



# **A Retrospective Analysis of Emergency Service Transfers of Head Trauma Cases in 2019 and 2020**

## Kafa Travması Olgularına Ait Acil Servis Transferlerinin 2019-2020 Yıllarına Ait Retrospektif Analizi

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### **Makale Bilgisi / Article Information**

**Makale Türü / Article Types:** Araştırma Makalesi / Research Article

**Geliş Tarihi / Received:** 19 Eylül / September 2021

**Kabul Tarihi / Accepted:** 14 Ekim / October 2021

**Yıl / Year:** 2021 | **Cilt – Volume:** 6 | **Sayı – Issue:** 3 | **Sayfa / Pages:** 585-594

**Atıf/Cite as:** Tetik, B. ve Derya, S. "A Retrospective Analysis Of Emergency Service Transfers Of Head Trauma Cases In 2019 And 2020 - Kafa Travması Olgularına Ait Acil Servis Transferlerinin 2019-2020 Yıllarına Ait Retrospektif Analizi". Samsun Sağlık Bilimleri Dergisi- Journal of Samsun Health Sciences 6(3), August 2021: 585-594. <https://doi.org/10.47115/jshs.997667>

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## A RETROSPECTIVE ANALYSIS OF EMERGENCY SERVICE TRANSFERS OF HEAD TRAUMA CASES IN 2019 AND 2020

### ABSTRACT:

**Aim:** The aim of this study was to analyze respectively the frequency of head traumas and case transfer information by retrospective analysis of emergency department transfers of head trauma cases.

**Method:** In this retrospective study, transfers made by Malatya 112 Coordination Center to emergency services of all pediatric or adult head trauma cases in 2019 and 2020 were examined. The data were evaluated retrospectively. Statistical analyses were performed by using SPSS 24.0 statistical package program.

**Results:** It was detected that a total of 4793 patients were transferred due to head trauma in 2019 and 2020; of these 2297 (47.9%) patients were transferred in 2019, and 2496 (52.1%) in 2020. The most common causes of head traumas were found to be falls (35.3%), in-vehicle traffic accidents (24.5%), and trauma due to an unknown/ unspecified cause (20.7%), respectively. When the calls to 112 coordination centers were examined the most common places where the calls were made were found to be places open to traffic (31.6%), open areas /streets (29.6%), and health institutions (20.7%). It was found that 99.6% of the cases were alive before the transfer. When the cases were evaluated according to the Glasgow Coma Scale (GCS), it was found that 97.1% of the cases were in mild group (13-15), 1% in moderate (9-12), and 1.9% were in the severe group (3-8).

**Conclusion and Suggestion:** It was observed that head trauma transfers to emergency services were common and falls and in-vehicle traffic accidents were the most common causes of trauma. The most common symptoms at presentation were found to be nausea-vomiting, loss of consciousness, dizziness, and headache.

**Keywords:** *Emergency service; Emergency service transfers; Head trauma; 112 emergency service*



## KAFA TRAVMASI OLGULARINA AIT ACIL SERVİS TRANSFERLERİNİN 2019-2020 YILLARINA AIT RETROSPEKTİF ANALİZİ

### ÖZ:

**Amaç:** Bu çalışmada kafa travması olgularına ait acil servis transferlerinin retrospektif analizi ile kafa travmalarının sıklığı ve vaka transfer bilgilerinin incelenmesi amaçlanmıştır.

**Yöntem:** Retrospektif nitelikte tasarlanan bu araştırmada, 2019 ve 2020 yıllarındaki çocuk ya da erişkin tüm kafa travması olgularına ait Malatya 112 Komuta Merkezi tarafından acil servislere yapılan transferler incelenmiştir. Kafa travmalarına ait veriler geriye dönük olarak değerlendirilmiştir. Veriler SPSS 24.0 istatistik paket programı kullanılarak değerlendirilmiştir.

