

Analysis of Interhospital Emergency Referrals Despite Safety Concerns on the Roads: Emergency Referrals in Northwest Syria intraregional Borders

Güzergahlardaki Güvenlik Endişelerine Rağmen Yapılan Hastaneler Arası Acil Sevkinin Analizi: Kuzeybatı Suriye Bölge İçi Sınırlarda Acil Sevkler

Bahadır Karaca¹, Burak Çelik²

ABSTRACT

Aim: Our study aims to assess emergency patient transport between hospitals in the northwestern region of Syria. In this way, determining the patient profiles transferred in the region can help shed light on the reasons for avoidable transfers, reduce transfers, and reduce the risks associated with transfers.

Material and Methods: Our retrospective study investigated the patients who were transferred to Azez Vatan Hospital, Çobanbey Hospital, and Jarablus Hospital and from these facilities within the borders of the northwestern region of Syria between 01/01/2020-01/01/2021. Transfer records of patients transferred between hospitals and ambulance stations were searched in files and computer records. Because there was no automation system in the healthcare facilities involved in the study, data were recorded manually on the data collection form and processed for statistical analysis. Statistical analyses of the study were performed as descriptive statistics of variables are reported as mean±standard deviation, median (min-max), and n (%). Statistical analyses of categorical variables were performed using the chi-square test and Fisher Freeman Halton Exact test.

Results: The mean age of the patients of 899 patients included in the study was 33.68±26.80 years, 530(59.0%) were male and 369(41.0%) were female. 27.3% of patients were trauma patients and of both sexes. Male trauma patients were approximately 2.5 times more common than female trauma patients. Among pediatric transfers, trauma was present in one out of every three patients. Patients were most frequently transferred in February, March, and June and least frequently in January (p < 0.05). It was found that the need for adult, newborn, and pediatric intensive care, the need for medical material and equipment, the need for further examination/treatment, followed by the need for treatment under the supervision neurosurgeon, obstetric and gynecologist, cardiology specialist, or pediatrician. It was also noted that transfers for COVID-19 (SARS-CoV-2 Coronavirus Disease 2019) service needs due to the impact of the COVID-19 outbreak during the study period were among the most common reasons. COVID-19 falls, respiratory distress, traffic accidents, and acute MI were the most common diagnoses in all transferred age groups.

Conclusion: In northwestern Syria, emergency patients are most often transferred from one hospital to another because they require all types of intensive care units, medical materials and equipment, advanced diagnostic treatment, and specialists in neurosurgery, obstetrics and gynecology, cardiology, and pediatrics. Increasing hospital capacity and qualifications of hospitals within the humanitarian response and increasing the number of specialists, may be considered to reduce inter-hospital transfers of emergency patients.

Keywords: Emergency transfer, interhospital transfer, post-conflict area, Syria

ÖZ

Amaç: Bu çalışmada, Suriye'nin kuzeybatı bölgesindeki hastaneler arasındaki acil hasta sevklerini değerlendirmeyi amaçlandı. Bu çalışmayla bölgede sevk edilen hasta profillerinin belirlenmesine, önlenebilir sevk nedenlerinin aydınlatılmasına, sevklerin azaltılmasına ve sevklerden kaynaklanan risklerin azaltılmasına katkı sağlanabilir.

Gereç ve Yöntemler: Bu retrospektif çalışmada, 01/01/2020-01/01/2021 tarihleri arasında Suriye'nin kuzeybatı bölgesi sınırları içindeki Azez Vatan Hastanesi, Çobanbey Hastanesi ve Jarablus Hastanesi'ne sevk edilen ve bu tesislerden sevk edilen hastalar değerlendirildi. Hastanelerdeki ve ambulans istasyonlarındaki hastaların sevk kayıtları dosyalardan ve bilgisayar kayıtlarından araştırıldı. Araştırmaya dâhil edilen sağlık kuruluşlarında otomasyon sistemi bulunmadığından veriler, veri toplama formuna manuel olarak kaydedilerek istatistiksel analizler için kaydedildi. Araştırmanın istatistiksel analizleri değişkenlere ait tanımlayıcı istatistikler ortalama±standart sapma, ortanca (min-maks) ve n (%) olarak raporlanarak yapıldı. Kategorik değişkenlerin istatistiksel analizleri ki-kare testi ve Fisher Freeman Halton Exact testi kullanılarak yapıldı.

