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Original Article

Occupational burnout among radiographers in Urmia hospitals, Iran: a study two and a half years after the onset of the COVID-19 pandemic

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Abstract

Background & Aims: This study was conducted two and a half years after the onset of the coronavirus disease 2019 (COVID-19) pandemic to evaluate the occupational burnout rates among radiographers of Urmia hospitals in Iran, and to investigate the factors influencing their mental health and burnout during this period.

Materials & Methods: This cross-sectional study was conducted based on a questionnaire. The questionnaire was designed in three sections: the first part collected data on sociodemographic characteristics; the second section included questions related to the participants' COVID-19 conditions, and the last part included the Maslach Burnout Inventory Human Services Survey (MBI-HSS) to evaluate the occupational burnout rates among respondents. A total of 142 responses were analyzed using one-way analysis of variance (ANOVA) and independent samples t-test in SPSS version 20.

Results: The mean (\pm SD) scores for subscales of burnout including emotional exhaustion, depersonalization, and personal accomplishment were 15.19 (\pm 12.60), 3.11 (\pm 4.25), and 35.28 (\pm 9.54), respectively. Factors associated with COVID-19, as well as income and maternal status, showed the strongest correlation with the subscales of burnout.

Conclusion: Although, at the time of our study, there was a significant decrease in the number of new COVID-19 cases, stress related to the coronavirus was still common among radiographers. This highlights the importance of ongoing monitoring of staff mental health over extended periods. Implementing measures such as providing adequate facilities to reduce the risk of infection transmission, along with ensuring fair compensation and appropriate salaries during crises, can significantly improve the mental health of healthcare workers.

Keywords: Burnout, COVID-19, Maslach Burnout Inventory, Radiographer

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Introduction

According to the World Health Organization (WHO), ensuring a healthy workplace entails providing both a suitable psychosocial and physical work environment. This is crucial for promoting health, safety, and overall well-being of employees. It is particularly essential to recognize the connection between the mental and physical health of workers, the community that they serve, and the health of the organization and society as a whole (1).

The healthcare industry is recognized as one of the most demanding professions with numerous stressors present in the working environment (2). With challenges such as heavy workloads, job-related tasks, extended hours, supervisor pressure, limited social support, and irregular shift schedules (3), healthcare workers need to possess an elevated level of physical and emotional endurance to effectively navigate these difficulties in the workplace (4).

Sometimes the relentless pressure and expectations faced by healthcare professionals can exceed their ability to effectively cope, resulting in job burnout (5). Individuals experiencing Burnout Syndrome (BOS), often go through a substantial decline in their emotional well-being and an increasing sense of dissatisfaction with their jobs. This emotional distress hampers their ability to adapt to the work environment and makes them susceptible to developing negative attitudes toward their jobs, colleagues, and patients (5). Subsequently, the effects of burnout can have a detrimental impact on the healthcare system in various ways such as lowering the quality of patient care, encouraging early retirement and even increasing the likelihood of medical errors (6). Enhancing safety in radiology is crucial, as errors may occur at various stages of the imaging procedure, potentially leading to increased patient doses, misdiagnosis, or treatment errors (7).

Adequate occupational burnout management plays a vital role in preserving the safety, health, and well-being of patients and staff, as well as ensuring the efficient operation of the organization (8). Thus, the importance of maintaining good mental health cannot be overstated as it directly impacts an individual's capacity to fulfill their duties and thrive in their work environment (4). By prioritizing mental well-being, healthcare workers can enhance their ability to excel in their roles, effectively manage stress, and provide the highest level of care to their patients.

The outbreak of coronavirus disease 2019 (COVID-19) significantly altered the working conditions within healthcare facilities, exacerbating the already challenging nature of this environment. The radiology unit, as a part of the health system during the crisis, encountered unparalleled obstacles in ensuring the continuation of radiology services while also safeguarding the well-being of both healthcare staff and uninfected individuals in the community (9). The utilization of imaging modalities such as Chest CT scans and chest X-rays became widespread for diagnosing, monitoring, and treating suspected and confirmed cases of COVID-19 (10, 11) This increased reliance on radiodiagnostic procedures placed a substantial burden on radiology departments (12), further complicating their operational landscape during these trying times.

