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COVID-19 and health care professionals
A study in Greece and Cyprus

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2025, 42(6):788–798

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COVID-19 και επαγγελματίες υγείας. Μελέτη σε Ελλάδα και Κύπρο

Περίληψη στο τέλος του άρθρου

OBJECTIVE **To assess the impact of the first year of the pandemic on healthcare professionals, focusing on job stress, fatigue, burnout, and quality of life, and to compare groups as well as to explore risk factors.** METHOD **During the transition of the COVID-19 second to third wave, a cross-sectional online survey was conducted simultaneously in Greece and Cyprus. A total of 467 health care professionals, from the public and private sector, participated in the study. A number of measurement tools were used to collect data, including the Job Stress Measure, Chalder Fatigue Scale, Copenhagen Burnout Inventory, and EQ-5D-5L. Statistical analyses included descriptive statistics, Cronbach's alpha, group comparisons, correlations, *post-hoc,* and regression analyses.** RESULTS **Findings revealed gender as a predictor, with females being more susceptible to job stress and fatigue, reporting increased anxiety/depression and lower quality of life. Full-time employment predicted higher fatigue, while longer service at one workplace correlated with diminishing quality of life. Altered work conditions predicted more intense fatigue, while increased income reduced burnout. Knowing colleagues at the workplace who had COVID-19 predicted increased job stress and burnout. Greece and Cyprus exhibited no significant differences in comparative analyses. Nearly 80% of nurses reported burnout, with almost 19% at high levels. Physiotherapists (53%) and doctors (47.5%) were also significantly affected. Among professions, nurses reported the highest mean burnout (61.07, standard deviation [SD]: 17.53). Low income corresponded to increased anxiety and burnout. Overall, nurses, females, and those aged 30–44 were most affected.** CONCLUSIONS **The cumulative impact of pandemic waves is likely to further impact healthcare professionals' well-being. These alarming findings should serve as a wake-up call for policymakers to avert potential consequences, preventing an exodus of healthcare professionals from the health system.**

Key words

Burnout
COVID-19 pandemic
Greece and Cyprus
Healthcare professionals

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Before the COVID-19 pandemic, burnout (BO) ranged from 50% to 65% for doctors,[1,2] 28–45% for nurses,[3] and more than 45% for physiotherapists.[4] In Greece, it was reported above 35% for doctors,[5] 78% for nurses[3] and was common for physiotherapists.[6] In Cyprus, it was 21% for physiotherapists,[7] 12.8% for nurses[8] and for doctors there was no study to our knowledge. The COVID-19 pandemic has increased the workload for health care professionals (HCPs)[9] and more mental health problems have been reported[10] since the early waves of the pandemic.[11]

HCPs, due to the nature of their work, show emotional contact with patients,[12] work long hours[13] and risk developing anxiety, depression, stress,[14,15] and BO,[1] which could lead to reduced quality of care, increased health care cost and lack of human resources.[16] Risk factors for developing BO is being a nurse, younger age and being female.[17] Women report higher levels of BO due to a higher level of emotional exhaustion, depersonalization, less tolerance for negative emotions, that can lead to secondary maladaptive detachment.[18,19] Data from 44 countries reported that female HCPs have significantly higher levels of job stress[19] and being a nurse for more than five years correlates with developing BO, stress, and reduced quality of life (QoL).[11] Those with 10 or more years of experience and higher working positions report more stress.[20] Though not many studies in the literature have focused on physiotherapists, they also report increased stress levels and BO.[21–23]

In Greece and Cyprus despite early governmental mea-

sures being taken to keep the COVID-19 pandemic consequences low,[24] due to limited resources,[25] stress, anxiety, depression and signs of BO[26] were being reported from the onset of the pandemic. In Greece, nurses, younger HCPs, females and those working frontline with COVID-19 reported higher levels of fatigue and BO.[27] In Cyprus, working for longer hours was one of the factors impacting on BO.[28] Data from the 1st COVID-19 wave in Greece showed depression among HCPs reaching around 30%,[26] anxiety 25%[29] and stress 30–33%.[26,29] Nurses working in public and private hospitals reported a moderate level of BO.[30] Emotional exhaustion was reported by 44%.[26] At the time, HCPs expressed low satisfaction for safety[30] with those reporting high concern also reporting high burnout.[30] During the 1st wave, females, front-line health professionals and nurses reported worse mental health.[29] During the 2nd wave, nearly half of the health care workers reported moderate depersonalization and 56% high emotional exhaustion.[31] During the 3rd wave, which took place between February and June 2021, up to 72% of Greek HCPs reported mainly high scores of BO and a 20% reported moderate scores.[32] At the same wave period, 70% of Greek frontline doctors had moderate level of BO.[33] The 4th wave in Greece started in June 2021, with a high peak in November–December, and 60% of nurses reported anxiety and fatigue.[27] By this time, Greek nurses reported higher scores of mental health consequences than other countries possibly due to the country going through its worst pandemic wave.[27] There is not much research done for the Cypriot HCPs.

