Burnout among primary healthcare professionals during COVID-19 pandemic: A need for timely identification strategies to increase the resilience of the Greek health system

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ABSTRACT

INTRODUCTION The study aims to assess the level of burnout among Greek Primary Healthcare Professionals (physicians, nurses, and allied professionals) and to investigate the association between work-related stressors with the presence of clinical burnout.

METHODS A multi-center, web-based, cross-sectional survey was conducted from June to end of October 2021, in Greece. Facilitating convenience sampling, the survey recorded demographic data, personal experience with COVID-19, and emerging work-related perspectives and concerns. Burnout was assessed using the Maslach Burnout Inventory (MBI), which is a 22-item inventory, referring to three burnout dimensions: emotional exhaustion (EA, 9 items), depersonalization (DE, 5 items), and personal accomplishment (PA, 8 items). The inventory is rated on a 7-point Likert scale, and, for diagnosis, burnout is experienced when at least 2 of the 3 dimensions yield high scores. Data were analyzed using descriptive statistics and multiple regression models.

RESULTS A total of 236 participants, including 104 physicians, 83 nurses, and 49 allied professionals, with a mean age of 46 years (SD=9.3) and a male/female ratio of 0.4, completed the online questionnaire. In respect to MBI subscales, high burnout risk was found in the 23.3%, 29.7%, and 46.6% of the three types of participants, respectively. Gender, occupation, and education level were not identified as predisposing factors. Nevertheless, vulnerability was related to young age (<44 years, p=0.028), working in urban settings (29/64, p=0.001), and the experience of severe SARS-CoV-2 infection in the work environment (32/85, p=0.018). Clinical burnout was more frequently observed in participants who would avoid visiting patients (n=36/96, p=0.015), in those who stated that work could endanger their health (n=59/183, p=0.023), and in those concerned about an imminent staff (n=54/155, p=0.004) or protective equipment (n=53/141, p<0.001) shortage.

CONCLUSIONS This study showed the severe psychological impact of the COVID-19 pandemic. Building resilience through the timely identification of risk factors and implementation of meaningful interventions to promote the mental health of healthcare workers is critical.

INTRODUCTION

The work performance of healthcare professionals (HPs) is a vital issue in community and occupational health and becomes even more critical during health crises. These crises, like the coronavirus disease 2019 (COVID-19) pandemic may change the healthcare landscape and place

pressure on healthcare workers by introducing additional stressors, such as staff redeployment and the fear of infection, hence increasing further their risk of developing depression and anxiety disorders[1,2]. Several studies have evaluated the mental well-being of healthcare workers during the COVID-19 pandemic, reporting psychological strain, occupational stress and mood disturbances of varying duration and severity[3-5].

Burnout is an emotional construct, characterized by psychological distress, resulting from excessive physical, psychological and social demands, and manifesting feelings of exhaustion, withdrawal, disengagement from the workplace and doubts about the significance of their profession and about their skills[6]. Burnout is a problem of rising magnitude in healthcare settings, beginning as early as the undergraduate years, and affecting approximately one-half of physicians in practice[7]. Knowledge about burnout is of paramount significance because of its severe consequences. The burnout of HPs is detrimental for their health, but also affects patients by lowering the quality of healthcare services, increasing the risk of malpractice and creating pressure on healthcare systems due to increased rates of absenteeism, augmented direct and indirect costs, and reduced clinical productivity[8,9].

Burnout among frontline and primary healthcare professionals (PHPs) is exacerbated by the complexity of their role in addressing a variety of problems, taking a holistic approach to the patient, and balancing clinical and administrative duties[10]. During the pandemic, Primary Healthcare (PHC) served as the cornerstone in minimizing the spread of SARS-CoV-2 in the community by responding to emergencies and continuing to provide care for chronic patients[11], providing medical surveillance and patient monitoring, and adapting their daily practice to the new healthcare settings (at-home care, telemedicine applications) and sometimes outside their field of expertise[12]. Although, the relationship between the burnout risk in PHPs with sociodemographic variables, job characteristics and demands, the level of exposure to COVID-19, the organization of health system and its resources, and the country income, has been extensively studied during the COVID-19 pandemic[13], the association of certain aspects of work-related concerns, sense of duty, willingness to work in various situations and peer pressure, has not been explored in detail.

In light of an impending health crisis, understanding the primary care-related characteristics linked with burnout and those attributes which may have a protective effect against burnout is critical for raising awareness among organizations to design and implement customized prevention strategies and measures. Therefore, the purpose of this study, as part of a larger project investigating the psychological impact of the pandemic on PHPs[14], is to assess the level of burnout among Greek PHPs (physicians, nurses and allied professionals), and to investigate the association between the presence of clinical burnout with work-related stressors, the perceptions

of their role and their sense of duty, in an effort to enhance future pandemic preparedness by identifying mental health aspects that may positively or negatively affect their output and overall well-being.

