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ORIGINAL ARTICLE

Occupational injuries presenting to the emergency department of a tertiary hospital in Dubai: a retrospective analysis

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ABSTRACT

Objective: This study aimed to describe occupational injury patterns and outcomes and explore associations between injury characteristics and clinical outcomes.

Methods: A retrospective cross-sectional study was conducted in the Emergency Department (ED) of Rashid Hospital Trauma Center (RHTC), Dubai Health (DH), between November 2019 and December 2021. Adults aged 18–60 years who were identified during ED triage by nurses as having sustained an occupational injury, defined as a physical injury incurred as a direct result of employment, were included.

Results: Among 6,730 included patients, 6,480 were male (96.3%), and the median age was 32 years (interquartile range 12; range 18–60). The most common causes of injury were direct trauma (30.1%), falls (25.6%), and sharp objects (20.5%). Isolated soft tissue injury was the predominant injury type (69.7%). Hospital admission occurred in 896 patients (13.3%), and 66 (1.0%) required intensive care unit (ICU) admission, most commonly due to head injuries. Eight deaths were recorded (0.1%), predominantly following falls and head trauma. Cause of injury was significantly associated with injury type and ICU admission ($p < 0.001$).

Conclusion: Occupational injuries presenting to this ED predominantly affected young male workers, with direct trauma, falls, and sharp-object injuries being the leading mechanisms. Head injuries were strongly associated with ICU admission and death, highlighting the need for strengthened workplace safety measures, enhanced surveillance, and a national occupational injury registry.

Keywords: Occupational injuries, work place injuries, UAE, emergency department, tertiary care hospital, Dubai.

Introduction

Occupational injuries are associated with considerable physical, psychological, and socioeconomic burdens for individuals, workplaces, and health systems. The World Health Organization (WHO) estimated that 20%–50% of workers worldwide are exposed to occupational hazards, with higher proportions in developing and newly industrialised settings [1].

Occupational injuries included falls, road traffic incidents, electrical injuries, thermal injuries, and other trauma-related events [2]. The burden and pattern of occupational injuries vary between regions, influenced by the local industrial profile, labour legislation and enforcement, workplace safety practices, healthcare access, and climate [3].

Dubai, a major economic hub in the United Arab Emirates (UAE), has experienced rapid growth and diversification across multiple sectors, accompanied by a large and heterogeneous workforce and a continued burden of work-related injuries [4]. Effective prevention requires up-to-date, location-specific data to identify high-risk

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populations and mechanisms and to guide targeted interventions and policy development [5]. Despite existing safety regulations, recent data describing the causes, types, and outcomes of occupational injuries presenting to emergency care in Dubai remain limited.

Hence, this study aimed to characterize occupational injuries presenting to the ED of a tertiary trauma center in Dubai and to examine associations between injury characteristics and clinical outcomes.

Subjects and Methods

A retrospective cross-sectional analysis was performed of patients presenting to the Emergency Department (ED) of Rashid Hospital Trauma Centre (RHTC), Dubai Health (DH). The study was primarily descriptive and exploratory in nature, aiming to characterize the patterns of occupational injuries and explore associations between injury characteristics and selected clinical outcomes. Patients were flagged as having sustained an occupational injury, defined as a physical injury incurred as a direct result of employment, during the initial ED triage assessment, between November 2019 and December 2021. Occupational injury status was based on patient-reported workplace-related injury documented by nursing staff during the initial ED triage assessment. Rashid Hospital is a Level I trauma centre and serves as the primary trauma referral centre in the Emirate.

Data were collected from Electronic Medical Records (EMRs) accessed through the Salama (EPIC) system. The inclusion criteria comprised all patients aged 18 to 60 years who were identified as having sustained occupational injuries. Patients were excluded if they met any of the following criteria: age below 18 or above 60 years, discharged against medical advice (AMA), dead on arrival (DOA), absconded from hospital care before discharge, presented for follow-up rather than initial injury presentation, allegedly assaulted outside of the workplace, sustained nontraumatic injury, or had incomplete medical records.

A total of 9,286 records were collected from the EMR. Of these 2,556 were excluded, and 6,730 were included (Figure 1).

