Greek and Cypriot Healthcare Professionals: Burned Out from the First Year of the COVID-19 Pandemic?

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Abstract

The COVID-19 pandemic lasted for more than three years, significantly impacting the working conditions of healthcare professionals. This study investigates the job stress, fatigue, burnout, and quality of life of these professionals in Greece and Cyprus, using the Chalder Fatigue questionnaire, the Copenhagen Burnout Inventory, the Job Stress Measure and the EQ-5D-5L questionnaire. A total of 467 participants reported a mean job stress of 49.15, and moderate fatigue with a 17.26 mean score. A moderate level of burnout was also reported by 57.9% of participants. There were positive correlations between job stress and fatigue, job stress and burnout, and fatigue and burnout. All three variables negatively correlated with quality of life. Signs of increased job stress, fatigue, burnout, and reduced quality of life were evident as of the first year of the pandemic. The study concludes that both Greek and Cypriot governments must take measures to restore and protect the wellbeing of healthcare professionals.

Keywords: COVID-19 pandemic; burnout; healthcare professionals; Cyprus; Greece

Introduction

First reported as a syndrome in the 1970s, burnout (BO) is caused by occupational factors that create stress.[5] [6] It contains three dimensions: 1) emotional exhaustion

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[5] Alexandros-Stamatios Antoniou, 'Personal Traits and Professional Burnout in Health Professionals', (1999) 16(1) *Archives of Hellenic Medicine* 20.

[6] Christina Maslach, Susan Jackson & Michael Leiter, 'Maslach Burnout Inventory' in Carlos Zalaquett & Richard Wood (eds), *Evaluating Stress: A Book of Resources* (US: Scarecrow Education, 1997) 191.

(EE), 2) depersonalisation, and 3) a low feeling of personal accomplishment.[7] Healthcare professionals (HCPs) are particularly prone to developing BO, perhaps because of the emotional toll of the contact they have with their patients,[8] including prioritising the latter's needs, which can result in long working hours.[9] This puts HCPs at risk of anxiety, depression, and stress,[10] [11] leading to a high prevalence of BO.[12] [13]

HCPs experienced BO[5] even prior to the COVID-19 pandemic: BO was generally reported as high, around 65% for physicians[14] and between 28–36% for nurses.[15] The COVID-19 pandemic increased HCPs' workload;[16] they felt considerable, if not excessive, pressure due to job demands, fatigue and frustration, accompanied by isolation and lack of contact with their families.[17] Work-related difficulties, including lack of personal protective equipment, increased stress and anxiety, may have added to their work-related stress.[18]

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[7] Isabelle Roy, 'Burnout Syndrome: Definition, Typology and Management', (2018) 39(318) *Soins. Psychiatrie* 12.

[8] Christina Maslach & Michael P. Leiter, 'Understanding the Burnout Experience: Recent Research and its Implications for Psychiatry', (2016) 15(2) *World Psychiatry* 103.

[9] Elizabeth H. Stephens, Joseph A. Dearani & Kristine J. Guleserian, 'Courage, Fortitude, and Effective Leadership of Surgical Teams during COVID-19', (2020) 11(5) *World Journal for Pediatric & Congenital Heart Surgery* 675.

[10] Xiu-Jie Zhang & al., 'Interventions to Reduce Burnout of Physicians and Nurses: An Overview of Systematic Reviews and Meta-Analyses', (2020) 99(26) *Medicine (Baltimore)* e20992.

[11] Panagiota Koutsimani, Anthony Montgomery & Katerina Georganta, 'The Relationship between Burnout, Depression, and Anxiety: A Systematic Review and Meta-Analysis', (2019) 10 *Frontiers in Psychology* 284.

[12] Nathalie Embriaco & al., 'High Level of Burnout in Intensivists: Prevalence and Associated Factors', (2007) 175(7) *American Journal of Respiratory and Critical Care Medicine* 686.

[13] Zhi Xuan Low & al., 'Prevalence of Burnout in Medical and Surgical Residents: A Meta-Analysis', (2019) 16(9) *International Journal of Environmental Research and Public Health* 1479.

[14] Lisa S. Rotenstein & al., 'Prevalence of Burnout among Physicians: A Systematic Review', (2018) 320(11) *JAMA: The Journal of the American Medical Association* 1131.

[15] Linda H. Aiken & al., 'Patient Safety, Satisfaction, and Quality of Hospital Care: Cross Sectional Surveys of Nurses and Patients in 12 Countries in Europe and the United States', (2012) 344(7851) *Bmj* 17.

[16] Arnaud Bruyneel & al., 'Impact of COVID-19 on Nursing Time in Intensive Care Units in Belgium', (2021) 62 *Intensive & Critical Care Nursing* 102967.

[17] Mohammad Jalili & al., 'Burnout among Healthcare Professionals during COVID-19 Pandemic: A Cross-Sectional Study', (2021) 94(6) *International Archives of Occupational and Environmental Health* 1345.

[18] Judith Arnetz & al., 'Personal Protective Equipment and Mental Health Symptoms among Nurses during the COVID-19 Pandemic', (2020) 62(11) *Journal of Occupational and Environmental Medicine* 892.