METHODS
Study setting
This multi-center, national study was conducted in the Greek public primary healthcare facilities (health centers and allied practices, and local health units), which are all part of the country's National Health System (NHS).

Study design
This cross-sectional study and data collection took place in Greece from the beginning of June to end of October 2021, a year after the emergence of COVID-19 pandemic. This observational study is reported based on STROBE guidelines for cross-sectional studies.

Study population
As a sampling frame, data were collected using a pre-existing panel of HPs[15]. The main goal of the panel is to improve care in PHC and general practice by allowing healthcare professionals to collaborate with each other and with academic institutions. An invitation to voluntarily participate in this study was sent to 484 eligible PHPs on the panel.

Research questionnaire
The questionnaire's content was reviewed and adjusted by a working group of five researchers and physicians. The online questionnaire was designed in four sections to collect data on: demographics (age, gender, occupation, education level, working experience, work location and characteristics, vulnerability to COVID-19, and vaccination status; 13 questions), participants' personal experience with COVID-19 (severity and confrontation of previous infection, relative or colleague with severe infection; 6 questions), emerging work-related perspectives and concerns during the pandemic through a 25-item set of questions, used in a previous study to evaluate risk perceptions of PHPs in Greece during the first wave of COVID-19[16], and the 22-item Maslach Burnout Inventory (MBI).

The Maslach Burnout Inventory (MBI), developed in 1981, is the gold-standard tool in the diagnosis of occupational burnout[17]. It is a 22-item inventory, referring to three burnout dimensions: emotional exhaustion (EA, 9 items), depersonalization (DE, 5 items) and personal accomplishment (PA, 8 items). The MBI - Human Services Survey for Medical Personnel (MBI-HSS-MP) has been tested, especially in HPs[18]. In this study, we used a translated into Greek, validated, and adapted to the HPs version of the MBI. The inventory is rated on a 7-point Likert scale, ranging from 0 (never) to 6 (every day), and higher scores in the EE and DE items, but lower scores in the PA, are indicative of more severe burnout. Cut-offs for moderate and severe EE range

from 21–30 and ≥31, respectively, while, in the PA section, scores ranging from 41–36 and ≤35 indicate moderate and severe feelings of incompetence and unaccomplishment, respectively; the cut-offs for moderate and severe DE are 6–10 and ≥11, respectively (Supplementary file Table 1). For the purposes of diagnosis, burnout is experienced when at least 2 of the 3 dimensions yield high scores[19].

Data collection
Participants received an email invitation to the study and two reminders, 1 and 3 months after the initial call. Informed and written consent was obtained before completing the questionnaire and was included in the online questionnaire. Participants did not receive any incentive to take part in the study and they were allowed to opt out at any point during the survey.

Data collection took place during a five-month period (June–October 2021), following the relaxing of the restrictive measures of the second national lockdown in Greece that started in November 2020 and ended in May 2021. Prior to the sampling period (February to May 2021), the government suspended healthcare workers' annual paid leave as an urgent measure to the understaffing in health facilities and then reinstated it from September until December 2021. Throughout the sampling period, all parts of the country were similarly affected by the pandemic and the restrictive measures which were part of the preventive strategies.

Ethical statement
The study was approved by the Bioethics Committee of the Medical School of the Aristotle University of Thessaloniki (reference number 9.398/22.06.2021).

Data analysis
Continuous variables were summarized with mean and standard deviation (SD), while categorical variables with frequencies and percentages. Associations between risk perception assessors and the sociodemographic characteristics were assessed using the chi-squared test and Student's t-test. In addition, we attempted to: 1) compare the sociodemographic characteristics of the participants and search for significant differences in clinical burnout levels; and 2) correlate risk perception assessors with burnout, by dividing the participants into two categories, those who reported clinically important burnout (at least 2 of the 3 subscales with high-risk scores) and those who did not.

To investigate potential risk factors for burnout, univariable linear regression analyses were performed with MBI dimensions (EE, DE, PA) as outcome variables. The univariable models were fitted using only one explanatory variable along with examining its relationship with the outcome of burnout. The contribution of each risk factor in explaining the outcomes was measured as β coefficients and their 95% Confidence Intervals (CI). The multivariable models were applied to assess the relationship between a dichotomous outcome and many explanatory variables. The variables that had a p<0.2 in the univariable analysis, as well as gender and age (possible confounders), were used for the multiple regression analysis models.