Studies have shown short-term and long-term adverse effects of working during disasters and pandemics (13, 14). The timing of our study, which was conducted during the final stage of the COVID-19 pandemic, holds significant importance. By exploring burnout in this specific period, we can gain valuable insights into the probable prolonged effects of such a crisis on the well-being of radiology experts. This information can serve as a foundation for implementing targeted support mechanisms to mitigate burnout risks and ensure the continued provision of high-quality healthcare services.

Materials & Methods

We conducted a cross-sectional study during July and August 2022. The participants comprised all the radiographers of medical imaging departments in Urmia hospitals of Iran (public and private). A total of 142 responses (out of 150) were analyzed.

The questionnaire was designed in several parts. The first part retrieved sociodemographic data. The second section contained three questions related to COVID-19, evaluating if the staff had regular COVID-19 tests, had proper access to personal protective equipment, and felt any changes in the behavior of family with them due to fear of COVID-19. The last part included the Persian translation of the Maslach Burnout Inventory Human Services Survey (MBI-HSS) (15). The reliability of the Persian translation of MBI was verified in Iran using Cronbach's alpha coefficient (16, 17). The last part of the questionnaire consists of 22 questions related to three dimensions of burnout. The cut-off points used are depicted in Table 1. Emotional exhaustion (EE) scores of 30 and higher, Depersonalization (DP) scores of 12 and higher, and Personal accomplishment (PA) scores of 33 and lower are known as occupational burnout.

Data were analyzed using SPSS version 20. Within the SPSS software, a one-way analysis of variance (ANOVA) or independent samples t-tests were employed to examine the association between burnout subscale scores and various variables. A p value less than 0.05 was used as the significance level.

Table 1. Cut-off values for each dimension of occupational burnout

N . H	Cut-off score			
Burnout dimension	Low	Moderate	High	
EE	0 - 17	18 - 29	30 - 54	
DP	0 - 5	6 - 11	12 - 30	
РА	0 - 33	34 - 39	40 - 48	

EE: Emotional exhaustion; DP: Depersonalization; PA: Personal accomplishment

Results

A total of 150 responses were collected through online and offline questionnaires, including radiographers from the public and private sectors, which 142 responses were analyzed. Of those 61 (43%) were male and 81 (57%) were female. The majority of them had a Bachelor's degree. Subjects' sociodemographic characteristics are presented in Table 4. The prevalence of occupational burnout among the radiographers in Urmia hospitals is shown in Table 2. The mean (\pm SD) score for emotional exhaustion, depersonalization, and personal accomplishment were 15.19 (\pm 12.60), 3.11 (\pm 4.25), and 35.28 (\pm 9.54), respectively. Figure 1 shows that the percentage of radiographers who were at moderate to high risk of burnout for EE, DP, and PA were 34.50%, 20.40%, and 65%, respectively.

Table 2. Level of burnout subscale scores among radiographers

Burnout subscales	Scores (Mean ± SD)
EE	15.19 ± 12.60
DP	3.11 ± 4.25
РА	35.28 ± 9.54



Fig. 1. The frequency of burnout subscales with low, moderate, and high levels among radiographers (high in DP and EE dimensions and low in PA subscale referring to higher burnout)

As shown in Table 3, 54.2% of radiographers assumed that there was not a regular COVID-19 test, and 33.8% have experienced changes in family members' behaviors due to fear of COVID-19 (such as

distancing). Only 3 radiographers believed that personal protective equipment was rare. 64.8% of radiographers assumed that they had proper access to personal protective equipment.