The high rates of BO reported by HCPs can impact both their physical and mental health, resulting in poor quality of care provided to patients, even jeopardising patient safety.[19] [20] Only one month into the COVID-19 pandemic, HCPs reported needing psychological treatment[21] for depressive symptoms and anxiety[22] and one in two was found to have BO.[23]

During the first wave of the pandemic, both the Greek and the Cypriot governments reacted fast and adapted effective strategies that kept the total number of deaths at a low rate.[24] But the pressure and the limited resources overwhelmed the HCPs.[25] Early in the pandemic, in both countries, HCPs experienced considerable effects, which included anxiety, depression, stress, distress, emotional instability,[26] [27] BO,[28] and post-traumatic stress disorder (PTSD).[29] BO prevalence was associated with life changes during the pandemic, including longer working hours, being separated from family, and spending time in isolation.[30]

[19] Carolyn S. Dewa & al., 'The Relationship between Physician Burnout and Quality of Healthcare in Terms of Safety and Acceptability: A Systematic Review', (2017) 7(6) *BMJ Open* e015141.

[20] Louise H. Hall & al., 'Healthcare Staff Wellbeing, Burnout, and Patient Safety: A Systematic Review', (2016) 11(7) *PLoS ONE* e0159015.

[21] José Ángel Martínez-López & al., 'Psychological Impact of COVID-19 Emergency on Health Professionals: Burnout Incidence at the most Critical Period in Spain', (2020) 9(9) *Journal of Clinical Medicine* 3029.

[22] Deni Kurniadi Sunjaya, Dewi Marhaeni Diah Herawati & Adiatma Y. M. Siregar, 'Depressive, Anxiety, and Burnout Symptoms on Health Care Personnel at a Month After COVID-19 Outbreak in Indonesia', (2021) 21(1) *BMC Public Health* 227.

[23] Jalili & al., (n 17).

[24] Annalisa Quattrocchi & al., 'Extensive Testing and Public Health Interventions for the Control of COVID-19 in the Republic of Cyprus between March and May 2020', (2020) 9(11) *Journal of Clinical Medicine* 3598.

[25] Konstantinos Tsamakis & al., 'COVID-19 Pandemic and its Impact on Mental Health of Healthcare Professionals', (2020) 19(6) *Experimental and Therapeutic Medicine* 3451.

[26] Theodora Fteropoulli & al., 'Beyond the Physical Risk: Psychosocial Impact and Coping in Healthcare Professionals during the COVID-19 Pandemic', (2021) *Journal of Clinical Nursing* 1.

[27] Konstantinos Kapetanos & al., 'Exploring the Factors Associated with the Mental Health of Frontline Healthcare Workers during the COVID-19 Pandemic in Cyprus', (2021) 16(10) *PloS One* e0258475.

[28] Sofia Pappa & al., 'From Recession to Depression? Prevalence and Correlates of Depression, Anxiety, Traumatic Stress and Burnout in Healthcare Workers during the COVID-19 Pandemic in Greece: A Multi-Center, Cross-Sectional Study', (2021) 18(5) *International Journal of Environmental Research and Public Health* 2390.

[29] Apostolos Blekas & al., 'COVID-19: PTSD Symptoms in Greek Health Care Professionals', (2020) 12(7) *Psychological Trauma* 812.

[30] Kapetanos & al., (n 27).

The aim of the current study is to examine the job stress, fatigue, and BO reported by Greek-Cypriot and Greek HCPs during the second and third wave of the COVID-19 pandemic and how these associate with quality of life (QoL) for this population.

Method

Using a snowball method, a cross-sectional online survey was posted on Greek and Cypriot social media accounts and circulated via university newsletters and email lists. Data collection took place in December 2020 and then between February and March 2021. The periods reflect the end of the second and start of the third wave of the COVID-19 pandemic. The study included questions divided into: 1) demographics and work-related characteristics, 2) job-related stress, 3) fatigue, 4) burnout, and 5) quality of life. All questionnaires were in the Greek language.

The study obtained the approval of the National Bioethics Committee of Cyprus (ΕΕΒΚ ΕΠ 2020.01.10). Participants were informed about the purpose of the study and their rights under the General Data Protection Regulation. Informed consent was inferred through participants' completion and submission of the electronic questionnaire.

Measures Used

The Chalder Fatigue Scale (CFS) measures fatigue severity.[31] It has been used in multiple studies,[32] [33] [34] [35] and shows good internal consistency[36] and convergent validity.[37] The CFS was translated into Greek by the authors of the present study, with the method and results of this translation shown in a different publication.

[31] Trudie Chalder & al., 'Development of a Fatigue Scale', (1993) 37(2) *Journal of Psychosomatic Research* 147.

[32] Alicia Deale & al., 'Cognitive Behavior Therapy for Chronic Fatigue Syndrome: A Randomized Controlled Trial', (1997) 154(3) *The American Journal of Psychiatry* 408.

[33] Pauline Powell & al., 'Randomised Controlled Trial of Patient Education to Encourage Graded Exercise in Chronic Fatigue Syndrome', (2001) 322(7283) *Bmj* 387.

[34] Alison J. Wearden & al., 'Nurse Led, Home Based Self Help Treatment for Patients in Primary Care with Chronic Fatigue Syndrome: Randomised Controlled Trial', (2010) 340(7753) *Bmj* 19.

