist or the National Institutes of Health study quality assessment tools were used to appraise each source of evidence. Outcome measures Publication characteristics, country-specific data points, COVID-19-specific data, demographics of affected HCWs and public health measures employed. Results A total of 152 888 infections and 1413 deaths were reported. Infections were mainly in women (71.6%, n=14 058. By September 2020, 570,000 American HCWs were infected and 2,500 died (6). The first year of the pandemic revealed a global prevalence of 15.1% regarding HCW hospitalization and a mortality rate of 1.5% (7) 225 articles did not meet inclusion criteria; therefore, 97 full-text article were reviewed. Finally, after further revision, 30 articles were included in the systematic review and 28 were used for meta-analysis. Results: Twenty-eight studies were identified involving 119,883 patients. The mean age of the patients was 38.37 years (95% CI 36.72–40.03. By the time that this research took place (December 2020), there had been almost 6,500 confirmed COVID-19 deaths in Greece, without a separate report on HCWs (8). It is of great importance to assess the impact of this grim situation on medical staff who are constantly exposed, and are experiencing a gloomy job routine.

Apart from the endangerment of their physical health due to a COVID-19 infection, these circumstances indirectly increase stress, anxiety, depression and insomnia, compromising the safety of their psychological wellness (9, 10). A survey in Australia revealed alarming results regarding the impact of the pandemic on the mental health of the general population, since several negative behaviors and increased psychological distress were found (11). In the German population during the first months of the pandemic, a study revealed emotional and behavioral distress regarding the virus outbreak (12)research on specific vulnerability factors, such as health anxiety, intolerance of uncertainty, and distress (in. Emotional distress has also been noticed in children and adolescents (13). Thus, the same or even worse effects are expected in HCWs, since the highest prevalence rates of PTSD-like (Post-Traumatic Stress Disorder) symptoms were reported in medical staff (14). Depression and anxiety levels were very much alike, at their highest peaks. In addition, health care specialists are exposed to critical situations, endangering not only their own physical health, but that of their families too. This pressure could be devastating for their mental, psychological and physical well-being (15). A systematic review revealed that one out of three nurses were suffering from anxiety, stress and depression during the first year of the pandemic (16). Similarly, another study reported almost 25% prevalence of anxiety and depression among HCWs (17)who are at the forefront of the fight against COVID-19, are particularly susceptible to physical and mental health consequences such as anxiety and depression. The aim of this umbrella review of meta-analyses is to determine the prevalence of anxiety and depression among healthcare workers during the COVID-19 pandemic. Methods: Using relevant keywords, data resources including PubMed, Scopus, Web of Science, Cochrane, ProQuest, Science Direct, Google Scholar and Embase were searched to obtain systematic reviews and meta-analyses reporting the prevalence of anxiety and depression among healthcare workers during the COVID-19 pandemic from the beginning of January to the end of October 2020. The random effects model was used for meta-analysis, and the I2 index was employed to assess heterogeneity among studies. Data was analyzed using STATA 14 software. Results: In the primary search, 103 studies were identified, and ultimately 7 studies were included in the umbrella review. The results showed that the overall prevalence of anxiety and depression among healthcare workers during the COVID-19 pandemic was 24.94% (95% CI: 21.83–28.05, I2 = 0.0%, P = 0.804. PTSD was confirmed among health specialists, with a prevalence of 21.5%. Psychological distress was also revealed at the same rate (18).

A Greek survey indicated that 63.0% of Greeks believe that this crisis will have an adverse im-

pact on their psychological wellness, and 57.9% on their income (which will indirectly affect their mental state) (19). Yet another Greek survey related to the COVID-19 crisis, conducted during April 2020, focusing on HCWs, reported moderate stress, with female participants fluctuating at significantly higher levels. The latter study suggested that HCWs should be screened for psychological symptoms, insomnia, and even PTSD symptoms (20).

