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When a child is hospitalized in a Covid-19 ward: An emotional roller coaster for parents



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ABSTRACT

Purpose: To examine the emotions demonstrated by parents of children hospitalized in a pediatric Covid-19 ward.

Background: Although Covid-19 is mostly a mild disease in children, a small proportion develop severe disease requiring prolonged intensive care support.

Methods: On October 1st, 2020, a unique ward for children with Covid-19 was established in a large hospital in Israel. Interviews were conducted with parents of children who had been hospitalized in a pediatric Covid-19 ward.

Findings: A total of 22 parents of children aged 3 weeks to 18 years were interviewed. Three themes emerged: Theme 1: Recognizing their child needed hospitalization in the Covid-19 ward, caused parents anxiety and fear of the unknown. Theme 2: Their child's hospitalization in the Covid-19 ward caused fear and worry at their child's condition, parental stress, shame, boredom, and acceptance. Theme 3: Parents initially felt emotional loneliness towards the healthcare staff in the Covid-19 ward, as well as loss of control, later replaced by feelings of confidence.

Conclusion: Parents have diverse emotions in response to needing to accompany their children who are hospitalized and isolated in a closed ward due to Covid-19.

Practical implications: Health care professionals are immensely important in providing support for parents and for their children suffering from Covid-19. A national plan should be established to address inpatient childcare during an epidemic. Nurses can encourage parents and family to be involved in the child's care and communicate effectively to reduce both the parents' and the child's uncertainty, shame, fear and stress.

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Introduction

SARS-CoV-2, severe acute respiratory syndrome coronavirus 2, which is the strain of coronavirus that causes Covid-19, is a mild disease in children and depends on the child's underlying health condition. Nevertheless, a small proportion develop severe disease requiring prolonged intensive care support and ventilation. Few studies on Covid-19 in children have been published to date, even though the number of confirmed Covid-19 cases in children and adolescents is currently higher than 8 million globally (Gotzinger et al., 2020). A retrospective study conducted in China examined reports to the Chinese Center for Disease Control and Prevention regarding children positive to Covid-

19 and found that most children (90%) had no symptoms or had mild-to-moderate symptoms. However, the same study found that infants were vulnerable to infection (Dong et al., 2020).

Another study was conducted in 25 European countries, in which data were collected from 82 medical centers during 24 days in April 2020. Of 582 children and adolescents aged 0–18 years with SARS-CoV-positive PCR, 62% needed hospitalization, including 8% who were hospitalized in the intensive care unit and 4% who required resuscitation. Moreover, 25% of the hospitalized children had pre-existing conditions including chronic pulmonary disease, malignancy, neurological disorders, congenital heart disease chromosomal abnormalities and chronic kidney disease (Gotzinger et al., 2020). Finally, a study conducted in March–April 2020 in a children's national hospital in Washington DC, found that of the 177 children and adolescents who had SARS-CoV-2 with clinical symptoms, 25% needed hospitalization and 20% were critically ill. Background diseases were prevalent among 39% children and included asthma, neurological diseases, diabetes

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Table 2
Sociodemographic characteristics of the parents ($n = 22$).

Variable	Mean (SD)	Median
Age (years)	39.81 (11.02)	40.5
Hospitalized child age (years)	8.54 (6.8)	9
Number of children	3.81 (2.8)	
Hospitalized child birth order	2.68 (2.47)	
	Number (%)	
Gender		
Male	2 (9.09%)	
Female	20 (90.9%)	
Marital Status		
Married/living with a partner	19 (86.36%)	
Single	3 (13.63%)	
Education level		
High School	14 (63.63%)	
Academic	8 (36.36%)	
Employment		
Employed	15 (68.18%)	
Unemployed	7 (31.81%)	
Religiosity		
Secular	5 (22.72%)	
Traditional	5 (22.72%)	
Religious	3 (13.63%)	
Orthodox	9 (40.9%)	
Covid-19 status		
Positive	17 (77.27%)	
Negative	5 (22.72%)	
Vaccination status		
Vaccinated	6 (27.27%)	
Non-Vaccinated	16 (72.72%)	

SD = Standard Deviation.