Table 5. Contration between burnout subscale scores and COVID-17-related variables						
Variable		Frequency (percentage) —	Burnout subscale scores Mean ± SD			
			EE*	DP**	PA***	
Regular COVID-19 tests	Yes No	65 (45.8%) 77 (54.2%)	$11.64 \pm 9.81 \\ 18.19 \pm 13.90 \\ (p = 0.001)$	1.58 ± 2.11 4.40 ± 5.10 (p = 0.0001)	38.60 ± 6.90 32.48 ± 10.51 (p = 0.001)	
Access to adequate personal protective equipment	Low Average Adequate	3 (2.1%) 47 (33.1%) 92 (64.8%)	34 ± 25.90 15.80 ± 12.80 14.26 ± 11.61 (p = 0.02)	7.33 ± 6.60 3.44 ± 4.90 2.80 ± 3.70 (p = 0.15)	23.33 ± 7 32.90 ± 11.20 36.89 ± 8.11 (p = 0.005)	
Change in Family members' behaviors because of fear of COVID-19	Yes No	48 (33.8%) 93 (65.5%)	$16.37 \pm 12.62 \\ 14.71 \pm 12.60 \\ (p = 0.8)$	3.04 ± 4.51 3.18 ± 4.10 (p = 0.23)	36.27 ± 9.12 34.66 ± 9.70 (p = 0.62)	

Table 3. Correlation between burnout subscale scores and COVID-19-related variables

* Emotional exhaustion, ** Depersonalization, *** Personal accomplishment

Table 3 shows that COVID-19-related variables, including regular COVID-19 tests in the workplace and personal protective equipment, had a significant influence on burnout subscales. The absence of regular COVID-19 tests in the workplace was related to higher EE, DP, and lower PA scores (p < 0.001). Inadequate access to personal protective equipment was associated with increased EE and decreased PA (p < 0.05). Changing the behavior of family members due to the fear of COVID-19 showed no significant relationship with the burnout subscales.

The relationships between demographic and occupational characteristics with burnout subscales are reported in Table 4. This study demonstrated that income was another important factor that had a significant impact on burnout. By increasing income, PA score increased significantly (p < 0.05). The personal accomplishment scores for radiographers with low, moderate, and high income were 32.82 ± 12.21 , 35 ± 8.70 , and 38.80 ± 6.90 , respectively. Radiographers with a low income had the lower mean score for the PA subscale, which placed them in the high-risk group for occupational burnout in the PA subscale according to cutoff points. Radiographers with moderate and high income were at a moderate risk of burnout (Table 4).

Moreover, the prevalence rate of DP among married radiographers was significantly lower than single ones (p < 0.05).

In our study, no significant association was identified between burnout subscale level and other variables such as gender, age, degree, owning children, and years of experience (Table 4).

Table 4. Relationship	between burnout	subscales and	Sociodemographic	characteristics of the	e participants
			8		I I

Variables		Frequency	Burnout subscale scores		
		(percent)	EE	DP	РА
Gender F	M-1-	(1 (420/)	13.92 ± 11.73	3.40 ± 4.20	35.90 ± 9.30
	Male	61 (43%) 81 (57%)	16.16 ± 13.21	2.88 ± 4.20	34.80 ± 9.60
	Female	emale 81 (57%)	(p = 0.09)	(p = 0.5)	(p = 0.9)
Age	20 - 29	44 (31%)	13.43 ± 12	3.15 ± 4.11	36.11 ± 9.41
	30 - 39	44 (31%)	16.79 ± 13.51	3.90 ± 4.90	32.47 ± 9.80

