

## The impact of earthquake-induced human migration on violence against healthcare professionals

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### ABSTRACT

**Aim:** Violence is a set of actions that encompass threats and behaviors which disrupt an individual's overall well-being and negatively affect the person in various manners. Despite various deterrent sanctions, violence in healthcare remains a persistent societal issue. Following the February 6, 2023 Kahramanmaraş earthquake, the province of Mersin experienced a significant influx of migrants. In the present study, we aimed to examine the effect of this migration on violence in healthcare.

**Methods:** In this study, Code White notifications issued at tertiary hospital between April 12, 2022 and February 6, 2023 and between February 6, 2023 and December 3, 2023 were retrospectively analyzed. Individuals younger than 18 years of age and Code White notifications issued outside the specified date ranges were excluded from the study. The study was conducted with a total of 212 participants.

**Results:** Violence occurred most frequently in the emergency department, accounting for 33.5% (n = 71) of the incidents, and physicians were the most affected group, experiencing 48.1% (n = 102) of the violence. A statistically significant relationship was observed between the time periods before and after the earthquake and the units where violence occurred ( $p = 0.010$ ).

**Conclusion:** Based on the Code White data examined in the present study, it can be concluded that violence against healthcare personnel remains a significant societal issue today, despite the deterrent legal sanctions implemented as part of the Health Transformation Program. The issue of violence in healthcare is multifaceted, requiring additional measures beyond legal sanctions.

**Key words:** Code white, earthquake, migration, violence in healthcare.

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### 1. Introduction

Violence is a set of actions comprising threats and behaviors that disrupt an individual's overall well-being and negatively affect the person in

various aspects. Violence can take many forms, including physical, psychological, verbal, sexual, and economic violence, with varying prevalence in different societies and individuals. One of these types of violence is violence against healthcare workers, defined as “verbal or behavioral threats, physical assault, or sexual assault originating from patients, their relatives, or any other individual, posing a risk to healthcare professionals” [1]. Some studies indicate that healthcare workers are 16 times

more at risk of violence compared to workers in other fields [2]. In Turkey, the rate of violence in healthcare has been reported to range between 49% and 91% [3].

Numerous legal changes have been made to date to prevent violence in healthcare. The first regulation regarding violence in healthcare was introduced with the enactment of Law No. 3359, the Basic Law on Health Services, in 1987. Since then, various regulations have been implemented to address and prevent violence in healthcare. Code White, introduced by the Ministry of Health in 2012, aims to ensure rapid intervention by security personnel, rectification of the situation, and documentation in the event of potential violence or threats against healthcare workers [4]. Intentional injury to healthcare workers was included as a reason for arrest and prosecution in 2014, thereby being classified as a crime listed in the legal catalog. The Code White system was revised in 2015 accordingly. Additions and amendments have been made to Article 12 of Law No. 3359 (Healthcare Violence Act) in response to observed difficulties and needs in implementation, aligning with evolving requirements. With the latest regulations, private healthcare workers are also considered as public officials in terms of crimes committed against them in relation to their duties, and it is stated that the penalty for violence against health workers will not be postponed. However, due to problems in implementation, the deterrent effect of penalties has not been sufficient and violence in healthcare remains a current and increasingly prevalent phenomenon.

In a study conducted after the February 6, 2023 Kahramanmaraş earthquake, it was reported that 83% of the people affected by the earthquake had left their province of residence, with 23% of these individuals relocating to the province of Mersin. It is estimated that the earthquake displaced approximately five

hundred thousand people to Mersin [5]. In this study, we aimed to assess the impact of post-disaster migration on violence in healthcare by examining the Code White rates before and after the earthquake over a 10-month period in a tertiary referral and research hospital with the highest number of healthcare workers in Mersin province.

## 2. Materials and methods

**2.1. Sample size prediction:** G\*Power 3.1 program was used to determine the sample size. No study was found in the literature on the relationship between earthquakes, mass migration and violence in health. In a study conducted by Aygün et al. on violence in healthcare with the Covid-19 pandemic [6], the effect size was found to be 0.344. The sample size was determined to be 167 (n) for a statistical power of alpha 0.05 and power 0.95.

**2.2. Study design and select of participants:** In the study, Code White notifications issued at tertiary hospital between April 12, 2022 and February 6, 2023 and between February 6, 2023 and December 3, 2023 were retrospectively analyzed. Data were obtained from the Code White unit of the public hospital where the study was conducted, after approval from the institution. Code White notifications from individuals under the age of 18, submitted outside the specified date ranges, and with missing data were excluded from the study. Ethical approval for the study was obtained from the local ethics committee (Date: 27.12.2023, number: 894). This study was conducted in accordance with the provisions of the Declaration of Helsinki.