The independent variables in the 25-item set of questions (participants' personal experience with COVID-19, risk perception assessors) were rated on a four-point Likert scale ranging from agree to disagree, and for analysis purposes, dichotomous dependent variables were created: the 'agree' variable (sum of 'somewhat agree' and 'agree') and the 'disagree' variable (sum of 'somewhat disagree' and 'disagree'). As part of the analysis, the means of these questions were computed, along with their 95% confidence limits. Means that approached 1 indicated a consensus of strong agreement to the question, whereas means that approached 4 indicated consensus of strong disagreement. We also determined a Net Agreement Score computed by subtracting the percentage of positive responses ('agree' variable) from the percentage of negative responses ('disagree' variable). This generated the distributional measure of agreement to the questions with a score between -100 and +100. A score of 0 indicating an equal number of agreement and disagreement to a question (neutrality), a score of +100 indicating 100% agreement, and a score of -100 indicating 100% disagreement[20].

Collected data were processed using the R software (version 4.1.3). The significance level was set at 5% and all tests were 2-tailed.

RESULTS
Participants' demographic characteristics
A total of 236 PHPs with mean age of 46.1 years (SD=9.3), and mean number of years of professional experience of 14.8 years (SD=9.2), completed the online questionnaire (response rate=48.8%). This sample was composed of 104 physicians (44.1%), 83 nurses (35.2%) and 49 allied PHPs (20.8%), 162 female participants (71.4%), 200 individuals of academic education (84.7%), and professionals employed in urban (n=64; 27.1%), semi-rural (n=87; 36.9%) and rural (n=85; 36%) PHC settings. Importantly, 86 participants had a colleague admitted for COVID-19/ deceased from COVID-19 (36.9%), 129 a relative/friend admitted for/deceased from COVID-19 (56.4%), 209 were vaccinated (89.7%), and 36 contracted COVID-19 themselves (15.5%). The basic characteristics of participants in the study are summarized in Supplementary file Table 2.

Burnout by MBI dimension, clinical burnout, and related factors
Analysis per MBI dimension showed that 55 (23.3%) and 70 (29.7%) of the answers were indicative of high emotional exhaustion (EA) and depersonalization (DE) risk, respectively (Supplementary file Table 3). Notably, almost a half of the participants (110/236; 46.6%) experienced high burnout risk in the personal accomplishment (PA)

Table 1. Participant characteristics by existence of clinical burnout, Greece, 2021 (N=236)*

Characteristics	Overall (N=236) n (%)	Clinical burnout		p§ (χ² test)
		Yes (N=67) n (%)	No (N=169) n (%)	
Gender				0.9
Female	162 (69)	46 (69)	116 (69)	
Male	68 (29)	19 (28)	49 (29)	
NA	6 (2.5)	2 (3.0)	4 (2.4)	
Occupation				0.4
Physician	104 (44)	25 (37)	79 (47)	
Nursing staff	83 (35)	26 (39)	57 (34)	
Other	49 (21)	16 (24)	33 (20)	
Education level				0.9
Academic	75 (32)	19 (28)	56 (33)	
Elementary	36 (15)	12 (18)	24 (14)	
High academic	63 (27)	18 (27)	45 (27)	
Technical	62 (26)	18 (27)	44 (26)	
Location				**0.001**
Rural	85 (36)	16 (24)	69 (41)	
Semi-rural	87 (37)	22 (33)	65 (38)	
Urban	64 (27)	29 (43)	35 (21)	
Child at home	163 (69)	43 (64)	120 (71)	0.3
Vulnerable relative	80 (34)	22 (33)	58 (34)	0.8
Vulnerable colleague	37 (16)	14 (21)	23 (14)	0.2
Infected colleague	85 (36)	32 (48)	53 (31)	**0.018**
Infected relative	130 (55)	35 (52)	95 (56)	0.6
Infection	36 (15)	9 (13)	27 (16)	0.6
Age (years), mean (SD)	46.0 (9.0)	44.0 (9.0)	47.0 (9.0)	**0.028****
Professional experience (years), mean (SD)	15.0 (9.0)	13.0 (9.0)	15.0 (9.0)	0.057**

*A total of 236 primary healthcare professionals participated in this cross-sectional study. Data collection took place in Greece from the beginning of June to end of October 2021. **Student's t-test. § Statistically significant at p<0.05.

dimension.

In our study, 67 participants (28.4%) experienced clinical burnout. Predisposing factors were young age (p=0.028), working in urban settings (p=0.0013) and having a colleague severely infected from the COVID-19 (p=0.018) (Table 1).