Most of the available research focused on single groups (e.g., studies on doctors or nurses only) or pulled together all HCPs without subgroup analysis. In addition, there are not many studies to have included physiotherapists, who have been a front-line HCP during the pandemic. This study aimed to investigate what factors may relate with the presence of BO, job stress, fatigue and QoL, including demographic and work-related characteristics.

MATERIAL AND METHOD

In two time points (December 2020 and February–March 2021), during the end of the 2nd and the start of the 3rd COVID-19 pandemic waves, following a snowball method, an online cross-sectional survey was circulated in social media, via emails and newsletters. The study was approved by the National Bioethics Committee of Cyprus (ΕΕΒΚ ΕΠ 10.1.2020).

Participants

Participants had to be HCP of the private or public sector in Greece or Cyprus. The front page of the survey explained all study details, including anonymity and European Data Protection Law. Consent was given by online submission of the questionnaire.

Measures

The survey contained general demographic, work-related questions and validated measures. To collect data the Job Stress Measure (JSM), the Chalder Fatigue Scale (CFS), the Copenhagen Burnout Inventory (CBI) and the EQ-5D-5L were used. JSM reflects the level of work-related stress scores from 1 (no stress) to 5 (significant stress) and having a total range of 16–80. Cronbach's alpha in this study was α=0.92. CFS: Fatigue was measured using the Greek version CFS, which uses 11 items to assess physical and mental fatigue, has a good validity[34] and has been used in multiple studies and populations.[35–38] The scoring method of 0–3 per item was used. CFS has been translated in Greek by members of this study (results to be published separately). In the current study CFS showed a very good internal consistency of Cronbach's a=0.903. CBI: The CBI, which has been used in various populations including health workers,[39] uses 19 questions to assess personal, client and work-related BO.[40] Its items are distributed across three scales: Personal burnout (CBI-PBO), work-related burnout (CBI-WRBO), and patient-related burnout (CBI-CRBO). Depending on the item, they are scored from 100 (always) to 0 (never) and from 100 (very high degree) to 0 (very low degree). The last item of CBI-WRBO is scored in reverse.[40] In the current study Cronbach's α was 0.939, which shows very high reliability for the scale, with the CBI-PBO of α=0.909, the CBI-WRBO of α=0.898 and CBI-CRBO of α=0.886. EQ-5D-5L: To assess QoL, the EQ-5D-5L was used.[41] This is a multidimensional general health status assessment tool, which uses five Likert scaled questions to assess mobility, self-care, usual activities, pain/discomfort, and anxiety/depression creating a health state profile of 3,125 possible combinations.[42] As there was no set value for Greece or Cyprus at that time, the United Kingdom (UK) values were used. The minimum possible value (worst possible health state: 55555) is equal to -0.285 and the maximum (best possible health state, 11111) is equal to 1. EQ-5D-5L also includes a 0–100 scale representing the worst and best imaginable health, respectively.[42]

Statistical analysis

Data was analyzed with the Statistical Package for Social Sciences (SPSS), version 25.0. Normality was tested with Shapiro-Wilk or Kolmogorov-Smirnov, categorical data compared using Chi-square test and independent t-test (two samples) or F-test (ANOVA) (more than two samples) to compare means. If normality was not met, then the non-parametric Mann-Whitney or Kruskal-Wallis (H) was used. Correlations were checked with Pearson's r or Spearman's rho coefficient. Cronbach's alpha was used to examine internal consistency. Significance level was set at 0.05. To correct for type I error *post-hoc* analysis was done. Regression analysis was conducted to examine which factors had a significant impact on the variables of interest.

RESULTS

Sample characteristics

The sample consisted of 467 HCPs, mainly females (67%). There were less nurses and "other" HCPs who responded to this study (p<0.001). The "other" group consisted of members of management, radiologists, lab workers, first aiders, social workers, midwives and psychologists. For analysis purposes physiotherapy assistants were included in the physiotherapist's group and nursing assistants in the nurse's group. Significantly more HCPs aged 30–59 years (73.9%) in comparison with those under 30 or above 60 years responded (p<0.001). More participants were working in Greece (79.9%) with Greek respondents being mainly doctors (39.9%), whereas Cypriots being mainly physiotherapists (69.2%). Doctors reported significantly higher salaries (p<0.001) (tab. 1). Participants worked as HCPs for a mean of 16 (standard deviation [SD]: 10.8) years, with the 13.09 (SD: 11.9) being at the current position, most working full time (x^2=375.93, df=1, p<0.001) and holding a permanent job (x^2=237.82, df=2, p<0.001).

Significantly more nurses reported working in a setting that accepted patients with COVID-19 (92.8%). Three in four nurses worked with patients with COVID-19, whereas only one in three physiotherapists had done the same (31.7%). Almost all participants reported changed working conditions during the pandemic (p<0.001), including trying hard not to be infected, having increased job obligations, not having enough breaks and jobs requiring more physical activity. More than one in four had been in quarantine due to contact with a COVID-19 case (tab. 2).

Country differences

No significant differences were found between the country where the participants worked (Greece or Cyprus) and job stress, fatigue, BO or QoL.