The interview analysis was conducted using the constant comparative analysis method (Glaser & Strauss, 1967) by classifying the findings into repetitive content worlds in the interviewees' words. First, the interviewers and the study facilitator, who is researcher specialized in qualitative research methods, read each interview's findings. Subsequently, the study facilitator coded the recurring findings and classified them into content worlds while dividing them into themes and dividing the themes into main categories (Fram, 2013). Afterwards, the study facilitator conducted a comprehensive discussion with the interviewers about the division into themes and categories until full agreement was reached regarding the identification of the content worlds and the division into themes and categories.

Study rigor

The study facilitator instructed the four interviewers about conducting the interviews according to interview guidelines for social scientists and guided them through the process of data analysis (Arksey & Knight, 1999). To ensure the reliability and validity of the findings, a peer debriefing was conducted (Lincoln & Guba, 1985) by presenting the findings by the interviewers to the staff working in the Covid-19 ward. COREQ checklist was used (Supplementary File).

Ethical consideration

The study received the approval of the Helsinki Committee of the hospital where the study was conducted (approval number: Sheba

Medical Center; SMC-7897-20). Prior to each interview, the purpose of the study was explained to the parent and they understood that they had no obligation to participate and if they did they were assured complete anonymity. All parents who agreed to participate signed an informed consent form.

Results

Twenty-two parents of children aged 3 weeks to 18 years were interviewed. Thirty percent of the hospitalized children had acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection with no background diseases; 33% also had oncological diseases; and the rest had various diagnoses, including eating disorders, suspected appendicitis, seizures, and heart defects. None of the children needed mechanical ventilation. Of the parents, 20 were mothers and 2 were fathers. The mean age of the parents was 39.81 years ($SD = 11.02$), the mean age of the hospitalized children was 8.54 years ($SD = 6.8$), 86.36% of the parents were married, and 13.63% were single; 63.63% had a high school education; 68.18% were employed; and 31.82% were non-employed stay-at-home parents. Regarding religion, the participants were Jewish: 22.72% were secular, 22.72% traditional, 13.63% religious, and the rest ultra-Orthodox. Lastly, 77.27% of the parents were positive for the SARS-CoV-2 (Covid-19 virus but they did not have clinical symptoms (Table 2).

Qualitative findings

The findings revealed three themes and eight categories: Theme 1 - Emotions arising from recognizing the need for hospitalization in the pediatric Covid-19 ward, with one category: (a) Anxiety and fear of the unknown. Theme 2 - Parents' emotions towards the child's hospitalization in the pediatric Covid-19 ward, with five categories: (a) Fear and worry at their child's condition; (b) Parental stress; (c) Shame; (d) Boredom; (e) Acceptance. Theme 3 - Parents' emotions towards the healthcare staff on the pediatric Covid-19 ward, with two categories: (a) From emotional loneliness to emotional connection with the staff; (b) From loss of control to demonstration of control, as detailed below.

First theme: emotions arising from recognizing the need for hospitalization in the pediatric Covid-19 ward

This theme presents the emotions that arose in the parents when informed that their child and themselves had to be hospitalized in the Covid-19 ward.

Category 1. Anxiety and fear about the unknown

The uncertainty involved in having a child hospitalized due to a new and unfamiliar disease led to fear and anxiety about the unknown. The main questions that troubled the parents were how would they cope being with their ill child who is hospitalized in an isolated unit, and when would their child recover? As the following quotations illustrate:

"It is a feeling of the unknown and having fears ahead of hospitalization. I did not understand what I was entering into. The corona diagnosis really shocks you: What will happen? How will we manage without being able to leave the ward for days? When will we get out of here? I had many scripts running through my head" (Mother of a 9-year-old child).

"Life turned upside down in an instant, I was terribly scared, I felt like I was going to faint" (Father of an 18-year-old teen); "I thought I would lose consciousness. I did not know what would happen. It's a terrible anxiety that a disaster might happen to us now" (Mother of a 5-year-old child).

