



## Comparison of forensic reports on the same forensic cases issued by the emergency department and forensic medicine polyclinic

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### Abstract

In this study, forensic traumatology reports prepared in the emergency department were compared with reports of the same cases prepared by the forensic medicine polyclinic. The aim was to determine the extent of differences, discuss their causes and consequences, and provide solutions and recommendations. Retrospective analysis was conducted by comparing the demographic data, types of incidents, injury sites, and the forensic-medical evaluation results in the forensic reports prepared by emergency departments with those prepared by the forensic medicine polyclinic for the same incidents. Of the 383 reports issued by the emergency department stating that the injuries were not of a nature that could be resolved with a simple medical intervention, reports of the same cases by the forensic medicine outpatient clinic revealed that 216 (56.4%) of these cases were, in fact, of a nature that could be resolved with a simple medical intervention. In 108 reports issued by the emergency department stating that injuries were life-threatening, 74 (68.5%) were assessed as non-life-threatening by the forensic medicine polyclinic. It was observed that more errors were made in evaluations of intoxication and polytrauma cases conducted in the emergency department. It has been acknowledged that the majority of forensic reports prepared in emergency departments pose problems for the proper implementation of the legal process. To reduce or even eliminate errors and deficiencies in forensic reports, we believe that it is important to increase both the duration and quality of pre-graduate forensic medical education, as well as provide postgraduate training focused on responsibilities in forensic cases and medico-legal evaluation in trauma cases, particularly for emergency department physicians who bear a heavy burden of forensic report preparation.

**Keywords:** emergency department, forensic report, forensic medicine, forensic case

### 1. Introduction

A "forensic case" refers to a situation in which an individual loses their health, excluding a natural disease process, due to intentional or accidental actions of another person, and the person responsible for causing the harm could be subject to legal prosecution. In other words, when the actions of an individual lead to injury and could result in legal consequences, the injured person is recognized as a "forensic case" (1, 2). Firearm and explosive injuries, stabbing, sharp-object injuries, perforating, piercing, penetrating-crushing, and blunt object injuries, traffic accidents, assault cases, occupational accidents, falls, poisonings, burns, exposure to electric current, cases of mechanical asphyxia, allegations of torture, sexual offenses, malpractice, suicide attempts, negligence, and abuse cases emerge as forensic cases (3, 4). In practice, forensic reports are prepared for individuals who seek treatment at emergency services and meet the criteria of forensic cases. These reports are then submitted to judicial authorities, initiating the forensic notification process. While these forensic reports fulfill the obligation of forensic notification, they also

guide the initial stages of the investigation (4, 5). Initial legal measures are taken based on these reports, and if it is specified that these reports are provisional, a request is made for the preparation of a definitive report regarding the injury in the subsequent process. Definitive reports are generally prepared by forensic medicine experts, and in cases where this is not possible, they can also be prepared by relevant medical specialists.

Forensic reports prepared in the emergency department are crucial as they include the findings of the initial examination by the attending physician and guide the early stages of the legal process. However, several studies have highlighted many deficiencies and errors in forensic reports prepared in the emergency department (5-7). The deficiencies or errors in forensic reports can sometimes be a contributing factor to prolonging the legal proceedings, and at times, they can also impose legal and criminal responsibility on the physicians preparing the forensic reports (8). Studies conducted on the

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forensic medicine training of physicians working in the emergency department, its implications in their professional life, their approach to forensic reports, and their shortcomings in preparing forensic reports have revealed issues and deficiencies in these subjects (9-11).

Turkish Penal Code Articles 86-89 are specifically designed to address crimes against bodily integrity (12). In forensic traumatology reports prepared in emergency departments, the primary focus is on determining whether the injury, as defined in the mentioned laws, is of a minor nature that can be resolved with simple medical intervention (SMI), or whether the injury is life-threatening (LT). If the injury is categorized as SMI, it is used to describe the mildest level of injury and an injury that is not considered as such is defined as a moderate injury based on the corresponding penalties. This judicial definition aims to translate the severity of the injury into a language that legal professionals can comprehend, rather than focusing on whether any treatment was administered or the simplicity of the treatment itself. The concept of a LT condition refers to when the patient is in a life-threatening state, following an injury. However, regardless of whether the person can survive either through their body's resilience or medical treatment and there is no actual death at the time of the incident, the presence of an immediate life-threatening situation is crucial, and legally, the outcome of recovery does not alter the consequences of the incident. Furthermore, the relevant law specifies that if there is a bone fracture/dislocation in the body, the penalty can be increased by up to half, depending on its impact on vital functions. Therefore, in trauma cases, it is crucial to clarify whether there is a fracture/dislocation related to the incident, and if so, which bone is affected and the type of fracture/dislocation it entails (1, 2). The criteria for these evaluations are outlined in the "Guide for the Evaluation of Injury Crimes Defined in the Turkish Penal Code from a Forensic Medicine Perspective" which serves as guidance for all physicians preparing forensic reports. This guide was last updated in June 2019 (13).

