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Violent encounters on the front line: Sequential explanatory mixed-methods investigation of physical violence factors in the prehospital setting

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Abstract

Objective Workplace violence (WPV) is an important issue in prehospital care, especially for emergency medical technicians (EMTs) who are at increased risk of physical violence due to the nature of their work. This study aimed to shed light on the specific factors that contribute to the underlying causes of physical WPV in the prehospital context through direct experience and insight into the work of EMTs.

Methods Sequential explanatory mixed methods were applied in five western provinces of Iran from 2022 to 2023. In total, 358 EMTs that met the criteria for the quantitative phase were selected using a multi-stage clustering method. In the quantitative phase, the researchers used a questionnaire on workplace violence in the healthcare sector. Based on the results of the quantitative phase, 21 technicians who had experienced physical violence in the past 12 months were invited for in-depth interviews in the qualitative phase.

Results The average age of the EMTs was 33.96 ± 6.86 years, with an average work experience of 10.57 ± 6.80 years. More than half (53.6%) of the staff worked 24-hour shifts. In addition, most EMTs were located in urban bases (50.3%), and 78 (21.8%) reported having experienced physical violence. No significant correlations were found between the demographic characteristics of the technicians and the frequency of physical violence, except base location in the last 6 months. The qualitative study also created one theme (the complexity of WPV in the prehospital setting), four categories, and ten subcategories.

Conclusion The study's results emphasize the need for comprehensive WPV factors in the prehospital setting. These factors can lead to identifying and improving strategies such as organizational support, improving communication and collaboration between responders, and training in de-escalation techniques. In addition, it is crucial to address the root causes of WPV such as poverty and lack of education in the community to create a safer and more supportive environment for patients and staff.

Keywords Workplace violence, Emergency medical technicians, Prehospital, Emergency medical services, Paramedics, Sequential explanatory mix methods

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Background

Workplace violence (WPV) is a pervasive and pressing problem in prehospital care, where emergency medical technicians (EMTs) and paramedics are at increased risk of physical violence due to the nature of their work [1, 2]. Emergency medical care often occurs in uncontrolled and hostile environments, such as accident scenes and patient homes, where members of the public may also be present [3]. Physical violence in the prehospital setting can be defined as any act or threat of physical aggression directed against an emergency provider during the performance of professional duties [4, 5]. This can include a range of behaviors from verbal threats and intimidation to physical attacks such as hitting, kicking, or biting. This exposure to the public, combined with the high stress of the workplace, can lead to an increased risk of physical violence against EMTs and paramedics [6, 7]. According to a study by the Occupational Safety and Health Administration (OSHA), healthcare workers, including those in prehospital settings, are four times more likely to suffer from WPV than those in other industries [8]. According to a survey of emergency medical services (EMS), almost half of the respondents reported experiencing physical violence on duty [9]. The consequences of these incidents can be serious, both for the victims and for the healthcare system as a whole. Physical injuries, psychological trauma, and increased absenteeism are some of the negative consequences associated with WPV in the prehospital setting [10].

The widespread issue of WPV in the prehospital setting lacks a comprehensive understanding of its causes, particularly from the direct perspective of EMTs and paramedics who experience WPV firsthand. Research into the causes of physical violence in such setting is crucial for several reasons. First, the safety and well-being of emergency responders are paramount, as they play a vital role in the healthcare system and the communities they serve. Exposure to physical violence can lead to physical injuries, emotional suffering, and even long-term psychological consequences, such as posttraumatic stress disorder (PTSD) [11–14], which can affect the ability of EMTs to perform their duties effectively, which can jeopardize the quality of care and the functioning of the entire prehospital system [15–17]. Second, the issue of physical violence in the prehospital workplace has far-reaching societal implications. Prehospital personnel are often the first point of contact for people in medical emergencies, and their ability to respond effectively and safely is critical for saving lives and managing the impact of such crises [18, 19]. Exposure to physical violence can impact the continuity of care, lead to delays in emergency medical service response times, and ultimately jeopardize the health and well-being of the communities they serve [20].

Prior research has focused mainly on the frequency, type, and outcomes of violence in the prehospital setting [4, 10, 11]. Although valuable, these studies may not fully capture the detailed experiences and perspectives of frontline workers who directly encounter physical violence in this setting. Additionally, most existing quantitative research has been carried out in North America and Europe [12–14], leading to a lack of qualitative knowledge about the experiences of employees in other regions of the world, such as Iran. Since cultural, social, and systemic differences can influence the dynamics of workplace violence [15], it is crucial to expand research efforts for a more comprehensive understanding of this complex issue.

The focus of this study is to gain insight into the experiences and perspectives of EMTs to better understand the causes of physical workplace violence (WPV) in prehospital settings. The ultimate goal is to enhance the safety and well-being of EMTs, paramedics, and the communities they serve. To achieve this goal, a mixed-methods study is essential because it provides a comprehensive understanding of the challenges and risk factors faced by healthcare providers. This, in turn, can facilitate the development of targeted interventions and strategies to address this issue effectively. The specific objectives of this study are as follows: (1) to analyze the demographic characteristics of technicians who have experienced physical violence, (2) to assess the extent of physical violence experienced by EMTs, and (3) to explore the connection between technicians' demographic characteristics and their encounters with physical violence. Additionally, the qualitative approach aims to elucidate the reasons behind physical violence from the perspective of technicians and to validate or refute the findings of the quantitative analysis.

Methods

Design

This study used a sequential explanatory mixed-methods design to gain a better understanding of the research question. The sequential explanatory design involves collecting data in two consecutive phases over a period of time. Initially, the researcher gathers and analyzes quantitative data, followed by qualitative data in the second phase, which are linked to the outcomes of the first phase [16]. One of the reasons for using this approach was that the results of the quantitative phase were used to design and select participants for subsequent qualitative data research. The qualitative phase also played a key role in explaining the quantitative results. The quantitative data served two main purposes: (1) identifying an information-rich sample for the qualitative phase to enable a targeted selection of participants with relevant

experiences and (2) developing or refining the qualitative interview guide [17]. To ensure ethical approval, the study was approved by the Ethics Committee of the Asadabad School of Medical Sciences (Code of Ethics: IR.ASAUMS.REC.1402.030). All procedures were conducted strictly according to the guidelines and regulations of the committee.