The objective of the present study is to evaluate the symptoms of psychological distress during the COVID-19 pandemic in Greek primary healthcare workers, and to explore differences in psychological distress symptoms due to individual characteristics, such as gender, age, education, parental status, specialty and professional experience. This investigation could reveal some risk factors regarding the deterioration of HCWs' psychological well-being and efficiency.

Materials and Methods

Participants and Procedure

The research was conducted by distributing and collecting anonymous self-report questionnaires (N=143) amongst primary HCWs in several public healthcare units. The self-administered questionnaire was distributed randomly to primary HCWs and to some general or office workers in Thessaloniki's Public Health Care Units (HCUs). More specifically, it was distributed to the 3rd, 9th and 10th public HCUs which belong to the municipalities of Neapolis, Evosmos and Ampelokipoi of the Greater Area of West Thessaloniki. Our sample size was 143 participants who took the survey. The sampling used was cluster-sampling, as the data were collected from three primary HCUs in West Thessaloniki. The study took place on 2nd and 3rd of September 2020, and was distributed by hand to the respondents. They were asked to fill in the questionnaires during their breaks from work. Consent was obtained from each participant, and they were informed in detail about the survey and the aim of the study. All participants signed the detailed page of informed consent about the study's objectives, benefits, and harm. They were also given some time to decide or pose questions regarding their participation. Participants were also informed that they could leave the questionnaire at any time. Participation was voluntary and anonymous.

Measures

Before the creation of the survey, bibliography was searched in order to gain knowledge and address the right questions. The composition of our questionnaire, the content and certain details were based on validated tools. Specialized characteristics were drawn from the Depression Anxiety Stress Scale-21 (DASS21) (21) (nervous, overreact, lack of positive emotions and serenity, fear, irritable) [Greek-DASS21 (22)], the Kessler Psychological Distress Scale-10 (hopeless, nervous, tired, depressed) (23), the General Health Questionnaire-28 (24)which are complex, multifaceted, and affect a patient's rehabilitation and recovery. Due to the consequences of these challenges, psychosocial well-being should be considered an important outcome of the stroke rehabilitation. Thus, a valid and reliable instrument that is appropriate for the stroke population is required. The factor structure of the Norwegian version of GHQ-28 has not previously been examined when applied to a stroke population. The purpose of this study was to explore the psychometric properties of the GHQ-28 when applied in the stroke population included in the randomized controlled trial; \"Psychosocial well-being following stroke\", by evaluating the internal consistency, exploring the factor structure, construct validity and measurement invariance. Methods: Data were obtained from 322 individuals with a stroke onset within the past month. The Kaiser-Meyer-Olkin (KMO (insomnia, day-to-day routine activities, fear of infection) and the Hospital Anxiety and Depression Scale (fear, anxiety and depression questions) (25). The final questionnaire consists of 6 demographic questions and 15 specialized questions about their psychological distress and the general impact that they suffered because of the pandemic crisis. The demographic

questions were about age, gender, parenthood, education, specialty and years of professional experience. These questions represent the independent variables of this study. The 14 questions of Tables 2 and 3 were multiple choice style, built up in a 4-point Likert scale (1= not at all, 2= Little, 3= Much and 4=Very much). These questions were built upon the dependent variables that this study aimed to evaluate. Questions 1.1 to 1.9 evaluate the "personal distress" of each participant. This constitutes one of the two main measures of the study, assessing the worries, bad habits, emotional instability, personal relationships and the general impact on their psychological wellnessdue to COVID-19. The second main measure of the study is "work-related distress", which is evaluated by questions 2.1 to 2.5. More specifically, in this section, fear of exposure, insecurity due to safety measures, exposure and worries at work are assessed. Finally, there was a single question that aimed to evaluate directly the participants' most dominant feelings (Figure 1). "Fear", "depression" and "anxiety" were the negative feelings from which they could use only one. "Calm" was also among the choices, as a positive one, alongside a neutral answer ("other").

