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ORIGINAL ARTICLE

# Rates of emergency room visits and hospitalizations among refugee and resident children in a tertiary hospital in Turkey

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## Abstract

Evaluation of emergency department (ED) presentation by Syrian refugee children might provide important information about their health care needs. For this purpose, we compared ED presentation of refugee and resident children in a tertiary university hospital in Istanbul, Turkey.

Electronic medical records of Syrian refugee children ≤ 18 years old presenting to the ED between January 2013 and July 2019 were retrospectively reviewed and compared with resident children.

The study population consisted of 7299 refugees and 690,127 resident children admitted to the ED. High-acuity cases were more frequent in Syrian refugees (2.2% vs 1% $p < 0.001$). One-third of Syrian children were under 12 months of age (31% vs 17%, $p < 0.001$). Syrian children were more commonly hospitalized (7.9% vs 3.1% $p < 0.001$). The median age (and interquartile range – IQR) was lower in hospitalized refugee than in resident children [12 (0–83) months vs 41 (8–111) months, $p < 0.001$]. Rate of intensive care unit hospitalization (13% vs 9.4%, $p = 0.001$) and neonatal hospitalization was higher in Syrians compared to resident children (29% vs 12%, $p < 0.001$). The median NICU stay was longer in refugees [6 (IQR 4–17) days vs 3 (IQR 1–9) days, $p < 0.001$].

*Conclusion*: Refugee children, as compared to resident children, are more likely to present to the ED with high acuity conditions and at a younger age resulting in higher rates of inpatient admissions. Strategies to increase access to preventive health care services for young refugee children should be explored to decrease ED and hospital services and improve health outcomes.

**What is Known:**
- *Children are the most affected victims of armed conflicts in terms of health outcomes.*
- *Refugees prefer to access healthcare through the emergency department.*

**What is New:**
- *Refugee children were more likely to present as urgent when compared to resident children.*
- *Admission to neonatal and intensive care units was more frequent among refugee than resident children.*

**Keywords** Armed conflict · Child · Emergency · Healthcare · Refugee

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**Abbreviations**

| | |
|---|---|
| ED | Emergency department |
| ICD-10 | International classification of diseases 10 |
| ICU | Intensive care unit |
| IQR | Interquartile range |
| NICU | Neonatal intensive care unit |
| SES | Socioeconomic status |

## Introduction

The Syrian conflict resulted in the largest displacement crisis in history with more than 7.2 million Syrians seeking asylum in other countries [1]. Turkey first opened camps for refugees in 2011 and remains the country hosting the largest Syrian refugee population [2]. As of June 2019, there are 3.6 million registered Syrian refugees in Turkey under "Temporary Protection" [3]. "The Temporary Protection Regulation" in Turkey, which applies to only Syrian refugees, promotes their access to national systems, such as health care, education, and social protection in the city where they are registered. However, unregistered Syrian refugees do not have free access to usual healthcare services except for emergency conditions. Additional barriers to Syrian refugees accessing healthcare in Turkey may include language difficulties, xenophobia, and lack of trust in or awareness of available services [4, 5].

The medical conditions and health care needs of refugees differ from the needs of the resident population [6]. Children are the most vulnerable victims of armed conflicts. Displacement, death of family members, lack of education, risk of exploitation or trafficking, psychological trauma, and access barriers to health services increase their vulnerability [7].

Although health risks and needs of refugee children have been investigated, studies of pediatric ED presentations involving refugee children are still limited [8–12]. As the number of Syrian refugees in Turkey increases, emergency service use in government hospitals is also increasing [13]. Evaluation of emergency department (ED) usage by Syrian refugee children might provide important information about their health care needs as a prerequisite for improving preventive health services and outcomes. The aim of this study is to compare ED presentations of refugee and resident children in a tertiary hospital, in order to better understand the current health status and health service utilization of refugee children in Turkey.

