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Retrospective Study of Patients Transported to Hospital by Ambulance Due to Fever

ABSTRACT

Objectives: The rates of EMS use due to fever and the characteristics of these patients have not been clearly evaluated in the literature. The aim of this study is to evaluate the demographic characteristics of patients who requested an ambulance with complaints of fever.

Methods: Our study was conducted by retrospectively examining the data of patients over the age of 18 who requested an ambulance from Ankara EMS with complaints of fever between 01.01.2022 and 31.12.2022 and whose fever was detected as ≥38 °C by the ambulance teams.

Results: Between 01.01.2022 and 31.12.2022, a total of 5430 (1.07%) people called Ankara EMS with complaints of fever and requested an ambulance, and 1874 (34.5%) were found to have a fever of ≥38 °C. Of these patients with fever, 61.1% were male, and their mean age was 63.4±21.5. The patients' vital signs were as follows: fever levels=39(38–40) °C, systolic blood pressure=127.6±24.5 mmHg, and diastolic blood pressure=74.9±13.8 mmHg. Pulse and respiratory rates were 98 (18–146)/min and 18 (10–32)/min, respectively. While 20.1% of the patients had COVID-19, 7.4% had asthma-COPD, 6.4% had gastroenteritis, and 4.0% had upper respiratory tract infection.

Conclusion: In our study, most of the patients (65.5%) who requested an ambulance with a fever complaint had no fever detected at the scene by the ambulance team..

Keywords: Ambulances, fever, vital sign

According to the World Health Organization (WHO), injuries and illnesses requiring emergency care affect millions of people globally, with most of these events occurring in low- and middle-income countries (1). The necessary medical assistance for these patients before they arrive at the hospital is provided by emergency medical services (EMS), which is an important field of emergency medicine (2). The purpose of EMS is to ensure that patients with life-threatening conditions are quickly transported to the hospital and receive definitive treatment (3).

In recent years, the increase in emergency department (ED) visits has outpaced population growth, and the demand for EMS has also increased. A study from Australia reported that EMS demand increased by 1.4% annually (4). Despite the increase in the number and variety of urgent care centers today, calls to ambulance services for 'non-urgent' problems are increasing, and patients without serious illnesses are also requesting ambulances for transportation to the hospital (5). This causes delays in intervention for time-critical patients, loss of workforce, and increased costs (6).

Fever is defined as a core temperature of >38 °C in adults. Fever is one of the most common reasons for admission to the ED. While 5% of adult applications were to emergency services, this rate was 15% in geriatrics and 40% in pediatrics (7). In the United States, 1.1% of patients calling the 9-1-1 emergency call center complained of fever (8). Requests for EMS services were most frequently for respiratory, cardiovascular, and neurological complaints (9). In the literature, the frequency of patients' requests for an ambulance and which symptoms may be life-threatening have been clearly evaluated (10). However, the rates of EMS use due to fever (which is seen in more than 200 diseases, such as infections, noninfectious inflammatory diseases, and malignancies, and which we encounter more frequently with the pandemic) and the characteristics of these patients have not been clearly evaluated

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in the literature (11,12). The aim of this study is to evaluate the demographic characteristics of patients who requested an ambulance with complaints of fever.

Materials and Methods

In Turkey, EMS service is requested by calling the 112 emergency call number, and service is provided by ambulances dispatched by Command and Control Centers (CCC). Patient triage codes are determined as a result of the telephone conversation with the CCC. Among the triage codes used in EMS, the green triage code indicates patients who apply as outpatients, whose general condition is stable, and who have simple health problems that can be treated as outpatients. The yellow triage code indicates cases with the potential for life-threatening conditions, risk of limb loss, and significant morbidity, or cases with intermediate and prolonged symptoms and potential for severity. The red triage code indicates life-threatening situations that require a rapid, aggressive approach and immediate simultaneous evaluation and treatment (13). Land, air, and sea ambulances are used to reach emergency cases. Depending on the characteristics of the ambulances in the country, doctors, paramedics, emergency medical technicians, and nurses work in ambulances.