Ethics Statement

Ethical approval for the study was obtained from the Aristotle University of Thessaloniki Bioethical Committee (*approval No: 27868/09-06-2020*). The Ministry of Health also granted permission for conducting this research. After the deposition of Bioethical Approval and consent papers to the Department of Human Resources and Development of HCUs, the present study was granted permission for the specific days and the specific local HCUs (Registration No: Δ3β/39919, Thessaloniki 14-08-2020). The whole procedure was welcomed by most of the HCWs, with the acceptance rate reaching 90% in total (159 HCWs contacted).

Statistical Analysis

All statistical analyses were carried out using SPSS version 24.0 (IBM, SPSS Inc., Chicago, IL, USA). In order to provide an analysis based on the respondents' age, they were divided into two subgroups; one consisted of those above 45 years and the other from the age of 45 and below. The Kolmogorov-Smirnov (K-S) test was also performed on the participants' age and years of work experience to decide whether we should present the mean or the median value (Table 1). Finally, one question was set to reveal the dominant feelings of the participants (Figure 1). The aim was to investigate whether or not there was a significant difference between the aforementioned independent variables (categorical variables) regarding the indicators of psychological distress in the participants. The presence or absence of an association between the participants' gender, education, specialization and parenthood, was determined using Pearson's chi-squared (χ^2) test. After extracting the descriptive results (Tables 1-3), we reported the associations and prevalence of the investigated items among the different groups, defined by gender, age group, profession, educational level and parenthood. The analysis of the indicators of the psychological distress of the respondents was performed by dichotomizing the Likert scale of the items (Low vs. High). Tables 4 and 5 provide a better insight into participants' responses. These tables present the findings of the 2-scale analysis, by dichotomizing the Likert-4 scale. This method provides clear results about differences due to individual characteristics. The level of statistical significancy was set at 0.05.

Results

To begin with, the sample consisted of 143 participants. The median age was 44 years with a rage of 26-60 y (Kolmogorov-Smirnov test, $P<0.05$). The median value of the years of experience was 15 y, with a range of 1 to 37 y (K-S test, $P<0.05$). Most of the participants (72%) were parents and females (72.7%). Almost half of them had a MSc/PhD degree. Nurses and physicians were the majority (Table 1).

Regarding participants' dominant feeling, almost half of them (47.2%) declared that they felt

Table 1. HCW Characteristics and Demographics.

Characteristics	Number (%)
Age	
<=45	75 (52.4)
>45	68 (47.6)
Gender	
Female	104 (72.7)
Male	39 (27.3)
Parenthood	
Yes	103 (72)
No	40 (28)
Education	
High School	17 (12)
Bachelor's Degree (BSc)	51 (35.5)
Master's (MSc)/PhD Degree	75 (52.5)
Specialty	
Physician	55 (38.5)
Nurse	37 (25.9)
Midwife	8 (5.6)
Medical Lab/Radiology Assistant (M.L./R. Ass.)	23 (16.1)
Other	20 (14.0)

anxious during the pandemic, with just 6% remaining calm. Fear was also a common negative feeling, as 28.9% experienced it. Excluding those who felt calm or had other feelings, 88.7% of the participants experienced negative feelings during the COVID-19 crisis (Figure 1). HCWs' worries, habits and psychological evaluation are presented, based on their responses, in Tables 2 and 3. Table 2 presents the personal distress of the participants. Most of them declared they were upset due to routine changes, and significantly affected by the Covid-19 pandemic. However, sleep disturbances, eating and drinking habits were not changed during the pandemic. Most of them did not feel the need for psychiatric evaluation and assistance, but they were worried about the future and declared that they had experienced emotional instability. Table 3 presents the work-related distress. Most of our HCWs were quite worried about their exposure to Covid-19, and felt that they treated Covid patients differently. Burn-out was not of high prevalence.

