Dear Sir,

Since December 2019, the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS CoV-2) has been creating a havoc around the world. A particular concern has been the effect of this virus on health and safety of children. There have been unprecedented changes to school curriculum and teaching methodologies. Children comprise a very small proportion of all COVID-19 patients, and they have a lower risk of progressing to severe infection than adults. Most infected children remain asymptomatic or with only mild infection. We studied details of all patients including children who required admission to our tertiary COVID care hospital between July 1, 2020, and August 31, 2020, when the COVID pandemic was rapidly spreading in India. There is still inadequate literature about differences in severity of COVID-19 disease in adults and children who have been admitted to a hospital. This can have important bearing on morbidity and mortality. With an aim to assess the differences in severity of COVID-19 infection between adults and children, we embarked upon this study after ethical approval from our institute.

During the period of study, there were 984 admissions of patients who were symptomatic with COVID-19. At our institute, admission was denied to asymptomatic patients despite being reverse transcriptase-polymerase chain reaction positive for the disease. Out of these, 984 patients, 20 were children under 14 years of age and the rest were adults. Patient details including demography, clinical, and laboratory data were collected from the Medical Records department and then analyzed.

Whereas all adult patients were symptomatic as per our institute admission policy at the time, we noted that five children were asymptomatic on admission. They were kept in the hospital as their parents had been found to be positive along with them. Thus to ensure proper care, these children were kept with their parents. A positive contact history was found in significantly higher numbers in children as compared to adults (30% vs. 8.92%; P < 0.05). Proportion of females infected with COVID-19 was statistically higher in children as compared to adults (P < 0.05) though this could be by chance. Fever was found in lesser number of children compared to adults (P < 0.05).

A lower proportion of children requiring hospital admission progressed to develop severe COVID infection as compared to adults though it was not found to be statistically significant. Breakdown of the severity of cases may be found in Table 1. Case fatality rates in children have been shown to be >1%; however, in our subset of admissions in this study showed that mortality in children requiring hospitalization is not significantly lower compared to adults (20% vs. 25.82%, P > 0.05). One reason for this apparently high mortality rates could be because we are a tertiary pediatric care institute and one of the few dedicated COVID care hospitals in the
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region. During the lockdown, there was a complete ban on public transport, and private transport was exorbitantly costly. Many of the children as well as the adults presented late. This could be a reason why some children as well as adults presented late when not much could be done to salvage them. Analyzing the antibiotic consumptions, we noted that children required antibiotics more often than adults. This also could be because of a late presentation when secondary bacterial sepsis had complicated the viral disease. None of the children admitted in 2 months under study received remdesivir or tocilizumab. We could not find lymphopenia or neutrophilia as a consistent feature of COVID infection in children. This is similar to observations made earlier by Du et al.\[5\]

Manifestations of the SARS-CoV-2 infection is not restricted to lungs, rather, most other organ systems such as liver, heart, and kidney damage may be affected. Mean liver transaminase values were noted to be normal in children, but we found that serum bilirubin was statistically higher compared to adults ($P < 0.05$). Blood urea nitrogen was found to be normal in a higher proportion of children as compared to adults ($P < 0.05$). Pro-inflammatory markers lactate dehydrogenase and ferritin were noted to be significantly higher in adults; however, C-reactive protein (CRP) which was noted to be significantly higher in children. Parameters measuring the coagulation abnormalities such as prothrombin time, activated partial thromboplastin time, and D-dimer were found to be normal in children admitted during 2 months [Table 2].

**CONCLUSION**

In children admitted to a hospital, a lower proportion of patients progressed to have a severe disease. Mortality rate in admitted children was comparable to the rates in adults. Blood counts did not indicate any major abnormalities in children. Serum bilirubin levels were more raised

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**Table 1: Clinicoepidemiological characteristics of COVID-19 infection in children and adults**

