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Frequency and types of workplace violence against emergency medical technicians: a cross-sectional study in Tehran, Iran

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Abstract: **Objective:** This study was implemented to assess various types of violent incidents involving emergency medical technicians (EMTs) working in Tehran, Iran. Furthermore, the characteristics of violent people and possible causes of their violence were assessed.

Methods: In this cross-sectional study, 500 EMTs working in the capital city of Tehran were randomly invited. The participants were asked to fill out a questionnaire of workplace violence. Univariate and multivariate logistic regression were also performed for identifying the possible risk factors of violence. In addition, the distribution and association of violence patterns were also analyzed considering demographic features and characteristics of violent people.

Results: In total, 320 EMTs with the mean age of 31.8 ± 6.7 years participated, 315 (98.4%) of whom were men. Overall, 279 (87.2%) out of the 320 participants experienced 654 episodes of violence, mostly bullying, in the last 4 months. The relationship between the level of education and experiencing violent incidents was statistically significant (p=0.035). Also, non-Persian EMTs had experienced significantly more violent behaviors than Persian EMTs [171 (91.0%) vs. 108 (81.8%); p=0.016]. Nonetheless, the prevalence of violent incidents was not significantly correlated with marital status, years of work experience, employment situation, and working hours. The odds of facing violent behavior among EMTs with associate degree was 2.9 times higher than those with technical diploma (p=0.048). Furthermore, the odds of experiencing violence among non-Persian EMTs was 2.2 times higher than Persian EMTs (p=0.039).

Conclusion: We found that EMTs had faced numerous episodes of violence in their workplace, especially verbal threats, which were more prevalently committed by patients' relatives during night shifts.

Keywords: Aggression; Emergency Medical Technicians; Emergency Medical Services; Iran; Workplace Violence

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1. Introduction

According to the "Occupational Safety and Health Administration", workplace violence is defined as violent behavior, verbal abuse, and verbal or physical threat occurring in or out of workplace and related to a job (1). Workplace violence may affect work performance and self-esteem of the employees, and leads to work inequality, and unwillingness to work (2-4).

Emergency medical technicians (EMTs) are among those who have a high risk of exposure to workplace violence (5-8). It is likely that EMTs are exposed to a considerable degree of violence and aggressive reactions by patients or their relatives and often encounter stressful situations while providing patients with first aid and prehospital care during patient transfer (9-11). Exposure to aggressive behavior may lead to negative physical and psychological effects such as burn out, lack of inspiration, and unwillingness to work, and hampers quality of care and professionalism in EMTs (12, 13).

Studies from the USA (14), Australia (15), India (16), Swe-

den (17), and Taiwan (5) reported that more than half of EMTs experience at least one episode of violence during one year; while available data on this topic is still limited in Iran. Tehran emergency medical services (EMS) center receives an average of 7,000 calls per day, about 3,000 of which lead to dispatching an ambulance. Such a considerable number of missions, would be a suitable context for researching workplace violence. Therefore, this study was implemented to assess various types of violent incidents involving EMTs working in Tehran. Furthermore, the characteristics of violent people and possible causes of their violence were assessed.

2. Methods

2.1. Study design and setting

This cross-sectional study was performed from February to November 2019 in Tehran, Iran. Ethical aspects of this study were reviewed and approved by Iran University of Medical Sciences Institutional Review Board (IR.IUMS.REC.1398.024). Informed consent was obtained from the participants after complete comprehensive explanation of the study. Data were recruited, analyzed, and reported anonymously.

2.2. Definitions

Different types of violent incidents in the health sector have been defined according to World Health organization, which consist of physical violence, including assault/attack, and psychological violence, which comprises abuse, threatening, bullying/mobbing, sexual harassment, and racial harassment (5).

2.3. Study population

Out of the 1800 EMTs working in the capital city of Tehran during the study period, 500 EMTs were randomly invited to participate in this study. Those who had consented, filled out the questionnaire. Incomplete questionnaires were excluded. EMTs as a representative of the city population are comprised of Persian and non-Persian ethnicities, the latter includes Azari, Kurd, Lur, Arab, and Balouch.

Regarding the level of education, EMTs achieved technical diploma by passing practical requirements, internships, and practicums after diploma; associate degree includes two years of coursework, internship, and practical missions; bachelor's degree includes a four-year 120-credit-hours of coursework accompanied by practical work and a project; master's degree includes a two-year coursework, practicums, a project, and cumulative examinations. The majority of EMTs are men in our country.