Bulgular: Çalışmaya dâhil edilen 899 hastanın yaş ortalaması 33,68±26,80 yıl olup, 530'u (%59,0) erkek, 369'u (%41,0) kadındı. Hastaların %27,3'ü travma hastasıydı. Erkeklerde travma kadın hastalara göre yaklaşık 2,5 kat daha sık görülüyordu. Pediatrik başvurularda her üç hastadan birinde travma mevcuttu. Hastalar en sık Şubat, Mart ve Haziran aylarında, en az ise Ocak ayında başvurdu (p<0,05). Hastaların; erişkin, yenidoğan ve çocuk yoğun bakım ihtiyacı; tıbbi malzeme ve ekipman ihtiyacı, ileri tetkik/tehdavi ihtiyacı olduğu ve beyin cerrahisi, kadın doğum uzmanı, kardiyoloji veya pediatri uzmanı gözetiminde tedavi ihtiyacı olduğu tespit edildi. Ayrıca çalışma dönemi içerisinde COVID-19 salgınının etkisiyle oluşan COVID-19 (SARS-CoV-2 Coronavirüs Hastalığı 2019) hizmet ihtiyaçlarına yönelik sevklerin de en sık görülen nedenler arasında yer aldığı saptandı. Sevk edilen tüm yaş gruplarında en sık görülen tanılar, COVID-19, düşme, solunum sıkıntısı, trafik kazası ve akut miyokard enfarktüsü idi.

Sonuç: Kuzeybatı Suriye'de acil hastalar çoğunlukla acil nedenlerle bir hastaneden diğerine sevk edilebilmektedir. Sevk nedenleri olarak yoğun bakım ünitesinde takip ihtiyacı; tıbbi malzeme ve ekipman ile ileri teşhis tedavi gereksinimi ve beyin cerrahisi, kadın doğum, kardiyoloji ve pediatri uzmanı değerlendirmesine ihtiyaç duyulması görülmektedir. İnsani yardım kapsamında hastane kapasitesinin ve hastanelerin niteliklerinin artırılması ve uzman sayısının artırılmasının, acil hastaların hastaneler arası sevkleri azaltacağı düşünülebilir.

Anahtar Kelimeler: Acil sevk, hastaneler arası transfer, çatışma sonrası bölge, Suriye

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¹ Sancaktepe Şehit Prof. Dr. İlhan Varank Training and Research Hospital, Emergency Department, İstanbul, Türkiye

² Kırşehir Training and Research Hospital, Emergency Department, Kırşehir, Türkiye

Corresponding Author: Bahadır Karaca, MD, Associate Professor **Address:** Namık Kemal Cd. No:54, Sancaktepe Şehit Prof. Dr. İlhan Varank Training and Research Hospital, Emergency Department, 34785 Sancaktepe, İstanbul, Türkiye. **Telephone:** +905326211188 **e-mail:** dr.bk40@hotmail.com.

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Introduction

Treatment options are limited during prehospital and interhospital transfer, and extensive assessment is required, particularly during transfer (1,2). Studies have shown that transfer of critically ill patients increases the risk of death and transfer is considered a dangerous maneuver (3,4). For these reasons, the decision to transfer a patient is made by weighing the benefits to the patient at the transfer site against the potential risks of transfer (5).

Even in countries with well-developed health systems, patient transfers between hospitals are common (6). In low-income countries, there are many urgent surgical needs, such as motor vehicle accidents, agricultural accidents, peritonitis, long bone fractures, and postpartum hemorrhage, that may be transferred to other hospitals due to insufficient medical technical staff and equipment (7,8).

One of the regions lacking infrastructure after more than a decade of civil unrest and conflict in northwestern Syria (9,10,11). After this region was liberated from terrorism, health facilities were established as part of the humanitarian response. In addition to preventive health services, hospitals were also equipped with operating rooms, intensive care units, and other advanced diagnostic facilities (12). However, hospitals in northwestern Syria have varying capacities and service capabilities due to security concerns, transport difficulties, technical facilities, and human resources (13). If a patient is admitted to one of these hospitals for urgent surgical or medical reasons and cannot be adequately cared for there, they may be transferred to another health facility in northwest Syria where they can receive the most benefit. In north-western Syria, transport disruptions and difficulties occur due to a lack of infrastructure and security risks and controls. For elective patient transfers, it can be assumed that road and ambulance services are optimal for regional conditions. However, when emergencies require transfer to other facilities without waiting, the nature of the transfer process creates a risk that is exacerbated by transport problems. In this context, it is believed that analyzing the characteristics and reasons for patient transfers by determining the profiles of patients transferred in the region can help to shed light on the reasons for avoidable transfers, reduce transfers, and reduce the risks associated with transfers. Our study aims to assess emergency patient transfers between hospitals in the northwestern region of Syria.