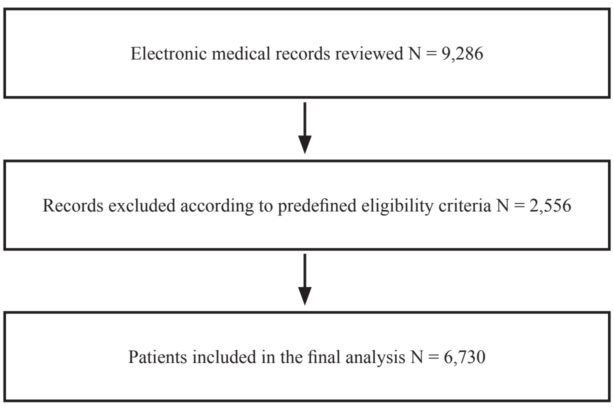

***Figure 1.** Flowchart of patient selection (N: number of patients).*

Data were collected and organized using Microsoft Excel (Microsoft Corporation, WA, USA). The following variables were extracted: age, gender, nationality, cause, type of injury, body region, number of sick leave days, length of stay (LOS), intensive care unit (ICU) admission status, and outcome.

Injury causes were categorized as direct trauma (struck by an object other than a heavy object), environmental injury (including electrical injury, thermal injury, and heat-related illness), heavy object, machinery, sharp object, twisting injury, fall, and other causes (animal attack, assault, chemical injuries, explosion, gunshot, and MVC). Injury types were categorized as isolated soft tissue injury, isolated fracture, combined fracture and soft tissue injury, burn, multiple injuries, traumatic brain injury (TBI), solid organ and/or hollow viscus injury, no external injuries, and other injuries (caustic ingestion, joint dislocation, eye injury, heat exhaustion, and inhalational injury).

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) (SPSS Inc., Chicago, IL, USA). Numerical data were reported as mean ± standard deviation for normally distributed data and median with interquartile range (IQR) for skewed data. The Shapiro–Wilk test was used to assess normality. Categorical variables were presented as counts and percentages. Pearson's chi-square test was used for categorical comparisons. Fisher's exact test was applied when expected cell counts were small. Continuous variables were summarized using medians and IQRs due to non-normal distributions. The Kruskal–Wallis H test was used to compare continuous variables across groups when data were not normally distributed. All tests were two-sided, and $p < 0.05$ was considered statistically significant.

Results

The study population consisted of 6,730 patients. Most were males (96.3%), with a median age of 32 years (IQR 12; range 18–60 years), and most patients were from South Asia. The most common cause of injury was direct trauma (30.1%). Isolated soft tissue injury was the predominant injury type (69.7%). No external injuries were documented in 16 patients (0.2%).

Most patients had one body region involved (97.8%). Whereas multiple regions were involved in 129 patients (1.9%). Twenty-two patients (0.3%) had no recorded body region involvement, mainly because they had no external injuries or sustained conditions that could not be assigned to a specific anatomical body region (e.g., heat exhaustion) (Table 1).

External (skin and soft tissue) injuries were most frequent (47.6%), followed by upper extremity injuries and lower extremity injuries (Figure 2).

Hospital admission was required for 896 patients (13.3%). Length of stay was assessed only among admitted patients. The median length of stay for admitted patients was 6 days (IQR 9; range 1–294). ICU admission was required for 66 patients (1.0%). Sick leave certificates were issued to 4,389 patients (65.2%), with a median duration of 5 days (IQR 8; range 1–112).

Table 1. *Demographics of study population and characteristics of injury (n = 6,730).*

Variable	Number (N)	Percentage (%)
Gender		
Male	6,480	96.3
Female	250	3.7
Age Group (years)		
18–29	2,524	37.5
30–39	2,614	38.8
40–49	1,160	17.2
50–60	432	6.4
Geographical region		
South Asia	5,181	77
Africa	866	12.9
Middle East	336	5
Southeast Asia	228	3.4
Other (East, South, and Central Asia, Europe, and Americas)	119	1.8
Cause of injury		
Direct trauma	2,023	30.1
Environmental	135	2.0
Heavy object	522	7.8
Machinery	647	9.6
Sharp object	1,382	20.5
Twisting injury	153	2.3
Fall	1,722	25.6
Other (animal attack, assault, chemical injuries, explosion, gunshot, and MVC)	146	2.2
Type of injury		
Fracture and soft tissue injury	690	10.3
Burn	143	2.1
Isolated fracture	927	13.8
Isolated soft tissue injury (laceration, abrasion, contusion, ligamentous injury, and muscle injury)	4,691	69.7
Solid organ injury/hollow viscus injury	9	0.1
Traumatic brain injury	33	0.5
No external injuries	16	0.2
Multiple injuries	70	1.0
Other (caustic ingestion, joint dislocation, eye injury, heat exhuastion, and inhalational injury)	151	2.2

