

# Evaluation of morphological findings in fire-related deaths: a retrospective study

✉ Büşra Baydemir Kılıncı,<sup>1</sup> ✉ Abdulkadir Sancı,<sup>2</sup> ✉ Ahmet Nezhik Kök<sup>3</sup>

<sup>1</sup>Balıkesir Forensic Medicine Branch Office, Balıkesir-*Türkiye*

<sup>2</sup>Kars Forensic Medicine Branch Office, Kars-*Türkiye*

<sup>3</sup>Department of Forensic Medicine Atatürk University Faculty of Medicine, Erzurum-*Türkiye*

## ABSTRACT

**BACKGROUND:** Fire-related deaths are a significant global public health concern. Although most cases are accidental, some may involve suicide or homicide, making forensic autopsy essential for determining the cause of death. Variations in mortality rates between countries, along with the presence of soot residues and heat-related artifacts, can complicate postmortem interpretation. The classic cherry-pink skin discoloration is not consistently observed; therefore, detection of soot in the upper respiratory tract provides important evidence. This study aimed to evaluate the demographic, forensic, and pathological characteristics of fire-related deaths.

**METHODS:** This retrospective study analyzed fire-related deaths subjected to autopsy at the Morgue Specialization Department of the Erzurum Group Presidency of the Forensic Medicine Institution between 2018 and 2024. Parameters assessed included age, sex, origin of the incident, seasonal distribution, location of the event, degree of burns, and indicators of vitality.

**RESULTS:** The majority of fire-related deaths were accidental and occurred predominantly in adult males. Most incidents took place in residential settings, with a higher frequency observed during the fall and winter seasons. Autopsy findings commonly revealed third- and fourth-degree burns, as well as soot deposition in the respiratory tract and associated pulmonary pathologies. In cases involving prolonged hospitalization, complications emerged as a major contributing factor to mortality.

**CONCLUSION:** Fire-related mortality is influenced not only by the extent and severity of burns but also by associated complications and characteristics of vulnerable populations. From a forensic medicine perspective, there is a need to develop fire safety policies and comprehensive strategies to reduce fire-related deaths.

**Keywords:** Fire; autopsy; forensic medicine.

## INTRODUCTION

Fire-related deaths are recognized as a significant global public health problem. The rate of deaths per 100 fires has been reported as 0.3 in the United States, 1.9 in Russia, and 0.9 in South Korea. In 2020, thousands of fire-related deaths were reported in countries such as the United States, China, Japan, and Germany.<sup>[1]</sup> As approximately 10% of fires are believed to be intentionally set, all fire-related deaths are considered potentially suspicious, and the cause of the fire must be thor-

oughly investigated. The manner of death in individuals recovered from fire scenes may be classified as accidental, suicidal, or homicidal.<sup>[2]</sup> Previous studies indicate that most fire-related deaths are accidental, with suicide being the second most common cause. Arson following homicide, or arson used as a method of homicide, is relatively rare.<sup>[3]</sup>

A forensic medical evaluation of burned or charred bodies must be conducted with great care, as death may result from a variety of causes. It is essential to determine whether the

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Address for correspondence: Büşra Baydemir Kılıncı

Balıkesir Forensic Medicine Branch Office, Balıkesir, *Türkiye*

E-mail: busrabaydemirk@gmail.com

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victim was alive at the time of exposure to fire. Thermal effects can obscure or even prevent accurate determination of the cause and manner of death.<sup>[4]</sup> In cases of homicide, the perpetrator's primary aim is often to conceal evidence of the crime; therefore, establishing whether the victim died before or after the fire is of critical importance. During post-mortem examination, the presence of soot in the respiratory and digestive tracts, as well as elevated levels of carboxyhemoglobin (HbCO) in the blood, are considered key indicators of vitality.<sup>[5]</sup> Furthermore, heat-related artifacts, such as thermal fractures and heat hematomas, may complicate the interpretation of findings and hinder accurate determination of the cause and manner of death in cases recovered from fire scenes. A cherry-red discoloration, a classic sign of carbon monoxide exposure, may be observed; however, this finding is not consistently present in cases involving severe burns.<sup>[6]</sup> The upper respiratory tract should be carefully examined for evidence of smoke inhalation. Soot-stained mucus lining the trachea and main bronchi, as well as soot deposits in the nostrils and oropharynx, are important indicators of ante-mortem exposure.<sup>[7]</sup>

Data on fire-related deaths in our country are limited. This study aims to contribute to the literature by evaluating the macroscopic morphological findings in cases recovered from fire scenes and subjected to autopsy at the Erzurum Forensic Medicine Group Directorate.