Settings and participants

Quantitative study

Sample selection

The study covered all EMTs working in five western provinces of Iran from 2022 to 2023. To ensure that different areas (Hamadan, Kermanshah, Kurdistan, Asadabad and Ilam) were represented, a multistage cluster sampling method was used. In this method, the provinces were identified as primary clusters, the districts within each province were divided into subclusters, the prehospital stations from each district were randomly selected, and finally two EMTs from each base were randomly selected to complete the questionnaires. The sample size was determined via a formula based on the population, aiming for 80% power, a relative error of 10% ($r=10\%$), and a 95% confidence interval ($1-\alpha/2=95\%$). Additionally, 22% of the sample size reported by Sahebi et al. [11] ($p=36.39$) was considered, resulting in a required sample size of 251 individuals (n).

The inclusion criteria included all EMTs with a bachelor's or master's degree in nursing, an associate's or bachelor's degree in EMTs, an associate's or bachelor's degree in the operating room, an associate's or bachelor's degree in anesthesia, at least one year of work experience in emergency centers and bases, a full-time presence (12–24 h) in urban bases and road bases, a willingness to participate in the study, no history of mental disorders, and no concurrent employment in other medical facilities and centers and personnel working that had not experienced any nonwork-related stress problems, such as the death of a relative, in the past eight weeks. The exclusion criterion was EMTs who had completed the questionnaire incompletely.

A total of 358 medical technicians from the western region of Iran participated in this study. After sufficient explanation of the purpose and conduct of the study and obtaining oral and written informed consent, the research instrument was handed over to the technicians. Data from technicians who completed the questionnaires incompletely were excluded from the analysis.

Data collection

The data were collected via a quantitative research instrument consisting of a two-part questionnaire (over a

period of one year, 2022–2023). The first part focused on demographic information such as age, work experience, educational qualifications (including nurses, medical technicians, operating room technicians, and anesthesia technicians), education level (postgraduate, bachelor's, postgraduate and above), employment type (formal, contractual, planning), marital status (married, single, separated), base location (road, urban, motorlance, air), number of assignments, and number of shifts worked in the last month. The second questionnaire was the Healthcare WPV Questionnaire and included four parts: physical violence, psychological violence, sexual violence, and racist violence in the last 12 months. Owing to the overall aim of the study, only the WPV questionnaire portion was used, as only technicians who had experienced physical violence were interviewed. Since the validity of the questionnaire was previously tested in Iran [16], we used the Persian version of this questionnaire to examine the instrument's reliability. It was distributed to 10 technicians by two members of the Asadabad School, and Cronbach's alpha was calculated. The present study revealed that the overall score of the questionnaire has high reliability, with a Cronbach's alpha coefficient of 88, indicating that the instrument is reliable.

Settings and participants

Qualitative study

Sample selection and data collection

In the qualitative phase of the study, we purposively selected a sample of 21 emergency medical technicians (EMTs) with a rich reservoir of workplace violence (WPV) in the previous 12 months. These EMTs were chosen based on the results of the quantitative study in which 78 out of 358 EMTs reported experiencing physical violence in the past year (Table 1; Fig. 1). The interview question guide for this study was carefully developed in multiple stages. First, we created an initial set of questions on the basis of the expertise of the research team and the results of the quantitative phase. These questions were further refined and validated with feedback from 10 EMT experts, three assistant professors of nursing with experience in prehospital care, and five emergency medicine. After three pilot interviews to check participant understanding, minor adjustments were made to enhance clarity. All the interviews were conducted by the first author, an assistant professor of nursing education who is an experienced professional with 20 years of prehospital care experience (Table 2). Upon receiving consent and approval from the participants, the data were collected through in-depth and semistructured interviews. To ensure a comfortable and confidential environment for the participants, the interviews were conducted in a dedicated training room outside of working hours.

Table 1 Qualified participants in the qualitative phase

Participant	Field of Study	Marital Status	Employment Status	Work Experience (years)	Number of shifts per month		Base location
					12 h	24 h	
1	1	Single	Planned	1	16	-	Urban
2	2	Single	Planned	2	-	12	Urban
3	1	Married	Official	12	14	-	Air
4	3	Married	Official	7	-	10	Road
5	4	Single	Contractual	10	-	14	Road
6	1	Divorced	Official	21	15	-	Air
7	5	Married	Official	13	22	-	Urban
8	6	Single	Planned	8	14	-	Urban
9	2	Single	Contractual	4	16	-	Urban
10	2	Married	Planned	17	-	12	Road
11	4	Married	Official	12	-	11	Road
12	1	Single	Contractual	2	-	14	Urban
13	7	Married	Official	21	-	13	Road
14	7	Married	Planned	4	-	12	Urban
15	4	Married	Contractual	4	-	13	Urban
16	6	Single	Contractual	7	-	12	Urban
17	8	Married	Official	23	12	-	Air
18	1	Single	Planned	27	-	14	Urban
19	2	Married	Official	31	20	-	Urban
20	2	Married	Contractual	34	-	12	Urban
21	2	Married	Official	40	-	14	Urban

1: Bachelor of Nursing, 2: Associate of Emergency Medicine, 3: Bachelor of Emergency Medicine, 4: Associate of Operating Room, 5: Associate of Anesthetist, 6: Bachelor of Operating Room, 7: Master of Nursing, 8: Associate of Nursing