The multivariable linear regression analyses (Tables 2–4) showed that gender, occupation, education level, the presence of a child or of a vulnerable relative at home, and the personal history of COVID-19 infection, did not affect the development of burnout. Nevertheless, significantly important differences were observed: 1) In the EA dimension, in PHPs working in rural and semi-rural compared to urban settings (mean score difference, MSD= -6.72 ; 95% CI: -11.04 – -2.4, adjusted p=0.002; and MSD= -4.54; 95% CI: -8.9 – -0.17, adjusted p=0.042, respectively) and in those having a colleague severely affected by COVID-19 (MSD=4.87; 95% CI: 1.31–8.43, adjusted p=0.008); 2) In the DE dimension, in younger PHPs (on average, there was a 0.11 unit decrease on DE score for every one-year increase in age, 95% CI: -0.21 – -0.01, adjusted p=0.028), in PHPs working in rural compared to urban settings (MSD= -2.34; 95% CI: -4.54 – -0.13, adjusted p=0.038) and in those having a colleague severely affected by COVID-19 (MSD=3.38; 95% CI: 1.59–5.16, adjusted p<0.001); and 3) In the PA dimension in PHPs having a relative severely affected by COVID-19 (MSD=3.74; 95% CI: 1.0–6.47, adjusted p=0.008).

Table 2. Linear regression analysis for emotional exhaustion (EE) dimension of Maslach Burnout Inventory (MBI), Greece, 2021 (N=236)

Variables	Category/Ref.	Univariable analysis			Multivariable analysis		
		Unadjusted β	95% CI	p	Adjusted β	95% CI	Adjusted p
Gender	Male/Female	-1.87	-5.71–1.98	0.34	-2.4	-6.13–1.33	0.21
Age (years)		-0.07	-0.25–0.12	0.49	-0.06	-0.24–0.13	0.56
Occupation	Nurse staff/Physician Other/Physician	-1.68 -2.32	-5.59–2.23 -6.92–2.29	0.40 0.32			
Education level	Elementary/Academic Technical/Academic High academic/Academic	-1.76 -1.99 0.4	-7.17–3.64 -6.56–2.58 -4.95–4.15	0.52 0.39 0.86			
Location of workplace	Rural/Urban Semi-rural/Urban	-7.76 -4.31	-12.06 – -3.47 -9.58 – -0.04	<0.001* 0.048*	-6.72 -4.54	-11.04 – -2.4 -8.9 – -0.17	**0.002*** **0.042***
Personal history of COVID-19 infection	Yes/No	3.93	-0.86–8.71	0.11	2.58	-2.21–7.37	0.29
Child at home	Yes/No	1.87	-1.87–5.6	0.33			
History of severe COVID-19 in a family member	Yes/No	1.97	-1.5–5.44	0.27			
Vulnerability of a family member	Yes/No	0.54	-3.11–4.2	0.77			
History of severe COVID-19 in a colleague	Yes/No	5.86	2.34–9.39	<0.001*	4.87	1.31–8.43	**0.008***
Vulnerability of a colleague	Yes/No	4.39	-0.33–9.12	0.07	3.64	-1.06–8.34	0.13

A total of 236 primary healthcare professionals participated in this cross-sectional study. Data collection took place in Greece from the beginning of June to end of October 2021. Adjusted R^2=0.05 for multivariable model. β: coefficient of the explanatory variable. *Statistically significant. Ref.: reference category.

Participants' work-related perspectives and concerns, and association with clinical burnout

Participants reported being reluctant to work during the pandemic, in case of pregnancy and if they were asked to take up a role for which they were not adequately prepared (Table 5). About two-thirds of the participants were willing to work in case a colleague contracted the infection and almost half of the respondents were willing to work even if they lived with a child or even if they had to work overtime. The majority of participants reported that work was putting their health (77.5%) and their family's health (75.8%) in danger. Though, just 18.2% of participants considered changing their work position to decrease infection risk, and only 40.7% would rather avoid visiting patients. Despite the dangers, caring for COVID-19 patients was considered a professional duty (87.3%), as was educating the community about the pandemic and the vaccine (90.7%), and only a small proportion of PHPs was concerned about having to inform their friends or relatives about the pandemic (39.0%) and the vaccine (38.6%).

As for the associations between risk perception assessors and the sociodemographic characteristics of the participants, it was shown that younger healthcare workers (aged 20–29 years) were increasingly worried about the reliance of friends and family on them for guidance and information regarding the pandemic and vaccinations (53.8%, p=0.026; and 53.8%, p=0.033; respectively). Males exhibited increased willingness to work overtime (60%, p=0.028). Female healthcare workers would abstain from discussions regarding transmission risks to avoid worrying family members (58.6%, p=0.019). Doctors were willing to work during the pandemic, even when living with a child at home (57.4%, p=0.006). Only a third (32.7%) of doctors would avoid contact with patients, when possible, as opposed to 41% of nurses and 55.1% of other healthcare workers (p=0.031). The majority of doctors (76.2%) disagreed that existing SARS-CoV-2 vaccines are more dangerous than other vaccines, as opposed to a lower proportion of nurses (59%) and of other healthcare workers (59.2%, p=0.023).