**2.3. Data collection:** A total of 212 violent incidents reported within the specified date range were included in the study. The date of the white code notifications, the gender and duty of the

exposed healthcare worker, the hospital unit where the incident occurred, the type of violence, the legal aid received after the Code White notification, and the situations before and after the February 6 Kahramanmaraş earthquake were recorded. The data obtained from the records were evaluated by dividing them into two groups: before and after the February 6 Kahramanmaraş earthquake.

**2.4. Statistical analysis:** SPSS version 26.0 software was used for data analysis. Furthermore, descriptive statistics were presented as frequency and (%) for categorical variables. Comparison of categorical data was conducted using the Chi-square test. A  $p$  value of  $<0.05$  was considered statistically significant in the study.

### 3. Results

The study was conducted with a total of 212 participants, 58.5% ( $n = 124$ ) women and 41.5% ( $n = 88$ ) men. The units where violence occurred resulting in Code White were categorized as outpatient clinics, emergency departments, clinics/wards, diagnostic units, operating theaters/intensive care units, and other areas. Violence occurred most frequently in the emergency department, accounting for 33.5% ( $n = 71$ ) of incidents, followed by 26.9% ( $n = 57$ ) in outpatient clinics and 25.9% ( $n = 55$ ) in clinics/wards. The occupational groups working in the hospital were categorized as physicians, nonphysician healthcare personnel, administrative staff, and permanent workers. Among these groups, physicians experienced the highest rate of violence at 48.1% ( $n = 102$ ), and permanent workers comprised only 0.9% of the incidents ( $n = 2$ ).

Furthermore, 80.7% of Code White incidents benefited from legal support provided by the Ministry of Health. The number of Code Whites

issued before and after the earthquake was the same ( $n = 106$ ). The reasons for issuing Code White were grouped into types of violence: verbal, physical, and verbal and physical combined. Verbal violence was the most common type of violence accounting for 84% of the incidents ( $n = 178$ ), and physical violence was the least common with 1.4% ( $n = 3$ ).

Although 56.6% ( $n = 64$ ) of the hospital staff who were subjected to violence before the earthquake were women, this rate remained the same at 56.6% ( $n = 60$ ) after the earthquake and there was no statistically significant difference ( $p = 0.577$ ). Before the earthquake, physicians experienced the highest incidence of in-hospital violence at 48.1% ( $n = 51$ ), followed by nonphysician healthcare personnel at 34.9% ( $n = 37$ ). After the earthquake, physicians remained the group most affected by violence, accounting for 48.1% ( $n = 51$ ) of incidents. Although there were an increase in incidents of violence against nonphysician healthcare personnel after the earthquake, no statistically significant difference was observed in occupational groups affected by violence before and after the earthquake ( $p = 0.147$ ).

Comparing the data on Code White incidents before and after the earthquake, it was noted that before the earthquake, 32.1% ( $n = 34$ ) of in-hospital violence occurred in outpatient clinics, 30.2% ( $n = 32$ ) in the emergency department, and 17.9% in clinics/wards. However, after the earthquake, the distribution shifted, with 36.8% ( $n = 39$ ) of incidents occurring in the emergency department, 34% ( $n = 36$ ) in clinics/wards, and 21.7% ( $n = 23$ ) in outpatient clinics (Table 1). After the earthquake, the incidence of violence in the emergency department and clinics/wards increased. A statistically significant difference was found between the two time periods (before and after the earthquake) in terms of the units where violence occurred ( $p = 0.010$ ).

**Table 1.** Comparison of findings related to violence in healthcare before and after the earthquake.

Parameters		After the earthquake		Before the earthquake		P value
		n	(%)	n	(%)	
Gender	Female	64	(60.4)	60	(56.6)	0.577
	Male	42	(39.6)	46	(43.4)	
Unit Where the Violence Occurred	Outpatient Clinic	23	(21.7)	34	(32.1)	0.010
	Emergency Department	39	(36.8)	32	(30.2)	
	Clinics/Wards	36	(34.0)	19	(17.9)	
	Diagnostic Unit	1	(0.9)	6	(5.7)	
	Operating theaters/Intensive care units	0	(0)	1	(0.9)	
	Other Areas	7	(6.6)	14	(13.2)	
Occupational Group Subjected to Violence	Physicians	51	(48.1)	51	(48.1)	0.147
	Nonphysician Healthcare Personnel	47	(44.3)	37	(34.9)	
	Administrative Staff	7	(6.6)	17	(16)	
	Permanent Workers	1	(0.9)	1	(0.9)	
Type of Violence	Physical Violence	1	(0.9)	2	(1.9)	0.833
	Verbal Violence	89	(84)	89	(84)	
	Physical and Verbal Violence	16	(15.1)	15	(14.2)	
Legal Support	No	17	(16.0)	24	(22.6)	0.224
	Yes	89	(84.0)	82	(77.4)	

