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The approach of prehospital health care personnel working at emergency stations towards forensic cases



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ABSTRACT

Objectives: The objective of this study is to determine the states of health care personnel, working at 112 emergency stations in the province of Artvin, to encounter with regarding forensic cases and determine their practices aimed at recognizing, protecting, and reporting the evidences that may affect the forensic process. **Materials and methods:** This descriptive study was conducted with nurses and emergency medicine technicians working at 112 emergency stations in Artvin between January 2013 and February 2014.

Results: Of 141 health personnel that constituted sample of the study, 48.9% were nurses, 9.9% emergency medicine technicians, and 41.1% ambulance and emergency care technicians. The rate of feeling sufficient in coping with forensic cases and incidents was 20.6%. There was a lower rate of receiving education about the approach towards forensic cases (15.6%). In the study, the frequency of encountering with at least one forensic case was 88.7%. Traffic accidents (72.5%), suicides (41.5%) and assaults (41.5%) were among the most frequent reasons of forensic cases. The practices of nurses were more successful in woundings by firearms compared to other health personnel ($p < 0.05$). The rate of recognizing the evidences was 81.6–96.5%. Almost one fourth of the personnel had no sufficient information about storing and protecting the evidences.

Conclusions: The personnel working at 112 emergency stations in the province of Artvin frequently encounter with forensic cases. The personnel with higher educational level and nurses have more successful practices in forensic cases. Health personnel have approaches that may negatively affect the solution of forensic cases.

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1. Introduction

Many trauma types caused by violence, accidents, sexual assaults, and domestic violence threatening the life and health level of individuals are commonly observed in societies.¹ If a person plays a role in the health impairment of another person either on purpose or as a result of incautiousness or inattentiveness, and if such a condition is claimed or suspected, this condition is defined as a “forensic event/incident” and the wounded person a “forensic case”.^{2–4} An important part of forensic cases is involved within the scope of emergency cases. Thus, the first care and treatment of forensic cases are frequently conducted in 112 emergency

ambulances and emergency services. Forensic incidents usually constitute the first rank among the reasons for applying to 112 emergency ambulance services.^{5,6} Woundings by firearms, explosive materials, as well as sharp object injuries, traffic accidents, falls, assault cases, occupational accidents, poisonings, burns, asphyxia, all kinds of suicide attempts, all deaths that are suspected to be originated from murders, suicides, and accidents, domestic violences, sexual assaults, abuses are examples of emergency forensic incidents.^{3,7,8}

Health personnel providing emergency health care services are the people who will provide the first care and treatment to the case and see the evidences that will contribute to the enlightenment of forensic cases for the first time.² Everything being used, left, taken away, changed or contaminated by the accused or the victim while committing the crime is considered within the scope of an evidence in forensic cases.^{2,9,10} Physical evidences include bullets, clothes, hair, thread, debris, saliva, semen, and bite marks. On the other hand, non-physical evidences include the evaluation of trauma

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tendencies during the process of taking the psycho-social history such as the suicide attempt, violence, abuse, and self-destruction. All kinds of materials being carried by and/or found on patients should be protected and kept as an evidence and delivered to security officers. The biggest problem in protecting and storing the evidences in the clinical area is frequently caused by the failure of properly storing the evidences.^{8,11,12} For instance, if a short-term storage is required (72 h and below), it is suggested to store the urine in a freezer at -10°C , blood plasma in a refrigerator between $+2^{\circ}\text{C}$ and $+8^{\circ}\text{C}$, dry biological stains in a controlled environment between 15.5°C and 24°C and wet materials in a freezer unless they could be dried.¹¹

While realizing the care and treatment of the case, the health care personnel may fail to identify the forensic case or evidences due to the lack of information or damage the evidences due to their noncompliance with the procedure of storing and collecting. This condition may complicate the judicial review and lead to the inconclusiveness or wrong decision of courts.¹³ Thus, the health care of an emergency forensic patient should involve the storage of all kinds of evidences, which may contribute to the emotional support for patients and their families, preservation of their information, creating awareness regarding legal liabilities and solution of forensic events, in order to identify, collect and deliver them to authorities under suitable conditions.¹ Additionally, in the present legal system, in case that health profession members encounter with an indication of crime while carrying out their duty, they should inform the authorities about the situation and avoid any delays.¹⁴

Apart from physicians, the health care personnel working at emergency services in Turkey have an ambiguous approach towards forensic cases and there is a limited number of relevant studies. İlçe et al, stated that a great majority of health care personnel working at emergency services of hospitals did not have sufficient information about the storage and protection of evidences.³

The objective of this study is to determine the states of health care personnel, working at 112 emergency stations in the province of Artvin, to encounter with regarding forensic cases and determine their practices aimed at recognizing, protecting and reporting the evidences that may affect the judicial process.