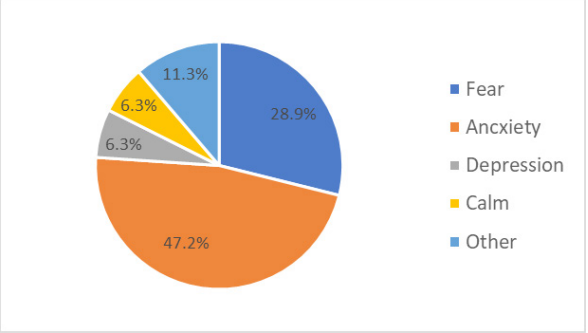

Figure 1. The feeling that survey respondents experienced the most during the pandemic.

The personal distress factors revealed that the majority (67%) experienced distress due to routine changes (Table 2). The effects on health behaviors (sleep, eating behavior and substance use) were low. Very few of the respondents declared that they were in need of psychological/psychiatric help. However, negative emotions and the need for social support were rated rather high. One out of three displayed intense emotional instability (Table 2). Of the two sexes, females appeared to be significantly more anxious and fearful (79.6%) in comparison to male participants (20.6%) (P<0.01) (Figure 1).

Sixty-five percent (65.0%) of high school graduate HCWs experienced emotional instability, ranging from 3 to 4 (Likert-4 scale), compared with those with a BSc (27.5%) or MSc/PhD (28%) in the same range (P=0.013, χ^2=16,208).

The majority of the respondents were parents, and most of them (80.0%) declared that they were quite affected by this crisis. However, the percentage was also high for those without children (P=0.23; χ^2=9,490; Likert-4 scale).

As mentioned, respondents were divided into two groups and this revealed a significant difference in relation to future worries due to the pandemic (P=0.03, χ^2=14.251, Likert-4 scale). While 45.0% of the second group (age>45 y) declared that they were anxious about the future, the counterpart of younger HCWs claimed to be rather concerned (72.0%).

All work-related distress factors were rated high (Table 3). Worry about contracting COVID-19 in

Table 2. HCWs'† Personal Distress during the Pandemic

Personal distress factors	Likert scale			
	Not at all N (%)	Little N (%)	Much N (%)	Very much N (%)
Affected by COVID-19 pandemic	8 (5.6)	34 (23.8)	79 (55.2)	22 (15.2)
Got upset due to routine changes	6 (4.2)	41 (28.7)	71 (49.7)	25 (17.5)
Experienced sleep disturbances (duration/quality)	57 (39.9)	67 (46.9)	12 (8.4)	7 (4.9)
Increase in tobacco, alcohol or drugs intake	105 (73.4)	33 (23.1)	3 (2.1)	2 (1.4)
Changes to eating habits	77 (53.8)	46 (32.2)	15 (10.5)	5 (3.5)
Worried about the future	11 (7.7)	46 (32.2)	58 (40.6)	28 (19.6)
Experienced emotional instability	25 (17.5)	72 (50.3)	32 (22.4)	14 (9.8)
Felt the need for psychological or psychiatric help	132 (92.3)	10 (7.0)	0 (0.0)	1 (0,7)
Felt closer to your family during the crisis	32 (22.4)	47 (32.9)	50 (35.0)	14 (9.8)

†Healthcare workers.

Table 3. HCWs'† Work-Related Distress during the Pandemic

Work-related distress factors	Likert scale			
	Not at all N (%)	Little N (%)	Much N (%)	Very much N (%)
Worried about getting COVID-19 in your workplace	10 (0.7)	24 (16.8)	71 (49.7)	47 (32.9)
Felt exposed to COVID-19 infection	15 (10.5)	61 (42.7)	45 (31.5)	22 (15.4)
Felt that safety measures at your workplace are adequate	25 (17.5)	68 (47.6)	46 (32.2)	4 (2.8)
Experienced burn-out from the constant shifts / on-call time	31 (21.7)	44 (30.8)	52 (36.4)	16 (11.2)
Felt that you treated patients who are suspected of COVID-19 infection differently	24 (16.8)	52 (36.4)	47 (32.9)	20 (14.0)

†Healthcare workers.

the workplace scored the highest (82,6%). Almost half of the participants felt exposed to COVID-19 infection (47.0%). Burn-out symptoms were also revealed (78.4%).

