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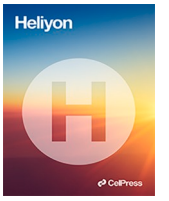

Research article

Evaluation of problems arising in emergency services from the perspectives of medical and criminal law: The example of Türkiye

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ABSTRACT

Introduction: In recent years, the field of medical malpractice has attracted growing attention, and despite the long history of research in this area, aspects of this phenomenon remain unexplored. In this paper, we aimed to explore the issue of medical malpractice, focusing on cases involving healthcare professionals working in emergency services in Türkiye. We examine the surge in medical malpractice lawsuits, the consequences of such cases, and the prevalence of criminal liability faced by healthcare professionals.

Materials and methods: A comprehensive analysis of healthcare-related cases from 2017 to 2022 was carried out using the electronic decision database "LEGALBANK." We scrutinized these cases from both medical and criminal law perspectives, aiming to shed light on the complex dynamics of medical malpractice in emergency services.

Results: The findings reveal that professionals in emergency services are confronted with a considerable number of criminal cases. Among these cases, doctors are the most frequently implicated, followed by nurses, midwives, ambulance drivers, and other healthcare professionals. The crimes attributed to these professionals vary but primarily include involuntary manslaughter, misuse of public duty, forgery of documents, and reckless injury.

Discussion: In Türkiye, there is a notable prevalence of investigations conducted in emergency services and criminal cases involving healthcare professionals in this field. This dual prominence underscores the unique significance of examining medical malpractice from the perspectives of both criminal law and medicine within the Turkish context. This study categorizes the multi-faceted challenges of medical malpractice as human-related, system-related, and legal, offering valuable insights into the intricate landscape of this phenomenon in Türkiye's emergency services.

Conclusion: This research contributes to a deeper understanding of medical malpractice, particularly its criminal dimensions in the Turkish context, and thereby calls for improved healthcare, enhanced patient safety, and error prevention in emergency settings.

1. Introduction

Malpractice can be briefly defined as a "professional practice error" or, more specifically, a "medical practice error that may cause

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harm to another person." According to the definition offered by the World Medical Association in 2005, it is defined as a "*physician's failure to conform to the standard of care for treatment of the patient's condition, or a lack of skill, or negligence in providing care to the patient, which is the direct cause of an injury to the patient*." [1]. Today, medical malpractice is not just a situation specific to physicians but has become a concept that includes all health personnel working in the diagnosis and treatment stage. Damage caused by lack of training and experience (inexperience), carelessness (indifference), or the incompetence of healthcare providers may also fall into the category of malpractice.

Its origins date back to ancient times; various studies are still being carried out to understand the phenomenon of malpractice. Although the reasons that lead to malpractice and the effects of these errors are not fully known, two issues revealed by academic studies conducted in various countries are important. First, over the years, more lawsuits have been filed for medical malpractice [2]. The second is that emergency services are one of the areas where malpractice cases are commonly brought to court and high damages are awarded by the courts [3–9]. In a study conducted in the USA, the probability of physicians encountering malpractice claims up to the age of 65 was determined to be 75 %, even for those physicians working in low-risk areas [10].

In addition to the legal situation faced by physicians, it is stated that more than 250,000 deaths occur every year in the USA due to medical errors [11], and the total cost of these errors exceeds 50 billion US dollars annually [12]. Therefore, malpractice is a double-edged sword, which emerges as a process that needs to be addressed, scrutinized, and understood in depth from the point of view of patients, physicians, and states. However, there are limited number of studies in which the actions of healthcare professionals working in emergency services are addressed from the perspective of criminal law. For this reason, it is vital to carry out studies that ensure that healthcare professionals are aware of risky procedures and practices, thus avoiding criminal liability and the risk of repeating mistakes.

In our study, in light of data obtained from LEGALBANK, an electronic data bank for court decisions [13], events that took place in emergency services in the last five years and their reflection to the Court of Cassation, the highest court of appeal, were analyzed and evaluated from the perspective of medical and criminal law. In this context, the criminal files brought before the Court of Cassation regarding the patients admitted to emergency services were analyzed in light of the literature, and solutions were developed.

2. Materials and methods

This study aimed to raise awareness among healthcare professionals, particularly physicians, by highlighting the fundamental issues encountered in emergency services and various factors that heighten the likelihood of errors, with a focus on legal risks. To achieve this, incidents in emergency services during the provision of healthcare that were subject to judgment were evaluated quantitatively and qualitatively in the context of criminal law. In this study, it was decided to analyze the decisions of the Court of Cassation since they are accessible, represent the practice throughout the country, and guide the judgment of trial courts. Over 5 years (1 January 2017–1 September 2022), those criminal files related to emergency services, which were brought before the Court of Cassation and related to the provision of healthcare, were included in the study.

Search results were cross-checked using the following keywords: "doctor," "physician," "nurse," "emergency medical technician," "anesthesia technician," "health worker," "medical staff," "health officer," "ambulance driver," and "paramedic." To ensure inclusiveness and comprehensiveness, each keyword was individually entered into the database and the search results were compiled and analyzed. No ethics committee decision was required since the database in question contains judgments that are already in the public domain.

The data obtained represent the number of lawsuits arising from the provision of healthcare in an emergency setting and in which healthcare workers were tried as accused or defendants. Claims filed for the collection of compensation through recourse, lawsuits in which emergency healthcare professionals were the victims, and cases not related to the diagnosis and treatment process were excluded from this study. In addition, scientific publications related to the subject were also searched in PubMed with the keywords "*malpractice claims,*" "*treatment,*" "*misdiagnosis,*" "*medical error,*" "*emergency service,*" and "*criminal liability*." Articles considered significant to the topic were used as references and background information to develop the study's framework and content. Based on the data obtained, the reasons that lead to criminal liability were classified under three main headings human-related, system-related, and legal, then analyzed in conjunction with existing literature.

3. Results

A total of 8015 files were accessed as a result of a search with keywords from the electronic data bank "LEGALBANK." By analyzing

Table 1
Distribution of cases within healthcare professional groups.