**Bulgular:** 2019-2020 yıllarına ait toplam kafa travması transfer sayısı 4793'dir. Bu transferlerin 2297'si (%47.9) 2019 yılına, 2496'sı (%52.1) ise 2020 yılına aittir. Travma nedenleri arasında ilk üçte; %35.3 düşmeler, %24.5 araç içi trafik kazası, %20.7 travma nedeni bilinmeyen hastaneler arası nakiller yer almaktadır. 112 komuta merkezine yapılan vaka ihbar adresleri arasındaki ilk üçte adres; %31.6 trafiğe açık alan, %29.6 açık alan/sokak, %20.7 sağlık kurumudur. Nakil öncesi vakaların %99.6'sının yaşadığı, Glasgow Koma Skalası (GKS) sınıflamasına göre vakaların %97.1'inin hafif (13-15), %1'inin orta (9-12), %1.9'unun ise ağır (3-8) grupta yer aldığı belirlendi.

**Sonuçlar ve Öneriler:** Acil servislere yapılan kafa travması transferlerinin yaygın olduğu ve düşme ile araç içi trafik kazalarının en sık karşılaşılan travma nedenleri olduğu görüldü. Bulantı-kusma, bilinç kaybı, baş dönmesi ve baş ağrısının vaka ile ilk karşılaşmada rastlanan semptomlar olduğu belirlendi.

**Anahtar Kelimeler:** Acil servis, Acil servis transferleri, Kafa travması, 112 acil servis.



## INTRODUCTION

Head trauma constitutes a significant part of trauma cases admitted to the emergency department (Mirzai et al., 2005). Head traumas have become a more important public health problem, due to the great wars as well as the growing number of motor vehicles thanks to technological revolution in the last century (Çökük et al., 2013). Head trauma is a socioeconomic problem that should be eva-

luated in terms of being preventable, as well as being a health problem that needs to be treated as a cause of serious morbidity and mortality (Işık et al., 2011).

Despite intensive treatment, most of the patients with severe head trauma are disabled or die. Even in cases with moderate head trauma, significant neurophysiological and psychiatric sequelae may develop (Sögüt & Al 2009; Çökük et al., 2013). In some developing countries, it is stated that of head trauma cases tend to increase and attention is drawn to factors such as unavailability or inadequacy of pre-hospital first aid as the important causes of many deaths and disabilities (Sumardino et al., 2020).

The development of regional major trauma centers for severely injured patients is a widely recognized model of care. However, the decision to bypass the nearest hospital to directly transfer a patient to a regional major trauma center is difficult and depends on prehospital clinical evaluation and prioritization (Pickering et al., 2015). Early correction of hypoxia and hypotension can only be managed by transferring the patients to the nearest hospital (Moppett, 2007; Pickering et al., 2015). In this context, it is important to examine the emergency department transfer data of head trauma cases. To the best of our knowledge, there is no study in Turkey examining transfers of head trauma cases to the emergency department. The aim of this study was to analyze the emergency department transfer data of head trauma cases, retrospectively and to determine the frequency of head traumas in Malatya.

## METHOD

This study was carried out with the aim of examining the transfers of all child and adult head trauma cases to the emergency services, made by Malatya 112 Coordination Center, in 2019 and 2020. Data were evaluated retrospectively. Patient information was obtained from the data system of Malatya 112 Coordination Center and ambulance transport forms. All head trauma cases were included in the study without any inclusion criteria. The data were recorded in the "Patient Evaluation Form" prepared by the researchers. The patient evaluation form consisted of 8 questions including age, gender, cause of trauma, call address, survival status, GCS, symptoms, and transport address of the cases.

The data were evaluated by using the SPSS 24.0 statistical package program. Descriptive statistics were expressed as number, percentage, mean, standard deviation, min-max. Ethical approval for the study was obtained from the Local Ethics Committee and institutional permission was obtained from 112 Coordination Center where the research would be conducted (Decision Number: 2021/2178).

## RESULTS

The frequency of emergency service transfers of head trauma cases by years and the seasonal distribution of the cases are shown in Table 1. It was determined that a total of 4793 head trauma cases were transferred to the emergency department, in 2019 and 2020. Of these 2297 (47.9%) patients were transferred in 2019, and 2496 (52.1%) in 2020. It was noted that, 32% of head trauma transfers were made in the autumn months (Table 1).

