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Occupational injuries among radiologist in Saudi Arabia: A cross sectional study

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ABSTRACT

Background: Any injury or illness that has resulted in a limitation in an individual's working area is referred to as an occupational injury. This Study aimed to illustrate the types of work-related injuries experienced by medical imaging professionals. *Methods*: Medical Imaging Professionals in Saudi Arabia who work in public and private institutions participated in a cross-sectional study via an online survey. Descriptive statistics were used to analyze the data. *Results*: A total of 370 medical imaging professionals have participated in the survey. Among the respondents, 100 (27%) radiologists have experienced job-related injuries while working as radiologists. Among those who have experienced work-related injuries, 44% work on average 5 to 8 hours per day, and 47% work 8 to 10 hours per day. Most of the respondents (45%) have taken less than one week's leave of absence from work for the job-related injury, followed by 21% who had not taken leave due to the injury. Comparing the number of their daily reported cases, nearly one-fourth of the radiologists (24%) claim that their achievements decreased by 5% to 10%. *Conclusion*: Our findings show that occupational damage is likely to be multi-factorial in nature. Poor ergonomic standards harm radiologists, and this can have a negative impact on patients if radiologist tiredness leads to reporting mistakes. Individual techniques for decreasing or eliminating the prevalence of occupational injuries among radiologists require more research.

Keywords: Radiologists, Occupational Injuries, compensation, Saudi Arabia

1. INTRODUCTION

Occupational injuries are any injury or illness that resulted in an individual's working area, forming a limitation. Work-related injuries differ in their impact on parties. Types of work-related responsible injuries result from physical, biological, chemical, or psychosocial hazards such as noise, temperature, aerosols, blood-borne pathogens, hazardous chemicals, radiation, and occupational burnout. In the presence of safety protocols, injuries still occur due to lack of safety training, improper heavy-duty lifting, general hazardous

material, and lack in the importance of usage of personal protective equipment (Varacallo & Knoblauch, 2020).

The types of work-related injuries suffered by medical imaging practitioners are depicted in this report. In addition, the duration of medical leave, financial assistance for compensation, and the willingness of injured radiologists to perform their same job duties once they return to work are all investigated in this report. Finally, injury prevention measures can help to avoid or mitigate work-related accidents among medical imaging practitioners and other stakeholders.

Occupational Injuries among Radiologist in Saudi Arabia was not fully investigated. The objective of the present study was to investigate and report the Occupational Injuries among Radiologist in Saudi Arabia.

2. MATERIALS & METHODS

A cross-sectional study was conducted between the period of Jun 2020 to August 2020 via an online survey among medical Radiologists in Saudi Arabiawho works with governmental and private hospitals. Four hundred seventy-nine medical imaging professionals across Saudi Arabia were selected for the study. Especially Medical Radiologists in Saudi Arabia by the Saudi Commission for Health Specialties (SCFHS) have used for the study. A valid questionnaire has been taken from a previous study by Macavei and Clark (2020) with the author's permission to use/edit the questions. Consent was taken electronically from the participants at the beginning of the survey regarding conducting the survey. Those who were accepted to participate in the study were included in this study. Those who did not responded were excluded from the study.

The questionnaire is about demographics (age, gender, city, specialty area, years of experience), the second part is occupational injuries that addresses (a type of injury, leave of absence from work, financial assistance and duties upon returning to work), and the rate of importance (1=least important, 5=most important) of strategies or ideas that could prevent or decrease job-related injuries to Radiologists.

Descriptive statistics were used to summarize the data to identify the data's underlying patterns in the analysis's preliminary stage. It summarizes and presents the data in a meaningful way. Cronbach's Alpha has been used as an index of reliability associated with the actual variation of an underlying hypothetical variable measured (Hatcher, 1994). It is more commonly used in order to estimate the reliability of a constructed psychometric test. It was the first name Alpha by Lee Cronbach in 1951 (Cronbach, 1951).