Professional Group	Total Cases	Civil Cases	Criminal Cases
Physicians	730	423 (57.9 %)	307 (42.05 %)
Nurses	56	23 (41.07 %)	33 (58.9 %)
Midwives	20	12 (60 %)	8 (40 %)
Ambulance Drivers	20	6 (30 %)	14 (70 %)
Anesthesia Technicians	7	3 (42.8 %)	4 (57.1 %)
Emergency Medical Techs	4	–	4 (100 %)
Paramedics	1	–	1 (100 %)

the files accessed, 873 files were identified over 5 years (1 January 2017–1 September 2022) on cases arising from the provision of healthcare and in which healthcare professionals were tried as accused or defendants. While 495 compensation lawsuits (56.7 %) were filed due to incomplete or improper health care, 378 criminal files (43.2 %) were found in which healthcare professionals were tried as accused because they committed a criminal act during the provision of healthcare. Although the total number of files of healthcare professionals is as above, the distribution of cases within each professional group differs [Table I].

A total of 730 files were identified in which doctors were tried as accused, with 57.9 % (423) of these files being compensation cases and 42.05 % (307) criminal cases. In the 143 files identified related to healthcare professionals other than doctors, compensation cases accounted for 50.3 % (72), and criminal cases accounted for 49.6 % (71). In this respect, compared to other healthcare professionals, doctors face both more compensation lawsuits and criminal proceedings brought before the Court of Cassation. Furthermore, while approximately half of the cases brought against other healthcare professionals are related to criminal proceedings, compensation lawsuits make up more than half of the cases filed against physicians.

The other healthcare professionals group is represented by nurses, midwives, anesthesia technicians, emergency medical technicians, ambulance drivers, and paramedics. Among these, nurses, ambulance drivers, and midwives constitute the three groups against whom most cases are filed. Out of the total 143 cases identified about other healthcare professionals, 39.1 % (56) were related to nurses, 13.9 % (20) to midwives, 13.9 % (20) to ambulance drivers, 4.8 % (7) to anesthesia technicians, 2.7 % (4) to emergency medical technicians, and 0.6 % (1) to paramedics. No civil or criminal cases were found for anesthesia technicians or emergency medical technicians. The distribution of civil and criminal cases within other healthcare professionals group is as follows: 23 civil (41.07 %) and 33 criminal (58.9 %) cases were filed against nurses; 12 civil (60 %) and 8 criminal (40 %) cases against midwives; 6 civil (30 %) and 4 criminal (70 %) cases against ambulance drivers; and 3 civil (42.8 %) and 4 criminal (57.1 %) cases against anesthesia technicians. All those cases involving emergency medical technicians and paramedics are in the form of criminal proceedings. It should be noted that there are also decisions that could not be associated with any professional group and that general concepts such as “healthcare professionals,” “health officers,” and “health personnel” are, therefore, used. Decisions using these general terms account for 25.1 % (36) of the total 143 cases filed against other healthcare professionals.

Among the 378 criminal files involving healthcare professionals as defendants, 74 were linked to emergency services. In other words, emergency service professionals were tried as defendants in 19.5 % of the criminal cases related to the provision of healthcare brought before the Court of Cassation. While this rate is 17.2 % (53) for all criminal cases filed against physicians, it is 29.5 % (21) in terms of other healthcare professionals [Table II]. Among healthcare professionals other than physicians, emergency medical technicians and paramedics lead with a rate of 100 % and nurses with a rate of 39.3 % (13), followed by health officers with a rate of 25 % (1) and ambulance drivers with a rate of 14.2 % (2). No criminal cases relating to the emergency services could be identified for healthcare professional groups other than those mentioned above. When we separate the criminal cases associated with emergency services, it was determined that 71.6 % of these cases were filed against physicians and 28.3 % against other healthcare professionals.

The types of crimes attributed to the healthcare professionals working in emergency services are as follows: involuntary manslaughter, reckless injury, failure of healthcare professionals to report the crime, forgery of documents, misuse of public duty, sexual assault, and defamation. Apart from those listed, there are other types of crimes, such as willful killing, willful killing by omission, extortion, and willful injury, that may be encountered during the diagnosis and treatment process, but no criminal case could be found before the Court of Cassation regarding these offenses. The distribution of these crimes based on professional groups is shown in Table III. Upon evaluating the data gathered, the types of crimes most commonly attributed to doctors in criminal cases brought before the court are, in order: involuntary manslaughter (45.2 %), misuse of public duty (24.5 %), forgery of documents (22.6 %), reckless injury (5.6 %), and sexual assault and failure of the healthcare professionals to report the crime (1.8 %). For other healthcare workers, the ranking of these crimes is as follows: reckless injury (33.3 %), involuntary manslaughter (28.5 %), forgery of documents (19.04 %), misuse of public duty (14.2 %), and defamation and sexual assault (4.7 %). Therefore, the cases brought before the Court of Cassation involving healthcare professionals working in emergency services, are mostly attributed to reckless injury, involuntary manslaughter, forgery of documents, and misuse of public duty.

4. Discussion

Emergency services in hospitals, for reasons such as the ability to perform various medical procedures more quickly and cheaply and provide care without time constraints, have become the first place that comes to mind for all kinds of health problems. Because of this feature, an increasing number of people use emergency services every year [8,14,15]. According to statistics published by the General Directorate of Public Hospitals of Türkiye in 2017, the branch with the highest number of examinations in public hospitals was emergency medicine, with 101,473,472 admissions, and at least one out of every four examinations (28.36 %) is conducted in emergency services [16]. In their study, Beştemir and Aydın stated that the number of examinations in emergency services increased to 129,588,470.0 in 2021, approximately four times more than the population growth rate in the previous six years [17]. This increase in

Table 2
Distribution of criminal cases related to emergency services.

Professional Group	Total Criminal Cases	Cases Related to Emergency Services (n)	Cases Related to Emergency Services (%)
Physicians	307	53	17.2 %
Other Healthcare Professionals	71	21	29.5 %
Total	378	74	19.5 %

Table 3
The types of crimes attributed to the healthcare professionals working in emergency services.

Crime Type	Physicians (%)	Other Healthcare Professionals (%)
Involuntary Manslaughter	45.2 %	28.5 %
Misuse of Public Duty	24.5 %	14.2 %
Forgery of Documents	22.6 %	19.04 %
Reckless Injury	5.6 %	33.3 %
Sexual Assault	1.8 %	4.7 %
Failure to Report the Crime	1.8 %	–
Defamation	–	4.7 %

the number of visits is also reflected in the number of medical malpractice lawsuits filed against healthcare professionals working in emergency services. Indeed, between 1978 and 2006, 30 cases were identified, of which 28 were compensation cases and two were criminal cases that were brought before the Court of Cassation [18]; in this study, 423 compensation cases and 307 criminal cases were associated with medical malpractice.

