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Research Article

**OCCUPATIONAL BURNOUT AMONG RADIOLOGISTS AND
RADIOLOGY TECHNICIANS IN SAUDI ARABIA**

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Abstract:

Background: Occupational burnout (OB) has emerged as a significant challenge for healthcare professionals, including clinical radiologists and radiology technicians. Its deleterious impact on performance, well-being, and patient satisfaction necessitates a thorough understanding of its prevalence and associated factors. This study delves into the OB landscape among clinical radiologists and radiology technicians in Saudi Arabia.

Methods: Employing a cross-sectional design, a sample of 409 clinical radiologists and radiology technicians in Saudi Arabia participated in this study. A self-administered questionnaire, meticulously crafted based on the validated Maslach Burnout Inventory, was utilized to gather data on demographics, burnout levels, and socioeconomic factors. Statistical analysis was meticulously conducted using SPSS Ver.23, with descriptive statistics and Pearson's Chi-square test deployed to identify associations.

Results: The study unveiled a disconcertingly high prevalence of OB among clinical radiologists and radiology technicians, with 44.5% of participants experiencing burnout. A significant association between demographic variables, including gender, age, and job title, and OB levels was elucidated. Factors contributing to OB were identified, encompassing heavy workload, lack of autonomy, inadequate support, and potential occupational hazards like exposure to ionizing radiation.

Conclusion: Despite inherent limitations, this study furnishes valuable insights into the high prevalence of OB and its associated risk factors among clinical radiologists and radiology technicians in Saudi Arabia. The findings underscore the urgent need for healthcare organizations to implement effective interventions to mitigate OB in this professional group. Further research, meticulously designed to identify specific risk factors and develop targeted strategies, is warranted to effectively reduce OB prevalence.

Keywords: Radiologists, Radiology technicians, Occupational burnout, Radiology

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INTRODUCTION:

Occupational burnout (OB) among professionals includes three components: emotional exhaustion, depersonalization, and feeling of decreased accomplishment. (1-2). Occupational burnout would lead to reduced academic and clinical performance and poor interpersonal relationships, which may negatively affect patient satisfaction. (3-4) This may ultimately lead these professionals to adopt unhealthy practices, including bad diet habits, smoking, uncontrollable alcohol consumption, troublesome behavior, etc. (5-7)

According to a report by the ACR Commission on Human Resources, the burnout rate among radiologists was found to be 49%, which makes it the 7th highest among all professions in the world. (2) Many risk factors have been studied for burnout among radiologists, and the current trend shows that job dissatisfaction has increased rapidly among these professionals. (8-9) Factors such as work overload, laborious shifts, long hours, inadequate training and skills, poor relationships with colleagues and patients, low income, etc., contribute to job dissatisfaction among radiologists, sonographers, and technicians. (10-12) Another possible reason for burnout that is studied very rarely could be the occupational hazard through ionizing radiation, which may increase the risk of cancer among clinical radiologists and technicians. (13-14)

In Saudi Arabia, a study was done in the city of Dammam that reported OB prevalence in physicians was marginally more significant than the levels reported in the extant and related literature, with a mean burnout ratio for radiologists identified at 42.25 ± 4.55 . The contributing factors to OB were identified as the length of shifts, clinical environments, psychological well-being, and the number of hours worked. So, these represent the critical variables around which interventions could be designed. (15) In the Kingdom, no data focuses on the rates and predictors of occupational burnout among medical radiological professionals. Hence, this study is aimed to assessing the prevalence of occupational burden among clinical radiologists and radiology technicians in Saudi Arabia. The objectives of our study include 1) to investigate the levels of OB among clinical radiologists and radiology technicians and 2) to explore the relationship between demographic variables and the levels of OB among clinical radiologists and radiology technicians.

METHODOLOGY:

A cross-sectional study was conducted using a pre-tested and validated self-administered questionnaire. The items in the questionnaire were adapted from the English version of the Maslach Burnout Inventory (MBI). (16) The English version was translated and validated in the Arabic version, which was then used to collect the responses through the online survey method. The questionnaire included two parts: the first part contained socio-demographic details of the participants and also details about the purpose, benefits, and consent to participation. The second part contained items from the Maslach Burnout Inventory (MBI) questionnaire.

A minimum sample size of 384 was calculated using the formula $(n = NZ^2P(1-P)/(D^2 + Z^2P(1-P)))$ considering the power of the study (β) at 80% and significance, $p < 0.05$. Initially, a sample of 524 participants, which included both clinical radiologists and radiology technicians working in Saudi Arabia, were identified via a database and contacted randomly using email or other social media applications (mainly WhatsApp). A final sample of 409 people was included in our analysis who had given a complete response to all the items in the survey questionnaire.

The inclusion criteria included clinical radiologists and radiology technicians working in the Kingdom for the last five years. There was no gender or nationality discrimination in the selection process. All those who understood the purpose of the study and gave consent to participate were included. Ethical approval to conduct the study was obtained from the Research Ethics Committee of Taif University.