Regarding age, the sub-group of younger HCWs did not feel so anxious and worried about a potential COVID-19 infection. Only 5% of those under 45 y declared that they had undoubtedly been exposed, in comparison with 26.5% of older (age>45 y) participants (P=0.05; χ^2=12,908; Likert-4 scale).

Almost all the independent variables present statistically significant differences with regards to routine changes. More specifically, female participants appeared more upset in comparison to males (P=0.013), as 73% of females declared "high" and only half of the male respondents did the same (51%). Younger respondents (75% "high") were also more upset than older ones (59% "high") (P=0.044). A strong statistical difference (P=0.003) was observed in the specialty analysis in the same context. It seems that half of the physicians were not very upset ("low"), while all the other specialties declared "high" with a percentage of 70-85%. There are also strong statistical findings regarding future worries and age. Almost half of the older participants appeared to be rather worried about the future, while most of younger respondents (72%) declared the same (P=0.002).

High school educated participants manifested higher emotional instability (65%) compared to those with a BSc (27%) or MSc/PhD (28%) (P=0.009). Among specialties, apart from physicians who seem to be less affected, the others manifested higher emotional instability (P=0.049).

The HCWs in the present study revealed a burn-out prevalence of 78.4%, which is quite significant and alarming. However, no significant difference was found among the variables (Table 5).

Table 4. HCWs'†† Personal Distress during the Pandemic. Dichotomized Likert-4 Scale (Low 1-2, High 3-4)

Table 2 analysis		Affected by COVID-19 pandemic		Got upset due to routine changes		Experienced sleep disturbances (duration/ quality)		Increase in tobacco, alcohol or drugs intake		Changes to eating habits		Worried about the future		Experienced emotional instability		Felt the need for psychological or psychiatric help		Felt closer to your family during the crisis	
Dichotomized Likert-4 scale		L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H
Gender	Male	15	24	19	20	35	4	37	2	34	5	18	21	28	11	1	38	22	17
	Female	27	77	28	76	89	15	101	3	89	15	39	65	69	35	0	104	57	47
	P-value	0.144		0.013*		0.513		0.515		0.806		0.347		0.534		0.273†		0.864	
Age	<=45 y	19	56	19	56	64	11	71	4	61	14	21	54	49	26	74	1	38	37
	>45 y	23	45	28	40	60	8	67	1	62	6	36	32	48	20	68	0	41	27
	P-value	0.266		0.044*		0.610		0.209		0.090		0.002*		0.502		0.524†		0.248	
Parenthood	Yes	29	74	35	68	90	13	102	1	91	12	45	58	74	29	103	0	56	47
	No	13	27	12	28	34	6	36	4	32	8	12	28	23	17	39	1	23	17
	P-value	0.601		0.649		0.707		0.008*		0.196		0.133		0.01*		0.280†		0.753	
Education	High School	6	11	3	14	12	5	16	1	14	3	3	14	6	11	16	1	9	8
	BSc	12	39	12	39	45	6	51	0	43	8	19	32	37	14	51	0	29	22
	MSc/PhD	24	51	32	43	67	8	71	4	66	9	35	40	54	21	75	0	41	34
	P-value	0.502		0.029*		0.112		0.244†		0.757		0.078		0.009*		0.119†		0.951	
Specialty	Physician	20	35	28	27	52	3	52	3	48	7	28	27	44	11	55	0	30	25
	Nurse/Midwife	9	36	8	37	36	9	43	2	36	9	12	33	30	15	44	1	24	21
	M.L./R.Ass.	7	16	7	16	21	2	23	0	20	3	9	14	12	11	23	0	13	10
	Other	6	14	4	16	15	5	20	0	19	1	8	12	11	9	20	0	12	8
	P-value	0.359		0.003*		0.058		0.739†		0.426		0.108		0.049		0.615†		0.965	

L=Low; H=High; *Statistically significant correlation at the 0.05 level; †Fisher's Exact test; ††Healthcare workers.