2. Materials and methods

This descriptive study was conducted with health care personnel (nurses and emergency medicine technicians) working at 112 emergency stations (three in the city center and nine in the districts) of the Provincial Directorate of Health of Artvin. The inclusion criteria of the study involved working at any of 112 emergency stations in the province of Artvin on the date when the study was conducted and accepting to participate in the study. The only exclusion criteria of the study was to leave more than half of the questionnaire, applied in the study, incomplete. In the study, the entire population was reached without using the sample selection methods ($n = 146$). We excluded 3 individuals from the study as they rejected to participate and 2 others as they left more than half of questions incomplete, and the study was completed with 141 individuals. In order to conduct this study; permission from the Provincial Directorate of Health of Artvin and an approval from the Ethics Committee of Artvin Çoruh University Rectorship were received.

The data were collected by researchers via a questionnaire, which was formed in accordance with literature, between January 2013 and February 2014. Having twenty four questions, the questionnaire involves eight questions about descriptive characteristics (age, gender, place where a large part of life is spent,

marital status, occupation, working duration), six questions about determining the frequency of encountering with forensic events, reasons of forensic cases and the level of obtaining relevant information, seven questions about determining the practices performed in cases wounded by firearms, and three questions about determining the practices aimed at protecting, storing, and delivering the forensic evidences. The statistical analysis of the data was conducted using the package software of Statistical Package for Social Sciences 16.0 (SPSS) on computer. The data were presented as mean \pm standard error and frequency (n , %). While the Kolmogorov Smirnov test was used to evaluate whether the data of the study showed a normal distribution or not, the Levene's test was used to assess the equation of variances and by this way, the appropriate analysis technique was determined. Since the data showed a normal distribution and the variances were homogeneous, parametric tests were selected in comparisons. In the study, the answers given by participants regarding the practices made/to be made in cases wounded by firearms were transformed into scores. While 1 point was given for each correct answer, 0 was given for each unanswered and wrong question. The mean scores obtained by participants from this evaluation and the descriptive characteristics were compared using the ANOVA test where the post-hoc tukey analysis was selected. The data were assessed at the confidence interval of 95% and the significance level of $p < 0.05$.

3. Results

Majority of health care personnel that participated in the study were women (58.1%, $n = 82$), in the age group of 20–29 years (50.4%, $n = 71$) and married (53.2%, $n = 75$). 48.9% ($n = 69$) of participants were nurses/health officers, 9.9% ($n = 14$) were emergency medicine technicians and 41.1% ($n = 58$) were ambulance and emergency care technicians. A great majority of participants who spent most of their life in the provinces (35.5%, $n = 50$) and districts (54.6%, $n = 77$) were high school graduates (Table 1). While the average working duration of participants was 112.8 (9.4

Table 1
Descriptive characteristics of health care personnel working at emergency services.

Characteristics	n	%
Age group		
20–29 years	71	50.4
30–39 years	62	44.0
40 years and older	8	5.6
Gender		
Female	82	58.1
Male	59	41.9
Marital status		
Married	75	53.2
Single	66	48.8
Place where a large part of life is spent		
Province	50	35.5
District	77	54.6
Village	13	9.2
Unanswered	1	0.7
Educational background		
High school	91	64.5
Associate degree	33	23.4
Undergraduate	12	8.5
Unanswered	5	3.6
Occupational Group		
Nurse/Health Officer	69	48.9
Ambulance and Emergency Care Technician	58	41.1
Emergency Medicine Technician	14	9.9
Total	141	100