| Clinical characteristics | Children ($n=20$), n (%) | Adult ($n=964$), n (%) | $P$ |
|--------------------------|--------------------------|------------------------|-----|
| Gender                   |                          |                        |     |
| Male                     | 9 (45)                   | 752 (78.01)            | 0.00048 |
| Female                   | 11 (55)                  | 212 (21.99)            |     |
| History of contact       | 6 (30)                   | 86 (8.92)              | 0.00138 |
| Asymptomatic             | 5 (25)                   | 00                     |     |
| Symptomatic              | 15 (75)                  | 964 (100)              | 0.00001 |
| Symptoms                 |                          |                        |     |
| Fever                    | 11 (55)                  | 716 (74.27)            | 0.00001 |
| Cough                    | 12 (60)                  | 672 (69.70)            | 0.3523 |
| Dyspnea                  | 4 (20)                   | 490 (50.82)            | 0.00634 |
| COVID-19 severity        |                          |                        |     |
| Mild                     | 11 (55)                  | 462 (47.92)            | 0.5287 |
| Moderate                 | 6 (30)                   | 269 (27.90)            | 0.8336 |
| Severe                   | 3 (15)                   | 233 (24.17)            | 0.3421 |
| Treatment                |                          |                        |     |
| HCQ                      | 15 (75)                  | 673 (69.81)            | 0.6173 |
| Azithromycin             | 9 (45)                   | 673 (69.81)            | 0.0173 |
| LMWH                     | 5 (25)                   | 642 (66.59)            | 0.0001 |
| Injection dexamethasone   | 3 (15)                   | 673 (69.81)            | 0.0001 |
| Antibiotic               | 15 (75)                  | 426 (44.1)             | 0.0107 |
| Remdesivir               | 0                       | 226 (23.44)            |      |
| Convalescent plasma      | 1 (5)                    | 59 (6.12)              | 0.8336 |
| Tocilizumab              | 0                       | 47 (4.87)              |      |
| Oxygen                   | 5 (25)                   | 520 (53.94)            | 0.0101 |
| Ward                     | 12 (60)                  | 804 (83.40)            | 0.00596 |
| ICU                      | 8 (40)                   | 293 (30.39)            | 0.3375 |
| NIV                      | 5 (25)                   | 119 (12.34)            | 0.0910 |
| Mechanical ventilation   | 1 (5)                    | 75 (7.78)              | 0.6455 |
| Death                    | 4 (20)                   | 249 (25.82)            | 0.5552 |

Number in bracket shows percentage. LMWH: Low molecular weight heparin, HCQ: Hydroxychloroquine, ICU: Intensive care unit, NIV: Noninvasive ventilation

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**Table 2: Differences in lab readings between children and adults with COVID-19 infection**

| Variable                  | Children ($n=20$) | Adults ($n=964$) | $P$  |
|---------------------------|------------------|-----------------|-----|
| Hemoglobin (g/dl)         | 11.35±4.29       | 11.75±3.24      | 0.0476 |
| Total leukocyte count (/µl)| 10.50±5.96       | 10.26±7.94      | 0.1355 |
| Platelet count (/µl)      | 188.9±157.84     | 202.33±101.6    | 0.0012 |
| Neutrophil (%)            | 62.58±21.67      | 76.61±16.12     | 0.0364 |
| Lymphocyte (%)            | 29.1±22.32       | 18.35±13.86     | 0.0004 |
| Eosinophil (%)            | 1.66±2.42        | 0.89±1.96       | 0.1388 |
| SGPT (U/L)                | 34.20±33.62      | 81.13±91.57     | 0.000006 |
| SGOT (U/L)                | 51.75±49.77      | 76.00±163.26    | 0.000002 |
| ALP (IU/L)                | 265.97±351.24    | 110.96±76.03    | 0.000001 |
| Serum total bilirubin (mg/dl) | 2.50±1.7   | 1.16±1.95       | 0.0032 |
| Serum total protein (g/dl) | 6.67±1.15       | 7.01±2.38       | 0.0049 |
| Serum albumin (g/dl)      | 3.68±0.63        | 3.61±0.58       | 0.5339 |
| Serum globulin (g/dl)     | 2.95±0.92        | 3.33±0.55       | 0.0112 |
| Blood urea (mg/dl)        | 23.85±10.53      | 50.38±54.88     | 0.000001 |
| Serum creatinine (mg/dl)  | 0.45±0.14        | 1.21±1.63       | 0.000001 |
| CRP (ng/ml)               | 55.90±138.44     | 48.59±95.55 (n=50) | 0.0077 |
| Ferritin (ng/ml)          | 247.01±387.93    | 436.98±686.18 (n=677) | 0.0046 |
| LDH (U/L)                 | 326.61±526.0     | 707.03±117.40 (n=405) | 0.000001 |
| D-Dimer (µg/ml)           | 0.56±0.91        | 1.70±6.27 (n=655) | 0.000001 |
| PT                        | 9.43±8.33        | 16.05±20.32 (n=710) | 0.000037 |
| APTT                      | 13.33±14.05      | 15.79±20.31     | 0.0574 |
| INR                       | 0.72±0.63        | 0.79±0.79 (n=709) | 0.2386 |

SGOT: Serum glutamic oxaloacetic transaminase, SGPT: Serum glutamic-pyruvic transaminase, ALP: Alkaline phosphatase, CRP: C-reactive protein, LDH: Lactate dehydrogenase, PT: Prothrombin time, INR: International normalized ratio, APTT: Activated partial thromboplastin time
compared to transaminase levels and only CRP showed a significant rise with COVID infection. Coagulation parameters were not deranged either.

**Financial support and sponsorship**
Nil.

**Conflicts of interest**
There are no conflicts of interest.

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Submitted: 11-Mar-2021 Accepted: 20-Mar-2021 Published: 03-Jul-2021

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