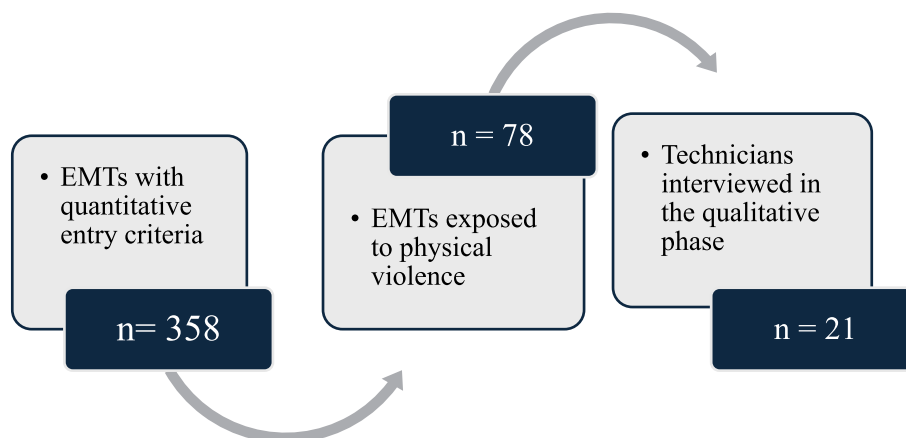


Fig. 1 The phases of selecting participants for the quantitative and qualitative studies

Each interview lasted between 30 and 45 min, depending on the interviewee’s pace and willingness to share their experiences. Some participants were interviewed twice in two different parts to increase the depth of data collection. Following the interviews, they were asked to discuss any additional topics that came to mind. The interviews were conducted until data saturation was reached so that

no additional data could be retrieved. The researchers then transcribed, reread, and analyzed the interviews. Before asking any specific questions, the interviewer asked some general questions: “Can you tell me a bit about your experience working as an emergency medical technician (EMT)? For example, more probing questions, such as “Have you ever personally experienced physical

Table 2 Main and probe interview questions guide of qualitative study

Main Questions	Probs
Can you tell me a bit about your experience working as an emergency medical technician (EMT)?	Can you explain more?
Have you ever personally experienced physical violence while on the job?	Can you tell me more about that incident(s)?
In your opinion, what factors cause physical violence in the prehospital environment?	Can you explain more?
In your experience, how do communication breakdowns or misunderstandings contribute to potentially physical violent situations?	Can you explain more?
Do you feel confident in your de-escalation skills when dealing with agitated patients or families?	Can you give me an example of that?
How do you usually cope with a situation where you feel threatened or unsafe?	Can you elaborate on that?
Do you feel adequately supported by your colleagues, supervisors, or the organization as a whole when facing violence?	Can you give me an example of that?
Are there any specific resources or training programs available to help you deal with potentially violent situations?	How did that incident make you feel?
Are there any specific resources or training programs available to help you deal with potentially violent situations?	How did you handle that situation?
In your opinion, what could be done to prevent physical violence against EMTs?	What do you think could have been done differently?
Are there any changes you would suggest regarding training, protocols, or support systems to improve safety?	Have there been other times you felt unsafe but no violence occurred?

violence while on the job? Can you tell me more about that incident(s)? To ensure this quality of reporting in the qualitative part of the present study, the Consolidated Criteria for Reporting Qualitative Research (COREQ) was considered for reporting study methods, study context, results, analysis, and interpretations of content analysis research [17].

Trustworthiness qualitative research

In this study, we ensured the trustworthiness of the qualitative data through a multistage approach [18, 19]. To ensure the rigor of the questions, we first thoroughly piloted our interview questions with a small group representative of our target audience so that we could refine the questions on the basis of their feedback. Additionally, we employed member checking, where participants reviewed their responses to confirm the accuracy of our findings. To guarantee that the data collection, analysis, and interpretation accurately reflected the participants' experiences, each phase was reviewed and validated by three expert supervisors with relevant experience. We used purposive sampling to recruit participants with diverse backgrounds and experiences related to the research questions to include a wide range of perspectives and enrich the authenticity of the collected data. The analysis's dependability was confirmed by three independent researchers with qualitative research experience (assistant professors of nursing and clinical psychology). Their review and expertise minimized potential bias or errors in the analysis phase. The transcripts, codes, and

categories were presented to an oversight committee, including the designated supervisor (an assistant professor of nursing) and two additional faculty members with qualitative research expertise to improve confirmability. Their participation in the analysis process provided an external perspective and contributed to the objectivity of the results. Finally, to enhance the transferability of the results, we documented a detailed description of the study context, participant characteristics, and data collection and analysis processes. This comprehensive information allows for further evaluation and potential application of the study results in other contexts and populations.

Data analysis

Quantitative data analysis

Means and standard deviations (SDs) were used to describe normally distributed data, whereas medians and ranges were used for nonnormally distributed data. The Kolmogorov–Sapiro test was used to assess the normality of the data. Categorical variables are expressed as frequencies and percentages. Independent samples *t* tests, chi-square tests, and Fisher's exact tests were used to compare subsets of patient demographic characteristics (age, work experience, education level, 12- or 24-hour shift, field of study, type of base, type of employment, etc.) with the dependent variables (experience or no experience with physical violence). All the statistical analyses were performed via SPSS version 21.

Qualitative data analysis

After quantitative data collection and analysis, the focus of the research was shifted to a qualitative approach. Since there were no theories or categories of physical violence in the prehospital setting in our context, we used the inductive method in the present study. In this phase, a conventional content analysis approach was used based on the framework developed by Graneheim and Lundman [20]. In phase preparation, the interviews were taped and subsequently transcribed. They were carefully reviewed several times to gain a comprehensive understanding and communicate with the unit analysis. In the organization phase, meaningful segments within the data were identified as meaning units related to goals and then assigned appropriate codes. In the next step, the codes were examined for similarities and differences via a constant comparative method. Then, codes with the same characteristics were grouped into subcategories. Next, the subcategories were compared, and those with similar characteristics were combined to form broader categories. Finally, the categories could somehow point to a more general concept and lead to the formation of a theme. In the reporting phase, themes, categories, subcategories, and codes were reported and interpreted. In short, after the units of analysis are determined, they are divided into units of meaning, open coding, subcategories and themes. At this point, we have 10 subcategories, four main categories, and one theme. The entire coding and analysis process was supported by MAXQDA10, a data analysis software application (VERBI Software, Berlin, Germany).