[35] Peter D White & al., 'Comparison of Adaptive Pacing Therapy, Cognitive Behaviour Therapy, Graded Exercise Therapy, and Specialist Medical Care for Chronic Fatigue Syndrome (PACE): A Randomised Trial', (2011) 377(9768) *The Lancet (British Edition)* 823.

[36] Matteo Cella & Trudie Chalder, 'Measuring Fatigue in Clinical and Community Settings', (2010) 69(1) *Journal of Psychosomatic Research* 17.

[37] Jolanda De Vries, Helen Michielsen & Guus Van Heck, 'Assessment of Fatigue among Working People: A Comparison of Six Questionnaires', (2003) 60(1) *Occupational and Environmental Medicine* i10.

The Job Stress Measure (JSM) is a questionnaire that consists of 16 items assessing stress.[38] It is a reliable measure[39] with a Cronbach's alpha α=0.868 for the Greek version of the questionnaire.[40]

The Copenhagen Burnout Inventory (CBI) uses 19 questions to assess personal, work-related, and client-related BO.[41] It has been translated into several languages.[42] [43] The Greek version has shown a face validity above 0.8 and Cronbach's alpha α=0.84.[44]

The EQ-5D-5L questionnaire is widely used to assess general health status and QoL[45] in different conditions,[46] and has also been translated into many languages.[47] It assesses mobility, self-care, usual activities, pain/discomfort, and anxiety/depression to create a health state profile of a possible 3,125 combinations. It also calculates an EQ-score (health state index score) using a value set, which however was not available for Greek/Cypriot samples; as a workaround, the set values for England were used in the current study. The minimum possible value (worst possible health state, 55555) is equal to -0.285, while the maximum (best possible health state, 11111) is

[38] Angeliki Sakketou & al., 'Validation of the Greek Version of the "Job Stress Measure', (2014) 5(13) *Psychology* 1527.

[39] Ioannis Nikolaou & Ioannis Tsaousis, 'Emotional Intelligence in the Workplace: Exploring its Effects on Occupational Stress and Organizational Commitment', (2002) 10(4) *International Journal of Organizational Analysis* 327.

[40] Sakketou & al., (n 38)

[41] Tage S. Kristensen & al., 'The Conceptualization and Measurement of Burnout: The Copenhagen Burnout Inventory: A New Tool for the Assessment of Burnout. Commentary', (2005) 19(3) *Work and Stress* 256.

[42] Emilia Molinero Ruiz, Helena Basart Gómez-Quintero & Salvador Moncada Lluis, 'Validation of the Copenhagen Burnout Inventory to Assess Professional Burnout in Spain', (2013) 87(2) *Revista Espanola De Salud Publica* 165.

[43] Marko Živanović, Emina Borjanić Bolić & Maša Vukčević Marković, 'Psychometric Properties and Structural Validity of the Serbian Version of the Copenhagen Burnout Inventory (CBIser)', (2021) 11(4) *SAGE Open* 215824402110488.

[44] Efstathios Papaefstathiou & al., 'Translation and Validation of the Copenhagen Burnout Inventory Amongst Greek Doctors', (2019) 7(1) *Health Psychology Research* 7678.

[45] Michael Herdman et al., 'Development and Preliminary Testing of the New Five-Level Version of EQ-5D (EQ-5D-5L)', (2011) 20(10) *Quality of Life Research* 1727.

[46] Gimena Hernandez & al., 'EuroQol (EQ-5D-5L) Validity in Assessing the Quality of Life in Adults with Asthma: Cross-Sectional Study', (2019) 21(1) *Journal of Medical Internet Research* e10178.

[47] Dominik Golicki & al., 'Interim EQ-5D-5L Value Set for Poland: First Crosswalk Value Set in Central and Eastern Europe', (2014) 4 *Value in Health Regional Issues* 19.

equal to 1.[48] The second part of the scale assesses perceived health from 0 (the worst imaginable health) to 100 (the best imaginable health).

Statistical Analysis

Data analysis was performed using SPSS 25.0. Descriptive statistics were initially obtained. The Shapiro-Wilk (sample ≤50) or Kolmogorov-Smirnov (sample >50) were used to test normality. Comparisons between categorical variables were performed using the Chi-square test. To compare means, the independent t-test was used for two samples and the F-Test (Anova) for more than two, whereas when normality was not met, the Mann-Whitney for two samples and the Kruskal-Wallis for more than two were used. Pearson's r was used to test correlations of interest and the Spearman's rho coefficient for cases of non-normality or ordinal data. Internal consistency using Cronbach's alpha was examined for all scales used. The level of significance was set at 0.05.

Results

A total of 467 questionnaires were completed online. The sample contained significantly more women (67% versus 33%, $p<0.001$). Most respondents (73.9%) were aged between 30–59 ($p<0.001$). Most were married ($p<0.001$). There were almost equal numbers of doctors and physiotherapists, followed by nurses ($p<0.001$). There were significantly more people working in Greece than in Cyprus ($p<0.001$) (see Table 1).