Liability arising from medical malpractice is determined differently based on the economic, social, and institutional structure of each country. Unlike countries such as the United States, where the private sector predominantly provides healthcare services, in countries such as Türkiye, Japan, China, Thailand, New Zealand, and Italy, where public institutions play a significant role, there is a tendency to pursue not only civil liability but also criminal liability [19–23]. In particular, Türkiye is one of the leading countries in terms of initiating criminal proceedings for medical malpractice. This deduction can be supported by comparing data presented in various studies. A study conducted in Taiwan revealed that of the criminal cases brought before the Supreme Court between 2000 and 2014, 122 were related to medical malpractice [7]. In Croatia, from 2014 to 2017, in the 70 cases investigated due to the type of crime specifically regulating medical malpractice, only four of the 47 people accused of this crime were convicted [19]. Similarly, due to medical malpractice, eight criminal trials were conducted in Moldova and 24 in Kazakhstan between 2017 and 2018 [24]. In Türkiye, within almost five years (2017–2022), 74 cases were brought before the Court of Cassation involving emergency healthcare professionals alone. Even excluding the 16 cases that cannot be considered medical practice errors and are related to forgery, the remaining 58 cases are sufficient to reveal the role of criminal proceedings in the Turkish legal system in a striking way.

As can be understood from the data presented, Türkiye ranks among the top countries in terms of both the number of investigations conducted in emergency services and the number of criminal cases brought before the Court of Cassation related to healthcare professionals working in emergency services. Therefore, the examination of the medical malpractice phenomenon from both a criminal law and a medical point of view holds a particular significance for Türkiye. However, within the evolving world driven by the widespread adoption of modern technology, medical practice errors are becoming increasingly complex. Moreover, long-standing issues related to malpractice, such as increased workload due to overcrowding and communication gaps, are not yet fully understood. However, considering the literature and the cases brought before the Court of Cassation, we can categorize the fundamental problems that arise in emergency services as human-related, system-related, and legal, based on their sources. In reality, it is not entirely possible to separate these reasons from one another because these problems are interlinked. However, to evaluate the situation more accurately, the problems arising in emergency services have been categorized under a tripartite classification.

4.1. Human-related problems

Malpractice lawsuits, known for their substantial financial consequences, moral implications, and time-intensive nature, may be initiated for a variety of reasons. As stated by Cosby, among these reasons, human-induced or individual errors are the most concrete, visible, and disturbing [25]. Some studies classify human-induced errors as cognitive, skill-set, task-based, and personal impairment errors [26,27], but cognitive errors seem to stand out. Among the cognitive error group, diagnostic errors are to the fore. Therefore, the error group that should be focused on primarily is related directly to the diagnostic process.

Diagnostic errors can be seen as an overlapping set of errors based on cognitive deficits, which have been considered the primary reason for medical practice errors in numerous studies [28–32]. The study conducted by Wong found that diagnostic errors were the most frequently mentioned errors in closed claims between 2011 and 2015, accounting for 36.4 % of cases [3]. In Türkiye, there is no record system in place for identifying medical practice errors. Furthermore, no collective statistical data are available on this matter. However, based on the cases brought before the Court of Cassation, it can be said that diagnostic errors are quite common in our country as well. In this study, we determined that approximately half of the 53 criminal cases (26) involving emergency services physicians as defendants were related to diagnostic errors. Among the missed diagnoses were myocardial infarction, testicular torsion, lung infection, urinary sepsis, and mechanical ileus. Indeed, between 2018 and 2019, out of 63 cases that were subject to expert opinion given by the Seventh and Eighth Forensic Medicine Specialization Committees and indicating medical practice errors, 48.5 % were related to the diagnostic process, 25 % to the follow-up process, and 22 % to the treatment process [33]. In the same study, it was found that these errors were attributed to a "*failure to request consultation*" and "*inadequate treatment*" at 14.7 %, "*misdiagnosis*" and "*inadequate follow-up/early discharge*" at 13.2 %, and a "*failure to request necessary tests*" at 11.7 %.

Patient circulation and numerous diagnostic possibilities in emergency services make emergency healthcare professionals vulnerable to diagnostic errors. However, there are specific situations in which physicians are particularly vulnerable and at greater risk of error. As highlighted in various studies, cardiac or cardiorespiratory arrest, acute coronary syndrome, acute myocardial infarction, aortic aneurysm, pulmonary embolism, acute aortic dissection, acute epiglottitis, intracranial bleeding, meningitis,

appendicitis, subarachnoid hemorrhage, fractures, luxation, foreign bodies, and drug reactions are among the most commonly missed diagnoses [34–40]. It is crucial to pay attention to the key findings associated with these diagnoses, which are more likely to be overlooked, and not disregard the importance of requesting the necessary tests. Furthermore, algorithms and guidelines periodically updated by professional associations should also be taken into account during the diagnosis process.

The process of taking a medical history, performing a physical examination, requesting necessary tests and consultation, and evaluating the findings obtained plays an important role in the occurrence of diagnostic errors [31,41,42]. According to a study conducted in 2012, omissions were detected in at least one of the basic steps, such as taking medical history, performing a physical examination, and analyzing test results, in 98.9 % of the cases [43]. Among these omissions, 34.2 % were related to history taking, and 42.4 % occurred during the observation of the patient. In this study, it was evaluated that 39.6 % of the cases brought before the Court of Cassation in terms of physicians were related to the examination (incomplete, incorrect, or not performed at all), requesting the necessary tests and evaluating the findings obtained, and 5.6 % were related to the process of observing and following up the patient. This result is in line with other studies on the subject. Moreover, it was found that physicians working in the emergency services did not request a consultation in 15 % of the cases. This situation not only increases the risk of physicians making mistakes in emergency services but also prevents the sharing of legal responsibility. The dissertation prepared by Ceylan in 2021, based on the files submitted to the Forensic Medicine Institute, reported that medical malpractice was more common in cases where consultation was not requested than in cases where consultation was requested [33]. However, when making an assessment, it should be taken into account that physicians working in emergency services can also request a consultation through unofficial means (calls, messages, etc.), but this can lead to evidential problems for physicians. Therefore, in cases where a consensus cannot be reached with the consultant on patient follow-up, the consulting physician must evaluate the patient in person and formalize the procedures with a written assessment [44].

