Childhood Obesity and its Connection with Hypertension During Pandemics

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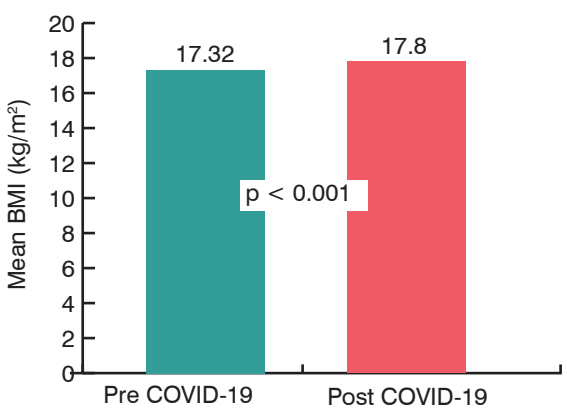
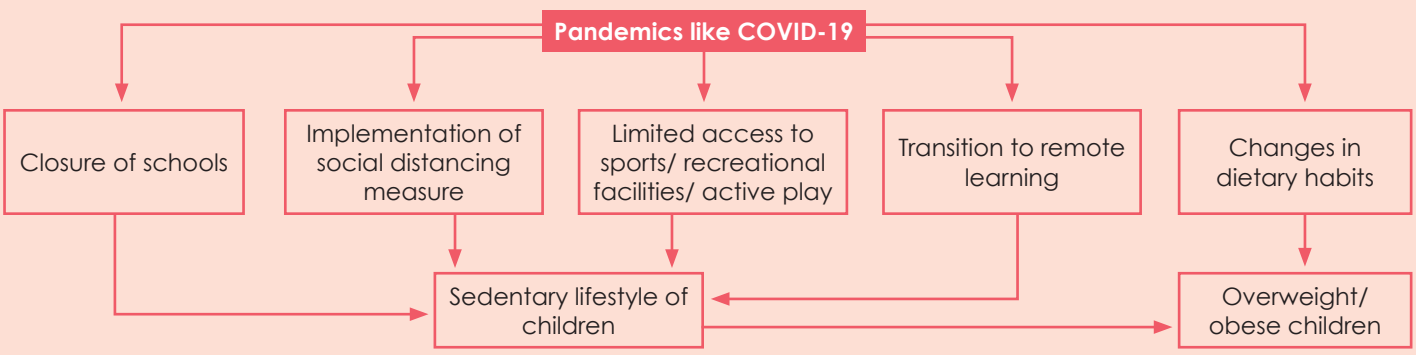
Overview

Obesity among children is rising in all world regions and the growing possibilities of pandemics have raised the prevalence of childhood obesity as well. To support this context, an immense impaction was seen on all classes of society during and after the recent coronavirus 2019 (COVID-19) pandemic, however the effects on children and adolescents were much more pronounced than on others.[1] There was a cited fear by experts that at the onset of the pandemic, governmental restrictions could exacerbate the ongoing childhood obesity epidemic as school environments provide structure and routine regarding meal times, physical activity, and sleep habits. Hence, the loss of this structure might negatively impact lifestyle behavior and weight development in children, particularly in those with overweight and obesity.[2] In addition to this, the psychological effect of the pandemic, including increased stress levels and emotional eating contribute to the amplified phenomenon of childhood obesity.[3] An Indian study highlighted the impact of COVID-19 lockdown on increased weight gain in children. Results revealed significant differences in variables such as body weight, body mass index (BMI) before and after lockdown. Post-lockdown, the mean BMI increased among all children from 17.32 to 17.80 kg/m^2 ($p < 0.001$) (Figure 1).[4]

Figure 1: The change in mean BMI before and after COVID-19 lockdown among Indian children[4]



