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Letter to the Editor

Homeless people hospitalized with COVID-19 in Brussels

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ARTICLE INFO

Article history:

Received 27 June 2020

Received in revised form

29 July 2020

Accepted 3 August 2020

Available online 7 August 2020

Editor: L. Leibovici

To the editor,

Compared to the general population, homeless people have higher mortality related to both communicable and non-communicable diseases; this can be explained in part by greater exposure to risk factors (including alcohol, illicit drugs and smoking) [1,2]. Transmissible infectious diseases contribute significantly to the morbidity and mortality of the homeless [1]. Notably, airborne diseases such as tuberculosis, influenza and pneumococcal pneumonia have been reported with increased incidence and severity in homeless populations [2]. Shelter overcrowding and limited access to hygienic supplies could enhance the transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in this vulnerable population.

We assessed the prevalence, incidence and outcome of homeless patients hospitalized with COVID-19 in our institution between 3rd March and 26th May 2020. Sociodemographic features and risk factors were compared with those of non-homeless patients admitted during the same period.

Only symptomatic hospitalized patients with SARS-CoV-2 positive RT-PCR or rapid antigen test with evidence of pneumonia on computed tomography were included. Nosocomial cases and pregnant women were excluded. Demographic data were collected

and included age, gender, smoking, alcohol abuse, methadone therapy for opioid substitution, HIV, hepatitis B virus and hepatitis C virus serological status, and chronic comorbidities such as arterial hypertension, diabetes, obesity, and neurological, cardiovascular and pulmonary diseases. Homeless patients were retrospectively identified based on systematic social inquiry performed upon admission. In order to assess disease severity and outcome, each (homeless) case was matched to three controls based on sex and age categories. Non-parametric Wilcoxon's and Fisher's exact tests were used for continuous and binomial variables analyses, respectively.

Between 3rd March and 26th May 2020, 14 homeless people were identified among 238 patients hospitalized for COVID-19 pneumonia, a homelessness prevalence of 5.88%. All but three resided in homeless shelters. Incidences of COVID-19 among homeless and non-homeless patients were calculated using a homeless census report and our hospital catchment population. According to the last homeless census report, there were 2151 homeless people in Brussels in November 2018 [3]. Most of them were found to attend homeless shelters located in the downtown area surrounding our hospital. The Centre Hospitalier Universitaire (CHU) Saint-Pierre is a public tertiary hospital which works closely with public social services of the capital and is a referral centre for resource-limited patients in Brussels City. The estimated catchment population of our institution was 122 808 people in 2018 (data provided by the Federal Public Health Service, Food Chain and Safety Environment). For the reporting period, incidences were 650 and 194/100 000 hospitalized homeless and non-homeless patients for COVID-19, respectively.

The median age was 56.36 (standard deviation \pm 16.76) and 61.78 (standard deviation \pm 16.87) years for homeless and non-homeless patients, respectively. We observed a male predominance in both populations (71.43% and 58.04%). Compared to non-homeless patients, the homeless were more likely to smoke (OR 4.14, 95%CI 1.73–9.85), to suffer from alcoholism (9.82, 95%CI 3.07–30.64), to be treated with methadone for opioid substitution (OR 37.17, 95%CI 3.90–538.2) and to have neurological diseases (OR 5.88, 95%CI 1.84–18.64).

There was no difference between the two groups in terms of C-reactive protein and lactate dehydrogenase levels and lymphocytes

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Table 1
Comparison of severity and outcome of COVID-19 between homeless and age and sex-matched non-homeless controls

	Homeless (n = 14) n, n (%)	Non-homeless (n = 42) n, n (%)	p
Admission CRP level (mg/L), median (IQR)	79.6 (30.4; 191.2)	84.3 (51.7; 151.7)	0.62
Admission LDH level (UI/L), median (IQR)	397 (316; 487)	416 (238; 489)	0.92
Admission lymphocyte count (/μL), median (IQR)	1065 (980; 1620)	880 (690; 1270)	0.10
Symptoms delay before admission (days), median (IQR)	6.0 (4.0; 7.0)	7.0 (6.0; 10.0)	0.18
ICU admission	2 (14.29%)	12 (28.57%)	0.47
Invasive ventilation	1 (7.14%)	8 (19.05%)	0.42
Dialysis	0 (0.00%)	2 (4.88%)	1.00
HCQ treatment	11 (78.57%)	1 (97.62%)	0.06
Length of stay in ICU (days), median (IQR)	5.5 (1.0; 10.0)	15.0 (8.0; 23.5)	0.22
Length of stay in hospital (days), median (IQR)	6.0 (4.0; 10.0)	11.0 (5.0; 20.0)	0.11
Mortality	2 (14.29%)	8 (19.51%)	1.00