The risk of making mistakes increases when consultation does not occur and the necessary tests are not performed. In particular, a failure to request radiography, computed tomography, ultrasonography, and laboratory tests for cardiac enzyme levels may cause a chain of errors [36,40,45–47]. Due to inexperience and errors in the evaluation period, misinterpreting images is also a common occurrence [48]. A literature review has shown that the error rate for clinically significant or major errors in radiology falls within the range of 2 %–20 %, with the variation dependent on the specific radiological examination being conducted [49]. Hence, proper patient examination, analyzing laboratory values that are inconsistent with clinical assessment, if necessary repeating them, and providing specific instructions, especially during the process of taking radiographs, are of paramount importance.

Serious life-threatening errors can also occur during drug administration in emergency services. Following rules and protocols strictly at every stage of the medication process, from procurement to distribution and usage, is a fundamental strategy to prevent errors in healthcare settings. However, due to time pressures and circulation in emergency services, especially during verbal communication, similarly pronounced medications can be confused, a dose different from the specified dose may be administered, and the wrong person may be injected. Therefore, as much as possible, orders should be defined in writing without abbreviations or should be confirmed verbally [50]. Healthcare professionals should be more inquisitive when confronted with unusual dosage requests, whether in writing or verbally.

In instances of medical malpractice, physicians' theoretical and practical knowledge and their professional experience may be decisive factors. While some studies have indicated that the impact of professional experience is not significant in the outcome of malpractice lawsuits with compensation [51]; relatively less experienced resident doctors can contribute significantly to the occurrence of medical practice errors [12,48,52]. A study conducted in the Netherlands documented that residents were involved in 76 % of the claims, and in only 15 % of these claims, residents had acted under the supervision of consulting physicians [9]. Similarly, a study by Kachalia in 2007 indicated that there was inadequate supervision was in over half of the incidents involving trainee doctors [36]. Furthermore, residents can contribute more to such errors depending on the training they receive. On behalf of residents who do not receive specialized training in emergency medicine (even if they specialize in a different field), twice as much is paid in terms of both defense costs and compensation compared to residents who receive emergency medicine training [51]. This situation, therefore, brings two issues to the fore: supervision and the training of residents.

It is important to emphasize that diagnosis and treatment are provided by cooperation between various staff and departments. Obtaining the necessary imaging for accurate diagnosis, seeking consultation in the case of findings requiring expertise, and administering injections as part of treatment might necessitate the involvement of different healthcare professionals. This situation can contribute to errors among physicians working in emergency services, and some studies have highlighted this deduction. It has been stated that most of the files brought before the court can be attributed to more than one person providing healthcare in the emergency services and other healthcare professionals providing consultation [31,36,47]. The study conducted by Guly in 2001, found that in 16 cases of fractures and dislocations that were missed, the primary cause of error was incorrectly taken radiographs [48]. Therefore, when considering factors contributing to errors, it is necessary to take into account the cooperation network within emergency services as a whole. A solution limited to healthcare professionals working in emergency services will fall short of addressing the problem. Those involved in the functioning of the emergency services should not work independently but rather, collectively, as partners in the diagnostic and treatment process [53].

Patient–physician communication, much like collaboration, is a multidimensional issue that can lead to various problems when inadequate. Communication problems include subtopics such as indifference and insufficient information sharing. Additionally, due to the urgency of the situation, especially in emergency services, patients might be informed after necessary diagnostic and treatment steps have been taken [14]. It is beneficial for healthcare professionals, especially physicians, to be aware of the risks associated with delayed, incorrect, and incomplete information. Communication-related errors can lead to adverse outcomes for both healthcare professionals and patients. Stiell et al. found in a study that the lack of information on patients admitted to emergency services caused the diagnosis and treatment process to be prolonged for more than an hour [54]. This situation may result in healthcare professionals

being more involved in the legal process as suspects, defendants, or plaintiffs. Indeed, a study conducted in Germany indicated that 27.5 % of incidents reported between 2005 and 2015 were communication-related [55]. Hence, verification should be carried out using electronic data systems, and, the focus should not be only on the diagnosis of the disease, considering that the patient might understand less than expected of the information shared.

Beyond the deficiencies arising from healthcare professionals working in emergency services, patient-related factors and behaviors can also have the effect of increasing risk. For instance, some patients may request early discharge despite the physician's advice for reasons such as refusing treatment or surgery, prolonged waiting times in the emergency services, partial recovery, or the need to care for a child waiting at home. According to a study, approximately 21 % of these patients return to emergency services within 72 h [56]. In a similar study conducted in Istanbul, it was observed that patients left the emergency services even if their condition was urgent because they did not want to be put under observation, or refused hospitalization (34.6 %) or had insufficient health insurance (19.6 %) [57]. Some patients, in addition to their emergency conditions, may be more prone to harm due to factors such as ignorance, state of consciousness, comorbidities, or substance addictions. In his study, Gurley stated that patient-related factors such as non-compliance with recommended treatment contributed 14 % (for residents) and 18 % (for non-residents) to the incident being submitted to the court [52]. Therefore, when evaluating medical malpractice, the risk factors related to the patient and the patient's behaviors that increase the existing risk should also be taken into consideration, and criminal liability should be determined in light of these factors.

Human-related factors that constitute a source of medical malpractice were discussed briefly. It is noteworthy that the information shared under this heading is mostly related to physicians. While it possible to find some studies related to nurses, the role of other healthcare professionals working in emergency services in medical malpractice and their contribution to these errors remain uncertain. However, other healthcare professionals, such as nurses, technicians, and paramedics, play an important role in the fast and accurate delivery of healthcare in emergency services. Indeed, in this study, it was determined that nearly one-third of the criminal cases brought before the Court of Cassation were related to other healthcare professionals working in emergency services. Therefore, it is necessary to examine the contribution of other healthcare professionals to the medical practice errors that occur in emergency services and how this situation impacts the responsibility of physicians.

