

Research Article

Sharp Object Injuries of Family Health Workers Working in Primary Health Care Services and Related Factors

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Abstract

AIM: The aim of this study was to evaluate family health workers' exposure to injuries with needlestick and sharp instruments and its related factors.**METHOD:** The universe of the relational descriptive study consisted of 150 family health workers working in 26 family health centers in the Bornova district, and the study was completed with 115 family health workers who voluntarily accepted to participate in the research. The data consisted of 4 sections and 26 questions in total: the questionnaire form created by the researchers in line with the literature, the sociodemographic information form, the questions regarding the needlestick and sharp injuries. In the evaluation of the data, using SPSS 20.0 package program, number, percentage distributions, mean and standard deviation were calculated, and Kruskal–Wallis analysis and logistic regression analysis were performed.**RESULTS:** All of the family health workers included in the research were women and the average age was 38.6 ± 6.38 . It was determined that 81.7% of family health workers received occupational health and safety training, and the average score they gave to the level of knowledge about what to do in case of a cutting-edge injury was $7.62 \pm .96$. In the study group, the ratio of history of needlestick and sharp instrument injury was 79.1%, and the average number of injuries was 6.72 ± 4.01 .**CONCLUSION:** As a result of the research, it has been determined that family health workers' occupational health and safety training increases the use of protective equipment, where the rate of injuries is high and the rate of reporting in case of injury is very low.**Keywords:** Family health worker, injury, needlestick and sharp instrument

Introduction

Healthcare workers may face many occupational risks. The most important and common of these are sharp object injuries (SOIs) (Mehregan et al., 2018). According to a report published by the World Health Organization (WHO) in 2003, every year three million SOIs occur in the world (Prüss Üstün et al., 2005). In the United States of America (USA), an average of more than 1000 SOIs per day and approximately 385,000 injector injuries are reported each year (Centers for Disease Control and Prevention, 2008).

Contaminated SOIs create a significant risk of infection for both healthcare workers and patients, and as

a result of the injury, more than 20 pathogen infections can be seen, including hepatitis B (HBV), hepatitis C (HCV), and human immunodeficiency virus (HIV) (Centers for Disease Control and Prevention, 2015; Kuyurtar & Altıok, 2009).

As the incidence of HIV, HBV, and HCV continues to increase, more attention needs to be paid to reduce the risk of healthcare workers' exposure to blood and body fluids (Pépin et al., 2014). According to the data of the CDC, 62% of the injuries occur with the syringe needle and usually occur immediately after the bloodletting process until the equipment is thrown into the waste bin (Centers for Disease Control and Prevention, 2008).

Nurses are the most exposed group to SOIs at the rate of 44% among healthcare workers (Centers for Disease Control and Prevention, 2015). An in-depth examination of the literature indicates that the rate of SOIs is between 19.5 and 78.3% (Belachew et al., 2017; Çalikoğlu et al., 2019; Kebede & Gerense, 2018). These rates are considered to be higher due to reasons such as insufficiency of notification systems and healthcare professionals not paying enough attention to SOIs (Beyera & Beyen, 2014; Cui et al., 2018; Jahangiri et al., 2016). The findings of many studies conducted with healthcare professionals also show that approximately half of the healthcare professionals do not make a report of SOIs (Atenstaedt et al., 2007; Bekele et al., 2015; Yang & Mullan, 2011). When some studies are examined, it is seen that the rate of not reporting accidents varies between 58.7 and 60% (Bekele et al., 2015; Çalikoğlu et al., 2019; Yang & Mullan, 2011).

Healthcare professionals, especially family health workers, who have an important role in the delivery of primary healthcare services, are faced with many risk factors in the process of protecting, treating, and improving health (Atenstaedt et al., 2007). As in other fields of work, SOIs and exposure to infected blood and body fluids can be observed in primary health care institutions depending on the working environment and working conditions (International Labour Organization, 2011). In the literature, the rate of SOIs in primary health care is between 31.2 and 67.5% (Akeem et al., 2011; Chowdhury et al., 2011; Janjua et al., 2010). The International Council of Nurses and WHO (2010) stated that it is necessary to establish an international professional framework within the scope of the project of protecting health workers and preventing needlestick injuries and that policy development is an obligation (International Labour Organization, 2011). When the "patient and worker safety" issue is considered in primary health care services, it is observed that there is a limited number of studies on the subject (Turkey Public Hospitals Authority, 2011). In Turkey, practice for diagnosis and treatment in primary care services has increased with the family doctor model. Nurses and midwives who work as family health workers perform more interventional practices in both preventive healthcare practices (vaccination, etc.) and early diagnosis and treatment services (pre-marriage, newborn screenings, home care). For these reasons, it is important to determine

the risks that family health workers who provide primary health care services in primary care may encounter, in order to plan interventions for occupational safety. This study aims that family health workers working in primary health care services should fill in the incident report form after exposure and evaluate the related factors.