Nearly half of the participants worked in public hospitals (48.4%), with a median work experience of 15 years (interquartile range 7 to 23) and the median years of working at the current workplace was 10 (interquartile range 3 to 19). The vast majority of the participants worked full time (94%), with most on a permanent contract (65.5%); 36.5% had an income of €500–800. Of those working in a hospital, almost half (49.6%) worked in a COVID-19 reference hospital. At the time of the survey, nearly one in four HCPs had already been in quarantine once and most of them (37.3%) were in quarantine for one or two weeks (31.8%) (see Table 1).

[48] Nancy J. Devlin & al., 'Valuing Health-related Quality of Life: An EQ-5D-5L Value Set for England', (2018) 27(1) *Health Economics* 7.

Table 1: Sample demographics

Variable	Category	Valid Percent (%)
N = 467		
Gender	Male	33
	Female	67
Age	< 30	21.6
	30 – 44	41.1
	45 – 59	32.8
	60 - 74	4.5
Marital status	Single	25.5
	Divorced	7.5
	Married	52.9
	Relationship	13.7
	Widowed	0.4
Health profession	Doctor	33.8
	Nurse	20.6
	Nursing Assistant	3.2
	Physiotherapist	34
	Physiotherapist Assistant	0.9
	Other	7.5
Education	High School	2.8
	Post High School	3.2
	Undergraduate Degree	47.5
	Postgraduate Degree	37.7
	Doctorate Degree	8.8
Country of employment	Greece	79.9
	Cyprus	19.5
	Other	0.6
Monthly income N=441	Up to €500	3.6
	€501 - €800	9.1
	€801 - €1200	36.5
	€1201 - €1600	17.7
	€1601 - €2000	14.1
	€2001 - €2750	9.8
	More than €2750	9.3
Working at a Covid-19 reference hospital N=272	Yes	49.6

N=467		
Patients with Covid-19 at workplace	Yes	73.7
Have worked with patients with Covid-19	Yes	53.7
Working conditions changed during the pandemic	Yes	94.9
Way working conditions changed	Working more hours	37
	Working less hours	10.7
	Not often breaks	32.5
	Have often breaks	3.4
	Job requires more physical activity	28.9
	Increased work obligations	61.7
	Must very careful not to get infected by any disease	79.7
Have been in contact with a possible positive case	No	72.4
Have been in quarantine once	Yes	23.5
Colleague(s) have tested positive for Covid-19	Within workplace	63.6
	Outside workplace	67.2

Job Stress

On the JSM, job stress can range between 16 and 80. Participants reported a mean score of 49.15 (SD13.8). Among the conditions that tended to be quite stressful were the number of tasks HCPs had to do, time spent at work, volume of work to be done in the time specified, lack of job security, degree of responsibility, and scope of responsibilities. There was a high correlation for each item with the total of the JSM (with Pearson's ranging from 0.609 to 0.778 across items), except for the item 'The amount of travelling I must do'. Internal consistency with Cronbach's α was high for all items, indicating a high reliability for this scale, α=0.92 (see Table 2)

Table 2: Job Stress Measure and item correlations

N=467	Min. – Max.	Mean	SD	Variance	Pearson Correlation
Number of tasks to do	1-5	3.39	1.143	1.306	0.715**
Time spent at work	1-5	3.24	1.228	1.508	0.695**
Duration of work meetings	1-5	2.79	1.139	1.298	0.654**
Number of telephone calls and visits throughout day	1-5	3.16	1.297	1.682	0.616**
Politics rather than performance affecting the organizational decisions	1-5	3.08	1.318	1.738	0.634**
Inability to clearly understand what is expected at work	1-5	2.40	1.302	1.695	0.643**
Volume of work to be done in time specified	1-5	3.44	1.280	1.638	0.778**
Degree to which the job presents conflicting requirements	1-5	3.08	1.289	1.660	0.770**
Degree of bureaucratic procedures required to carry out work tasks	1-5	3.13	1.333	1.776	0.674**
Time pressure experienced	1-5	3.52	1.254	1.572	0.751**
Lack of job security	1-5	3.31	1.439	2.070	0.715**
Percentage of responsibility	1-5	3.75	1.272	1.617	0.733**
Application of duties implied in job position	1-5	3.26	1.274	1.623	0.767**
Degree at which career seems to be stabilized	1-5	3.00	1.413	1.996	0.644**
Opportunities for career development	1-5	2.88	1.381	1.907	0.609**
Number of business trips to be done	1-5	1.73	1.112	1.236	0.373**
Job Stress Measure Total	16 - 80	49.15	13.81	190.94	
Job Stress Measure Total (for Pearson's correlation)					1
Cronbach's α					
Total Scale	0.92				
If item "Number of business trips to be done" is deleted	0.923				

** Correlation is significant at the 0.01 level

Fatigue

For the CFS, internal consistency was very high, α = 0.903, indicating a very high reliability for this scale. From the corresponding item analysis, it appeared that there was no possibility for further improvement of Cronbach's α index (see Table 3). HCPs generally felt more tired than usual, as during the previous month they felt physical fatigue more than usual, while mental fatigue was no worse than usual. The total fatigue mean score was 17.26 (SD 6.58). The total CFS has a possible range of 0–33. The Physical Fatigue subcategory (scale range 0–21) had a mean of 11.85 (SD 4.54) and the Mental Fatigue (scale range 0–12) a mean of 5.41 (SD 2.76).

