



Position Paper Prevalence and Significance of Post-COVID19 Symptoms in Children

The bottom line

The term post-Covid, as it has appeared in the literature, expresses two syndromes:

1. Pediatric Multisystem Inflammatory Syndrome /Multisystem inflammatory Syndrome (PIMS / MIS-C) - a rare syndrome whose risk of developing is likely affected by background conditions such as being overweight. With proper treatment, the prognosis for recovery is excellent.
2. Long COVID - a syndrome that to date has not been clearly defined, which includes non-specific symptoms that are also known to occur after infections from other viruses (fatigue, headaches, difficulty concentrating, etc.). Recent studies show that these symptoms resolve within a few weeks in the vast majority of cases, and within a few months in the remaining cases.

A number of studies have not even detected differences between children who were found to be positive for the virus and children who were not infected with it. According to the current body of knowledge, the health risk of these syndromes is smaller than the risk of severe side effects from the vaccine. Both of these syndromes have been identified in children who developed Covid mildly or even just contracted the virus without showing any symptoms. Since, according to scientific publications, it is not clear that the vaccine prevents the infection itself (which, as mentioned, may cause these syndromes), there is currently no information regarding the effectiveness of the vaccine in preventing the above two syndromes.

Therefore, there is no merit to the recommendation to vaccinate children in order to prevent "post-covid" syndromes.

Introduction

One of the main concerns of many parents regarding COVID19 is the late or long-term complications of the illness in children, complications that are sometimes referred to as "post-corona syndrome" or long COVID. The media has dealt extensively with this subject around the debate that arose regarding vaccinating children against COVID19, and it is no wonder that many parents have developed understandable concerns. The claims that it is important to vaccinate children in order to prevent the abovementioned "post-covid" complications continue to be voiced even though:

- The risk posed by Covid for children is smaller than the risk caused by other winter illnesses [1,2];
- Children have no significant contribution in the spread of the illness [3];
- The vaccine for children (and also adults) has not yet received full FDA approval, as the safety research phases have not yet been completed. Health authorities thus define the vaccine as "under investigation" and approved for emergency use [4];
- Concerns regarding the side-effects of the vaccine have arisen and have been reported in the media regarding myocarditis and other symptoms.

Media personalities are often heard stressing that "we do not know enough" about the illness, but the truth is that in the 15 months that have passed since the onset of the pandemic, much knowledge has been accumulated in Israel and around the world, including, in part, knowledge that is fundamentally different from that available at the beginning of the pandemic. For this reason, we have chosen to present to you the existing knowledge on the subject, so that every parent can make a decision based on evidence and an informed assessment of harm versus benefit.

Definitions

First, it is important to separate the discussion of the long-term complications of the COVID19 virus into two essentially different phenomena:

1. Multisystem Inflammatory Syndrome (PIMS/MIS-C)
2. Long COVID



It is important to note that these syndromes can, according to the knowledge existing today, appear regardless of the severity of the illness' symptoms, and even in patients who became infected but did not experience any symptoms [5, 6].

Multisystem inflammatory Syndrome

The first syndrome, called PIMS (Pediatric inflammatory multisystem syndrome), or MIS-C (Multisystem inflammatory syndrome) is a syndrome that appears several weeks after recovery from the virus, and is reminiscent in some of its characteristics of other multi-systemic inflammatory syndromes known to the medical world, such as Kawasaki disease [7]. In that condition, there is an intense overactivity of the immune system which manifests in multisystem inflammation that can damage, among other things, the digestion system, the nervous system, the heart, blood vessels, and the respiratory system [6,7,8]. This is a rare syndrome, whose accurate incidence is difficult to estimate for a number of reasons:

The first difficulty stems from the fact that certain groups of children—such as overweight children or children from certain ethnic groups—are at increased risk of developing PIMS. For example, according to data from a study conducted in the United States, the syndrome was found with an incidence of 316 per 1,000,000 verified COVID19 cases (which means a risk of 0.03%), but this group included a significant proportion of Hispanic and African-American children, who are at increased risk of developing the syndrome [8], which may skew the risk upwards relative to other groups. Another study from the United States that examined the rate of cases relative to the population also found a low rate of 21 cases per million children (0.002%) [9]. In a prospective study conducted in 20 hospitals in Israel, 56 cases of the syndrome were identified out of 291,628 verified cases during the follow-up period (i.e., 0.02% incidence), with the rate of overweight children in the group of children suffering from PIMS being significantly higher than their rate in the group of children with verified COVID19 cases who did not develop PIMS. All the children in this study, it should be noted, have fully recovered [7]. In a webinar held by the British Medical Journal (BMJ), the risk of PIMS was assessed as 0.03% (1-2 out of 5000) [10].

Another difficulty stems from the fact that there is an underestimation of the number of children infected with the virus, for the reason that many of them are asymptomatic. In Israel, for example, a serological study by the Center for Disease Control of the Ministry of Health revealed that as of early June, two times or more children had been infected with COVID19 than what we knew (more than half a million children), which implies that PIMS is even more rare among confirmed cases [11].

From all of the above it follows that as per the information available today, PIMS is a rare syndrome, whose likelihood of developing in a patient is most likely affected by underlying conditions such as being overweight or by belonging to certain ethnic groups such as Hispanic and African American children (ethnic groups with low prevalence in Israel). It is worth noting and emphasizing that modern medicine is well equipped to dealing effectively with this syndrome through advanced anti-inflammatory treatments—and that, according to data collected in Israel, recovery from it is excellent [7].

Long COVID

This phenomenon has recently received much media attention, so we will write about it in some more detail.

Most children and teens infected with the COVID19 virus do not experience any symptoms whatsoever or experience only mild symptoms. This is true for both children treated in the community and for hospitalized children [7]. In most cases, the natural course of the disease, in both children and adults, resolves in complete recovery within 2-6 weeks [12]. In some cases, patients report symptoms lasting weeks or even months after the end of the acute illness. This phenomenon is referred to as "long COVID" (or, alternatively, post COVID, and in the media sometimes "post Corona"). Although these are non-life-threatening symptoms, they have garnered much interest because of the impairment caused to the ability to function and the resulting harm to quality of life. According to current knowledge, long COVID involves a wide range of non-specific symptoms, which include, among others, fatigue, headaches, chest pains, muscle aches, mood swings, difficulty concentrating, loss of sense of taste and smell, shortness of breath, palpitations, diarrhea, abdominal pain, rash and fever [12].

Such conditions are not unique to the COVID19 virus, and post-viral syndromes (i.e., after a viral disease) are observed and are resolved even after ordinary winter illnesses, some of which are caused by infections by common viruses against which there is no vaccine. One of the most well-known among them is the EBV virus, which causes infectious mononucleosis [31, 14].

In contrast with PIMS phenomena, the study of long COVID is more complex. One of the main reasons is that, as of today, there is no accepted definition or criteria for diagnosing this syndrome, in adults or in children, due to significant knowledge gaps [12, 14]. According to a March 2021 study of the British National Institute for Health Research (NIHR), which reviewed over 40 studies conducted on the subject, a large proportion of cases overlap with the definition of a common post-viral syndrome called Post-Viral Fatigue, and the symptoms resolve by themselves after 8-12 weeks [14].

Also, according to the NIHR data, it is very difficult to draw clear conclusions about the phenomenon due to the varying research methods employed by the studies that dealt with the syndrome, some of which were based on surveys and questionnaires (sometimes by telephone or online), and therefore suffer from many biases. In addition, in an effort to publish quickly, many of the studies followed the patients only for a short time (hence also why the name "Long COVID" provoked



criticism) and examined a small and unrepresentative sample of patients. Many studies referenced by the media were not peer reviewed and were not published in a scientific journal [14, 15].