Material and Methods

Study design and setting

Our retrospective study examined the patients who were transferred to Azez Vatan Hospital, Çobanbey Hospital, and Jarablus Hospital within the borders of the Northwestern Region of Syria between 01/01/2020-01/01/2021, as well as the patients who were transferred from these three hospitals to hospitals within the borders of the Northwestern Region of Syria.

The study was approved by the Non-Interventional Research Ethics Committee of Hatay Mustafa Kemal University (meeting date: 18.02.2021, decision number: 11) and the relevant hospital administrations.

Selection of Participants

Patients transferred to Azez Vatan, Çobanbey, and Jarablus hospitals from the emergency departments of other hospitals and patients transferred to other hospitals from the emergency departments of these three hospitals were included in the study. Patients who were transferred to Turkey or who returned from Turkey after completing their treatment were not included in the study. Patients transferred from wards, intensive care units, and outpatient clinics were excluded from the study. For patients who were transferred to another hospital without being treated at the place of transfer, the first and last hospitals were included in the study.

Study site and health care facilities

The study was conducted in hospitals, health centers, emergency ambulances, and their stations, and command and control centers for emergency medical services opened by Turkey as part of its humanitarian assistance in northwestern Syria, where Syrian doctors, nurses, and other health professionals' work. These health facilities serve the local population in northwestern Syria. The largest general hospitals are Azez Vatan Hospital in the south of Kilis province, ten kilometers (km) from the Turkish southern border, Çobanbey Hospital in the south of Elbeyli district in Kilis province, seven km from the Turkish southern border, and Jarablus Hospital in the south of Karkamış district in Gaziantep province, two km from the Turkish southern border. These hospitals also have ambulance stations for the transfer of emergency patients, while Çobanbey Hospital also has a command-and-control center for the management of ambulances. The patient transfers included in the study cover a radius of 131 km from Afrin in the west to Jarablus in the east.

Operation of health centers in the region

As a result of the Syrian civil war and terrorism, health centers in the region have been destroyed and rendered unusable. In addition, most of the health workers had to migrate from the region or lost their lives in the war. The Azez Vatan hospital was used by terrorist elements during the war, targeted by heavy weapons and even bombed by aircraft, and lay in ruins. After the region was cleared of terrorism, Turkey restored the Azez Vatan hospital and provided it with the physical conditions to provide advanced health services such as a 200-bed operating theatre, adult and neonatal intensive care units and a dialysis unit. Çobanbey Hospital was also rebuilt from scratch as a 200-bed prefabricated hospital capable of providing advanced health services such as operating rooms, neonatal, pediatric and adult intensive care units, a dialysis unit, and a burn unit. The Jarablus Hospital was opened as a 75-bed health facility providing advanced health services such as operating rooms, neonatal and adult intensive care units, and dialysis unit by converting the buildings with suitable physical conditions in the region into a hospital. Turkey has provided, and continues to provide, the infrastructure, equipment, and logistics for these hospitals, which were opened as part of humanitarian aid. These hospitals have provided the environment and facilities for local health workers working in the region to provide health services. Turkish health workers also provide training and advice to local health workers. Azez Vatan, Çobanbey, and Jarablus hospitals have

become the focal point of health services for local health workers through the provision of these facilities and the employment of local Syrian health workers. Azez Vatan, Çobanbey, and Jarablus hospitals are the most comprehensive hospitals in the region and receive the highest number of transfers. These hospitals have the most physical facilities, material and equipment capacity, and human resources, and provide the most advanced health services in the region. There are also smaller humanitarian hospitals and health centers opened by Turkey in the region. Some civil society organizations also run smaller hospitals and health centers with limited facilities. All patients who exceed the capacity of all hospitals and health facilities in the region are transferred to Azez Vatan, Çobanbey, and Jarablus hospitals. Particularly in emergencies, doctors in neurosurgery, head, face, and maxillofacial surgery, cardiovascular surgery, thoracic surgery, orthopedics, obstetrics and gynecology, pediatrics, and other specialties are not always present in other small hospitals or are not present at all. In at least one of the Azez Vatan, Çobanbey, and Jarablus hospitals, these specialists are available 24 hours a day, 7 days a week for emergency treatment of patients.