Results

Quantitative phase results

A total of 358 EMTs employed at medical universities in western Iran participated in this study. The average age of the paramedics was 33.96 ± 6.86 years, with an average professional experience of 10.57 ± 6.80 years. The highest age group was 30–34 years (30.7%), and the longest level of work experience was 6–10 years (26.8). Most respondents had a degree in emergency medicine (75.6%), a bachelor's degree (60.6%), were formally employed (43.6%), and were married (74%) (Table 3). More than half (53.6%) of the staff worked 24-hour shifts, and the remainder worked 12-hour shifts. In addition, most research units were located in urban bases (50.3%) (Table 4).

Of the 358 paramedics who participated in this study, 78 (21.8%) reported having experienced physical violence during their professional activities. The most common form of physical assault was pushing or shoving, while the least common form was hitting. These incidents resulted in physical injuries in 12 EMTs. In addition, eight technicians were attacked with cold weapons

(knives, machetes, glass, etc.). In terms of perpetrators, most physical violence was perpetrated by patients' companions or family members, followed by bystanders. The least frequent perpetrators were medical colleagues and technicians. The most common action taken by EMTs in response to physical violence was to attempt to de-escalate the situation by asking the assailant to calm down. The least common action involved law enforcement. The only demographic variable that had an impact on workplace violence was base location in the past 6 months ($df=3$, $p=0.02$). Finally, no significant associations were found between technicians' demographic characteristics such as age ($t=0.04$, $p=0.96$), work experience ($t=-0.58$, $p=0.55$), education level ($df=5$, $p=0.63$), 12- or 24-hour shifts ($p=0.46$), field of study ($df=4$, $p=0.42$), or type of employment ($df=5$, $p=0.68$) with the dependent variables (experience or no experience with physical violence).

Qualitative phase results

We reached data saturation after conducting 21 qualifying interviews, as no new themes emerged from subsequent interviews. To ensure the thoroughness of our research and strengthen the foundation of our study, two more interviews were conducted. However, these additional interviews did not uncover new categories or notable alterations to existing codes. Table 5 provides a detailed summary of the extracted codes, subcategories, categories, and theme.

Theme: the complexity of workplace violence in the prehospital setting

Category 1: organizational challenges

This category was divided into three subcategories: structural problems, organizational atmosphere, and lack of organizational support. One of the codes placed in the subcategory of structural factors and technicians referred to an inadequate emergency base and its impact on emergency response and patient–personnel conflict. The scarcity of emergency bases relative to the population density of the province poses a significant challenge for EMSs. This shortcoming often leads to situations in which an ambulance is dispatched to an emergency call and simultaneously confronted with another emergency call. Delays in reaching the second location due to geographical distance can lead to frustration and conflict between those accompanying the patient and the ambulance personnel.

P3: "The number of emergency bases is low compared to the population of the province. This has led to a scenario where if one base is dispatched on a mission and at the same time another emergency mission is announced in the vicinity of the same

Table 3 Categorical variables related to the demographic characteristics of EMTs

Categorical Variables	Category	Frequency	Percent
Age (Years)	20-24	17	4.7
	25-29	83	23.2
	30-34	110	30.7
	35-39	76	21.2
	40-44	36	10.1
	45-49	24	6.7
	50-54	12	3.4
Work Experience (Years)	> 1	23	6.4
	2-5	76	21.2
	6-10	96	26.8
	11-15	87	24.3
	16-20	45	12.6
	>20	31	8.7
Field of Study	Operating room	4	1.1
	Anesthesia	12	3.4
	Nursing	57	15.9
	EMTS	274	76.5
	Incident and crisis management	5	1.4
	Other	6	1.7
Degree	PhD	1	0.3
	Diploma	7	2.0
	Associate	112	31.3
	Bachelor	20	5.6
	Master	234	60.6
Type of employment	Contractual	115	32.10
	Permanent	156	43.6
	Corporate	18	5.0
	Tarhi	44	12.3
	Temporary	25	7.0
Marital status	Married	265	74.0
	Single	186	26.0
Number of shifts (in a month)	12 h	166	46.4
	24 h	192	53.6
base location in the past 6 months	Road	174	48.6
	Urban	180	50.3
	Motorlance	2	0.6
	Air	2	0.6
	Total	358	100.0

Table 4 Noncategorical variables associated with paramedic demographic characteristics

Quantitative Variables	N	Minimum	Maximum	Mean	Std. Deviation
Age (Years)	358	22	54	33.96	6.869
Work Experience (Years)	358	0	34	10.57	6.805
Number of shifts (Per month)	24 h	192	1	9.11	1.978
	12 h	166	3	13.20	3.795

Table 5 Themes, category, subcategory and codes resulting from the qualitative interview

Theme	Category	Subcategory	Code
The complexity of WPV in the prehospital setting	Organizational challenges	Structural problems	Lack of emergency bases
			Emergency equipment malfunction
			Shortcomings of the relief fleet
		Organizational climate	Lack of workplace amenities
			Inequities in payments
			Low income of personal
			Lack of response to previous instances of physical violence
			The psychological atmosphere of the work environment
			Inappropriate behavior of superiors
			Lack of organizational support
	Society and judicial laws	Sociocultural challenges	Failure to adequately protect the rights of staff
			Unclear reporting procedures
			Not caring about the safety of personnel
			Lack of legal advice in the office
			Lack of clear instructions against violence
			Inflation and expensiveness in society
			Poverty in society
Lack of general education in society			
The level of culture in society			
High prevalence of neurological and mental disorders in society			
Consumption of alcohol and drug by the patient or his companion			
Lack of transparency of the rules of violence against technicians	Lack of transparency of the rules of violence against technicians	Lack of an appropriate punishment law for the guilty	
		Failure to the punishment of perpetrators of violence	
		Disproportion of crime with punishment	
		Weak and ineffective laws	
		Lack of appropriate punishment law for the guilty person	
		Lack of proper and timely legal proceedings	
		Unknown prehospital emergency system in society	Unknown prehospital emergency system in society
Lack of awareness among people about emergency infrastructure			
People's lack of awareness of the rules			
Lack of general education in society			

Table 5 (continued)

Theme	Category	Subcategory	Code
	Interprofessional problems	Inconsistency of security-relief agents	Delay other organization relief at the scene Lack of coordination among other relief organizations Unauthorized interference by law enforcement authorities Delay of law enforcement officers at the scene of the accident
		Interpersonal contradictions	Delay in mission announcement by operators Use wrong or incorrect address from the operators Lack of justification for unintentional delay on the part of the operator Unethical behavior by colleagues Stressing of patients and clients
	Challenge inside of Individual	Lack of motivation to the profession	Personal's lack of awareness of his primary responsibilities Lack of motivation to do things well Staff lack of awareness of their rights Not coping with the job
		Inadequate technician skills	Lack of proper communication with the patient and companions Inadequate practical skills Poor stress management skills deficits in accident scene management Inadequate driving skills

base, because of the distance and delay in reaching the mission site, the patients' companions may get involved with the emergency personnel”.