Second theme: Parents' emotions towards the child's hospitalization in the pediatric Covid-19 ward

This theme refers to the admission of a child to the Covid-19 ward, which also requires the parent's hospitalization, evoked diverse

obesity, cardiac, hematological and oncological diseases. Most children arrived to the hospital with symptoms of fever and shortness of breath. They also suffered from cough, sore throat, headache, diarrhea and vomiting, and loss of sense of smell and taste (DeBiasi et al., 2020).

Since there are children who are hospitalized due to Covid-19, even though the outcomes are generally good, parents may be put under emotional strain. However, the emotional coping of parents with children hospitalized with Covid-19 has not yet been thoroughly investigated. A study on the mental health of parents of hospitalized children during the Covid-19 epidemic in China revealed that the parents experienced stress and fear of infection (Raphael, Kessel, & Patel, 2021; Wimmensberger et al., 2020; Virani et al., 2020; Yuan et al., 2020). This may be because it is more difficult to maintain hand hygiene rules with children. Moreover, Covid-19 transmutation may be higher in children and the risk of infection is high due to their lower immune system (Yuan et al., 2020). The study also found that the level of anxiety and depression of parents to children hospitalized during the Covid-19 pandemic was higher than parents to hospitalized children during a non-epidemic period (Yuan et al., 2020). Fan et al. (2020) examined the psychological needs of parents to hospitalized newborns in a neonatal intensive care unit in China during the Covid-19 outbreak, and found that the parents' main concern was related to receiving updated medical information regarding their child's health condition.

In response to the increasing number of children positive for SARS-CoV-2 from March 2020, a large hospital in central Israel quickly established in four days a new unique ward for children with Covid-19 that was opened on 1.10.2020. The ward included 12 rooms and met the need for isolation, monitoring, and medical and psychosocial care for the child and their parents. Due to the current decrease in Covid-19 morbidity in Israel, the ward was closed at the end of April 2020. Since then, there has been a monthly average of one child with Covid-19 who has been hospitalized in the regular pediatric ward in an isolated room. The aim of this study was to examine the emotions and thoughts of parents to children hospitalized in the pediatric Covid-19 ward. The research questions were: (1) What are the emotions and thoughts of parents of children with Covid-19 when they know that their child needs to be hospitalized in the Covid-19 ward? (2) What emotions do parents experience when their child is hospitalized in the Covid-19 ward?

Methods

Study procedure

Parents of children hospitalized in our hospital's Covid-19 pediatric ward, and who were with their child during the hospitalization, were interviewed (father or mother). From the opening of the ward on 1.10.2020 until 4.4.2020, 49 children were hospitalized. Their mean age was 6.38 years ($SD = 6.45$). On average, between one and eight children per month were hospitalized in the ward. The duration of hospitalization was 1 to 53 days (mean: 6.65 ± 8.15 days).

Installed in each of the ward's 12 rooms was a video camera whose images were transmitted to a control room staffed by one registered nurse and one physician. Each room also had a monitor for monitoring vital signs and a bell with an intercom. The ward also contained a kitchen, and in the ward lobby were games, a worktable and a TV screen. Personal hygiene, hair products and recreational activities (such as coloring and craft books) were provided for the parents and children. The parents and the children with Covid-19 were able to leave their isolation rooms to use the common area (kitchen, lobby, and worktables). The nurses and physicians were trained with regard to personal protective equipment. They were also trained about the usage of mobile devices for maintaining communication with the children and their parents. The parents were similarly trained and received an explanation page which emphasized how to communicate with the staff. In later stages, other family members who either wore personal protective equipment, had been vaccinated, or had recovered from Covid-19,

were allowed to enter the ward. In addition to the nurse and physician, the Covid-19 ward also included members of a multidisciplinary team that would enter the isolated ward when needed. These included social workers, school and kindergarten teachers working in the hospital's pediatric wards, psychologists, physiotherapists and medical clowns. The social workers and the teaching staff held regular meetings with the children and their parents to identify personal needs and provide a learning curriculum in accordance with the child's age and needs.