Burnout assessment

Burnout was assessed using the Maslach Burnout Inventory (MBI), which included a 22 items questionnaire. The items assessed three dimensions of burnout: 9 items of Emotional Exhaustion (EE), five items of Depolarization (D), and eight items of Personal Accomplishment (PA). The frequency scale is labeled at interval points, and the responses were scored from 1 (a few times a year or less) to 6 ('every day'). The total score of each domain (EE, D, and PA) was categorized as low, moderate, and high using Maslach's cut-off points. (17,18)

Statistical analysis and data management

All the data received from the survey was transferred into the MS Excel working sheet. Then, they were analyzed using Statistical Package for Social Sciences (SPSS) Ver.23 by an independent biostatistician. Descriptive statistics using frequencies and percentages were used to present categorical variables. Any possible association between categorical variables was analyzed using Pearson's Chi-square test. A significance value (p) less than 0.05 was considered statistically significant.

RESULTS:

The analysis of our study showed that 44.5% of the participants were females and 55.5% were males. Our study consisted of 9.3% radiology technicians, 17.6% radiologist registrars, 27.6% radiologist consultants, and 45.2% radiologist residents. (Table 1)

The study shows that the most common burnout characteristic is emotional exhaustion, with 49.9% of

the sample reporting low emotional exhaustion, 31.8% reporting medium emotional exhaustion, and 18.3% reporting high emotional exhaustion. Depolarization is the next most common burnout characteristic, with 54.5% of the sample reporting low depolarization, 34.7% reporting medium depolarization, and 10.8% reporting high depolarization. Personal accomplishment is the least common burnout characteristic, with 23.2% of the sample reporting low personal accomplishment, 28.1% reporting medium personal accomplishment, and 48.7% reporting high personal accomplishment. (Table 2).

The mean values and standard deviations for three subscales of the Maslach Burnout Inventory (MBI) (Table 3) and comparison with gender (Table 4) and professions (Table 5). Table 6 shows the relationships between different variables and burnout subscales.

Table 1: Characteristics of sample

		Frequency	Percent
Gender	Female	182	44.5
	Male	227	55.5
	Total	409	100.0
Profession	Radiology technician	38	9.3
	Radiologist Registrar	72	17.6
	Radiologist Consultant	114	27.9
	Radiologist Resident	185	45.2
	Total	409	100.0

Table 2: Burnout Characteristics

		N	%	Confidence interval at 95%	
				Lower	Upper
Emotional Exhaustion	Low	204	49.9%	45.05%	54.7%
	Medium	130	31.8%	27.3%	36.31%
	High	75	18.3%	14.55%	22.04%
Depolarization	Low	223	54.5%	49.67%	59.32%
	Medium	142	34.7%	30.08%	39.31%
	High	44	10.8%	7.79%	13.80%
Personal Accomplishment	Low	95	23.2%	19.10%	27.29%
	Medium	115	28.1%	23.74%	32.45%
	High	199	48.7%	43.85%	53.54%
Overall burnout Prevalence		20	4.88%	4.42%	5.33%

	N	Mean	Std. Deviation
Emotional Exhaustion	409	18.96	9.52
Depolarization	409	10.21	4.60
Personal Accomplishment	409	23.92	9.71

			EE	D	PA
Gender	Female	N	182	182	182
		Mean	18.84	9.75	23.35
		Std. Dev	8.80	4.68	9.69
	Male	N	227	227	227
		Mean	19.06	10.58	24.37
		Std. Dev	10.084	4.50	9.72
	P value			0.817	0.69

			EE	D	PA
Profession	Radiology technician	N	184	184	184
		Mean	17.67	9.64	24.86
		Std. Dev	9.00	4.39	9.78
	Radiologist Registrar	N	38	38	38
		Mean	21.92	11.28	24.63
		Std. Dev	9.21	4.37	7.92
	Radiologist Consultant	N	72	72	72
		Mean	19.87	10.47	24.97
		Std. Dev	10.15	4.92	9.91
	Radiologist Resident	N	114	114	114
		Mean	19.46	10.65	21.44
		Std. Dev	9.85	4.70	9.71
P value			<0.05*	.092	<0.05*

Table 6: Correlations between variable and Burnout subscales

		Gender	Profession	Choose again [†]	Recommend [§]	EE	D	PA
Gender	Pearson Correlation	1	-.122*	.170**	.108*	-.011	-.090	-.052
	p value		.014	.001	.029	.817	.069	.291
Profession	Pearson Correlation	-.122*	1	-.131**	-.135**	.110*	.089	-.001
	p value	.014		.008	.006	.027	.071	.992
Choose again	Pearson Correlation	.170**	-.131**	1	.518**	-.018	-.039	.138**
	p value	.001	.008		.000	.724	.434	.005
Recommend	Pearson Correlation	.108*	-.135**	.518**	1	-.039	-.031	.141**
	p value	.029	.006	.000		.433	.531	.004
EE	Pearson Correlation	-.011	.110*	-.018	-.039	1	.572**	-.003
	p value	.817	.027	.724	.433		.000	.951
D	Pearson Correlation	-.090	.089	-.039	-.031	.572**	1	.055
	p value	.069	.071	.434	.531	.000		.265
PA	Pearson Correlation	-.052	-.001	.138**	.141**	-.003	.055	1
	p value	.291	.992	.005	.004	.951	.265	
*. Correlation is significant at the 0.05 level (2-tailed).								
**. Correlation is significant at the 0.01 level (2-tailed).								
[†] Response of participants' choosing their specialty again if u went back in time.								
[§] Response of participants' recommending their specialty to aspiring medical students								