Cause of injury was significantly associated with injury type (χ^2 (56) = 5,570.69; $p < 0.001$). Falls accounted for 490 of 927 isolated fractures (52.9%), whereas direct trauma accounted for 1,532 of 4,691 isolated soft tissue injuries (32.7%). Environmental injuries accounted for 107 of 143 burns (74.8%).

Injury type was significantly associated with hospital admission ($p < 0.001$). Fractures comprised 376 of 896 hospital admissions (42.0%). Admission occurred in 31 of 33 patients with TBI (93.9%) and 58 of 70 patients with multiple injuries (82.9%). Length of stay differed by injury type (Kruskal–Wallis H test, $p < 0.001$). Burns had

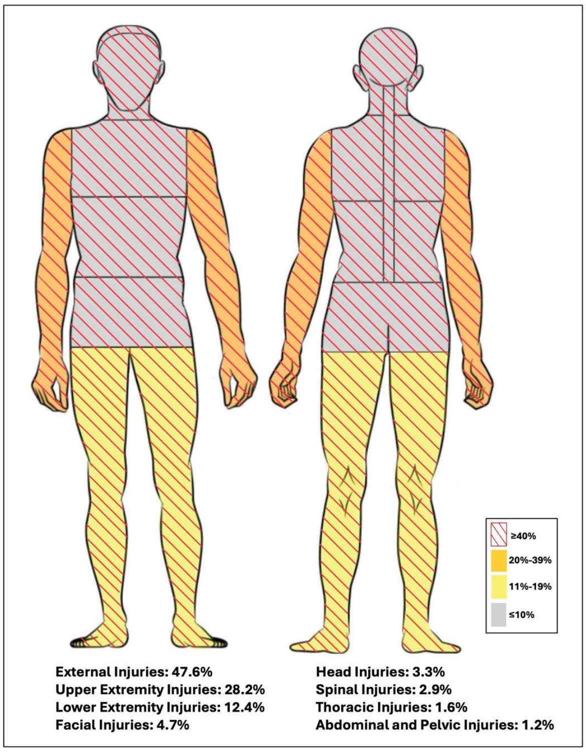

Figure 2. *Distribution of occupational injuries by body region.*

the longest median length of stay (17 days; IQR 46; range 2–135), followed by TBI (12 days; IQR 26; range 2–294) and multiple injuries (10 days; IQR 15; range 1–121).

Of the 66 ICU admissions, 65 were male and one female, with no significant association between gender and ICU admission (χ^2 (1) = 0.90; $p = 0.342$). Falls accounted for most ICU admissions: 49 (74.2%), while machinery, sharp object, and twisting injuries did not result in ICU admission. Cause of injury was significantly associated with ICU admission (Fisher's exact test, $p < 0.001$). Injury type was also significantly associated with ICU admission (Fisher's exact test, $p < 0.001$); most ICU patients sustained multiple injuries: 21 (31.8%) or TBI: 19 (28.8%). ICU admission was significantly associated with involved body region (Fisher's exact test, $p < 0.001$). Head injuries showed the strongest association with ICU admission (χ^2 (1) = 679.62; $p < 0.001$) (Table 2).

Overall, 6,722 patients survived (99.9%), and eight deaths were recorded (0.1%). Seven of the 66 ICU-admitted patients died (10.6%), while one death occurred among non-ICU patients. The median age of deceased patients was 37 years (IQR 23; range 22–56) compared with 32 years (IQR 12; range 18–60) among survivors ($p = 0.173$). Falls were the leading cause of death (5/8; 62.5%), followed by heavy objects (2/8; 25.0%) and direct trauma (1/8; 12.5%). There was no significant association between cause and mortality (Fisher's exact test, $p = 0.135$). Head injury was the most common involved body region among deaths (5/8; 62.5%) and was significantly associated with mortality (Fisher's exact test, $p < 0.001$). Given the small number of deaths, mortality findings should be interpreted cautiously (Figure 3).