Our study was conducted by retrospectively examining the data of patients over the age of 18 who requested an ambulance from Ankara EMS with complaints of fever between 01.01.2022 and 31.12.2022 and whose fever was detected as ≥38 °C by the ambulance teams. Data were obtained from the EMS database named ASOS, belonging to the Turkish Ministry of Health. Age, gender, fever values, and other vital signs, other symptoms or diseases accompanying fever, triage codes, and transport hospital types were evaluated.

Our study was approved by the Ankara Bilkent City Hospital Ethics Committee (dated 03.07.2024 and approval number TABED 1-24-364). The study was conducted following the Helsinki Declaration throughout the research process.

Statistical Analysis

All data were analyzed using the Statistical Package for Social Sciences (SPSS) for Windows version 20 (IBM SPSS Inc., Chicago, IL). The consistency of the data to normal distribution was evaluated by the Kolmogorov-Smirnov test. Numerical variables were shown as mean ± standard deviation. Categorical variables were given as frequencies and percentages. Comparison of normally distributed numerical variables between two groups was evaluated using the Student's t-test. Comparison of non-normally distributed numerical variables between two groups was evaluated using the Mann-Whitney U test. While the ANOVA test (numerical variables showing normal distribution) and the Kruskal-Wallis test (for numerical variables with normal distribution) were used to evaluate numerical variables that differed between three or more groups, Bonferroni correction was used for pairwise comparisons. The chi-square test was used to compare categorical variables. Changes in follow-up periods were evaluated through mixed model analysis in repeated measurements. The statistical significance level was accepted as $p<0.05$.

RESULTS

Ankara EMS teams were assigned to 504,025 cases between 01.01.2022 and 31.12.2022. During this period, a total of 5430 (1.07%) people called Ankara EMS with complaints of fever and requested an ambulance. When the patients who requested an ambulance with a fever complaint were evaluated by the ambulance teams, 1874 (34.5%) were found to have a fever of ≥38 °C. Of these patients with fever, 61.1% were male, and their mean age was 63.4±21.5 (Table 1).

Table 1. Demographic characteristics of patients who underwent intervention due to fever

		n=1874	%
Gender	Women	729	38.9
	Age (Years)*	65.0±22.1	
	Men	1145	61.1
	Age (Years)*	62.4±21.0	
	All	1874	100.0
	Age (Years)*	63.4±21.5	

*: Mean ± Standard Deviation / Median (Min-Max)

Table 2. Vital signs of patients who underwent intervention due to fever

	Mean ± SD	Median (Min-Max)
Fever (°C)	38.7±0.7	39 (38-40)
SAP (mmHg)	127.6±24.5	130 (60-220)
DAP (mmHg)	74.9±13.8	70 (10-150)
Pulse (beats/minute)	99.7±20.1	98 (18-146)
Respiratory rate (min)	19.5±9.8	18
SpO_2 (%)	92.8±6.9	95 (41-100)
Glucose mg/dL	158.5±72.3	138 (30-700)

The patients' vital signs were as follows: fever levels=39(38–40) °C, systolic blood pressure=127.6±24.5 mmHg, and diastolic blood pressure=74.9±13.8 mmHg. Pulse and respiratory rates were 98(18–146)/min and 18(10–32)/min, respectively. Peripheral oxygen saturation (SpO_2) was 95% (41–100), while blood glucose levels were 138 (30–700) mg/dL (Table 2).

According to the initial evaluations made by the ambulance teams, the source of fever could not be determined in 56.7% of the patients. While 20.1% of the patients had COVID-19, 7.4% had asthma-COPD, 6.4% had gastroenteritis, and 4.0% had upper respiratory tract infection. Most of the patients (60.9%) had a yellow triage code. Most of the patients (52.1%) were transported to a training and research hospital (Table 3).

Ambulance requests due to fever complaints were most common in December (12.8%), August (10.8%), and January and July (10.5%) (Figure 1).

