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Covid in Pediatric Population

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ABSTRACT

Background: *Coronavirus disease 2019 or COVID-19 is still wreaking havoc all across the world even after more than one and half year has been passed since its inception. More than three million causalities have been reported from across the world which is unprecedented in the past hundred years of human civilizational history.*

Pediatric age group have been so far escaped from the wrath of the COVID-19 as they are going through their peak of immune system response. Some neonates have suffered severe disease conditions due to COVID-19 and post COVID-19 related complications. COVID-19 infected mothers have not found to be transmitting the infection through womb or placenta also known as vertical transmission, but several antibodies taste for COVID-19 in neonates born to infected mothers tested positives. Teenagers are so far not produces adverse clinical outcome post COVID-19 infection like their older counterparts but it is anticipated that third phase or the wave is going to hit the teenagers harder. Preventive measures are the effective way to deal with the infection. Complacency has no place in this raging pandemic and one must remain vigilant. More study needs to be done to ensure empirical backing for all the related studies.

Key words: Covid-19, Pediatrics, Neonates, Teenagers, Vaccination

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INTRODUCTION

Coronavirus disease 2019 or COVID-19 which is caused by novel coronavirus or SARS-COV-2 which is the successor of SARS-COV is wreaking havoc all over the world. Since its inception in Wuhan city of Hubei province in China, it has spread to every nook and corner of the world. It is evolving to this date and constantly mutating. The extent of menace of COVID-19 so huge that no other event in the human civilizational history of past hundred years had proven so lethal as COVID-19. On March 11, 2020, after seeing its extent and fatal nature, World Health Organization (WHO) upgraded its status from public health emergency of international concern (PHEIC) to pandemic [1,2]. As of May 16, 2021, 162,177,376 COVID-19 infection cases have been reported from across 200 territories and 3,364,178 case fatalities are reported which are due to COVID-19 related complications [3]. United States of America, India, Brazil, Turkey, France and Russian federation are among the worst affected countries and accounts for majority of three reported infections and fatalities related to COVID-19 [4]. The mutation which is said to be the reason behind the second lethal wave have taken place and is spread to all parts of the world [5]. As it is widely seen and established that, COVID-19 affects differently to different peoples. There are some high risk categories which are vulnerable to COVID-19 more [6]. These include pregnant women and also their babies. As both of them are closely interlinked, one affects another physiologically. Neonates are the first and most vulnerable to COVID-19 according to their nascent physiology and immunity in progress. The young children's and teenagers are also found to be more resilient till date but considering mutation pattern of the virus, one cannot predict the course of the infection. The psychological impact on the pediatric age group are the topic which needs more attention and is a serious cause of concern. Preventive measures are issued on time to time and are very effective in containing the viral spread. Here, in this article we discussed some of the issues stated above comprehensively.

Pregnant women and Covid-19

Coronavirus disease 2019 or COVID-19 has completed more than a year on Earth but there is no sign of relief from it. In fact, it is raging more than ever and it has become more difficult to manage the pandemic. The so called second wave or the resurgence in COVID-19 cases due to lethal and more transmissible mutant version of novel coronavirus has left all of us helpless. Certain section of the population which are categorized as vulnerable or high risk category people [7]. Because these people are found to be more vulnerable to both getting infected with COVID-19 and producing severe clinical outcome post infection. Management of these section of COVID-19

patient is becoming difficult day by day as the health care infrastructure is on the brink of collapsing due to exponential surge in demand. Pregnant women are one of the section of population which are found to be vulnerable. In first wave or initial phase of the pandemic, it was thought that pregnant women are not that susceptible to COVID-19 and they are at par with other section of population. But as the resurgent wave of COVID-19 hit, many medical complications and fatal outcomes have been seen which points towards differential impact on pregnant women of novel coronavirus. Pregnancy is already an immunosuppressive state and special care is needed for successful completion of pregnancy. Various studies and observations across the world have highlighted the risks of increased fatalities, still birth, preterm pregnancy, long hauls in intensive care units, need of sophisticated medical attention like oxygen support system. In a cross country observational study among 700 pregnant women having COVID-19 infection and 1400 pregnant women without COVID-19 infection offers a great deal of insights about the facts associated with the situation. Pregnant women are in extremely high risk category as fetus is also under risk along with the mother [8]. This study pointed out that pregnant women having COVID-19 have 20 times more chances of developing fatal outcome than the pregnant women not having COVID-19. Around 12 percent of the babies born to COVID-19 infected pregnant women were tested positive although there was no need panic as babies were safely treated for the same. Study also pointed out that the susceptibility of catching COVID-19 of pregnant women is not more than any other group of population. But post infection, the clinical management of patient becomes difficult and complicated. The comorbidity plays a key role in deciding the course of treatment and outcome of treatment. Underlying medical illnesses like obesity, hypertension, kidney ailments, bronchial disease can create complications post infection and such patient becomes difficult to manage. In fact some of the worst affected countries by COVID-19 like Brazil suggested the women to delay pregnancy in this pandemic times [9]. Also there are several conditions among pregnant women which are similar to conditions in COVID-19. Cardiorespiratory condition among pregnant women sometimes can lead to hypoxia which can be taken for granted as it can be a symptom of COVID-19. Dyspnea due to fetal oxygen consumption is common among pregnant women. Also in COVID-19 it is the indicator of worsening of patient's condition. Therefore, it is advisable to check the pregnant women for COVID-19 from time to time as delayed diagnosis can create medical complications. Psychological condition of the pregnant women has huge influence on perinatal outcome. Mother should be in positive state all throughout the trimesters so that there are no complications arising out of psychological impact. COVID-19 infected mothers are extremely vulnerable to depression and anxiety as they are very uncertain about the condition of their future baby. Also long hauls in isolation and away from family can also have considerable impact on psyche of the patient.