3. RESULTS

A total of 479 medical imaging professionals from across Saudi Arabia were polled. The survey received responses from 370 medical imaging practitioners (radiologists), reflecting a response rate of 77.2 percent. 125 (33.8 percent) of the respondents were female, while 245 (66.2 percent) were male. More than half of the respondents are between the ages of 23 and 34 (215, 58.1 percent). Medical imaging practitioners aged 35 to 44 years and 45 to 54 years were represented by twenty-two (24.9%) and forty-two (11.4%), respectively. The majority of the radiologists have been with the division for one to five years. Approximately half of the total sample is female (190, 51.4 percent). From the total study, about 64 (17.3%) and 65 (17.6%) radiologists have worked for 5 to 10 years and 10 to 15 years, respectively. Furthermore, 51 (13.8%) of radiologists have worked for more than 15 years. A total of 100 radiologists (27%) have been injured on the job while employed as radiologists. As a result, these 100 radiologists were used for further investigation (Table 1).

45 percent, 22 percent, 15 percent, and 21 percent of radiologists who have had work-related injuries have had eye pain or dryness, decreased vision, conjunctivitis, and other eye-related injuries, respectively. Thyroid defects, erythema, alopecia, and sterility have all been recorded by 9 percent, 6 percent, 4 percent, and 7 percent of radiologists, respectively. In terms of blood contamination-related disorders, 7 percent, 8%, and 4% of radiologists, respectively, have been exposed to hepatitis B, West Nile virus, and other diseases. When it comes to airborne contamination, 22 percent, 5 percent, 4 percent, 32 percent, 15 percent, and 3 percent of radiologists, respectively, have been exposed to tuberculosis, chickenpox, measles, coronavirus, and H1N1 other airborne contamination conditions. In terms of dermatological injuries, 9%, 9%, and 2% of radiologists have had MRSA exposure, skin injury, and other dermatological injuries, respectively. Abortion, infant malformation, chronic headache, DVT, stroke, stress-related depression, and other disorders have been experienced by 3 percent, 2 percent, 40 percent, 3 percent, 5 percent, 48 percent, and 16 percent of respondents, respectively. When it comes to musculoskeletal injuries, 37 percent, 23 percent, 44 percent, and 7% of radiologists, respectively, have dealt with spine injuries, joint injuries, muscle injuries, and other musculoskeletal injuries (Table 2).

Table 1 Radiologists' Characteristics

Variables	Frequency	Percentage
Gender		
Female	125	33.8%
Male	245	66.2%
Age group		
23 to 34	215	58.1%
35 to 44	92	24.9%
45 to 54	42	11.4%
55 to 64	20	5.4%
65 or above	1	0.3%
Service period		
1 to 5 years	190	51.4%
5 to 10 years	64	17.3%
10 to 15 years	65	17.6%
More than 15 years	51	13.8%
Job-related injuries		
Yes	100	27.0%
No	270	73.0%

Table 2 Types of work related injuries

Variables	Frequency	Percentage
Eye injuries		
Irritation/dryness	45	45%
Decrease vision	22	22%
Conjunctivitis	15	15%
Other eye-related	21	21%
Radiation-induced condition		
Thyroid abnormalities	9	9%
Erythema	6	6%
Alopecia	4	4%
Sterility	7	7%
Blood contamination		
Exposure to hepatitis B	7	7%
HIV	0	0%
West Nile virus ,needle stick	8	8%
Other blood born pathogens	4	4%
Airborne contamination		
Exposure to tuberculosis	4	4%
Chickenpox	22	22%
Measles	5	5%
Coronavirus	32	32%
H1N1	15	15%
Other airborne pathogens	3	3%
Dermatological injuries		
Exposure to MRSA	9	9%
Radiation induced skin injury	9	9%
Other skin injuries	2	2%
Miscellaneous		

Abortion	3	3%
Radiation induced fetal malformation	2	2%
Recurrent headache	40	40%
DVT	3	3%
Stroke	5	5%
Stress related depression	48	48%
Other	16	16%
Musculoskeletal injuries		
Spine injuries	37	37%
Joint injuries (eg, sprains or compressive syndromes)	23	23%
Muscle injuries (e.g. Ache or tear)	44	44%
Other MSK injuries	7	7%

Among the radiologists who have experienced work-related injuries, 44% work on average 5 to 8 hours per day, and 47% work 8 to 10 hours per day. Only 7% of them work more than 10 hours per day. Most of the respondents (45%) have taken less than one week's leave of absence from a work-related injury, followed by 21% who have not taken leave due to the injury. 12% and 9% of the respondents have taken one week and two weeks leave, respectively. Three weeks to 1 month of leave was taken by 10% of the radiologists who have experienced work-related injuries. Very few respondents have taken three months to one year leave (Table *3*).