Research Questions

1. What is the frequency of SOIs of family health workers?
2. What are the levels of knowledge of family health workers about SOIs?
3. What is the protective equipment usage status of family health workers?
4. What are the SOI cases and related factors of family health workers?

Method

Study Design

This was a descriptive-relation seeking study.

Sample

The study was carried out in 26 family health centers (FHC) in the Bornova district of İzmir province between July and October 2017. The population of the research composed of 150 family health workers working in these FHCs. Since it was aimed to reach the entire population, no sampling method was used. The sample of the study consisted of 115 family health workers who voluntarily accepted to participate in the study. In the power analysis made as a result of the study, it was determined that 115 people were sufficient to represent the sample with a 5% level of significance and 95% CI.

Data Collection

The data for the study were collected based on self-report through a questionnaire created by the researchers in line with the literature (Akeem et al., 2011; Aslan et al., 2009; Chowdhury et al., 2011; Göktaş & Cengiz, 2010; International Safety Center, 2017; Janjua et al., 2010). The survey form consists of 4 parts and a total of 26 questions about the sociodemographic information form, questions about the educational status regarding taking protective measures against SOIs, questions about taking preventive measures against SOIs, and questions about SOI stories.

Sociodemographic Information Form: It consists of nine questions regarding the demographic

characteristics of individuals such as age, gender, and educational status.

Questions About the Educational Status Regarding Taking Protective Measures against Sharp Object Injuries: This section consists of five questions, yes/no, open-ended, and multiple-choice, which measure the level of knowledge of individuals about their education about occupational health and safety and what to do in case of injury.

Questions Regarding Taking Protective Measures against Sharp Object Injuries: This section was prepared by the researchers in line with the relevant literature (Aslan et al., 2009; Göktaay & Cengiz, 2010; Janjua et al., 2010). It consists of three questions about protective and security measures against SOIs that will be answered as yes/no.

Questions for Sharp Object Injury Stories: This section consists of nine questions, including yes/no, open-ended, and multiple-choice, regarding the incidence of SOIs, location of the injury, type of the injury tool, and reporting status after injury (Aslan et al., 2009; Göktaay & Cengiz, 2010; Janjua et al., 2010).

Statistical Analysis

Statistical Package for Social Sciences (IBM SPSS Corp., Armonk, NY, USA) for Windows 20.0 package program was used for data analysis. In statistical analysis, number, mean, percentage distributions, and standard deviation were calculated, the suitability of the data to normal distribution was examined by Kolmogorov–Smirnov test. Kruskal–Wallis analysis was used to compare variables because the data did not conform to normal distribution. Logistic regression analysis was performed to determine the effect of occupational health and safety training on using gloves during operations.

Ethical Considerations

Ethical permission from Ege University Scientific Research and Publication Ethics Board (Date and Number: 23.05.2017-175-2017) and institutional permission from the Public Health Directorate (Date and Number: 01.11.2017-77597247-604.02-100 74) were obtained to conduct the study. Family health workers were interviewed, given information

about the study, and their written consents were obtained.

Results

All of the family health workers included in the study are women and the average age is 38.6 ± 6.38 . Other features are presented in Table 1.

It was determined that 81.7% of family health workers received occupational health and safety training in their professional lives, and the average score they

Table 1.
Sociodemographic Characteristics of Family Health Workers

Sociodemographic Characteristics	n	%
Age		
Avg. $\pm$ SD: 38.6 ± 6.38 ; Min-max: 24–58		
Age groups		
24–29	6	5.2
30–35	34	29.6
36–40	38	33.0
41–45	22	19.1
46–50	8	7.0
51 and above	7	6.1
Education status		
High school	3	2.9
Associate degree	36	31.3
Undergraduate	76	66.1
Professional time		
1–5 years	7	6.1
6–10 years	32	27.8
11–15 years	30	26.1
16 years and above	46	40.0
Professional time as a family health worker		
1–5 years	47	40.9
6–10 years	31	27.0
11–15 years	28	24.3
16 years and above	9	7.8
Total	115	100

Table 2.