Research tool

This was a qualitative study where data were collected through semi-structured interviews. Data saturation was achieved by the Comparative Method for Themes Saturation (CoMeTS) method, which is common in qualitative interview studies. The themes that emerged from the interviews were compared with each other. Afterwards, the sequence of interviews was reordered several times (Constantinou et al., 2017). Each interview began with socio-demographic questions. Subsequently, the parents were asked about their emotions and thoughts of when their child was hospitalized in the Covid-19 ward as well as their emotional and social needs (Table 1: and 2:).

The interviews took place over three months between February and April 2021. Nine interviews were conducted face-to-face with parents after their child had been admitted to the ward, and 13 interviews were held after discharge by telephone with other parents of children who had been inpatients in the ward from October 2020 until April 2021. These telephone interviews took place one week to three months after discharge. Four registered nurses were the interviewers, all with a Master's degree (three have a Master's degree in nursing and one a Master's degree in health systems management). Two of the interviewers worked in the Covid-19 pediatric ward and two worked in the hospital's pediatric management. The interviewers who worked in the hospital management had no direct connection to the treatment of the children. The other two interviewers who worked in the pediatric ward interviewed parents of children they did not care for. In this way, the interviewers had no previous acquaintance with the parents they interviewed. Each interview lasted about 15 to 30 min.

Data analysis

Analysis of the socio-demographic question was performed using SPSS version 25. Means and standard deviations were calculated for the continuous variables. For categorical variables, frequencies and percentages were examined. The interviews were held in Hebrew, after being translated into English and back-translated according to Brislin (1980). In accordance with the approval of the hospital's Helsinki Committee, each interviewer wrote the parents' answers on the interview guidelines pages during the interview.

Table 1
Interview guide.

Question

1. How do/did you feel about your child being infected with the Virus?
2. What feelings did you feel when you were told there was a need to hospitalize your child in the Covid-19 ward?
3. Do you have any concerns due to your child's medical condition?
4. What is your experience when interacting with the medical staff in the Covid-19 ward?
5. How do/did you feel during the hospitalization of you and your child in the Covid-19 ward?
6. Did/do you feel your privacy was/is harmed during your stay in the Covid-19 ward?
7. What is your experience when communicating with the medical staff in the Covid-19 ward?
8. How much do you feel involved in the medical decisions regarding the care of your child?
9. How do/did you handle your child's hospitalization in the Covid-19 ward?

emotions, such as fear, worry, parental stress, shame, and boredom, but also acceptance.

Category 1. Fear and worry of their child's condition

Fear and worry for the child's health were common emotions expressed by the parents, as two mothers stated:

"I was frightened about my baby's condition. I cried a lot and I was worried about how he was infected and why it all fell on us. He is so small and already with Corona. It's unbelievable" (Mother of a 3-week-old baby).

"I am very scared. It's a disease that might affect her in the long term. I really cried a lot here" (Mother of a 5-year-old child).

Category 2. Parental stress

Parents' stress was a common emotion due to their child's need to be hospitalized in an isolated ward without the ability to go out and without friends or family members. The heavy responsibility of only one parent being allowed in the unit with their child without additional family members was mentioned:

"The ward is closed, no one goes out and no one comes in. This is a very difficult emotional experience; it is a stressful claustrophobic feeling" (Mother of an 11.5-year-old child).

"It's stressful to be closed in here, only me and my baby. The responsibility I have is great. I am used to going out, being active, breathing air. I'm already going crazy" (Father of a 5-month-old baby).

Category 3. shame

Another emotion that was expressed was shame associated with the Covid-19 disease, especially because anyone who was in contact with the sick child within the 14 days prior to their SARS-CoV-positive PCR would be required to isolate. As three mothers shared:

"What will they say out there about my girl being positive for Corona? All her girlfriends went into isolation because of her. I'm afraid it will harm her social status" (Mother of a 9-year-old child).