Table 3. Cronbach's alpha for the Chalder Fatigue Scale

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Have problems with tiredness	15.36	36.745	0.654	0.894
Need to rest more	15.22	37.008	0.629	0.895
Feel sleepy or drowsy	15.63	36.546	0.596	0.897
Have problems starting things	15.85	36.507	0.614	0.896
Lack energy	15.49	34.868	0.762	0.887
Have less strength in muscles	15.78	35.662	0.629	0.895
Feel weak	15.72	34.740	0.734	0.889H
Have difficulty in concentrating	15.79	35.315	0.677	0.892
Make slips of the tongue when speaking	16.01	36.120	0.606	0.896
Find it difficult to find the correct word	15.96	36.279	0.591	0.897
Have memory problems	15.91	38.194	0.569	0.898

There was a high correlation (Pearson's ranging from 0.636 to 0.814 across items) for each item with the total sum for this scale. The items of the Physical Fatigue subcategory had a higher correlation with the total sum compared to the Mental Fatigue subcategory (see Table 4).

Table 4: Chalder Fatigue Scale and item correlations

	Min. – Max.	Mean (SD)	Variance	CFS Total	Physical Fatigue	Mental Fatigue
				Pearson Correlation		
Have problems with tiredness	0 - 3	1.92 (0.76)	0.57	0.718**	0.786**	0.419**
Need to rest more	0 - 3	2.05 (0.75)	0.57	0.696**	0.767**	0.398**
Feel sleepy or drowsy	0 - 3	1.64 (0.84)	0.71	0.676**	0.740**	0.393**
Have problems starting things	0 - 3	1.42 (0.83)	0.69	0.689**	0.664**	0.552**
Lack energy	0 - 3	1.78 (0.86)	0.74	0.814**	0.868**	0.512**
Have less strength in muscles	0 - 3	1.49 (0.91)	0.83	0.709**	0.747**	0.462**
Feel weak	0 - 3	1.55 (0.90)	0.81	0.794**	0.839**	0.512**
Have difficulty in concentrating	0 - 3	1.49 (0.89)	0.80	0.748**	0.592**	0.809**
Make slips of the tongue when speaking	0 - 3	1.26 (0.88)	0.78	0.688**	0.468**	0.869**
Find it difficult to find the correct word	0 - 3	1.31 (0.88)	0.78	0.675**	0.439**	0.887**
Have memory problems	0 - 3	1.36 (0.67)	0.44	0.636**	0.488**	0.714**
Physical Fatigue	0 - 21	11.85 (4.54)	20.63			
Mental Fatigue	0 - 12	5.41 (2.76)	7.62			
Chalder Fatigue Scale Total	0 - 33	17.27 (6.58)	43.35			

** Correlation is significant at the 0.01 level,
The Chalder Fatigue Scale (11 items) was used.

Burnout

Using the CBI, people are considered to have BO if they score ≥50. The results showed that 57.9% of the participants reported having BO, with 12% reporting high and severe scores. More people reported personal and work-related BO and it is notable that 2.8% reported severe personal BO. The mean overall BO score was at a moderate level, 52.6 (SD18.8). Personal BO was the subcategory with the highest mean score (61, SD20.3) (see Table 5).

Table 5: Percentage of people reporting Burnout

	Personal Burnout		Work-related Burnout		Client-related Burnout		Total Burnout	
	N		N		N		N	
No/low Burnout: 0-49	113	24.2%	145	31.0%	300	64.2%	196	42.1%
Moderate BO: 50-74	192	41.1%	202	43.3%	129	27.6%	214	45.9%
High BO: 75-99	149	31.9%	118	25.3%	32	6.9%	55	11.8%
Severe BO: 100	13	2.8%	2	0.4%	6	1.3%	1	0.2%
Mean	467	61	467	57.1	467	38.9	467	52.6
		(SD20.3)		(SD21.6)		(SD23.8)		(SD18.8)

Regarding personal BO, HCPs felt physically and emotionally tired; they 'could not take it anymore' and frequently felt exhausted or worn out. Regarding work-related and client-related BO, HCPs reported being emotionally exhausted, particularly at the end of the day and from the idea that they had to work which they were finding difficult to do. They also reported frustration with their work and to a small degree with working with patients, often wondering how much longer they would be able to do so (see Table 6).

Table 6. Copenhagen Burnout Inventory and item correlations

Variable	Always/ very high degree	Often/ high degree	Sometimes/ Somewhat	Seldom/ low degree	(Almost) Never/ very low degree	Mean (SD)	Burnout Pearson Correlation
Personal burnout (N = 467)							
How often do you feel tired?							
	12.2	58.5	24.8	4.1	0.4	69.5 (18.1)	0.655**
How often are you physically exhausted?							
	9.4	46.7	29.8	12.8	1.3	62.5 (21.9)	0.696**
How often are you emotionally exhausted?							
	16.3	47.3	21.6	12	2.8	65.5 (24.6)	0.732**
How often do you think: "I can't take it anymore"?							
	13.7	33	25.9	18.6	8.8	56 (29.1)	0.777**
How often do you feel worn out?							
	12.6	40.3	29.3	15.4	2.4	61.3 (24.3)	0.795**
How often do you feel weak and susceptible to illness?							
	9.4	27.2	31.7	22.7	9	51.3 (27.7)	0.656**
Average Total Score (Personal burnout)						61 (20.3)	