Neonates and Covid-19

Neonates are closely linked to the mother's condition. Every state of mother, whether physical or psychological, it is reflected upon the neonates. As the COVID-19 in pregnant women increases the risk of various precarious events like still birth and preterm delivery, many studies also assessed the impact on neonates born in COVID-19 pandemic. There is lot of ambiguity on the possible impact of COVID-19 on neonates. There are many ways by which babies can acquire the infection of novel coronavirus. Mishandling of baby post labor can be one way of transmission of COVID-19. Vertical transmission in the womb or uterus of infected mother may be the other method by which transmission of COVID-19 can take place. Many neonates test positive in 24 to 48 hours after delivery and again tests negative for COVID-19 within 2 or 3 days without showing any symptoms. In preterm pregnancy happens due to COVID-19 relates complications then foetus may not be fully developed and can show some medical conditions. Neonates are also categorized under vulnerable section as all their bodily functions which are vital for proper functioning are in nascent and early stages [10]. Their immune system is in formation stage and they need utmost medical attention and constant monitoring. There are very less events that produce any severe clinical outcomes due COVID-19 infection. Generally, new born are rarely affected by COVID-19. But in some cases, COVID-19 antibodies were found in new born baby who surprised the doctor's as both mother and baby were tested negative for COVID-19. Although antibodies are not an issue in grownups, it creates complications in new born babies. There has been reporting of multisystem inflammatory syndrome in children (MISC) which was identified after weak cry and shock in baby. Ventilator support was needed in such cases. Although no symptoms were shown by the baby for COVID-19, the antibodies are being associated with the MISC. This was considered as post COVID-19 complications. In MISC, severe inflammation can be seen in vital organs like heart, kidney, liver and so on. Elevated D dimer levels which can go up to 20000 has mandates use of steroids in few cases of infection [11].

Mother to new born transmission of COVID-19 is highly debatable topic and needs more enhanced research in to the topic. Although so far there is evidence that deny the mother to baby transmission of COVID-19. One study observed after studying and testing 255 neonates only 2.2 percent of them tested positive for SARS-COV-2. The study also stated that neonates are not much affected by COVID-19 on their own; instead mothers affected by COVID-19 which induced pre term delivered can have detrimental impact and developmental issues in neonates. Unnecessary premature deliveries should be avoided at all cost by nursing homes and hospitals as it poses greater threat to new born than COVID-19 infection. Another study conducted on 1481 deliveries of babies found that 116 which is 8 percent of total studied population tested positive for COVID-19. 120 neonates which were identified for the study were tested negative

for COVID-19 after 24 hours of the delivery. 68 of 82 neonates which were followed up after 5-7 days after life were allowed to stay with mothers. All of them were allowed to breastfeed and after 5-7 days of life, none of them tested positive for COVID-19. This study strongly denies the claim of vertical transmission [12].