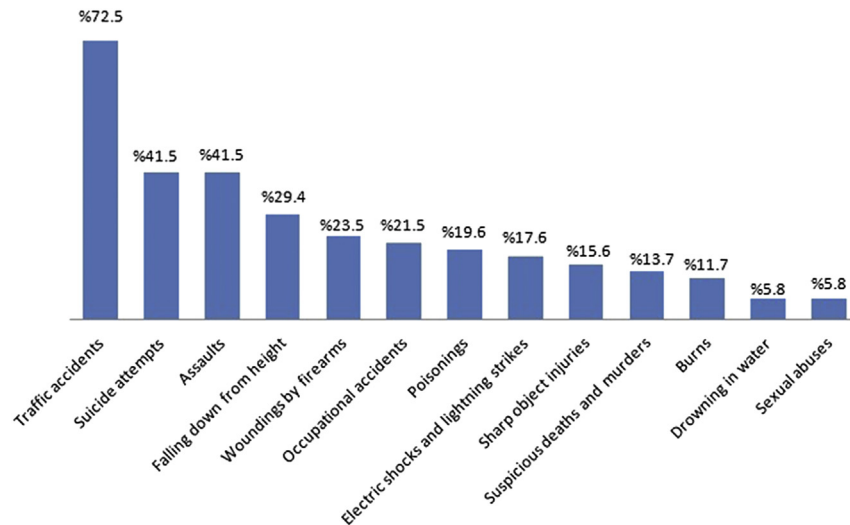


Fig. 1. Reasons of frequently-encountered forensic cases.

years) months \pm 36.3 (minimum: 2, maximum: 264 months), their average working duration at 112 emergency services was 657 (21.6 months) days \pm 1.168 (minimum: 5, maximum: 2555 days).

88.7% of participants ($n = 125$) were determined to have encountered with at least one forensic case. For the question, 'how often do you encounter with forensic cases?', 12.1% of participants answered 'changes according to time/season', 10.7% 'almost every day', 53.1% 'at least once a week', and 10% 'less than five times a year'; whereas 14.1% of them left this question empty. When the reasons of frequently-encountered forensic cases were asked as open-ended questions, 51 individuals (36.1%) answered this question. According to these answers, the reasons of frequently-encountered forensic cases included traffic accidents, suicide attempts and assaults, respectively (Fig. 1).

It was determined that 20.6% of health care personnel ($n = 29$) found themselves sufficient in coping with forensic cases and events. A great majority of them (78%, $n = 110$), on the other hand, stated that they needed to be trained about approach towards forensic cases and events. Only 15.6% of participants ($n = 22$) were already trained about how to approach to forensic events during and after their education. Regarding the question, 'Have you ever read a scientific book, journal, article giving information about forensic events?', 24.8% answered yes ($n = 35$) and 75.2% answered no ($n = 106$).

Examining some of practices made/to be made by participants in cases wounded by firearms; the practices of those giving the answer 'Yes' were accepted as appropriate (Table 2). 1 point was given to those giving the answer 'Yes' and 0 point to those giving the answer "No" or giving no answer. The answers given by participants were transformed into scores and the mean of their total

scores (min:0 and max:7) was compared in terms of descriptive characteristics. Accordingly; while the mean score obtained by nurses/health officers from this evaluation was 5.07 ± 1.94 , it was 4.82 ± 1.59 for emergency medicine technicians and 4.67 ± 1.30 for emergency medicine technicians. The difference between the mean scores of these three occupational groups was statistically significant ($p < 0.05$). Examining the intergroup difference; the mean scores of the nurse group were significantly higher compared to the other occupational groups ($p < 0.05$).

In addition; while the score obtained by those with undergraduate education was 5.25 ± 1.71 , it was determined as 4.75 ± 1.41 for those with educational level of associate degree and 4.48 ± 1.58 for high school graduates. The difference between the educational level and the scores obtained was statistically significant ($p < 0.05$). The practices of those with undergraduate education were higher compared to those with associate degree or high school education in a statistically significant way ($p < 0.05$). No significant difference was determined between other descriptive characteristics ($p > 0.05$).

