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Exposure to Occupational Accidents and Near-Miss Events of the Healthcare Workers During the COVID-19 Pandemic

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ABSTRACT

Objectives: Health institutions are considered high-risk occupational areas due to the need for human resources, including numerous specialists with distinct characteristics, intensive technology, and complex occupational processes. The purpose of this study is to examine the frequency of exposure to occupational accidents and near-miss events of the nurses and physicians working in hospitals, their reporting status, and factors affecting these characteristics during the coronavirus disease-2019 (COVID-19) pandemic.

Methods: This descriptive study evaluating the occupational accidents and near-miss events of healthcare workers in 2020 was carried out between January 1, 2020, and December 31, 2020. The questionnaire created over Google Forms was shared through social media groups (WhatsApp, Facebook, etc.) of the healthcare workers in Turkey. The data collection form consisted of four sections, which assess sociodemographic characteristics, history of employment, characteristics of occupational accidents, and near-miss events of the healthcare workers.

Results: A total of 225 healthcare professionals, with a mean age of 35.2±8.5 years, 156 (69.3%) female and 163 (73.8%) doctors, participated in this study and 101 (44.9%) healthcare workers declared that they experienced a work accident and 84 (37.3%) healthcare workers reported near-miss events; however, only 14 (13.9%) healthcare workers reported this accident to their institution during the COVID-19 pandemic.

Conclusion: Every occupational accident or near-miss event experienced by healthcare professionals should be reported and analyzed carefully to prevent potential risks. Training health professionals about health risks they may encounter and protective measures against occupational accidents have vital importance.

Keywords: COVID-19, near miss event, nurse Occupational accidents, physician



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INTRODUCTION

Health institutions are considered high-risk occupational areas due to their need for human resources, including numerous specialists with distinct characteristics, intensive technology, and complex occupational processes.^[1] Besides, the health sector is mentioned as one of the riskiest occupational areas according to both Turkish national legislation and previous studies on this subject due to the risks and dangers faced by the employees while providing healthcare and the nature of the service they provide. The healthcare providers' well-being in terms of physical, psychological, and social aspects and a safe working environment provide adequate health services vital for health institutions.^[2] Healthcare professionals in high-risk hospitals must first ensure their safety and then focus on the safety of their patients, where they have to adopt and implement safety practices as a legal imperative and cultural change. Be-

fore occupational accidents occur, it is crucial to control the hazard at its source, design working systems ergonomically to minimize the risks, use personal protective equipment (PPE), and, most importantly, emphasize the internalization of the subject by both management and employees.^[3]

In America, 8.8 out of every 100 healthcare professionals working full-time in hospitals suffer from occupational accidents/occupational diseases or are discharged from their jobs.^[1] In comparison, this rate is four for every 100 employees in the mining sector, 7.9 in the construction industry, and 8.1 in the production sector.

According to a study in Germany in 2009, healthcare professionals are exposed to physical and verbal violence throughout their professional life, with a lifetime risk of 70.7% and 89.4%, respectively.^[4] According to a study conducted by Turkish Health-Syndicate at the beginning of 2012 on 1864 healthcare professionals, 78% of doctors and 69% of nurses and midwives reported that they were exposed to violence.^[5] Health services are a risky sector in terms of occupational accidents. It is reported that the annual number of non-lethal occupational accidents is 262,700 in the USA, 16,548 in the UK, and 35,491 in Canada. According to a study on accident types and occupations in the UK, large-scale injuries in nurses, assistant nurses, and caregivers were reported to be slipping or snagging and assault or violence in 2002/2003. In a study conducted by the Ontario Occupational Health and Safety Insurance Department, it was found that 36,103 employees applied for work-related incidents, and 11 of them died between the years 1996 and 2000. According to a study examining healthcare workers' insurance compensation applications in the USA, the most common reasons for application included sprains and muscle strains, crushing, bruises, cuts, and fractures.^[6,7]

Treatment and management of severe acute respiratory syndrome coronavirus-2, which causes coronavirus disease-2019 (COVID-19), requires extensive PPE to be worn by healthcare workers.^[8,9] The use of PPEs is an essential and comprehensive part of the effort to prevent COVID-19 transmission. The World Health Organization recommends using masks to protect medical workers during routine care for patients, especially those confirmed with the disease. These PPEs protect healthcare workers in terms of COVID-19 and protect them against many occupational accidents. However, since the work routine of many health workers has changed due to the pandemic, their exposure to occupational accidents and near-miss events may also change during this period.