Another of the codes obtained from interviews with technicians regarding the causes of physical violence and categorized as structural factors was the older age of tools, ambulances, and prehospital equipment. One technician stated:

P11: “We were dispatched on an urgent mission and were tasked with swiftly reaching the scene of a car accident. However, our prompt response was abruptly stopped when our ambulance inexplicably shut down the midroute. After a frantic struggle, we managed to coax the vehicle back to life. Upon our arrival at the accident site, the first greeting we received was a slap from the patient’s enraged companion, a direct consequence of our delayed arrival”.

Organizational climate has emerged as a distinct subcategory within the broader category of organizational challenges. This subcategory encompasses codes related to perceived inequities in payments, low income of employees, lack of response to previous instances of physical violence, and inappropriate supervisor behavior. During the interviews, technicians repeatedly stated that injustice and inequality in the payment of salaries and wages led to anger and a reduced focus on performing prehospital care in such a way that, facing aggressive patients and accompanying individuals, the ability to control conditions was lost, which led to physical confrontations on the scene. One technician stated:

P2: “When I see that my colleague is doing the exact same job as me but is getting paid more and has better benefits, it makes me want to slack off and subconsciously say to myself, “Why should I exhaust myself? This lack of motivation has even led to physical violence on the scene. “.

Lack of organizational support was another subcategory within the category of organizational challenges. In this subcategory, codes such as failure to adequately protect staff rights, failure to follow up on cases of violence, lack of concern for staff safety, lack of legal counseling in the office, and lack of clear instructions were listed. During the interviews, technicians frequently mentioned one of the most important factors, namely, repeated cases of physical violence against technicians. The organizations did not take action against these acts of violence, which resulted in technicians seeking retaliation after physical alterations, leading to further conflicts and disputes in the field. A mening unit from a technician.

P18: "If the organization does not take action against the violence that has been perpetrated against me, why should I remain silent in the face of physical assault? From now on, anyone who attacks me will receive a forceful response."

Category 2: society and judicial laws

This category was divided into three subcategories: sociocultural challenges, lack of transparency in rules on violence against staff, and unknown prehospital emergency response systems. The subcategory "Sociocultural challenges" included codes such as inflation and expensive society, poverty, lack of general education in society, cultural level in society, high prevalence of neurological and psychological disorders in society, and drug use by the patient or companion. In this context, the technicians explained that the economic sanctions against Iran have led to inflation in society and a decrease in income levels. On the other hand, poverty and high prices have led to an increase in mental and psychological problems among people, which has led to a decrease in people's patience and tolerance for problems. The following are some quotations from technicians about this phenomenon:

P8: "I clearly see that the economic conditions prevailing in society have influenced the resilience of the citizens. Most of the physical violence I have experienced has been in poor areas, and I have seen less physical violence in areas with citizens with higher income levels."

P20: "We were dispatched on an emergency mission due to amphetamine consumption by the operator. We arrived at the scene in less than 5 min. According to the protocol, we first invited the patient's bystander to calm. While taking the IV line for the patient, suddenly and without reason, I was hit by a strong punch from the patient. I had never experienced such a punch in my life."

A lack of transparency in the rules governing violence against technicians was another subcategory extracted from the codes obtained from the interviews with the technicians and placed in the category of society and judicial laws. This subset of codes includes lack of appropriate punishment laws for the guilty person, failure to punish perpetrators of violence, a disproportion of crime with punishment, weak and lax rules, lack of appropriate punishment laws for the guilty person, and lack of proper and timely legal proceedings. The most important quote from the technicians in this regard was the lack of specific and clear laws regarding physical violence perpetrators in the field of the perhospital. Technicians stated that there are very few laws in this regard and that there is no proportionality to the type of violence, which has led perpetrators to resort to violence without fear. Other technicians also stated that even these limited and nondeterrent laws take a long time to implement, causing the problem to fade and be forgotten, and technicians no longer find motivation to pursue the matter. Related quotes from technicians include but are not limited to the following:

P15: "I was attacked on the accident scene by the patient's companions. Unfortunately, my nose fractured after being hit by a fist. I told the patient who you caused physical harm to a government employee while carrying out his duties, and I will file a complaint against you. The patient's companion calmly stated that you could not do anything?"

P11: "On the scene of an accident, a patient with a history of physical violence against my colleagues attacked me and injured my face. I told him I would file a complaint against him. You know what he said? "Do whatever you want, your friends said the same nonsense the last time."

Regarding the unfamiliarity of the prehospital emergency system in society, the last subcategory referred to the "society and justice laws" category, which includes codes such as lack of information and knowledge of beneficiaries about the description of the prehospital emergency tasks but not people's awareness of the emergency infrastructure, people's lack of awareness of the rules and the lack of general education in society. The primary cause of physical violence by companions or patients and rescue workers identified was a lack of awareness and information about emergency care and infrastructure among service recipients. Technicians stated that owing to the lack of adequate knowledge and education about the tasks of emergency responders, the public often has unrealistic expectations regarding the emergency response system, which cannot be met within the

framework of the prehospital system in Iran. Below are some quotations from technicians on this topic:

P11: "We got a call for a patient in critical condition. When we arrived, I saw that the patient had mild cold. As soon as I told him that his case was not urgent, he started cursing and swearing at me. It got so bad that his companion had to intervene to prevent a physical altercation. We ended up taking the patient to the hospital anyway."