Gender differences

Women reported higher job stress, physical, mental and total fatigue than men (p<0.001). Women passed the total mean BO cut-off point, which was ≥50 (mean 55.47, SD: 18.07) and scored significantly higher (p<0.001) on total, personal, and work-related BO. Overall, 48.6% of women reported ≥50 in total BO in contrast with only 15.2% of men. Men reported significantly better QoL (p<0.001) (tab. 3). Both genders reported no problems with mobility and self-care and there was no difference between them (x^2=6.689, df=3, p=0.08 and x^2=5.447, df=2, p=0.06, respectively). More women reported pain/discomfort (x^2=11.791, df=4, p=0.019, 7.7% vs 2.6%), problems with anxiety/depression (x^2=17.717, df=4, p=0.001) and problems with usual activities (x^2=11.167, df=4, p=0.025, 47.3% vs 61.7%). Moderate/severe anxiety/depression was reported by 33.5% of women and 29.9% of men.

Table 1. Sample demographics.

	% (n)	p-value		% (n)	% (n)	% (n)	% (n)	p-value
Gender			*Monthly salary*	*Doctor*	*Nurse*	*Physiotherapist*	*Other*	
Male	33.0 (154)	p<0.001*	Up to € 500	2.8 (4)	0.0 (0)	5.7 (9)	8.6 (3)	
Female	67.0 (313)		€ 501–800	0.0 (0)	10.3 (11)	16.6 (26)	8.6 (3)	
Health profession			€ 801–1,200	14.1 (20)	65.4 (70)	35.0 (55)	45.7 (16)	
Doctor	33.8 (158)		€ 1,201–1,600	22.5 (32)	15.9 (17)	16.6 (26)	8.6 (3)	p<0.001*
Nurse	20.6 (96)		€ 1,601–2,000	26.8 (38)	3.7 (4)	10.2 (16)	11.4 (4)	
Nursing assistant	3.2 (15)	p<0.004*	€ 2,001–2,750	19.0 (27)	3.7 (4)	5.7 (9)	8.6 (3)	
Physiotherapist	34.0 (159)		More than € 2,750	14.8 (21)	0.9 (1)	10.2 (16)	8.6 (3)	
Physiotherapist assistant	0.9 (4)		*Country of employment*					
Other	7.5 (35)		Greece	79.9% (373)				p<0.001*
Age (years)			Cyprus	19.5% (91)				
<30	21.6 (102)							
30–44	41.1 (195)	p<0.0001*						
45–59	32.8 (149)							
60–74	4.5 (21)							

* Significant at 0.01 level

Table 2. COVID-19 related working conditions.

	Doctor % (n)	Nurses % (n)	Physiotherapist % (n)	Other % (n)	p-value
Patients with COVID-19 at workplace (n=465)	79.0 (124)	92.8 (103)	54.9 (89)	80.0 (28)	p<0.001*
Have worked with patients with COVID-19 (n=464)	63.7 (100)	74.8 (83)	31.7 (51)	48.6 (17)	p<0.001*
Working conditions changed (n=467)	93.0 (147)	98.2 (109)	93.3 (152)	100.0 (35)	
Working more hours (n=173)	37.6 (65)	20.2 (35)	34.1 (59)	8.1 (14)	
Working fewer hours (n=50)	34.0 (17)	2.0 (1)	54.0 (27)	10.0 (5)	
Not having enough breaks (n=152)	25.7 (39)	34.9 (153)	31.6 (48)	7.9 (12)	
Have increased breaks (n=16)	37.5 (6)	0.0 (0)	56.3 (9)	6.3 (1)	p<0.001*
Job requires more physical activity (n=135)	25.2 (34)	34.8 (47)	29.6 (40)	10.4 (14)	
Job has increased obligations (n=288)	28.5 (82)	31.9 (92)	30.6 (88)	9.0 (26)	
Try very hard not to get infected (n=372)	33.3 (124)	23.4 (87)	36.0 (134)	7.3 (27)	
Have been in quarantine due to contact (n=467)	29.5 (38)	24.8 (32)	40.3 (52)	5.4 (7)	p=0.30
Have been in quarantine once	28.2 (31)	27.3 (30)	40.9 (45)	3.6 (4)	
Have been in quarantine twice	29.2 (7)	25.0 (6)	29.2 (7)	16.7 (4)	

* Significant at 0.01 level

Table 3. Gender differences.

	Male (n=154) Mean (SD)	Female (n=313) Mean (SD)	p-value
Job stress	45.08 (13.5)	51.16 (13.5)	p<0.001*
Fatigue			
Total	14.82 (5.5)	18.48 (6.7)	p<0.001*
Physical	10.22 (3.9)	12.66 (4.6)	p<0.001*
Mental	4.60 (2.3)	5.82 (2.8)	p<0.001*
*Burnout*** (cut-off point: ≥50)			
Total	46.22 (19.7)	55.47 (18.0)	p<0.001*
Personal	52.76 (20.8)	65.14 (18.8)	p<0.001*
Work-related	49.41 (24.4)	61.09 (20.7)	p<0.001*
Client-related	36.48 (21.8)	40.18 (24.6)	p=0.10
Quality of life	0.81 (0.1)	0.75 (0.1)	p<0.001*

* Significant at 0.01 level

** Levels of burnout (BO): No/low: 0–49; moderate BO: 50–74; high BO: 75–99; severe BO: 100

SD: Standard deviation

Age differences

Increasing age significantly related to lower personal (p=0.04) and work-related BO (p=0.009). The highest mean job stress (49.83, SD: 13.16), total (p=0.008) and physical fatigue (p=0.001) was reported by people aged 30–44 years (tab. 4). Overall, people of different ages did not report significantly different QoL; however, those aged 45–59 reported the most problems with mobility (x^2=26.491, df=9, p=0.002) and those under 30 more problems with usual activities (x^2=35.461, df=16, p<0.001). Most people reported slight pain/discomfort.