2.4. Data gathering

The participants were asked to fill out a questionnaire of workplace violence. The workplace questionnaire in healthcare was developed in accordance with the framework guidelines of International Labor Office/International Council of Nurses/World Health Organization/International Public Services. It consists of four sections including physical, psychological, gender-based, and racial violence (18).

Overall, this questionnaire consisted of eight questions focusing on population-based data, and 13 questions on various types of violence, including three specific questions on physical violence. Furthermore, three open questions address the attitude toward workplace violence. The questionnaire's reliability and validity were confirmed in previous studies.

The number of violent behaviors, the violent individual, and location and time of the violent incidents were documented. Moreover, the possible causes of violent behavior were asked from the participants. In addition, the characteristics, distribution, and association of violence with the demographics of violent people, and possible related causes were evaluated. Each episode of violence exposure received one point.

2.5. Statistical analysis

Data were analyzed using SPSS version 25.0. Study variables were described as frequency/ percentage for categorical and mean/ standard deviation (SD) for numerical variables. The mean differences of numerical variables were analyzed using independent sample T-test. P-value lower than 0.05 was considered statistically significant. Univariate and multivariate logistic regression were also performed for identifying the possible risk factors of violence. In addition, the distribution and association of violence patterns were also analyzed considering demographic features and characteristics of violent people.

3. Results

Overall, 320 EMTs with the mean age of 31.8 ± 6.7 years old participated in the study, 315 (98.4%) of whom were men, representing the gender proportion among these personnel in our country. The mean ± SD of years of work experience and working hours were 7.5 ± 5.9 years and 260.0 ± 54.9 hours per month, respectively. Each EMT had an average of 14 missions during 24-hour shifts. The prevalence of violent incidents was higher among young (20–30 years old) EMTs than older (>40-year-old) individuals; however, this difference was not statistically significant (89.7% vs. 78.9%; p=0.178). In other words, the mean age of EMTs who experienced violence showed no statistically significant difference with that of those who did not face violence (31.5±6.6 vs. 33.1±7.7; p=0.157). Also, the mean work experience in those who experienced workplace violence and those who did not was not significantly different (7.5 ± 5.8 vs. 8.1 ± 6.3; p=0.518). The mean working hours of those who experienced workplace violence and those who did not was not significantly different (258.3 ± 49.9 vs. 271.6 ± 81.2; p=0.311). The relationship between the type of academic degree and experiencing violent incident was statistically significant (p=0.035). Of the EMTs with bachelor's degree, 68.0% had experienced violent incident, compared to 94.4% of EMTs with a master's degree.

Table 1 The distribution of baseline and demographic variables and prevalence of violent incidents involving emergency medical technicians

Variable	Total Participants	Violence Experience		p-value
		Yes	No	
	Number (%)			
Age, year				
20-30	175 (54.7)	157 (89.7)	18 (10.3)	
31-40	107 (33.4)	92 (86.0)	15 (14.0)	0.178
>40	38 (11.9)	30 (78.9)	8 (21.1)	
Marital status				
Married	200 (62.5)	175 (87.5)	25 (12.5)	0.829
Single	120 (37.5)	104 (86.7)	16 (13.3)	
Educational level				
Technical Diploma	25 (7.8)	17 (68.0)	8 (32.0)	0.035
Associate degree	180 (56.3)	161 (89.4)	19 (10.6)	
Bachelor's degree	97 (30.3)	84 (86.6%)	13 (13.4)	
Master's degree	18 (5.6)	17 (94.4)	1 (5.6)	
Work experience, year				
<5	130 (40.6)	114 (87.7)	16 (12.3)	
5-9	87 (27.2)	79 (90.8)	8 (9.2)	0.488
10-14	57 (17.8)	47 (82.5)	10 (17.5)	
≥15	46 (14.4)	39 (84.8)	7 (15.2)	
Ethnicity				
Persian	132 (41.3)	108 (81.8)	24 (18.2)	0.016
Non-Persian	188 (58.7)	171 (91.0)	17 (9.0)	
Employment situation				
Recruitment	109 (34.1)	94 (86.2)	15 (13.8)	
Service commitment	6 (1.9)	5 (83.3)	1 (16.7)	0.862
Contractual	37 (11.6)	32 (86.5)	5 (13.5)	
Conscription	168 (52.5)	148 (88.1)	20 (11.9)	
Working hours per month				
<240	23 (7.2)	17 (73.9)	6 (26.1)	
240-249	214 (66.9)	190 (88.8)	24 (11.2)	0.127
≥250	83 (25.9)	72 (86.7)	11 (13.3)	

Moreover, non-Persian EMTs had experienced significantly more violent incidents than ethnically Persian EMTs (91.0 vs. 81.8%; p=0.016). However, the prevalence of violence was not significantly related to marital status, work experience, employment situation, and working hours (Table 1).