Healthcare workers with postgraduate qualifications

Table 3. Linear regression analysis for depersonalization (DE) dimension of Maslach Burnout Inventory (MBI), Greece, 2021 (N=236)

Variables	Category/Ref.	Univariable analysis			Multivariable analysis		
		Unadjusted β	95% CI	p	Adjusted β	95% CI	Adjusted p
Gender	Male/Female	-0.19	-2.17–1.80	0.85	-0.44	-2.37–1.49	0.65
Age (years)		-0.12	-0.21–0.02	0.02*	-0.11	-0.21 – -0.01	**0.028***
Occupation	Nurse staff/Physician Other/Physician	1.22 0.29	-0.80–3.24 -2.08–2.67	0.23 0.81			
Education level	Elementary/Academic Technical/Academic High academic/Academic	0.56 0.69 1.38	-2.22–3.35 -1.67–3.05 -0.97–3.73	0.69 0.57 0.25			
Location of workplace	Rural/Urban Semi-rural/Urban	-3.32 -1.86	-5.55 – -1.09 -4.08–0.36	0.004* 0.10	-2.34 -1.22	-4.54 – -0.13 -3.43–0.98	**0.038*** 0.28
Personal history of COVID-19 infection	Yes/No	-0.32	-2.8–2.17	0.80			
Child at home	Yes/No	-1.63	-3.55–0.29	0.10	-1.15	-3.07–0.77	0.24
History of severe COVID-19 in a family member	Yes/No	0.98	-0.82–2.77	0.28			
Vulnerability of a family member	Yes/No	-0.34	-2.23–1.55	0.72			
History of severe COVID-19 in a colleague	Yes/No	3.6	1.80–5.40	<0.001*	3.38	1.59–5.16	<0.001*
Vulnerability of a colleague	Yes/No	2.18	-0.26–4.62	0.08	2.23	-0.16–4.63	0.07

A total of 236 primary healthcare professionals participated in this cross-sectional study. Data collection took place in Greece from the beginning of June to end of October 2021. R^2=0.083 for multivariable model. β: coefficient of the explanatory variable. *Statistically significant.

Table 4. Linear regression analysis for personal achievement (PA) dimension of Maslach Burnout Inventory (MBI), Greece, 2021 (N=236)

Variables	Category/Ref.	Univariable analysis			Multivariable analysis		
		Unadjusted β	95% CI	p	Adjusted β	95% CI	Adjusted p
Gender	Male/Female	1.09	-1.89–4.07	0.47	0.5	-2.45–3.44	0.74
Age (years)		0.1	-0.04–0.25	0.16	0.05	-0.1–0.2	0.49
Occupation	Nurse staff/Physician Other/Physician	-2.52 -3.61	-5.53–0.49 -7.16 – -0.07	0.10 0.046*	-1.47 -2.81	-4.64–1.71 -6.39–0.77	0.36 0.12
Education level	Elementary/Academic Technical/Academic High academic/Academic	-2.62 -2.1 0.2	-6.8–1.55 -5.64–1.43 -3.32–3.72	0.22 0.24 0.91			
Location of workplace	Rural/Urban Semi-rural/Urban	0.96 -0.88	-2.45–4.34 -4.28–2.52	0.58 0.61			
Personal history of COVID-19 infection	Yes/No	1.74	-2.00–5.47	0.36			
Child at home	Yes/No	-0.34	-3.25–2.57	0.23			

Table 4. Continued

Variables	Category/Ref.	Univariable analysis			Multivariable analysis		
		Unadjusted β	95% CI	p	Adjusted β	95% CI	Adjusted p
History of severe COVID-19 in a family member	Yes/No	4.67	2.03–7.3	<0.001*	3.74	1.00–6.47	**0.008***
Vulnerability of a family member	Yes/No	0.46	-2.38–3.3	0.32			
History of severe COVID-19 in a colleague	Yes/No	3.57	0.81–6.33	0.012*	2.41	-0.41–5.22	0.09
Vulnerability of a colleague	Yes/No	-0.96	-4.65–2.74	0.61			

A total of 236 primary healthcare professionals participated in this cross-sectional study. Data collection took place in Greece from the beginning of June to end of October 2021. R^2=0.073 for multivariable model. β: coefficient of the explanatory variable. *Statistically significant.

were not willing to work if living with elderly people (56.2%, p=0.011) and in the case of pregnancy (41.3%, p=0.037). A quarter of those working in urban settings were considering changing workplace, as opposed to 17.2% in semi-urban and 12.2% in rural settings (p=0.045). A quarter of those living with high-risk individuals were considering changing their workplace (p=0.043), while 72.1% of workers whose co-worker died/was hospitalized for COVID-19, were willing to work in case of a co-worker contracting the disease (p=0.014). Regarding those having contracted COVID-19 themselves, over half (52.8%) reported anxiety over reliance of closed ones for vaccine information (p=0.049).