DISCUSSION

Febrile diseases are one of the most common reasons for admission to EDs. The most reported reason for an ED visit in the United States in 2021 was fever (leading in children <15 years of age and fifth in adults) (14). A study reported that 11% of families would request an ambulance if their child had a fever (15). In the study by Lehm et al. (16) evaluating non-emergency calls, the rate of calling

Table 3. Diagnosis and triage codes of patients and types of hospitals to which patients were transported

		n	%
Diagnosis	Undiagnosed Fever	1062	56.7
	Covid-19	376	20.1
	Asthma-COPD	139	7.4
	Diarrhea	120	6.4
	Upper respiratory tract infection	75	4.0
	Malignancy	40	2.1
	Syncope	11	0.6
	Urinary tract infection	10	0.5
	Others	41	2.2
Triage code	Green	602	32.1
	Yellow	1141	60.9
	Red	131	7.0
Hospital type	Training and Research Hospitals	976	52.1
	General State Hospitals	712	38.0
	University Hospitals	141	7.5
	Private Hospitals	45	2.4

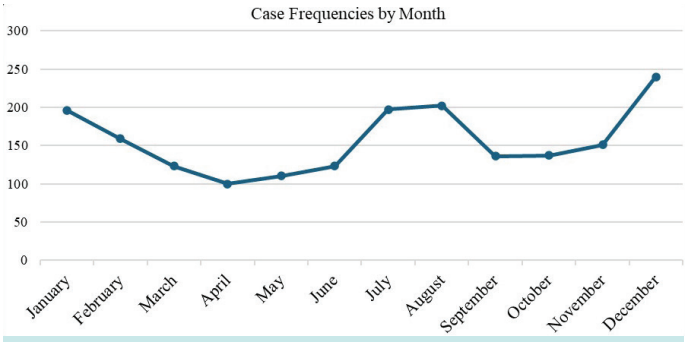

Figure 1. Case frequencies by month

an ambulance due to fever was 1.7%. In another study by Hjä Lte et al. (5), this rate was 2%. In our study, the rate of calling an ambulance due to fever was 1.01%.

A study conducted in Denmark evaluating all emergency calls for children and adults reported that 0.6% of the calls were for fever. While 38.9% of these cases were females, their mean age was 52.2±27.6 years (10). Similarly, in our study, 38.9% of emergency cases were women, and the mean age was 63.4±21.5 years.

In a study evaluating the triage of febrile patients, the mean fever value of orange and red zone patients who used EMS more was 38.2 °C (37.4–38.9) (17). In another study evaluating non-surgical patients who applied to the ED with complaints of fever, the mean fever value of the patients was 38.9 °C (38.5–39.5) (18). In our study, fever values were similarly determined as 39.0 (38–40) °C.

Van Laar et al. (19) found that 63% of patients presenting to the emergency department with fever had various infectious diseases, such as pneumonia, tonsillitis, and urinary tract infections. In another study by Limper et al. (18), most non-surgical patients (80.3%) who applied to the ED with fever were diagnosed with various proven or strongly suspected infectious diseases. We suggest that the reason why most of the cases (56.7%) were not diagnosed in our study is due to the fact that Ankara EMS ambulances mostly employ paramedics and do not have pre-hospital examination opportunities.

While it was reported that the number of cases in Ankara EMS increased by 9.8% at the beginning of the pandemic period (2019–2020), 15.2% of all transported cases were suspected of COVID-19, and 2.9% were diagnosed with COVID-19. The same study also reported that applications with fever symptoms increased compared to previous periods (+14.1%) (11). A study conducted in Iran reported that after the first SARS-CoV-2 case, EMS requests with complaints of fever increased by 211% compared to before the pandemic (20). Since our study was conducted during the ongoing process of the pandemic, we suggest that the most common cause of fever was COVID-19.

