

PERCEPTIONS OF HEALTH PERSONNEL ABOUT WORK SAFETY AND ITS RELATIONSHIP WITH OCCUPATIONAL INJURIES

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Abstract:

Although hospital work environment is one of the most hazardous place to work, there are relatively little studies focused on health personnel's' perceptions about workplace safety. This study investigated perceptions of health personnel about work safety at a university hospital and its relationship with occupational injuries. Questionnaire included demographics, exposure to an occupational injury, occupational safety scale for health personnel and universal precautions compliance scale. The lowest scores for the hospital safety were given for the dimensions measuring "occupational diseases and complaints" and "management support and approaches". Gender, unsafe behaviours, and long working hours affected exposure to an occupational injury. Healthcare workers who experienced an occupational injury stated lower safety scores for the dimension "management support and approaches". Hospital administrations should give much more attention to safety regulations in order to improve safety and health in hospitals. This study confirms the importance of management support (by arranging working hours, giving priority to training activities on safety practices and identifying problematic dimensions for safety) to come over occupational injuries.

Key-words: *Occupational health, Health personnel, Occupational exposure*

Introduction

Occupational safety can be defined as protecting employees from negative aspects of a workplace, offering them a safe and comfortable workplace and therefore protecting them against occupational injuries and diseases while maintaining their physical and mental health. The primary goal of occupational safety is protection of employees [31, 16].

Studies have shown that the hospital work environment is one of the most hazardous place to work. Healthcare workers are faced with lots of biological, physical, chemical ergonomic hazards and psychosocial exposures [30, 23, 33, 32, 25, 26]. In 2011, U.S. hospitals recorded 253,700 work-related injuries and illnesses, showing a rate of 6.8 work-related injuries and diseases showing a rate for every 100 full-time employees [26]. The most common health problems faced by healthcare workers include hepatitis B, tuberculosis, back pain, varices, occupational stress, musculoskeletal injuries, violence, maltreatment and sharp medical equipment injuries. The magnitude of these problems has increased dramatically over the last 20 years [1, 38]. A 2011 health and safety survey of nurses

pointed out that 74% of healthcare professionals had serious health conditions caused by stress and overwork, 62% had disabling musculoskeletal injury from work and 34% claimed being assaulted while working [4].

It is important to establish a safe work environment and "safety climate" in every occupational setting since all occupational diseases and 98% of occupational injuries are preventable [27]. Safety climate can be described as perceptions of employees about safety of their work environment [39]. Their perceptions about safety are important because there are direct links between strong safety climates and reports of fewer workplace injuries, medical errors or infections which is also directly correlated with patient satisfaction [14, 15]. It has also been reported that a safe environment supports and reinforces employees to follow and obey safe workplace practices. Perceived safety work practices result in fewer occupational injuries and illnesses [39].

Although hospital-based work is difficult and contains many hazardous situations, workplace health and safety at hospitals is not widely understood or perceived as a priority by health care directors in general. Because hospital work safety

is a new subject for Turkey, there are few studies about the working conditions of health personnel, occupational risks and risk assessment of work environment at hospitals [27]. Specific legislative efforts such as the Law on Maintaining Patient and Employee Safety (act of 27897) and the Law on Occupational Health and Safety (act of 6331) were established in 2011 and 2012 [21, 22]. This legislation allows for all employees working in any occupational setting to benefit from occupational health and safety services. Although this legislation has been present for 3 years, the application and evaluation in the hospital settings has just gained sufficient interest. In this study, we aimed to evaluate occupational safety in a university hospital from the point of view of the healthcare workers, as well as their compliance with universal precautions and their relationship with occupational injuries.

Method

Study sample

This hospital-based cross-sectional study was carried out between September and October 2014 in a university hospital in a western city of Turkey. University hospital has 485 beds with 1800 employees; including cleaning staff and contractual workers. After excluding cleaning staff and workers who were not in relation with patient care, the study population included 1,166 people. No sample selection was performed, however a total of 801 people (68.7%) were reached for the study due to transient out-of-town duties, vacations, and so forth. The questionnaire was completed by medical faculty students in the workplace of the participants by face-to-face interviews. Before the interviews, medical students were trained for data collection for a week. The inclusion criteria for the study were that the participants were above 17 years old and agreed to participate in the research. Ethic approval was taken from the Medical Faculty of Adnan Menderes University (protocol no: 2014/ 442). The questionnaire was pretested on 10 nurses who were not included in the original study.