Table 2. *Demographics and characteristics among ICU admissions (n = 66).*

Variable category	Subcategory	Total number	ICU admissions	
			n	%
Gender	Male	6,480	65	1
	Female	250	1	0.4
Type of injury	Fracture and soft tissue injury	690	6	0.9
	Burn	143	5	3.5
	Isolated fracture	927	12	1.3
	Isolated soft tissue injury	4,691	1	0.0
	Solid organ injury/hollow viscus injury	9	1	11.1
	Traumatic brain injury	33	19	57.6
	Multiple injuries	70	21	30
	Other	151	1	0.7
Cause of injury	Direct trauma	2,023	4	0.2
	Environmental	135	4	3.0
	Heavy object	522	2	0.4
	Fall	1,722	49	2.8
	Other	146	7	4.8
Body region	Head	224	40	17.9
	Face	314	6	1.9
	Spine	192	10	5.2
	Thorax	105	9	8.6
	Abdomen/pelvis	83	9	10.8
	Upper extremities	1,897	6	0.3
	Lower extremities	836	8	1
	External (Skin)	3,206	6	0.2

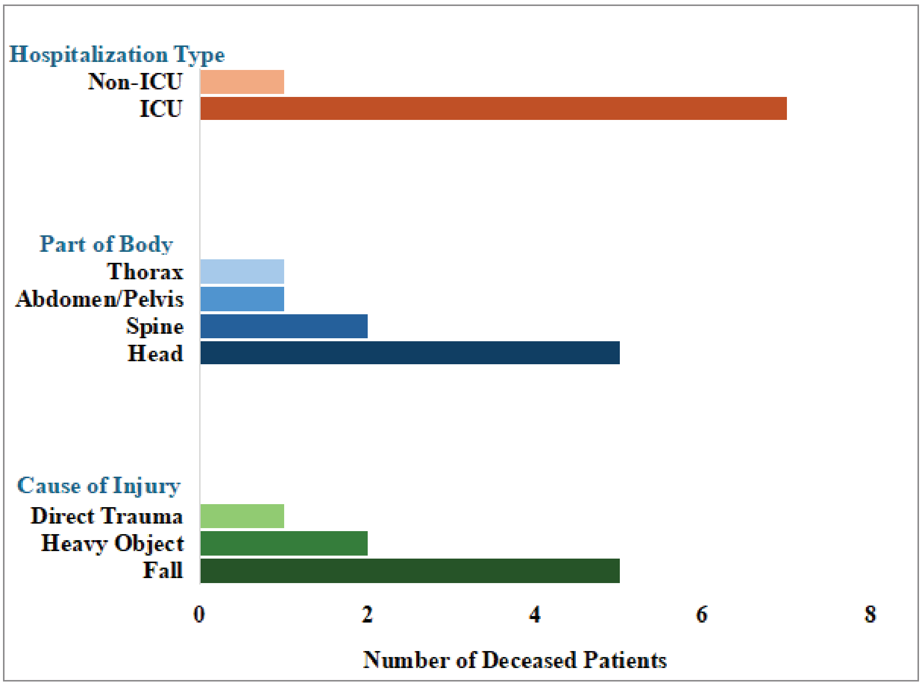

Figure 3. *Mortality distribution by hospitalization type, body region, and cause of injury.*

Discussion

Most patients in current study were male (96.3%), which is consistent with findings from previous studies reporting male proportions ranging from 79.5% to 97.9% among occupational injury patients [6,7]. The predominance of males could be attributed to many factors, such as occupational tasks, geographical region, and gender-based differences [8]. It could also be due to the fact that males work in occupations associated with a higher likelihood of injury, such as construction and operating machinery [9]. According to the Dubai Statistics Center, a large percentage of males (around 36.3%) worked as craft workers and machine operators, as compared to females, who only constituted a small number in these industries (0.3%) [10].

The median age of the patients in current study was 32 years (range = 18 – 60 years), with the most common age group being 30–39 years. This is consistent with other studies. One study conducted in 2016 showed that most patients fell between the ages of 30 and 39 years [9]. Another study, however, showed the most common age group to be 18–29 years [6]. Generally, younger workers were found to have a higher rate of occupational injuries compared to older workers [11]. This could be due to a lack of safety training, experience, or higher risk-taking behavior [12]. A study in Saudi Arabia showed that lack of awareness and experience, followed by machine defects or errors (82.7% and 64.3%, respectively), were the most common causes of injury. These findings were most common in the 26–31 years age group [13].