Comparing the number of their daily reported cases, nearly one-fourth of the radiologists (24%) claim that their achievements decreased by 5% to 10%. 14% of them think that their achievements have not affected them by the injury. 15%, 12%, and 13% of the respondents claim that their achievements decreased by 10% to 20%, 20% to 50%, and more than 50%, respectively. Moreover, only 10% of the respondents have received financial assistance from their employer for a sustained work-related injury. Also, 84% of the Radiologist could fully resume their previous job duties upon returning to work (Table *3*). Considering radiologists who have experienced work-related injuries, most of them say that there had been no change in their responsibilities upon returning to work after the injury. Nearly one-fifth of the radiologists (21%) claim that they had given less physical effort. Furthermore, 12%, 9%, 8%, and 7% of them claim that they had given more administrative responsibilities, less critical condition patient interaction, less radiation exposure, and less number of cases to report or manage, respectively (Table *3*).

Table 3 Radiologists Work Related Statements

Variables	Frequency	Percentage
Average working hours per day		
Less than 5hrs	2	2%
Between 5hrs to 8hrs	44	44%
Between 8hrs to 10hrs	47	47%
More than 10hrs	7	7%
Duration of leave due to the injury		
No leave	21	21%
Less than 1 week	45	45%
1 week	12	12%
2 weeks	9	9%
3 weeks	5	5%
1 month	5	5%
More than 3 months	3	3%
Decrease in achievements due to the injury		
My achievements decreased by 5 to 10%	24	24%

My achievements decreased by 10 to 20%	15	15%
My achievements decreased by 20 to 50%	12	12%
My achievements decreased by more than 50%	13	13%
My achievement has not affected by the injury	14	14%
Not applicable	22	22%
Financial assistance		
Yes	10	10%
No	90	90%
Resume the previous job		
Yes	84	84%
No	16	16%
Job responsibilities		
Less physical effort	21	21%
less no. of cases to report / manage	7	7%
Less radiation exposure	8	8%
Less critical condition patient interactions	9	9%
More administrative responsibilities	12	12%
No change	56	56%

Seven strategies were considered to prevent or reduce the work-related injuries that impact medical professionals. One hundred radiologists who have experienced work-related injuries have participated in the survey. Most respondents think that all seven strategies are most important to prevent work-related injuries (Figure 1).

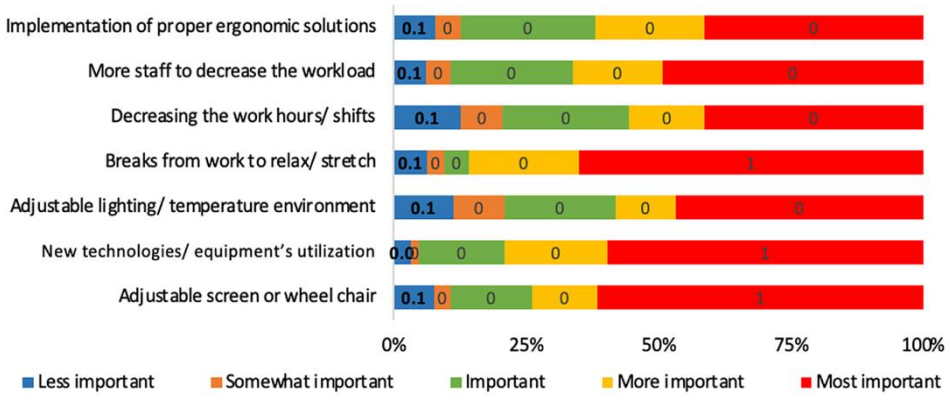

Figure 1 Strategies to Prevent or Reduce Work Related Injuries that Impact on Radiologists

According to the underlying attitude continuum, a multi-item scale is more reliable than a single-item question. The scale should be designed appropriately so that all the scale components are directed to the common factor under consideration. Therefore, the internal consistency of this constructed scale is essential in capturing the so-called latent variable. Considering the above facts, the following strategies have been used to capture the underlying phenomenon of the overall strategy.