## MATERIALS AND METHODS

In this study, data from 2,722 autopsies performed at the Erzurum Forensic Medicine Group Directorate of the Ministry of Justice between January 1, 2018 and December 31, 2024, were retrospectively reviewed. Thirty-one cases recovered from fire scenes, in which the cause of death was determined to be burns or burn-related complications, were included in the study. Cases in which death was solely due to carbon monoxide intoxication without evidence of burns were excluded. Information on the cases included in the study was obtained from institutional archive records, forensic investigation files, information provided by relatives, and the National Judiciary Network Project (UYAP) system. For each case, detailed data were collected on autopsy findings, sociodemographic characteristics, age group (0–18 years: pediatric; 18–64 years: adult; ≥65 years: geriatric), season and year of the incident, comorbid diseases, sex, place of residence (urban/rural), location of the incident (home, workplace, outdoor areas including home extensions), and origin of the event. All data were recorded in a Microsoft Excel database (Microsoft, USA).

### Statistical Analysis

Statistical analysis was performed using IBM SPSS version 29 (IBM Corp., Armonk, NY, USA). Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean ± standard deviation. Complementary statistics were presented as numbers (n)

and percentages (%), and the Pearson chi-square test was used to assess associations between variables. A p value of <0.05 was considered statistically significant. Ethics committee approval for the study was obtained from the Education and Scientific Research Commission of the Forensic Medicine Institution on July 8, 2025 (Date: 08.07.2025, Decision no: 21589509/2025/508). The study was conducted in accordance with the principles of the Declaration of Helsinki.

## RESULTS

A total of 31 autopsy cases were evaluated between January 1, 2018 and December 31, 2024, at the Erzurum Forensic Medicine Group Directorate of the Forensic Medicine Institution. Autopsies were most frequently performed in 2019 (29%). Cases occurred most commonly during the fall (38.8%) and winter (29%) seasons, predominantly in residential settings (77.3%) and rural areas (87.1%). Two cases were determined to be suicide-related. Of the cases, 58.1% (n=18) were male, and 45.2% (n=14) were in the adult age group, with a mean age of 47.06±28.42 years (range: 1–92) (Table 1).

It was determined that 51.6% of the cases (n=16) were hospitalized following the incident. The mean duration of treatment was 13.81±21.86 days (range: 1–90). Death was attributed to burns and related complications in 71% of cases (n=22), carbonization-level burns in 22.6% (n=7), burns combined with carbon monoxide (CO) intoxication in 3.2% (n=1), and burns with myocardial infarction in 3.2% (n=1).

Second-degree burns were observed in 12.9% of cases (n=4), 75% of which occurred in individuals over 65 years of age. Third-degree burns were present in 58% of cases (n=18), with 55.6% (n=10) in the adult age group. Fourth-degree burns were identified in 29% of cases (n=9), with 44% (n=4) occurring in individuals under 18 years of age. No statistically significant association was found between age groups and burn degree (p=0.146). Analysis of burn degree by sex showed that 75% of second-degree burns occurred in males, while 67% (n=6) of fourth-degree burns were observed in males. No statistically significant relationship was identified between sex and burn degree (p=0.542) (Table 2).

A pugilistic posture was observed in 16% of cases (n=5), most frequently in those with fourth-degree burns (80%). A statistically significant association was found between burn degree and the presence of a pugilistic posture (p=0.022). Soot deposition in the respiratory tract was observed in 25% of cases (n=1) with second-degree burns and in 89% of cases (n=8) with fourth-degree burns. A statistically significant relationship was identified between soot deposition in the respiratory tract and burn severity (p=0.003). Bone pathologies, including fractures and amputations, were observed exclusively in cases with fourth-degree burns (p=0.017) (Table 3).