These hospitals, which provide the highest level of healthcare in the region, accept all patients and are the main healthcare centers for patients in the region. However, if there are situations that exceed the capabilities of the Azez Vatan, Çobanbey, and Jarablus hospitals, patients can be transferred to hospitals in Turkey with the decisions made in this hospital. These transfers can be emergency transfers. In the case of emergency patient transfers, the entire healthcare process of the patients transferred to the hospital in Turkey can be completed in Turkey until they are discharged. In other cases, patients may be transferred for appropriate interventional procedures in some selected patient groups, such as emergency PCI, or emergency advanced surgery. Patients can be readmitted to Azez Vatan, Çobanbey, and Jarablus hospitals in Syria for emergency procedures and follow-up of post-operative stabilized patients. In addition, patients residing in northern Syria who have traveled to Turkey and require hospitalization can also be transferred to Azez Vatan, Çobanbey, and Jarablus hospitals in Syria if the patient wishes. Another group, elective patients, can be transferred to these hospitals for advanced medical services upon the decision of the medical boards of these hospitals. However, these patients are not the group of patients evaluated in this study.

Data collection

Transfer records of patients transferred between hospitals and ambulance stations were searched in files and computer records. From these records, demographic information, diagnoses, reason for transfer, transferring hospital, vital signs, Glasgow Coma Scale, and time zones and days of transfer were scanned. As there was no automated system in the healthcare facilities involved in the study, data were manually recorded on the data collection form and processed for statistical analysis.

Statistics

Statistical analyses of the study were performed using Statistical Package for Social Sciences version 28.0 software for Windows (IBM SPSS Statistics for Windows, version 28.0.

Armonk, NY: IBM Corp., USA). Descriptive statistics of variables are reported as mean±standard deviation, median (min-max), and n (%). Statistical analyses of categorical variables were performed using the chi-square test and Fisher Freeman Halton Exact test.

Results

A total of 899 interhospital transferred patients were included in the study. The mean age of the patients was 33.68±26.80 years, 530 (59.0%) were male and 369 (41.0%) were female. The relationship between sex and age groups was not statistically significant ($p=0.096$) (Table 1).

Age groups	Mean±SD Median (Min- Max)	Male n (%)	Female n (%)	Total n (%)	p [#]
Neonatal (age≤28 Days)	3.85±5.39 1.0 (1.0-15.0)	76 (14.3)	65 (17.6)	141 (15.7)	
Child (28 Days <age<18 years)	6.97±5.25 6.0 (0-17.0)	97 (18.3)	84 (22.8)	181 (20.1)	
Adult (18≤age <65)	42.90±13.24 44.0 (18.0-64.0)	280 (52.8)	166 (45.0)	446 (49.6)	0.096
Elderly (age≥65),	74.49±7.45 72.5 (65.0-97.0)	77 (14.5)	54 (14.6)	131 (14.6)	
Total	33.68±26.80 35.0 (0.0-97.0)	530 (59.0)	369 (41.0)	899 (100.0)	

Table 1. Values for the age of patients and distribution of age groups by sex. SD: Standard deviation, #: Chi-Square.

When analyzing the distribution of patients according to trauma status, 654 (72.7%) were non-trauma patients and 245 (27.3%) were trauma patients. When evaluating trauma patients, there was a higher prevalence of patients in the adult age group compared to the other age groups, in both sexes ($p=0.016$). Among transferred trauma patients, male trauma patients ($n=171$) were approximately 2.5 times more common than female trauma patients ($n=74$). In pediatric transfers, trauma was present in one in two patients ($n=63$) (0.016) (Table 2).

When comparing transfers by month, patients were most frequently transferred in February, March, and June, and least frequently in January (chi-square test, $p < 0.05$). When compared by days of the week, the distribution of transfers was homogeneous (chi-square test, $p=0.201$).