Strategy 1: Adjustable screen or wheelchair

Strategy 2: New technologies/equipment's utilization

Strategy 3: Adjustable lighting/temperature environment
Strategy 4: Breaks from work to relax/ stretch (e.g., Yoga, relax rooms, walking around)
Strategy 5: Decreasing the work hours/ shifts
Strategy 6: More staff to decrease the workload
Strategy 7: Implementation of proper ergonomic solutions

The scale's internal consistency, which includes the above statements, has been tested using Cronbach's alpha reliability coefficient. Generally, the Cronbach's alpha reliability coefficient depends on the inter-correlation among test statements. All the statements are correlated significantly with each other (Table 4). Therefore, it initially suggests that all the statements measure the same latent variable overall job strategies to prevent work-related injuries.

Table 4 Inter-Item Correlation Matrix

Strategy	1	2	3	4	5	6	7
1	1.000	0.323	0.433	0.332	0.290	0.315	0.340
2	0.323	1.000	0.257	0.302	0.212	0.220	0.369
3	0.433	0.257	1.000	0.137	0.275	0.352	0.398
4	0.332	0.302	0.137	1.000	0.437	0.462	0.319
5	0.290	0.212	0.275	0.437	1.000	0.665	0.363
6	0.315	0.220	0.352	0.462	0.665	1.000	0.490
7	0.340	0.369	0.398	0.319	0.363	0.490	1.000

It can be seen that Cronbach's alpha value for the scale used for overall strategies to prevent work-related injuries is 0.788, which indicates a high level of internal consistency for the scale used (Table 5). It is recommended that the scales that receive alpha scores over 0.7 are reliable (Hair et al., 2010). Therefore, Cronbach's alpha value implies that the scale used to determine the overall strategies to prevent work-related injuries is consistent.

Table 5 Reliability Statistics

Cronbach's alpha	Number of items
0.788	7

The values in the first column of Table 5 represent correlations between the statement and the composite score of all other remaining statements. It can be seen that for all the statements, this correlation value is significantly high. The second column presents the Cronbach's alpha value of the remaining statements' composite scale if that particular statement is deleted from the scale. It can be seen that all the statements should be used to construct the composite scale (Table 6).

Table 6 Reliability of the Statements

Strategy	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
1	0.501	0.764
2	0.404	0.780
3	0.454	0.774
4	0.485	0.766
5	0.557	0.752
6	0.639	0.737
7	0.569	0.751

The strategy's statements to prevent or reduce work-related injuries were summarized using their average response level to attain a general level (composite scale) for the overall strategy to prevent or reduce work-related injuries. The agreement level for the statements is directly considered as the strategy to prevent or reduce work-related injuries. The summarized results are presented in the above pie chart. The pie chart illustrates that nearly half of the respondents (47%) think that the strategies are most

important to prevent job-related injuries. 26% and 18% of them think the strategies are more critical and essential, respectively. Only 5% and 4% of the respondents think the strategies are somewhat essential and less critical, respectively (Figure *2*).

The association tests are carried out to find out the demographic factors and the job-related statements that are significantly associated with the overall strategy to prevent job-related injuries. Gender, Age group, financial assistance, and Decrease in achievements due to the injury are associated with the overall strategy to prevent job-related injuries (Table *7*). Hence the statements which exhibit a statistically significant association with the overall strategy to prevent job-related injuries have been used in the model building process.

