Social and Demographic Disparities in the Severity of Multisystem Inflammatory Syndrome in Children

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Abstract: Social constructs are known risk factors for multisystem inflammatory syndrome in children. A review of 206 patients demonstrated that children who were non-Hispanic Black, over the age of 12 years or living in a disadvantaged neighborhood associated with severe multisystem inflammatory syndrome in children (intensive care unit admission, intubation and/or vasopressor use).

Key Words: coronavirus, coronavirus disease 2019, ethnicity, multisystem inflammatory syndrome in children, race, socioeconomic

METHODS

RESULTS

The cohort included 206 patients based in Texas according to their residential postal codes. Despite severity levels, all patients survived hospitalization. The median age was 9.4 years (interquartile range [IQR], 5.5–13.2 years). All patients were under 21 years of age. Overall, 45% (n = 92) of children were female and 42% (n = 86) were overweight. The predominant race/ethnicity was Hispanic (49%), followed by non-Hispanic Black (23%) and non-Hispanic White (20%). Children with severe MIS-C were typically older, overweight and with an elevated ADI.

The median length of hospital stay was 6.7 days (IQR, 4.9–8.5 days), while the median ADI was 5 (IQR, 2–7). Children with severe MIS-C were more likely to have exaggerated levels of brain natriuretic peptide, C-reactive protein, white blood cells, ferritin, procalcitonin, creatinine, blood urea nitrogen, international normalized ratio, protime and reduced amounts of platelets. The median hospital stay for a child with severe MIS-C was 8.1 days compared with 5.6 days for cases with mild MIS-C. The administration of steroids coupled with immunomodulators (eg, anakinra) was higher in children with severe MIS-C (98% vs. 65%). Table 1 provides more details about patient demographics, clinical characteristics and laboratory results classified by MIS-C severity and by socioeconomic category.

Table 2 summarizes the multivariable logistic regression model. This model showed that, when simultaneously controlling
for sex, BMI and vaccination status, non-Hispanic Black pediatric patients had an increased odds for severe MIS-C in reference to Hispanic patients (odds ratio [OR], 2.30; 95% confidence interval [CI], 1.06–4.99; \( P = 0.035 \)), increasing age of the child associated with the development of severe MIS-C (OR, 1.14 per year; 95% CI, 1.06–1.22; \( P < 0.001 \)) and that increasing ADI also associated with severity of MIS-C (OR, 1.21 per rank; 95% CI, 1.07–1.37; \( P = 0.003 \)).

**DISCUSSION**

This study highlights the association of socioeconomic disparities and race on severity of illness in a cohort of Texas-based pediatric patients diagnosed with MIS-C. Non-Hispanic Black children, older patients and those living in an area with a high deprivation index were significantly more likely to require intubation and/or vasoactive support. These disparities remained after adjustment for sex, BMI and vaccination status.

Although Hispanic children were more likely to be diagnosed with MIS-C, they had a comparable distribution of mild and severe cases of MIS-C. In contrast, non-Hispanic Black children were disproportionately at higher probability of developing severe MIS-C even when controlling for socioeconomic status. These findings are consistent with other observations by Javalkar et al.\(^6\) that Black children had significantly higher odds for MIS-C diagnosis. However, Javalkar et al.\(^6\) did not note differences in MIS-C severity and socioeconomic status, suggesting that the increased risk of severe MIS-C in non-Hispanic Black children may be due to other factors or the study’s limitations.
severity (intensive care unit admission, intubation or inotrope requirement). Our study included 5 times the number of MIS-C cases and was, therefore, better powered to assess disparities in MIS-C severity.

Our analysis also found an increase in odds of severe MIS-C by 21% for each rank increase in ADI. The role of neighborhood deprivation indices on COVID-19 in Louisiana showed similar findings. Although we do not fully understand why non-Hispanic Black children had higher rates of severe MIS-C, we do have a few hypotheses: (1) reduced access to healthcare, (2) differences in ADI may be manifested by crowded homes/neighborhoods, (3) provider bias/racism, (4) distrust of the US medical system given the history of mistreatment and (5) there may be an immunogenomic component.

Strengths of our study include the number of patients, the granularity of the data and the correlation of MIS-C severity to clinical outcomes and laboratory markers. Although our work was derived from a single site, it is among the largest MIS-C cohorts in the nation and TCH is a significant referral center for the entire state. Our study did not examine the biological differences that may be inherent in race or ethnicity; instead, we describe these terms as social constructs. Another limitation to our work is the small number of children (n = 4) that received a COVID-19 vaccine. A larger sample is needed to accurately estimate the effect of the vaccination status on MIS-C severity and its relationship with other social and demographic variables.

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