Pediatric age group other than neonates and Covid-19

Pediatric age group other than neonates, meaning younger children and teenagers have other conclusions to offer with respect to COVID-19. In the first phase of COVID-19, it was widely assumed that young children and teenagers are not severely affected by COVID-19 although their susceptibility is same as other section of population. The clinical manifestation of COVID-19 is extremely basic and often asymptomatic cases dominates in this age group. Symptomatic case are also of mild nature and symptoms includes fever, cough and cold [13]. These can be easily overcome by basic treatment course. The need of hospitalization is extremely rare and often home isolation would produce desirable outcome. All these aspects are attributed to their immunity stage. People in this age group are at their peak of their immune system response and are quite often rugged and robust. The body can cope up with any loss which is invited by external pathogenic invasion very quickly, which helps to avoid complications related to COVID-19. Several studies have been done in order to assess the impact of COVID-19 on young children and teenagers. Although comorbidity such as obesity which is prevalent now days in many children and teenagers, hereditary diabetes and other congenital diseases can be life threatening especially in COVID-19 infection. A massive study done on 7780 infected individuals belonging to this age group has many insights to offer. Out of the said number of samples tested, 56 percent of these were male. The mean age was 8-9 years and majority of them were exposed to COVID-19 infected family members [14]. No symptoms were defined in 19 percent of cases while to most common symptoms of fever and cold were found in 59 and 55 percentage of samples studied. 67 of the 321 stool samples suggested possible fecal transmission of the virus and 2 out of 54 samples were studied and tested positive for urinal transmission. Length of the hospital days stay among admitted patients were ranging from 10 to 12 days. Among 3564 patients only 116 patients of COVID-19 were admitted to intensive care unit. Overall the pediatric population remains aloof to dangerous clinical manifestation of COVID-19, they can be carrier as well facilitator to community transmission unknowingly [15]. The symptoms which were observed in these studies on SARS-COV-2 are far less lethal than SARS-COV or MERS. The chance of vertical transmission is denied in the systemic review and all the babies born to COVID-19 infected mothers were tested negative. Also previous similar events of SARS and MERS also did not show any cases of vertical transmission although the transmissibility was very less in both the cases as compared to SARS-COV-2.

Psychological impact of Covid-19 among pediatrics population

Physiological impact of COVID-19 is not as grave as it is for other section of population in pediatrics population. But a vast amount of difference has been seen in mental state of pediatrics especially teenage population. This often less talked about impact as the health acre infrastructure is overwhelmed by physiologically impacted cases. Also there is gross lack of awareness among all people about mental health and wellbeing. As the initial phase of COVID-19 was marked by lockdown and various movement restrictions which made all the people in non-essential category to stay at home. The age group discussed has habit of socializing and playing, meeting friends and they need constant interaction. It was totally prohibited as lockdown restrictions were imposed. More time was spent on gadgets such as mobile phones and games. Too much time on social media networks and other sites can have catastrophic impact. The situation worsens in second phase of COVID-19 and the restrictions are somewhat same round the year, banning any kind of nonessential travel, gatherings, sports events and so on. This can induce severe anxiety and depression among stated age group. Already there has been widespread lack of physical activity among teenagers and habit of junk food munching making the upcoming population more prone to obesity and other long term illnesses [16]. More screen time automatically increases craving for high carbohydrate and fat content food which is detrimental to the health of the teenagers. Various changes in the body such as physical, chemical, emotional changes are taking place in teenagers. Therefore, it is necessary to look on for deviation which is adverse. A poll based study on 977 teenagers suggested that one third of girls and one fifth of boys have been experiencing worsening or onset of anxiety. This, if not treated in time can escalate into severe grade depression and bipolar disorder in later years of life [17].

Preventive measures available in the Covid-19 pandemic

The menace which COVID-19 has created is extremely unbelievable. No other event in the human history was so destructive and lethal as COVID-19. Health care infrastructure has been completely collapsed and literally gasping for air. Curative measures are being employed but the transmission rate is so high that demand has been surging day by day without adequate supply. The long term implications of COVID-19 also known as long COVID-19 is slowly unfolding and is our possible next challenge in post COVID-19 world. Many of the symptoms and situations persists even after testing negative for COVID-19. Weakening of muscles, palpitations, occasional loss of taste and smell, weakening of heart and other vital organ's muscles, reduced physical capacity, inflammation in alveoli are some of the long term consequences after COVID-19 which was observed among COVID-19 treated patients. This was also evident from previous similar outbreaks of SARS and MERS [18]. Therefore, it is necessary to understand the importance of preventive

measures available to the population. Various guidelines and preventive measures were issued from time to time by World Health Organization (WHO) and health authorities across the world. It includes wearing of mask especially double mask is suggested, maintaining physical distancing, avoiding getting out from residential place, sanitizing hands at regular intervals, getting vaccinated especially high risk and vulnerable population are some of the key suggestions and measures which can save us from th wrath of novel coronavirus. This measures needs to be followed religiously. After the initial phase of COVID-19, there was some period of low cases where people became negligent and did not obeyed the preventive measures. Also the law enforcement agencies laxly implemented the regulations which have led us to the extremely virulent and lethal second phase of COVID-19. Therefore, one has to learn from its past mistakes and it should be rectified as soon as possible. It is the only way from staying away from the infection as no money or contact can buy you your precious life as health infrastructure is overwhelmed. Vaccination drives must be implemented on mission mode and hurdles like vaccine supple and shortages must be rectifying as soon as possible. Genome sequencing is yet another measure which every government has to take so that all the mutant versions are tracked and studied to rectify the guidelines according to it [19].

