

Effects of the COVID-19 pandemic on healthcare delivery to an immigrant population in the Islamic Republic of Iran

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Abstract

Background: Healthcare inequity has widely affected marginalized and immigrant communities globally during the COVID-19 pandemic.

Aims: This study assessed the effect of COVID-19 pandemic on health care delivery to immigrant populations in Isfahan Province, Islamic Republic of Iran.

Methods: All 67 hospitals across Isfahan Province were included in this study conducted from 1 March to 31 May 2020. Data on clinical manifestations, comorbidities, patient management, and outcomes of patients during hospital admission were extracted from medical records and analysed using SPSS for chi-square and odds ratio (OR).

Results: One hundred and sixty-eight (3.3%) of 5128 PCR-confirmed COVID-19 cases during the study period were immigrants and were included in the study. There were no differences in sex, clinical presentation, comorbidities, and length of hospital stay between the non-immigrant and immigrant groups. Immigrant patients were significantly younger and had poorer outcomes, including tracheal intubation [OR = 1.9, 95% confidence interval (CI): 1.2–3.1; P = 0.009] and in-hospital mortality (OR = 1.6; 95% CI: 1.1–2.4; P = 0.02).

Conclusion: Adverse health outcomes among immigrant communities may be an indication of health inequity and should be addressed by the relevant policymakers.

Keywords: health care delivery, migrants, COVID-19, health equity, Iran

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Introduction

Background

Individual health outcomes can be significantly influenced by nonmedical factors: the social determinants of health (1). Providing efficient, consistent, safe, equitable and high-quality emergency care is essential to improve access to optimal care.

Structural inequities and social determinants have an impact on health care delivery. Several studies have shown disparities, limited resources and poor health outcomes among marginalized communities, including individuals with different backgrounds, race/ethnicity and im/migrants (2–5). Data from the United Kingdom confirmed that in 2020, 34% of critically ill patients admitted to intensive care units were from ethnic/racial minorities although this group comprised only about 14% of the general population (6). The term “im/migrant” was used to refer to immigrants, refugees, asylum seekers and undocumented persons (5). This is fundamental to addressing healthcare disparities to improve health equity for im/migrants (7).

Since the declaration of the COVID-19 pandemic by the World Health Organization, there have been challenges in delivering equitable care globally and

several studies have reported significant disparities and inconsistencies between communities (8,9). In the United States of America, higher case numbers and mortality rates have been reported among the Black and Hispanic populations. In Michigan, around 40% of fatalities were reported in Black patients although they accounted for only 14% of the population (10). In a recent Spanish study, being an immigrant was independently associated with higher in-hospital mortality among patients admitted for COVID-19 (11). The shortage of healthcare workers and limited medical resources in low- and middle-income countries is well established, and the burden of the COVID-19 pandemic accentuated the problem (12). Appropriate and fair allocation of scarce and limited health resources has instigated ethical and legal challenges in these countries (13).

The COVID-19 pandemic has created a unique opportunity to expose unfair and unjust public health inequities among racial and ethnic minority groups, including im/migrants. In this study, we performed a multi-centre retrospective study to evaluate the effect of the COVID-19 pandemic on health care delivery to im/migrant population in Isfahan Province, Islamic Republic of Iran.

Objectives of the study

Our primary aim was to illustrate the demographic and clinical presentations of COVID-19 patients among non-immigrants and im/migrant populations. The secondary aim was to compare the need for invasive management, orotracheal intubation and in-hospital mortality between im/migrant and non-immigrant COVID-19 patients.

Methods

Study design

This was a retrospective multi-centre observational study that assessed the differences between clinical presentations, management and primary outcome of COVID-19 among non-immigrant and im/migrant populations. The primary clinical outcomes were defined as the need for orotracheal intubation and in-hospital mortality.

Setting and participants

There are 67 hospitals in Isfahan Province. We analysed a cohort of COVID-19-positive patients who required admission to one of these hospitals between 1 March 2020 and 31 May 2020. A confirmed COVID-19 patient was defined as having at least one positive nasopharyngeal swab determined by real-time reverse transcriptase-polymerase chain reaction (PCR) assay as defined by the World Health Organization protocols (14).