Work-related burnout (N = 467)							
Is your work emotionally exhausting?							
	27.8	39.6	20.6	8.4	3.6	69.9 (26.2)	0.664**
Do you feel burnt out because of your work?							
	22.9	33.8	25.3	12	6	63.9 (28.5)	0.824**
Does your work frustrate you?							
	17.1	16.1	25.1	18.4	23.3	46.3 (34.8)	0.722**
Do you feel worn out at the end of the working day?							
	17.1	46.5	25.3	9.6	1.5	67 (22.9)	0.771**
Are you exhausted in the morning at the thought of another day at work?							
	13.5	25.1	33.6	18.8	9	53.8 (28.7)	0.742**
Do you feel that every working hour is tiring for you?							
	9.2	21	35.1	26.6	8.1	49.1 (27)	0.787**
Do you have enough energy for family and friends during leisure time?							
	1.9	25.7	46.5	21	4.9	49.6 (21.5)	0.557**
Average Total Score (Work-related burnout)						57.1 (21.6)	
Client-related burnout (N = 467)							
Do you find it hard to work with clients?							
	4.9	18.8	28.5	25.7	22.1	39.7 (29.1)	0.646**
Do you find it frustrating to work with clients?							
	2.6	5.8	22.5	29.3	39.8	25.4 (26)	0.635**
Does it drain your energy to work with clients?							
	9	26.6	28.9	19.7	15.8	48.2 (30.1)	0.646**
Do you feel that you give more than you get back when you work with clients?							
	19.5	24.8	22.1	15.8	17.8	53.1 (34.3)	0.601**
Are you tired of working with clients?							
	3.9	8.4	25.3	28.1	34.5	29.7(27.8)	0.647**
Do you sometimes wonder how long you will be able to continue working with clients?							
	7.1	15.4	26.3	22.9	28.3	37.5 (31.1)	0.684**
Average Total Score (Client-related burnout)						38.9 (23.8)	
Average Total Score						52.6 (18.8)	1

** Correlation is significant at the 0.01 level

There was a high reliability for the CBI scale, with a Cronbach's α=0.939 and high reliability scores for all three subscales. Item analysis showed no possibility for further improvement of Cronbach's α (see Table 7).

Table 7: Cronbach's α for the CBI

N=467	Cronbach's α	Range among items
Personal Burnout	α=0.909	α=0.875 – 0.910
Work-related burnout	α=0.898	α=0.868 – 0.902
Client-related burnout	α=0.886	α=0.857 – 0.887
Total CBI	α=0.939	

Quality of Life

Using the EQ-5D-5L, there were 134 different health states reported. Health profiles were calculated from the UK value set. The EQ-score had a mean of 0.70 (SD 0.20), a median of 0.73, and a range from -0.169 to 1.00. Most participants stated that they had no problem walking ($p < 0.001$), no problem washing or dressing themselves ($p<0.001$), no problem / little problems in doing their usual activities ($p<0.001$), no / little pain or discomfort ($p<0.001$), and low / moderate anxiety or depression ($p<0.001$) (see Table 8)

Table 8: EQ-5D-5L reported percentages

	Mobility n (%)	Self-care n (%)	Usual activities n (%)	Pain/ Discomfort n (%)	Anxiety/ Depression n (%)
No problem	322 (69)	435 (93.1)	243 (52)	127 (27.2)	93 (19.9)
Slight problems	90 (19.3)	25 (5.4)	134 (28.7)	206 (44.1)	177 (37.9)
Moderate problems	36 (7.7)	7 (1.5)	67 (14.3)	103 (22.1)	129 (27.6)
Severe problems	19 (4.1)	0 (0)	18 (3.9)	28 (6)	53 (11.3)
Extreme problems/ unable to do	0 (0)	0 (0)	5 (1.1)	3 (0.6)	15 (3.2)
Total	467 (100)	467 (100)	467 (100)	467 (100)	467 (100)

Correlations

Job stress positively correlated with total fatigue and its subscales, as well as with BO and all its subscales individually. It negatively correlated with QoL (see Tables 9, 10, and 11). Fatigue positively related with total BO and with its subscales. Total fatigue and its physical and mental components also negatively correlated with quality of life (see Tables 10 and 11).

Table 9: Correlations between job stress, total fatigue, and quality of life

	Job Stress Measure	Fatigue (total)1	Burnout2	EQ-5D-5L
Job Stress Measure				
Fatigue (total)†	0.543 **			
Burnout‡	0.620 **	0.630 **		
EQ-5D-5L	-0.327 **	-0.514 **	-0.483 **	

** Correlation is significant at the 0.01 level, †Measured with the CFS, ‡Measured with the CBI

Table 10: Correlations between fatigue subscales, job stress, burnout and quality of life

	Physical Fatigue†	Mental Fatigue†
Mental Fatigue	0.602**	
CFS (total)	0.942**	0.835**
Job Stress Measure	0.550**	0.390**
CBI (total)	0.644**	0.443**
Personal Burnout‡	0.677**	0.462**
Work Related Burnout‡	0.656**	0.435**
Client Related Burnout‡	0.342**	0.257**
EQ-5D-5L	-0.470**	-0.453**