As a result, there is no consensus among researchers regarding the prevalence of the phenomenon and its practical significance. However, there is clear evidence that the phenomenon is less common in children [16]. An article published in the leading journal *The Lancet* found a very low incidence of light symptoms (4% coughing and 2% fatigue) that lasted between 3 to 8 weeks among children who were confirmed as having contracted the virus [17]. In the aforementioned BMJ webinar about COVID19 in children, it was emphasized that since COVID19 illness manifests itself in children in a significantly milder form, it would not be correct to conclude that long COVID, which has not yet been clearly defined, will manifest in them in the same way, and that all evidence shows that the incidence of the syndrome is lower in children [10]. Two additional studies that followed over a period of 6-11 months prolonged symptoms in children who had tested positive for COVID19 did not find significant differences in the incidence of these symptoms in the long run between children who had tested positive for COVID19 and a control group of children who has not tested positive [18, 19]. In one of the studies (which had not yet been peer reviewed), the question was posed whether the symptoms of "long-COVID" were caused solely due to infection with the virus, or whether they have something to do with social isolation, loss of routine and other difficulties experienced by children and adolescents during the COVID19 crisis (a phenomenon known as Long-Pandemic Syndrome) [18].

Summary

We must return to the starting point: do PIMS and Long-Covid constitute a concern that justifies the vaccination of children?

As for the PIMS syndrome: this is a rare occurrence, and the risk for a child to develop it is about 0.003% -0.002%—this when, according to the findings of the examination committee of the Ministry of Health, the risk of a teenager developing myocarditis after vaccination is 3 to 10 times higher: about 1 in 3000-6000 (0.02%-0.03%) [20-22] and, according to the US Vaccine Adverse Event Reporting System (VAERS), is 1 in 15,000 (0.007%), 30 times more than expected [23]. It is important to note that according to the report of the meeting of the committee for the prioritization of vaccines, in collaboration with the epidemiological treatment team, the available data regarding myocarditis after vaccination are only for individuals getting vaccinated aged 16 and over, and there is no information regarding the prevalence of the phenomenon in children younger than 16.

It should be emphasized that, contrary to the attempts to define the phenomenon as "minor," it poses an immediate threat to life, with about half of the patients hospitalized in the intensive care units [22]. In addition, at this stage it is not yet clear whether this has long-term significance. Also, according to Pfizer data, the rate of serious side effects in the first month after vaccination in children is 0.4% [4]. Therefore, according to the information available today, in children the vaccine has a higher risk of side effects than the illness itself. As for Long COVID: As mentioned above, this is a general name for a wide range of non-specific, non-life-threatening symptoms of short duration (several weeks); their incidence is low, and they largely overlap with familiar post-viral syndromes which, in the large majority of cases, resolve without treatment.

Finally, we must ask whether the vaccine has been shown to be beneficial in preventing these syndromes: the vaccine has not been proven in the first place to prevent infection or asymptomatic illness [24] (and now it is also clear that vaccinated individuals can be infected and infect,) and since according to the studies even patients with mild symptoms or no symptoms may suffer from one of the above syndromes, there is no way to know what the usefulness of the vaccine is in preventing PIMS or Long COVID.

Although the Council believes, as is widely accepted in medicine, that every parent should make decisions according to their belief system and their own considerations, the Council feels an obligation to express an opinion on the basis of the factual information presented above and on the basis of the broad clinical experience of its members: our conclusion is that the syndromes appearing after the COVID19 virus, which include PIMS/MIS-C and Long COVID, are rare, are not fundamentally different from familiar post-viral syndromes, are treatable and have an excellent prognosis. According to the knowledge available today, the risk for children to develop these syndromes is lower than their risk of developing severe side effects from the vaccine.

Therefore, there is no reason at this time to recommend vaccinating children in order to prevent these syndromes.



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