The aim of this study is to examine the frequency of exposure to occupational accidents and near-miss events of the nurses and physicians working in the internal medicine units of a university hospital and their reporting status, as well as the factors affecting these characteristics.

METHOD

This is a multicenter, descriptive study evaluating the data collected between January 1, 2020, and December 31, 2020. The study was carried out through social media groups (WhatsApp, Facebook, etc.) of healthcare workers in Turkey. The data were collected online using the "Evaluation Form for Occupational Accidents and Near-Miss Events," created over Google Forms by the researchers. Health workers who are not on active duty and those working outside of Turkey were excluded from the study.

The data were collected using the "Evaluation Form for Occupational Accidents and Near-Miss Events," form which is divided into four sections and consists of 15 questions prepared to define the employees' demographic characteristics, history of employment, characteristics of occupational accidents and near-miss events, and their reporting status. The form was created in consideration of the factors related to occupational accidents and near-miss events. In terms of coverage and understandability of questions, the questionnaire was presented to academics specializing in internal health nursing and nursing research, and the form was finalized based on their feedback. The data were collected after receiving ethical permissions. The test took about 5 min for each participant to complete. Cronbach's alpha internal consistency coefficient was 0.72 in the total scale.

The data were evaluated using SPSS (IBM SPSS Statistics for Windows, Version 23.0. NY: IBM Corp.) software in the computer environment. Categorical variables were expressed as frequency and percentage. The continuous variables were presented as mean and standard deviation. The Chi-squared test was used to compare categorical variables. A $p < 0.05$ was considered statistically significant for this study.

RESULTS

A total of 225 healthcare professionals, with a mean age of 35.2 ± 8.5 years, 156 (69.3%) females participated in the study. Of the participants, 163 (73.8%) were doctors, and 45 (20.0%) were nurses. Of the participants, 158 (70.2%) were working in shifts, and 101 (44.9%) health workers declared that they experienced occupational accidents in the last year due to different reasons. However, only 14 (13.9%) of them reported this incident as taking place in their institution.

Considering all occupational accidents, 60 (53.1%) of accidents were due to cut-puncture wounds, 60 (53.1%) were exposed to blood and body fluids, 41 (36.3%) were exposed to violence, and 24 (21.2%) were due to fall-slip injuries. Furthermore, 80 (68.4%) healthcare workers reported to had protective equipment during the occupational accident. In addition, only 112 (49.8%) employees attended occupational health training. Characteristics of occupational accidents are summarized in Table 1.

When the distribution of the workers according to their knowledge of the near-miss incidents was examined, 158 (70.2%) health workers knew the meaning of the near-miss incident, while 67 (29.8%) did not know. Of the health workers, 84 (37.3%) reported near-miss events, and 209 (92.9%) thought that the near-miss incident reports could effectively reduce occupational accidents. Characteristics of the near-miss events are summarized in Table 2.

It was determined that 35 (34.7%) of the male health workers and 66 (65.3%) of the female health workers had an occupational accident at work (p=0.242). Occupational ac-

cidents according to sociodemographic features are summarized in Table 3.

The frequency of near-miss events was significantly lower in the other health workers than in both nurses and doctors (p=0.001). It was determined that 43 (30.7%) of the male health workers and 97 (69.3%) of the female health workers had a near-miss event at work (p=0.761). Near-miss events according to sociodemographic features are summarized in Table 4.