Burn extent was evaluated based on total body surface area using Wallace's Rule of Nines. Burns involving 0–20% of the

**Table 1.** Age, sex, location, time of death, and origin of cases

	n	%
Age group		
0–18	7	22.5
19–64	14	45.2
≥65	10	32.3
Sex		
Female	13	41.9
Male	18	58.1
Year		
2018	3	9.7
2019	9	29
2020	7	22.6
2021	5	16.1
2022	2	6.5
2023	2	6.5
2024	3	9.7
Season		
Spring	3	9.7
Summer	7	22.6
Fall	12	38.8
Winter	9	29
Location of incident		
Home	26	77.3
Workplace	2	6.5
Inside vehicle	2	6.5
Home extensions/open areas	3	9.7
Origin		
Accidental	29	93.6
Suicide	2	6.4
Place of residence		
Urban	4	12.9
Rural	27	87.1

body surface area were present in 19% of cases (n=6), 21–49% in 9.6% (n=3), and ≥50% in 71.5% of cases (n=22). In all pediatric cases, burns involved more than 50% of the body surface area. No statistically significant association was found between age and burn extent (p=0.258). Regarding sex distribution, 67% of cases with burns covering 21–49% of the body surface area were male, while 59% of cases with burns ≥50% were male. No statistically significant association was observed between sex and burn extent (p=0.878) (Table 4).

In 14 cases (45.1%), burn-related internal organ pathology and complications were identified. Among these, six cases developed pulmonary complications, including pneumonia and acute respiratory distress syndrome (ARDS), while the remaining cases exhibited pathologies such as cerebral hemorrhage, rectal prolapse, gastric ulcer, and acute renal failure. Compartment syndrome developed in two cases. All cases with accompanying pulmonary pathology died during hospitalization. The distribution of pathological findings is presented in Figure 1.

In the pediatric age group, all cases occurred at home in the presence of family members. In the adult age group, 14.2% of cases lived alone, and 64.2% (n=9) required hospitalization following the incident. In the geriatric age group, 60% (n=6) of individuals lived alone, and 60% were hospitalized. Overall, 77.3% of fire incidents occurred in residential settings, 9.7% in home extensions or open areas, and the remaining cases resulted from fires associated with traffic accidents or occupational explosions.

Review of medical histories revealed that 19.3% of cases (n=6) had conditions affecting cognitive or motor function, including gonarthrosis, intellectual disability, hemiplegia, epilepsy, Alzheimer's disease, and Parkinson's disease. One case involved a pregnant individual.

Examination of scene investigation reports indicated that two deaths in an industrial setting, classified as occupational accidents, were caused by fires resulting from sodium chlorate (NaClO<sub>3</sub>) explosions.

**Table 2.** Distribution of burn degree according to sex and age group

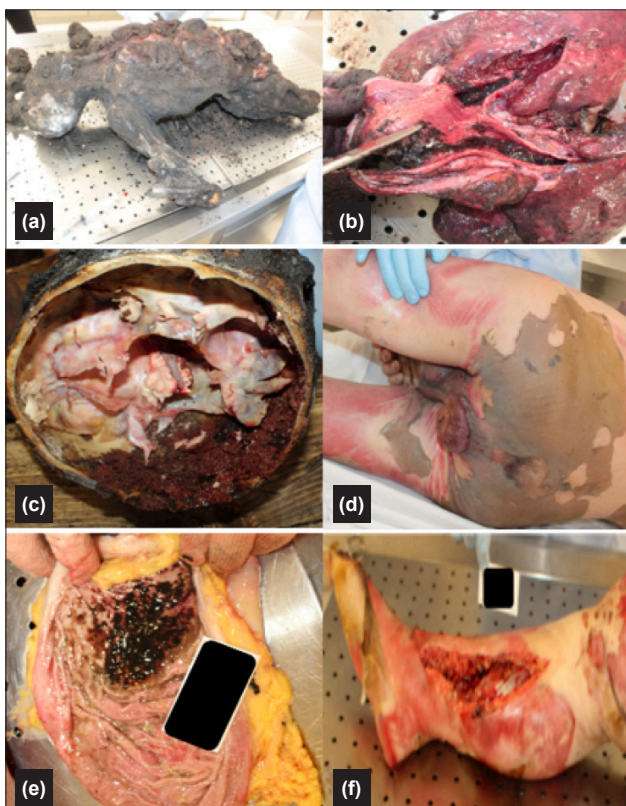
Burn degree	Sex	n (%)	p	n (%)	n (%)	n (%)
2 <sup>nd</sup> de-gree	Male	3 (9.7)	<b>0.542</b>	0	1 (3.3)	2 (6.4)
	Female	1 (3.3)		0	0	1 (3.3)
3 <sup>rd</sup> de-gree	Male	9 (29)		2 (6.4)	5 (16.1)	2 (6.4)
	Female	9 (29)		1 (3.3)	5 (16.1)	3 (9.7)
4 <sup>th</sup> degree	Male	6 (19.3)		2 (6.4)	3 (9.7)	1 (3.3)
	Female	3 (9.7)		2 (6.4)	0	1 (3.3)