Study questionnaire

In this study, a semi-structured questionnaire form was used to collect data from individuals. The questionnaire form consisted of three major sections: 1) demographics and exposure to an occupational injury 2) hospital occupational safety scale for health personnel and 3) health personnel' compliance with universal precautions.

Demographics

Demographic questionnaire included questions about participants' age, sex, education, job category, duration of occupational experience, duration of time in the current position, weekly working hours, and any diagnosed chronic disease.

History of an occupational injury

Participants were asked if they had experienced an occupational injury in the previous 12 months, and if so, type of the injury, location of the injured body part and if they participated in any preventive therapies after the injury.

Hospital occupational safety scale for health personnel (OSS-HP)

Original Scale, which was developed by Ozturk H and Babacan E [28] in 2012 for determining safety conditions of health care workers in hospitals, contains seven dimensions: occupational diseases and complaints (13 items; $\alpha=0.93$), health screening and recording system (six items; $\alpha=0.90$), accidents and poisoning (five items; $\alpha=0.90$), management support and approaches (seven items; $\alpha=0.87$), control of materials and tools (five items; $\alpha=0.84$), protective measures and rules (five items; $\alpha=0.85$), and appropriate physical environment (four items; $\alpha=0.82$) (total scale's Cronbach alpha=0.96; content validity index=0.92). The 6-point Likert scale is composed of 45 questions (1= strongly disagree; 6= strongly agree). The lowest total score is 45; highest total score is 270. When total score is divided by the number of items in the scale, the range of scores is between 1 and 6. Scores towards 6 indicate that occupational safety is obtained in the hospital while scores close to 1 indicate the opposite.

Compliance

Healthcare workers mostly exposed to blood and other body fluids while they were working. Because of this reason a 14-item Universal Precautions compliance scale was asked to measure safety practices of them in their daily routines [11, 13, 12]. Each question consisted of a 5 point Likert scale (1=never to 5=always). Responses of "always" for all the items were accepted as "strict compliance".

Statistical Analysis

The SPSS software version 18.0 was used for statistical analysis. The variables were investigated to determine whether or not they are normally distributed by Kolmogorov-Smirnow test. Descriptive analyses were presented using medians (Mdn) and minimum-maximum values for the non-normally distributed variables. Since the scale (OSS-HP) results were not normally distributed, nonparametric-tests (Mann-Whitney U test) were used to compare scale scores with the selected parameters. The univariate analyses were performed to examine associations between exposure of an injury with demographic parameters and strict compliance. Strict compliance and exposure of an injury was also evaluated for each dimension of safety scores. For the multivariate analyses, the possible factors identified with univariate analyses were further entered into logistic regression analyses to determine independent predictors of exposure of an occupational injury in the previous year. In this analysis, exposure of an injury was taken as dichotomous variable whereas gender, strict compliance (yes or no), weekly working hours, duration of time in the current position, occupational experience, and job category (physician/nurse or other health workers) were taken as independent variables. The results of logistic regression analysis were showed as relative risk (odds ratio [OR]) and 95% confidence interval (CI). The Backward-Wald method was used. A 5% type-1 error level was used to infer statistical significance.

Findings

Demographics

The participants were predominantly women (62.3%), with a median age of 29.5 years (range, 18-52). The majority of them (90.8%) had at least a high school degree and were employed as nurses (37,6%). Other job categories were as follows: physician 14.5%, technician 12.0%, other personnel (such as pharmacist, physiotherapist, medical secretary etc.) 35.9%. The median duration of professional experience for employees was 5 years (range, 0-38 years), while the median time spent at their current position was 3 years (range, 0-25). Median weekly working hours was 45 hours (range, 8-140). 10.9% of the participants stated that they were diagnosed with a chronic disease.

History of an occupational injury

From a total of 801 participants; 112 healthcare workers (14.7%) had experienced an occupational injury in the previous 12 months. When the participants were asked if they had ever experienced an occupational injury in their professional life, 49% of them stated that they had such an experience. Most commonly affected body parts were fingers, hands, and arms (59%). Among participants reporting work-related injuries in the past 12 months, 28.3% stated that they were not using any protective materials at that time of incident and 53.5% stated that they did not do anything after the accident.

Work safety

Median score of the total safety scale was 2.80. The lowest scores were given for the dimensions measuring occupational diseases and complaints (mdn=1.92) and management support and approaches (mdn=2.28). On the other hand, the highest scores were given for protective measures and rules (mdn=4.20) and appropriate physical environment (mdn=4.00). In general, safety level of the research hospital can be defined as “poor”. Results for each of the safety items and median levels of dimensions are shown in Table 1.

