

ORIGINAL ARTICLE

ASSESSMENT OF OCCUPATIONAL STRESS AMONG RADIOGRAPHERS IN SOUTHERN IRAN: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Occupational stress is known to affect the working performance, physical and mental health of employees. Meanwhile, due to the well-known effects of x-ray, radiographers deal with a substantial degree of inherent risk and stress in their job. The aim of this study was the assessment of occupational stress in radiographers working in southern, Iran.

Materials & Methods: This cross-sectional study was performed on population of radiographers in Bandar Abbas city, Iran. The participants were asked to fill-out Osipow or Stress Inventory-Revised questionnaire, which is based on three distinct sections designed for collection of demographic, occupational and stress-related data. Statistical analysis was performed on SPSS 16.0.

Results: A total of 43 participants (12 males and 31 females) with a mean age of 31.16 ± 8.48 , were enrolled. We found a significant inverse linear correlation between stress score, and daily and weekly working hours with Pearson's correlation coefficients of -0.37 and -0.36 , respectively. Participants receiving incomes higher than the baseline were found to achieve significantly higher scores in the questionnaire, compared with participants on baseline income (P -value=0.002). Female participants were found to experience significantly higher levels of occupational stress than their male counterparts (P -value<0.05).

Conclusion: Daily/weekly working hours, income, and the sex of individuals working as radiographers are strong determinants of occupational stress, and since employees working in this profession are subject to higher levels of stress, due chiefly to occupational hazards associated with imaging modalities, programs aimed at alleviating occupational stress in this particular community are strongly recommended to take these factors into account.

KEY WORDS: Occupation; stress; Psychological; health; Work; Employee; Radiographer.

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INTRODUCTION

Stress is a broadly-defined term that most often is used to describe the feeling of coping incompetence perceived by an individual when encountering external demand.¹ When these demands are associated with occupation, they give rise to a specific type of stress known as occupation stress, which strongly affects the psychological well-being of the staff.² Today, occupational stress is becoming a predom-

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inant work-related issue to the extent that it is often regarded to as the modern plague.³ The World Health Organization (WHO) refers to occupational stress as a response to work-related issues when individuals are not equipped with the knowledge or skills to deal with them. While certain levels of occupational stress have been associated with increased performance, exceedingly high degrees of this particular form of stress may very well result in impaired performance.⁴

Based on recent investigations, occupational stress can lead to exhaustion, dissatisfaction, and resignation of the employee. Physical and mental morbidities, including hypertension, sleep disorders, substance abuse, depression, and anxiety, stand among the pathological sequelae of occupational stress⁵, which may also influence the performance of healthcare workers, e.g., nurses, just as individuals in other professions.⁶ However, considering the fact that the nursing personnel are required to tend to the