When the reasons for patient transfer were evaluated in general and by gender, the 10 most common reasons for transfer are shown in Figure 1. Accordingly, the most common reasons for transfer were the need for intensive care ($n=164$), the need for medical equipment and supplies ($n=129$), and the need for neonatal intensive care ($n=120$), followed by the need for treatment under the supervision of a neurosurgeon ($n=47$), the need for further evaluation/treatment ($n=44$), the need for treatment under the supervision of an obstetrician/gynecologist ($n=42$), the need for pediatric intensive care ($n=33$), and the need for treatment under the supervision of a cardiologist ($n=29$) or pediatrician ($n=27$).

Age groups	Male n (%)		Female n (%)		Total n (%)	
	Trauma (-)	Trauma (+)	Trauma (-)	Trauma (+)	Trauma (-)	Trauma (+)
Total	359 (67.7)	171 (32.3)	295 (79.9)	74 (20.1)	654 (72.7)	245 (27.3)
Neonatal (Age≤28 Days)	50 (13.9)	26 (15.2)	59 (20.0)	6 (8.1)	109 (16.7)	32 (13.1)
Child (28 Days<Age<18)	58 (16.2)	39 (22.8)	60 (20.3)	24 (32.4)	118 (18.0)	63 (25.7)
Adult (18≤Age<65)	192 (53.5)	88 (51.5)	130 (44.1)	36 (48.6)	322 (49.2)	124 (50.6)
Elderly (65≤Age)	59 (16.4)	18 (10.5)	46 (15.6)	8 (10.8)	105 (16.1)	26 (10.6)
#p	0.122		0.021		0.016	

Table 2. Trauma status of patients by age group and gender.

#: Chi-Square Test

It was also found that transfers for COVID-19 service needs (n=111) due to the impact of the COVID-19 (SARS-CoV-2 Coronavirus Disease 2019) outbreak during the study period were among the most common reasons (Figure 1). When the distribution of transfers by the hospital was evaluated, the

hospital that transferred the most patients was Azez Vatan Hospital (n=558) and the hospital that received the most transfers was Çobanbey Hospital (n=341) (Table 3).

Hospitals accepting transfers n (%)	Referring hospitals n (%)			p [#]
	Azez Vatan H. 558 (62.1%)	Jarablus H. 109 (12.1)	Çobanbey H. 232 (25.8)	
Afrin H.	20 (2.2)	15 (2.7%)	4 (1.7)	<0.001
Azez Vatan H.	119 (13.2)	-	105 (45.3)	
Jarablus H.	43 (4.8)	16 (2.9%)	27 (11.6)	
Çobanbey H.	341 (37.9)	280 (50.2%)	-	
Elbab H.	136 (15.1)	55 (9.9%)	52 (22.4)	
IDA (Independent Doctors Association) H.	90 (10.0)	89 (15.8%)	-	
Marea H.	135 (15.0)	88 (15.8%)	44 (19.0)	
Other local hospitals	15 (1.7)	15 (2.7%)		

Table 3. Distribution of transfers among hospitals.

#: Fisher Freeman Halton Exact test, H.: Hospital

When the mean and median vital signs of the transferred patients over 18 years of age were analyzed, it was found that the vital signs were close to normal values and the Glasgow Coma Scale (GCS) score was less than 15. The assessment of the level of consciousness using the AVPU scale among the transferred patients, whose data were available, revealed that 388 (86.2%) were alert (A) and 62 (13.8%) were responsive to verbal stimuli (V), responsive to pain (P), or unresponsive (U). Diagnostic groups were used in the analysis of the diagnostic distribution of the transferred patients to facilitate the evaluation, as the spectrum was wide. After excluding inaccessible data and analyzing the distribution of diagnoses by age group, it was found that COVID-19 (n=111), falls (n=69), respiratory distress (n=63), traffic accidents (n=61), and acute MI (n=60) were the most common diagnoses in all transferred age groups. Respiratory distress (n=52) and prematurity (n=49) were the most common diagnoses in newborns, while the

rate of trauma-related diagnoses was highest in children. In the adult and elderly age groups, COVID-19-related diagnoses ranked first, while respiratory distress and acute MI in the elderly and acute MI and trauma in adults were the leading diagnoses (Table 4).

When the distribution of transfer diagnoses was evaluated by sex, respiratory distress (n=37) and prematurity (n=21) were most common among all males under 18 years of age, followed by trauma-related diagnoses such as traffic accidents (n=19) and falls (n=15). When the distribution of diagnoses was analyzed for all patients over 18 years of age, COVID-19-diagnosed transfers were the most common regardless of gender, whereas cardiopulmonary and trauma were the most common diagnoses for males. When all female patients over 18 years of age were analyzed, transfers with a trauma diagnosis were less common (Table 5).