**Table 3.** Evaluation of pugilistic posture, bone pathology, and soot deposition in the lower respiratory tract according to burn degree

Burn degree	Pugilistic posture n (%)		p	Bone pathology n (%)		p	Soot deposition (lower respiratory tract) n (%)		p
	Yes	No		Yes	No		Yes	No	
2 <sup>nd</sup> degree	0	4 (12.9)	<b>0.022</b>	0	4 (12.9)	<b>0.017</b>	1 (3.2)	3 (9.6)	<b>0.003</b>
3 <sup>rd</sup> degree	1 (3.2)	17 (54.8)		0	18 (58.1)		4 (12.9)	14 (45.3)	
4 <sup>th</sup> degree	4 (12.9)	5 (16.2)		3 (9.6)	6 (19.4)		8 (25.8)	1 (3.2)	

**Table 4.** Distribution of burn extent according to sex and age group

Burn extent (%)	Sex n (%)	n (%)	p	0–18 years n (%)	19–64 years n (%)	≥65 years n (%)	p
0–20	Male	3 (9.7)	<b>0.878</b>	0	1 (3.3)	2 (6.4)	<b>0.258</b>
	Female	3 (9.7)		0	2 (6.4)	1 (3.3)	
21–49	Male	2 (6.4)		0	1 (3.3)	1 (3.3)	
	Female	1 (3.3)		0	0	1 (3.3)	
>50	Male	13 (41.9)		4 (12.9)	7 (22.5)	2 (6.4)	
	Female	9 (29)		3 (9.7)	3 (9.7)	3 (9.7)	



**Figure 1.** Findings from different cases: (a) Upper and lower limb amputations due to burns with varying degrees of carbonization; (b) Soot deposition in the trachea and lower respiratory tract; (c) Heat hematoma; (d) Rectal prolapse; (e) Curling ulcer in the stomach; (f) Compartment syndrome.

(58.1%) and in the adult age group (45.2%). Previous studies conducted in Istanbul, Ankara, Muğla, and Trabzon, Türkiye, have reported male predominance ranging from 63.3% to 75.4%, with mean ages between 41 and 60 years.<sup>[2,5,6,10]</sup> Men may be at higher risk due to factors such as lower compliance with fire safety measures, increased risk-taking behavior, and greater exposure to hazardous environments. Similarly, studies conducted in Israel and Germany have reported male predominance, while the mean age of fire-related deaths varies across countries, for example, 26.8 years in India and 52.9 years in the United Kingdom. In the United States, the male-to-female ratio has been reported as 2.2.<sup>[11–15]</sup> These findings suggest that males constitute a higher-risk group for fire-related mortality, while age distribution may vary depending on the sociocultural characteristics of different regions. Factors such as the proportion of men working outdoors or in more hazardous occupations, individual behavioral characteristics, and gender roles can be considered among the factors explaining gender differences in fire-related deaths. Therefore, placing emphasis on awareness messages targeting the male population in fire prevention and education programs indicates the need to focus on these at-risk segments of the population in fire safety policies.

Considering seasonal distribution, incidents were found to occur most frequently in fall (38.8%) and winter (29%). Similar studies conducted in Türkiye show that fire-related deaths frequently occur in winter, ranging from 26.7% to 52%.<sup>[2,5,6,10]</sup> These deaths have been reported to occur particularly in win-

ter and spring in the United Kingdom and in winter in Iran.<sup>[16,17]</sup> Due to the climate of the region where the study was conducted, the need for heating may begin in fall, prior to the winter season, unlike in other regions. Therefore, the misuse or inadequate maintenance of devices such as stoves, boilers, and electric heaters during these seasons may increase the risk of fire. Furthermore, low humidity (dry air) in the region encourages fires to spread rapidly, while neglecting fire safety precautions can further exacerbate the situation.