**Table 1. The frequency of emergency service transfers of head trauma cases by years and the seasonal distribution of the cases (n=4793)**

Distribution of the cases according to years	n	%
2019	2297	47.9
2020	2496	52.1
Clinical Insomnia (Moderate to Severe)	15-21	26
Clinical Insomnia (Severe)	22-28	1
Distribution of the cases according to years		
Spring	835	17.4
Summer	1163	24.3
Autumn	1535	32.0
Winter	1260	26.3
<b>Total</b>	<b>4793</b>	<b>100.0</b>

The distribution of head trauma cases according to age, gender, cause of trauma, and the place of call are given in Table 2. It was determined that 69.1% of the head trauma cases were male and 58.9% were between the ages of 18-64. It was found that the five most common causes of head trauma were falls (35.3%), in-vehicle traffic accidents (24.5%), cases with unspecified cause who were transferred between the hospitals (20.7%), assault and battery (11.9%), and pedestrian accidents (7.1%). When the places where the call was made to 112 coordination centers were examined, it was found that 31.6% of the calls were made from places open to traffic, 29.6% from open areas/streets, 20.7% from health institutions (transports between hospitals), 11.7% from houses, and 2.6% from educational institutions. It was noted that 0.8% of the emergency calls were made from workplaces (Table 2).

**Table 2. The distribution of head trauma cases according to age, gender, cause of trauma, and the place of call (n=4793)**

Variable	n	%
Male	3310	69.1
Female	1483	30.9
Age		
≤6 years	558	11.6
7-17 years	708	14.8

18-64 years	2824	58.9
≥65 years	703	14.7
<b>Cause of trauma</b>		
Fall	1693	35.3
In-vehicle traffic accident	1173	24.5
Transportation between the hospitals without specified cause	991	20.7
Assault and battery	571	11.9
Pedestrian accidents	341	7.1
Blunt trauma injury	21	0.4
Suicide	3	0.1
<b>Place of emergency call</b>		
Places open to traffic	1514	31.6
Open area/street	1417	29.6
Health institution	991	20.7
House	559	11.7
Educational institution	127	2.6
Workplace	38	0.8
Sports area	34	0.7
Penitentiary	27	0.6
Security station	25	0.5
Shopping center	17	0.4
Heliport area	15	0.3
Nursing home	11	0.2
Official institution	10	0.2
Other *	8	0.1
<b>Total</b>	<b>4793</b>	<b>100.0</b>

\*Other : Sanctuary 6, Pool 2

The distributions of the data regarding transfer of head trauma cases to the emergency service are shown in Table 3. It was detected that 99.6% of the cases were alive before the transportation. When the cases were evaluated according to the Glasgow Coma Scale (GCS) scores, it was found that 97.1% of the cases were mild group (13-15), 1% in moderate (9-12), and 1.9% were in severe group (3-8). It was found that no symptom information was recorded in 95.1% of the cases; among the remaining cases, 70 cases had nausea-vomiting, 65 had loss of consciousness, 64 had dizziness and 35 cases had headache. When transport addresses were examined, it was determined that 75% of the cases had been transferred to the hospital, 20.6% had been transferred between hospitals, 3.5% of the cases rejected the transfer, and 0.3% of the cases had been transported to their homes. In addition, it was found that the rate of on-site intervention was 0.1% (Table 3).

**Table 3. The distributions of the data regarding transfer of head trauma cases to the emergency service (n=4793)**

<b>GCS classification</b>		
Mild (13-15)	4655	97.1
Moderate (9-12)	46	1.0
Severe (3-8)	92	1.9
<b>Survival</b>		
Alive	4772	99.6
Exitus	21	0.4
<b>Symptom</b>		
No symptom information	4559	95.1
Nausea- Vomiting	70	1.5
Loss of consciousness	65	1.4
Dizziness	64	1.3
Headache	35	0.7
<b>Transportation address</b>		
Transportation to hospital	3596	75.0
Transportation between hospitals	991	20.6
Rejection of transportation	167	3.5
Transportation to house	14	0.3
Exitus- Transported to the morgue	13	0.3
Exitus- Left on-site	8	0.2
On-site intervention	4	0.1
<b>Total</b>	<b>4793</b>	<b>100.0</b>

GCS: Glasgow Coma Scale

## DISCUSSION

Head trauma is an important cause of morbidity and mortality that impair the quality of life of the individual in the short or long term. However it is a preventable health problem. Trauma is the leading cause of death, especially in the young population, and the most common cause of death is head trauma (Karasu et al., 2009). In a retrospective study evaluating the data of approximately 30 years, it was found that 8% of deaths were due to trauma and approximately 50% of these deaths were due to brain damage (Silav et al., 2000).