DISCUSSION

This study aimed to study the frequency of exposure to occupational accidents and near-miss events of the nurses and physicians working in the internal medicine units of a university hospital and their reporting status and factors affecting these characteristics. A previous study by Costa et al. showed that increasing age is associated with decreased work ability index.^[10] The shift work also worsens the health

Table 1. Characteristics of occupational accidents

	n (%)
The type of the occupational accidents*	
Fall, slip	24 (21.2)
Strain injuries	23 (20.4)
Exposure to blood or body fluids	60 (53.1)
Cut-puncture wounds	60 (53.1)
Exposure to radiation	18 (15.9)
Electric incident	4 (3.5)
Exposure to violence	41 (36.3)
COVID-19	2 (1.9)
Other	3 (2.7)
The reason of the accident*	
Haste	32 (29.1)
Fatigue	16 (14.6)
Tiredness	19 (17.3)
Busy	2 (1.8)
Other	41 (37.3)
Reason for not reporting the accident*	
I was swamped	30 (30.9)
I did not know that I had to report the accident	9 (9.3)
I thought that the patient was not risky for HIV-HBV-HCV	7 (7.2)
I thought that reporting was not important	13 (13.4)
The tool I was injured by was not used in any patient	18 (18.6)
Other	20 (20.6)

*Multiple options can be selected.

Table 2. Characteristics of the near-miss events

	n (%)
The type of near-miss events*	
Fall, slip	84 (58.7)
Strain injuries	84 (58.7)
Exposure to blood or body fluids	53 (37.1)
Cut-puncture wounds	65 (45.5)
Exposure to radiation	16 (11.2)
Electric incident	12 (8.4)
Exposure to violence	40 (27.9)
Other	2 (1.4)
The reason for the near-miss events*	
Haste	47 (33.6)
Fatigue	26 (18.6)
Tiredness	19 (13.6)
Being busy	2 (1.4)
Ground problems	5 (3.6)
Other	41 (29.3)
Reason for not reporting the near-miss events*	
I was swamped	31 (24.0)
No unit to report the near-miss incident	11 (8.5)
I didn't know that I had to report the incident near a work accident	30 (23.3)
The device in the near-miss incident was not used in any patient	15 (11.6)
I did not think it was important to report	32 (24.8)
Other	10 (7.8)
Using personal protective equipment during the near-miss event	87 (60.4)
Reporting the near-miss incident to the institution	11 (7.8)

*Multiple options can be selected.

Table 3. Occupational accidents according to sociodemographic features

	Accident at work		p
	Yes (n=101)	No (n=124)	
Gender			
Male	35 (34.7)	34 (27.4)	0.242
Female	66 (65.3)	90 (72.6)	
Occupation			
Doctor	73 (72.3)	90 (73.2)	0.024
Nurse	24 (23.8)	21 (17.1)	
Other health workers	5 (3.9)	11 (9.7)	
Hospital unit			
Surgical units	35 (36.1)	16 (14.8)	0.002
Internal units	54 (55.7)	82 (75.9)	
Emergency/triage service	8 (8.2)	10 (9.3)	
Educational status			
Master's degree or above	63 (62.4)	83 (66.9)	0.527
Undergraduate	37 (37.6)	41 (33.1)	
Working style			
Shift	60 (59.4)	57 (45.9)	0.045
Routine	41 (40.6)	67 (54.1)	

Data are presented as n (%).

Chi-square test.

Table 4. Near-miss events according to sociodemographic features

	Near-miss event		p
	Yes (n=140)	No (n=92)	
Gender			
Male	43 (30.7)	30 (32.6)	0.761
Female	97 (69.3)	62 (67.4)	
Occupation			
Doctor	101 (72.1)	65 (71.4)	0.001
Nurse	35 (25.0)	13 (14.3)	
Other health workers	4 (2.9)	13 (14.3)	
Hospital unit			
Surgical units	38 (28.4)	16 (20.5)	0.207
Internal units	82 (61.1)	57 (73.1)	
Emergency/triage service	14 (10.5)	5 (6.4)	
Educational status			
Master's degree or above	89 (63.6)	60 (65.2)	0.861
Undergraduate	51 (36.4)	32 (34.8)	
Working style			
Shift	84 (60.0)	34 (36.9)	0.001
Routine	56 (40.0)	58 (63.1)	
To know what a near-miss is			
Yes	94 (67.1)	64 (69.5)	0.699
No	46 (32.9)	28 (30.5)	
Do you think near-miss incident notifications will be effective in reducing occupational accidents?			
Yes	120 (85.7)	89 (96.7)	0.006
No	20 (14.3)	3 (3.3)	

Data are presented as n (%).