Our study shows that 83.8% of fires occur in the home environment. According to 2023 American Burn Association (ABA) data, 61% of burn cases occurred in private homes. A study conducted in South Australia found that 48.4% of fire-related deaths occurred in enclosed spaces,<sup>[18,19]</sup> and a review by Kumar et al.<sup>[20]</sup> reported that 73.9% of burn cases occurred in the home environment. The high rate of burns occurring in the home environment can be attributed to several factors, including the large proportion of time individuals spend at home, the prevalence of indoor risk factors (e.g., stoves, electrical appliances, and kitchen-related accidents), and inadequate safety measures. Furthermore, the widespread use of tandoors in the region is another important factor that increases the risk of fire. To reduce fire risks, it is essential to strengthen safety measures in homes and minimize potential hazards that could lead to accidents.

In our study, 51.6% of cases (n=16) were rescued alive from the fire scene but died after receiving treatment in the hospital. In the literature, a study conducted in Ankara reported this rate as 38.7%, while another study evaluating 61 cases in Muğla reported that two cases died after hospitalization. Additionally, a study conducted in Israel reported that burns accounted for approximately 3% of all trauma cases requiring hospitalization.<sup>[6,10,15]</sup> Third-degree burns were the most common (58%), followed by fourth-degree burns (29%). In other studies conducted in our country, the incidence of fourth-degree burns ranged from 36% to 83.6%, followed by third-degree burns.<sup>[5,6,10,15]</sup> Due to the severe tissue damage caused by third- and fourth-degree burns, these burn types play a critical role in mortality risk and the development of complications. The high incidence of these severe burn types among cases rescued from fire environments further emphasizes the importance of early intervention and effective burn treatment.

In our study, a small proportion of cases in the adult age group lived alone, whereas more than half of the cases in the geriatric age group lived alone. This finding suggests that social isolation increases with advancing age and that family and social support mechanisms weaken over time. Delays in emergency response among elderly individuals living alone significantly increase the risk of mortality and morbidity in life-threatening events such as fires. Similarly, the literature indicates that older adults who live alone are more vulnerable to disasters and accidents, with particularly poor prognoses in burn cases.<sup>[5,6]</sup> Furthermore, conducting similar epidemio-

logical studies in different regions of Türkiye will contribute to the development of fire and burn prevention strategies by improving the understanding of regional differences and associated risk factors. However, regardless of the quality of healthcare services, complications, infections, and organ failure secondary to burns can substantially reduce survival rates.

The evidence in this study was categorized based on legal investigation files, crime scene examinations, and witness statements. It was determined that the majority of deaths (93.6%) were accidental in origin, while two individuals died in the workplace due to a NaClO<sub>3</sub> explosion. Studies conducted both in India and nationally similarly report that most deaths are accident-related.<sup>[2,6,12]</sup> This is often due to the failure to take basic precautions or the neglect of fire safety procedures, highlighting the need for more effective, continuous, and comprehensive training programs to improve individuals' ability to respond appropriately during fires. Therefore, increasing fire safety awareness and educating individuals on how to act in emergencies is essential. Ensuring workplace safety is also critical. Sodium chlorate is used in industry as a herbicide to control weeds by inhibiting water absorption, in the paper and pulp industry for bleaching processes, and in the production of explosives due to its oxidizing properties.<sup>[21]</sup> The deaths resulting from a sodium chlorate explosion in this study highlight that, despite its industrial benefits, sodium chlorate poses serious safety risks. As a powerful oxidizing agent, it must be handled with caution, and occupational health and safety measures should be strengthened accordingly.

The effect of heat on the body during a fire, in which the hands are found raised in front of the face (pugilistic posture), may create the impression that the individual was involved in a struggle prior to death.<sup>[22]</sup> In our study, the pugilistic posture (16%) was observed more frequently in cases with fourth-degree burns and less commonly in those with third-degree burns. This rate has been reported as 37.8% in Italy and 20.8% in a study conducted in our country, with a higher frequency noted in fourth-degree burns.<sup>[3,10]</sup> Although these findings are important for understanding the severity and effects of injuries, they are not considered definitive criteria for distinguishing between ante-mortem and post-mortem events.<sup>[23]</sup>

It is well established in the literature that soot formed during a fire can passively deposit around the mouth and nose in the absence of inhalation; however, such passive accumulation does not extend beyond the level of the vocal cords.<sup>[24]</sup> The presence of soot in the esophagus and stomach, beyond the respiratory tract, the existence of a hyperemic line at the junction between burned and intact skin, and elevated levels of carboxyhemoglobin in the blood are considered vital signs and indicators of exposure to fire prior to death.<sup>[10]</sup> Our study found that the likelihood of soot deposition in the lower respiratory tract increases with burn severity.