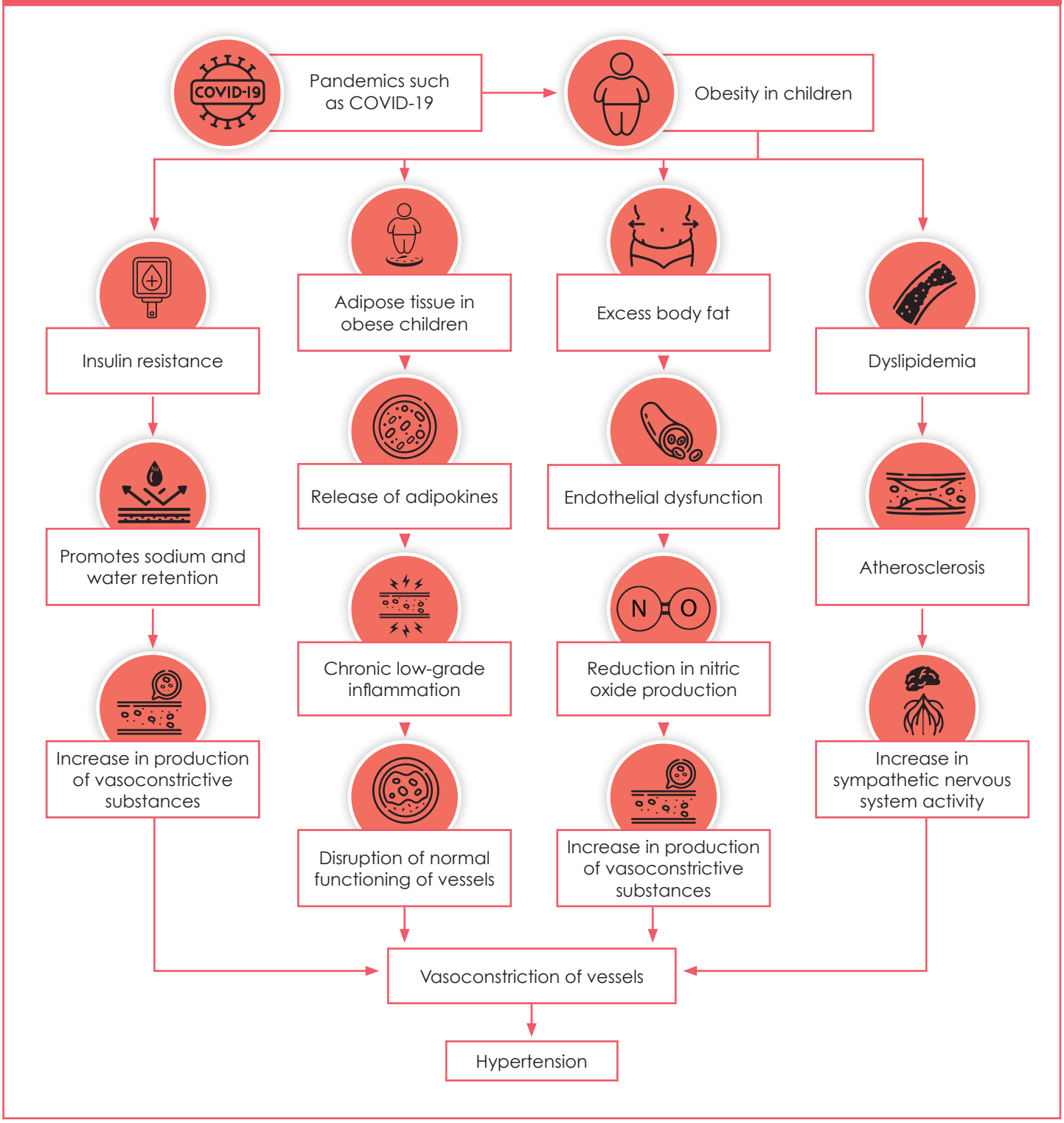
Factors contributing to childhood obesity during pandemics[3]



An established connection between childhood obesity and hypertension

Childhood obesity is associated with various co-morbidities including hypertension, type-2 diabetes, metabolic syndrome, and chronic kidney disease.[5] Understanding the mechanisms behind the associations between pandemic such as COVID-19 infection and hypertension and obesity is important in developing effective targeted therapies.[5] These various mechanisms are well elaborated in Figure 2 which shows clear association between hypertension and childhood obesity.[3]

Figure 2: Mechanistic association between childhood obesity and hypertension during pandemic[3]



> PREVALENCE OF HYPERTENSION INCREASED AMONG CHILDREN AND ADOLESCENTS DURING THE COVID-19 OUTBREAK

Clinical evidence highlighting link between childhood obesity and hypertension during COVID-19

Qiu's study[6] analyzed potential sex differences in BMI and blood pressure among school-age children amidst lifestyle changes, particularly during the COVID-19 quarantine. This cohort study, encompassing 445 children, investigated BMI and blood pressure alterations over five months. The study was conducted with the aim to identify predictors of overweight, obesity, and elevated blood pressure (EBP). The results revealed an increase in the proportion of boys with overweight and obesity ($p = 0.036$) and a rise in pre-EBP and EBP for both genders ($p = 0.004$ in boys; $p < 0.001$ in girls) during the quarantine. Conclusively, BMI is more likely to raise in boys, and blood pressure raises in both boys and girls during the COVID-19 quarantine.