## Material and methods

### Study design and setting

In this retrospective observational study, all pediatric ED visits of children aged ≤ 18 years between January 2013 and July 2019 at the Marmara University Research and Training Hospital in Istanbul were reviewed. Istanbul is the largest city in Turkey with approximately 15 million inhabitants. As of June 2019, 548,865 registered Syrians reside in Istanbul under temporary protection, which is 3.64% of the total resident population [3]. For the purpose of this study, children with "temporary protection" status were also considered refugees [14]. These Syrian refugee children were born in Syria, Turkey, and other countries and registered in Turkey under temporary protection. Among Syrian refugees in Turkey, children constitute 1.6 million individuals. In June 2019, Ministry of Interior Director General of Migration Management, announced that since 2011 more than 415,000 Syrian babies were born in Turkey [15], whereas during the same time number of total live births ranged between 1.1 and 1.3 million per year in Turkey (Syrian births constituting approximately 4.3% of live births) [16].

Marmara University Research and Training Hospital is the only governmental university hospital and is in the vicinity of Pendik, where 0.72% of the population are Syrian refugees, and Sultanbeyli, where Syrian refugees compose 6.27% of the population [17]. Since there are no refugee camps nearby the hospital, the population included in the study are refugees living independently in urban setting. Interpreter services are available in the hospital but due to overcrowding some refugees might have difficulty to access. Refugees commonly enter the hospital with a Turkish speaking relative. During the study period, registered Syrian refugees could access hospital services free of charge. For unregistered refugees, only emergency encounters for life-threatening conditions were covered by the government. As of December 2019, refugees have to pay a contribution fee for healthcare access and medicines as do Turkish citizens. Since there is not a well-functioning referral system between the different levels within the Turkish healthcare system, referral from primary physicians is not mandatory for access to hospitals. Both resident and refugee patients can access ED for urgent or non-urgent reasons except for immunization and well child visits. Priority is given to more severe presentations. The study protocol was approved by the Marmara University Institutional Review Board (09.2019.616).

### Patient population and data collection

Information from all ED encounters of children ≤ 18 years old were obtained from the hospital medical record system. Before data were released, personal identifiers were encrypted to ensure confidentiality. Data regarding age, gender, date of ED visits, triage category, diagnosis, and inpatient hospital admissions status and duration were

extracted from the electronic database by the Information Technology Department of the hospital.

All patient encounters were primary encounters as the hospital electronic system does not allow additional encounter records from the same patient in the following 2 weeks after the first presentation. Therefore, multiple presentations within a 2-week period were counted as one visit.

Emergency Severity Index version 4 is being used in the pediatric emergency department as the triage category system [18]. The Index has five levels. For this study, patients requiring immediate life-saving interventions (Level 1) and those presenting with high-risk conditions (Level 2) were considered high-acuity; patients who are expected to require two or more resources (Level 3) were considered moderate-acuity, and those who are expected to require one resource (Level 4) or no resources (Level 5) are considered low-acuity patients [18]. Triage code category was determined on presentation to the ED by a nurse according to the institutional criteria defined above considering both the presenting complaints and vital signs of the patients. Diagnoses were classified according to the International Classification of Diseases 10 (ICD-10) codes, which were entered during the ED visits.

Patients were categorized into resident and Syrian refugee patients for comparison. Residents were children with a Turkish ID and did not include other immigrant children. Refugee patients were Syrian children under temporary protection regardless of their country of birth. Refugee status was able to be identified without accessing personal data by classifying the patients according to the insurance system as all refugees under temporary protection have the same insurance code called AFAD (Turkish abbreviation for The Disaster and Emergency Management Presidency); which is the governmental organization responsible for the payment of healthcare costs of Syrian refugees. Similarly, resident children were also identified by the type of their insurance system, which is the governmental insurance.

### Statistical analysis

Categorical variables were summarized by frequencies ($n$) and percentages (%) and compared by the chi-square test (with Fisher's test if appropriate). Continuous variables were expressed as medians and interquartile range (IQR, 25–75). Missing data were excluded from the analyses. The hypothesis of normal distribution was tested using the Kolmogorov–Smirnov test, graphical visualization, skewness, and kurtosis. Differences of continuous variables between groups were compared by Kruskal Wallis and Mann–Whitney $U$ test where appropriate. Data were analyzed using Statistical Program for the Social Sciences (SPSS) version 20.0 (IBM. Armonk, NY, USA). A critical $p$-value of 0.05 was accepted as significant.