Mariahlar		Frequency Burnout subscale scores			res
variables		(percent)	EE	DP	РА
	>40	54 (38%)	15.33 ± 12.33	2.42 ± 3.50	36.90 ± 8.90
			(p = 0.45)	(<i>p</i> = 0.22)	(p = 0.05)
Number of	.5		13.55 ± 12	3.58 ± 4.31	35.60 ± 9.61
years of	< 3	38 (26.8%)	15.80 ± 13.30	3.29 ± 4.60	34.21 ± 9.70
experience in	5-15	58 (40.8%)	15.78 ± 12	2.50 ± 3.60	36.30 ± 9.21
the profession	>15	40 (32.4%)	(<i>p</i> = 0.6)	(p = 0.47)	(p = 0.54)
III altered	Associate degree	12 (8.5%) 116 (81.7%) 14 (9.9%)	19.66 ± 12.70	1.90 ± 2.60	36.41 ± 8.70
Highest	Bachelor's degree		14.57 ± 12	$3.13 \pm \!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!\!$	35.37 ± 9.10
qualification	Master's degree or		16.50 ± 15.60	$3.90{\scriptstyle~\pm6.10}$	33.64 ± 13.60
level	higher		(p = 0.38)	(p = 0.48)	(p = 0.74)
Marital	<u>C'a 1</u>	55 (38.7%) 87 (61.3%)	15.82 ± 13.86	4 ± 5	34.30 ± 10.30
Marital	Marital Single		14.80 ± 11.80	2.55 ± 3.50	35.90 ± 8.90
status	warried		(p = 0.35)	(<i>p</i> = 0.01)	(<i>p</i> = 0.2)
	Without	85 (59.9%) 57 (40.1%)	14.80 ± 12.70	3.41 ± 4.40	34.81 ± 9.80
Children	w ithout		15.71 ± 12.50	2.66 ± 3.90	36 ± 9.11
	with		(p = 0.9)	(<i>p</i> = 0.34)	(<i>p</i> = 0.7)
Income	< 00	34 (23.9%) 79 (55.6%) 29 (20.4%)	18 ± 14.71	3.94 ± 5.21	32.82 ± 12.21
	< 90		14.80 ± 12.41	3.26 ± 4.20	35 ± 8.70
(million	90 - 120		12.81 ± 9.72	1.72 ± 2.22	38.80 ± 6.90
Rial)	> 120		(p = 0.25)	(p = 0.1)	(p = 0.04)

Occupational burnout among radiographers in Urmia hospitals, Iran: a study two and a half years after the onset of the COVID-19 pandemic

Discussion

In this study, we assessed the level of occupational burnout subscales among radiographers of Urmia hospitals in Iran that was conducted approximately two and a half years after the onset of the coronavirus. The mean scores of burnout subscales including EE, DP, and PA were 15.19 (\pm 12.60), 3.11 (\pm 4.25), and 35.28 (\pm 9.54), respectively. These results demonstrated that the EE and DP levels of radiographers in Urmia hospitals were low and the PA level was moderate, which indicates the low level of occupational burnout in them.

One of the most important factors affecting occupational burnout was the variables related to Covid-19. Despite a notable decrease in the number of new cases and fatalities during our study period, distress related to the coronavirus was still evident widely among radiographers. Factors related to COVID-19 including regular COVID-19 tests and access to personal protective equipment showed a deep correlation with all burnout subscales. Sense of vulnerability, loss of control, and concern for the health of self and family are feelings that affect the workers' reaction to the pandemic-created situation (18). Radiographers who had regular COVID-19 tests in their workplace showed lower EE and DP and higher PA compared to those who hadn't regular COVID-19 tests (p < 0.05). Moreover, for radiographers who were more satisfied with their access to personal protective equipment, their EE and PA scores were lower and higher, respectively. The high rate of burnout among medical imaging workers who did not have regular COVID-19 tests or access to personal protective equipment may be due to the fear of being infected with the COVID-19 virus and transmitting it to other people.