4.2. System-related problems

Healthcare consists of different steps, such as diagnosis, treatment, and care. For hospitals to manage these steps effectively, they need to establish a functional system in terms of the division of labor, staff and technical equipment, safety, hygiene, and other aspects. Otherwise, system-related problems can exacerbate human-related and legal problems, leading to a more serious situation. In a study conducted in the United States involving files presented to the Peer Review Committee, it was found that in 8 out of 9 cases where the harm occurred, practitioner-related errors were accompanied by at least one system-related problem, and in only 1 out of 12 cases was there solely a practitioner error [27]. In our study, it was found that at least one of the five cases had system-related problems in addition to human-related factors. Therefore, various system-related factors, such as the size, structure, and technical and staff infrastructure of the organization, affect the quality of healthcare provided in emergency services and decision-making [58,59]. Well-equipped organizations contribute to faster and more accurate decision-making.

The most significant system-related problem contributing to medical malpractice is, undoubtedly, overcrowding. In almost all countries, there has been an increase in the number of patients using emergency services due to health problems. This increase is even more striking in Türkiye, which has a population of 85 million. For instance, in the US, approximately one-third of the population (131 million out of 324 million) sought care from emergency services in 2020 [60]. In Türkiye, however, the number of patients examined in emergency services in 2020 (112,152,363.0) was more than the total population [17]. This congestion makes it challenging to provide timely and accurate intervention to patients in real need of urgent assistance [61,62]. The overcrowding also brings with it certain negative economic, social, and psychological consequences. Various studies have associated overcrowding with increased mortality rates, undesired cardiovascular outcomes (adverse inpatient cardiovascular outcomes) such as delayed myocardial infarction, congestive heart failure, weakened physician–patient communication, decreased patient satisfaction, more patients leaving the hospital without examination, longer hospital stays, deviations in antibiotic timing, ambulance diversion, increased expenses, decreased hand hygiene compliance, misdirection in triage, and increased workplace violence [63–72].

Overcrowding can lead to the practice of defensive medicine along with the malpractice fear [73–75]. Defensive medicine affects the quality of healthcare provided and leads to an increase in the expenses associated with the care [76]. These effects can lead to more striking outcomes, especially in emergency services. In a survey conducted by Studdert et al., in 2005, it was revealed that 70 % of physicians working in the emergency services requested more diagnostic tests than were medically necessary, and more than 50 % of them used computerized tomography, radiography, and MRI even though they were clinically unnecessary [76]. Another study showed that over 85 % of doctors surveyed admitted that emergency service patients were subjected to too many diagnostic tests, and 97 % resorted to certain imaging methods such as CT or MRI although medically unnecessary [75].

In Türkiye, which stands out in terms of the ratio of the number of examinations performed in emergency services to the population, the frequency of resorting to defensive medicine and its economic cost are not fully known. Judicial decisions also do not touch on this issue. Although some studies exist on this subject, only one study focusing on physicians working in emergency services could be found. Nevertheless, it can be said that defensive medicine is widely resorted to in Türkiye. A survey conducted by Kumtepe in Izmir and its surroundings determined that 83.7 % of residents working in emergency services avoided patients with medical problems who were likely to sue, and 95.4 % admitted patients without proper indications to protect themselves from medical malpractice claims [77]. For a more accurate interpretation, comprehensive studies regarding the psychological and financial dimensions of defensive medicine in Türkiye, especially in emergency services, are needed.

The workload can also lead to system-related problems with personnel adequacy. Studdert et al. found in 2019 that physicians are more likely to leave clinical practice with an increase in the number of malpractice lawsuits [4]. Another study conducted in Taiwan indicated that physicians working in emergency services are more likely than other specialists to quit their jobs in the long term due to the highly stressful work environment [78]. Furthermore, a study demonstrated that workloads exceeding 15 % of the optimum level could increase the risk of sickness absence among nurses [79]. The same study revealed that a workload exceeding 30 % resulted in a loss of 12 workdays per person due to absenteeism. Anticipating the challenges brought about by these risks is not difficult, especially considering that it takes 10 years to specialize in a field [80], it may become nearly impossible to encounter specialized physicians in emergency services in the following years. Such a scenario could lead to the loss of functionality of a fundamental component of healthcare—emergency services—and cause difficulties during the supervision and training processes of residents.

The psychological well-being of healthcare professionals presents yet another system-related problem. In emergency service professionals, who work in one of the riskiest working environments both legally and medically, burnout syndrome is prevalent. It was found that 82 % of nurses working in the emergency service suffered burnout, and 86 % had a moderate–high increase in compassion fatigue levels [81]. Another survey determined that 65 % of residents working in emergency services met the criteria for burnout syndrome [82]. Studies have shown that workload is one of the most influential factors in burnout syndrome and compassion fatigue [83,84]. Additionally, emergency patient volume, working with dying or suffering patients, conflicts with other healthcare professionals (colleagues and supervisors) or patients, and the ambiguity of assigned tasks have been highlighted as contributory factors [63].

The presence of burnout syndrome can lead to not only a decline in healthcare quality but also emotional exhaustion, somatic complaints, and cynicism among healthcare professionals [84]. Psychological well-being may also influence their tendencies to make errors and their lifestyle habits [85]. A study conducted in the United States reported that emergency service nurses were 3.5 times more likely to use marijuana/cocaine than those working in other departments [86]. The same study indicated that nurses also ranked high in terms of smoking addiction and binge drinking. However, the effects of burnout syndrome are not limited to these aspects. Burnout syndrome may also give rise to system-related problems such as absenteeism, reduced professional productivity, early retirement, and difficulties in meeting staffing needs [81,85,87]. This situation highlights the need to provide the necessary education, guidance, support, and psychological assistance to both nurses and doctors from the early stages of their careers. Additionally, it is necessary to raise the awareness of supervisors and managers to provide guidance and support to achieve this goal. Individuals with unrealistic expectations, poor communication skills, and a tendency to exacerbate rather than resolve problems cannot contribute positively to this process [81].

Last but not least, another important system-related problem is shift changes. The physician taking over a shift may act based on the assumption that the previous physician assessed and examined the patient properly. Additionally, the physician taking over the shift might neglect to investigate the patient thoroughly and monitor them closely, assuming that the previous physician has already shared crucial patient information with them. However, the physician handing over the shift might also avoid taking responsibility for a patient, especially toward the end of the shift, relying on the next physician to take the necessary steps. Failure to document the examination and treatment process accurately can make the problems more invisible. These kinds of disruptions during shift changes can lead to diagnostic and treatment errors [12,36]. Therefore, physicians who take over the shift must re-evaluate the patient, clarify any uncertain points by consulting more experienced residents and physicians, and for the handing-over physicians to act with a full sense of responsibility, considering that they will also be taking over shifts later on [88]. Systemically, it is crucial to establish standard protocols for shift changes and ensure comprehensive documentation of the steps followed.