** Correlation is significant at the 0.01 level, CFS=Chalder Fatigue Scale, CBI= Copenhagen Burnout Inventory, †Measured with the CFS, ‡Measured with the CBI

Table 11: Correlations between Burnout subscales, job stress, fatigue, and quality of life

	Personal Burnout	Work Related Burnout	Client Related Burnout
Work Related Burnout†	0.782**		
Client Related Burnout†	0.480**	0.569**	
Job Stress Measure	0.566**	0.640**	0.394**
Fatigue (total) ‡	0.661**	0.635**	0.343**
Physical Fatigue‡	0.677**	0.656**	0.342**
Mental Fatigue‡	0.462**	0.435**	0.257**
EQ-5D-5L	-0.534**	-0.470**	-0.259**

** Correlation is significant at the 0.01 level, †Measured with the CBI, ‡Measured by the CFS

BO positively correlated with physical and mental fatigue and negatively with QoL. Personal BO showed a fairly high correlation with work-related BO, but moderate with client-related BO. It also positively correlated with physical and mental fatigue. Work-related BO correlated with client-related BO, physical fatigue, and mental fatigue. Finally, client-related BO associated with physical fatigue and mental fatigue. All BO subscales negatively correlated with QoL, personal BO, work-related BO, and client-related BO (see Table 11).

Discussion

The study examined job stress, fatigue, BO, and QoL reported by HCPs during the second and third waves of the COVID-19 pandemic in two European countries. All scales showed high reliability in the study. As expected, a large proportion of HCPs worked with patients with COVID-19. Participants reported work changes including increased hours, fewer breaks, and more obligations. Tasks like time spent at work, number of tasks assigned, and lack of job security correlated with job stress, which is in line with relevant literature.[49] [50]

HCPs reported a total of 17.2 (SD 6.5, Std. Error .305) of fatigue on the CFS, which is higher than that reported by HCPs (nurses) (13.5, SD 4.5),[51] or the general population (14.2, SD 4.6)[52] prior to the pandemic period, and higher than people who previously had COVID-19 (15.1, SD 5,[53] (13.4, SD 4.5),[54] including teenagers (13.5, SD 5.2),[55] in the early days of the pandemic. The consequences of fatigue have been well documented in the literature. Longer working hours, especially if they are mandatory, and highly demanding jobs with low reward and autonomy relate with fa-

[49] Zhang & al., (n10).

[50] Janet Alexis A. de Los Santos & Leodoro J. Labrague, 'The Impact of Fear of COVID-19 on Job Stress, and Turnover Intentions of Frontline Nurses in the Community: A Cross-Sectional Study in the Philippines', (2021) 27(1) *Traumatology* 52.

[51] Corné A. M. Roelen & al., 'Physical and Mental Fatigue as Predictors of Sickness Absence among Norwegian Nurses', (2013) 36(5) *Research in Nursing & Health* 453.

[52] Cella & Chalder, (n 36).

[53] Knut Stavem & al., 'Prevalence and Determinants of Fatigue After COVID-19 in Non-Hospitalized Subjects: A Population-Based Study', (2021) 18(4) *International Journal of Environmental Research and Public Health* 2030.

[54] Liam Townsend & al., 'Persistent Fatigue Following SARS-CoV-2 Infection is Common and Independent of Severity of Initial Infection', (2020) 15(11) *PloS One* e0240784.

[55] Benjamin Caesar & al., 'Evaluation of Physician Burnout at a Major Trauma Centre using the Copenhagen Burnout Inventory: Cross-Sectional Observational Study', (2020) 189(4) *Irish Journal of Medical Science* 1451

tigue; these often only require modest levels to correlate with complex cognitive functions, like decision making ability and communication skills, tasks essential when dealing with emergency situations, which could lead to human error.[56]

Nearly 58% of respondents reported having BO, which is lower than the 78% reported by doctors and nurses of Greece's largest hospital in Athens.[57] This could be because in our study not all participants worked in a hospital. Our sample reported moderate levels of BO (52.63, SD 18.8, Std. Error .886), which is slightly higher than that reported by surgeons working in trauma units (50, SD 12.79)[58] and nurses (46.71)[59] prior to the pandemic. It is also higher than that reported by a Greek sample of nurses during the pandemic (46.95, SD 18.75).[60] Personal BO was higher than work-related BO and client-related BO. This is similar to other results among nurses[61] [62] and slightly different to another study on Greek nurses where higher work-related BO was found.[63]

The mean QoL reported by HCPs in our study was 0.70 (SD 0.20) on the EQ-5D-5L. This result is very similar to that reported by the Greek general population prior the pandemic (0.72, SD 0.3; mean VAS 74.71, SD 18.89),[64] but lower than during the

[56] Ulises Techera & al., 'Causes and Consequences of Occupational Fatigue', (2016) 58(10) *Journal of Occupational and Environmental Medicine* 961.

[57] Dimitra Latsou & al., 'Professional Quality of Life and Occupational Stress in Healthcare Professionals during the COVID-19 Pandemic in Greece', (2022) 15 *Health Services Insights* 11786329221096042.