Stress and burnout related to fear of exposure or transmission were reported in previous studies during the COVID-19 pandemic (19-21). The study by Pereira et al. (22) reported that fear of getting the infection in Portuguese radiographers was associated with higher scores for EE and DP (p < 0.001). In addition, fear of transmitting the virus to family members or other people

was associated with higher EE scores (p < 0.001). Their study showed that elevating the level of protection, ensuring the safety of radiographers, and providing proper personal protective equipment can be effective in reducing the risk of burnout in all three subscales of burnout (22). Considering radiographers' fear of being infected with the COVID-19 virus and transmitting it to others, conducting a COVID-19 test for radiographers following potential exposures to infection and wearing surgical masks at a distance of one meter from people regardless of their COVID-19 status can potentially reduce the anxiety related to the spread of infection (23).

The third factor associated with the COVID-19 pandemic is the Change of Family members' behaviors due to the fear of COVID-19, which causes them to distance themselves from the healthcare workers. This avoidance can potentially impact the relationships of healthcare workers with their profession, leading to a decreased sense of efficacy and a more detached attitude toward their work. Lasalvia et al. have highlighted the detrimental effects of this factor on burnout (24). In our study, 48 out of 142 respondents (33.8%) reported experiencing such avoidance within their families. Surprisingly, our findings revealed no statistically significant correlation between this factor and burnout levels among radiographers.

Our study was conducted approximately two and a half years after the onset of the coronavirus. Despite a significant decrease in the number of cases and fatalities during our study period, the impact of COVID-19 on mental health and burnout among staff was remarkable. This finding demonstrates the long-term effects of COVID-19 on the burnout level of radiographers, which is in line with the results of studies in other countries (24-28). Several studies have reported that stressors related to the infection outbreak decrease over time, while feelings of burnout can persist for 1–3 years later (24, 29-31). This approach highlights the importance of monitoring the prolonged effects of the pandemic on the mental health of radiographers and other healthcare providers.

According to the results of our study, most of the sociodemographic and occupational factors (such as gender, age, years of experience, degree, and owning children) showed no statistically significant association with the burnout level. The present study demonstrated that married radiographers showed a lower level of DP in comparison with single ones, indicating a lower level of burnout among married radiographers. This finding was in agreement with the results of other studies, which showed that married participants were less at risk of burnout (32-35).

It has been observed that salary was another important factor related to the burnout. A lower salary was associated with a lower PA score. It has been shown that despite the obvious impact of the COVID-19 condition on the mental health of healthcare workers and burnout among them, they are more likely to attribute their burnout to inadequate salary rather than the COVID-19 condition (36). Adequate salaries and proper compensation make workers feel their hard work is valued and increase their satisfaction with their work (36, 37). Feeling valued in their job is consistently related to the sense of purposefulness in their work, which in turn is associated with reduced levels of stress and burnout (38). Thus, proper salary and fair compensation in the face of disasters like pandemics can improve the mental health of healthcare workers and decrease feelings of burnout triggered by such conditions.

This study had a number of limitations. We did not evaluate the psychological status of participants and were satisfied only with the answers of the participants. Another limitation of our study was its cross-sectional nature and data collection method. We used selfreported data collected during only one time period. Changes in income level, COVID-19-related factors, management, etc. may cause changes in the level of job burnout for the same samples.

Conclusion

To our knowledge, the number of studies conducted on the burnout level of radiographers in Iran is very few. For the first time, the present study investigated the occupational burnout level of radiographers in Urmia hospitals of Iran. Our results demonstrated that the mean levels of EE and DP were low among Urmia radiographers and the PA level was moderate. Most of the sociodemographic and occupational factors showed no statistically significant association with the burnout level. However; COVID-19-related factors and income level were considered as the contributing variables to burnout. The significant effect of coronavirus-related factors on the burnout subscale levels indicates that COVID-19 has had an important impact on the mental health of staff and the quality of their care. This highlights the importance of ongoing monitoring of staff mental health over extended periods.

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Authors' Contributions

None declared by authors.

Data Availability

The raw data of the article are available from the authors upon reasonable request.

Conflict of Interest

The authors declare that they have no conflict of interest.

Ethical Statement

The protocol was approved by the Ethics Committee of Urmia University of Medical Sciences with the code of ethics IR.UMSU.REC.1401.355.

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