

Wearing mask in children: Do's and Don'ts

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Abstract

Due to COVID-19 disease, children of all ages seem susceptible to COVID-19; thus, preventing children from COVID-19 disease is a serious duty. One of the preventive strategies in children is the behavior of mask-wearing. Recently, many parents have stated concerns to doctors and social media about whether masks may be harmful for their children. Incorrect news about the negative effects of face masks has also been increasing. Therefore, this letter aims at answering the most common and most important parents' worries about children's wearing face masks.

Key Words: Children, COVID-19, Face mask.

* Please cite this article as: Mirzaei N, Abolfathi M. Wearing mask in children: Do's and Don'ts. Int J Pediatr 2022; 10 (6):16170-16173. DOI: **10.22038/ijp. 2022.60545.4681**

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Received date: Sep.22,2021; Accepted date:Jan.24,2022

Dear Editor,

The number of children with COVID-19 has increased seriously. Children of all ages seem susceptible to COVID-19, and there is no impressive sex difference. Thus, preventing children from COVID-19 disease is a difficult and great duty. The simultaneous use of different preventive strategies can help children get better protected from infection; one of such strategies is the behavior of mask-wearing (1).

Despite the recommendations of WHO (World Health Organization) for the use of face masks in above-5-year-old children (2), recently, many parents have stated concerns to doctors and social media about whether masks may be harmful for their children. Incorrect news about the negative effects of face masks has also been increasing. This has contained fallacious reports about face masks causing several sickness and even deaths among children. These reports suggest that face masks may lead to increased rebreathing and accumulation of carbon dioxide, which could be discomforting or even fatal (3).

With the reopening of schools, parents' worries about mandatory mask use in children have increased. The aim of this letter is to answer the most common and most important parents' worries about children wearing face masks. Their main concerns in this regard are:

- 1) Is it necessary to wear a mask at school?
- 2) What is the best type of mask to prevent disease in children in schools?
- 3) Should the mask use be continued during physical activity?
- 4) And what is the effect of the mask on the health of the children's physiology and respiratory system?

In answer to the first question, we should say yes, wearing a mask has been proven to prevent disease transmission in children.

Various studies have been conducted in different schools in this field; All of them have indicated that children who wore masks at school were less likely to get sick than those who did not wear masks (4). A meta-analysis of 26 studies reported that mask wearing in schools was associated with a decreased risk of SARS-CoV-2 infection in schools (OR: 0.52; 95% CI: 0.35–0.78) (5).

To answer the second and third questions, first, it is better to take a brief look at the types of masks. The most common masks currently available are: N95 masks, surgical masks, and Home-made or commercially cloth masks.

The effectiveness of the cloth masks is not fully determined, but it is well known that surgical masks can block the inhalation of large droplets and sprays. In a meta-analysis of randomized controlled trials, surgical masks were compared with N95 respirators in preventing influenza-like illnesses and laboratory-confirmed influenza. The results demonstrated that these two preventive methods were similarly effective (6). Some studies have shown that wearing N95 respirators that are designed to meet a very close facial fit and can prevent 0.3- μ m particles is related with an increased effort in breathing, leading to inconvenience, fatigue, or headaches after a few hours of use. This illustrates why the use of N95 respirators is introduced only for health care workers to protect them from being exposed to infected aerosolized particles of very small size (6-7).

To answer the third question, it must be said that children have to take off their masks to breathe in fresh air after a certain amount of time, about 1hour. Furthermore, they shouldn't wear masks, especially N95, when doing exercise. According to reports in China, at least three children have died of asphyxia after physical exercise, due to wearing N95 masks during COVID -19 pandemic (1).

As for the last question, information about the influence of commonly used face masks on physiological and respiratory parameters in children is very limited. Very few clinical studies have been performed on the effect of the face masks on the pediatric respiratory system. In a cohort study of 47 healthy children wearing or not wearing surgical masks, no significant difference was reported in median partial pressure of end-tidal CO₂, O₂ saturation, pulse rate or respiratory rate during 30 minutes of usual play with or without a mask (8). Similarly, in another study, it was found that the use of N95 masks could potentially cause breathing difficulties in children, if the mask does not have an exhalation valve, particularly during a physical activity (9).

Another pediatric study evaluated the specially designed pediatric N95 mask. They found that the evaluated mask (with or without MF) is safe for use in children 7 to 14 years old with no underlying medical problem and in the field of routine daily activities including brisk walking. The endpoint measure of ETCO₂ showed no significant rise and the highest ETCO₂ recorded for all children was 42 mmHg. It was reported that wearing a mask slightly increased the ETCO₂ and FICO₂ when at rest and with brisk walking. The MF was observed to effectively bring the FICO₂ levels to a level comparable to that of not wearing a mask (10).

In comparison to adults, children's maximal inspiratory and expiratory pressures are lower, informing a positive correlation between biometric data and age (2). In a pre-pandemic research conducted by Lee et al, it is shown that wearing an N95 respirator leads to a 126% increase of inspiratory and a 122% increase of expiratory flow resistance. Thus, N95 respirators or FFP2 masks are recommended particularly for high-risk children (3, 11).

In general, research findings seem to support the use of surgical masks among children, especially with regard to the reopening of schools. According to the above description, we briefly conclude that wearing face masks in children is one of the most effective ways to control COVID-19. Researchers have suggested that the best type of mask among healthy children older than three years of age are the surgical masks and only children at high risk of complications are allowed to wear FFP2/N95 masks. The effectiveness of cloth masks is variable and not completely clear. Masks should not be used in children during physical exercise and respiratory problems as they may cause hypoxemia and hypercapnia. Information on the effect of commonly used masks on physiological and respiratory parameters in children has not yet been fully specified; because these studies were associated with limitations and have not been performed for a long time. Further studies are recommended about the effect of the masks in different age groups of children and over long periods of time.

At the end, it should be added that the vaccine is now available for children 5 years and older. Every eligible child should get vaccinated to protect against COVID-19 (12). Updated guidelines indicate that fully vaccinated staff and students may not require wearing masks at school; but because of the CDC forcing the use of masks on public transportation, they have to wear masks on school buses (13).

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