Overall, 279 (87.2%) out of the 320 EMTs who participated had experienced 654 episodes of violence in the last 4 months; of these, 63 (22.6%) EMTs had experienced all types of violence. Figure 1 shows the distribution of the type of violence towards EMTs. The violent incidents were more frequently observed in patients' homes (34.7%) than in ambulance (18.2%) or in hospitals (4.7%). The prevalence of violent incidents in night shifts was 48.3%, which was significantly higher than evenings (29.7%) or morning shifts (24.1%) (p<0.001). However, 20.6% of EMTs experienced violence in all three shifts. Violent behaviors were mainly committed by people aged 19-35 (81.0%). The frequency of violent events was often reported to be monthly. Bullying and threatening were more prevalent in patients' homes (45.8% and 33.7%, respectively), while physical violence and racial harassment were more often observed in ambulances (32.1% and 46.3%, respectively) and therefore, the type of reported violence was different in these places (p<0.001).

Overall, 63.8% (n=417) of violent incidents were conducted by several people in each episode. The violence was more frequently committed by patients' relatives (49.1%) than patients (15.3%), and were observed more commonly by men (46.2%) than women (27.3%). Furthermore, violence was committed more prevalently by non-Persian people (24.9%) than Persians (13.6%). The type of violence differed based on the number, gender, and ethnicity of violent people.

The distribution and association of violent behavior such as bullying, threatening, physical assault, and racial harassment with demographics and other characteristics of violent people towards EMTs are shown in table 2. Multiple missions, patients' critical conditions, and personnel shortage accounted for 171 (61.3%),142 (50.9%), and 96 (34.4%) of the most prevalent causes of violence (Table 3).

Table 4 reports the univariate and multivariate logistic regression analyses of risk factors for experiencing violence by EMTs. The univariate logistic regression analysis showed that a lower level of education and non-Persian ethnicity were influential factors for experiencing violence. Also, based on the multivariable logistic regression, after adjusting for other variables (age, marital status, years of work experience, and ethnicity), the odds of facing violent behavior among EMTs with associate degree was 2.9 times higher than those with technical diploma (p=0.048). Furthermore, the odds of experiencing violence among non-Persian EMTs was 2.2 times higher than Persian EMTs (p=0.039).

Table 2 The distribution and association of violence patterns against emergency medical technicians with demographic features and characteristics of violent people

Variable	Any type of Violence (n=654)	Psychological Violence			Physical Violence	p-value
		Bullying (n=264)	Threatening (n=202)	Racial Harassment (n=82)	Assault/Attack (n=106)	
	Number (%)					
Place						
Patients' Homes	227 (34.7)	121 (45.8)	68 (33.7)	13 (15.9)	25	
Ambulance	119 (18.2)	16 (6.1)	31 (15.3)	38 (46.3)	34 (32.1)	
Hospital	31 (4.7)	9 (3.4)	6 (3.0)	7 (8.5)	9 (8.5)	<0.001
All	248 (37.9)	103 (39.0)	91 (45.0)	19 (23.2)	35 (33.0)	
Other	29 (4.4)	15 (5.7)	6 (3.0)	5 (6.1)	3 (2.8)	
Number of violent people						
One	237 (36.2)	95 (36.0)	58 (28.7)	33 (40.2)	51 (48.1)	0.007
Several	417 (63.8)	169 (64.0)	144 (71.3)	49 (59.8)	55 (51.9)	
Violent people						
Patients	100 (15.3)	32 (12.1)	24 (11.9)	17 (20.7)	27 (25.5)	
Patients' relatives	321 (49.1)	127 (48.1)	104 (51.5)	41 (50.0)	49 (46.2)	0.012
Both	233 (35.6)	105 (39.8)	74 (36.6)	24 (29.3)	30 (28.3)	
Gender of violent people						
Male	302 (46.2)	112 (42.4)	114 (56.7)	29 (35.4)	47 (44.3)	
Female	178 (27.3)	45 (17.0)	41 (20.4)	43 (52.4)	49 (46.2)	<0.001
Both	173 (26.5)	107 (40.5)	46 (22.9)	10 (12.2)	10 (9.4)	
Ethnicity of violent people						
Persian	89 (13.6)	44 (16.7)	28 (13.9)	7 (8.5)	10 (9.4)	
Azari	118 (18.0)	35 (13.3)	31 (15.3)	20 (24.4)	32 (30.2)	
Lur	30 (4.6)	4 (1.5)	10 (5.0)	10 (12.2)	6 (5.7)	<0.001
Other*	15 (2.3)	3 (1.1)	1 (0.5)	9 (11.0)	2 (1.9)	
Unknown	295 (45.1)	130 (49.2)	99 (49.0)	24 (29.3)	42 (39.6)	
Several	107 (16.4)	48 (18.2)	33 (16.3)	12 (14.6)	14 (13.2)	