Salary differences

There were significant differences in the BO reported by people with different salary income (p<0.008). In particular, people earning € 501–800 had more personal BO (p=0.001) and work-related BO (p<0.001). They also marginally reported more physical fatigue (p=0.05) (tab. 5). Most people (56%) receiving less than € 500 reported moderate anxiety/depression followed by those on € 501–800 salary (32.5%).

Health care profession differences

Nurses showed significantly higher job stress (p=0.003), total fatigue (p=0.002), physical fatigue (p<0.001), and all levels of BO (p<0.001) (tab. 6). A total of 79.1% of nurses passed the BO cut-off score of 50. For doctors this was 47.5%, for physiotherapists 53.4%, and for "other" HCPs 57.9%. Mainly moderate BO was reported. Also, 11.8% of the total sample reported high BO, with nurses being more affected (19.1%). The categories most affected were personal and work-related BO with 45% of nurses reporting high personal. There was no significant difference in the EQ-score of QoL between the different HCPs (t(462)=-1.276, p=0.203). Only 20.7% of nurses reported not having any problem, while 41.1% of doctors reported slight and 27.6% of physiotherapists reported moderate pain/discomfort.

Table 4. Age group differences.

		<30 (n=101) Mean (SD)	30–44 (n=192) Mean (SD)	45–59 (n=153) Mean (SD)	60–74 (n=21) Mean (SD)	p-value
Job stress		49.53 (12.9)	49.83 (13.1)	48.85 (14.0)	43.29 (20.6)	p=0.29
Fatigue	Total	17.73 (6.7)	18.05 (6.4)	16.12 (6.4)	16.38 (7.4)	p=0.008*
	Physical	12.19 (4.5)	12.55 (4.4)	10.84 (4.3)	11.33 (5.3)	p=0.001*
	Mental	5.54 (2.7)	5.50 (2.8)	5.27 (2.7)	5.05 (2.5)	p=0.67
Burnout	Personal	64.07 (18.8)	62.78 (19.6)	58.09 (20.7)	52.38 (27.4)	p=0.04**
	Work-related	60.29 (22.3)	58.63 (21.4)	55.02 (19.7)	43.20 (27.2)	p=0.009*
	Client-related	35.07 (23.7)	39.02 (24.2)	42.05 (22.6)	35.12 (27.7)	p=0.18
	Total	53.52 (18.6)	53.75 (18.9)	51.89 (17.8)	43.55 (24.9)	p=0.11
Quality of life		0.75 (0.1)	0.78 (0.1)	0.76 (0.1)	0.80 (2.2)	p=0.580

*Significant at 0.01 level, **Significant at 0.05 level

SD: Standard deviation

Table 5. Salary differences.

	Up to € 500 (n=16) Mean (SD)	€ 501–800 (n=40) Mean (SD)	€ 801–1,200 (n=161) Mean (SD)	€ 1,201–1,600 (n=78) Mean (SD)	€ 1,601–2,000 (n=62) Mean (SD)	€ 2,001–2,750 (n=43) Mean (SD)	€ >2,750 (n=41) Mean (SD)	p-value
Job stress	47.75 (14.9)	49.25 (15.3)	51.01 (13.0)	48.76 (11.8)	47.89 (15.1)	47.60 (15.7)	48.98 (13.7)	p=0.660
Fatigue								
Total	16.19 (8.0)	18.33 (7.0)	18.63 (6.6)	16.51 (6.4)	16.18 (5.3)	16.74 (7.0)	16.73 (6.7)	p=0.083
Physical	10.94 (5.8)	12.63 (4.7)	13.09 (4.6)	11.12 (4.2)	11.10 (3.7)	11.16 (4.8)	11.34 (4.4)	p=0.05**,***
Mental	5.25 (2.5)	5.70 (2.9)	5.5 (2.9)	5.40 (2.8)	5.08 (2.2)	5.58 (2.9)	5.39 (2.7)	p=0.937
Burnout								
Personal	62.76 (20.2)	66.56 (19.1)	65.99 (18.3)	61.12 (20.2)	55.04 (21.3)	57.00 (21.6)	55.49 (21.7)	p=0.001*,***
Work-related	48.81 (25.3)	64.11 (20.9)	63.56 (21.1)	53.52 (22.6)	52.85 (22.8)	53.36 (23.4)	52.79 (23.8)	p<0.001*,***,†
Client-related	36.77 (20.6)	37.60 (22.7)	41.46 (24.8)	39.48 (24.5)	37.10 (23.9)	32.85 (23.6)	40.54 (2.9)	p=0.501
Total	49.45 (19.8)	56.09 (17.7)	57.01 (18.3)	51.37 (18.7)	48.33 (20.0)	47.73 (19.7)	49.60 (20.0)	p<0.008*
Quality of life	0.69 (0.1)	0.66 (0.2)	0.67 (0.2)	0.68 (0.1)	0.72 (0.1)	0.74 (0.1)	0.74 (0.2)	p<0.20