The aim of our study is to compare forensic reports prepared in the emergency department with those prepared in the forensic medicine polyclinic regarding the same cases in terms of forensic medical evaluation. We intend to assess the extent of differences in the evaluations and examine how these differences relate to the type of incident and the nature of the injury.

## 2. Materials and Methods

The present study includes trauma cases sent by judicial authorities to the Forensic Medicine Polyclinic of Bandırma Training and Research Hospital, requesting the issuance of definite reports for injuries that occurred during the six months from 01/07/2022 to 31/12/2022. Forensic reports prepared by the emergency departments where the cases presented themselves on the date of the incident have been retrospectively examined, along with forensic reports prepared

by the forensic medicine polyclinic for the same incidents. The demographic data of the cases, types of incidents, injury locations, and the results of forensic medical evaluations conducted by the emergency departments and the forensic medicine polyclinic were compared.

The research data were analyzed using the IBM SPSS Statistics software version 22.0 (IBM Co., Armonk, NY, USA). Descriptive statistics were used to present numerical data, including mean and standard deviation, while categorical data were presented using frequencies, percentages, and counts. The comparison of categorical data was conducted using the Chi-square test or Fisher's exact test. A significance level of  $p < 0.05$  was specified for statistical significance.

## 3. Results

The study population consisted of 773 cases, and their forensic reports were analyzed. The gender distribution of the cases revealed that 70.9% (n=548) were male, and 29.1% (n=225) were female. The age distribution of the cases ranged from a minimum of 1 year to a maximum of 90 years, with a mean age of  $33.45 \pm 16.53$  years. It was observed that the most common age range for both genders was 18-34 years (45.1% male, 38.2% female) (Fig. 1).

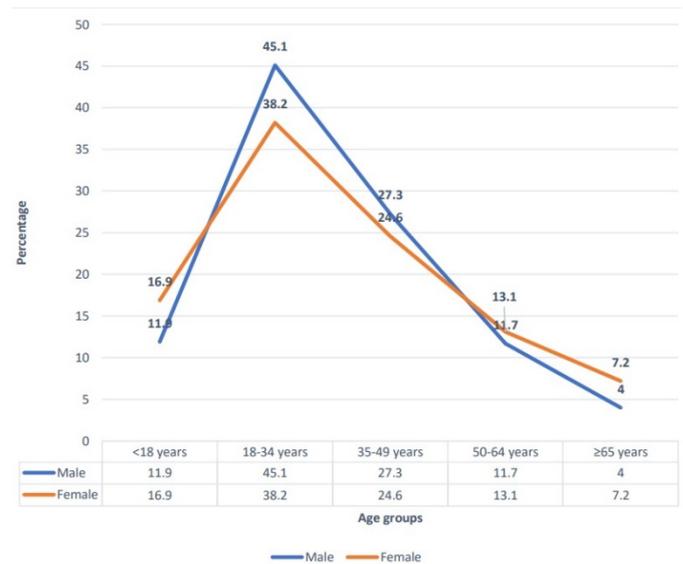


Fig. 1. Distribution of forensic cases according to age groups gender

When the forensic cases were examined based on etiology, intentional injury was the most prevalent at 32.5% (n=251), followed by intoxication at 12.7% (n=98), blunt trauma caused by being crushed under a solid object or being struck by a solid object at 10.2% (n=79), and falls/falls from a height at 10.1% (n=78). Additionally, 23.2% (n=179) of the cases are traffic accidents (motorcycle accident; %8,9 (n=69), in-vehicle traffic accident; %8,7 (n=67), non-vehicle traffic accident; %5,6 (n=43)). The distribution of the type of incidents according to gender is presented in Table 1.