*Balouch, Kurd, Arab

Table 3 Characteristics of violence against emergency medical technicians (EMTs)

Violence characteristics	Item	Number (%)
Age of violent people	12 - 18	50 (17.9)
	19 - 35	226 (81.0)
	36 - 60	143 (51.3)
	> 60	60 (21.5)
	Multiple age groups	144 (51.6)
Causes	Lack of equipment	114 (40.9)
	Numerous missions	171 (61.3)
	Personnel shortage	96 (34.4)
	Lack of physician in ambulance	24 (8.6)
	EMTs' unprofessional performance	21 (7.5)
	Patients' critical condition	141 (50.5)
	Multiple causes	120 (57.0)
Frequency	Multiple times a day	37 (13.3)
	Daily	16 (5.7)
	Weekly	59 (21.1)
	Monthly	95 (34.1)
	Only once	72 (22.5)

4. Discussion

According to our results, EMTs were frequently faced with violent behavior and dealt mostly with bullies. Similarly, in a study by Gormley et al., 69% of the American EMTs had faced violence during one year (19); among which, verbal violence was more prevalent than physical violence (19, 20). However, several episodes of violent behavior were observed in our study in a shorter time period. Another study on prehospital personnel in Canada showed that 75% of the participants faced violent behavior within one year (21). Some researchers concluded that the majority of personnel faced violence and did not report it (20, 22). Other studies reported that many healthcare personnel faced physical violence and suffered physical injuries (23-26). In this context, Rahmani et al. concluded that 75% of EMTs reported at least one incident

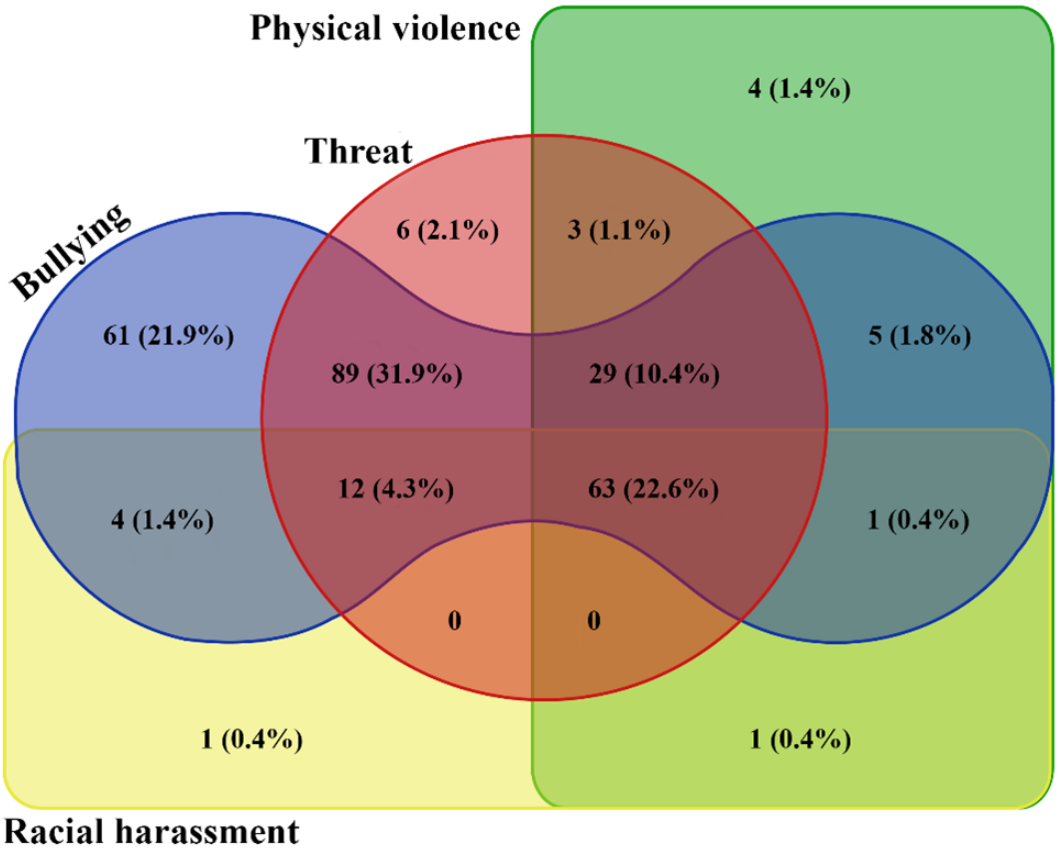

Figure 1 The distribution of the type of violence towards emergency medical technicians