*Significant at 0.01 level, **Significant at 0.05 level, ***Between € 501–800 and € 1,201–1,600

†Between € 801–1,200 and € 1,601–2,000

SD: Standard deviation

Working with patients with COVID-19 and quarantine periods

When there had been patients with COVID-19 at the workplace and when working with such patients, HCPs showed higher job stress (p=0.001), total fatigue (p=0.036), physical fatigue (p=0.021), work-related BO (p=0.001), and total BO (p=0.003) (tab. 7). Those HCPs who had been in quarantine due to contact with a suspected COVID-19 case, showed significantly greater total fatigue (p=0.032), physical fatigue (p=0.013), work-related BO (p=0.018), and marginally non-statistically significantly total BO (p=0.054) (tab. 8).

Regression analysis

The regression analysis model for job stress, including all the variables, showed that 16% of the dependent variable was explained by this model (R^2=0.16) and was significantly valued for job stress (F(18, 246)=2.61, p=0.001). When taking out from the model the question "If you work in a hospital, is it a reference one?", the sample size increased a lot. In this model job stress was expected to increase by 0.252 for females, decreased by 0.865 for those HCPs who reported work condition changes, and decrease by 0.256 for those who knew colleagues who had tested positive for COVID-19.

Table 6. Health care profession differences.

		Doctor (n=158) Mean (SD)	Nurses (n=111) Mean (SD)	Physiotherapist (n=163) Mean (SD)	Other (n=35) Mean (SD)	p-value
Job stress		48.68 (14.3)	53.05 (13.3)	46.79 (13.2)	49.94 (13.5)	p=0.003*,**
Fatigue	Total	16.59 (6.6)	19.34 (6.6)	16.53 (6.0)	16.53 (6.0)	p=0.002*,***
	Physical	11.17 (4.4)	13.57 (4.5)	11.37 (4.2)	11.77 (5.2)	p<0.001*,***
	Mental	5.42 (2.7)	5.77 (3.0)	5.15 (2.5)	5.46 (2.8)	p=0.34
Burnout	Personal	57.28 (21.5)	69.03 (17.7)	58.79 (19.2)	63.33 (21.3)	p<0.001*,***
	Work-related	53.93 (23.6)	66.44 (18.4)	54.29 (19.1)	55.00 (24.4)	p<0.001*,***
	Client-related	35.87 (22.6)	46.85 (25.5)	36.91 (21.4)	37.74 (28.9)	p=0.001*,***
	Total BO	49.28 (19.7)	61.07 (17.5)	50.23 (16.6)	52.18 (21.5)	p<0.001*,***
Quality of life		0.78 (0.1)	0.74 (0.1)	0.79 (0.1)	0.74 (0.2)	p=0.203

*Significant at 0.01 level, **Between nurses and physiotherapists, ***Between nurses and doctors and between nurses and physiotherapists
BO: Burnout, SD: Standard deviation

Table 7. Patients with COVID-19 at workplace.

		Patients with COVID-19 at workplace				Have worked with patients with COVID-19			
		Yes (n=344) Mean (SD)	No (n=82) Mean (SD)	Not sure (n=39) Mean (SD)	p-value	Yes (n=251) Mean (SD)	No (n=184) Mean (SD)	Not sure (n=28) Mean (SD)	p-value
Job stress		50.59 (13.3)	44.18 (13.6)	47.54 (15.8)	p=0.001*	51.10 (13.5)	46.69 (13.8)	48.54 (14.0)	p=0.004*
Fatigue	Total	28.69 (6.5)	26.60 (6.2)	28.26 (7.2)	p=0.036**	29.06 (6.3)	27.31 (6.8)	27.57 (6.9)	p=0.02**
	Physical	19.1 (4.5)	17.59 (4.38)	19.03 (4.8)	p=0.021**	19.41 (4.3)	18.19 (4.7)	18.25 (4.6)	p=0.018**
	Mental	9.55 (2.7)	9.01 (2.5)	9.23 (3.1)	p=0.25	9.65 (2.7)	9.11 (2.7)	9.32 (2.9)	p=0.13
Burnout	Personal	62.15 (20.5)	57.12 (18.9)	59.40 (21.9)	p=0.117	63.88 (20.1)	58.01 (20.2)	56.40 (21.2)	p=0.005*
	Work-related	59.32 (21.6)	49.96 (19.0)	53.2 (23.2)	p=0.001*	61.53 (21.1)	52.01 (21.0)	51.66 (22.3)	p<0.001*
	Client-related	40.58 (24.8)	32.27 (18.8)	39.00 (22.1)	p=0.017**	41.34 (24.7)	36.38 (22.7)	35.15 (20.8)	p=0.068
	Total	54.30 (19.1)	46.63 (15.8)	50.67 (19.9)	p=0.003*	55.91 (18.1)	48.97 (18.3)	47.93 (18.4)	p<0.001*
Quality of life		0.67 (0.2)	0.74 (0.1)	0.66 (0.2)		0.69 (0.2)	0.70 (0.2)	0.70 (0.2)	p=0.69

SD: Standard deviation. *Significant at 0.01 level, **Significant at 0.05 level

Table 8. Health care professionals being in quarantine.