The injuries of the forensic cases were classified based on the body region where traumatic lesions occurred. The most common injury sites, according to the classification, were as

follows; polytrauma (injuries involving two or more regions) in 25.5% (n:197), head-neck region in 23.4% (n:181), upper extremities in 17.7% (n:137), lower extremities in 13.2% (n:102), metabolic (indicating the region of injury resulting from intoxication) in 12.7% (n:98), thorax in 3.2% (n=25), dorsal region in 1.8% (n:14), and abdomen in 1.0% (n:8).

**Table 1.** Distribution of the type of incidents according to gender.

| Type of Incidents              | Male n (%)       | Female n (%)     | Total n (%)      |
|--------------------------------|------------------|------------------|------------------|
| Intentional Injury             | 181 (33)         | 70 (31.1)        | 251 (32.5)       |
| Intoxication                   | 50 (9.1)         | 48 (21.3)        | 98 (12.7)        |
| Blunt Trauma by a Solid Object | 62 (11.3)        | 17 (7.6)         | 79 (10.2)        |
| Falls-Falls from a Height      | 55 (10)          | 23 (10.2)        | 78 (10.1)        |
| Motorcycle Accident            | 60 (11)          | 9 (4)            | 69 (8.9)         |
| In-Vehicle Traffic Accident    | 45 (8.2)         | 22 (9.8)         | 67 (8.7)         |
| Sharp Object Injury            | 49 (9)           | 7 (3.1)          | 56 (7.2)         |
| Non-Vehicle Traffic Accident   | 21 (3.8)         | 22 (9.8)         | 43 (5.6)         |
| Burn                           | 15 (2.7)         | 6 (2.7)          | 21 (2.7)         |
| Electrical Shock               | 4 (0.7)          | 0 (0)            | 4 (0.5)          |
| Firearm Injury                 | 2 (0.4)          | 1 (0.4)          | 3 (0.4)          |
| Suicide Attempt by Hanging     | 3 (0.6)          | 0 (0)            | 3 (0.4)          |
| Drowning in Water              | 1 (0.2)          | 0 (0)            | 1 (0.1)          |
| <b>Total</b>                   | <b>548 (100)</b> | <b>225 (100)</b> | <b>773 (100)</b> |

**Table 2.** Comparison of emergency department and forensic medicine polyclinic reports in terms of simple medical intervention (SMI), life-threatening (LT) and bone fracture (BF).

