

# COVID-19 in Young Adults and Vaccination

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## ABSTRACT

**Background:** COVID-19 is the evolving pandemic that is still ongoing. There is not much decrease in the extent and impact of COVID-19 even after more than a year has been passed. The younger adults and children are believed to be in danger from possible third wave of COVID-19 in many countries.

**Summary:** Young adults and children have shown great medical resilience in initial phase of the wave. Not much lethal outcome has been reported from podiatric age group. But as novel coronavirus is mutating and changing its working, one must be cautious about the approach. Clinical manifestation is of milder nature among podiatric age group but MIS-C is stinging the containment efforts which are believed to be caused due to COVID-19. Mental health, one of the least discussed medical topics has been highlighted by the impact of the pandemic and should be tackling with professional help. Vaccination divide can be felt and rapid vaccination needs to be done among paediatric age group.

**Conclusion:** There is the need of more study among young adults about clinical manifestation of COVID-19, especially among comorbid patients so that we are well prepared for any eventualities. Vaccination is the way out of the pandemic and must be equitably distributed among all the inhabitants of the world.

**Key words:** COVID-19, Misc-C, Young adults, Children, Vaccination, Mental health

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## INTRODUCTION

Coronavirus disease 2019 or COVID-19 is the ongoing contagious disease pandemic which is still at large from being over. It is affecting millions of people directly and indirectly resulting in huge number of casualties [1]. The number of fatalities associated with the COVID-19 is one of the highest in a certain period of time in past hundred years of human civilizational history. Since its inception in Wuhan city of Hubei province in China, in December 2019, it has spread to every nook and corner of the world. It also had shown phases in its occurrence, successive phases being more and more lethal. Many countries are still reeling under the pressure and registering massive number of cases still after more than a year has been passes. As of June 4, 2021, 172, 191, 804 infection cases has been registered across the world and 3,702,736 fatalities has been reported from all over the world due to COVID-19 related complications. Vaccination is in progress and 2, 013, 138, 071 jabs have been administered to the people all over the world [2]. Still United States of

America, India, Brazil, France, Turkey and Russian federation are the top countries reporting more than half of infection cases and fatalities related to COVID-19 [3]. As the initial phase was lethal among older adults, now scientists are protecting about next phase will be more dangerous among children and young adults. Clinical manifestation of COVID-19 among young adults is of milder nature than their older counterparts [4]. The recent spike in MIS-C cases is the recent cause of concern as severe inner inflammation on various organs can be seen among children. The cause and knowhow about the syndrome is still evolving and needs proper attention. Mental health of young adults who are already in their crucial age is important to discuss as less awareness is there to tackle it [5]. Vaccination of young adults is being tested and efforts are being made to vaccinate as much young population as we can before any next wave arrives. In this article, we have taken a holistic overview of the entire above mentioned topic.

## LITERATURE REVIEW

### Clinical manifestation of COVID-19 among young adults

Coronavirus disease 2019 or COVID-19 has overstayed its presence and is still haunting millions of people who are unaffected. Especially many young adults are protected from the brunt of first and second wave.

Although considerable amount of young adults has been infected with COVID-19 which can offer some valuable insight while containing the disease spread among the targeted population. Some of the infected individuals will not experience any symptoms at all and will overcome the disease infection on their own. The reason behind such cases is that this age group are on their peak of their immune system response. Body's pathogen fighting mechanism is well developed and can eliminate any mild viral load on its own without formally getting treated. The symptoms or clinical manifestations of COVID-19 has incubation period of 4 to 12 days, average being 6 days [6]. It is almost same as adult. But the main difference between adult and young adult and children clinical manifestation of COVID-19 is that the symptoms are of mild nature among young adults. It hardly spiral into severe one like in older adults. Symptoms include cough, cold and fever which are considered as onset symptoms and one must be vigilant about these symptoms. Loss of taste and smell is also a common symptom which was identified among infected children and young adults. Headache, extreme fatigue, muscle pain, brain fogging which is the condition of confusion while thinking are also considered as mild symptoms. More aggravated symptoms may include dyspnoea, chills, sore throat, breathing difficulty, chest pain, nausea, vomiting diarrhoea and so on. Combination of some of these symptoms can be seen among infected individuals. Although kids and younger adults have low chances of developing chronic lifestyle disease which comes with age and sedentary lifestyle, they can be comorbid with genetic disorders and diseases like diabetes mellitus, obesity, asthma, bronchitis, cardiovascular ailments which can prove dangerous for them especially in COVID-19 pandemic. So far it is established from various studies and observations that comorbidity is the worst thing to have in COVID-19 pandemic. Majority of the case fatalities have contributed by comorbid patients. Also clinical manifestation of the COVID-19 becomes severe in comorbid patients and such patient escalates into severe condition quickly, making medical management of such patients more difficult. Requirement of sophisticated medical equipment is high among such patients. Comorbidity has equal impact on COVID-19 patients clinical outcome, be it older adults or children [7].