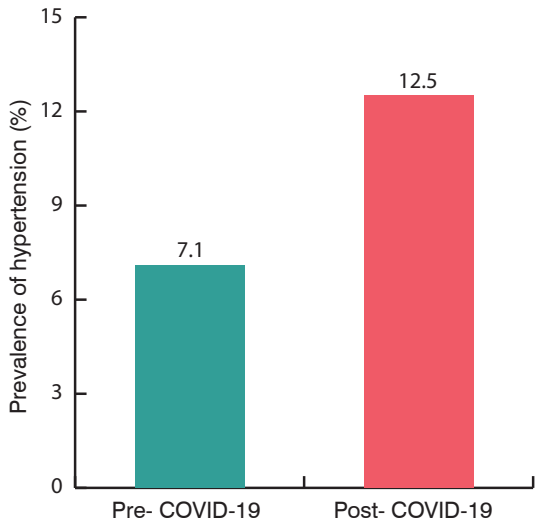
Another study[7] was conducted to investigate the prevalence of hypertension among 1428 youths aged 10–18 years using data from the Korea National Health and Nutrition Examination Survey 2018–2020. It was observed that the prevalence of hypertension increased from 7.1% to 12.5% in all participants (Figure 3). In the sex-specific analysis, the prevalence was found to be increased in boys. In the age-specific analysis, the prevalence was found to be increased in youths aged 13–15 years. In the BMI-specific analysis, an increase in the prevalence was prominent in the normal BMI group. Hence, results showed that the prevalence of hypertension increases among children and adolescents during the COVID-19 outbreak. It was concluded that it is important to closely monitor hypertension among children and adolescents during the COVID-19 pandemic.

Dealing with the trajectory of childhood obesity associated with hypertension

In the surging era of childhood obesity associated with hypertension during and post-pandemics, it is essential to deal with its consequences and long term effects. A comprehensive approach has to be opted to address childhood obesity and associated hypertension. The numerous methods through which this problem can be intervened and managed are mentioned below[3]:

- **Education and creating awareness:**
  - Educate the families regarding impact of pandemic on children's health.[3]

Figure 3: Change in prevalence of hypertension in children during COVID-19 outbreak[7]



- **Lifestyle alterations:**
  - Promoting balanced nutrition, increasing physical activity, and monitoring blood pressure.[3]
- **Assessment of children:**
  - Regular screenings
  - Identification of children at risk for obesity and hypertension
  - Enable early intervention and personalized care.[3]
- **School interventions:**
  - Implementation of evidence based programs that promote healthy eating habits, provide nutritious meals, and incorporate physical activity into the curriculum
  - Mental health support for students
  - Collaboration with healthcare providers and families to create awareness
  - Supports the overall well-being of children.[3]
- **Role of policy makers:**
  - Adoption of policies prioritizing access to healthy food, regulating the marketing of unhealthy products, and setting standards for physical education and recreational facilities
  - Allocation of resources for research, surveillance, and the implementation of effective prevention and intervention programs
  - Creation of a supportive policy framework can enable positive changes that promote healthy lifestyles for children during pandemics.[3]

- **Role of families of children:**
  - Provide nutritious meals
  - Limit the availability of processed foods
  - Promote family meals
  - Encourage physical activity by engaging in active play, limiting screen time
  - Foster a positive relationship with exercise
  - Creation of a supportive and nurturing environment[3]

Conclusion

Childhood obesity is one of the major health concern during and after pandemics. In addition to this, there are various co-morbidities associated with it including hypertension which can lead to several long-term effects. Factors related to pandemics such as Closure of schools, implementation of lockdown and social-distancing measures, limited access to sports/ recreational facilities/ active play, transition in remote learning and dietary modifications exacerbate the health conditions of children which raise the trajectory of childhood obesity and thereby citing the reason for hypertension in children. At last, in order to deal with this obesity and hypertension collaborative approach by healthcare providers, schools, policy makers, and families is crucial for creating an healthy environment for children to reduce the prevalence of obesity in children and hypertension.

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