Dimension	Agree ” or - “strongly agree” (%)*
Occupational diseases and complaints (median score=1.92)	
Varices are not common among employees.	6.6
Mental problems, including depression, are extremely rare.	8.1
Excessive fatigue is extremely rare.	6.7
The frequency of insomnia is low.	7.4
Hernias, including lumbar disk hernias, are rare.	6.6
There are no digestive system complaints (constipation, ulcer, etc)	13.6
Emotional problems are very rare (loneliness, burnout, etc)	12.1
Complaints of arm and leg pain are rare.	8.1
Mental fatigue and lack of coordination are rare.	10.0
Allergic problems (e.g. dermatitis) are extremely rare.	17.8
Respiratory system diseases are not very common among employees.	15.8

The frequency of infectious diseases is low (e.g. hepatitis, AIDS)	10.2	and devices being used are taken.	
Soft tissue trauma is not very common (e.g. needle-stick injuries, scalpel cuts)	10.8	Protective equipments (e.g. gloves, glasses) can easily be found.	40.9
Health screening and recording system (median score=2.50)		Equipments and devices bought are high-quality in terms of safety and reliability.	27.0
Occupational accident reporting forms are being used.	24.1	Equipments which have been bought and used are regularly checked for safety measures.	29.2
Sharp equipment accident reporting forms are being used.	24.5	Protective measures and rules (median score=4.20)	
Occupational diseases are diagnosed and related forms are used.	20.6	Rules for carrying patients are established and being followed.	40.5
There is a recording system for occupational safety (e.g. personal health forms)	21.2	Rules for elevating patients are established and being followed.	43.9
Personal health screening and physical examinations are performed regularly.	15.9	Special rules are followed for specific drugs (e.g. chemotherapy).	50.4
Training programs regarding occupational safety are being held (management of stress, exercise, etc.)	17.8	Precautions are taken for protection from blood and associated fluids.	49.4
Accidents and poisoning (median score=2.80)		Precautions are taken for protection from toxic and medical waste.	54.8
Burns do not occur	25.3	Appropriate physical environment (median score=4.00)	
Poisoning does not occur (ethylene oxide, food and drug, radiation, etc.)	21.6	Lighting is adequate and appropriate.	52.9
Electrical injuries are not seen.	28.7	Temperature and humidity are adequate and appropriate in work place.	
Crush, compression of arms, legs, hands, etc. are less common	23.5	Heating is adequate and appropriate.	49.2
Falls do not occur	19.6	Ventilation is adequate and appropriate.	38.2
Management support and approaches (median score=2.28)		Total scale's median score=2.80	
There are certain events organized to increase motivation and satisfaction of job.	9.3	* Responses of "agree" or "strongly agree" define better safety levels for the hospital.	
Various activities are being held to decrease psychological pressure on employees (e.g. entertainment and education seminars)	9.0		
In case of an occupational accident or disease, the institution takes responsibility and supports the employer.	18.8		
Patient/nurse ratios are acceptable.	16.8		
When safety problems are reported to the administration, they are emergently solved without delays.	21.5		
Patient/doctor ratios are acceptable.	19.2		
The administration is considerate when problems related to safety are reported.	25.7		
Control of materials and tools (median score=3.60)			
Equipments and devices which have stopped working are put out-of-order.	35.6		
Regular controls and care of equipments	40.0		

Table 1. The 45-item hospital occupational safety scale defined by each of its seven dimensions

Compliance to universal precautions

Participants' compliance with safety practices was not at the desired level. Highest scores were reported for disposal of sharp objects to the sharps container (89.8%) and recapping bloody needles (88.5%). The lowest rates of compliance were reported for wearing protective eye shields (42%), wearing a disposable outer garment (44%), and unscrewing needles from needle holders (54.3%). General compliance for each item was found to be approximately 70-80%. Strict compliance was found in 16.6% from a total of 453 responses. Compliance rates are shown in Table 2.