From the association of work-related perceptions with clinical burnout, the analysis yielded significant results. Clinical burnout was observed more frequently in participants that would rather be appointed to another position (44.2% vs 22.3%, p=0.01) or would avoid visiting patients (37.5% vs 22.1%, p=0.015) to avoid the risk of infection, in those who stated that work could endanger their health (32.2% vs 15.1%, p=0.023), in those concerned about an imminent staff shortage (34.8% vs 16%, p=0.004) or about an imminent shortage of protective equipment at work (37.6% vs 14.7%, p<0.001), and in those worried that acquaintances and friends may seek information on the COVID-19 vaccine from them (39.6% vs 21.4%, p=0.004). Interestingly, participants who stated that the vaccines being

Table 5. Participants' work-related perceptions and correlations with clinical burnout, Greece, 2021 (N=236)

Perceptions	Participants n (%)	Consensus score Mean (SD)*	Net agreement score %	Clinical burnout		
				Yes	%	p§
Willingness to work in various situations						
If I had a colleague admitted for COVID-19/ deceased from COVID-19	151 (64.0)	2.27 (0.90)	28.0	38	25.2	0.189
If I had to work overtime	114 (48.3)	2.55 (0.99)	-3.4	30	26.3	0.590
If I lived with a child	110 (46.6)	2.63 (0.93)	-6.8	30	27.3	0.833
If there was a high risk of transmission to my relatives	92 (39.0)	2.75 (0.92)	-22.0	22	23.9	0.284
If I lived with an elder	88 (37.3)	2.80 (0.94)	-25.4	21	23.9	0.298
In case of pregnancy (mine or spouse's)	69 (29.2)	3.04 (0.97)	-41.5	16	23.2	0.327
If I had to take up a role, I was not trained for	66 (28.3)	3.03 (0.93)	-43.4	18	27.3	0.939

Continued

Table 5. Continued

Perceptions	Participants n (%)	Consensus score Mean (SD)*	Net agreement score %	Clinical burnout		
				Yes	%	p§
Work-related concerns						
Work could put my health at risk	183 (77.5)	1.87 (1.00)	55.1	59	32.2	0.023
Work could put my family's health at risk	179 (75.8)	1.93 (0.97)	51.7	57	31.8	0.055
I am concerned about an imminent shortage of staff at work	155 (65.7)	2.21 (1.04)	31.4	54	34.8	**0.004**
I am concerned about an imminent shortage of protective equipment at work	141 (59.7)	2.30 (0.99)	19.5	53	37.6	**<0.001**
Sense of duty						
I am professionally and socially committed to informing the community about the epidemic	214 (90.7)	1.38 (0.75)	81.4	61	28.5	0.999
I am professionally and socially committed to informing the community about the vaccination	212 (89.8)	1.40 (0.75)	79.7	61	28.7	0.881
Getting vaccinated is a good way to protect the community against COVID-19	212 (89.8)	1.44 (0.97)	79.7	58	27.4	0.421
Getting vaccinated is a good way to protect myself against COVID-19	212 (89.8)	1.41 (0.78)	79.7	59	27.8	0.743
It is my responsibility to care for patients infected with SARS-CoV-2	206 (87.3)	1.49 (0.83)	74.6	57	27.7	0.670
I would rather avoid visiting patients	96 (40.7)	2.86 (1.13)	-18.6	36	37.5	**0.015**
I would rather be appointed to another position to avoid the risk of infection	43 (18.2)	3.39 (0.90)	-63.6	19	44.2	**0.019**
Peer pressure						
Non-medical staff are concerned of getting infected	166 (70.3)	2.02 (0.98)	40.7	51	30.7	0.286
Medical staff are concerned of getting infected	155 (65.7)	2.17 (0.94)	31.4	46	29.7	0.649
To avoid worrying my family, I will avoid discussing the risk of infection at work	126 (53.4)	2.47 (1.11)	6.8	41	32.5	0.171
I am worried that acquaintances and friends may seek information on COVID-19 from me	92 (39.0)	2.85 (1.03)	-22.0	33	35.9	0.059
I am worried that acquaintances and friends may seek information on the COVID-19 vaccine from me	91 (38.6)	2.89 (1.05)	-22.9	36	39.6	**0.004**
People avoid me for fear of getting infected, due to my job	85 (36.0)	2.91 (0.96)	28.0	27	31.8	0.476
The vaccines being developed for the new coronavirus pose greater risks than vaccines currently in use for other infections	79 (33.5)	2.97 (1.02)	-33.1	32	40.5	**0.005**