The Knowledge Levels of Family Health Workers Regarding Sharp Object Injuries (SOIs) and Their Preventive Measures

Knowledge level score	Yes		No	
	n	%	n	%
Avg. $\pm$ SD: 7.62 $\pm$.96; Min-max: 5–10				
Training on occupational health and safety in the unit they work at	55	47.8	60	52.2
Occupational health and safety training throughout their professional life	94	81.7	21	18.3
Using gloves during operations				
Bloodletting	76	66.1	39	33.9
Vaccination	14	12.2	101	87.8
Injection	24	20.9	91	79.1
When disposing a contaminated needle	53	46.1	62	53.9
When disposing of contaminated sharp objects	62	53.9	53	46.1
Breaking an ampule	12	10.4	103	89.6

Note: Avg. = average; SD = standard deviation.

had for the level of knowledge about what to do in case of SOI was 7.62 $\pm$.96 (Min-Max: 5–10). The data regarding the cases of taking protective measures against SOIs are given in Table 2.

In the study group, the rate of family health workers with a history of SOIs is 79.1%, and the average number of injuries is 6.72 $\pm$ 4.01. Findings regarding other data are given in Table 3.

When examining the number of injuries of family health workers according to their working time in the profession and in the institution, a statistically significant difference between the number of injuries and working time in the institution (χ^2 (3)=8.12, p =.04) and in the profession (χ^2 (3)=16.04, p =.001) was determined (Table 4).

Logistic regression analysis was performed to determine the effect of occupational health and safety training on wearing gloves during operations. While training status was included in the model as an independent variable, wearing gloves during operations was included in the model as a dependent variable. It was determined that the obtained model was statistically significant and the variables in the model explained 37.6% of the variance of the result variable. It was determined that occupational health and safety training increased the use of gloves 5.3 times (CI=1.38–20.7) during the blood collection process and .06 times

during the contaminated needle disposal process (CI=.008–.42) (Table 5).

Discussion

More than half of the family health workers (52.2%) participating in the study did not receive occupational health and safety training in the unit they work. The status of receiving education throughout their professional life is 81.7% (n =94). In the study of Yıldız et al. (2017), the education status in the unit where they worked was 42.4%, in Çelikkalp et al. (2016)'s study was 44.4%, in Terzi et al. (2019)'s study this rate was found to be 16.9%. In Turkey, according to the Occupational Health and Safety Law No. 6331, the employer is obliged to provide all employees with the necessary training on occupational health and safety (Kılıkış, 2013).

Considering the research data and literature findings, it is thought that the trainings are not at the desired level yet.

Family health workers frequently experience SOIs, and this study findings support this. In the study conducted by Yıldız et al. (2017), the average number of injuries of 483 people who stated that they were injured at least once during their professional life and gave information about the number of injuries was found to be 4.15 $\pm$ 15.1, with the lowest one being 300.

Table 3.*Sharp Object Injuries (SOIs) of Family Health Workers***Injury situation**Rate: 79.1% ($n=91$)Avg $\pm$ SD: 6.72 ± 4.01 ; Min-Max: 2–15

Injury number+	<i>n</i>	%		
2–6 times	54	47.0		
7–11 times	38	33.0		
12 times and above	13	11.3		
	<i>n</i>	%	<i>n</i>	%
Place of injury+	Yes		No	
Vaccination room	54	47.0	51	44.3
Treatment preparation room	55	47.8	50	43.5
Lab room	43	37.4	62	53.9
Emergency dressing room	47	40.9	58	50.4
During what activity did you experience sharp object injury+				
Sudden movement of the patient while doing injection	75	65.2	32	27.8
Bloodletting	50	43.5	57	49.6
Closing the needle tip	64	55.7	43	37.4
When throwing a needle tip in the medical waste bin	36	31.3	71	61.7
Ampule cut	78	67.8	29	25.2
What did you do after sharp object injury?+				
Nothing	38	33.0	67	58.3
Signed the SOI reporting form	5	4.3	102	88.7
I had the patient tested for HIV, HBC, HCV	49	42.6	58	50.4
I got tested for HIV, HBC, HCV	48	41.7	59	51.3
I bleed the injured area	2	1.7	105	91.3
I washed it with an antiseptic solution	58	50.4	49	42.6
I washed it with soap and water	52	45.2	55	47.8
Reporting	13	11.3	98	85.2
Reason for not reporting+				
I didn't know if I should report	45	39.1	53	46.1
I didn't worry	73	63.5	25	21.7
I had the patient tested, there was no risk of infection	44	38.3	54	47.0
I didn't know the process	19	16.5	79	68.7
I didn't have time	31	27.0	67	58.3
The patient had a low risk of contagiousness	44	38.3	54	47.0
I was injured with a sterile object	16	13.9	82	71.3
There was no such committee	2	1.7	96	83.5
I was immune	26	22.6	72	62.6

+More than one answer was given.