It is well understood that system-related problems are interconnected and form an inseparable network. Overcrowding increases the risk of making mistakes, elevated risk leads to a higher probability of malpractice lawsuits, lawsuits contribute to burnout syndrome, burnout affects staff numbers, and staff numbers influence overcrowding directly and indirectly. All the problems discussed under this topic create a cycle within themselves. Hence, a multidisciplinary solution needs to be developed. To mitigate such problems, mechanisms preventing inappropriate use of emergency services should be established; special tests such as point-of-care tests (e.g., troponin or lactate) should be used to identify high-risk patients, and the triage system should be improved both quantitatively and qualitatively to assess and direct patients in need of urgent treatment more efficiently [89]. Additionally, patients and their families should be provided with educational and social opportunities to instill a sense of responsibility and understanding of the system [90]. However, beyond solving the overcrowding issue, considering the psychological well-being of healthcare professionals in emergency services, it is crucial to create a less chaotic, more reassuring working environment and to reconsider the shift system in a more responsibility-sharing manner.

4.3. Legal problems

The risk of being sued for medical malpractice leads to various negative outcomes, ranging from defensive medical practices to burnout syndrome. Therefore, a fundamental issue that needs to be addressed in this section is the frequent use of legal remedies. It is possible to address this issue differently from the perspectives of civil law and criminal law. Since the focus of this study is on criminal law, we will provide a limited evaluation solely from the perspective of criminal law and the types of crimes that are most frequently subject to court decisions. For this purpose, a brief explanation of Turkish criminal law should be provided.

It is accepted that a person who acts with the knowledge that the objective elements of a certain type of offense are taking place as a result of their actions, either knowingly or by foreseeing, acts with intent [91]. In the Turkish criminal law system, the perpetrator must act with intent for an offense to be deemed to have occurred. Article 21 of the Turkish Penal Code states explicitly that the commission of the offense hinges on the existence of intent. Due to this provision, actions other than those committed intentionally cannot be

punished unless they are stated explicitly in the law. However, an exception is made under the heading of "negligence." In cases specifically foreseen by the law, negligent behaviors also constitute a form of exceptional criminal liability. In other words, the offenses in the penal code can only be committed with negligence in situations regulated explicitly by the law. In this regard, negligence offenses are regulated specifically and limited in number.

Negligence is typically categorized into a binary distinction of gross and simple negligence, aligning with the generally accepted understanding. Simple negligence, which constitutes the fundamental form of negligence, applies in cases where the person acting does not foresee the occurrence of a typical consequence due to a violation of diligence. In conscious negligence, although the person foresees the typical consequence, they trust that this consequence will not occur contrary to due diligence. Therefore, the common characteristic of these two types of negligence is the breach of due diligence, and the criterion that distinguishes them is whether the consequence is foreseen or not. However, it should be emphasized that even in the case of simple negligence, the consequence must be foreseeable. Foreseeability means that if the due diligence mandated by legal norms or general experience is exercised, elements of typicality can be realized and, therefore, avoided [91].

The structure of negligent crimes is controversial in Turkish law, but there is a consensus on the objective nature of due diligence. Since due diligence is objective, it is determined based on the reasonable and prudent average person within the social context of the perpetrator. However, in legal doctrine, it is accepted that when determining the scope of the due diligence, the specific knowledge of the perpetrator should also be taken into account [91,92]. For example, in a case where a resident who started to work in emergency services after leaving cardiology specialist training and missed the diagnosis of hypertrophic cardiomyopathy of a young patient, the violation of the due diligence will be determined by considering the reasonable and prudent average resident working in the emergency service, but the fact that the resident received cardiology specialist training for a while will also be taken into consideration.

For a person to be punished for a negligent crime, the consequence, as specified by the law, must occur, and this consequence results from the violation of due diligence, so there must be a causal link. If there is no causal link between them, it is not possible to speak of a negligent crime. In addition to the causal link, the consequence must also be attributable to the perpetrator both objectively and individually [91]. For this to happen, the preventability of the consequence is as important as its foreseeability. For the negligent act to be attributed to the perpetrator individually, the perpetrator must be capable of foreseeing the consequence and exercising the required due diligence based on their abilities, experience, level of knowledge, and circumstances [92]. Consequently, any causal act that constitutes a violation of due diligence and can be attributed objectively and individually is sufficient for a conviction for a negligent crime.

The main examples of negligent crimes in Turkish law are involuntary manslaughter (Article 85) and reckless injury (Article 89). The consequences of death and injury caused by a person's failure to exercise due diligence are addressed under these two types of offenses. Healthcare professionals are also held liable under these provisions for death and injury caused by violation of due diligence. While Turkish law includes certain specific types of crimes, such as "*failure of the healthcare professionals to report the crime*," no specific type of crime has been regulated for acts committed with negligence in the context of medical malpractice. In this regard, the Turkish legal system is similar to the legal systems of some countries, such as Germany and Switzerland. However, in other countries, such as Japan, China, Latvia, Croatia, and Slovakia a specific type of crime is regulated under "*medical negligence*" or "*professional negligence*." [19,21,93].

In some countries, special criteria or exceptions are introduced regarding the criminal or civil liability of physicians. For example, in the United States, where liability is primarily based on tort, some states have regulated the "gross negligence" condition for physicians to be held liable as a result of reforms related to malpractice [3,94]. In addition, special defense opportunities have been developed for physicians through jurisprudence, such as "*Good Samaritan*," "*Sudden Emergency*," "*Respectable Minority Rule*," and "*Affirmative Act*." [44,95]. In Italy, a parallel development was followed, and criminal liability has been limited. With the amendment made by Law 24/2017 (Gelli–Bianco law), the provision that does not provide for criminal liability for simple negligent acts, also known as the Balduzzi Law, was abolished, and Article 590-sexies was added to the penal code [59,96]. With the new provision, it is envisaged that healthcare professionals will not be punished for death and injury caused solely due to inexperience while carrying out their activities, provided that they comply with recommendations set out in the guidelines as defined and published under the law or, in the absence of these, good clinical care practices. It should be noted that the abolition of the criterion for negligence and the replacement of it with the concept of "incompetence" may lead to uncertainty in practice and, in some cases may have consequences to the detriment of the health professionals.