Most common diagnoses in all age groups	n (%)*	Most common diagnoses in newborns (≤28 Days)*	n (%)*	Most common diagnoses in children (28 Days -18 years)*	n (%)*	Most common diagnoses in adults (18 years-65years)*	n (%)*	Most common diagnoses in the elderly (>65years)*	n (%)*
COVID 19	111 (12.3)	Respiratory Distress	52 (36.9)	Traffic Accident	26 (14.4)	COVID-19	62 (13.9)	COVID-19	47 (35.9)
Falls	69 (7.7)	Prematurity	49 (34.8)	Falls	25 (13.8)	Acute MI	46 (10.3)	Dyspnea	16 (12.2)
Respiratory Distress	63 (7.0)	Congenital anomaly	10 (7.1)	Head Trauma	13 (7.2)	Falls	38 (8.5)	Acute MI	14 (10.7)
Traffic Accident	61 (6.8)	Jaundice	10 (7.1)	Dyspnea	10 (5.5)	Traffic Accident	34 (7.6)	Femur Fracture	8(6.1)
Acute MI	60 (6.7)	Meconium aspiration	5 (3.5)	Fever	8 (4.4)	Dyspnea	25 (5.6)	Falls	6 (4.6)
Prematurity	49 (5.5)	Cyanosis	3 (2.1)	Congenital anomaly	6 (3.3)	Pregnancy	20 (4.5)	Stroke	4 (3.1)
Dyspnea	41 (4.6)	Fever	2 (1.4)	Acute Renal Failure	5 (2.8)	Acute Renal Failure	18 (4.0)	DM emergencies	3 (2.3)
Femur Fracture	26 (2.9)	ileus	2 (1.4)	Burn	5(2.8)	Firearm Injury	17 (3.8)	Acute Renal Failure	2 (1.5)
Acute Renal Failure	25 (2.8)	Pneumonia	2 (1.4)	Femur Fracture	5(2.8)	Femur Fracture	13 (2.9)	Seizure	2 (1.5)
Firearm Injury	23 (2.6)	Blood incompatibility	2 (1.4)	Firearm Injury	5(2.8)	Burn	11 (2.5)	Hydronephrosis	2 (1.5)
Other	371 (41.3)	Other	4 (2.8)	Other	73 (40.3)	Other	162 (36.3)	Other	27 (20.6)

Table 4. Distribution of the most common diagnosis groups among transferred patients by age group

*Missing values are not included in the % calculation. Valid percent values were use

Discussion

Our study found that the most common reasons for transfer were the need for intensive care, the need for medical supplies and equipment, the need for neonatal intensive care, the need for treatment under the supervision of a neurosurgeon, and the need for further evaluation/treatment. The most common specialties required for transfer were neurosurgery, obstetrics and gynecology, cardiology, and pediatrics. The most common diagnostic groups for transfer were falls, dyspnea, motor vehicle crashes, and acute MI. In addition, the need for COVID-19 services and the importance of COVID-19-related diagnoses demonstrated the impact of the pandemic on transfers for adult and elderly patients.

A study conducted in Jamaica examining interhospital transfer of trauma patients showed that 4 out of 5 trauma patients transferred between hospitals were male (14), and a study conducted in Nigeria showed that 6 out of 7 patients transferred for head trauma were male (15). An analysis of interhospital transfers in the United States showed that, despite some differences by ethnicity, the ratio of female to male patients was equal or close to equal, and in some cases, the ratio of female to male patients was even higher (16). Considering the publications in the literature, it can be said that the difference in the ratio between females and males in interhospital transfers is related to the level of development and the reasons for transfer. In our study, the high rate of male patients and the 2.5 times higher rate of male patients in trauma-related transfers can be explained by the high incidence of trauma in Northern Syria, where civil unrest and conflict continue.

