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Letter to the Editor

Needlestick and sharp injuries among healthcare workers prior to and during the coronavirus disease 2019 (COVID-19) pandemic

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To the Editor—The coronavirus disease 2019 (COVID-19) pandemic has brought various changes to healthcare systems globally. It has showcased the vulnerability of healthcare workers (HCWs) and has demonstrated the importance of ensuring their safety.[1] Personal protective equipment (PPE), in addition to providing protection, imposes some restrictions for everyday clinical work. A decrease in the number of needlestick and sharp injuries (NSIs) among HCWs during the COVID-19 pandemic has been reported in an institution treating a heterogenous population of patients.[2] We evaluated NSIs among HCWs in our completely repurposed and dedicated COVID-19 tertiary-care center prior to and during the pandemic.

Methods

A retrospective cohort study was conducted using medical records of all emergency department visits at the University Hospital Dubrava, Zagreb, Croatia, that related to NSIs among HCWs from January 1, 2019, to February 28, 2021. Our institution was completely reproposed to serve as a dedicated COVID-19 tertiary-care center. The number of NSIs per month, NSIs per the total number of active hospital activities (expressed as the number of NSIs per 1,000 activities per month), and the number of NSIs per the total number of hospitalized patients (expressed as the number of NSIs per 1,000 patients per month) were compared prior to (up to February 2020) and during the pandemic period (after February 2020). We considered the following active hospital activities: all outpatient activities, surgical procedures, emergency examinations, and procedures on hospitalized patients. The study was reviewed and approved by the Ethical Committee of the University Hospital Dubrava (reference no. 2021/2503-12), and the obligation for written consent was waived due to the retrospective study design.

Statistical methods

Normality of distribution of numerical variables was tested using the Shapiro–Wilk test. Due to nonnormal distribution, numerical variables were presented as median and interquartile range (IQR) and were compared between groups using the Mann–Whitney *U* test. Categorical variables were presented as frequencies and percentages and were compared using the χ^2 test or the Fisher exact test where appropriate. The Spearman rank correlation was used to test association between 2 numerical variables. *P* values <.05 were considered statistically significant. Analyses were performed using MedCalc version 20.014 statistical software (MedCalc Software, Ostend, Belgium).

Results

In total, 134 NSIs were reported to the emergency department during the study period: 74 during the 14 months prior to and 60 during the 12 months after complete repurposing of the hospital during the COVID-19 pandemic. An overview of incidents and associated parameters is provided in Table 1.

The median age of involved HCWs was 30 years (IQR, 24–38). Of 134 HCW participants, 99 (73.9%) were female. The most common cause of NSI was a nonsterile needle in 122 HCWs (91%) followed by the surgical equipment in 10 HCWs (7.5%). We detected no significant differences in age and sex distribution nor in the cause of NSI prior to and during COVID-19 period ($P > .05$ for all analyses).

Although the total number of NSIs per month did not significantly differ (median 5 vs 5.5 per month prior to and during the pandemic; $P = .897$), a total number of active hospital activities per month was significantly higher prior to the pandemic: median 54.9 versus 17.9 × 1,000 ($P < .001$). Also, the hospitalized patients per month was significantly higher prior to the pandemic: median 2.8 vs 1.6 × 1,000 ($P < .001$). When considering number of NSIs per 1,000 activities, there was a significantly higher occurrence of NSIs during the pandemic: median 25.2 vs 8.9 per 1,000 activities per month ($P = .021$). When considering number of NSIs per 1,000 hospitalized patients, there was also a significantly higher occurrence of NSIs during the pandemic: median 3.4 vs 1.7 per 1,000 patients per month ($P = .036$). Serology for hepatitis B, hepatitis C, and HIV after NSI did not significantly differ prior to and during the pandemic, although there was somewhat lower frequency of anti–HBs positive individuals experiencing NSIs during the pandemic.

The occurrence of NSIs in an overall cohort or during each of the periods did not show significant correlation with total number of active activities, total number of hospitalized patients, age, or sex of individuals experiencing the incident ($P > .05$ for all analyses).

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Table 1. Overview of NSIs and Associated Parameters Prior to and During the COVID-19 Pandemic

Variable	Prior to COVID-19 (14 months)	During COVID-19 (12 months)	*P* Value
No. of incidents	74	60	. . .
Nonsterile needle, n/N (%)	66/74 (89.2)	56/60 (93.3)	.411
Other equipment, n/N (%)	6/74 (8.1)	4/60 (6.7)	
Unknown, n/N (%)	2/74 (2.7)	0/60 (0)	
Median age, years, median (IQR)	31 (25–38)	29 (24–38.3)	.512
Sex, female, n/N (%)	59/74 (79.7)	40/60 (66.7)	.087
Incidents per month, median (IQR)	5 (3.25–7.5)	5.5 (2.5–7)	.897
Total no. of active activities ×1,000, median (IQR)	54.9 (51.5–56.4)	17.9 (9.4–29.1)	**<.001***
Total no. of hospitalized patients per month ×1,000, median (IQR)	2.8 (2.7–2.9)	1.6 (1.04–1.8)	**<.001***
Incidents per activity per month, median (IQR)	8.9 (5.73–14.47)	25.2 (11.52–78.71)	**.021***
Incidents per no. of patients, median (IQR)	1.7 (1.12–2.71)	3.4 (1.75–6.25)	**.036***
HBs-Ag positive, n/N (%)	0/71 (0)	1/58 (1.7)	.450
Anti-HBs positive, n/N (%)	66/71 (93)	50/58 (86.2)	.207
Anti-HBc positive, n/N (%)	0/71 (0)	1/58 (1.7)	.450
Anti-HCV positive, n/N (%)	2/71 (2.8)	0/58 (0)	.501
Anti-HIV positive, n/N (%)	0/71 (0)	0/58 (0)	1.000

Note. NSIs, needlestick and sharp injuries; IQR, interquartile range; HBs-Ag, surface antigen of the hepatitis B virus; HBc, core antigen of the hepatitis B virus; HCV, hepatitis C virus; HIV, human immunodeficiency virus.
*Statistically significant at $P < .05$.

Discussion

We would like to emphasize several important points. To the best of our knowledge, our study is the first to show that the occurrence of NSIs per number of active hospital activities and NSIs per number of hospitalized patients among HCWs from a dedicated COVID-19 hospital seemed to substantially increase during the COVID-19 pandemic. Only one previous report from a tertiary-care center treating heterogenous population of mostly non–COVID-19 patients reported a decrease in exposure of HCWs to NSIs during the pandemic period.[2] Our findings are representative of a high-volume tertiary-care hospital treating exclusively COVID-19 patients where HCWs are continuously equipped with PPE, which is probably the main reason for the observed differences. HCWs often experience difficulties in delivering a high level of care to patients while wearing multilayered PPE, and their performance may be affected to a significant degree, especially affecting their dexterity, visual impairment, communication, and risk of injury.[3–5]

A non-significantly higher proportion of inadequately HBV-immunized personnel experienced NSIs during the pandemic period. This could indicate the higher proportion of nonprepared medical professionals that had to be engaged in the care of COVID-19 patients, which may have additionally contributed to the higher NSI rate.

This study had several limitations. It was a single-center experience with a retrospective study design and relatively small sample size. Nevertheless, our data show that the burden imposed on the healthcare system by the pandemic also resulted in the higher occurrence of NSIs despite a lower overall number of treated patients in the dedicated COVID-19 hospital. Possible reasons for this finding might include the need for PPE and engagement of inadequately prepared medical professionals. Further studies on this topic are needed to help avoid NSIs and to improve the safety of HCWs.

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