Specifying the materials used in forensic events as evidences, it was determined that a great majority of participants (81.6–96.5%) could recognize the evidences (Table 3). Examining the practices made/to be made by participants regarding the protection, storage and delivery of evidences in forensic events; it was determined that 82.3% of them would protect and store the evidences (putting in a bag, writing the patient information, taking a minute) and report them to authorities (prosecution office, police, gendarmerie, security officer at the hospital), 12.8% ($n = 18$) would only report them, 2.1% ($n = 3$) would toss them out and 2.8% ($n = 4$) would deliver the evidences to the patient's relatives.

Table 2

Practices made/to be made in cases wounded by firearms.

Practice made/to be made	Yes n (%)	No n (%)	Unanswered n (%)
If the patient will be undressed, I cut the clothes out on a distance far from the bullet holes and undress the patient	88 (62.4)	41 (29.1)	12 (8.5)
I keep the clothes	105 (74.4)	30 (21.3)	6 (4.3)
I do not clean the hands of the patient	122 (86.5)	7 (5.0)	12 (8.5)
I do not clean the body of the patient	122 (86.5)	4 (2.9)	15 (10.6)
I cover the hands of the patient with a clean paper or a plastic bag	40 (28.4)	84 (59.6)	17 (12.0)
I keep the pads placed on the wound of the patient	62 (44.0)	64 (45.4)	15 (10.6)
I inform the police/gendarmerie	136 (96.5)	4 (2.8)	1 (0.7)

Table 3

Materials that are thought to be used as evidence in forensic events.

Materials that could be used as evidence in forensic events	Yes n (%)	No n (%)
Firearms, bullets, sharp objects	136 (96.5)	5 (3.5)
Findings of violence, suicide, abuse, and negligence in the psycho-social history	115 (81.6)	26 (18.4)
Materials on the case such as thread, clothes	127 (90.1)	14 (9.9)
Biological materials such as semen, saliva, bite marks, blood, hair, vomit, stool etc	130 (92.2)	11 (7.8)
Materials that are thought to belong to the crime scene such as glass, dust, soil, and stuff	125 (88.7)	16 (11.3)
Any stuff or material found in or near the crime scene	131 (92.9)	10 (7.1)
All materials that are suspected to have been used in the event	136 (96.5)	5 (3.5)

4. Discussion

This study, aiming to determine the states of health care personnel to encounter with forensic events and detect the practices aimed at recognizing, protecting and reporting the evidences that may affect the forensic process, was conducted with nurses/health officers, emergency medicine technicians and operators working at 112 Emergency Service Stations in the province of Artvin (n = 141). 88.7% of participants encountered with at least one forensic case throughout their work life and 53.1% encountered with at least one forensic case a week. Even though Artvin has a lower population density compared to population density of Turkey, it has a very high frequency of encountering with forensic events. According to the data of the Turkish Statistical Institute; the rate of traffic accidents involving deaths and woundings increased at the rate of 23.5% in the province in 2012, compared to 2008.¹⁵ Emergency medicine personnel will have a higher possibility of encountering with forensic cases in provinces with a higher population density. As a matter of fact; in their study that was conducted with 44 medical personnel working at emergency services of hospitals in the province of Bolu, İlçe et al, reported the rate of encountering with forensic cases as 90.9%.³ Various studies have revealed that the intensity of forensic events may change within the year and they may increase especially in summer months.^{5,8,16} In this study, 12.1% of participants stated that the frequency of encountering with forensic cases changed based on seasons, which supports the previous studies.

According to data of the work annual of the Ministry of Health General Directorate of Basic Health Services; trauma (25.7%) ranks first among the early diagnoses of emergency cases throughout Turkey.¹⁷ Yaylacı et al., stated that while 36.8% of patients coming to a hospital in the province of İstanbul on an ambulance were taken to the emergency service with the early diagnosis of trauma, 2.8% were taken with the early diagnosis of suicide; Türkçüer et al., reported that 34.1% of patients applied to emergency services in Denizli due to in-vehicle traffic accidents, which was respectively followed by sharp object injury, out-vehicle traffic accidents and poisonings; and in their study that was conducted in Erzurum, Çakır et al., indicated the most frequent forensic trauma cases respectively as traffic accidents (44.2%), assaults (10%), sharp object injuries (9.8%), burns (9.4%) and falling down from height (9.3%).^{6,16,18} Another study that was conducted in the same province reported the suicide as the most frequently-encountered forensic case outside of trauma.¹⁹ In our study, trauma was determined as the most frequent reason of forensic cases (72.5% traffic accidents, 41.5% assaults, 29.4% falling down from height 23.5% woundings by firearms), which shows a parallelism with these results.