A study using an animal (sheep) model to examine mucus migration in the upper respiratory tract following burns demonstrated that, within the first 4–24 hours, obstruction was limited to the bronchial airways. In the subsequent period (24–72 hours), the degree of bronchial obstruction increased and extended distally to the small airways and parenchyma.<sup>[25]</sup> These findings suggest that as burn severity increases, soot deposition, mucus accumulation, and airway obstruction may progressively worsen over time, leading to more severe respiratory complications.

In our study, bone pathologies such as fractures and amputations were identified in 9% of cases and were exclusively associated with deaths due to fourth-degree burns, occurring in one-third of these cases. Similarly, a study conducted in Muğla reported heat fractures and heat hematomas in partially or completely charred bodies.<sup>[6]</sup> Bone fractures resulting from burns represent postmortem heat-related lesions and should not be confused with ante-mortem injuries. Exposure to extreme heat causes the burning of muscles, tendons, and soft tissues, leaving the underlying bones directly exposed, which may result in heat-induced fractures. These fractures typically have irregular edges, and skull fractures may cross suture lines, whereas ante-mortem fractures generally terminate at suture lines. Furthermore, such fractures may be partial in thickness and may expose the spongy layer.<sup>[26]</sup> However, depending on the severity of the burn, distinguishing between ante-mortem and postmortem fractures may not always be possible. Therefore, during autopsy, suspicious areas should be thoroughly documented photographically, assessed for signs of vitality, and sampled for histopathological examination when necessary.

In 14 cases (45.1%), macroscopic internal organ pathologies and burn-related complications were identified. According to the literature, internal organ pathologies following burns may include brain microabscesses due to *Staphylococcus pyogenes* septicemia, myocardial hemorrhage, and pyelonephritis in the kidneys. It has also been reported that gastrointestinal ulcerations may develop, particularly in cases involving 40–70% total body surface area burns; that *Pseudomonas* sepsis may occur during prolonged hospitalization; and that pulmonary edema, mucus plugging, congestion, and atelectasis are common findings.<sup>[27]</sup> Similarly, in our study, pathological findings were most frequently observed in the lungs and kidneys. Lung pathology was present in all cases requiring hospitalization. In one case, a Curling's ulcer developed in the stomach, likely due to ischemia and cell necrosis of the gastric mucosa associated with reduced plasma volume. In another case involving severe burns, rectal prolapse was observed. Severe burns may contribute to rectal prolapse by reducing blood flow to surrounding tissues and impairing the function of muscles, connective tissue, and neural structures, ultimately leading to decreased tone. Early diagnosis and management of such complications in hospitalized patients are essential for improving quality of life and reducing mortality rates.

In 19.3% of cases (n=6), conditions affecting memory and motor function were identified. A similar study reported 21 cases with conditions such as paralysis, psychosis, depression, bipolar disorder, and hearing loss.<sup>[5]</sup> In our study, the identified conditions included gonarthrosis, intellectual disability, hemiplegia, epilepsy, Alzheimer's disease, and Parkinson's disease. These physical and mental health disorders may be associated with an increased risk of burn trauma, particularly among elderly individuals. Furthermore, uncontrolled epilepsy is known to pose a significant risk due to seizure-related injuries.<sup>[28,29]</sup> Therefore, understanding the relationship between physical and mental health conditions and burn trauma is important for strengthening treatment and rehabilitation processes in these patients.

A nine-year study conducted in Iran examined the etiology and outcomes of burns in 51 pregnant women and found that burn surface areas exceeding 40% and the presence of inhalation injuries were strongly associated with maternal and fetal mortality.<sup>[30]</sup> In our study, one case involving a woman in the seventh to eighth month of pregnancy presented with third-degree burns covering 60% of the total body surface area. It is well established that deep burns affecting a large body surface area in pregnant patients adversely affect both maternal and fetal outcomes. When considered alongside the increased oxygen demand, circulatory load, and altered immune response during pregnancy, the systemic stress caused by burns can have severe consequences for both the mother and the fetus. Additionally, the cardiovascular and respiratory adaptations of pregnancy may exacerbate the severity of inhalation injury and further increase the risk of mortality.