## Results

### Patient characteristics

We analyzed 697,426 ED visits between January 2013 and July 2019, 1% ($n=7,299$) were visits from refugee children. Table 1 shows the characteristics of both refugee and resident populations.

The ratio of refugee to resident children increased remarkably from 2013 until 2017, by 113-fold (Fig. 1), followed by a decreased proportion of refugee admissions since 2018. Among refugee children, 2,850 (39%) were born in

**Table 1** Characteristics of pediatric patients presenting to the emergency department

| Category | Resident children $N = 690,127$ (99%) | Refugee children $N = 7,299$ (1%) | $p$-value |
|---|---|---|---|
| Male/female, *n (%)* | 372,275 (54)/317,852 (46) | 4,036 (55)/3,263 (45) | 0.02 |
| Age in months* | 54 [20–107] | 33 [9–92] | < 0.001 |
| Age groups (months), *n* (%) | | | |
| 0–12 | | | < 0.001 |
| 13–36 | 119,780 (17) | 2,258 (31) | |
| 37–60 | 147,781 (21) | 1,570 (22) | |
| 61–120 | 104,196 (15) | 876 (12) | |
| ≥ 121 | 174,362 (25) | 1,250 (17) | |
| | 143,956 (21) | 1,340 (18) | |
| Acuity, *n* (%) | | | < 0.001 |
| Low | 442,841 (64) | 4,757 (65) | |
| Moderate | 240,464 (35) | 2,378 (33) | |
| High | 6,822 (1) | 164 (2.2) | |

*Median [interquartile range]

Missing data: age < 0.1%

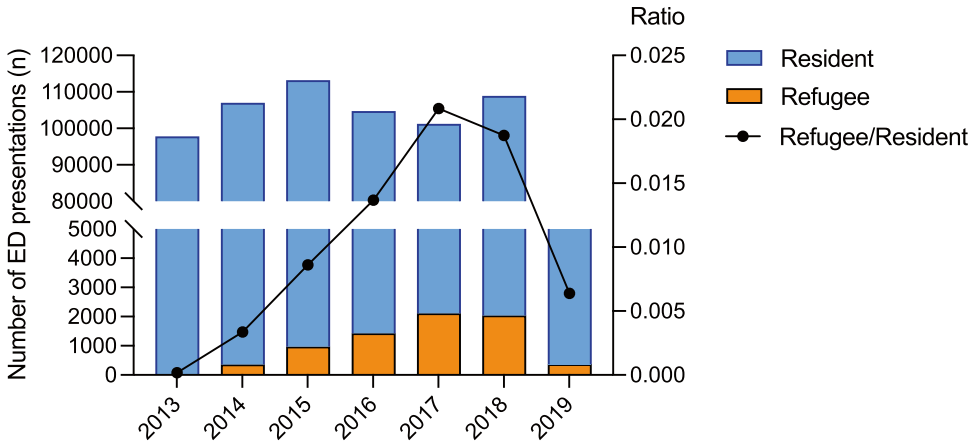


**Fig. 1** Number of ED presentations according to the years (data from 2019 is until July). The line graph represents the ratio of refugee to resident presentations in each year

Syria, 2,215 (30%) were born in Turkey, and place of birth was unknown for 2,201 (30%). Less than 1% were known to have been born in other countries ($n=33$). Refugees born in Turkey were younger [11 months (4–21), $p<0.001$] than the refugees born in Syria [83 months (48–136)] and other countries [48 (37–58)].

## Emergency department presentation

Refugees (2.2%) were significantly more likely to present with high-acuity conditions compared to the resident children (1%, $p<0.001$, *OR*: 2.3, 95% *CI*: 1.95–2.64). The pattern of high-acuity ED presentation tended to decrease over the years among refugees (Table 2).