Table 5. HCWs'† Work-Related Distress during the Pandemic. Dichotomized Likert-4 Scale (Low 1-2, High 3-4)

Table 3 Analysis		Worried about getting COVID-19 in your workplace		Felt exposed to COVID-19 infection		Felt that safety measures at your workplace are adequate		Experienced burn-out from the constant shifts / on-call time		Felt that you treated patients suspected of COVID-19 infection differently	
Dichotomized Likert-4 scale		L	H	L	H	L	H	L	H	L	H
Gender	Male	9	30	23	16	21	18	22	17	22	17
	Female	16	88	53	51	72	32	53	51	54	50
	P-value	0.281		0.392		0.086		0.561		0.632	
Age	<=45y	15	60	46	29	45	30	38	37	39	36
	>45y	10	58	30	38	48	20	37	31	37	31
	P-value	0.405		0.039*		0.185		0.654		0.773	
Parenthood	Yes	17	86	54	49	63	40	51	52	56	47
	No	8	32	22	18	30	10	24	16	20	20
	P-value	0.621		0.782		0.119		0.260		0.638	
Education	High School	3	14	8	9	10	7	6	11	5	12
	BSc	12	39	26	25	34	17	31	20	33	18
	MSc/PhD	10	65	42	33	49	26	38	37	38	37
	P-value	0.335		0.743		0.839		0.172		0.034*	
Specialty	Physician	8	47	31	24	37	18	29	26	30	25
	Nurse/Midwife	9	36	22	23	25	20	24	21	26	19
	M.L./R.Ass.	5	18	12	11	20	3	12	11	11	12
	Other	3	17	11	9	11	9	10	10	9	11
	P-value	0.825		0.898		0.054		0.996		0.747	

L=Low; H=High; *Statistically significant correlation at the 0.05 level. †Healthcare workers.

The majority of older participants (56%) felt highly exposed to COVID-19 infection, compared to the younger respondents who felt the same (39%) (P=0.039). Regarding the differences between the educational level and treating suspected COVID-19 patients differently, the majority of high school participants (71%) and almost half of the MSc/PhD respondents declared that they did so ("high"). A minority of 35% of BSc participants declared "high" on treating these patients differently (P=0.034).

Discussion

A high prevalence of anxiety, depression and insomnia has been proportionally linked with exposure to COVID-19 during HCWs' routine (3, 4, 10, 11, 17, 18, 20, 26. Our findings revealed the prevalence of anxiety (47.2%) and fear (29%) as the main dominant feelings. In the current study, insomnia was not found at significant rates. Almost 70% of our HCWs declared themselves to be generally affected by the pandemic. The personal distress factors revealed that the majority (67%) experienced distress due to routine changes. The effects on sleep, eating behavior and substance use were relatively low. Despite the fact that the need for psychological/psychiatric need was rated low, negative emotions and need of social support were high. Moreover, a significant percentage of 31.4% displayed intense emotional instability.

College education is helpful when dealing with these dire situations, as college students exhibit high risk perception (27). Our HCWs declared that they were not in need of psychiatric or psychological assistance. However, the ongoing pressure might change that in the future. A cross-sectional study claimed that front-line workers are going to suffer from mental health disturbances as long as the pandemic lasts, and thus, are in need of personalized treatment from psychotherapists and psychiatrics (28). A statistically significant difference was found between the genders regarding being upset due to routine changes, with females appearing more troubled about this matter. Females also appeared to be significantly more anxious (20).

Alongside psychological distress are the dietary and eating disorders (29). In terms of dietary habits, the participants in the present study were not much affected, as only 14% experienced significant changes to their eating routine. However, it seems that the lockdown and the whole COVID-19 crisis has affected the dietary and activity habits of each gender differently (30). The respondents in the present study experienced mild sleep disturbances, with only 13.3% declaring otherwise. Insomnia and sleep disorders are also adverse outcomes brought on by the COVID-19 pandemic. Front-line workers are the most vulnerable to this predicament, as they demonstrate conspicuous high levels of insomnia (10).