Data source and variables

The data were collected by reviewing completed COVID-19 forms from the medical records. The following information was collected from each patient's medical records: patient demographics, presenting complaint at triage (e.g. cough, shortness of breath, myalgia, prior contact to a COVID positive case), clinical manifestations

[O₂ saturation, fever (temperature > 38° C), etc.], comorbidities, need for orotracheal intubation and clinical outcome (length of stay and in-hospital mortality).

Quantitative variables and statistical methods

Categorical variables are presented as frequency (percentage) and continuous variables as median [interquartile range (IQR)]. Chi-square and odds ratio (OR) were used to analyse associations between categorical variables and an independent *t*-test was used for continuous variables. We used a non-parametric Fisher's exact test when the value of a variable was less than 5. We used SPSS, version 27.

Ethics

Ethical considerations for the study were reviewed and approved by the ethics committee of Isfahan University of Medical Sciences, approval number: IR.MUI.MED.REC 1399.423, dated 22/08/2020.

Results

In Isfahan Province, 5128 PCR-confirmed COVID-19 patients presented to 67 hospitals during the study period; 562 were re-presentations and 3.3% (168) were im/migrants. All re-presentations were among the non-immigrant population ($P < 0.001$). The characteristics and management of patients are summarized in Table 1.

During the first presentation (excluding re-presentations), 54.4% of non-immigrant and 60.1% im/migrant patients were male. Im/migrant patients were significantly younger than non-immigrant patients, median age 54 (IQR 31) years and 58 (IQR 27) years respectively ($t(175.6) = 2.51$, $P = 0.013$). There were no significant differences in the clinical manifestations and comorbidities between the 2 groups (Table 2). Length of stay in hospital did not differ between im/migrant

Table 1 Epidemiology and management of confirmed COVID-19 patients admitted to hospital in Isfahan, 2020

Demographics	Non-immigrants (n = 4960)	Im/migrants (n = 168)	P-value	Odds ratio (95% CI)
Age ^a , median (IQR) (years)	58 (27)	54 (31)	0.013 ^b	
	No. (%)	No. (%)		
Sex^a				
Female	2261 (45.6)	67 (39.9)		
Male	2966 (54.4)	101 (60.1)	0.144	
Re-presentation	562 (11.3)	0 (0.0)	< 0.001	
Disposition				
In-hospital death	614 (12.4)	31 (18.5)		
Discharged alive	4346 (87.6)	137 (81.5)	0.02	1.6 (1.1–2.4)
Orotracheal intubation				
Yes	311 (6.3)	19 (11.3)		
No	4649 (93.7)	149 (88.7)	0.009	1.9 (1.2–3.1)

^aExcluding re-presentations.

^bEqual variances not assumed; Levene's test for equality of variances was significant ($P < 0.001$).

CI = confidence interval.

IQR = interquartile range.

[median 8 (IQR 14) days] and non-immigrant [median 8 (IQR 19) days] groups ($P = 0.437$).

Considering both initial presentation and re-presentations among im/migrant as opposed to non-immigrant patients, the likelihood of having an orotracheal intubation (90%) [OR = 1.9, 95% confidence interval (CI): 1.2–3.1; $P = 0.009$] and in-hospital mortality (60%) (OR = 1.6, 95% CI: 1.1–2.4; $P = 0.02$) was higher.

Discussion

Equitable access to proper, high-quality emergency care during the COVID-19 pandemic has been a global challenge that affects clinical outcomes (15,16). Therefore, we designed this study to address the gaps in delivering equitable and efficient emergency care to im/migrant populations affected by the COVID-19 disease. The hospitals in this study cover more than 5 million people (50.76% male, 49.24% female) including at least 185 000 im/migrants (51.8% male, 48.2% female) over about 107, 018 km² and a population density of 49.45/km² (17). The Islamic Republic of Iran was one of the few countries after China and Italy which were severely affected by the SARS-CoV-2 virus during the early stages of the pandemic (18). During the study period, 151 466 cases of laboratory-confirmed COVID-19 positive patients were reported, with a mortality of 7797. Our study comprised 3.4% of the whole country's cases.

Although we have demonstrated that the clinical presentations, baseline observations and past medical history between the 2 groups were not significantly different, the likelihood of requiring orotracheal intubation during hospital stay was significantly higher among im/migrant patients. Besides, the im/migrant group showed a higher mortality rate despite being significantly younger than the non-immigrant patients.