A study conducted on nine children and their families shown that the occurrence of COVID-19 among the children and younger adults were mostly due to their family contacts. These are called immediate contact of the infected person. Half of the children had shown no symptoms. Rest of the children which shown symptom were of mild nature and varied from fever in 22 percent, cough in 11.2 percent to other symptoms such as loss of taste and smell. On the contrary, the family members of these infected children showed more prominent symptoms. Among adults, fever was predominant in 57.1 percent of cases, cough in 35.7 percent of cases which is way more than their younger counterparts. Although stool samples of the younger adults were tested positive even after they got discharged from the treatment. Whereas in older adults it was negative. Some of the kids

were re admitted to assure the public health but no serious condition was recorded. Although this phenomenon must be taken into account for further study [8].

In another study in which four children as an infected patient from COVID-19 were admitted and were under observation. They had no comorbidities what so ever. In this scenario, two of them required mechanical ventilation while other two were on Non-Invasive Ventilation (NIV). Although, no mortalities were reported, but the serious clinical manifestations raised some important questions as, till date, it was considered as children's do not show severe symptoms. C-reactive protein levels were found to be elevated among said children. Troponins were also found to be at higher levels. These podiatric patients were in ICU for 6 days and another 6 days in normal ward. This was attributed to shock due to COVID-19 infection and high inotropic requirements [9].

### Rising instances of MIS-C

There is limited number of studies available that comprehensively covers the clinical manifestation of COVID-19 in young adults and paediatric population because these group were not vulnerable to the previous waves of COVID-19. But as the pandemic is progressing and evolving along with constant mutations of different kinds, this unaffected population is at risk of developing severe symptoms. Some of them are already showing their signs. Such medical condition which rising day by day among paediatric population is multisystem inflammatory syndrome in children (MIS-C). MIS-C is the condition among children and new born babies where two or more than two organs show inflammation on them. These include critical organs such as lungs, heart, liver, kidney, gastrointestinal tract, skin etc. There is ambiguity on the cause of the said medical condition. Although it was found out that the individual affected by MIS-C was in close contact with person infected with COVID-19 or himself or herself was infected with COVID-19. The symptoms of this phenomenon include fever, abdominal pain, diarrhoea, breathing difficulty, and rash and so on. Various ultrasound test and echocardiogram are employed to detect the MIS-C in children. Inflammation on the organs internally is severe and needs urgent sophisticated treatment to increase survival chances. It is categorized as syndrome instead of disease as not much is known about the occurrence of the syndrome. Bunch of symptoms together makes up the said syndrome. The risk can be increase if not treated in time although with proper treatment, it can be treated successfully. Generally, the symptoms start showing two to six week after getting cured from COVID-19. A rapid and sudden increase in antibodies is being attributed to the syndrome [10].

Neonates and children can acquire the COVID-19 infection in two ways. First through vertical transmission and other through environmentally induced infection. Vertical transmission is the transmission of infection from mother to offspring in womb or uterus. It can

happen through placenta or other means. Although so far little evidence is backing this theory and no concrete conclusion is available to prove this transmission. Second transmission method is of environmentally induced infection. It can happen through various ways. If pregnant mother is infected with COVID-19 and gives birth, the close contact of the new born or child with infected mother can induce the infection in them. Improper handling of babies during hospital stay can also transfer the infection to the baby. Essential post-natal activities such as breastfeeding and skin to skin contact which is also called as kangaroo care are necessary to ensure the safe and sound survival of the neonate. These are an unavoidable task which has to be done to ensure the safety of the baby. Lot of loopholes such as not wearing mask while breastfeeding, not maintaining hygiene around the baby, not following the protocols for nursing wards in COVID-19 can easily exploited by the virus. MIS-C has close association with the COVID-19 infection as most of the cases were either infected or got cured from the infection or were in close contact with the infected person. Therefore it is necessary to ensure following of COVID-19 appropriate behaviour. These measures are tried and tested in previous instances of mass infections and are ready to be followed. Taking MIS-C casually would mean inviting a disaster in waiting as third wave in most of the countries is expected to target the paediatric age group population [11].