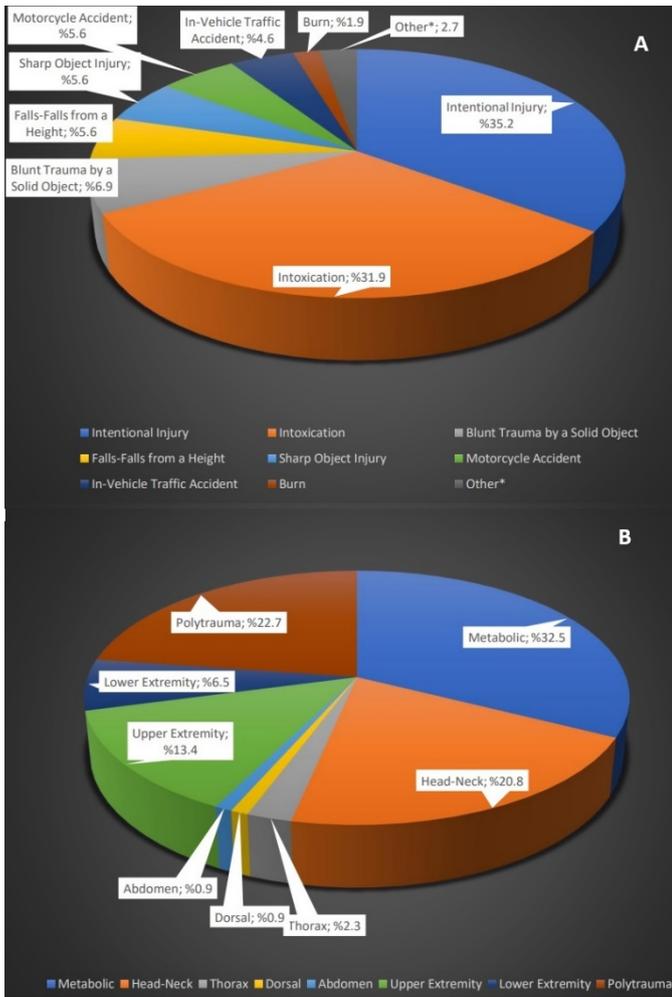
| <u>Emergency Department</u> | <u>Forensic Medicine</u> | SMI is not Present n (%) | SMI is Present n (%) | No Injuries n (%) | p                |
|-----------------------------|--------------------------|--------------------------|----------------------|-------------------|------------------|
| SMI is not Present          |                          | 165 (62.3)               | 216 (43.5)           | 2 (18.2)          | <b>&lt;0.001</b> |
| SMI is Present              |                          | 56 (21.1)                | 167 (33.6)           | 3 (27.3)          |                  |
| No medical intervention     |                          | 44 (16.6)                | 114 (22.9)           | 6 (54.5)          |                  |
| <b>Total</b>                |                          | <b>265 (100)</b>         | <b>497 (100)</b>     | <b>11 (100)</b>   |                  |
| <u>Emergency Department</u> | <u>Forensic Medicine</u> | LT is not Present n (%)  | LT is Present n (%)  | No Injuries n (%) | p                |
| LT is not Present           |                          | 572 (79.8)               | 9 (19.6)             | 10 (90.9)         | <b>&lt;0.001</b> |
| LT is Present               |                          | 74 (10.3)                | 34 (73.9)            | 0 (0)             |                  |
| No LT Evaluation            |                          | 70 (9.9)                 | 3 (6.5)              | 1 (9.1)           |                  |
| <b>Total</b>                |                          | <b>716 (100)</b>         | <b>46 (100)</b>      | <b>11 (100)</b>   |                  |
| <u>Emergency Department</u> | <u>Forensic Medicine</u> | BF is not Present n (%)  | BF is Present n (%)  | No Injuries n (%) | p                |
| BF is not Present           |                          | 26 (4.5)                 | 3 (1.7)              | 0 (0)             | <b>&lt;0.001</b> |
| BF is Present               |                          | 18 (3.1)                 | 79 (43.6)            | 0 (0)             |                  |
| No BF Evaluation            |                          | 527 (90.7)               | 89 (49.2)            | 11 (100)          |                  |
| <b>Total</b>                |                          | <b>581 (100)</b>         | <b>181 (100)</b>     | <b>11 (100)</b>   |                  |

When discrepancies regarding SMI between reports prepared by the emergency department and the forensic medicine polyclinic were examined based on the type of incident, it was observed that cases involving intentional injuries comprised 35.2%, and cases related to intoxication

SMI was reported in 226 (29.2%) of the forensic reports prepared in the emergency department, and no SMI was reported in 383 (49.6%) of the forensic reports. The reports of 164 cases (21.2%) concluded that no medical intervention was conducted at all. However, when the evaluations conducted by the forensic medicine polyclinic for the same cases were reviewed, SMI was reported in 497 (64.3%) forensic reports, while 265 (34.3%) reports indicated no SMI, and 11 (1.4%) reports concluded that there was no injury of any kind that violated bodily integrity.

Of the 383 reports from the emergency department reporting no SMI, it was found that 216 (56.4%) of these reports were subsequently issued as SMI in the forensic medicine polyclinic's evaluations. Conversely, among the 226 reports from the emergency department that indicated SMI, 56 (24.8%) indicated no SMI in the forensic medicine polyclinic evaluations. The differences in evaluations regarding whether the injury was SMI or not between the emergency department and the forensic medicine polyclinic were found to be statistically significant ( $p < 0.001$ ), as shown in Table 2.

comprised 31.9% of reports, demonstrating the highest level of disagreement (Fig. 2a). In terms of region of injury, 32.5% of cases were classified as metabolic and polytrauma cases were at 22.7%, both ranking at the top in terms of discrepancies (Fig. 2b).