This study divided the patient population by geographical regions. Most patients in current study cohort originated from South Asia (77%). Similar demographic patterns have been reported in previous studies from the UAE and Qatar, where workers from Pakistan, India, Bangladesh, and other South Asian countries accounted for the majority of occupational injury cases [4,14]. This observation was likely related to the demographic composition of the UAE workforce, in which migrant workers from non-Arab Asian countries represented a substantial proportion of employees, particularly in labor-intensive industries associated with a higher risk of occupational injury [10].

When examining the cause of injury, the most common cause was found to be direct trauma (30.1%), followed by fall (25.6%). The current study findings differ from the study conducted in the UAE in 2009, where the most common cause of injury was fall (51%), followed by being struck by falling objects. The study, however, targeted patients who required hospital admission [4]. Likewise, two other studies noted falls to be the most common cause of occupational injuries [6,15]. Cemalovic et al. (2016) reported that sharp objects were the most common cause of occupational injury [9]. Comparatively, older studies reported machinery and hand tools as the most common causes of injury, while they only caused a small number of injuries in current study population [16]. This could be due to better implementation of machine safety devices and measures, as well as better inspection [16].

The current study results showed the most common type of injury to be isolated soft tissue injury (69.7%), followed by isolated fracture (13.8%). These findings are comparable to two studies. The first study, which was conducted in India, reported that the most common type of injury was laceration, followed by soft tissue injury (65.0% and 36.8%, respectively) [17]. The second study, conducted in Switzerland, also showed laceration as the most common presenting injury [18]. Compared to these studies, TBIs were lower in current study population [17,18]. The most frequently involved body region in current study was external, followed by upper extremities (47.6% and 28.2%, respectively). This is supported by multiple studies, which have shown that the upper extremities, specifically the hands and wrists, are at the highest risk of occupational injuries [18,19].

Only a small number of current study population required admission to the hospital (13.3%), with a median stay of 6 days, from which only 1% required ICU admission. A study conducted in Bahrain showed an admission rate of 32.5% with a mean LOS of 8.15 days and an ICU admission rate of 2.2% [20]. In contrast, a study conducted in Turkey demonstrated an admission rate of 74.4% with a median LOS of 3 days (1–29 days) and 16.3% ICU admissions [21]. The LOS could greatly differ based on multiple factors, including the age of the patient, type and severity of injury, medical condition at the time of injury, as well as hospital factors such as the initiation time of treatment, referral or admitting wards, and administrative policies [6,22]. The majority of current study patients received sick leave (65.2%), with a median duration of 5 days (1–112 days), which is comparable to another study [20]. Longer duration of sick leave was associated with multiple aspects, including female gender, severity of injuries, seniority, higher salaries, and employment in larger firms [23].

A significant association was found between the type of injury and other factors, such as the cause of injury and the length of hospital stay. The most common type of injury among those admitted was fracture, which concurs with findings from a study done in Bahrain [20]. Although TBI was associated with a higher rate of hospital admission in current study, those with burns had the longest hospital stay (median = 17 days, 2–135 days), which is comparable to another study [16]. The longer LOS is likely because burns usually result in multiple complications and a high number of morbidity and mortality [14,21].

Analysis of the patients admitted to the ICU revealed that the majority were male (98.5%). As previously mentioned, this could be because males work in higher-risk occupations and therefore were more likely to sustain more severe injuries [9,21]. The most common cause of ICU admission in current study was fallen (74.2%). Road traffic accidents, followed by falls, were the most common causes of ICU admission in a previous study conducted in the UAE [24]. This difference is likely explained by the fact that road traffic accidents were not flagged as occupational injuries in our EMR.

A higher proportion of ICU admissions were also observed among patients with multiple injuries, followed by TBI. The most common body region involved for ICU-admitted patients was the head, followed by spinal injuries. The mortality rate among those admitted to the ICU in current study was 10.6%, which is comparable to multiple studies [21, 24]. Although the all-cause mortality of polytrauma patients admitted to the ICU has decreased over the past decade, the incidence of brain-related death has increased [25].