CRP, C-reactive protein; IQR, interquartile range; LDH, lactate dehydrogenase; ICU, intensive care unit; HCQ, hydroxychloroquine.

count at admission, delay of symptoms before admission, intensive care unit (ICU) admission, invasive ventilation, dialysis, treatment uptake with hydroxychloroquine, length of stay (LOS) in ICU, total LOS in hospital, and death (Table 1).

In the present study we found an incidence of hospitalization for COVID-19 three times higher in homeless people than in the general population. A recent report in the USA identified a high prevalence (36%) of SARS-CoV-2 RT-PCR positivity in a homeless shelter [4]. Most subjects (88%) with positive RT-PCR in the latter study were asymptomatic, highlighting the risk of spread among residents of homeless shelters.

We found a high but similar proportion of comorbidities (arterial hypertension, diabetes and cardiovascular diseases) in both populations hospitalized with COVID-19. Smoking, opioid substitution and alcohol abuse were highly prevalent among homeless patients as previously reported [1]. The high prevalence of comorbidities and the increased exposure to risk factors in the homeless population could increase their risk of more severe disease and mortality following SARS-CoV-2 infection. Although more severe manifestations could explain higher hospitalization rates, the disease severity of the homeless included in this study tended to be reduced as compared to the non-homeless, with lower rates of ICU admission and mechanical ventilation requirement and shorter hospital and ICU LOS. Moreover, a trend of shorter duration of symptoms upon admission in homeless patients did not evoke any delay in the access to care.

The main limitation of our study is the small sample size of the homeless group and the monocentric design. Larger studies are required to properly assess the outcome of COVID-19 in homeless patients.

In conclusion, we found a high incidence of hospitalization for COVID-19 among homeless patients in Brussels. They had a high but similar proportion of comorbidities as compared to non-homeless patients. Outcome was not worse, although this interpretation is limited by the small sample size of homeless patients. Our results illustrate the urgent need for implementing strategies

to stop the spread of COVID-19 in the homeless population. Strategies based on wide-scale prevention, screening and management of COVID-19 infection have been shown to be efficient in reducing SARS-CoV-2 transmission among homeless people [5,6].

Transparency declaration

The authors have no conflicts of interest to disclose. ND is a Postdoctorate Clinical Master Specialist of the FRS-FNRS. No financial support relevant to the research, authorship and/or publication of this article was received.

Ethical approval

The study was approved by the Ethics Committee of CHU Saint-Pierre.

References

- [1] Fazel S, Geddes JR, Kushel M. The health of homeless people in high-income countries: descriptive epidemiology, health consequences, and clinical and policy recommendations. *Lancet* 2014;384:1529–40.
- [2] Badiaga S, Raoult D, Brouqui P. Preventing and controlling emerging and re-emerging transmissible diseases in the homeless. *Emerg Infect Dis* 2008;14:1353–9.
- [3] Bertrand BQ F. Dénombrement des personnes sans-abri et mal logées en Région de Bruxelles-Capitale. La Strada asbl; 2019 [Internet] Available from: <https://www.lastrada.brussels/portail/fr/etudes-et-analyses/denombrement/393-cinquieme-edition-du-denombrement-des-personnes-sans-abri-et-mal-logees-en-rbc>.
- [4] Baggett TP, Keyes H, Sporn N, Gaeta JM. Prevalence of SARS-CoV-2 infection in residents of a large homeless shelter in Boston. *JAMA* 2020;323:2191–2. <https://doi.org/10.1001/jama.2020.6887>.
- [5] Tobolowsky FA, Gonzales E, Self JL, Rao CY, Keating R, Marx GE, et al. COVID-19 outbreak among three affiliated homeless service sites—King County, Washington, 2020. *MMWR Morb Mortal Wkly Rep* 2020;69:523–6.
- [6] Baggett TP, Racine MW, Lewis E, De Las Nueces D, O'Connell JJ, Bock B, et al. Addressing COVID-19 among people experiencing homelessness: description, adaptation, and early findings of a multiagency response in Boston. *Public Health Rep Wash DC* 1974 2020; 33354920936227.