The proportion of children under 12 months of age presenting to the ED was higher among refugee children compared to the residents (31% vs 17%, $p<0.001$, *OR*: 2.13, 95% *CI*: 2.03–2.24).

**Table 2** Demographics of ED presentations over the years

| | High acuity | | *OR* (95% *CI*) |
|---|---|---|---|
| | Refugee children *n* (%*) | Resident children *n* (%*) | |
| 2013 | 3/18 (17) | 1,511/97,747 (1.5) | 12.73 (3.68–44.04) |
| 2014 | 19/359 (5.3) | 921/106,966 (0.9) | 6.43 (4.03–10.26) |
| 2015 | 27/975 (2.8) | 875/113,197 (0.8) | 3.65 (2.48–5.39) |
| 2016 | 30/1,431 (2.1) | 806/104,689 (0.8) | 2.76 (1.91–3.98) |
| 2017 | 50/2,109 (2.4) | 1,222/101,230 (1.2) | 1.98 (1.49–2.64) |
| 2018 | 33/2,040 (1.6) | 1,111/108,859 (1) | 1.59 (1.12–2.26) |
| 2019 | 2/367 (0.5) | 376/57,439 (0.7) | NA |
| Total | 164/7,299 (2.2) | 6,822/690,127 (1) | |

*Percentages represent the ratio of children presented with high acuity to the total number of children presented to the ED in each group according to the years

*CI* confidence interval, *OR* odds ratio, *NA* not applicable

## Inpatient hospitalization

Overall, 3.2% ($n=22,069$) of ED visits resulted in inpatient hospitalizations. The proportion of hospitalized refugee children was higher ($n=573$, 7.9% vs $n=21,496$, 3.1% $p<0.001$, *OR*:2.65, 95% *CI*: 2.43–2.88). The duration of hospital admission was not different between refugee [3 days (1–6)] and resident children [3 days (1–7), $p=0.053$]. The median age of the hospitalized refugee children was younger than resident children [12 (0–83) months vs 41 (8–111) months, $p<0.001$]. Admitted children were more likely to be a refugee in all age groups (Table 3). Almost half (51%) of the refugee admissions were under 12 months of age.

**Table 3** Inpatient admissions according to age groups

| Age groups (months) | Inpatient admission/total emergency service admission | | *OR* (95% *CI*) |
|---|---|---|---|
| | Refugee children *n* (%*) | Resident children *n* (%*) | |
| 0–12 | 292/2,258 (13) | 6,507/119,780 (5.4) | 2.58 (2.28–2.93) |
| 13–36 | 81/1,570 (5.2) | 3,753/147,781 (2.5) | 2.08 (1.66–2.61) |
| 37–60 | 39/876 (4.5) | 2,319/104,196 (2.2) | 2.04 (1.48–2.82) |
| 61–120 | 49/1,250 (3.9) | 4,065/174,362 (2.3) | 1.7 (1.28–2.27) |
| > 120 | 111/1,340 (8.3) | 4,839/143,956 (3.4) | 2.59 (2.13–3.16) |
| Total | 572/7,294 (7.8) | 21,483/690,075 (3.1) | 2.64 (2.42–2.88) |

*Percentages represent the proportions of admitted refugee and resident children in each age groups. In the total row, percentages are for the total admitted patients in each group

*CI* confidence interval, *OR* odds ratio

Missing data: inpatient admission < 0.1%

Admission to the neonatal inpatient services was more frequent among refugee children ($n=166$, 29%), compared to resident children ($n=2{,}578$, 12%, $p<0.001$). Similarly, admissions to all intensive care units (ICU) were significantly higher among refugees ($n=77$, 13%) than among resident children ($n=2{,}013$, 9.4%, $p=0.001$). This difference was related primarily to admissions to the neonatal intensive care unit (NICU). Among admitted patients, refugee neonates ($n=41$, 7.2%) were more likely to be admitted to the NICU than the resident neonates ($n=987$, 4.6%, $p=0.004$, *OR*:1.6, 95% *CI*:1.15–2.21). The hospital length of stay of the refugee neonates was longer compared to resident neonates in the NICU [6 (4–17) days vs 3 (1–9) days, $p<0.001$].