CONCLUSION

COVID-19 is not going anywhere and is here to stay. As the second phase or wave is progressing, there is already a warning issued by various competent and credible authorities about preparing for third wave. The highlight of the third wave is that it will hard among pediatric age group and we should be ready to face the catastrophe. Also it can be avoided by following all the necessary protocols and preventive measures and by vaccination which is in final stage and soon it will be rolled out for population of age group less than 18 years. Neonates are showing low risk but MISC is the big challenge which needs to be contained. Proper standard operating procedure and protocols must be followed while handling the new born babies. Also time to time sanitization of all the organs and parts of COVID-19 infected mother before breastfeeding and handling the new born babies. Vertical transmission is not yet established but large amount of comprehensive studies across countries are needed to put forward any concrete argument about vertical transmission. Psychological impact should be taken seriously as it has been more than a year. Prolonged anxiety and depression can sum up into more critical and grave mental health impact which would take more efforts than now to resolve. Communication between teenagers and parents along with occasional clinical consultation can be the right approach as the novel coronavirus is here to stay for a considerable amount of time. Forecasting the third wave must be complemented with ramping up of health care infrastructure and vaccination drives. The logistical challenge for transportation of available medical oxygen must be resolved so that it is utilized properly. Comorbid teenagers should be given proper attention as they must be protected against the COVID-19 infection otherwise the clinical management of such patients become difficult. Contact tracing is the key to trace back all the positive patients so that they can be treated at the earliest and need of sophisticated medical care can be reduced.

REFERENCES

1. https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020
2. Bawiskar D, Phansopkar P, Gotmare AV. Covid-19 facets: Pandemics, curse and humanity. Int J Res Pharm Sci 2020; 385-390.
3. https://coronavirus.jhu.edu/map.html
4. https://covid19.who.int
5. Wise J. Covid-19: New coronavirus variant is identified in UK. Br med J 2020; 371:4857.
6. Guan WJ, Liang WH, Zhao Y, et al. Comorbidity and its impact on 1590 patients with COVID-19 in China: A nationwide analysis. Eur Respir J 2020; 55.
7. Yan J, Guo J, Fan C, et al. Coronavirus disease 2019 in pregnant women: A report based on 116 cases. Am J Obstetr Gynecol 2020; 223:111-e1.
8. Zeng H, Xu C, Fan J, et al. Antibodies in infants born to mothers with COVID-19 pneumonia. JAMA 2020; 323:1848–9.
9. http://www.theguardian.com/world/2021/apr/16/brazil-warns-women-to-delay-pregnancy-amid-covid-19-surge
10. De Rose DU, Piersigilli F, Ronchetti MP, et al. Novel coronavirus disease (COVID-19) in newborns and infants: What we know so far. Italian J Pediatr 2020; 46:56.
11. Chang TH, Wu JL, Chang LY. Clinical characteristics and diagnostic challenges of pediatric COVID-19: A systematic review and meta-analysis. J Formos Med Assoc 2020; 119:982–9.
12. Swann OV, Holden KA, Turtle L, et al. Clinical characteristics of children and young people admitted to hospital with covid-19 in United Kingdom: Prospective multicentre observational cohort study. Br Med J 2020; 370:3249.
13. de Souza TH, Nadal JA, Nogueira RJN, et al. Clinical manifestations of children with COVID-19: A systematic review. Pediatr Pulmonol 2020; 55:1892–9.
14. Hoang A, Chorath K, Moreira A, et al. COVID-19 in 7780 pediatric patients: A systematic review. E Clin Med 2020; 24.
15. Eastin C, Eastin T. Epidemiological characteristics of 2143 pediatric patients with 2019 coronavirus disease in China. J Emergency Med 2020; 58:712.

16. Zhang C, Ye M, Fu Y, et al. The psychological impact of the COVID-19 pandemic on teenagers in China. J Adolesc Health 2020; 67:747–755.
17. Dubey S, Biswas P, Ghosh R, et al. Psychosocial impact of COVID-19. Diabetes Metab Syndr 2020; 14:779–788.
18. Batawi S, Tarazan N, Al-Raddadi R, et al. Quality of life reported by survivors after hospitalization for Middle East respiratory syndrome (MERS). Health Quality Life Outcomes 2019; 17:101.
19. Zhang L, Tao Y, Shen M, et al. Can self-imposed prevention measures mitigate the COVID-19 epidemic? PLOS Medicine 2020; 17:e1003240.