Only eight patients from current total study population died (0.1%). This is much lower compared to other studies. For instance, a study conducted in Turkey had a mortality rate of 2.6% [21]. Another study conducted in Qatar had a mortality rate of 3.7%, with 40.5% of them being prehospital deaths [14]. Moreover, Bagheri Toolaroud et al. (2023) reported that occupational injuries caused by burns had a mortality rate of 11.2%, which is much higher than current study mortality rate [26]. The current study's low mortality rate could be justified by the fact that we did not include any DOA or prehospital deaths and because a minority of current study patients sustained burns (2.1%). Among the eight deaths recorded, falls were the most common mechanism of injury (62.5%), consistent with findings from other studies [14,27].

The predominant body region involved in the deceased patients was the head (62.5%). This is similar to two studies, which reported the main body region with the highest fatality to be the head [27,28]. In contrast, the majority of current study samples had external injuries (47.6%), while only 3.3% sustained head injuries. This could be another reason for current study's low mortality rate. The median age among the patients who did not survive was 37 years. One study has shown that mortality increases with age, although these findings were not statistically significant [14].

Another study reported that younger workers were more likely to sustain nonfatal injuries, while older ones sustain higher rates of fatal injuries [29]. It is important to note that there has been an overall decrease in deaths caused by work-related injuries in both low- and high-income countries [30]. This is attributed to improved safety measures and technology [31]. It is important to note that the small number of deaths in current study limited firm conclusions regarding mortality patterns.

The strengths of this study included the large sample size, which represented one of the largest cohorts of occupational injuries reported in the Middle East and North Africa (MENA) region. Another strength was the variety of cases that presented to current study ED, given that it is a tertiary hospital and a Level I Trauma Center. Moreover, current study was a comprehensive analysis that included different variables ranging from the mechanism to sick leave duration. Hence, it could contribute to various applications such as safety measure implementations, health policy applications, and clinical practice improvement.

On the other hand, there were a few limitations. First, although current study hospital receives most of the trauma cases in the Emirate, this study included patients from a single center, which could make it less applicable to the general population. Second, occupational road traffic accidents were not flagged as occupational injuries in current EMR. Additionally, further details such as job title, industry sector, and use of personal protective equipment were not collected, as they were outside the primary study objectives. Incomplete documentation and the large sample size limited the inclusion of these variables, restricting a more detailed analysis of occupational risk patterns and preventive measures. Furthermore, the retrospective nature of the study and the large number of cases made it difficult to incorporate certain injury severity indicators, such as the Injury Severity Score (ISS), which might have provided additional insight into injury outcomes. Moreover, minor injuries that did not seek medical attention and those that presented to other hospitals were not accounted for. The analyses were limited to unadjusted bivariate comparisons; therefore, the observed associations should be interpreted as exploratory associations rather than independent predictors, as potential confounding factors were not accounted for. Lastly, only eight deaths were recorded during the study period, limiting the statistical power of mortality analyses. Thus, findings related to mortality should be interpreted cautiously and considered descriptive rather than definitive.

Conclusion

This study highlighted that occupational injuries in Dubai remain a significant concern, especially among young South Asian male workers. Most injuries resulted from preventable mechanisms, such as direct trauma and falls. The 30–39 years age group was the most impacted, pointing to the importance of directing safety training toward this core segment of the workforce. The considerable number of patients requiring time off work highlighted the critical need for proactive occupational injury prevention, both to support individual recovery and to maintain workforce continuity while easing pressure on the broader system. Though less frequent, head and spinal injuries were strongly associated with ICU admissions and death, emphasizing the need for targeted prevention, as well as better supervision and implementation of safety measures and advanced emergency care. The exclusion of AMA and absconded patients due to possible financial reasons indicated that stakeholders should aim to reduce economic and structural barriers that could prevent injured workers from completing medical care. Finally, establishing a national occupational registry in the UAE to document various types of work-related injuries is not merely a technical enhancement, it is a vital step toward understanding the causes behind these incidents. With accurate and comprehensive data, more informed and effective policies can be developed, paving the way for a safer workplace environment that offers a clear, transparent, and inclusive insight into the challenges workers encounter daily.

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Consent for participation

Informed consent was obtained from all the participants.

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Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Ethical approval

This study was conducted in accordance with the Belmont Report and the Declaration of Helsinki and approved by

the ethics committee of Mohammed Bin Rashid University (number MBRU-IRB/USRRC/2024/05) and the Dubai Scientific Research Ethics Committee (number DRSEC/RRP/2022/29). Dated: 31-10-2022.

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