P18: "Unfortunately, people confuse ambulances with taxis. When we tell them, we only provide emergency care for life-threatening situations; they immediately put their guard up against us."

Category 3: interprofessional problems

Interpersonal contradictions and inconsistent security-relief agents comprise two subcategories of this category. Codes such as delay of other organizational relief at the scene, lack of coordination among other relief organizations, interventions without justification of force law enforcement, and delay of law enforcement officers at the scene of the accident are included in the subcategory of inconsistent security relief agents. Additionally, codes such as the operator's delay in announcing the mission, their use of the wrong or incorrect address, their inability to provide an explanation for an unintentional delay, unethical behavior with colleagues, and the stress of patients and clients were also classified as interpersonal contradictions.

The majority of technicians in the subcategory of security relief agents were predicated on the idea that physical violence at the accident scene was caused by relief organization inconsistency, which included the police, the Red Crescent, and the fire department. As a result, the lack of work and shortcomings of other organizations were more focused on prehospital emergencies. The following are some quotations from the technicians:

P7: "We arrived at the scene of an accident where the patient was trapped inside the car due to a severe accident. We tried our best to release the bleeding from the patient, but this procedure was unsuccessful. Unfortunately, owing to the delay of the fire brigade, we were beaten by the people around the scene."

P21: "The patient's mom truly insisted that we calm down her schizophrenic son with meds. We waited almost 30 min for the cops. Since the police were delayed getting to the scene, we had no choice but to take matters into our own hands and give the patient antipsychotic drugs. Suddenly, the patient's fist hit my face while taking IV"

The primary reasons for physical violence from the perspective of technicians in this category were attributed to problems arising from emergency operators. Many technicians stated that operators were unable to obtain a proper medical history from patients, resulting in a discrepancy between the actual clinical condition of patient at the scene and the medical history received from the operators. Additionally, patients and their companions failed manage and control their anger, and this existing stress could lead to physical violence in the prehospital system. Below are some quotes from the technicians:

P16: "The emergency operator delayed informing us that the patient was somewhat disoriented. We trusted this information. Upon arriving at the scene, we realized that the resuscitation equipment was not ready. I told my colleague to quickly retrieve the CP kit from the ambulance. As soon as I said this, the patient companion hit me with a strong slap."

P11: "The whole scene was a complete mess. Everyone was so stressed that the patient accidentally slipped and fell off the stretcher while we were moving them. I got kicked so hard that I had bedwetting for a long time afterwards."

Category 4: challenge inside individuals

This category was formed from two subcategories: challenges inside individuals and inadequate technician skills, which arise from codes such as personal lack of awareness of their primary responsibilities, lack of motivation to do things well, staff lack awareness of their rights, lack of coping with the job, lack of proper communication with the patient and companions, lack of sufficient practical skills of the technician, inability to control anger, deficits in dealing with the scene of the accident, and inadequate driving skills. With respect to the subcategory "lack of motivation to the profession," technicians stated that the lack of recognition by personnel regarding their job descriptions and workplace demotivation can create a breeding ground for violence on the scene. Some of the requests made by clients are deemed unjustified by technicians despite being part of their job descriptions. On the other hand, from the technicians' point of view, a decline in motivation can lead to a deterioration in the quality of care at the scene of physical violence. The statements from the technicians are as follows:

P14: "My less experienced colleague persistently urged the patient's family members that transporting the patient to the hospital was not part of the prehospital emergency services' job description. However, from my perspective, the patient required

ambulance transport. Ultimately, we transferred the patient with the threat of physical confrontation with the patient's companion."

P15: "The patient was not doing well, so we quickly started resuscitating the patient. I told my colleague to give me a fast laryngoscope blade number 4 fast. They were so unmotivated and slow that even the patient's agitated bystanders noticed, and one of them picked up the CPR bag and threw it toward me."

One of the subcategories that emerged from the codes extracted from the interviews with technicians was "inadequate technical skills." From a technician perspective, one of the most important and significant factors contributing to the occurrence of physical violence in a prehospital setting is the lack of sufficient skills among newly hired technicians. The technicians stated that the lack of sufficient skills of the technicians would create the conditions for physical violence at the scene of the accident, given the high level of stress in prehospital emergencies and the increasing knowledge of patients and their companions about diseases and modern treatments. The technicians' statements regarding this problem are as follows:

P20: "The baby was severely dehydrated. I was driving like a bat outta hell to get the patient to the hospital fast. Suddenly, I heard shouting and a commotion coming from the back of the ambulance. It turned out that my colleague had been struggling for a while and can not get an IV line on the baby."

P11: "We were transporting a patient with head and neck trauma over a bumpy road to the hospital. My partner was driving so damn rough that I could not even get an IV line on the patient. The patient was in so much pain from the ambulance jerking around that they chucked the latex glove box right at my head"

Discussion

The results of this study highlight the prevalence of physical violence against EMTs in five western provinces of Iran. The findings indicated that 21.8% of the 358 EMTs who were surveyed reported experiencing physical violence during their professional activities. In this regard, Sahibi et al., in their systematic review, reported a rate of physical violence of approximately 37%, which was higher than that reported in our study. The most common form of physical violence was pushing or shoving, whereas the least common form was hitting. These incidents resulted in physical injuries to twelve rescue workers, and eight technicians were attacked with cold weapons. Most physical violence

was perpetrated by patients' companions or family members, followed by bystanders. Notably, the rarest perpetrators were colleagues of doctors and technicians. In contrast to our study, Taylor et al. reported that the most commonly reported attackers were patients (73%) [30]. The most common response from emergency responders to physical violence was to attempt to de-escalate the situation by asking the attacker to calm down. This approach was followed by the least common actions, namely, seeking legal remedies through law enforcement. In this context, Sheikhbardsiri et al. reported that the majority of paramedical staff reported "lack of response and respect for the rights of patients and their families" as their main reactions [21]. Among those surveyed, the majority (306; 71%) stated that they would be prepared to defend themselves against the person who had first asked for help [22].