In laws that include a special type of crime for healthcare professionals, a lighter penalty is determined or imprisonment is applied only in exceptional cases, taking into account the risks inherent in the activity carried out [93]. Therefore, some authors argue that a regulation should be made to allow the punishment of healthcare professionals only for intentional acts or at least for cases of gross negligence and recidivism [97,98]. However, it is unclear whether the different approach adopted by each country according to its own social, economic, and cultural conditions contributes positively to the limitation of the liability of healthcare workers and the provision of healthcare. Moreover, there is even skepticism about the enforcement of criminal law for healthcare professionals and whether the penalties applied have a deterrent effect [22,97]. In this context, it is argued that a special criminal regulation cannot be said definitively to have a positive impact on protecting patients' rights and legal certainty [19], nor can the lighter penalties foreseen for special types of crimes disrupt the internal harmony of the penal code [99], or the introduction of the "gross negligence" criterion alone has no significant impact on defensive medicine and the quality of healthcare [94,100]. In our view, general negligence crimes provide a more flexible approach for healthcare professionals [19]. In legal systems that have special regulations for physicians or healthcare professionals, it is essential to define the concept of professional due diligence explicitly and distinguish it from ordinary due diligence to ensure legal foreseeability. This situation can lead to the imposition of heavier liability conditions for healthcare professionals or limit their possibility of avoiding liability. Conversely, general negligent crimes allow for the development of special

jurisprudence for healthcare professionals and more consideration of the circumstances of the concrete case, as they allow the judge greater discretion. In addition, since relatively wide sanction ranges are envisaged in general negligent crimes, the judge can determine the liability of healthcare professionals between lower and upper limits more fairly. Therefore, we believe that subjecting healthcare professionals to general negligent crimes is a more suitable way to limit their criminal liability.

While general negligence crimes offer a more favorable approach to limiting the criminal liability of healthcare professionals, they bring with them some problems. One of these problems is the frequent use of criminal law against healthcare professionals. To initiate a judicial process against healthcare professionals, it is sufficient for injury or death to result from acts contrary to due diligence. Moreover, in Türkiye, due to the public nature of criminal cases, the prosecutor is obliged to initiate proceedings and prepare an indictment *ex officio* in cases where there is sufficient suspicion. This applies to all crimes except those that require a complaint. For healthcare professionals, acts of reckless injury with gross negligence and simple negligence resulting in more severe consequences such as endangering life or causing functional loss to sensory organs and other organs, which often occur in the context of their actions, do not require a complaint (Turkish Penal Code Article 89, para. 5). Therefore, when an injury or death occurs in connection with the actions of a healthcare professional, it becomes inevitable to initiate an investigation and file a public lawsuit, even if the victim's wish is otherwise.

Another problem brought about by general negligence crimes is that the judicial bodies try to mitigate the situation with some interpretations that are incompatible with the theory of crime since the criminal responsibilities of healthcare professionals are frequently brought to the agenda. Examination of the decisions given by the Court of Cassation determined that such a mitigation effort is in question. In our study, more than half of the 53 cases in which physicians working in emergency service were tried as defendants (27) were related to involuntary manslaughter and reckless injury. However, in more than 70 % of these cases, convictions for misuse of public duty were imposed. In its decisions, the Court of Cassation considers forensic reports and concludes that even if the necessary treatment had been administered promptly, death or injury could still have occurred due to the circumstances, and therefore, it cannot establish a causal link between the negligent act and the consequence. As a result, it imposes a conviction for the offense of misuse of public duty rather than negligence crimes. The conviction for a secondary and complementary crime with lighter sanctions due to the existence of negligence but the absence of causality is a clear indication that the liability of physicians is being restricted pragmatically. In other words, the adoption of such jurisprudence is influenced by concerns such as "*disruption of healthcare*" and "*staff shortages*." Although similar concerns are encountered in other countries where healthcare professionals' criminal liability is at issue, Türkiye stands out as a quite unusual example due to the jurisprudence adopted by the Court of Cassation.

This jurisprudence is not in line with the principles of the criminal theory, nor does it lead to results in favor of physicians in all cases. If the causal link is accepted as a natural phenomenon, it can be comfortably argued that there is no issue with causality. Because the physician acted negligently due to their behavior contrary to their due diligence, and as a result of this behavior, the injury was aggravated or death occurred. Even if a different meaning is given to the causal link, it remains unclear how the causal link that cannot be established between the negligent crime and the consequence can be established with the offense of the misuse of public duty. Furthermore, the crime of the misuse of public duty is considered a crime that can only be committed intentionally, whether through an act of commission or omission. However, the Court of Cassation accepts the existence of an omission offense based on medically necessary procedures being either incomplete or not performed at all. Therefore, the Court of Cassation either confuses negligence with omission or overlooks that the crime of misuse of public duty with omission is a crime that can only be committed intentionally. Thus, the physician may be convicted for an act that does not constitute an offense due to the absence of intent.

Additionally, according to Article 48 of the Civil Servants Law, to maintain the status of a civil servant, a person must not be sentenced to one year or more of imprisonment for a crime committed intentionally. Therefore, unlike crimes of reckless injury or involuntary manslaughter, being convicted of the crime of the misuse of public duty may cause a person to be dismissed from their position. In essence, while an attempt is being made to find a solution in favor of the physician, it may result in a more unfavorable outcome. In our opinion, rather than deviating from the principles of criminal theory, a solution should be sought by considering the structure of negligent crimes. For example, in a situation where patients' added negligent actions are involved, the objective attribution of the consequence to health professionals should be considered. In cases where the consequence is deemed unpreventable due to overcrowding and chaos, attempts should be made to reach a solution within the scope of culpability.

One of the most important factors contributing to the adoption of such erroneous jurisprudence is expert reports. Expert reports are decisive in determining whether professional standards were followed and whether the consequence of the act was objectively foreseeable [19]. Since judges do not have technical knowledge in the field of medicine, it becomes obligatory for them to consult an expert to assess the existence of an act contrary to professional standards and the objective foreseeability of the consequence. This situation causes judges to attribute absolute binding force to expert reports. However, it is a legal requirement that expert reports are confined to the aspects mentioned above and do not include legal assessments. The judge should determine the presence of negligence, the establishment of the causal link, the objective attribution of the consequence to the accused, and the evaluation of culpability. Any other approach would undermine not only the principle of equality of arms but also that of judicial independence. In this context, the possibility of establishing specialized courts in the field of medicine should also be considered.