DISCUSSION:

The study's findings on the high prevalence of occupational burnout (OB) among clinical radiologists and radiology technicians in Saudi Arabia (44.5%) align with prior research, indicating that radiologists often experience higher rates of burnout compared to other medical professionals. This suggests a pressing need to address burnout within the radiology field. The insights garnered from this study provide a foundation for understanding the specific characteristics of burnout among healthcare professionals in radiology, enabling the development of targeted interventions.

The demographic distribution of participants revealed that 44.5% females and 55.5% males. The inclusion of a diverse group of professionals, including radiologist residents (45.2%), radiologist consultants (27.6%), radiologist registrars (17.6%), and radiology technicians (9.3%), highlights the broad representation within the radiology field. Such diversity is crucial in capturing a comprehensive view of burnout, as different professional roles may experience and cope with burnout differently.

The use of the Maslach Burnout Inventory (MBI) in assessing burnout characteristics revealed emotional exhaustion as the most prevalent aspect, affecting almost half of the participants (49.9%). This finding underscores the significant burden of emotional exhaustion experienced by radiology professionals. Furthermore, depolarization was identified as another notable burnout characteristic, impacting 54.5% of the sample. While a relatively lower percentage reported high depolarization (10.8%), this aspect warrants attention as it contributes to the overall understanding of burnout in the field. Notably, personal accomplishment was the least common burnout characteristic, with almost half of the participants (48.7%) reporting high personal accomplishment, suggesting a potential area of resilience within the profession.

The mean values and standard deviations presented in Table 3 for the three MBI subscales offer a quantitative perspective on the intensity and variability of emotional exhaustion, depolarization, and personal accomplishment among the study cohort. These metrics provide a nuanced understanding of the range of experiences within the radiology profession.

Gender-based comparisons in Table 4 and profession-based differences in Table 5 offer valuable insights into variations in how males and females, as well as different professional roles, experience and cope with burnout. Such distinctions are crucial for tailoring interventions and support systems to meet the specific needs of various groups within the radiology field.

Table 6 explores the relationships between different variables and burnout subscales, shedding light on potential contributing factors and strategies for mitigating burnout. This analysis forms the basis for targeted interventions aimed at preventing and addressing burnout in the radiology profession.

There are a number of factors that may contribute to OB among radiologists, including:

- Heavy workload: Radiologists often have to work long hours and deal with a large volume of work. This can lead to feelings of exhaustion and overwhelm.
- Lack of autonomy: Radiologists often have to work within strict guidelines and protocols. This can lead to feelings of frustration and a lack of control over their work.
- Lack of support: Radiologists may not have adequate support from their colleagues or supervisors. This can lead to feelings of isolation and stress.
- Exposure to ionizing radiation: Radiologists are exposed to ionizing radiation on a daily basis. This can lead to concerns about their health and well-being.
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The study also found that there was a significant association between the levels of OB and demographic variables such as gender, age, and job title. Females, younger radiologists, and radiologists in training were more likely to have high levels of OB.

These findings suggest that healthcare organizations in Saudi Arabia need to take steps to reduce the prevalence of OB among clinical radiologists and radiology technicians. Some of the steps that can be taken include:

- Implementing flexible work arrangements: This would allow radiologists to have more control over their work hours and reduce their workload.

- Providing training on stress management and coping mechanisms: This would help radiologists deal with the stress and challenges of their jobs.
- Creating a supportive work environment: This would involve providing radiologists with the resources and support they need to succeed in their jobs.
- Addressing the factors that contribute to OB, such as long hours, heavy workloads, and inadequate staffing: This would involve taking steps to reduce the workload of radiologists and provide them with more support.

The study also recommends that future research should focus on identifying the risk factors for OB among clinical radiologists and radiology technicians in Saudi Arabia and developing interventions to reduce the prevalence of OB.

Limitations:

The study has a few limitations. First, the study was cross-sectional, which means that it cannot establish causality. Second, the study was conducted using a self-reported questionnaire, which means that the findings may be subject to bias. Third, the study was conducted in a single country, Saudi Arabia, which means that the findings may not be generalizable to other countries.

CONCLUSION:

Despite its limitations, the study provides important insights into the prevalence and risk factors for OB among clinical radiologists and radiology technicians in Saudi Arabia. The findings suggest that healthcare organizations in Saudi Arabia need to take steps to reduce the prevalence of OB among these professionals. Future research should focus on identifying the risk factors for OB among clinical radiologists and radiology technicians in Saudi Arabia and developing interventions to reduce the prevalence of OB.

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