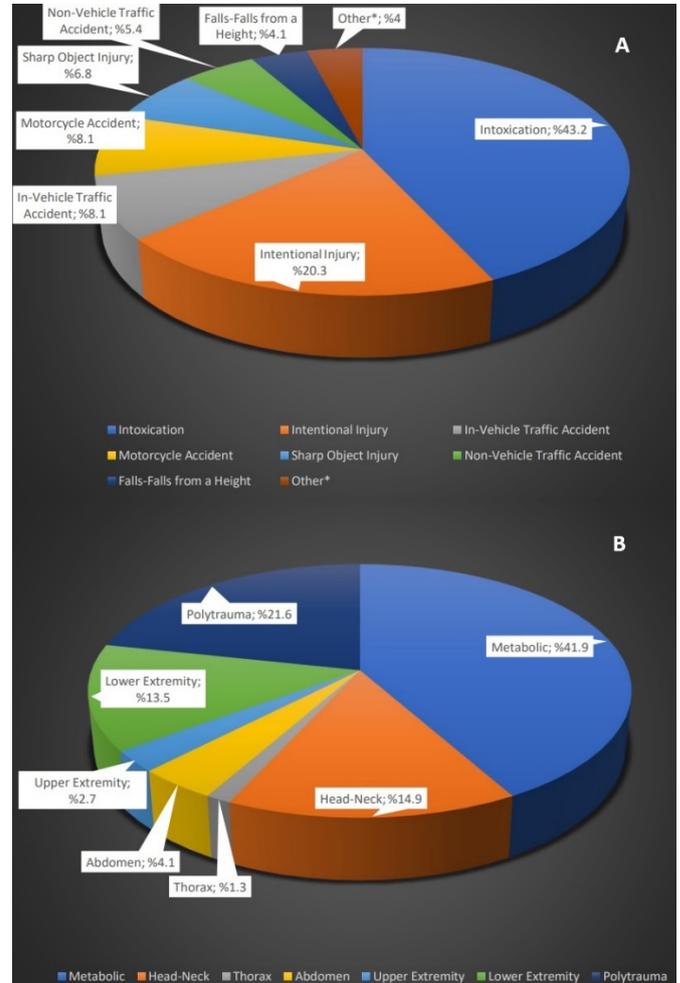


**Fig. 2. (a)** Distribution of conflicting reports in terms of simple medical intervention by type of incident; **(b)** Distribution of conflicting reports in terms of simple medical intervention by region of injury; (\*) Other: Non-vehicle traffic accident, firearm injury, electrical shock, suicide attempts by hanging, Drowning in water

Among the forensic reports prepared in the emergency department, it was evaluated that there was no immediate LT condition in 591 (76.5%) of the reports, while LT was reported in 108 (14.0%) cases. For 74 cases (9.5%), there was no evaluation made on this matter in the reports. However, when the reports of the same cases issued by the forensic medicine polyclinic were examined, 716 (92.6%) forensic reports indicated that there was no LT, while 46 (6.0%) reports indicated the presence of LT. In 11 cases (1.4%), the forensic reports concluded that there was no injury of any kind that violated bodily integrity, so no evaluation was made.

Among the 108 reports from the emergency department that indicated LT, it was found that 74 (68.5%) of these reports were subsequently issued as non-LT in the forensic medicine polyclinic's evaluations. Conversely, among the 591 non-LT reports from the emergency department, 9 (1.5%) reports were issued as LT in the forensic medicine polyclinic evaluations. The differences in evaluations between the emergency department and the forensic medicine polyclinic in terms of LT assessment were found to be statistically significant ( $p < 0.001$ ), as displayed in Table 2.

When discrepancies regarding LT between reports prepared by the emergency department and the forensic medicine polyclinic were examined based on the type of incident, it was observed that 43.2% of cases involved intoxication, and 20.3% were related to intentional injuries, showing the highest level of disagreement (Fig. 3a). In terms of location of injury, 41.9% of conflicting cases were classified as metabolic and 21.6% were polytrauma cases, both ranking at the top in terms of discrepancies (Fig. 3b).



**Fig. 3. (a)** Distribution of conflicting reports in terms of life-threatening assessment by type of incident; **(b)** Distribution of conflicting reports in terms of life-threatening assessment by region of injury; (\*) Other: Blunt trauma by a solid object, firearm injury, burn, electrical shock, suicide attempts by hanging, drowning in water