		Have been in quarantine		p-value
		Yes (n=129) Mean (SD)	No (n=335) Mean (SD)	
Job stress		50.98 (13.6)	48.46 (13.8)	p=0.078
Fatigue	Total	29.33 (6.2)	29.33 (6.2)	p=0.032*
	Physical	19.70 (4.3)	18.53 (4.5)	p=0.013*
	Mental	9.63 (2.6)	9.3 (2.8)	p=0.305
Burnout	Personal	63.50 (21.0)	60.16 (20.1)	p=0.109
	Work-related	60.91 (21.6)	55.68 (21.4)	p=0.018*
	Client-related	40.86 (23.4)	38.30 (24.0)	p=0.310
	Total	55.40 (18.6)	51.61 (18.9)	p=0.054
Quality of life		0.67 (0.2)	0.71 (0.2)	p=0.072

SD: Standard deviation. *Significant at 0.05 level

This model explained job stress by 15.3% (R^2=0.153, F(17, 423)=4.48, p<0.001) (tab. 9).

The model for fatigue showed three variables to affect it; gender, as women were expected to score 0.251 higher on fatigue, full time job and those for whom the working conditions had changed, scored lower by 0.277 and by 0.607, respectively. This model explained fatigue by 16.5% (R^2=0.165, F(17, 423)=4.92, p<0.001) (tab. 9).

BO was predicted by four variables, one of them was income, as for each increased level BO was expected to decrease by a score of 3.067. This model explained by 18.1% the independent variable and was significantly valued for BO (R^2=0.181, F(17, 246)=3.02, p<0.001). For the same dependent variable, when taking out of the model the variable "If you work in a hospital, is it a reference one?", the

Table 9. Regression analysis for job stress, fatigue, burnout and quality of life.

Model	Variables	Coefficient		t	p-value	Collinearity statistics	
		B	Standard error			Tolerance	VIF
Job stress							
All variables (n=265)	Working conditions changed	-1.290	0.265	-4.867	*0.000*	0.926	1.080
Removing question* (n=441)	Gender	0.252	0.087	2.896	*0.004*	0.896	1.117
	Know colleagues who tested positive for COVID-19 (within workplace)	-0.256	0.076	-3.356	*0.001*	0.756	1.322
	Working conditions changed	-0.865	0.180	-4.818	*0.000*	0.926	1.080
Fatigue							
All variables (n=265)	Gender	0.293	0.084	3.511	*0.001*	0.831	1.203
Removing question* (n=441)	Gender	0.251	0.061	4.138	*0.000*	0.896	1.117
	Job type	-0.277	0.130	-2.125	*0.034*	0.859	1.168
	Working conditions changed	-0.604	0.125	-4.849	*0.000*	0.926	1.080
Bournout							
All variables (n=265)	Gender	6.486	2.555	2.538	*0.012*	0.831	10203
	Monthly income	-3.067	1.217	-2.521	*0.012*	0.463	2.161
	Worked with patients with COVID-19	-6.358	2.141	-2.970	*0.003*	0.763	1.310
	Working conditions changed	-16.344	5.966	-2.740	*0.007*	0.926	1.080
Removing question* (n=441)	Gender	6.067	1.914	3.169	*0.002*	0.896	1.117
	Worked with patients with COVID-19	-3.945	1.573	-2.508	*0.013*	0.717	1.395
	Working conditions changed	-14.304	3.956	-3.616	*0.000*	0.926	1.080
	Know colleagues who have tested positive for COVID-19 (within workplace)	-4.555	1.697	-2.712	*0.007*	0.756	1.322
Quality of life							
All variables (n=265)	Years working at current workplace	-0.003	0.001	-2.476	*0.014*	0.720	1.388
Removing question* (n=441)	Gender	-0.047	0.019	-2.483	*0.013*	0.896	1.117
	Education	0.025	0.11	2.244	*0.025*	0.865	1.156
	Years working at current workplace	-0.002	0.001	-2.897	*0.004*	0.707	1.414

Note: Only statistical significant findings are shown in this table

*Removing the question *"If you work in a hospital, is it a reference one?"*

size of the sample increased and five variables were found to be of importance. This model explained BO by 15.5% (R^2=0.155, F(17, 423)=4.57, p<0.001) (tab. 9).