Even though violence and many types of trauma are known to have a negative effect upon the health level of individuals and their states of receiving care, health care personnel have a very limited undergraduate and postgraduate education aimed at providing care for forensic cases.²⁰ İlçe et al., stated that 65.9% of health care personnel did not receive education regarding forensic cases, but

90.9% found themselves sufficient in this subject.³ Gökdoğan and Erkol remarked that a great majority of nurses failed to fulfill their roles and responsibilities in forensic cases and stated that 84% of nurses have no or very little knowledge about forensic cases.²¹ In our study, 15.6% of participants were trained on the subject during and after their education. Even though they frequently encountered with forensic events, only 20.6% found themselves sufficient in coping with forensic cases and events, which was remarkable. This condition made us think that as well as the personnel working at hospital emergency services, those working in pre-hospital care needed the related training. In addition, 78% of the personnel were observed to be eager to receive the related training, which was an important result in the study.

In our study, some practices required to be made in forensic cases wounded by firearms were arranged in attitude statements and asked to the participants.^{2,3} The obtained results comply with the study of İlçe et al.,² which is the only study conducted regarding the subject. In the light of the present information, it could be asserted that the health care personnel did not have the required levels of approach towards cases wounded by firearms.

It is stated that nurses could take charge in recognizing, collecting, and observing the evidences that would be useful in the phases of judicial investigation if they receive the sufficient training.^{9,21,22} In our study, the practices made/to be made by nurses and the personnel with undergraduate education in cases wounded by firearms were more successful. These results supported the opinion that the entire health care personnel's having related training in forensic events could lead to better practices.²³

Karadayı et al, stated that the medical personnel working in emergency units who were sufficiently trained on forensic sciences, developed their knowledge and skills with vocational training, had sufficient equipments and acted in coordination with the public prosecutor could fulfill the responsibilities better when they encountered with forensic cases.⁴ It could be asserted that a great majority of participants in this study (81.6–96.5%) could recognize the evidences. However; while 18.4% of participants did not consider the findings regarding violence, suicide, abuse and negligence in the psycho-social history within the scope of evidence, 11.3% did not consider the materials thought to belong to the crime scene such as glass, dust, soil, and stuff within the scope of evidence. On the other hand, the rate of expressing to protect, store, and report the evidences was 82.3%. This rate was 68.2% in the study of İlçe et al. In his study, Türkmen reported that only 76% of cases required to be evaluated as forensic cases received a seal of forensic case.¹⁶ In addition, these rates are limited with the statements of individuals and it is a common idea that many forensic cases remain unreported and the number of known cases is higher than the unknown.²

5. Limitations

The study was conducted in only one province, had an insufficient sample size and did not include the personnel working at

emergency services of hospitals that are known to frequently witness forensic events, which all formed the limitations of the study. Thus, results of the study could be generalized to similar study populations.

6. Conclusions

According to the results obtained from this study; nurses, emergency medicine technicians and operators working at 112 emergency stations in the province of Artvin intensively encountered with forensic cases. The most common reasons of forensic cases included traffic accidents, suicides, assaults, falling down from height and woundings by firearms, respectively. The health care personnel in the sample group were observed to have deficiencies regarding the approach to forensic cases and especially the protection of evidences in woundings by firearms. In the study, nurses and the personnel with undergraduate education were more successful in approaching to forensic events. One in almost five health care personnel in the study failed to recognize the evidences and one in almost four personnel did not protect and store the evidences or report them to authorities. In accordance with these results; it would be beneficial to employ the personnel that are trained in the field of forensic nursing, develop the available personnel with the help of in-service trainings until the trained personnel are provided and keep at least one health care personnel with confirmed job definition available in the field in case of encountering with a forensic event. Future studies may focus on the frequency of health care personnel to report forensic events, conditions that obstruct reports and the interventions that may motivate the personnel to increase the reports.

Conflicts of interest

The authors declare that there is no potential conflicts of interest.

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