Assessment of bone fractures in reports made by the emergency department revealed that no evaluation was made in 627 cases (81.1%), 97 reports (12.5%) indicated the presence of bone fractures, 29 reports (3.8%) indicated no bone fractures, and 20 cases (2.6%) indicated suspected bone fractures. It was thought that in cases where bone fracture evaluation was not performed in the emergency department, evaluation may not have been performed even if a bone fracture was detected. In the reports from the forensic medicine polyclinic, it was concluded that 581 cases (75.2%) did not result in bone fractures due to injury, 181 cases (23.4%) had bone fractures, and 11 cases (1.4%) did not involve any injury

that violated bodily integrity, so no assessment was deemed necessary in this regard. Of the 97 forensic reports from the emergency department that indicated the presence of bone fractures, 18 (18.5%) were altered by the forensic medicine clinic to state that there were no bone fractures. Among the 29 forensic reports from the emergency department that indicated no bone fractures, 3 (10.3%) were altered by the forensic medicine clinic to indicate the presence of bone fractures. Within the 627 reports issued by the emergency department in which bone fracture assessments were not conducted, 89 cases (14.2%) were diagnosed with bone fractures by the forensic medicine clinic, and the reports were accordingly adjusted. Out of the 20 cases in the emergency department indicating suspected bone fractures, 10 cases (50.0%) were concluded as having bone fractures in the reports by the forensic medicine department. These findings were statistically significant ( $p < 0.001$ ), and the results are presented in Table 2.

#### 4. Discussion

In Turkey, all physicians have the authority to write forensic reports (2, 3). Physicians working in emergency departments often encounter forensic cases and therefore frequently prepare forensic reports. However, failure to prepare forensic reports in accordance with the proper procedures, comprehensively, and accurately from a medico-legal perspective can lead to the legal process not being conducted properly and may result in allegations of negligence and medical malpractice against the involved physician (6, 7).

Previous studies have found that forensic cases are more prevalent among young adults and males (8, 14-16). Consistent with the literature, our study also found that young adults and males, who are more active in their working and social lives, constituted the majority of forensic cases. Studies in the literature have identified the most common causes of forensic cases as traffic accidents, poisoning, and intentional injuries, and the most common injury areas as the head-neck region and injuries affecting multiple body regions (5, 6, 8, 16). Our study similarly identified deliberate actions (32.5%) and polytrauma cases (25.5%) as the most common, aligning with these findings.

One study identified inaccuracies regarding the presence of LT in 13% of the forensic reports prepared in the emergency department (6). Another study revealed that LT was mentioned in 21.4% of temporary reports prepared in the emergency department, whereas this rate was 6.0% in forensic medical reports for the same cases (16). Yet another study reported that a university hospital's emergency department had made incorrect decisions regarding LT conditions in 6.5% of cases (17). One study that examined 241 forensic reports determined that in 16 cases in which the emergency department did not report LT, forensic medicine reported LT, and in 26 cases in which the emergency department reported LT, forensic medicine did not report LT (18). In our study, among the 108 reports concluding that the injury was LT by the emergency

department, 68.5% ( $n=74$ ) of those same cases were contrarily evaluated as non-LT by forensic medicine.

In one study, it was revealed that out of 91 cases where the emergency department indicated no need for immediate SMI, forensic medicine disagreed in 8 cases, and out of 39 cases in which the emergency department indicated SMI, forensic medicine disagreed in 20 cases (18). In our study, in 383 cases where the emergency department assessed the injury as not requiring immediate SMI, forensic medicine assessed that 56.4% ( $n=216$ ) actually required SMI, contrary to the assessment made by the emergency department.

It has been observed that assessments in the emergency department regarding LT and SMI are made with a high rate of error. This is believed to be influenced by the misconception that injuries should be assessed not based on concrete findings but rather on potential possibilities, that it should be presented as a justification for referring the patient, and that it reflects a form of defensive medicine by indicating a more severe injury outcome. Additionally, in our study, the high rate of conflicting reports may be due to the larger number of cases compared to studies in the literature and the up-to-date nature of our data. This, along with the decline in education quality which has been discussed in recent years, and its potential impact on medical education and consequently forensic medicine education, are thought to be contributing factors.

Another aspect that requires clarification is that 164 (21.2%) of the forensic reports prepared in the emergency department were concluded as "no medical intervention was performed." It was observed that in the hospital programs used in these emergency departments when preparing a general forensic examination report, the evaluation of SMI was made mandatory. Three options were provided for this evaluation: whether SMI was performed, whether SMI was not performed, or whether no medical intervention was performed. Both the compulsion to fill out one of these options and the concept of "no medical intervention was performed" were considered inappropriate from a forensic medical perspective. In cases where no injury constituting a violation of bodily integrity was detected, it would not be appropriate to assess it as if there were an injury requiring immediate medical intervention. The statement "no medical intervention was performed" is also unsuitable in terms of the SMI concept mentioned in the introduction, as stated in the relevant law. In conclusion, it is considered necessary for the hospital database systems and forensic report forms used in the emergency department to be designed in a manner suitable for medico-legal assessment.