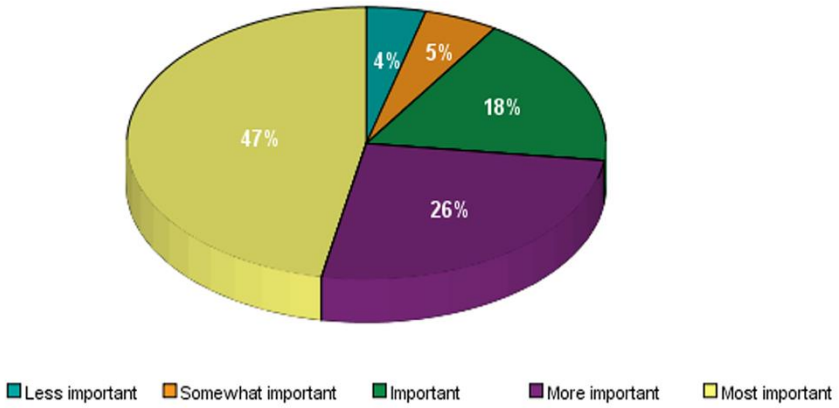

Figure 2 Overall Strategy to Prevent or Reduce Work Related Injuries

Table 7 Univariate Analysis

Variable	P-value	Conclusion
Gender	0.003 ***	Association
Financial assistance	0.130 *	Association
Back to work	0.597	No association
Age group	0.195 *	Association
Service period	0.331	No association
Average working hours per day	0.845	No association
Duration of leave due to the injury	0.408	No association
Decrease in achievements due to the injury	0.076 **	Association

Levels of statistical significance can be mentioned as follows.

***:- Variable is significant at 5% level

**:- Variable is significant at 10% level

*:- Variable is significant at 20% level

Before conducting the model building process, the dependent variable has been reduced into three categories to make the interpretation simpler and decrease the number of zero cell counts that could affect the model fitting procedure. Nearly three-fourths of the respondents think that the strategies are more critical to prevent or reduce the work-related injuries that impact radiologists. 18% think it is essential, and only 9% think it is less important (Table *8*).

Table 8 Distribution of the Importance of Strategy

Level of strategy	Frequency	Percentage
Less important	9	9%
Important	18	18%
More important	73	73%

The Chi-square statistics indicates that the final model gives a significant improvement over the baseline intercept-only model with $X2(11) = 27.217$, p-value = $0.004 < 0.05$ (Table *9*). The significance value of the test is well over the preferred 5% level of

significance; X2(11) = 12.029, p-value = 0.361 > 0.05 (Table *9*). Hence, the test concludes that the model holds proportional odds assumptions. Pearson and Deviance tests have p-values values greater than 0.05, suggesting that the model's fit is adequate (Table *9*).

Table 9 Model Fitting Information

	Chi-Square	df	Sig.
Model fitting information			
	27.217	11	0.004
Test of parallel lines			
	12.029	11	0.361
Goodness of fit test			
Pearson	49.486	71	0.976
Deviance	46.657	71	0.989

df: degrees of freedom
Sig: significant

Age group'23 to 34', '35 to 44' and '45 to 54' are statistically significant with p-value < 0.001 respectively. For 1 unit increase in the age group of 23 to 34 years, 35 to 44 years, and 45 to 54 years, there are 19.91, 19.94, and 18.67 decreases in the ordered log odds of being the higher level of importance in the strategy to prevent job-related strategies. For 1 unit increase in the 'decrease of achievement by 20% to 50%', there is a 2.73 increase in the ordered log odds of being in a higher level of importance in the strategy to prevent job-related strategies with p-value =0.046 <0.05. For 1 unit increase in receiving financial assistance from their employers for the sustained work-related injury, there is a 2.25 decrease in the ordered log odds of being in a higher level of importance in the strategy to prevent job-related strategies with p-value =0.006 <0.05. Hence, gender, age, financial assistance, and Decrease in achievement during injury result in their perception of importance in the strategy to prevent job-related strategies (Table *10*).