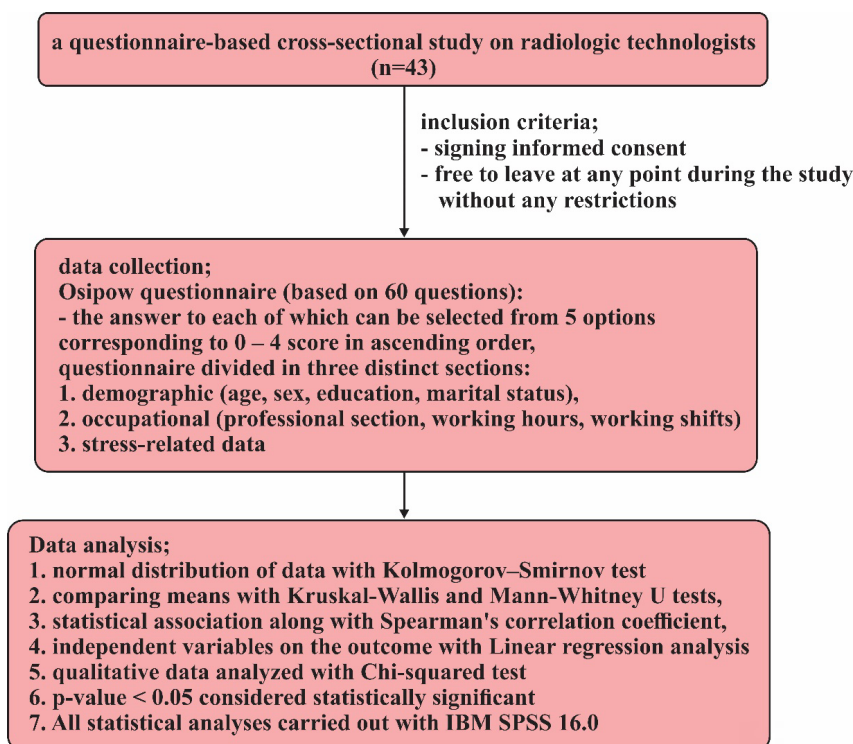


Figure 1. Study procedure

physical and emotional needs of patients, they are usually exposed to comparatively higher levels of occupational stress, that could jeopardize their safety.⁷

Similarly, radiography is a healthcare profession to be genuinely associated with a considerable level of inherent risk or hazard since radiographers ought to deal with the well-established harmful effects of X-ray.⁸ Since the number of investigations on the occupational stress, to which radiographers are exposed, is limited, especially among the population of radiographers working in southern Iran, the present study was designed to evaluate the effects of occupational stress among individuals working in this profession.

MATERIALS AND METHODS

The present investigation was a questionnaire-based cross-sectional study on radiographers, including radiographers working at computed tomography (CT), lithotripsy, magnetic resonance imaging (MRI), angiography, nuclear medicine and X-ray laboratories affiliated with a major university of medical sciences in southern Iran.

A total of 43 participants were enrolled after being briefed about the aims and scope of the investigation and the confidentiality of data that were going to be collected. Participants were free to leave at any point during the study without any restrictions. Occupational Stress Inventory-Revised (Osipow) questionnaire⁹, was adopted for data collection. The Osipow questionnaire is based on 60 questions,

the answer to each of which can be selected from 5 options corresponding to a 0 - 4 score in ascending order. The questionnaire used was basically divided into three distinct sections designed to collect demographic (age, sex, education, marital status), occupational (professional section, working hours, working shifts) and stress-related data. The latter included information regarding occupational stressors, e.g., workload, conflicts of interest, environmental control, involvement in decision-making, management, promotion, responsibilities, intimidation, violence, access to equipment, etc.

The normal distribution of data was assessed with Kolmogorov-Smirnov test, which returned affirmative results. Thus, we adopted the Kruskal-Wallis and Mann-Whitney U tests, along with Spearman's correlation coefficient, to evaluate the statistical association between our variables. Linear regression analysis was performed to measure the effect of independent variables on the outcome (questionnaire score). Qualitative data were analyzed with a Chi-squared test. A p-value < 0.05 was considered statistically significant. All statistical analyses were carried out with IBM SPSS 16.0.

RESULTS

A total of 43 participants were enrolled, of whom 12 (28%) were male and 31 (72%) were female, with a mean age of 31.16 ± 8.48 . Of these, 21 (49%) participants had associate degrees in radiography

and the remaining 22 (51%) had master’s degrees in the field, with 23 working in radiologic labs and 20 working in other sections. Near 65% of the population were married, and 36 (84%) subjects worked in shifts. The demographic data of participants are listed in Table 1. As can be viewed in Table 1, the independent

t-test indicated a statistically significant difference in the mean stress score between the two subgroups of employment contracts. Income was deemed an influential factor, as well, since participants with more income showed higher stress (114.04 ± 19.06 vs. 69.00 ± 15.56).