In a study, it was found that the assessment of LT was generally issued to cases of multiple traumas following traffic accidents, and in these cases, LT was unnecessarily issued at a high rate. The same study revealed that the largest group among cases where LT was unnecessarily issued consisted of poisoning cases, indicating a tendency to unnecessarily issue LT in cases of poisoning and traffic accidents in the emergency

department (6). In our study, looking at conflicting reports in terms of whether or not the injury required SMI, intentional injury accounted for 35.2% and intoxication accounted for 31.9% of the cases. When examining conflicting reports in terms of whether or not the injury was LT, intoxication cases were identified as the highest at 43.2%, followed by intentional injury cases at 20.3%. Furthermore, in terms of injury sites in conflicting reports made by the emergency department and the forensic medicine polyclinic, it was determined that both in SMI and LT evaluations, metabolic injuries, polytrauma, and head-neck regions were among the top three. In line with the literature, our study also showed that more errors were made in the forensic medical evaluation performed in the emergency department for intoxication and multiple trauma cases. These findings suggest the need for more complex forensic medical assessments in cases of multiple trauma and intoxication.

Especially in cases that require urgent intervention or cases where the patient is unconscious, overlooking the presence of fractures/dislocations caused by trauma, failure to clarify whether there is a fracture related to the incident at the initial hospital visit, and late diagnosis of fractures due to trauma-related issues can lead to causality problems. This situation can create difficulties in decision-making during the process of preparing forensic reports, necessitate a re-evaluation or reporting of the existing tests from the perspective of fractures/dislocations, and can lead to delays in the forensic reporting process (1). In one study, it was found that among 79 reports issued by the emergency department that did not mention fractures, 7 of those reports were evaluated by forensic medicine as having fractures, and in 94 emergency department reports for which no fracture evaluation was made, 28 reports were concluded by forensic medicine as having fractures (18). In our study, of the 97 forensic reports prepared in the emergency department indicating the presence of bone fractures, 18 (18.5%) were corrected by the forensic medicine outpatient clinic to indicate that there were no bone fractures, and of the 29 reports prepared in the emergency department indicating the absence of bone fractures, 3 (10.3%) were corrected by the forensic medicine outpatient clinic to indicate the presence of bone fractures. In cases where no assessment of bone fractures was made in the emergency department reports, forensic medicine diagnosed bone fractures in 89 (14.2%) of the 627 cases and conducted the appropriate medico-legal evaluation.

The reports in our study are temporary reports that are later evaluated by the forensic medicine department to generate definitive forensic reports. The process of constructing the forensic process based on the evaluations in these definitive reports, especially when they are issued as definitive reports in the emergency department without being sent to the forensic medicine department, can be concerning in terms of ensuring justice, when considered alongside the results of our study. Therefore, emergency department physicians should be aware of how to approach forensic cases, the methods of performing

medico-legal evaluations, preparing forensic reports, and what their forensic responsibilities entail. Forensic reports generally require the physician to clarify several important issues regarding the injury, such as whether the individual is in a life-threatening condition, whether the injury can be addressed with simple medical intervention, and whether there is a fracture. Most of these questions can be easily and accurately answered with the guidance of fundamental forensic medical knowledge and reference materials.

Especially considering that forensic reports are often prepared by physicians who are not forensic medicine specialists; importance should be given to the practice of preparing forensic reports during undergraduate education. In order to reduce or even eliminate errors and deficiencies in forensic reports, it is imperative to increase the duration and quality of pre-graduate forensic medical education. In addition, postgraduate training focused on physicians' roles in forensic cases and medico-legal assessment cases is particularly vital for emergency department physicians, who bear a heavy burden in preparing forensic reports.

#### **Ethical Statement**

The study was approved by the Bandırma Onyedü Eylül University Health Sciences Non-invasive Research Ethics Committee (decision no: 2023-4, date: 13.04.2023).

#### **Conflict of interest**

No conflict of interest was declared by the authors.

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None to declare.

#### **Authors' contributions**

Concept: U.A., H.Y.B., Design: U.A., H.Y.B., Data Collection or Processing: U.A., H.Y.B., Analysis or Interpretation: U.A., H.Y.B., Literature Search: U.A., Writing: U.A., H.Y.B.,

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