All work-related distress factors were also rated high. The worry about getting COVID-19 in the workplace scored the highest (82,6%). Almost half of the participants felt exposed to COVID-19 infection (47.0%), and most of them (78.4%) declared that they had experienced burn-out symptoms.

The risk of viral transmission among HCWs is higher in comparison with any other job during the COVID-19 pandemic. A study, based on 23 family clusters of SARS-CoV-2 infection that occurred in Greece, reports a median infection rate of 60.0%, which demonstrates the high transmission dynamics of the novel coronavirus (31). Zheng et al (32) reported a tremendous rate of 52.1% of infected individuals in Wuhan, China, to be HCWs. Thus, HCWs must also deal with the anxiety and fear of putting their families in danger due to their everyday exposure.

Burn-out is another syndrome that requires special attention, as its prevalence was quite high in the present study (33). However, we did not observe any significant difference between male and female primary HCWs. Burn-out syndrome is one of the main culprits for the deterioration of HCWs' quality of life (QoL), especially during the pandemic**.** QoL increases with good sleep, steady working hours and free time (34).

All the above support the fact that the mental health and psychological well-being of HCWs are at risk of further deterioration. Indeed, reviews have confirmed that PTSD symptoms could fluc-

tuate from 11% to 73% for HCWs during periods of pandemics and epidemics. As many studies have revealed, the prevalence of anxiety and depression during such crises soared to 80% in many cases, with an average of 25% in all HCWs globally (15) SARS, MERS, COVID-19, ebola, and influenza A. Greek HCWs manifest the same psychological distress (20). Our study revealed some significant results which indicate that primary Greek HCWs are indeed at risk for developing mental health problems, and these problems could be directly associated with several demographic and other characteristics. A meta-analysis of the adverse outcomes of HCWs during the pandemic showed several contradictive findings regarding the demographic and clinical characteristics of HCWs. Of course, the prevalence of distress was revealed, but gender, age and specialty were rather contradictive in relation to these cases. The effectiveness of protective measures at work were significantly associated with their mental and physical well-being. (35)health care workers (HCWs At the beginning of the pandemic, a study conducted at a primary healthcare center in Athens assessed the mental health of primary HCWs. The results were rather optimistic, as they did not reveal any signs of severe psychological distress. However, it was shown that females were significantly more burdened in terms of distress, compared to males. Their statistical analysis did not divulge any evidence about specialty or age correlations with psychological distress symptoms (36). Half a year later, Malfa et al. (37) assessed the health-related quality of life and psychological distress of public healthcare personnel, working in the region of Western Greece. This study presented some alarming results, especially for nurses' quality of life. Their findings on female participants are aligned with other studies, including ours. It seems once more that women manifested worse psychological deterioration than men, during the pandemic in Greece (37).

Over the last decade, the ongoing economic crisis in the country has affected the mental health of the Greek population. Thus, it should be taken into consideration that anxiety and depression were already noticed in the general population (38), and consequently, healthcare workers might have already been affected as well. In the same period of time (since 2015), even before the pandemic, Papathanasiou I. (39) found a moderate prevalence of burn-out syndrome in healthcare employees, from units all over Greece. This study implicates emotional exhaustion as a co-culprit for burn-out syndrome that most of the employees said they experienced. Another Greek study reported an increase in anxiety symptoms in Greek oncology nurses in 2015-2016 (40). Despite the fact that the latter evaluation was restricted to a certain specialty and unit, it confirms once more the rising anxiety levels among health specialists. It is only logical that the burden of the pandemic is even greater for our HCWs. A similar study of the general population found increased anxiety and depression levels, using DASS-21, especially in women and lower income populations (41). Similarly, the majority of the participants in another Greek survey stated that they were quite worried about the future, and female participants also appeared to be affected the most (42). Another large-scale general population survey was launched in Greece during April 2020, at the beginning of the crisis, and revealed high levels of fear, and moderate depression and anxiety symptoms. As we are going through the second year of the pandemic and having already re-evaluated distress levels, it seems that the situation is not improving, especially for women who have shown a much more significant deterioration in their psychological wellness from the beginning (43). Returning to HCWs, Greek physicians' educational process has been diminished as a Greek study observed that surgical trainees felt increased stress and reduced confidence due to the lack of practical education (44). A multi-center cross-sectional study of Greek frontline HCWs revealed moderate to severe anxiety and depression levels. In comparison to our primary HCWs, frontline staff experienced even higher "burn-out" and exhaustion symptoms (45). Another study in a Greek hospital revealed moderate burn-out symptoms, with males at higher risk (33). Additionally, a Greek cross-sectional study on health professionals observed changes in HCWs' sleep quality, espe-