The most common form of violence in Code White incidents before and after the earthquake were verbal abuse, accounting for 84% (n = 89) of cases. There was no statistically significant difference in the type of violence before and after the earthquake ( $p = 0.833$ ).

According to the comparison of data between the utilization of legal support and findings related to violence in healthcare, it was noted that 72.5% (n = 124) of those who benefited from legal support after experiencing violence were

women, while all those who did not benefit from legal support were men, with a statistically significant difference ( $p < 0.001$ ). Of the healthcare workers who benefited from legal support, 59.6% (n = 102) were physicians and 40.4% (n = 69) were nonphysician healthcare personnel. It was observed that administrative staff and permanent workers did not benefit from legal support. Additionally, all physicians benefited from legal support. A statistically significant relationship was found between

**Table 2.** Comparison of findings related to violence in healthcare with respect to utilization of legal support.

Parameters		Legal support				P value
		No		Yes		
		n	(%)	n	(%)	
Gender	Female	0	(0)	124	(72.5)	<0.001
	Male	41	(100)	47	(27.5)	
Unit where the Violence Occurred	Outpatient Clinic	0	(0)	57	(33.3)	<0.001
	Emergency Department	0	(0)	71	(41.5)	
	Clinics/Wards	12	(29.3)	43	(25.1)	
	Diagnostic Unit	7	(17.1)	0	(0)	
	Operating theaters/Intensive care units	1	(2.4)	0	(0)	
	Other Areas	21	(51.2)	0	(0)	
Occupational Group Subjected to Violence	Physicians	0	(0)	102	(59.6)	<0.001
	Nonphysician Healthcare Personnel	15	(36.6)	69	(40.4)	
	Administrative Staff	24	(58.5)	0	(0)	
	Permanent Workers	2	(4.9)	0	(0)	
Type of Violence	Physical Violence	0	(0)	3	(1.8)	<0.001
	Verbal Violence	10	(24.4)	168	(98.2)	
	Physical/Verbal Violence	31	(75.6)	0	(0)	
Time Period	After the Earthquake	17	(41.5)	89	(52)	0.227
	Before the Earthquake	24	(58.5)	82	(48)	

occupational groups and utilization of legal support ( $p < 0.001$ ) (Table 2).

Although 97.6% ( $n = 121$ ) of the women experienced only verbal violence, none experienced both physical and verbal violence. Moreover, 35.2% of the men were subjected to both physical and verbal violence. A statistically significant relationship was observed between gender and type of violence ( $p < 0.001$ ). The only victims of physical violence were physicians. Verbal violence was most common among physicians with 55.6% ( $n = 99$ ), followed by nonphysician healthcare personnel with 42.7% ( $n = 76$ ). All permanent workers were victims of both physical and verbal violence. The majority

of those who were subject to both physical and verbal violence were administrative staff (67.7%,  $n = 21$ ), and none of the physicians were subject to both physical and verbal violence. A statistically significant relationship was found between the type of violence and occupational groups ( $p < 0.001$ ). While only verbal violence was observed in the emergency department, both physical and verbal violence was observed in the operating theater/intensive care unit and other units. There was a statistically significant relationship between the unit where the violence occurred and the type of violence ( $p < 0.001$ ). The relationship between the type of violence and the findings regarding violence in health is shown in Table 3.