To identify the reasons for avoidable transfers, it may be strategic to first evaluate by age group. In a study

investigating emergency transfers between hospitals in Mardin, a border province of Turkey close to the region where our study was conducted, it was found that 7% of patients under one year of age were transferred. In comparison, 25.8% of patients over 65 years of age were transferred (17). In our study, it was found that 14.6% of transferred patients were elderly patients aged 65 years and above, about half of them were patients aged 18-65 years, 35.8% were pediatric patients under 18 years, and 15.7% of transferred patients were neonates. In our study, the rate of transferred elderly is lower than in Mardin, but the rate of neonates is higher than in Mardin. This situation can be explained by the fact that this difference in the development of the regions, even though they are geographically close, affects the increase in the elderly population, the increase in geriatric care services, and the increase in expectations of services for the elderly.

In a study by Kilci et al. examining emergency admissions in the elderly, respiratory diseases, infections, malnutrition, and trauma were found to be the most common diagnoses (18). In our study, when the distribution of diagnoses in elderly patients was examined, it was found that patients were admitted for the most common diagnosis of COVID-19, followed by reasons such as dyspnea, acute myocardial infarction, and falls. It is reasonable to assume that the patients transferred were consistent with the population from which they were selected.

In a review of pediatric transfers in the literature, Gattu et al. showed that the most common reason for transfer was respiratory disease (19). In a study by Odetola et al. reviewing transfers to pediatric intensive care units, respiratory distress and sepsis were the most common reasons for transfer (20).

Male		Female	
Diagnosis	n (%)*	Diagnosis	n (%)*
(Age <18 years) (n=173)		(Age < 18 years) (n=149)	
Respiratory Distress	37 (21.4)	Prematurity	29 (19.5)
Prematurity	21 (12.1)	Respiratory Distress	25 (16.8)
Traffic accidents	19 (11.0)	Falls	10 (6.7)
Falls	15 (8.7)	Traffic accidents	8 (5.4)
Congenital anomaly	11 (6.4)	Head Trauma	7 (4.7)
Head Trauma	7 (4.0)	Fever	5 (3.4)
Jaundice	6 (3.5)	Congenital anomaly	5 (3.4)
Fever	5 (2.9)	Birth	4 (2.7)
Dehydration	5 (2.9)	Femur fracture	4 (2.7)
Pneumonia	4 (2.3)	Jaundice	4 (2.7)
Other	43 (26.4)	Other	48 (32.2)
(18 years ≤ Age) (n=357)		(18 years ≤ Age) (n=220)	
COVID-19	67 (18.8)	COVID-19	42 (19.1)
Acute MI	37 (10.4)	Acute MI	23 (10.5)
Traffic accidents	31 (8.7)	Pregnancy	20 (9.1)
Falls	28 (7.8)	Falls	16 (7.3)
Dyspnea	26 (7.3)	Dyspnea	15 (6.8)
Firearms Injury	17 (4.8)	Femur Fracture	10 (4.5)
Femur Fracture	11 (3.1)	Acute Kidney Failure	9 (4.1)
Acute Kidney Failure	11 (3.1)	DM emergencies	6 (2.7)
Intracranial Hemorrhage	8 (2.2)	C-Section Birth	6 (2.7)
Stroke	8 (2.2)	Burn	5 (2.3)
Other	113 (31.7)	Other	68 (30.1)

Table 5. Distribution of patient transfer diagnosis groups by gender and age

*Missing values are not included in the % calculation. Valid percent values were used.

In our study, although respiratory distress and prematurity were among the most common reasons for transfer in neonates, it is observed that trauma diagnoses are more common in pediatric patients. They were not as prominent as trauma diagnoses, in contrast to the literature. In our study, where one in three patients was a child, it is reasonable to assume that the living conditions of patients in geographical areas with irregular and incomplete infrastructure increase the risk of traffic accidents and trauma.

A literature review of neonatal patients in Iran reported that neonates transferred between hospitals were on average 4.1 days old, half were male, a quarter was premature, and the reasons for transfer of these patients were respiratory distress in 58%, need for surgery in 21%, central nervous system disorders in 9%, sepsis in 6%, and acute renal failure in 4% (21). A study conducted in India found that almost half of the reasons for interhospital transfer of newborns were due to prematurity, followed by respiratory distress syndrome, sepsis, growth retardation, and meconium aspiration (22). In our study, respiratory distress and prematurity were among the most common diagnoses, although not as common as in India and Iran. Congenital anomaly, jaundice, and meconium aspiration followed the other two diagnoses more homogeneously. While it is a surprising result that nutritional deficiencies are not seen in the top-ranked neonates, it may suggest that the existing breastfeeding solidarity in this geography (23) may cause this effect. In addition, it is conceivable that differences between countries in prenatal follow-up rates, hospital facilities, and postnatal living conditions of newborns influence both the conditions and the reasons for the transfer.