In our study, it was found that the 18-64 age group was the most common age group with 58.9%, and men were more than twice as likely as women. This situation is thought to be due to the fact that men are still more active in business life and the majority of the drivers are males in our country. In the study conducted by Işık et al.; in Turkey, it was found that 75.5% of the trauma patients were male and 52.5% of them were between the ages of 15-40 (Işık et al., 2011). In the study conducted by Çökük et al., it was found that 63% of the trauma patients were male (Çökük et al., 2013). In the study conducted by Langlois et al, it was found that the

rate of males was 2 times higher compared to females, and the majority of the cases were younger than 40 years of age (Langlois et al., 2006).

In the study conducted by Çırak et al., which investigated the causes of trauma, it was found that 28% of the traumas were caused traffic accidents (Çırak et al., 1999) this rate was found to be 75% in the study of Işık et al. (Işık et al., 2011). In our study, the rate of traffic accidents was found to be 31,6% including. 24,5% in-vehicle traffic accidents and 7,1% traffic accidents involving pedestrians. Similarly, in the literature, the rate of in-vehicle traffic accidents was reported to be higher compared to pedestrian accidents (Ökten et al., 1997; Karasu et al., 2009). The higher rate of in-vehicle traffic accidents can be attributed to the ever-growing number of vehicles in traffic and individuals' preference of using their personal vehicles rather than public transportation due to the change in lifestyle.

In the study conducted by Karasu et al, 48% of the cases were classified as mild according to the GCS scores (13-15), at the first examination (Karasu et al., 2009). Similarly, in the study of Işık et al., this rate was found to be 48% (Işık et al., 2011). In our study, the rate of mild cases according to the GCS scores was 97,1%. This difference can be attributed to the fact that in our study, GCS scores depend on the examination performed on-site and the condition of the patients might be deteriorated until they were transferred to the hospital. However, since the data in our study were obtained from the 112 coordination center and the scores in the hospital were not available, a comparison could not be made.

In our study, the data of the years 2019 and 2020 were examined. It was found that the number of traumas occurred in 2020 was higher than 2019. Similarly, when we reviewed the studies in the literature conducted between 2006 and 2013, it was observed that the number of traumas increased year by year (Langlois et al., 2006; Karasu et al., 2009; Çökük et al., 2013). This may be due to the increase in the number of motor vehicles in the traffic.

In our study, when the rates of transferred cases of trauma were examined according to the seasons, it was found that more cases of trauma were transferred in the autumn months with a rate of 32%. This may be due to the extended braking distance due to rain. In the literature we could not find a study examining seasonal distribution of the cases. There is need for larger studies examining more parameters. In our study, it was found that 75% of the traumas case was transferred from the scene of the event to the hospital. The most common symptom was found to be nausea and vomiting. However, it was determined that the symptoms of 95% of the patients had not been recorded. This can be due to the fact that the 112 personnel give priority to transfer the patients to the hospital without wasting time while they were providing lifesaving emergency interventions and they might have paid less



attention to the paperwork. However, in order to suggest solutions depending on appropriate epidemiological data, it is very important to update our forms and to provide these forms to be filled correctly and completely.

## CONCLUSION AND SUGGESTIONS

Preventing head traumas before they occur should be a priority within the scope of preventive medicine, especially considering the sequelae that may develop due to the head trauma. On the other hand, there is need for larger epidemiological studies, investigating more parameters as well as improving the insufficiencies that have been detected previously. It is also crucial to provide continuous in-service trainings in order to provide that all measures are taken to prevent time loss in the fields of emergency service and neurosurgery, which are the primary responsible branches, by investigating epidemiological studies. Developing a recording system, which can be filled easily and used effectively, is also necessary in order to obtain appropriate data and in order to provide immediate solutions, that will facilitate quick and secure transportation of trauma patients.

### Conflict of Interest

The authors have no conflicts of interest to disclose.

### Author Contribution

Working Concept / Design: B.T, S.D. Data collection: B.T, S.D. Data analysis and interpretation: B.T, S.D. Text draft: B.T, S.D. Approval of the final version of the article: B.T, S.D.

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