### Presentation and admission diagnosis according to the ICD-10

The most frequent reason for emergency service visits was respiratory problems in both groups. Emergency arrivals due to respiratory problems were significantly higher among refugees ($n=4{,}869$, 66% vs $n=433{,}733$, 63%, $p<0.001$), whereas gastrointestinal problems were more common in resident children ($n=73{,}077$, 11% vs $n=521$, 7.1%, $p<0.001$). Respiratory and gastrointestinal problems collectively accounted for approximately three-quarters of all ED visits of both Syrian ($n=5{,}361$, 74%) and resident ($n=506{,}810$, 73%, $p=0.85$) children. Most of the visits related to respiratory and gastrointestinal problems were non-urgent visits constituting 74% of visits categorized as low- and moderate-; 38% were high-acuity visits.

## Discussion

Our study revealed significant differences between emergency health care presentation of refugee and resident children in a tertiary care hospital in Istanbul. Although non-urgent ED visits were most frequent in both groups, more refugee patients presented with a high-acuity status compared to resident children. In addition, inpatient treatment, ICU admissions (neonatal and pediatric), hospitalization of neonates, and longer duration NICU stays were identified in refugee children. The risk of presenting to the ED with high-acuity decreased among the refugee children over the years.

Our findings demonstrated refugee children were more likely to present to ED requiring immediate or urgent care and subsequent admission to hospital. Consistent with our findings, a study from Italy looking at the utilization of emergency services under age one showed more frequent visits among immigrant children for both non-urgent and very urgent conditions. ED visits of immigrant children were more likely to result in hospitalizations as they presented with more severe and complex conditions [19]. Another study from Turkey reported higher utilization of resources among refugee children presenting to the ED due to presentation with more severe disease [20]. Higher representation of refugee children with more acute conditions may be related to delayed presentation, caregiver's inability to recognize and accurately judge serious medical conditions, language barriers, or cultural predilection of traditional care-seeking practices [7, 9, 21–23]. Other reports have identified that insurance status may affect the pattern of ED utilization of refugees, with overrepresentation of high acuity conditions due to delayed presentation [24–26]. However, this specific reason does not apply to Syrian refugees in Turkey as all health costs are covered by the Ministry of Interior Disaster and Emergency Management Presidency according to the Temporary Protection Regulation during the study period [27]. Further research is needed to better elucidate factors other than financial issues that are related to the frequent use of ED visits among refugee children in Turkey.

Consistent with other studies in Turkey, our research found an increased frequency of hospitalization among refugee children compared to resident children [13, 20]. We also identified a greater number of infant ED visits among Syrian children as compared to resident children. Frequent ED use by younger immigrant children has been documented previously [19]. Increased hospitalizations were particularly observed among refugee neonates. This is in line with another study from Canada showing that infants born from immigrant women were more likely to be admitted into neonatal intensive care units when compared to the resident infants [28]. We did not investigate the reasons for the higher proportion of Syrian infant ED visits and neonatal inpatient admissions, but it may be possible these children have not acquired primary preventive care or general healthcare services that would protect them to some extent from more serious conditions requiring hospitalization [29]. Policies and education to increase primary healthcare-seeking practices of refugee families are necessary to expand preventive health care approaches and improve the health of neonates and infants.

Rates of intensive care unit hospitalizations were observed to be higher in refugee children, particularly related to NICU hospitalizations. NICU duration of stay was longer in refugee neonates. Barriers to accessing antenatal services may be related to disparities in neonatal outcomes, as most refugee women in Turkey do not receive regular antenatal care during pregnancy [30]. This again emphasizes the need for preventive services focused on neonates. Labelling all refugee births as high-risk and providing them with frequent appointments in the well-child clinic can help in detecting medical issues earlier, thus improving their health status and decreasing their ED usage. Overrepresentation of immigrant children in pediatric intensive care units is common among other immigrant communities as well [31].