### **Mental health impact of COVID-19 among young adults**

So far after more than a year, pathophysiology of COVID-19 is understood to some extent and there is constant study ongoing to check any changes. But the other aspect of the multifaceted COVID-19 of mental health impact is ignored so often. Mental health is often taken lightly and no comprehensive discussion gains ground. But the COVID-19 pandemic has highlighted that, the psychological repercussions of COVID-19 is also at par with physiological effects. There is a deep impact on people mental status due to various reasons. Also it is found in almost all the age groups. Particularly in paediatric age group, where it is seen graver than others as initially pandemic started to rage through countries, almost all the countries resorted to the measures like lockdown and physical distancing along with prohibition of gatherings, prohibition on all the non-essential activities which made this age group along with others to sit at home. The prolonged lockdown period and uncertainty about the future made these folks anxious. Already, there are lot of hormonal and mental changes are happening in paediatric age groups especially in young adults. This long lonely period without friends made them more anxious as this age groups speaks openly to their friends and relieve their anxiety rather than speaking to their parents. Lockdown inevitably invited the closure of all the non-essential institutions including schools and colleges. Study from home was introduced but the success of it is largely debated. Students were uncertain about their career prospects and their futures as this age group especially young adult

are in their turning point of their career. Naturally one is already anxious about the career prospects and pandemic made it worse. Rural urban divide was highlighted by introduction of online and digital learning. Students and young adults from rural background were back to their native places after announcement of lockdown and school and college closures. But rural areas lacked the necessary infrastructure which is required for digital learning. Higher latency and lower bandwidth made it more frustrating experience and feeling of lagging behind of their urban counterparts was rising. Lack of proper devices like smartphones and laptops prompted instances of suicides among aspiring candidates. This sad reality was often neglected. Those who want to study were under pressure to maintain their pace with their urban counterparts [12].

Families who got infected with COVID-19 were made to bear brunt of clinical impact of COVID-19. Lots of young adults lost their parents and relatives to the COVID-19 pandemic, making them depressed. Lot of young adults lost their both parents to the COVID-19 created void which can be never filled. Such heart wrenching experiences can have deep impact on psyche of the individual which needs urgent medical attention. Infection among young adults is also a serious cause of concern. Uncertainty about examinations and admission process in successive classes is already a long standing issue of concern which is aggravated by pandemic. Many individuals from this age group who are already prone to the lure of bad habits such as smoking and intoxication are actively indulging in such activities to relive their stress. Those who already taken up these activities were found to be doing these things more often. This age group is considered as gateway for chronic intoxicating habits and once it is acquired by the young adults, it is difficult to separate from them. The first wave saw no massive spike in cases among those individuals but as the mutation is in progress, more attention need to be given on various preventive measures and vaccination of this age group as soon as possible [13].

### **Vaccination among paediatric and young adults population**

The devastating second wave or the resurgence in infection cases of COVID-19 has devastating impact on all the related aspects of the human life. From collapse of health care infrastructure to spike in death tolls due to COVID-19 complication, second wave is considered as the worst nightmare one can have and become true. Taking cognizance of such severity, scientist and researchers already warned the authorities and health care agencies about the looming danger of third wave or recurring resurgence. Third wave is said to be more lethal for kids and children and signs can be seen from the widespread occurrence of MIS-C among children [14]. Therefore it is necessary to vaccinate the population of this age group. Although vaccination for COVID-19 has started way back, but it was carried out in a phased manner. In first phase, all the health care workers and frontline warriors against COVID-19 were vaccinated which was necessary seeing