cially in women. Even though sleep disturbances were not observed in our study, all the evidence points to the fact that women are at risk for severe psychological distress (46). Finally, it is worth mentioning that the willingness of staff to work has not been reduced during the COVID-19 and other crises. The above findings in Greece call for special attention. It is of paramount importance that governments establish proper health strategies that will ensure the protection of health staff, in order to protect and assist them in their work (47). Increased preparedness of the health system and especially frontline HCWs and intensive care unit HCWs is fundamental (48).

Strengths and Limitations

To the best of our knowledge, the present study contributes to further evaluation and be a point of comparison to other studies. This self-reported questionnaire, as a tailored-one, entails some comparative limitations. However, it is mostly based on widely used, validated tools. A shortcoming of this study is the limited size of the sample. This is due to the traditional distribution of the survey. Despite the several disadvantages of "hand to hand" surveys (i.e., far too much time needed for the respondent to fill it in, fewer responses returned, hesitancy to respond), this approach provides authentic and sincere responses, and diminishes any possible population biases (49). Due to safety reasons, we were only granted permission by the Ministry of Health for the specific units. Hence, our population was limited. It should also be noted that the aim of the question covered in Figure 1 was about the feeling that participants experienced the most. In order to answer this question, they were limited to only one response. Finally, we tried to perform a comparison with other studies during the pandemic and prior to it, in order to evaluate Greek healthcare providers' mental and psychological state, before and after the COVID-19 crisis. Due to the limited studies on this subject, we were not able to come to a solid conclusion about HCWs' state of mind prior to the pandemic, apart from a few implications due to the ongoing economic crisis.

Conclusions

The COVID-19 outbreak expanded to a worldwide pandemic, with many countries taking extreme precautionary measures. The severe pressure has caused shock to healthcare systems and pushed HCWs to their limits. The present study assesses the prevalence of psychological distress in Greek primary HCWs during the pandemic. It was found that direct exposure to COVID-19 could have a profound impact on their psychological health and wellness. Moreover, routine changes caused intense emotional instability and distress. There is a dire need for proper health strategies that will ensure the safety and protection of HCWs, in order to increase their effectiveness and shield them both physically and psychologically. Specialized programs must be provided in order for the healthcare system to be fortified. Perhaps online tools for distance sessions and meetings might be useful. It seems that females are more prone to anxiety and worry than males. Taking this into consideration, governments could organize special online meetings for those in need of communication and advice on how to handle the everyday pressure (i.e., support sessions, personalized advice programs etc.).

What Is Already Known on This Topic:
Psychological and mental distress among HealthCare Workers during the COVID-19 crisis have been assessed by several studies. The impact of this pandemic on HCWs affects not only their lives, but the effectiveness of the HealthCare Systems as well.

What This Study Adds:
Greek HCWs revealed a high prevalence of psychological symptoms and worry regarding their workplace and their quality of life during the pandemic. An important finding was that female HCWs seemed to be significantly more affected than males. Moreover, routine changes cause intense emotional instability and distress.

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