*Mean value and standard deviation of the four-point Likert scale with values ranging from 1–4. Means that approach 1 indicate a consensus of strong agreement to the question, whereas means that approach 4 indicate consensus of strong disagreement. A total of 236 primary healthcare professionals participated in this cross-sectional study. Data collection took place in Greece from the beginning of June to end of October 2021. § Based on χ^2 test; statistically significant at $p<0.05$.

developed for the new coronavirus pose greater risks than vaccines currently in use for other infections, experienced clinical burnout more often (40.5% vs 22.3%, p=0.005). More details are presented in Table 5.

DISCUSSION

This study, to our knowledge, represents the first study to comprehensively evaluate the psychological burden of Hellenic PHPs in relation to burnout during the ongoing COVID-19 pandemic. According to our findings, one in four PHPs had significant symptoms of burnout. Younger participants, those working in urban healthcare settings, and having a co-worker affected by COVID-19, were more likely to experience emotional exhaustion symptoms and clinical burnout, while participants having a relative severely affected by COVID-19 were more likely to present low personal accomplishment feelings. Participants with clinical burnout more frequently developed avoiding behaviors to minimize the exposure to COVID-19. Their worries about an impending risk of understaffing and a lack of personal protective equipment were also highlighted. Interestingly, demographics like gender, occupation, education level, the presence of a child or a vulnerable relative at home, and the personal history of COVID-19 infection, were not correlated with the development of burnout.

Our findings suggest that burnout is more common in younger PHPs and strongly associated with depersonalization (DE). This finding is consistent with the 2022 Commonwealth Fund International Health Policy Survey of Primary Care Physicians among 10 high-income countries, showing that younger physicians (aged <55 years) were more likely to experience stress, emotional distress, or burnout and with other studies in which emotional and psychological distress was higher among junior medical staff, even in countries with low COVID-19 infection rates[13,21,22]. Years of professional experience seem to play a vital role in building PHPs' sense of confidence regarding accurate clinical decision making, while exhaustion, uncertainty on how to inform about COVID-19, and engagement in less rewarding duties, have been linked to depersonalization among younger doctors[23].

The impact of work-related stress on the mental health of women healthcare professionals during the COVID-19 pandemic, has been extensively documented in previous studies[5,6,23]. Working in a setting that posed high health risk, while also fulfilling familial caregiving duties and adhering to conventional gender norms, are significant stressors[24]. It has been observed that women are more prone to emotional exhaustion, while men are at a greater risk of DP[25]. Even though our study did not find any significant association between gender and an increased likelihood of burnout, female PHPs would abstain from conversations pertaining to transmission risks, in order to prevent causing distress to their family members and protect them, while male participants demonstrated a greater propensity for

working overtime. These differences may be explained by the COVID-19 crisis which had the potential to elicit responses from individuals that align with traditional gender stereotypes emphasizing the tendency of women to be more protective and nurturing, and men to be more assertive by engaging in more potentially risky tasks[26].

During the pandemic, HPs faced the dilemma of providing for their family, while also putting their family at risk for disease spread secondary to consistent contact with ill individuals[27]. Of note, about three out of four participants in our study recognized that work is putting their health and their family's health in danger. However, despite the risk, nearly 90% of the participants acknowledged their duty to provide care for individuals affected with SARS-CoV-2 and to disseminate information and knowledge regarding the pandemic and the vaccination to the community. It is noteworthy that individuals who reported withdrawal behaviors and felt more disengaged at work (e.g. avoided patient visits, favored being assigned to a different role, expressed concern that family and friends may seek information from them about the COVID-19 vaccine) experienced the effects of burnout more frequently. This finding is consistent with the avoidance coping mechanism in burnout, which sometimes is also mentioned as the depersonalizing attitude and is a strategy of detachment from stressors[28]. On the other side, another coping strategy in burnout, described as a maladaptive coping behavior to stress exposure, is the over-commitment at work. This mechanism consists of putting increased effort in dealing with the new condition, like a crisis, progressively leading the individual to energy depletion and emotional exhaustion[29]. Thus, in our study, we should critically consider findings like the willingness of participants to work overtime (48.3%), to work despite a pregnancy (29.2%), even if there is a high risk of transmission for their relatives (39%) and for themselves (77.5%), since these could be some first signs of burnout.