Table 4 Univariate and multivariate logistic regression of risk factors for experiencing violence by emergency medical technicians

Variable	Univariate analysis			Multivariate analysis		
	Wald	OR (95% CI)	p-value	Wald	OR (95% CI)	p-value
Age, year	2.0	0.97 (0.92 to 1.0)	0.159	1.8	0.94 (0.85 to 1.0)	0.185
Marital status, Married	0.05	1.1 (0.55 to 2.1)	0.829	1.4	1.6 (0.72 to 3.8)	0.235
Education						
Technical Diploma		1.0			1.0	.
Associate degree	7.9	4.0 (1.5 to 10.5)	0.005	3.9	2.9 (1.0 to 8.5)	0.048
Bachelor's degree	4.5	3.0 (1.1 to 8.5)	0.033	2.6	2.4 (0.82 to 7.0)	0.110
Master's degree	3.5	8.0 (0.90 to 71.1)	0.062	3.1	7.4 (0.81 to 67.2)	0.076
Work experience, year	0.98	0.93 to 1.0	0.517	1.3	1.1 (0.96 to 1.2)	0.246
Ethnicity, non-Persian	5.6	2.2 (1.1 to 4.3)	0.018	4.3	2.2 (1.0 to 4.6)	0.039

during one year of work (27), while the most frequent types were verbal and physical violent behavior, respectively (27, 28). A systematic review and meta-analysis assessed workplace violence against nurses. They concluded that violence had commonly occurred, but less reported. Consistent data can be effective for taking preventive measures and devising proper management strategies (29).

Furthermore, the high number of missions and patients' critical situations were suggested to be possible causes in our study. According to some researchers, each additional transport in a week increased the odds of experiencing physical and verbal violence for an EMT (19). Other researchers believed that the most influential factor leading to workplace violence was peoples' lack of awareness of EMTs' duties. Also, 61.6 % of the prehospital personnel tried to control the situation by calming down the violent individuals and 48.4 % of EMTs believed that violence was a usual part of their work (28). Unlike what is found in the study by Grange et al. in the United States, where patients were responsible for 89.7 % of violent episodes, patients' relatives mostly committed violent behavior in our study (30). Regarding the timing of work shifts, one study showed that violence was more prevalent in the evening and night shifts (31); while in our study, violent behaviors mostly occurred during the non-holiday night

shifts. This issue might be due to the more frequent missions, the delay in ambulance entry, and the limited number of other transfer tools.

Higher number of violence episodes in the shifts of EMTs with higher educational level might be due to handling sophisticated situations and interventions. Thus, EMTs with higher academic degrees mandate higher communication skills to manage violent behavior. Some researchers reported that being a volunteer in this career had decreased odds of experiencing physical and verbal violence. In addition, the odds of experiencing violence were lower among non-urban EMTs and higher among EMTs with more years of experience ($p < 0.0001$) (19). The effect of race or ethnicity remained underreported (5, 19) or had small sample sizes for subgroup analyses (32), but our study showed that violent behaviors were more frequently committed by non-Persian people.

5. Limitations

The prehospital personnel were accessible during their shifts and this issue was coordinated with the director of the dispatch center. As a survey study, there was a concern that enough time was invested by EMTs to fill out the questionnaires, though they were complete by those willing to participate in the study. Furthermore, the characteristics of violent events and possible related causes were asked from the EMTs, which may be subject to recall bias although the EMTs assumed to have a clear vision of recent events. In addition, they reported the ethnicity of violent individuals according to their spoken language.

6. Conclusion

Prehospital emergency medical technicians had faced numerous episodes of violence in their workplace, most commonly verbal threats, which occurred more prevalently during night shifts, and many were committed by patients' relatives.

7. Declarations

7.1. Acknowledgement

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7.2. Authors' contribution

The conception and design of the work by AB, PS, PHK, MR and MB; Data acquisition by PS and PHS; Analysis and interpretation of data by AB, MR and MB; Drafting the work by MR, PHS and MB; Revising it critically for important intellectual content by AB, PS and PHK; All the authors approved the final version to be published; AND agree to be accountable for all aspects of the work; ensuring that questions related to the accuracy or integrity of any part of the work are addressed.

7.3. Conflict of interest

The authors of this manuscript declare no conflicts of interest.

7.4. Funding

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