Table 1. The demographic data of participants

Variable (independent)	Subgroup	Population		Stress Score (Mean ± SD)	P-value
		N =	Percentage		
Education	Associate degree	21	49	113.19 ± 20.86	0.72
	Master degree (or above)	22	51	110.86 ± 21.47	
Working section	Radiologic lab	23	53	114.95 ± 19.83	0.33
	Other	20	47	108.60 ± 22.18	
Employment contract	Fixed-term	29	69	117.93 ± 20.05	0.01
	At-will	13	31	100.31 ± 18.21	
Sex	Male	12	28	111.75 ± 21.73	0.97
	Female	31	72	112.03 ± 21.17	
Marital status	Single	15	35	110.53 ± 24.65	0.75
	Married	28	65	112.71 ± 19.33	
Medical history	Positive	3	7	113.66 ± 6.03	0.90
	Negative	39	91	112.10 ± 22.03	
Working shift	Day	7	16	117.00 ± 14.29	0.49
	Night	36	84	110.97 ± 22.17	
Alternative job	Yes	7	16	116.00 ± 17.05	0.58
	No	36	84	111.16 ± 21.89	
Hypnotic drug use	Yes	2	5	115.50 ± 6.36	0.81
	No	41	95	111.78 ± 21.55	
Anxiolytic drug use	Yes	2	5	105.50 ± 20.51	0.66
	No	41	95	112.26 ± 21.29	
Regular physical activity	Yes	9	21	111.88 ± 16.07	0.99
	No	34	79	111.97 ± 22.41	
Working interest	Yes	40	93	112.32 ± 21.67	0.91
	No	2	5	110.50 ± 13.43	
Thinking of quitting job	Yes	16	37	117.56 ± 23.13	0.24
	No	25	58	109.40 ± 19.92	
Income	> Baseline	41	95	114.04 ± 19.06	0.00
	Baseline	2	5	69.00 ± 15.56	

Table 2. Occupational Stress assessment

Variable	Subgroup	Occupational Stress				Cumulative Sum	P-value
		< Baseline	Baseline	Moderate	Severe		
Age	20 – 29	7 (53.85%)	6 (46.15%)	0	0	13 (30.23%)	0.91
	30 – 39	8 (47.06%)	9 (52.94%)	0	0	17 (39.53%)	
	≥40	6 (46.15%)	7 (53.85%)	0	0	13 (30.23%)	
Employment contract	Fixed-term	11 (37.93%)	18 (62.07%)	0	0	29 (69.05%)	0.06
	At-will	9 (69.23%)	4 (30.77%)	0	0	13 (30.23%)	
Marital status	Single	5 (33.33%)	10 (66.67%)	0	0	15 (34.18%)	0.14
	Married	16 (57.14%)	12 (42.86%)	0	0	28 (65.12%)	
Education	Associate degree	10 (47.60%)	11 (50%)	0	0	21 (48.84%)	0.88
	Master degree	11 (50%)	11 (44%)	0	0	22 (51.16%)	
Work experience	<10 years	14 (56%)	11 (44%)	0	0	25 (58.14%)	0.27
	>10 years	7 (38.89%)	11 (61.11%)	0	0	18 (41.82%)	
Working hours in month	≤20	13 (41.94%)	18 (58.06%)	0	0	31 (69.77%)	0.15
	>20	8 (66.67%)	4 (33.33%)	0	0	12 (30.23%)	
Sex	Male	10 (83.33%)	2 (16.67%)	0	0	12 (27.91%)	0.00
	Female	11 (35.48%)	20 (64.52%)	0	0	31 (72.09%)	

Table 3. The correlation between stress score and daily working hours

Variable (independent)		Mean \pm SD	Correlation coefficient	P-value
Age		34.16 \pm 8.48	0.25	0.10
Work experience	Total	12.06 \pm 8.79	0.27	0.09
	Current	11.02 \pm 8.28	0.29	0.06
Daily working hours		7.19 \pm 1.00	-0.37	0.02
Weekly working days		5.86 \pm 0.75	-0.36	0.03
Monthly working days		24.97 \pm 2.81	0.02	0.90
Extra working hours		60.09 \pm 41.91	0.43	0.05

Female participants were found to experience higher levels of stress (112.03 \pm 21.17) compared with their male peers (111.75 \pm 21.73). While the difference in stress score was not determined to be of significance, the qualitative measurement of stress yielded a significant difference between males and females (Table 2).

No statistically significant differences in stress were detected between participants of different marital statuses, educational degrees, ages, and working sections. However, we noticed a statistically remarkable gap between the stress score of subjects with different employment contracts, as participants with a fixed-term contract demonstrated higher levels of stress than their peer who were hired under an at-will contract (117.93 \pm 20.05 vs. 100.31 \pm 18.21). It should be noted that data regarding one of the participants were missing in this section.