Table 10 Parameter Estimation

Parameter	Estimate	Standard error	Wald	df	Sig.
[Strategy = 1][a]	-21.597	1.458	219.288	1	0.000
[Strategy = 2][b]	-20.035	1.429	196.626	1	0.000
[Gender]	0.706	0.606	1.360	1	0.244
[Age= 1][c]	-19.906	1.396	203.335	1	0.000
[Age= 2][d]	-19.939	1.403	201.986	1	0.000
[Age= 3][e]	-18.665	1.663	126.007	1	0.000
[Achievements not affected by the injury]	19.008	4449.707	0.000	1	0.997
[Achievements Decrease by 5 to 10%]	0.725	0.678	1.143	1	0.285
[Achievements Decrease by 10 to 20%]	0.978	0.861	1.292	1	0.256
[Achievements Decrease by 20 to 50%]	2.728	1.364	3.999	1	0.046
[Achievements Decrease by more than 50%]	0.033	0.744	0.002	1	0.964
[Received Financial Assistance]	-2.245	0.809	7.697	1	0.006

df: degrees of freedom
Sig: significant
[a] Adjustable screen or wheelchair
[b] New technologies/equipment's utilization
[c] (23 to 34 years)
[d] (35 to 44 years)
[e] (45 to 54 years)

Female radiologists were 0.433 times less likely than male radiologists to be admitted to the understanding of the policy to avoid or mitigate work-related injury. Furthermore, radiologists aged 20 to 44 were 3.233 times more likely than radiologists aged 45 and up to admit the strategy's perception of preventing or reducing work-related injury. Furthermore, radiologists who believe their

achievements decreased from 0% to 20% during the accident were 0.927 times less likely to admit X the strategy's impression of preventing or reducing work-related injury than radiologists who believe their achievement decreased by more than 20%. Radiologists who obtained financial assistance from their employer for a work-related injury were 4.929 times more likely than those who did not receive any financial assistance to admit the strategy's perception to avoid or minimise work-related injury (Table 11).

Table 11 Odds Ratio

Factor	Odds ratio direction	Value
Gender	Female to Male	0.433
Age	20 to 44 to Above 45	3.233
Decrease in achievements due to the injury	0 to 20% to Above 20%	0.927
Financial assistance	Received to not received	4.929

4. DISCUSSION

Radiologists' roles continue to evolve in interpreting imaging and performing consultation with referring clinicians, protocoling studies, interdisciplinary patient care, performing image-guided procedures, and conducting teaching sessions (Reiner & Siegel, 2002; Dhanoa et al., 2013). These activities revolve around using computers and monitors, which causes many radiologists to spend their careers around machines (Dhanoa et al., 2013; Reiner et al., 2003). As shown in the literature, screen users who spend three or more hours per day in front of a monitor, shown to have eye strain, headaches, blurred vision, and 90% of them experienced eye pain, a syndrome called Computer visual syndrome (Blehm et al., 2005). A study done in North America found that the prevalence of eye strain in Radiologists was 36% (Reiner et al., 2003). In contrast, our study reveals that Radiologists who experienced occupational injuries 100 (100%), the eye-related occupational injuries among them were irritation/dryness 45(45%), decrease vision 22(22%), conjunctivitis 15(15%), and other eye-related injuries 21(21%).

Regarding other occupational injuries in Saudi Arabia, a similar study conducted exclusively in the Eastern Province of Saudi Arabia shows that Radiologists' most occupational injury is lower back pain 137 (69.2%). In the case of gender difference, female Radiologists from 30 to 39 years old tend to face occupational injury more than males Radiologists (Al Shammari et al., 2019). While our data show most occupational injuries are stress-related depression 48 (48%) then irritation/dryness 45 (45%), as well as females radiologists were facing less occupational injuries with an odds ratio (0.433) since our male radiologists 245(66.2%) on our sample more than the female radiologists 125(33.8%). Also, Psychologic factors have also been found to play a role in determining the degree to which eye symptoms are experienced and expressed (Thomson, 1998).