This study confirms previous findings that marginalized and vulnerable groups had been affected

more severely by the COVID-19 pandemic. A 2020 observational study demonstrated a higher mortality rate among Black patients (19). Similar studies showed a higher rate of hospitalization and mortality in low socioeconomic and racial/ethnic minority populations in the United States of America (20–22). Im/migrants have been shown to be particularly vulnerable to the COVID-19 pandemic. Social determinants such as homelessness, living in highly populated areas, inability to work from home, lack of physical distance (space), poor hand hygiene and failure to self-isolate are a few contributing factors to severe outcomes in im/migrant communities (5,23,24). A 2021 study in the United States of America convincingly demonstrated the substantial influence of social determinants on racial/ethnic disparities (22).

The higher likelihood of orotracheal intubation and in-hospital mortality among im/migrant groups highlights that im/migrant and vulnerable communities are at elevated risk of adverse outcomes due to the COVID-19 disease. The median age of mortality is slightly lower among the im/migrant group in our study, emphasizing the non-clinical factors and the importance of social determinants in marginalized and vulnerable communities. Therefore, we urge that clinicians should be aware of non-clinical risk factors when assessing patients with COVID-19 disease.

Interestingly, all re-presentation patients were non-immigrants, which is an unexpected finding. We can only speculate that social factors, financial difficulties and lack of health insurance may be contributing factors. Further studies are needed to assess and evaluate behaviours and other social factors among these communities to understand their perception of the healthcare system.

This was a retrospective study conducted using medical records of confirmed COVID-19 cases at the time of their presentation to hospital. Due to the nature of the study, there are certain well-known limitations of this method, including the possibility of missing cases due to

Table 2 Clinical manifestations and comorbidities of confirmed COVID-19 patients admitted to hospital at first presentation in Isfahan, 2020

Patient situation	Non-immigrants (Total: 4398)	Im/migrants (Total: 168)	P-value
	No. (%)	No. (%)	
Clinical manifestation			
Fever	2298 (52.3)	87 (51.8)	0.906
Cough	2331 (53.0)	83 (49.4)	0.359
Shortness of breath	2353 (53.5)	92 (54.8)	0.748
Myalgia	911 (20.7)	27 (16.1)	0.144
Previous COVID exposure	712 (16.2)	31 (18.5)	0.413
O ₂ saturation < 93%	2833 (64.4)	109 (64.9)	0.902
Comorbidity			
Diabetes	755 (17.2)	26 (15.5)	0.567
Hypertension	445 (10.1)	12 (7.1)	0.207
Asthma	96 (2.2)	4 (2.4)	0.506 ^a

^aFisher's exact test.

a false positive or a false negative result of a COVID-19 PCR test. Data for clinical manifestations such as fever and O₂ saturation below 93% were recorded in a binary “yes” or “no” format rather than with a quantitative measurement. The recorded data lacked other important clinical measures such as blood pressure, heart rate and respiratory rate at the time of presentation. The low proportion of the im/migrant population included in the study may have affected the significance of the results.

In this study, there was no assessment of inter-rater reliability between hospitals. We only assessed the patient cohort who required hospital admission, thus data from mild COVID-19 outpatient cases were not collected.

We did not have access to the social circumstances such as socioeconomic status, health literacy and annual income of immigrant patients in this study. A further nationwide study assessing social determinants of im/migrant community is needed to address these critical health issues.

Conclusion

This study revealed that among our hospital admitted COVID-19 cases, marginalized and minority communities were more vulnerable to adverse outcomes with a higher rate of orotracheal intubation and in-hospital mortality.

Healthcare policymakers should pay more attention to the social determinants and financial difficulties of the racial and ethnic minority groups, including im/migrants, to have an efficient and equitable emergency and healthcare system.

Availability of data and materials: The dataset supporting the conclusions of this article is available in the osf.io (https://osf.io/pfdvc/?view_only=71bdddbe054946cbb715c571fc476c6d).

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Effets de la pandémie de COVID-19 sur la prestation de soins de santé dans une population immigrée en République islamique d'Iran

Résumé

Contexte : Les inégalités en matière de soins de santé ont largement touché les communautés marginalisées et immigrantes dans le monde entier pendant la pandémie de COVID-19.