The first solution that comes to mind for the legal problems faced by healthcare professionals, especially physicians, is to develop a system that prevents incidents resulting in injury or death from going to court. Türkiye already has a system that can fulfill this function if used effectively. According to *Law No. 4483 on the Prosecution of Civil Servants and Other Public Officials* and the relevant provisions of *Higher Education Law No. 2547*, preliminary examination/initial investigation is carried out by different committees to open an investigation against healthcare professionals working as academic staff or in the public sector. Moreover, with the "*Regulation on the Rules and Procedures Regarding the Investigation of Healthcare Professionals due to Medical Procedures and Practices and the Recourse of Compensation Paid by the Administration,*" which came into force in 2022, a professional liability board was established to perform the

same function for healthcare personnel working in private hospitals and clinics that are outside the scope of these laws. Therefore, if the preliminary examination/initial investigation phase is carried out effectively, incidents that do not involve medical malpractice can be prevented from coming before the judicial authorities. Thus, both the unnecessary attrition of healthcare professionals and the increase in costs can be prevented. A study conducted by Studdert et al., in 2006 showed that eliminating claims that do not involve medical malpractice can reduce system costs from 13 % to 16 % [101]. Another solution that can be considered in this context is the effective operation of accountability mechanisms outside the courts for healthcare professionals [102]. In particular, conducting disciplinary investigations effectively and objectively can often prevent resorting to criminal law as a way to increase transparency. Furthermore, criminal law is an instrument of coercion to be used as a last resort. Instead of punishing healthcare professionals for medical errors that mostly occur at the system level, the focus should be on better understanding human and system-related problems.

5. Limitations

The decision analysis method is considered a convenient method for understanding the phenomenon of error, as it provides access to crucial information regarding specific events brought before the judiciary [103]. By employing this method, it becomes possible to plan strategically for the future and make more accurate inferences about the necessary measures and regulations. However, this method inherently comes with shortcomings. Therefore, this study is subject to some limitations.

Despite being one of the most comprehensive databases of judgments, LEGALBANK does not include all cases resolved by the Court of Cassation. In addition, although searching with general terms such as “doctor” or “nurse” was preferred to access the most accurate data, some cases were not included in the study because it could not be determined precisely from the content of the decisions that they occurred in emergency services. Furthermore, since no information could be obtained on the incidents that had criminal elements but were not brought to court, they could not be included in the study. However, some cases that could not be associated with any professional group and used general terms such as “healthcare professional” and “health personnel” but were found to be related to emergency services were included in the study. Therefore, considering that the general concepts used in the decisions may also include other healthcare professional groups, the data obtained for other healthcare professionals may differ.

There are some limitations in terms of content apart from quantitative limitations. Although the decisions analyzed have comprehensive content regarding the course of events, they do not contain sufficient information about the age, gender, seniority, or specialty of the physicians. Moreover, due to the referral of reversed decisions to the court that rendered the decision, it was not possible to make a clear inference about the final decisions given at the end of the trials. Therefore, the results obtained in this study are the tip of the iceberg in terms of both quantity and content.

Beyond all of these, a situation specific to Türkiye should also be emphasized. In the first quarter of 2023, approximately 410,000 people came to Türkiye, which is one of the centers of health tourism, to receive healthcare [104]. Some of the patients coming to Türkiye for health tourism may face negative situations depending on the quality of the healthcare provided. Some of these situations are related to healthcare provided in emergency services. However, there are no clear data on these situations, and it remains unclear whether medical malpractice experienced by foreigners is reflected in the judiciary. Therefore, it could not be determined to what extent the number of criminal files before the Court of Cassation includes these situations within the framework of health tourism.

6. Conclusion

Emergency services pose significant medico-legal risks because in their environment there is a race against time, constant staff circulation, intense mental effort is needed, and information asymmetry exists between patients and physicians. The high risk increases the likelihood of medical errors, leading healthcare professionals working in emergency services to face compensation claims or criminal cases. While the legal remedies against healthcare professionals may vary depending on each country’s legal, social, and economic infrastructure, more striking results emerge in cases where criminal liability is in question. For these reasons, it is necessary to conduct more studies evaluating the behaviors and attitudes of healthcare professionals from the perspective of criminal law and to review the existing rules and practices according to the results of these studies.

Medical errors that lead to criminal liability and can pose a threat to patients’ lives are inevitable but, in most cases, preventable. The main goal should be to detect errors quickly and learn from mistakes to avoid repeating them. Therefore, Türkiye should take steps toward activating the patient referral chain, maintaining and preserving medical records properly, organizing problem-oriented training programs, formalizing shift changes and consultation processes, and improving the competence of healthcare professionals. Judicial bodies and medical associations have important roles to play in this regard. Judicial bodies should emphasize administrative and organizational responsibility and seek to limit criminal liability in line with the principles of the criminal theory. On the other hand, medical associations should guide both judicial bodies and healthcare professionals by compiling professional codes that outline the steps to be followed in the diagnosis and treatment process.

Above all, to understand and analyze medical errors, it is necessary to establish an electronic data system whereby medical errors can be reported safely and shared anonymously with healthcare professionals. Establishing such a system is vital for Türkiye, which is trailing behind in addressing medical malpractice. Additionally, numerical data on incidents that have been brought to the judiciary in the context of criminal liability of healthcare professionals should also be shared publicly. This will enable more accurate and representative results to be obtained through comparisons of the data. In this way, patients can be protected from medical malpractice, and healthcare professionals can be protected from criminal proceedings.

CRediT authorship contribution statement

Zeynep Esra Tarakçıoğlu: Writing – review & editing, Writing – original draft, Data curation, Conceptualization. **Bora Özdemir:** Writing – review & editing, Validation, Supervision, Methodology. **Mehmet Necmeddin Sutaşır:** Writing – original draft, Validation, Supervision, Investigation.

Consent to participate

Not applicable.

Ethics approval

No ethics committee decision and clinical trial number were required since the database in question contains judgments that are already in the public domain.

Data availability statement

The data associated with the study hasn't been deposited into a publicly available repository. The data that support the findings of this study are available through LEGALBANK, which is an electronic database accessible to subscribers.

Research involving human participants and/or animals

Not applicable.

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