Chi-square test.

of senior personnel.^[11] Therefore, older personnel should be assigned to low-risk units for the prevention of occupational accidents. COVID-19 is a tremendous challenge for occupational health. Workers in many occupations face high risks of becoming infected. Healthcare professionals are at increased risk of exposure to high viral load because of their close contact with COVID-19 patients, which puts them at risk of becoming infected.

The frequency of occupational accidents and near-miss events experienced by physicians was higher than by the nurses. In contrast, Pines et al. reported that physicians had the lowest frequency of occupational accidents than workers in hospital housekeeping and maintenance departments.^[12] However, the severity of accidents experienced by physicians was higher compared to other health workers. Hence, specialized training in occupational accidents should be provided to physicians. This intervention may include both physicians and nurses to increase their impact on occupational accidents and near-miss events. This difference can be explained by the increase in the workload for doctors during the pandemic period.

This study demonstrated that women had a higher frequency of experiencing near-miss events; however, no significant difference was found. Further studies are required to demonstrate the effect of gender on near-miss events. More than half of those (60.4%) who experienced a near-miss event stated that they used PPE during the event. A qualitative study conducted by Neves et al. demonstrated that the barriers against adherence to protective equipment pose problems in communication, overwork, availability of protective equipment, and organizational issues.^[13] Any educational intervention to prevent occupational accidents should include subjects focused on the use of PPE.

Only a tiny fraction of our participants reported their occupational accidents. The frequency of reporting the near-miss event was 7.8%. Notification of occupational accidents and near-miss events is vital tools of epidemiology to analyze the health condition of workers and the risk of occupational practices and enable them to create strategies for health promotion. According to the current legislation, Sêcco et al. reported that guidance on healthcare professionals is needed to enhance the notification flow.^[14] Thus, healthcare professionals should be informed of the importance of the notification of occupational accidents and near-miss events. Individual training and counseling should be provided to new physicians and nurses about reporting occupational accidents and near-miss incidents. Occupational health and safety practices remained in the background during the pandemic period, and routine

training and information to employees were incompletely caused this situation.

Surprisingly, it has been found that most occupational accidents occur in shifts working style. The previous studies showed that 8 h shifts are safer compared to 10 or 12 h shifts.^[15-17] Occupational accidents in afternoon shifts are relatively lower compared to morning shifts.^[18] The shifts should be organized as 8 h periods with appropriate rotations in shift periods.

The results of this study showed that the most common causes of occupational accidents were fatigue/tiredness, haste, sleepiness, and absent-mindedness. A study conducted on nurses working in private and university hospitals showed that the hospitals have problems planning time schedules for nurses.^[19] Another study showed that cognitive failures are linked to minor injuries and workplace accidents.^[20] In addition to ergonomic improvements, appropriate time schedules and support on mindful nursing practices in a safe psychological environment may decrease workload and workplace accident frequency. The results of this study indicate that an essential fraction of workplace accidents and near-miss events occur due to cuts and puncture wounds, which have a high risk of blood-borne infections. An adequate supply of PPE, ease of access to PPE, proper time management, and organization measures for the prevention of cuts and puncture wounds may decrease the frequency of workplace accidents and near-miss incidents dramatically.

This study is critical because it is the first study to investigate occupational accidents during the pandemic period. Despite this, the study has some limitations. First, online surveys have the limitation of being accessible to only computer-literate population and being biased towards individuals of higher socioeconomic status. Second, since the terminology of "near-miss event" is not exactly known by many health workers, there is a possibility that it will be answered incorrectly. In addition, the relatively small sample size reduces the power of the study despite the sample analysis.

CONCLUSION

Every workplace accident or near-miss event experienced by healthcare professionals should be reported and analyzed carefully to prevent future workplace accidents. Training health professionals on health risks they may encounter and protective measures against occupational accidents have vital importance. However, further research should be carried out to create and improve training programs to prevent the risks of occupational accidents. It should be kept

in mind that though COVID-19 is not considered an occupational accident or near-miss event in many regions, such pandemics disrupt the work order of the health system, and it is essential for countries to develop their policies in this direction. It is also essential for hospital workers in the countries to reduce the accident rates during pandemics and the burden on the healthcare workers. The accident prevalence and incidence reveal that prevention training organized once a year is insufficient.

Disclosures

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