Objectifs : La présente étude a évalué l'effet de la pandémie de COVID-19 sur la prestation de soins de santé aux populations immigrées dans la province d'Ispahan (République islamique d'Iran).

Méthodes : Les 67 hôpitaux de la province ont tous été inclus dans la présente étude menée entre le 1^{er} mars et le 31 mai 2020. Des données sur les manifestations cliniques, les comorbidités, la prise en charge et les résultats des patients pendant leur hospitalisation ont été extraites des dossiers médicaux et analysées à l'aide du logiciel SPSS pour le test du khi carré et l'odds ratio (OR).

Résultats : Cent soixante-huit (3,3 %) des 5128 cas de COVID-19 confirmés par PCR pendant la période de l'étude étaient des immigrants et ont été inclus dans l'étude. Aucune différence n'a été constatée entre les groupes de non-immigrants et d'immigrants en ce qui concerne le sexe, le tableau clinique, les comorbidités et la durée du séjour à l'hôpital. Les patients immigrants étaient significativement plus jeunes et présentaient des résultats moins favorables, notamment en ce qui concerne l'intubation trachéale [OR = 1,9, intervalle de confiance (IC) à 95 % : 1,2-3,1] ; $p = 0,009$ et la mortalité hospitalière (OR = 1,6 ; IC à 95 % : 1,1-2,4 ; $p = 0,02$).

Conclusion : Les résultats sanitaires négatifs dans les communautés d'immigrants peuvent être une indication d'inégalité sur le plan sanitaire et devraient être traités par les responsables de l'élaboration des politiques concernés.

آثار جائحة كوفيد-19 على تقديم الرعاية الصحية للسكان المهاجرين في جمهورية إيران الإسلامية

كيهان جلشني، حامد اخلاقي

الخلاصة

الخلفية: إن عدم المساواة في مجال الرعاية الصحية قد أثر تأثيراً سلبياً على مجتمعات المهتمّشين والمهاجرين على الصعيد العالمي خلال جائحة كوفيد-19. الأهداف: هدفت هذه الدراسة الى تقييم آثار جائحة كوفيد-19 على تقديم الرعاية الصحية للسكان المهاجرين في محافظة أصفهان، جمهورية إيران الإسلامية.

طرق البحث: شملت هذه الدراسة جميع المستشفيات في محافظة أصفهان البالغ عددها 67 مستشفى، وامتدت الدراسة من 1 مارس / آذار إلى 31 مايو / أيار 2020. واستُخلصت بيانات المظاهر السريرية، وحالات المراضة المصاحبة، وعلاج المرضى، ونتائج المرضى في أثناء دخولهم إلى المستشفى، من السجلات الطبية، وحُللت تلك البيانات باستخدام برنامج SPSS، لإجراء اختبار مربع كاي χ^2 والخروج بنسبة الأرجحية.

النتائج: تأكد وجود مائة وثمانية وستين حالة إصابة بكوفيد-19 بين المهاجرين، بنسبة 3.3% من إجمالي حالات كوفيد-19 المؤكدة بتفاعل البوليميراز المتسلسل البالغ عددها 5128 حالة، وذلك عن فترة الدراسة. ولم توجد فروق في الجنس، والأعراض السريرية، وحالات المراضة المصاحبة، ومدة الإقامة في المستشفى بين المجموعات غير المهاجرة والمجموعات المهاجرة. ومع ذلك كان المرضى المهاجرون أصغر سنًا بكثير، وكانت النتائج أسوأ، ومن ذلك الحاجة إلى إجراء تنبيب الرغامى [نسبة الأرجحية = 1.9؛ فترة الثقة 95%: 1.2–3.1؛ القيمة الاحتمالية = 0.009]، والوفيات داخل المستشفى [نسبة الأرجحية = 1.6؛ فترة الثقة 95%: 1.1–2.4؛ القيمة الاحتمالية = 0.02].

الاستنتاجات: إن المخرجات الصحية العكسية التي تلحق بمجتمعات المهاجرين ربما تكون مؤشراً على عدم الإنصاف في مجال الصحة، وينبغي لصنّاع السياسات المعنيين التصدي لها.

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