	Never	Rarely	Sometimes	Usually	Always
1.Dispose of sharp objects into a sharps container (n=500)	1.6	0.4	0.6	7.6	89.8
2.Taking special caution when using sharp objects (n=499)	1.0	-	1.6	13.0	84.4
3.Dispose of all potentially contaminated materials into biomedical waste bags (n=495)	1.8	0.2	2.8	18.4	76.8
4.Wearing gloves while drawing a patients' blood (n=483)	1.2	1.9	5.2	15.5	76.2
5.Wearing disposable gloves in case of a possibility of exposure to blood or other body fluids (n=493)	1.0	1.2	4.9	15.6	77.3
6.Never eating or drinking in the working area (n=485)	3.5	2.5	6.8	17.1	70.1
7.Never recapping needles that have been contaminated with blood (n=487)	3.9	0.6	1.4	5.5	88.5
8.Washing hands after removing disposable gloves (n=486)	1.2	1.9	4.1	16.3	76.5
9.Treating all materials that have been in contact with infectious patient's saliva (n=481)	1.5	2.5	4.0	15.8	76.3
10.Rubbing all potentially contaminated spills with a disinfectant (n=485)	1.0	3.1	5.8	21.2	68.9
11.Never unscrewing needles from needle holders that was used for patients (n=479)	7.5	4.8	13.4	20.0	54.3
12.Wearing a disposable outer garment during work (n=486)	17.5	11.3	11.5	15.6	44.0
13.Wearing protective eye shields whenever there is a possibility of a splash or splatter to eyes (n=474)	17.1	13.1	13.3	14.6	42.0
14.Wearing a disposable face mask whenever there is a possibility of a splash or splatter to face(n=485)		8.9	7.4	17.9	59.8

Table 2. Participants' compliance to universal precautions

On the other hand, adherence to safety practices was associated with safety levels of the hospital environment. Health personnel who reported strict compliance described lower safety levels for the dimension, "occupational diseases and complaints" ($p < 0.05$). No significant association was found between demographics and adherence to safety work practices ($p > 0.05$).

Factors affecting an exposure to an occupational injury

Univariate analysis showed that gender, job category, strict compliance, years of professional experience, years working in the current position, and weekly working hours affected exposure to an occupational injury ($p < 0.05$). Factors related to exposure to an injury are given in Table 3.

	Yes		No		χ^2	p
	n	%	n	%		
Gender						
Female	79	16.8	392	83.2	4.160	0.041
Male	33	11.4	257	88.6		
Education						
Lower than high school	9	12.5	63	87.5	0.312	0.577
High school and above	103	14.9	586	85.1		
Job category						
Nurse	54	19.2	227	80.8	12.886	0.005
Physician	21	19.1	89	80.9		
Medical technician	10	11.1	80	88.9		
Other*	27	9.6	253	90.4		

Chronic disease						
Yes	17	21.3	63	78.8	2.936	0.087
No	95	14.1	581	85.9		
Strict compliance						
Yes	3	4.2	68	95.8	12.142	0.000
No	79	22.0	280	78.0		
	Mdn	Min-max	Mdn	Min-max	U	p
Age	28	18-45	30	17-52	31533	0.059
Experience in occupation (years)	4	1-26	5	0-38	28897	0.001
Duration of time in the current position (years)	2.5	0.5-18	4	0-25	29301.5	0.003
Weekly working hours	48	40-140	45	8-120	25634	0.000

*Pharmacist (5), physiotherapist (2), psychologist (1), medical secretary (92), stretcher (107), other (81)

Table 3. Factors related to exposure to an occupational injury

Logistic regression analysis results showed that gender, strict compliance and weekly working hours affected exposure to an occupational injury. Female gender increased the risk by 2.067 (95% CI [1.041-4.107]; $p = 0.038$), strict compliance increased the risk by 6.050 (95% CI [1.843- 19.863]; $p = 0.003$), and higher weekly working hours increased the risk by 1.018 (95% CI [1.005-1.032]; $p = 0.009$) in terms of exposure to an injury.

When we evaluated from the point of occupational safety in the hospital, healthcare workers who reported a workplace injury in the previous 12 months stated lower safety scores for the dimension “management support and approaches” ($p < 0.05$).

Discussion

In Turkey, hospitals are classified as "very dangerous" branches of occupation [20]. Besides the danger of this occupation sector, healthcare workers have to work quick and much more, than any other work sectors. This highlights the necessity for healthcare workers to work in a safer environment.

