



## Community acquired infections among refugees leading to Intensive Care Unit admissions in Turkey



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### ARTICLE INFO

#### Article history:

Received 3 November 2016

Received in revised form 16 January 2017

Accepted 23 February 2017

Corresponding Editor: Eskild Petersen, Aarhus, Denmark

#### Keywords:

refugees

Turkey

Syria

community-acquired infections

intensive-care unit

### ABSTRACT

**Objectives:** Data on the impact of refugees on Intensive Care Units (ICUs) are lacking in the literature, in particular for community-acquired (CA) infectious diseases, for which they are known to be at higher risk. We did a descriptive, multicenter study to analyze CA infections among refugee patients requiring ICU admission.

**Methods:** Inclusion criteria were adult refugee patients admitted to an ICU due to CA infections. Anonymized data were collected between January 1, 2010 and December 30, 2015 across 10 referral centers.

**Results:** 29,885 patients were admitted to the ICUs in the study period. 37 patients were included the study, the majority were from Syria (n = 31, 83.8%). Mean (SD) age of the patients was 45.92 ± 20.16 years. The 5-year prevalence rate was 123.8 per 100,000 patients in the ICUs. All patients had at least one comorbid condition. Forty-nine CA infections were diagnosed. The most common CA infection was pneumonia (49%) followed by urinary-tract infections (16.3%). 21 patients (56.7%) hospitalized in the ICU had trauma history. Mortality rate was high at 22 patients (59.5%) with 5 (22.7%) deaths directly attributed to CA infections.

**Conclusions:** Refugees presented to ICUs with CA infections similar to the host populations (pneumonia and urinary-tract infections) but had high mortality rates (59.5%). It seems that Turkish ICUs were not congested with the refugee patients' influx for CA infections. More research needs to be done to better understand how to deliver preventative and timely health care services to this group of patients.

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### Introduction

In recent years human migration has increased all over the world, with individuals crossing borders to work, study, and to escape conflict.<sup>1</sup> Turkey hosts the largest refugee population in the

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world, with 3 million refugees living within its borders, of which 2.75 million are from Syria. Approximately 10% of the refugee population lives in refugee camps and the remainder are dispersed throughout the country. Poor living conditions, including living in open fields, has resulted in the deterioration in health of many individuals and numerous serious medical problems.<sup>2,3</sup>

Some studies have been reported in the literature, referring to refugees acquiring diseases requiring ICU admission, or highlighting specific infections in refugees.<sup>4,5</sup> In general medical practice, patients with CA infectious diseases comprise 20% of the cases in ICUs.<sup>6</sup> However, data relating to CA infectious diseases in refugees leading to ICU admission are lacking in the literature. Historical data suggested that migrant populations have higher rates of infectious syndromes leading to mortality like typhus, dysentery, relapsing fever, and typhoid fever.<sup>7–9</sup> The query at this point is whether the critical refugee patients were admitted to the ICUs with nonspecific infectious diseases like pneumonias or urinary infections as in non-migrant populations or were they taken to the ICUs with specific historical syndromes?<sup>6</sup> In order to explore the impact and nature of infections among refugees on ICUs in Turkey we did a retrospective cross-sectional multicenter study to analyze CA infections among refugee patients that required admission to the ICU.

## Materials and methods

### Approach and definitions

We did a retrospective, descriptive, epidemiological, multicenter study to analyze community-acquired (CA) infections among refugee patients in need of ICU admission in Turkey. This is a cooperative study of ID-IRI (*Infectious Diseases International Research Initiative*), ESGCIP (*ESCMID Study Group for Infections in Critically Ill Patients*) and ESGITM (*ESCMID Study Group for Infections in Travellers and Migrants*). Ten centers participated in the study. Inclusion criteria were adult refugee patients (age over 15 years) who were admitted to an ICU due to CA infection. Exclusion criteria were non-refugees, patients with hospital acquired infections, and those below 15 years of age.

**We defined a refugee as a person who has suffered (or feared) persecution on account of race, religion, nationality or political opinion and therefore migrates to another country and this request is accepted by that country.** According to Turkish State policy, all the people escaping from the Syrian and Iraqi conflicts are given refugee status and can utilize all health services freely. **A community-acquired infection** is an infection identified within the first 48–72 hours of hospitalization or acquired in daily life (non-hospital environment) without significant immunodeficiency.