Regarding the MBI scores, our findings conform to a study conducted in Italian General Practitioners (GPs) during the first pandemic wave, which showed that 46.1%, 17.6%, and 42.2% of the participants were in high burnout risk in EE, DP, and PA dimension, respectively[30]. Another study reported that GPs were experiencing significantly higher degrees of DP and reduced PA compared to nurses[31]. Although a recent, large-scale Korean study supports this evidence[24], in our study occupation was not significantly linked to burnout or any dimension of the MBI. From a previous study conducted in public hospital healthcare professionals in Greece during the first wave of the pandemic, results showed a higher percentage of severe/moderate burnout risk in EE (65%), 92% scored high in DE and 26% scored low, and 24% scored moderately in the DP dimension[32]. The higher levels of emotional exhaustion in that study might be a sign of the psychological burden experienced by COVID-19-unit staff during the early stages of the pandemic. However, in our study, results in the PA dimension were worse (46% scored

low and 32% moderate), which may indicate a low morale of PHPs during the pandemic's progression and may reflect participant frustration over the pandemic's disruption of the chronic disease healthcare services[11], which are an important part of the services offered by PHPs.

There is evidence from high-income countries that the prevalence of burnout in healthcare professionals differs according to speciality and that the risk may be higher in PHC[33]. Our findings are relevant with the existing literature; PHC physicians experienced considerable risk of burnout as a result of increased workloads since the emergence of the COVID-19 pandemic[13,22]. A possible explanation may be the imbalance in the relationship between work effort and the reward for job performance, which has been linked to negative health outcomes, including mental health manifestations like depression[3,7]. This is not unexpected, as PHC in Greece was understaffed even before the COVID-19 pandemic and PHC practitioners struggled to address their augmented duties and new tasks to high workloads[33-36]. In fact, about 65% of the participants expressed the concern about an imminent shortage of staff and this concern was also linked to clinical burnout.

This study has revealed a noteworthy finding regarding the association between the PHC setting in urban areas and an elevated likelihood of experiencing burnout among PHPs. This correlation may be attributed to the higher levels of stress and pressure that PHPs encounter in urban environments due to the comparatively impersonal nature of patient–provider interactions in urban centers, as opposed to rural communities. Further research is needed to prove a concrete relationship between the burnout levels and the urbanization level, and other variables such as marital status, or the presence of a severely affected colleague/relative, as current data seem heterogeneous[21,22].

Limitations
This is a cross-sectional study, which limits the ability to establish causal relationships. The nature of web-based research and the timing of dissemination of questionnaires (Summer 2021) could potentially affect participant turnover. Furthermore, it is common for online surveys to exclude digitally illiterate individuals. Factors such as existing mental health problems may impact participants' susceptibility to burnout. The inclusion of different occupational groups from various healthcare facilities – although more representative – results in sample heterogeneity, thereby constraining the generalizability of the findings. The considerable number, diversity and responsiveness of participants allow gaining a strong understanding of the psychological strain of Hellenic Primary Care. Nevertheless, we are aware of methodological limitations of note. Yet a sound methodological reminder system yielded acceptable participation rates. Authors are aware of the ever-changing nature of the pandemic and its effect on views and psychological state of healthcare professionals; hence the nature of our results reflects a time frame of one year after the pandemic started.

CONCLUSIONS
This study demonstrated the severe psychological impact of COVID-19 in PHC workers, a year after the beginning of the pandemic. Over half of the participants reported at least moderate psychological disturbances. Considering high pre-pandemic burnout levels, building resilience through the implementation of meaningful interventions to promote mental health well-being of healthcare workers is critical, especially in PCH settings, to ameliorate or even prevent the emergence of burnout symptoms. In all, our findings may be useful in the effort to pinpoint staff support needs and proceed to purposeful, personalized interventions like continuing education and regular rest breaks, and to incorporate them into PHC. Especially during pandemics and similar medical crises, such immediate actions seem necessary in the light of mitigating vulnerability, enhancing preparedness for future threats, and upgrading the quality of the healthcare services in the interest of all members of the community.

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ETHICAL APPROVAL AND INFORMED CONSENT
Ethical approval was obtained from the Bioethics Committee, Medical School of the Aristotle University of Thessaloniki (Approval number: 9.398/22.06.2021; Date: 22 June 2021). Participants provided informed consent.

DATA AVAILABILITY
The data that support the findings of this study are available from the corresponding author upon request.

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Not commissioned; externally peer reviewed.