Results of the current study indicated that safety climate is an important issue in hospitals and associated with workplace injuries and compliance with safety practices. The occupational safety scale which was used in this study, includes most of the criteria associated with hospital safety such as occupational diseases, accidents, physical environment, protective measures and etc. When the scale results were taken into account, median level of the total safety scale (mdn=2.80) was below the

average (which was “3” in the original scale). The lowest scores were given for the dimensions measuring “occupational diseases and complaints” (mdn=1.92) and “management support and approaches” (mdn=2.28). In a similar study which used the same scale in Trabzon (a city of Turkey), OSS-HP was found to be 4.05 ± 1.01 and the least satisfactory dimensions were “occupational diseases and complaints” (3.16 ± 1.31) and “management support and approaches” (3.40 ± 1.35) which was similar to our findings [29]. Similar results were also obtained in a study performed by Celikkalp et al. in Tekirdag (another city of Turkey) [6]. All of these results indicate that the problem in safety is due to occupational complaints and administrative activity dimensions.

In this hospital study, another finding is that 14.7% of healthcare workers had experienced an occupational injury in the previous 12 months. This frequency is higher when compared to Occupational Safety and Health Administration (OSHA) data of United States [26]. When Turkish government data is considered, Social Security Institution of Turkey 2012 records demonstrate that a total of 131 occupational injuries were reported for 700,000 healthcare workers [27]. The reason for the low formal number is the problems faced during identifying and controlling accidents. Like in many countries, underreporting of injuries (which vary between 22%-75%) is still an important problem in Turkey. Reasons for underreporting include forgetting to report the accident, lower risk perception, lack of knowledge, heavy workload, time constraints,

or sometimes misidentification of the accident as not work-related [9, 10, 34].

When person-based questionnaires were performed in Turkey instead of formal databases, 86.3% of emergency department workers experienced a sharp-related injury during their occupational life [34]. In a similar study, 63.4% of healthcare workers stated that they had at least one sharp object injury in their life [8]. The reason for lower percentages in our study is that we questioned the occupational injuries for the preceding year. Sharp object injuries are the most commonly reported and remembered injuries and therefore are much more commonly recorded in databases in the surveys. Results of our study are consistent with the results reported by World Health organization (WHO). WHO defines that each year, 3 million out of 35 million healthcare workers worldwide are exposed to blood-borne pathogens while using needles or other such materials[37].

In this study, female gender, strict compliance, and weekly working hours affected exposure to an occupational injury. Women are two-times more vulnerable to injuries. Gender differences have been evaluated in various industrial sectors [5, 17, 18]. Because of the anthropometric differences between women and men [24] and much more side effects for the same exposures among females compared to men [36], female workers had significantly higher risk of all injuries. Studies in the literature also report that women in particular are much more prone to accidents [19, 2].

From the point of participants' compliance with safety practices, strict compliance was found to be very low (16.6%). Particularly, the lowest rates were reported for wearing protective eye shields (42%), wearing a disposable outer garment (44%), and unscrewing needles from needle holders (54.3%). It has been shown that failure to conduct safety practices increases the frequency of occupational accidents six times. These findings are also consistent with the literature [14, 19].

Another factor affecting injury risk is weekly working hours. Generally in Turkey, hospitals are short of medical personnel and this causes long working hours. Long working hours cause fatigue, loss of attention, and burnout

which increases the likelihood of occupational injuries [19]. Moonlighting has a negative impact on attention levels of nurses in particular [35]. Study by Alamgir et al. stated that full-time work had significantly higher risk of injuries compared to low working hours [3].

When assessed in terms of hospital safety, healthcare workers who reported an occupational injury in the previous 12 months stated lower safety scores for the dimension "management support and approaches". These results indicate that as the administration accepts safety regulations as a priority and offers administrative support, the frequency of occupational injuries would decrease.

Several studies indicate that working in a safe environment increases compliance to universal rules [11, 13, 12, 7]. However, we detected a reverse situation in this study. This might be attributed to the higher efforts of healthcare workers to follow safety practices since they find the hospital environment unsafe. Nevertheless, the important point here is that although the general safety of the hospital was below average, compliance to safety practices was very low. A committee working on "employer health and safety" has just established in the study hospital and considering the results of this study, follow-up during the process would be necessary. It is important to document all accidents and injuries precisely and accurately, investigate basic reasons for them, and train employers through seminars in order to prevent occupational injuries and diseases. In addition, intermittent application of hospital safety scale to employees might help to identify dimensions which require priority in management.

Improving the safety of hospitals is a necessary but difficult process. Hospital administration should give much more attention to safety regulations in order to improve work safety and health. The results of this study confirms the importance of management support (by arranging working hours, giving priority to training activities on safety practices and identifying problematic dimensions for occupational safety) to come over the work-related injuries.

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