Although the red code is mostly used to identify hemodynamically unstable patients, in our study, the red code was applied to 7% of patients who requested an ambulance with a fever complaint. Because fever is a symptom, not a disease, it represents an underlying problem that needs to be evaluated and treated. The etiology of fever is quite extensive, and the cause may be infectious or non-infectious. Although most causes of fever are infectious, non-infectious causes include pulmonary embolism, intracranial hemorrhage, cerebrovascular disease, neuroleptic malignant syndrome/serotonin syndrome, malignant hyperthermia, thyroid storm, transfusion reaction, malignancy, autoimmune disorders, or drug fever (7). In our study, patients who were given code red may have had serious conditions related to the fever mentioned above. However, these patients could not be diagnosed due to limited resources in EMS and were evaluated as having undiagnosed fever. In addition, most of the patients in our study (59.6%) were transferred to tertiary care hospitals and university hospitals. Similarly, it was reported in the literature that most of the EMS cases were transported to tertiary care hospitals and university hospitals (21).

Ambulance requests due to fever complaints were most common in December (12.8%), August (10.8%), and January and July (10.5%). According to the literature, fever complaints have increased due to the rise in colds in the winter months and enterovirus agents in the summer months (22,23). The findings in our study were similar to those in the literature.

In the study conducted by Hjä Lte et al. (5), it was reported that almost half of the patients who applied to the ED with abdominal pain and urinary system problems used the ambulance unnecessarily. Another study in the UK found that 50% of calls for trauma-related conditions and 20% of calls for medical conditions were unnecessary requests (24). In our study, there was no fever diagnosis in 2 out of every 3 calls (65.5%) made due to fever. A review has highlighted that patients' social circumstances, perceptions of urgency, or the influence of caregivers have a greater impact on ambulance overuse than the actual clinical problem or final diagnosis (25). In our study, we suggest that the use of ambulances despite the absence of fever is actually a result of unnecessary ambulance use described in the literature.

CONCLUSION

In our study, most of the patients (65.5%) who requested an ambulance with a fever complaint had no fever detected at the scene by the ambulance team. In addition, in most patients with fever, the source of the fever could not be detected by EMS teams. Additionally, in patients with fever, the most common cause was COVID-19.

Ethics Committee Approval: This study was conducted with the permission of the Ankara Bilkent City Hospital Ethics Committee (No: TABED 1/364/2024, Date: 03/07/2024).

Informed Consent: Written informed consent was obtained from the patients who agreed to take part in the study.