Only the demographic characteristics, including base location (road, urban, motorlane and air), in the past 6 months were associated with the occurrence of physical violence in the prehospital setting. Additionally, there was no significant association between the other demographic characteristics of experienced technicians exposed to physical violence and the frequency of violence. This finding highlights the importance of addressing the root causes of physical violence in the prehospital setting rather than just focusing on individual characteristics. However, the results differed from those of Sanggouei et al. [23]. Their study revealed notable correlations between the occurrence of physical violence and marital status ($p=0.008$), age ($p=0.04$), and work experience ($p=0.04$). Asadi et al. also reported a notable correlation between marital status ($P=0.032$) and the road base ($P=0.001$) of EMS personnel and the amount of physical violence they encountered [24].

The results of this qualitative study led to the creation of a theme, four categories, and ten subcategories (Table 5). In this section, we discuss the most important codes for each subcategory. It is important to note that the discussion is challenging to write because, as of this writing, very few studies have been done that support the findings of our qualitative study.

Organizational challenges category

From the perspective of technicians, structural problems such as the lack of emergency bases can be a breeding ground for professional violence. According to them, the lack of emergency bases and their distribution across the urban and the road could increase the time to the scene, which could ultimately lead to patient dissatisfaction and physical violence. However, the quantitative study results showed no significant relationship between base location and the frequency of physical violence. Consistent with the qualitative study results, Hadian et al. [23] also found

that a lack of resources due to low staffing levels may contribute to the occurrence of physical violence against prehospital medical technicians.

The results of our qualitative study showed that unfair pay can lead to frustration and resentment among emergency workers, which in turn increases the likelihood of physical violence. Baratloo et al. found that 87.2% of EMTs in Tehran, Iran, experienced episodes of violence, mostly bullying, that were attributed to financial inequality [25]. Additionally, studies have shown that financial stress can worsen WPV as employees may feel undervalued and overworked [26]. Financial stress can significantly impact employee productivity and lead to lower job satisfaction, absenteeism, and turnover [27, 28].

Lack of anger control has also been identified as a significant factor in the occurrence of physical violence at the crime scene. Anger management programs play a critical role in preventing workplace violence by providing individuals with effective strategies for managing their anger and responding to violent situations [29]. These programs can be particularly useful for emergency responders who are at higher risk of violence due to their frontline work and 24-hour availability. A comprehensive review of interventions to reduce the negative impact of workplace violence among health care workers found that training programs, cognitive behavioral therapy, and anger management programs were effective in reducing psychological problems such as anxiety and depression, thereby reducing the incidence of workplace violence [30]. Therefore, these programs can help reduce the likelihood of physical violence incidents by providing individuals with effective strategies for managing their anger and responding to violent situations.

Another important code obtained from the interviews with the technicians was the psychological atmosphere that existed in the organization. A number of technicians stated that the psychological atmosphere of the work environment such as slander, absenteeism, vandalism and other such cases can influence the occurrence of physical violence at the scene. A positive organizational climate is critical to reducing workplace violence. A fair, harmonious, and positive atmosphere can reduce pressure on staff, minimize negative emotions, and promote work engagement [21, 31]. This is supported by the Huling study, which found a negative relationship between psychological violence in the workplace and organizational climate [31]. In addition, the behavior of supervisors plays a crucial role in shaping the work environment and influencing employee behavior. When supervisors engage in inappropriate behavior, such as bullying, harassment, or favoritism, it can create a culture of fear and distrust, leading to increased workplace violence [22].

Lack of response to previous instances of physical violence may also contribute significantly to the escalation of WPV [32, 33]. This can lead to a culture of impunity where employees feel that violent behavior is not taken seriously or punished. Therefore, responding to prior physical violence can help ensure that threats are identified, investigated, assessed, and effectively mitigated to reduce the likelihood of WPV. Our quantitative study results confirmed the assumption that technicians were less likely to take legal action for violence due to a lack of follow-up on previous incidents. Only 0.3% of technicians responded to physical violence with legal action, believing it to be ineffective.

The lack of clear and unambiguous guidelines for dealing with physical violence and the lack of adequate legal advice in the prehospital system were identified as two of the most common causes of physical violence. This lack of clarity can cause confusion and uncertainty among healthcare providers and lead to inconsistent responses to violent incidents, which can worsen the situation and endanger both patients and providers [34, 35]. Clear guidelines would provide healthcare providers with a framework to follow and ensure they are equipped to deal effectively and safely with violent situations.

The lack of sufficient legal advice in the prehospital system is also a crucial problem. Legal advice is necessary to ensure that healthcare providers understand their rights and responsibilities in cases of physical violence. This involves comprehending the legal consequences of physical restraint and the procedures for reporting and documenting incidents [36, 37]. The legal framework for addressing WPV varies by jurisdiction, but generally, it involves a combination of criminal and civil laws [38, 39]. Criminal laws aim to punish perpetrators of violence, while civil laws focus on providing compensation and redress to victims. Appropriate legal advice can help healthcare providers navigate the complexities of legal issues related to physical violence, reduce the risk of legal complications, and manage these situations effectively, thereby ensuring the safety and well-being of both healthcare providers and patients [40, 41].

Society and judicial laws category

Level of community culture was another code extracted in this study. Cultural norms, attitudes, and values prevalent in society can influence the occurrence of WPV [42, 43]. When a society's culture tolerates or normalizes aggression, conflict, or lack of respect, it can create an environment in which WPV is more likely to occur. Cultural factors such as acceptance of aggression, power dynamics, and communication styles can influence the way individuals interact in the workplace, potentially escalating tensions and conflicts to the point of violence

[44, 45]. Therefore, the cultural context of a society plays an important role in shaping behaviors and attitudes that may prevent or contribute to WPV.

In the prehospital setting, there is no sufficient direct evidence of a lack of practical skills among technicians and WPV. However, a lack of practical skills can lead to increased stress and anxiety among prehospital paramedic personnel. This, in turn, can result in increased emotional reactions and potential conflict in the workplace [46, 47]. Without the necessary practical skills, prehospital staff may have difficulty responding effectively to emergencies, increasing the likelihood of errors or delays in patient care [48–50]. This can cause tension and conflict in the workplace and potentially lead to violence.