The Canadian Institutes of Health Sciences national database reports that approximately 10% of patients admitted for acute cardiovascular disease were transferred to another center. Transferred patients were found to have lower all-cause mortality compared to non-transferred patients. NSTEMI and STEMI patients were also more likely to be transferred (24).

In contrast, a national cohort study in South Korea showed that patients transferred 30 days and 1 year after AMI had higher mortality. However, the elderly and patients with other comorbidities were more likely to be transferred to another emergency department. These patients with STEMI or NSTEMI were less likely to survive in the short and long term, even after adjustment for baseline characteristics and AMI severity. In addition, transferred patients were less likely to receive thrombolysis before interhospital transfer and less likely to receive immediate reperfusion therapy (25).

In our study, patients with coronary artery disease were among the most common diagnoses in patient referrals. Especially in the elderly, MI is the most common diagnosis. In the literature and our study, it was observed that MI patients were transferred to an advanced center because of concerns about mortality and the need for treatment. In northern Syria, patients are transferred to the appropriate intensive care unit after diagnosis, whereas for emergency invasive procedures, this support is provided by referral to hospitals in Turkey. Although each region has its characteristics, it can be seen that they are trying to provide the most ideal care for MI patients according to current treatment guidelines.

Westfall's assessment of inpatient databases in the United States suggests that the COVID-19 pandemic has highlighted

the challenges faced by hospitals. During the COVID-19 pandemic, there was an overall increase in mortality from non-COVID-19 diseases. In urban hospitals, mortality from acute myocardial infarction and gastrointestinal bleeding increased during the COVID-19 pandemic, while in rural hospitals, mortality from hip fracture increased during the COVID-19 pandemic. Mortality from pneumonia and sepsis increased in both rural and urban hospitals, suggesting that hospitals were unable to provide the same timeliness and level of care to non-COVID-19 patients in the face of the overwhelming number and severity of COVID-19 cases. The sheer volume of severe illness has been associated with increased mortality compared to pre-COVID-19. It has been hypothesized that the increased mortality may be due to the combined effects of resource constraints, particularly access to intensive care and mechanical ventilation; delayed care due to hospital overcrowding; and delayed care due to patient concerns about being admitted to the hospital with a COVID-19 infection (26). Our study shows that COVID-19 has the greatest impact on inter-hospital transfers. As is the case throughout the world, the periodic effects of COVID-19 on patient transfers, patient care and hospital organization are evident regardless of geography.

In a study of referrals to a hospital considered the main referral center in the capital of the sub-Saharan country of Malawi, delayed inter-institutional transfer was found to be an independent predictor of poor postoperative outcomes in patients transferred to a referring hospital for abdominal surgical emergencies. Each additional day to transfer was associated with an 18% increase in the likelihood of postoperative complications and a 19% increase in the likelihood of postoperative mortality. Another study examining the relationship between transfer status and in-hospital mortality in the same region showed that indirect transfer patients to the trauma centre had a significantly higher crude mortality rate than direct transfer patients. However, although indirect transfer patients arrived at the central trauma hospital an average of 2.69 days later than direct transfer patients, the longer time from injury to arrival was not associated with a higher risk of death (27). In our study, transfer of trauma patients was high in all age groups. The lack of health care personnel and equipment, especially in underdeveloped countries, creates the need for transfer of trauma patients. Adding the risk of transfer to inherently unstable trauma patients, can increase mortality.

An observational study of patient transfers between hospitals in the US found that lower socioeconomic status and being Hispanic or black were associated with fewer transfers. It has been suggested that this situation is indicative of disparities in access to health care (28). In the regions covered by our study, Turkey is attempting to provide access to healthcare for patients regardless of race, religion, language and gender by opening reference hospitals in the region.

Limitations

As there was no automation system in the healthcare facilities involved in the study, data were recorded manually on the data collection form. Manually recorded transfer records had insufficient and meaningless data and were

excluded from the study. Due to the wide variety of reasons for transfer and transfer diagnoses, the evaluation was made based on the ten most common diagnoses and reasons.

Conclusion

In northwestern Syria, increasing hospital capacity and qualifications of hospitals within the humanitarian response and increasing the number of specialists, may be considered to reduce inter-hospital transfers of emergency patients.

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