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REFERENCES

1. WHO. Classification and minimum standards for emergency medical teams. Available at: https://www.who.int/publications/i/item/9789240029330. Accessed Dec 2, 2025.
2. Wibring K, Magnusson C, Axelsson C, Lundgren P, Herlitz J, Andersson Hagiwara M. Towards definitions of time-sensitive conditions in prehospital care. Scand J Trauma Resusc Emerg Med 2020;28(1):7. [CrossRef]
3. Akın Paker S, Dagar S, Gunay E, Temizyurek Cebeci Z, Aksay E. Assessment of prehospital medical care for the patients transported to emergency department by ambulance. Turk J Emerg Med 2015;15(3):122-5. [CrossRef]
4. Andrew E, Nehme Z, Cameron P, Smith K. Drivers of increasing emergency ambulance demand. Prehosp Emerg Care 2020;24(3):385. [CrossRef]
5. Hjälte L, Suserud BO, Herlitz J, Karlberg I. Why are people without medical needs transported by ambulance? A study of indications for pre-hospital care. Eur J Emerg Med 2007;14(3):151-6. [CrossRef]
6. Nehme Z, Andrew E, Smith K. Factors influencing the timeliness of emergency medical service response to time critical emergencies. Prehosp Emerg Care 2016;20(6):783-91. [CrossRef]
7. Grandey KA, Sherman SC, Weber JM, Schindlbeck MA, Rahul GP. Fever. In: Clinical Emergency Medicine. New York, NY: McGraw-Hill Education; 2014.
8. The National Emergency Medical Services Information System. V3 911 Call Complaint vs. EMS Provider Findings. Available at: https://nemsis.org/911-call-complaint/. Accessed Jan 2, 2025.
9. McManamny TE, Dwyer R, Cantwell K, Boyd L, Sheen J, Smith K, et al. Emergency ambulance demand by older adults from rural and regional Victoria, Australia. Australas J Ageing 2022;41(1):e74-81. [CrossRef]
10. Ibsen S, Lindskou TA, Nickel CH, Kløjgård T, Christensen EF, Søvsø MB. Which symptoms pose the highest risk in patients calling for an ambulance? A population-based cohort study from Denmark. Scand J Trauma Resusc Emerg Med 2021;29(1):59. [CrossRef]
11. Şan İ, Usul E, Bekgöz B, Korkut S. Effects of COVID-19 pandemic on emergency medical services. Int J Clin Pract. 2021;75(5):e13885. [CrossRef]
12. Grebenyuk V, Kryštůfková O, Gregová M, Sokalská-Jurkiewicz M, Steinbauerová R, Sukovská M, et al. Fever of unknown origin. Vnitr Lek [Article in Czech] 2021;67(1):32-42. [CrossRef]
13. Şimşek DÖ. General overview of triage scales and determination of factors affecting emergency service applications in turkey by logistic regression. Sosyal Güvence Derg [Article in Turkish] 2018;0(13):84-115.
14. National Center for Health Statistics. National hospital ambulatory medical care survey: 2021 emergency department summary tables. Available at: https://www.cdc.gov/nchs/data/nhamcs/web_tables/2021-nhamcs-ed-web-tables-508.pdf. Accesed Jan 2, 2025.
15. O'Cathain A, Simpson R, Phillips M, Knowles E. Tendency to call an ambulance or attend an emergency department for minor or non-urgent problems: A vignette-based population survey in Britain. Emerg Med J 2022;39(6):436-42. [CrossRef]
16. Lehm KK, Andersen MS, Riddervold IS. Non-urgent emergency callers: Characteristics and prognosis. Prehosp Emerg Care 2017;21(2):166-73. [CrossRef]
17. Zaboli A, Ausserhofer D, Pfeifer N, Solazzo P, Magnarelli G, Siller M, et al. Triage of patients with fever: The Manchester triage system's predictive validity for sepsis or septic shock and seven-day mortality. J Crit Care 2020;59:63-9. [CrossRef]
18. Limper M, Eeftinck Schattenkerk D, de Kruif MD, van Wissen M, Brandjes DP, Duits AJ, et al. One-year epidemiology of fever at the emergency department. Neth J Med 2011;69(3):124-8.
19. van Laar PJ, Cohen J. A prospective study of fever in the accident and emergency department. Clin Microbiol Infect 2003;9(8):878-80. [CrossRef]
20. Saberian P, Conovaloff JL, Vahidi E, Hasani-Sharamin P, Kolivand PH. How the COVID-19 epidemic affected prehospital emergency medical services in Tehran, Iran. West J Emerg Med 2020;21(6):110-6. [CrossRef]
21. Bekgöz B, Şan İ, Usul E. Analysis of the use of emergency medical services by Syrians under temporary protection in Ankara, Turkey. Gulhane Med J 2022(1);64:110-6. [CrossRef]
22. Moriyama M, Hugentobler WJ, Iwasaki A. Seasonality of respiratory viral infections. Annu Rev Virol 2020;7(1):83-101. [CrossRef]
23. Auwaerter PG. Medscape [Internet]. Late summer fevers: History is paramount. Available at: https://www.medscape.com/viewarticle/995243?form=fpf. Accessed Jan 2, 2025.
24. Snooks H, Wrigley H, George S, Thomas E, Smith H, Glasper A. Appropriateness of use of emergency ambulances. J Accid Emerg Med 1998;15(4):212-5. [CrossRef]
25. Booker MJ, Shaw AR, Purdy S. Why do patients with 'primary care sensitive' problems access ambulance services? A systematic mapping review of the literature. BMJ Open 2015;5(5):e007726. [CrossRef]