**Table 3.** Comparison of type of violence and findings regarding violence in health care.

Parameters		Type of Violence						P Value
		Physical Violence		Verbal Violence		Physical/Verbal Violence		
		n	(%)	n	(%)	n	(%)	
Gender	Female	3	(100)	121	(68)	0	(0)	<0.001
	Male	0	(0)	57	(32)	31	(100)	
Unit where the Violence Occurred	Outpatient Clinic	3	(100)	54	(30.3)	0	(0)	<0.001
	Emergency Department	0	(0)	71	(39.9)	0	(0)	
	Clinics/Wards	0	(0)	47	(26.4)	8	(25.8)	
	Diagnostic Unit	0	(0)	6	(3.4)	1	(3.2)	
	Operating theaters/Intensive care units	0	(0)	0	(0)	1	(3.2)	
	Other Areas	0	(0)	0	(0)	21	(67.7)	
Occupational Group Subjected to Violence	Physicians	3	(100)	99	(55.6)	0	(0)	<0.001
	Nonphysician Healthcare Personnel	0	(0)	76	(42.7)	8	(25.8)	
	Administrative Staff	0	(0)	3	(1.7)	21	(67.7)	
	Permanent Workers	0	(0)	0	(0)	2	(6.5)	
Legal Support	No	0	(0)	10	(5.6)	31	(100)	<0.001
	Yes	3	(100)	168	(94.4)	0	(0)	
Time Period	After the Earthquake	1	(33.3)	89	(50)	16	(51.6)	0.833
	Before the Earthquake	2	(66.7)	89	(50)	15	(48.4)	

#### 4. Discussion

The aim of the current study was to investigate the effects of the mass migration resulting from the earthquake on violence against healthcare workers. In the present study, the unit where Code White was most frequently issued was the emergency department, accounting for 33.5% of incidents. In a meta-analysis on violence against emergency department healthcare workers, it was shown that 53%–90% of emergency department workers experienced violence [7]. Consistent with the findings of the present study, two studies conducted in Turkey reported that

Code White was most commonly issued from the emergency department [6,8]. In another study conducted in 2021, it was reported that Code White was most commonly issued from outpatient clinics, accounting for 42.9% of cases [9]. The high frequency of Code White issued from emergency departments is thought to be due to several reasons. These include the stress experienced by patients and their relatives due to critical illness, the intense and stressful working conditions of emergency department personnel, and the influx of unnecessary emergency department visits leading to overcrowding in these units.

In the present study, a significant increase was observed in Code White issued from the emergency department and clinics/wards after the earthquake compared to before, indicating that there was an increase in violence in these areas following the earthquake. The reason for this could be attributed to the influx of migrants to Mersin province, which experienced significant migration following the earthquake's acute phase, leading to increased patient influx in the emergency department. Subsequently, these patients required follow-up and treatment, resulting in overcrowding in the inpatient units. The literature lacks sufficient studies on Code White reporting before and after natural disasters, indicating the need for further research in this area.

In the present study, verbal violence was observed to be the most common type of violence with a rate of 84%. Consistent with the present study, literature evidence also showed that verbal violence was the most common type of Code White violence [6,8-10]. The reason for this might be the prompt intervention in Code White incidents, which prevents the escalation of incidents to physical violence, and the fear of increased legal repercussions, leading individuals to refrain from resorting to physical violence. It was noted that female hospital staff issued more Code White incidents before and after the earthquake but no significant difference was found between the time periods. Furthermore, a significant relationship was found between gender and the type of violence, with 97.6% of Code White incidents issued by women including only verbal violence. Consistent with these results, studies conducted in Turkey also reported higher rates of verbal violence reported by women [11-14].

In the present study, the rate of benefiting from legal support after issuing Code White was 72.5% among women, and a statistically

significant relationship was found between gender and utilization of legal support. Moreover, a significant relationship was found between personnel type and utilization of legal support; accordingly, all of the physicians issuing Code White benefited from legal support. In the literature, a study conducted in Turkey found that 73.7% of personnel issuing Code White benefited from legal support [9].

In the present study, when examining the personnel who were subjected to violence, it was observed that the group most frequently subjected to violence was physicians, accounting for 48.1% of the incidents. Physicians were the group most frequently subjected to violence before and after the earthquake and no significant difference was found between the time periods. Consistent with these results, other studies also reported that physicians were the occupational group most frequently exposed to violence [6,8-9,15]. The reason for this is believed to be because the physician is the most directly involved in the diagnosis and treatment process, and people often expect complete healing from the physician in stressful situations, while also tending to place blame on them in case of unfavorable outcomes.

The study has several limitations. The study was designed as a retrospective study and was conducted in a single-center setting. Additionally, information about the person who perpetrated the violence was not recorded.

In conclusion, the results obtained in the present study revealed that Code White was most commonly issued by physicians both before and after the earthquake, with a majority of the incidents issued by female healthcare personnel. Additionally, emergency department was identified as the unit where Code White was most commonly issued. Based on the Code White data examined in the present study, it can be concluded that violence against healthcare

personnel remains a substantial social concern today, despite the deterrent legal sanctions implemented as part of the Health Transformation Program. The issue of violence in healthcare is multifaceted, requiring additional measures beyond legal sanctions.

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