The last regression model examined QoL. When all variables were included, only one was found to have an impact, that of years working in the same workplace, where QoL was expected to drop by 0.003 for each additional year working at the same place. This model explained the 8% of QoL (R^2=0.08, F(17, 246)=1.19, p=0.269). When taking out of the model analysis the independent variable "If you work in hospital, is it a reference one?", three variables became of significance; gender, education, and years working at the current workplace. QoL was expected to be reduced by a 0.047 score for women and by a 0.002 score for each additional year at the same workplace. On the other hand, QoL was expected to improve by 0.025 for each higher level of education. This model explained the 8.7% of the QoL (R^2=0.087, F(17, 423)=2.38, p=0.002) (tab. 9).

DISCUSSION

This study took place simultaneously in two Greek-speaking countries, aiming to examine how HCPs coped during the first year of the pandemic and how their job stress, BO, fatigue and QoL were affected. Overall, regression analysis showed that job stress could be partially

explained by changes in the working conditions: (a) by knowing colleagues who had COVID-19 and (b) by being a female. Being a woman, being in full time job and having work conditions changed can predict fatigue and BO. On the other hand, better income can predict a decrease in BO. Finally, worse QoL can be predicted for those who work more years at the same workplace and for women. Better education seems to predict better QoL.

No significant differences were found for the main variables examined between the two countries. Prior to the pandemic both Greece and Cyprus had similar health care resources, including lower than the mean European (EU) government spending and lower number of nurses per 100.000 population.[43] After the pandemic onset both used countries similar policies prioritizing transmission reduction including centrally governed policies, effective and protective measures, movement restrictions, mobilization of the private health sector and increasing number of intensive care units (ICU) beds and HPCs.[43] These factors together with the cultural similarities of the two countries, could possibly explain why no differences between them were found.

Gender was a main variable to contribute to some important differences found. Women reported significantly higher job stress. Female HCPs had greater risk of developing work related stress.[19] An alarming 93% of Cypriot nurses reported fatigue already prior to the pandemic.[8] In the current study, women passed the BO cut-off score on CBI (mean: 55.47, SD: 18.07) which is a little higher than that reported in another Greek study,[27] but overall in agreement with early pandemic reports.[44] Women also reported significantly more problems with anxiety/depression as one in three reported moderate/severe problems.

In the literature, age has been a factor examined for its relation to BO, as younger age and increased risk had been reported prior to the pandemic,[45] though studying Cypriot nurses no such difference was found.[8] We found that younger age relates with higher personal and work related BO, which is in agreement with the literature.[27] People aged 30–44 are most affected in terms of physical fatigue. Our findings showed that HCPs with low payment (€ 501–800) reported more fatigue and those with even lower (€ <500) reported moderate anxiety/depression. Poor payment related with poor job satisfaction for nurses prior the pandemic[46] and payment was a predictor for BO for Cypriot physiotherapists even before the country's economic crisis.[7] We found that the nurses earning € 801–1,200 report worse work-related fatigue than doctors who earn € 1,201–1,600.

The presence of BO in nurses has long been discussed,[14] and being a nurse associated with BO from the early waves of the COVID-19 pandemic.[44] In the current study nurses showed significantly more BO as four out of five (79%) passed the BO cut-off (≥50), followed by physiotherapists (53.4%) and then doctors (47.5%). They also reported the highest mean of BO found in this study (61.07, SD: 17.53). BO has been negatively associated with the quality and safety in healthcare, especially with nurses in Europe, well prior to the COVID-19 outbreak and the need to pay attention had been noted.[47] In the 1st year of the pandemic high emotional BO for 53% of nurses was reported in Greece.[48] Examining more than half of the county's nursing population eight years prior to the pandemic, a 12.5% of BO for nurses in Cyprus was reported.[8] Our study, though it did not examine an extensive number of the Cypriot nursing population, was conducted a decade later, following a financial crisis, a health service reform and during a health pandemic, and found a massive 75% of Cypriot nurses to report BO. We also found significantly higher job stress for nurses compared to physiotherapists and more physical fatigue compared to both doctors and physiotherapists. Cypriot nurses who self-reported fatigue, particularly females, were more susceptible to BO even prior to the pandemic.[8]

The current study found that both the presence of patients with COVID-19 at work and having worked with them, related with significantly higher job stress, greater fatigue and higher BO. The more patients with COVID-19 the HCPs see during their work the higher their reported BO.[44] As expected, most of the HCPs in this study worked with patients with COVID-19, particularly nurses (74.8%). Front-line HCPs account for at least 7% of all COVID-19 diagnoses,[49] which may be impacting on their BO and fatigue levels.

Our study was not without limitations. One was that it followed a cross-sectional design, and though commonly used in research, it is a one-point in time examination whereas a longitudinal design could have assessed any continuation of the problem providing more information. Furthermore, the study was conducted online, may be leading to a response bias. Finally, though the study did not seek to examine those HCPs who had themselves contracted COVID-19, having examined that may have provided more information, particularly on fatigue which has been one of the symptoms reported by people with COVID-19.