the casualties among the health care professionals. In second phase, elderly and old aged people were given preference and then middle aged population. But young adults and children were not in the process as there is separate process to administer vaccines to them. Many vaccine candidates have been conducting their trials to check the efficacy of the vaccine candidate. Parents are raising questions about the necessity of vaccination among children's and younger adults as they do not generally show severe symptoms, and it is true [15]. According to a theory children and young adults do not need to get vaccinated if all the older adults are completely vaccinated. But as we know it is not possible. Further kids and young adults with comorbidities are at higher risk of developing the severe clinical manifestations of COVID-19. Long term implication of COVID-19 is still unknown among kids and children and which is very important as they are in their formative stage. Therefore one must ensure to get their young ones vaccinated before the onset of third wave. A huge disparity in vaccine distribution is also a danger to the possible destruction by third wave. Many poorer countries did not even have their jabs for older population. It will be difficult to vaccinate young ones in these countries. Many countries have approved Pfizer-Bio Ntech's COVID-19 vaccine for young adults and children. These are mostly developed countries having resources and money power. The World Health Organization (WHO) led vaccine distribution alliance, GAVI, is trying hard to procure the vaccines for these underdeveloped countries. Developed countries must donate their extra jabs to the initiative as COVID-19 will only eliminate if all the countries vaccinate their people more or less at the same time. Otherwise large number of mutations can occur among viral strain which can evade the vaccine shield and can re infect us. Priority group like comorbid kids and younger adults can be targeted for vaccination if scarcity develops. It is important that, this process happens quickly and no hurdles are in place for it. Before third wave hits, maximum number of candidates must be vaccinated so that devastation from third wave can be averted. Also as preparatory measures, ramping of health care infrastructure like NICU and paediatric ICU must be done to ensure no scarcity of such resources which was felt during second wave. Preventing the third wave seems more plausible than mitigating it. Therefore it is important to follow preventive measures issued by World Health Organization (WHO) and competent agencies around the world to ensure prevention from infection. This includes wearing of masks, maintain physical distancing, constantly sanitizing hands, taking ones jabs when called for, observing all the COVID-19 appropriate behaviours can ensure the aversion of the third wave [16].

### DISCUSSION

Young adults have shown a remarkable amount of resistance to the viral fall outs of the novel coronavirus. On the other hand, this section of the population has shown maximum number of infections as it comprises majority of the total population of the world. Hence to

check the willingness of the supposed candidates of the COVID-19 vaccines, a survey was done in order to gain knowledge about the vaccine hesitancy if any. The age bracket included was 18 years to 25 years of age. The results showed that 76 percentage of the surveyed population of young adults was willing to take the jabs. Although the population of young adults rejecting the idea was apprehensive regarding the outcome of the vaccine and would rather wait to see the results. The study concludes with the suggestion of awareness campaign which must be targeted towards vaccine hesitant population [18]. The huge burden exerted on the health care systems can be reduced by vaccination as feasible interventions. In case study conducted in Jordan the vaccine acceptability was found to be very low [19]. Only those who have received the previous dose of influenza were comfortable with the new COVID-19 vaccine. Free and subsidized rate of vaccine can help reduce the vaccine hesitancy among the young population. A huge disparity in vaccine distribution is also a danger to the possible destruction by third wave. Many poorer countries did not even have their jabs for older population. It will be difficult to vaccinate young ones in these countries. Many countries have approved Pfizer-BioNtech's COVID-19 vaccine for young adults and children [20].

### CONCLUSION

COVID-19 is still evolving and mutating and lowering the guard would be disastrous in such scenario. Clinical manifestation of COVID-19 among younger adults is of milder nature but focus must be on comorbid young adults. MIS-C must be dealt with global cooperation as the spike in cases is a serious cause of concern. The long term impact is still not yet known and one has to be vigilant about the issue. Negligence in reporting of MIS-C cases can prove to be lethal for the children as well as young adults. Mental health is not the topic that can be dealt with at home. It needs professional counselling. After seeing the extent of the distress, authorities must start the telemedicine and consultation so that it can be tackled professionally. Vaccination among young adults has been started in many countries especially among 12 to 15 years of age group. But vaccine distribution inequality must come to an end with global cooperation. As the virus can only be eliminated by positive and coordinated efforts which are synchronized and time bound. Preventive measures and COVID-19 appropriate behaviour must be followed at every cost as efficacy of these measures is well tested.

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