Previous studies showed a significant association between burnout and physical activity (Gerber et al., 2013; Toker & Biron, 2012). In this study, most of the radiologists were within the age group of 23 to 34. The service period of them was in between 1 to 5 years, stating that younger crowd has participated in the study, most of the radiologists in the sample work for 5 to 10 hours on average per day, and most of them have taken only less than one week leave due to job-related injuries. Previous researches on burnout showed the main organizational risk factors that can predict burnout, fairness, reward, community, workload, and values (Maslach & Leiter, 2016). 90% of the radiologists in this study have said that they did not receive any financial assistance from their employer for the sustained work-related injury. Besides, most radiologists think that their achievements decreased by 5% to 10% during the injury.

The following variables were positively correlated with our overall strategy to prevent or minimise work-related injuries among radiologists: gender, whether achievements decreased during the accident, and financial assistance from their employer for the sustained work-related injury, according to our research. Gender was also found to be significantly correlated at a 5% level of significance. The statement that their achievements were reduced during the injury was significantly associated with age at a 10% level of significance, and the statement that they received some financial assistance from their employer for the sustained work-related injury was significantly associated at a 20% level of significance with the overall strategy to prevent or reduce work-related injury was significantly associated at a 20% level of significance with the overall strategy to prevent or reduce work-related injury. Sex, age, reduced accomplishments during the accident, and whether or not they earned any financial support from their employer for a work-related injury were all considerations in the final model.

However, some limitations to the final model for the data were the following. Female radiologists were less likely to be admitted to the strategy's perception to prevent or reduce work-related injuries than male radiologists. Young radiologists were also more likely to admit the strategy's perception of preventing or reducing work-related injuries than the mid-age and older radiologists.

Moreover, the radiologists who think their achievements decreased less during the injury were less likely to admit to the strategy's perception of preventing or reducing work-related injuries than the radiologists who think their achievement decreased more. This limitation has been seen in Radiologists before as Guentte and Smith (Guenette & Smith, 2017). Reported radiology residents scored lower in personal accomplishment (one of the three diminutions of burnout) (Maslach & Jackson, 1981). When compared to residents in other specialties.

The principles of fairness and respect have previously been discussed in the literature, and people can have doubts if they believe they are not being handled fairly (Faragher et al., 2004). In our research, radiologists who obtained financial support from their employer for a work-related accident were more likely than those who did not to admit the strategy's perception of preventing or reducing work-related injuries. Financial assistance, according to the above fact, is the most important factor because it results in a higher level of strategy perception to avoid or minimise work-related injuries by a unit increase. Because of the time constraints involved in conducting the survey, the scope of this study was limited to determining how medical radiologists in Saudi Arabia perceive strategies to avoid or mitigate work-related injuries, as well as the factors associated with these strategies. As a result, the results of the study only refer to radiologists.

The findings would have been more generalizable to the entire Saudi Arabian medical industry if the study had included a few more organisations. Another part of the current study's drawback was the sophistication of the strategy's definition for preventing or reducing work-related injuries. A radiologist is a doctor who specialises in the since the psychological nature of the person influences it, every employee has their own opinions on the subject. As a result, deciding the precise technique used by our Radiologists is quite subjective. The evolved model can be further improved to more accurately predict the strategy's interpretation in order to avoid or minimise work-related injuries. More medical occupations should be included in future research to represent the entire Saudi Arabian medical industry.

5. CONCLUSION

The following are the key findings reached as a result of the investigation. We discovered a high prevalence of self-reported occupational injury among Saudi Arabian radiologists in this cross-sectional sample. Our findings show that occupational injury is likely to be multi-factorial, with factors such as a lack of ergonomic facilities, a failure to personalise those that are accessible, a lack of planning, lengthy reporting sessions, and a failure to recognise accidents as occupational injuries all playing a role. Bad ergonomic procedures cause injuries to radiologists. If radiologist fatigue leads to reporting errors, it can have an effect on patients. The problem of occupational injury among radiologists needs to be thoroughly investigated and addressed, so more research is required to determine individual strategies for minimising or eliminating occupational injury among radiologists.

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Conflict of Interest

The authors declare that there are no conflicts of interests

Ethical approval

The study was approved by the medical ethics committee of Imam Mohammad Ibn Saud Islamic University (Project number 43-2020).

Contribution of authors

All Authors contributed to all aspects of the study.

Data and materials availability

All data associated with this study are present in the paper.

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