In the most recent interview, the technicians emphasized the role of substance use in crime scene violence. They pointed out that alcohol and amphetamine use can influence the occurrence of violence. Substance abuse, particularly alcohol and drug use, by patients or their companions can contribute to workplace violence (WPV) in the prehospital setting. When individuals are under the influence of substances, they may become more aggressive, impulsive, and prone to violent behavior [51, 52]. This can manifest itself in various forms, for example physical or verbal aggression toward helpers, other patients or even oneself. Therefore, in these cases the need for a joint presence of police and emergency services is crucial, which increases the importance of safety at the scene and raising awareness of the situation in order to minimize the risk of violence. In addition, recognizing behavioral characteristics such as restlessness, aggression and intimidation is very important to prevent potentially unsafe situations.

Interprofessional problems category

In preset study, delay in providing assistance from other organization relief at the scene in a prehospital setting resulted in physical violence. Increased tension in the result of delays other organization relief at the scene can increase frustration among victims, bystanders and even first responders, leading to heightened emotions and potential conflict [53]. On the other hand, preventing the transfer of patients to the hospital due to unnecessary interventions by other organization relief, including the police, due to the completion of checklists related to accidents, has led to a delay in the transfer of patients to the scene of the accident, causing the discomfort of patients and companions, which can lead to conflict and violence at the scene of the accident.

The results of the qualitative study showed that delays in announcing emergency responses could lead to frustration and anxiety among patients and their companions. In emergency situations, patients' companions,

especially when lives are at risk, may be particularly susceptible to frustration and anxiety, which can heighten stress and potentially lead to violence [54–56]. According to the technicians, one of the key factors in the physical violence at the scene was that the emergency operator gave the wrong address of the patient, announced the call too late and gave incorrect information about the condition of the patient's bed. Incorrect information about patients can create confusion among responders, affecting the timeliness and effectiveness of care delivered leading to misallocation of resources and further exacerbating the situation in the scene. Therefore, emergency operators must be aware of these factors and take steps to mitigate them, such as providing clear and timely updates on mission status and ensure that companions are informed and involved in the decision-making process.

Challenge inside of individual category

Lack of motivation to do things well is a major factor in the increase in physical violence in the prehospital setting. When paramedics are unmotivated, their performance can be affected. This can lead to errors in patient care that can lead to tension with patients or bystanders. Inadequate practical skills, also, one of the most factor that can lead to physical violence at the scene of the incident. When clients perceive that their medical needs are not being met effectively, this can lead to heightened emotions and potential aggression. Lack of skills can result in poor decision-making during critical situations, potentially exacerbating the crisis and provoking aggressive reactions [57]. Poor stress management skills among EMTs can potentially lead to violence at the scene. EMTs often work in high-pressure environments where they encounter traumatic situations, difficult patients, and aggressive bystanders. If EMTs lack effective stress management techniques, increased emotional reactions may occur, which may contribute to conflict or escalate tensions [58, 59]. Factors such as burnout, inadequate training in de-escalation techniques, and a lack of support systems can exacerbate these problems [60, 61]. Training in stress management, communication skills and conflict resolution can help EMTs handle challenging situations more effectively and reduce the likelihood of violence .

Conclusion

The aim of the present study was to investigate the prevalence of WPV and its associated factors from the perspective of EMTs. The results of the present study indicate that physical violence is a pervasive and urgent problem in this environment: 21.8% of technicians report experiences of physical violence during their professional activities. The most common form of physical attack

was pushing or shoving, and the rarest form was hitting. Most physical violence was perpetrated by patients' companions or family members, followed by bystanders. The study also identified several factors contributing to WPV, including organizational challenges such as structural problems, lack of emergency bases, and emergency equipment malfunctions. In addition, the lack of organizational support, including the failure to adequately protect the rights of staff and the failure to follow up on cases of violence, was a significant factor. The results of this study highlight the need for comprehensive strategies to combat WPV in the prehospital setting. These strategies should include improving organizational support, improving communication and collaboration between responders, and providing training in de-escalation techniques. Furthermore, addressing the root causes of WPV, such as poverty and lack of general education in society, is crucial to create a safer and more supportive environment for patients and staff.

Limitations

Given that workplace violence against EMTs is a global problem, the results of the present study can be generalized to other contexts, however, the present study has limitations. The results of the study are limited by the sample size and self-reported nature of the data. Future studies should aim to recruit a larger and more diverse sample of EMTs and use objective measures of WPV. The sample size of this study was limited to 358 EMTs, which may not be representative of the entire prehospital setting. Additionally, the data collected in this study were based on self-reported experiences of physical violence, which may have been biased and inaccurate. Another limitation of the current study was that it only examined the association between physical violence and demographic characteristics, which may not be predictive of the association with other verbal, cultural, and sexual violence [62].

Abbreviations

EMTs	Emergency Medical Technicians
EMS	Emergency Medical Services
WPV	Workplace Violence

Acknowledgements

We are very grateful to the heads of prehospital emergency departments in the western region of Iran for their cooperation and facilitating the process of this study. We also sincerely thank the EMTs who patiently gave us their time to conduct the present study.

Authors' contributions

All of the interviews, content analysis, obtaining ethical approval, and manuscript drafting were completed by AKH. The study's conception, design, analysis, and result interpretation were all completed by AF and AKH, and MB contributed to the study's design, analysis, interpretation of the findings, and manuscript preparation. FD helped with the data analysis and interpretation. The final version of the manuscript was approved by all authors after it had been reviewed and edited.

Funding

The Research Council of the Asadabad Medical Sciences school granted permission for this study to be carried out as a research project (No: 149).

Availability of data and materials

The datasets used and/or analyzed during the current study are available upon reasonable request from the corresponding author and permission from the Ethics Committee of Asadabad School of Medical Sciences.

Declarations

Ethics approval and consent to participate

The study was approved by the Ethics Committee of the Asadabad School of Medical Sciences (Code of Ethics: IR.ASAUMS.REC.1402.030). All procedures strictly followed the committee's guidelines and regulations.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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Received: 4 July 2024 Accepted: 27 August 2024

Published online: 06 September 2024

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