Note: Avg. = average; SD = standard deviation.

Table 4.

Sharp Object Injuries (SOIs) According to Professional Times of Family Health Workers

	Professional Time	n	Rank Avg.	sd	χ^2	p
In the institution	1–5 years	45	45.62	3	8.12	.04
	6–10 years	29	51.14	3		
	11–15 years	23	65.98	3		
	16 years and above	8	63.94	3		
In the profession	1–5 years	7	57.50	3	16.04	.001
	6–10 years	30	36.63	3		
	11–15 years	28	51.43	3		
	16 years and above	40	65.59	3		

Note: Rank Avg., rank average; χ^2 , Kruskal–Wallis test.

Table 5.

The Effect of Occupational Health and Safety Training on the Use of Gloves

	β	SE	Wald	p	Odds ratio	CI
Bloodletting	1.678	.690	5.913	.015*	5.354	1.385–20.704
Injection	–.934	1.273	.538	.463	.393	.032–4.768
Contaminated needle disposal	–2.820	.998	7.987	.005*	.060	.008–.421
Contaminated sharp object disposal	–.128	.863	.022	.882	.880	.162–4.779
Ampule breaking	–.033	1.694	.000	.985	.968	.035–26.754
Constant	–39.648	20 445.918	.000	.998	.000**	

Note: Model Nagelkerke R Square: .376; p=.000.**

*p < .05, **p < .001.

In another study conducted in Turkey by Dikmen et al. (2014), it was found that 63.4% (n=664) of healthcare workers were injured at least once during their professional life with a sharp object. In a study conducted by Janjua et al. (2010) in Pakistan, the rate of SOIs in primary health care services in the last 6 months was found to be 53%. In another study conducted in Nigeria, it was found that 31.2% of primary health care workers experienced SOIs, and the rate of those who experienced injuries in the last 3 months was 45.5% (Akeem et al., 2011). In this study, the rate of SOIs in family health workers was found to be similar to the literature. This similarity is thought to be due to the increase in practice for diagnosis and treatment in primary care in the family medicine model conducted in Turkey.

According to the results of the research, it was determined that family health workers generally use gloves as a protective measure during bloodletting and while disposing of contaminated tools. In the study conducted by Turan and Togan (2013), it

was determined that 52.5% of the healthcare workers used gloves. Similarly, in the study conducted by Kepenek and Şahin-Eker (2017), it was determined that 55.1% of the injured worker used protective measures during the operations. Kebede and Gerensea (2018) found in their study that nurses who don't use personal protective equipment during the procedures have a five-fold higher risk of injury compared to those who use them (AOR=5.055, 95% CI 2.015–12.688). The insufficient use of gloves as a protective measure among nurses was found to be similar to the studies in the literature. This suggests that healthcare professionals working in primary care may have less risk of exposure to blood, body fluids, and secretions.

The distribution of the places where family health workers experienced the most injuries was found to be respectively the treatment preparation room and the vaccine room. Karakoç et al. (2018) found that in their study in a secondary healthcare facility, the injury rates were 43% in the operating room and

23% in inpatient wards, Cui et al. (2018) stated that injuries were 41.2% in operating rooms and 34.5% in internal units, Belachew et al. (2017) found that injuries are most common in operating rooms (21%). Injury incidents in primary and secondary health care facilities are often seen in work units where exposure to sharp objects is high. It is thought that this situation is caused by the workload of health workers working in primary and secondary health care institutions, the need to act fast, and the insufficient number of personnel.