## CONCLUSION

Fire is one of the leading causes of preventable deaths at both individual and societal levels. Reducing fire-related deaths is not only a medical and legal priority but also a critical public health responsibility. In this study, fire-related deaths were most common among adult males and occurred predominantly during the fall and winter seasons, primarily in residential settings. With the exception of two cases, the deaths were accidental in origin. Findings such as pugilistic posture, bone fractures, and soot deposition in the lower respiratory tract were more frequent with increasing burn severity. Additionally, complications including burn-related cerebral hemorrhage, rectal prolapse, gastric ulcer, acute renal failure, and compartment syndrome were observed. These findings not only contribute to forensic medical practice but also highlight the need to develop fire safety policies and more comprehensive strategies to reduce fire-related deaths.

**Ethics Committee Approval:** This study was approved by the Forensic Medicine Institute Presidency (Date: 08.07.2025, Decision No: 21589509/2025/508).

**Peer-review:** Externally peer-reviewed.

**Informed Consent:** Retrospective study.

**Authorship Contributions:** Concept: B.B.K., A.S.; Design: B.B.K., A.S.; Supervision: A.N.K., A.S.; Resource: B.B.K., A.N.K.; Materials: A.N.K.; Data collection and/or processing: A.S.; Analysis and/or interpretation: B.B.K.; Literature review: A.S., A.N.K.; Writing: B.B.K.; Critical review: A.S.

**Conflict of Interest:** None declared.

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## ORİJİNAL ÇALIŞMA - ÖZ

**Yangına bağlı ölümlerde morfolojik bulguların değerlendirilmesi: Retrospektif çalışma**

**AMAÇ:** Yangınla ilişkili ölümler dünya çapında önemli bir sağlık sorunudur. Ölümlerin çoğu kaza orijinli olmakla birlikte bazı vakalar intihar veya cinayet ile ilişkili olabileceğinden ölüm nedenini belirlemek için otopsi yapılır. Ülkeler arasında ölümlerin oranları değişkenlik göstermekle birlikte, yangın kaynaklı ölümlerde is kalıntıları ve ısıya bağlı artefaktlar yorumlamada zorluklar yaratabilir. Ciltte kiraz pembesi değişimi her zaman belirgin olmayabilir, üst solunum yollarındaki is incelemeleri ise önemli kanıtlar sunar. Bu çalışmada, yangına bağlı ölümlerin demografik, adli ve patolojik özelliklerinin incelenmesi amaçlanmıştır.

**GEREÇ VE YÖNTEM:** Çalışma kapsamında, Adli Tıp Kurumu Erzurum Grup Başkanlığı Morg İhtisas Dairesi'nde 2018-2024 yılları arasında gerçekleştirilen otopsilerde yangına bağlı ölümler; yaş, cinsiyet, olayın orijini, mevsimsel dağılım, olay yeri, yanık dereceleri ve vitalite bulguları açısından retrospektif olarak değerlendirilmiştir.

**BULGULAR:** Çalışmada yangına bağlı ölümlerin çoğunlukla kaza orijinli olduğu, erkek cinsiyet ve erişkin yaş grubunda daha sık görüldüğü belirlenmiştir. Olguların önemli bir kısmında olayların ev ortamında ve özellikle sonbahar-kış mevsimlerinde meydana geldiği saptanmıştır. Otopsi bulgularında sıklıkla 3. ve 4. derece yanıklar ile birlikte solunum yollarında is birikimi ve akciğer patolojileri tespit edilmiştir. Ayrıca uzun süreli hastane yatışı gerektiren olgularda komplikasyonların mortalite üzerinde belirleyici olduğu görülmüştür.

**SONUÇ:** Yangın ölümleri yalnızca yanık yüzey alanı ve derecesiyle değil, eşlik eden komplikasyonlar ve risk gruplarının özellikleriyle de ilişkilidir. Adli tıp uygulamalarının ışığında yangın güvenliği politikalarının geliştirilmesi ve yangın kaynaklı ölümleri azaltmaya yönelik kapsamlı stratejilerin oluşturulması gerekmektedir.

**Anahtar sözcükler:** Adli tıp; otopsi; yangın.

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