[58] Caesar et al., (n 55).

[59] Michael Clinton & Roulla Shehadeh, 'Rasch Analysis of Lebanese Nurses' Responses to the Copenhagen Burnout Inventory Alternative to the Maslach Burnout Inventory', (2021) 7 *SAGE Open Nursing* 237796082110209.

[60] Christos Sikaras & al., 'Nursing Staff Fatigue and Burnout during the COVID-19 Pandemic in Greece', (2022) 9(1) *AIMS Public Health* 94.

[61] Aoyjai P. Montgomery, Andres Azuero & Patricia A. Patrician, 'Psychometric Properties of Copenhagen Burnout Inventory among Nurses', (2021) 44(2) *Research in Nursing & Health* 308.

[62] Duaa Aljabri & al., 'Sociodemographic and Occupational Factors Associated with Burnout: A Study among Frontline Healthcare Workers during the COVID-19 Pandemic', (2022) 10 *Frontiers in Public Health* 854687.

[63] Sikaras & al., (n 60).

[64] John N. Yfantopoulos & Athanasios E. Chantzaras, 'Validation and Comparison of the Psychometric Properties of the EQ-5D-3L and EQ-5D-5L Instruments in Greece', (2017) 18(4) *The European Journal of Health Economics* 519.

pandemic (mean 0.813, SD 0.18)[65] and higher than that of people who previously had COVID-19 (0.61, SD0.006).[66]

The second wave of the pandemic hit Greece harder, and the preceding cuts to healthcare staff[67] meant that COVID-19 management grew as a challenge. During the fourth pandemic wave, 13.5% of HCPs at a COVID-19 reference hospital in Greece reported severe PTSD.[68] This highlights the importance of studying the needs of these professionals, but also of creating safety nets, including preventative measures for the ongoing fallout of the COVID-19 pandemic and other pandemics or epidemics that may follow in the future.

Though COVID-19 is now much better managed around the world and the WHO has declared the end of the pandemic, the consequences remain. With a prevalence of more than 0.3%, Long COVID affects many, and fatigue is its most prevalent symptom.[69] With 11% of HCPs globally infected with COVID-19,[70] a significant number are expected to have their own health problems that could, in turn, increase BO. It is essential for governments to look at factors that can reduce the risk of developing BO, which include adequate training, a reduction in working hours, and safer working environments.[71] Our findings show that the pandemic impacted the wellbeing of the HCPs as of its early days, so the healthcare systems need to enforce a strategic approach to reduce or, better, eliminate these negative circumstances, and more widely protect public health.

[65] Sara Olofsson & al., 'Quality of Life in the Swedish General Population during COVID-19 - Based on Pre- and Post-Pandemic Outbreak Measurement', (2021) *Nordic Journal of Health Economics* 56.

[66] Morteza Arab-Zozani & al., 'Health-Related Quality of Life and its Associated Factors in COVID-19 Patients', (2020) 11(5) *Osong Public Health and Research Perspectives* 296.

[67] Constantinos Siettos & al., 'A Bulletin from Greece: A Health System Under the Pressure of the Second COVID-19 Wave', (2021) 115(3) *Pathogens and Global Health* 133.

[68] Dimitra Lekka & al., 'Health Professionals in a COVID-19 Reference Hospital: Post-Traumatic Stress Disorder (PTSD) Levels and their Associations with Psychological Resilience and Quality of Life', (2022) 14(2) *Curēus* e22473.

[69] Chen Chen & al., 'Global Prevalence of Post-Coronavirus Disease 2019 (COVID-19) Condition or Long COVID: A Meta-Analysis and Systematic Review', (2022) *The Journal of Infectious Diseases* 1593.

[70] Tafadzwa Dzinamarira & al., 'COVID-19 Prevalence among Healthcare Workers. A Systematic Review and Meta-Analysis', (2021) 19(1) *International Journal of Environmental Research and Public Health* 146.

[71] Caesar et al., (n 55).

Study limitations

The current study is limited by the fact that it used a cross-sectional design to collect data; however, self-report is a common research design that helps reveal associations without drawing conclusions about causality. Another limitation is the online design that was followed, as it can be argued that it attracted the participation of those who had a prior interest in the topic, which undermines the potential for generalisability. But, particularly during pandemic-related social distancing regulations, this mode of data collection is widely used and accepted in research. The fact that our study agrees with other reports in the literature strengthens the findings regardless of the collection method used. Finally, all evaluation tools used were self-reports; those who reported as being at risk of developing mental health problems need an official evaluation by a health professional to confirm a diagnosis.

Conclusion

In conclusion, the current study shows that the job stress, BO, and fatigue reported by HPCs in Greece and Cyprus as early as the first year of the pandemic significantly associate with lower QoL. Those who worked to help the population during the COVID-19 pandemic remain at risk of having a mental health crisis. As a job should not define the personal wellbeing of any human, the maintenance of a good QoL of HCPs is essential. The results of the current study highlight the necessity to have created support programmes not after the end of the last pandemic, but as soon it had started. As pandemics of different types are likely imminent, part of pandemic preparedness and planning should be the protection of HCPs from the negative work-related consequences they may face. Greek and Cypriot governments must be proactive to protect HCPs as a matter of urgency.

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