### Data collection and statistical analysis

All the patients meeting the selection criteria were recorded in standardized case report forms including demographic data, ICU information, infection characteristics, comorbidities, invasive procedures, clinical findings, laboratory values, microbiological data, and outcomes.

Anonymized data were collected retrospectively between January 1, 2010 and December 30, 2015 across 10 referral centers. Data on demographics, clinical and laboratory data, and outcomes were entered into an Excel file (Microsoft Excel, 2010). SPSS Windows Version 16.0 was used for data analysis. Descriptive statistics were presented as frequencies, percentages for categorical variables and as mean  $\pm$  standard deviation and median (minimum-maximum).

Local ethics committee approval (Cukurova University/issuance number 41) was obtained.

## Results

29,885 patients were admitted to the ICUs in the study period and 37 patients eligible for the study were included. All the patients were living in the camps. The 5-year prevalence rate was 123.8 per 100,000 patients in the ICUs. Of these 13 were females (35.1%); 24 male (64.9%). Most of the patients were from Syria (n = 31, 83.8%). The mean (SD) age of the patients was  $45.92 \pm 20.16$  years. All of the 37 patients had one comorbid condition at the minimum. The details of the patients' characteristics are shown in [Table 1](#).

**Infection type:** Forty-nine CA infections were diagnosed in 37 patients. The most common CA infection was pneumonia (49%) followed by urinary infections (16.3%) ([Table 2](#)). Infectious microorganisms were isolated in 8 patients (18.9%) ([Table 3](#)). The correlation between the clinical diagnosis and the isolated microorganisms is shown in [Table 3](#). 21 patients (56.7%) hospitalized in the ICU had a history of trauma during the Syrian conflicts, including cranial trauma (n = 2) and gunshot wounds (n = 19).

**Antimicrobial therapy:** During intensive care therapy, antimicrobial agents were used in 37 patients. Monotherapy was performed in 19 patients (51.5%) (beta-lactams in 15, anti-tuberculosis agents in 3, beta-lactam and beta-lactamase inhibitors in 2, glycopeptide in 1, and quinolone in 1). Combination therapy was used in 18 patients (48.6%) (various combinations of beta-lactams, glycopeptides, quinolones, tigecyclin or metronidazole). Anti-tuberculosis agents were used in pulmonary tuberculosis (n = 2, 5.4%) and tuberculous meningitis (n = 1, 2.7%).

**Outcome:** Discharge to place of residence with cure was provided in 10 patients (27%), 5 patients (13.5%) were discharged to the wards and death was observed in 22 patients (59.5%). In 5 patients, death (22.7%) was directly attributed to the CA infections, in 9 patients (40.9%) it was partly related to the CA infections, and in 8 cases (36.4%) it was not related to the infection.

## Discussion

Syrian refugees have migrated to bordering countries such as Turkey, Iraq, Jordan and many countries in Europe because of the ongoing conflicts in Syria, but little is known about either their infectious disease status or their impact on Turkish health systems. In this study, we disclosed that refugees presented to ICUs with ordinary CA infections (pneumonia and urinary-tract infections) similar to the host populations in Turkey and the mortality rates were 59.5%. The 5-year prevalence rate of CA infections was 123.8 per 100,000 patients in the ICUs and it appears that the Turkish ICUs are not congested with the refugee patients' influx.

A multicenter study analyzing the ICU infections in 12 countries stretching from Central Europe to Mid-western Asia reported that 40% of all ICU patients had at least one type of infection and 20% of them had any type of CA infection.<sup>6</sup> According to this study, pneumonia is the most common CA infection (13.1%) followed by skin and soft tissue (3.3%), gastrointestinal (2.3%), bloodstream (1.6%) and urinary tract (1.3%) infections. The other Turkish study between 2012 and 2014 showed 280 ICU admissions for refugees, in which 29% was the physically traumatized Syrian refugees. The rest of the patients were taken to the ICUs for various medical reasons.<sup>10</sup> In another study, acute infections were responsible for 44% of all hospitalizations medical reasons.<sup>11</sup> Among the Syrian refugees applying to hospitals, the foremost acute infectious diseases were respiratory, gastrointestinal, and urinary infections.<sup>11</sup> Our data analyzing the CA ICU infections were in accordance with this, and pneumonias followed by urinary infections and skin-soft infections predominated. In multinational EPIC I, EPIC II, and ID-IRI pneumonias were the most common infections in ICUs on the whole.<sup>12,13,6</sup> Hence,

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