In conclusion, we reported an increase in BO presence in HCPs for both countries in comparison to prior the pandemic.[3,5–8] Our study supports findings that risk factors for BO are being a nurse, younger age and being female.[17] It is alarming that though countries like Greece

and Cyprus who were not hit hard by the pandemic during the first waves, their HCPs were already reporting job stress, fatigue and BO. It can only be expected that the following waves that brought more COVID-19 cases, had a cumulative impact on the well-being of HCPs. Indeed, reduced job satisfaction three years following the onset of the pandemic have been reported in Greece.[50] As health care and other COVID-19 related costs can be a threat for governments, both Greece and Cyprus seem to have done little so far to establish long-term support for people affected by COVID-19, either due to their illness, or due to work exhaustion. It is important that immediate attention was given, and actions were taken to set up multiple well-established clinics that offer services to HCPs affected by the multileveled consequences of the pandemic. In addition, governments should prioritize those HCPs prone to develop problems and act upon their needs, including keeping them satisfied with a better income and safer work environment. Low job satisfaction, along with high workload and reduced job recognition can impact on people retaining their jobs,[46] and female health workers and mainly nurses have already reported the intention to leave their job.[51] However, the health care systems of both countries cannot afford an exodus of their workers which will consequently further reduce quality of care.

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ΠΕΡΙΛΗΨΗ

COVID-19 και επαγγελματίες υγείας. Μελέτη σε Ελλάδα και Κύπρο

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ΣΚΟΠΟΣ Αξιολόγηση του αντίκτυπου του πρώτου έτους της πανδημίας στους επαγγελματίες υγείας, εστιάζοντας στο εργασιακό άγχος, στην κόπωση, στην εξουθένωση και στην ποιότητα ζωής, και σύγκριση των ομάδων, καθώς και διερεύνηση των παραγόντων κινδύνου. **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Κατά τη μετάβαση από το δεύτερο στο τρίτο κύμα της πανδημίας COVID-19 διεξήχθη συγχρονική διαδικτυακή έρευνα ταυτόχρονα σε Ελλάδα και Κύπρο. Στη μελέτη ανταποκρίθηκαν συνολικά 467 επαγγελματίες υγείας από τον δημόσιο και τον ιδιωτικό τομέα. Για τη συλλογή των δεδομένων χρησιμοποιήθηκαν διάφορα εργαλεία μέτρησης, όπως το Job Stress Measure, η κλίμακα κόπωσης Chalder, το Copenhagen Burnout Inventory και το EQ-5D-5L. Οι στατιστικές αναλύσεις περιλάμβαναν περιγραφικές στατιστικές, Cronbach α, συγκρίσεις ομάδων, συσχετίσεις, ανάλυση *post-hoc* και αναλύσεις παλινδρόμησης. **ΑΠΟΤΕΛΕΣΜΑΤΑ** Τα ευρήματα αποκάλυψαν το φύλο ως προγνωστικό παράγοντα, με τις γυναίκες να είναι πλέον ευάλωτες στο εργασιακό άγχος και στην κόπωση και να αναφέρουν αυξημένο άγχος/κατάθλιψη και χαμηλότερη ποιότητα ζωής. Η πλήρης απασχόληση προέβλεπε μεγαλύτερη κόπωση, ενώ η μεγαλύτερη θητεία σε έναν χώρο εργασίας συσχετίστηκε με τη μείωση της ποιότητας ζωής. Οι μεταβαλλόμενες συνθήκες εργασίας συνδέονταν με πιο έντονη κόπωση, ενώ το αυξημένο εισόδημα μείωσε την επαγγελματική εξουθένωση. Το να γνώριζαν συναδέλφους στην εργασία που είχαν COVID-19 προέβλεψε αυξημένο εργασιακό άγχος και εξάντληση. Η Ελλάδα και η Κύπρος δεν εμφάνισαν σημαντικές διαφορές στις συγκριτικές αναλύσεις. Σχεδόν το 80% των νοσηλευτών ανέφεραν εξουθένωση, με το 19% να κυμαίνεται σε υψηλά επίπεδα. Οι φυσικοθεραπευτές (53%) και οι ιατροί (47,5%) επηρεάστηκαν επίσης σημαντικά. Μεταξύ των επαγγελμάτων υγείας, οι νοσηλευτές ανέφεραν την υψηλότερη μέση επαγγελματική εξουθένωση (61,07, σταθερή απόκλιση: 17,53). Το χαμηλό εισόδημα αντιστοιχούσε σε αυξημένο άγχος και εξάντληση. Συνολικά, νοσηλευτές, γυναίκες και άτομα ηλικίας 30–44 ετών επηρεάστηκαν περισσότερο. **ΣΥΜΠΕΡΑΣΜΑΤΑ** Ο σωρευτικός αντίκτυπος των πανδημικών κυμάτων είναι πιθανόν να επηρεάσει περαιτέρω την ευημερία των επαγγελματιών υγείας. Τα εν λόγω ανησυχητικά ευρήματα θα πρέπει να χρησιμεύσουν ως κλήση αφύπνισης για τους υπεύθυνους χάραξης πολιτικής προς αποτροπή πιθανών συνεπειών, εμποδίζοντας την έξοδο των επαγγελματιών υγείας από το σύστημα υγείας.

Λέξεις ευρετηρίου: Ελλάδα και Κύπρος, Επαγγελματίες υγείας, Επαγγελματική εξουθένωση, Πανδημία COVID-19

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