Factors, including language or cultural barriers, and financial difficulties while accessing health care, such as the cost of transportation, should be further explored. Efforts to overcome these factors would improve access to prevention services.

Similar to other studies globally, the most common reasons for admissions to the ED were respiratory diseases and gastrointestinal system disorders in both refugee and resident children [32, 33]. When the neonatal period is excluded, acute respiratory infections and diarrheal diseases remain the leading cause of death among children under 5 years of age [34, 35]. As these are preventable and treatable causes of death, it is important to increase preventive and curative interventions targeting this most vulnerable age to reduce child mortality. Such services include vaccination, improved nutrition, sanitation, hygiene, and altered healthcare-seeking behavior. Similarly, increasing preventive measures for communicable diseases will help to decrease the cost of ED services. However, using tertiary ED services for primary care is a problem regardless of refugee status [36, 37]. Appropriate early management of minor illnesses related to respiratory and gastrointestinal system diseases in the primary care settings will prevent admissions related to ambulatory-care-sensitive conditions in the ED for both resident and refugee children.

An exponential increase in refugee ED presentations was noted in the study of Baykan et. al. conducted in Nevsehir, Turkey between 2013 and 2017 [13]. The decrease after 2018 in our center may be explained by improved living conditions of the refugees leading to better integration into the country's healthcare system. This was also supported by our finding that the risk of admission with a high acuity condition decreased over time among the refugees.

Our study adds to the limited information about ED utilization of refugee children. The study was a comparative study across refugee and local groups of children in a single tertiary hospital setting over time. The use of registered data and a large sample size contribute to the validity of our findings. However, our study has several limitations. The study is cross-sectional in design and performed in a single facility, limiting its generalizability to all refugee children. In addition, we did not evaluate the effects of socioeconomic status (SES) and parental educational level on ED utilization as the hospital medical record system was lacking this data. Maternal education level is inversely related to ED utilization rates [21]. Only 18% of the population in the hospital district has a college degree or above. Also, detailed clinical information, such as underlying comorbidities, was not analyzed, which might impact the differences in ED use between refugee and resident children. Finally, our analysis does not include information regarding how long Syrian refugees were living in Turkey when they presented to the ED. This may have effects on patterns of ED utilization, since the length of stay in the newly settled country may impact parents' language, and the level of information they know about the services offered.

In conclusion, our findings demonstrated that refugee children as compared to resident children are more likely to present to the ED with high acuity conditions and at a younger age resulting in higher rates of inpatient admissions and longer NICU stays. ED use might be reduced by improving access to primary preventive health care services that specifically focus on Syrian refugee children under 5 years of age. Despite governmental efforts to ensure equal access and quality of health services for Syrian refugees in Turkey, the health care needs of refugee children may remain unmet as demonstrated by differences in utilization of ED services. Knowledge of and access to primary health care should be improved for better health outcomes and to shift service utilization from hospital emergency units to preventive services. The findings of our study should be used to guide policy decision-making and hospital funding. Health policy strategies to promote the health of refugee children should be developed and implemented by intersectoral coordination, including governments, civil protection authorities, pediatric societies, families, and children.

**Authors' contributions** All authors contributed to the study conception and design. Material preparation, data collection, and analysis were performed by Ezgi Baris, Nicel Yildiz Silahli, Nuriye Ayca Gul, and Lubna Qutranji. The first draft of the manuscript was written by Ezgi Baris, and all authors commented on previous versions of the manuscript. Critical revision for important intellectual content was performed by Perran Boran and Jeffrey Goldhagen. All authors read and approved the final manuscript.

**Availability of data and material** Not applicable.

**Code availability** Not applicable.

## Declarations

**Ethics approval** The study protocol was approved by the Institutional Review Board of the Marmara University School of Medicine (09.2019.616).

**Consent to participate** Not applicable.

**Consent for publication** Not applicable.

**Conflict of interest** The authors declare no competing interests.

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