Needlestick injury still remains in the first place in the literature (Belachew et al., 2017; Dikmen et al., 2014; Kepenek & Şahin-Eker, 2017; Satılmış & Şahin, 2019). Similarly in this study, it was determined that 93% of the family health workers included in the study were injured by accidental needle sticking, 65.2% during the sudden movement of the individual during the injection, 55.7% when closing the needle tip, and the lowest rate, .4% were injured when breaking the ampule. On the other hand, CDC reports the same rate as 3% (Centers for Disease Control and Prevention, 2015). In their study by Kepenek and Şahin-Eker (2017), 41.9% of the healthcare workers exposed to injury were injured while closing the cap of the needle tip (Kepenek & Şahin-Eker, 2017). In the study conducted by Belachew et al. (2017), it was found that 46% of the injuries were experienced during the injection and 41.7% during the ampule breakage procedure. Karakoç et al. (2018) stated that 73% of the injuries were caused by the needle tip. It was determined that 35.3% of these injuries caused by the needle tip were caused as a result of closing the needle tip. For the first time in 1983, CDC stated that needle caps should not be closed in order to prevent needlestick injuries, and studies on safe injection practices are included in the framework of the standards specified by the WHO and CDC in Turkey (Centers for Disease Control and Prevention, 2015). In Turkey, various modern applications (protective shielded auto-safe intravenous cannula, closed intravenous catheter system, etc.) that prevent contact with the tip of sharp objects have come into use (HISAM, 2015). However, it is thought that the reasons such as the tendency of the healthcare personnel to continue the traditional practices and the lack of controls and in-service training on the use of protective equipment increase the needlestick injuries.

This study, it was determined that nine out of ten family health workers (85.2%) who had SOIs did not report anything about this injury. Yildiz et al. (2017) stated in their multi-center study that approximately half (46.0%) of the injuries in secondary care and 85.2% of the injuries in FHCs were not reported. Bekele et al. (2015) found that 58.7% of the healthcare workers who experienced the injury in the secondary care did not report. Similarly, in another study, it was determined that 62% of the injured did not report (Rajesh & Thamizhmaran, 2019). When the results were evaluated, it was seen that the rate of reporting in case of injury was insufficient. In order to increase the reporting rate, family health workers should be told about infections that can be transmitted by blood and infected body fluids as a result of SOIs, and when injuries occur, they should be notified and serologically monitored and, if necessary, treated.

When some variables which were thought to be related to the frequency of SOIs of family health workers were examined, it was found that the duration of work in the profession and in the institution affected the number of injuries. As the working time increases both in the profession and in the institution, the number of injuries decreases. Similarly, in the study conducted by Turan and Togan (2013), it was determined that nurses with less working time were injured more frequently. Karakoç et al. (2018) found in their study that 60% of the nurses who experienced injuries had a professional working period of 5 years or less. However, Kebede and Gerensea (2018) found in their study that those with a working period of 10 years or more had a six-fold higher risk of injury compared to those with a working period of 5 years or less (AOR=6.321, 95% CI 2.86–13.948). Studies conducted in Turkey are compatible with this research findings. It is thought that the higher rates of injury among healthcare workers who have just started the profession are due to their inability to integrate the knowledge they have acquired during their undergraduate education into their work areas, young professionals having to work in departments where the patient density is higher, the number of personnel being insufficient, and the need to work quickly.

The model obtained as a result of the logistic regression analysis performed to determine the effect of occupational health and safety training on using

gloves as a protective measure during operations was found to be statistically significant. It was determined that the occupational health and safety training of family health workers increased the frequency of using gloves during the procedures by 5.3 times during the blood collection process and by .6 times during the contaminated needle disposal procedure. In the study conducted by Belachew et al. (2017), it was found that not being trained about occupational health and safety increased the experience of the injury by 6 times (AOR: 5.99, 95% CI: 3.14, 11.41). Juni et al. (2015) stated that employee training and workplace inspections increase the use of protective equipment. It is thought that occupational health and safety trainings and regular inspections will increase the use of protective equipment by the employees and decrease the rate of SOIs.

Study Limitations

This research was carried out with family health workers working in FHCs in the Bornova district of Izmir province. Therefore, the results obtained from the study cannot be generalized to all family health workers.

Conclusion and Recommendations

As a result of the study, it was determined that more than half of the family health workers don't get trained for occupational health and safety in the working unit, the rate of SOIs are high, and the reporting rates in case of injury are not at the desired level. It is thought that in order to protect healthcare workers from SOIs, trainings should be planned on issues such as determining health risks, protective measures, steps to be followed after injury, and reporting the injury. This study is the first study in Turkey to examine the SOI status of primary health care workers and will make a significant contribution to the literature. However, it is recommended to carry out prevalence studies by reaching out to more people in many regions in order to determine the risk factors of SOIs caused by the increasing diagnosis and treatment services with the family medicine model and to organize trainings for preventive measures.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Ege University (Date: May 23, 2017, No: 175-2017).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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