In addition to the findings above, we also came across an inverse linear correlation between stress score and daily working hours with a coefficient of -0.37, i.e., the more the working hours, the less stress the employees will experience. Likewise, an inverse linear correlation was noted between weekly working hours and stress score with a coefficient of -0.36 (Table 3), suggesting that participants with more working hours in the week were relatively calmer than others.

DISCUSSION

We found that occupational stress among radiographers was associated with sex, income and daily/weekly working hours. Our findings are in agreement, in part, with those of previously published relevant investigations. For instance, the study by Molaie et al. on female employees residing in northwestern

Iran revealed that 62.8 and 36.5 percent of these employees were experiencing moderate and severe occupational stress, respectively. They also indicated that occupational stress was correlated with the employees' number of children, educational degree, place of residence, work experience, daily working hours, working shifts, type of employment, and physical and mental illnesses.¹⁰ Similarly, McGowan et al. discovered that female employees, in the field of medicine, were 40% more likely than their male counterparts to exhibit signs of stress and complain of health problems.¹¹ As a matter of fact, women are usually more inclined to be subject to occupational stress due to potential contrasts between their domestic and outdoor responsibilities.¹⁰ In 2014, an investigation by Abdulghani et al. on Arabic junior medical interns showed that 80% of female interns experienced occupational stress, while only 66.5% of their male counterparts complained of such experiences.¹² Likewise, Gramstad et al. reported a higher prevalence of occupational stress, depression and anxiety among female junior physicians in Norway¹³, and so did Kim et al. with their experimental population of medical interns and residents.¹⁴ Nevertheless, there are a number of accounts with contrasting results, such as the findings published by Adeolu et al. suggesting that there was not any significant correlation between occupational stress and sex.¹⁵ Still, the reports in favor outnumber those in contrast. Several reasons can be stipulated for the greater inclination of female employees to experience occupational stress, including their higher sensitivity to rivalry, religion and society, a deeper sense of responsibility, emotional approach, and lack of endorsement.

In the present study, we noted that technologists with higher incomes were less often affected by oc-

cupational stress, compared with those with lower incomes, which is consistent with the observations made by Gholam Nejad et al. in 2009. They reported that 48.6% of their participants regarded to lack of rewards as a key factor associated with occupational stress.¹⁶

Another important finding in the present study was the significant association between employment type and occupational stress score. Individuals with fixed-term employment achieved a higher mean score in the Osipow questionnaire, compared with those who had signed an at-will contract. This was in contrast to other recently published investigations of similar concepts such as the study by Ameri et al. on the occupational stress experienced by nurses in northwestern Iran, as they did not find a significant correlation between these two variables.¹⁷ Else, we also noted an inverse correlation between daily working hours and stress score, i.e., lower daily working hours were associated with increased occupational stress score. A correlation of this kind was observed between the latter and weekly working hours, as well. Again, these were in contrast to findings reported by Khaghanizadeh et al.¹⁸ and Aghilinejad et al.¹⁹ who suggested that working shifts might significantly impair the quality of life among employees. Crawford et al. also argued that increased working hours would aggravate occupational stress.²⁰ Similar findings were published by Liu et al. in 2019 who explored occupational stress in a population of Chinese physicians, indicating that working hours were inversely correlated with occupational satisfaction²¹, further opposing our observations.

CONCLUSION

While all employees at any given time could become subject to occupational stress, women, particularly those living in societies of deep cultural backgrounds, might be more predisposed to job-related stress. As occupational stress has been well known to be a strong predictor of working performance, motivation and satisfaction, organizations are encouraged to develop specific programs for overcoming excess occupational stress through measures like balancing daily/weekly working hours, and awarding certain rewards to their employees. Promotions in ranking or salary can also be of great value to this cause. Although the present investigation is limited in its scope and experimental population, our findings might still contribute to the field of social sciences dealing with occupational stress and health psychology.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.
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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	MM, OD
Acquisition, Analysis or Interpretation of Data:	MM, OD, SN, RA
Manuscript Writing & Approval:	MM, OD, SN, RA

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.



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