"The hardest thing was to update all of the parents that she was positive. Some of them had to cancel birthdays and family activities, all her girlfriends went into isolation because of us and could not get to school. We had to call everyone and also take care of ourselves. We explained over and over to the parents what happened. It is a terrible feeling of shame, just like a leper that infected everyone, but how are we to blame? After all, we did not do anything on purpose" (Mother of a 14-and-a-half-year-old child).

"Unlike other illnesses, telling the kindergarten parents that my daughter was sick from Corona was really difficult. I felt that some of the parents were very angry with us. Because of us, they could not get to work and stayed with the children in isolation, it is terrible" (Mother of a 5-year-old child).

Category 4. boredom

Boredom in the Covid-19 ward was an extremely common emotion. Some parents even likened the isolated ward to a closed prison:

"I'm very bored here. We are stuck here. It is difficult. Like a prison" (Mother of a one-year-old child).

"Sometimes I climb the walls out of boredom. How much can you read, talk, play. I see on Facebook that everyone goes on with their lives and only I am stuck without the ability to go out and breathe air" (Mother of a 9-year-old child).

"Time does not pass me by here. I freak out here sometimes" (Father of a 5-month-old baby).

Category 5. acceptance

Despite the difficulty involved with hospitalization in the Covid-19 ward, a sense of habituation and acceptance of the condition was also manifested:

"I am going with the flow here. I adapt to the reality I am in" (Mother of a 9-year-old child).

"The demon is not that terrible. I'm quite used to being here. I talk a lot on the phone, it helps" (Mother of a 6-month-old baby).

Third theme: Parents' emotions towards the healthcare staff on the pediatric Covid-19 ward

As reflected with this theme, a change was evident in the parents' emotions towards the healthcare staff during the hospital stay, as emotional loneliness was replaced by emotional connection and loss of control by a sense of control.

Category 1. From emotional loneliness to emotional connection with the staff

The parents' feeling of loneliness in the isolated ward was replaced by a feeling of emotional connection to the healthcare staff. Feelings of empathy and pity were expressed towards the staff working in protective suits, and appreciation was felt towards their dedicated care and warm attitude, as two mothers said:

"The staff is not physically in the ward all the time, but they are trying hard: their attitude is amazing, everyone is kind and pleasant, understanding and considerate. I feel sorry for the staff who are protected inside the space suits" (Mother of a 3-week-old baby).

"They make sure that we are okay. I ring the bell, talk to them through the intercom, and they bring me everything I need" (Mother of a one-year-old child).

The father of a 5-month-old baby even stated that he feels part of the team: *"I feel that the staff are my friends, helping me in everything. I can already be part of the team. When there are new nurses, I tell them where everything is"*.

Category 2. From loss of control to demonstration of control

A sense of a loss of control in the isolated ward due to the cameras, intrusion into privacy, and the prohibition to go out was replaced by a sense of control and confidence in the healthcare staff:

"It's a whirlwind of emotions and sometimes I felt on a roller coaster. At first, I felt out of control since I would be dependent on the staff and cut off from my family. I felt suffocated by the thought of not being able to go out. The staff is constantly looking at us on camera and we have no privacy. However, we got used to dressing in the bathroom because there is no camera there. The staff constantly takes care of us. Only at nights, I allow myself to let go and cry, without being seen" (Mother of a 9-year-old child).

"It's hard to be here without going out and yet, in the ward I'm pretty protected and sure that my child is being cared for and if anything happens, he's safe. I did not want to be alone at home with a corona sick child" (Mother of a 7-month old baby).

"It is not pleasant to be isolated, but I understand that this is how it should be. In the ward everything is explained, a nurse and a doctor share every decision with me" (Mother of a 14-and-a-half-year-old child).

Discussion

The current study found that when parents understand that their child who is positive for Covid-19 needs to be hospitalized, they feel uncertainty leading to fear and anxiety about the unknown. During their child's hospitalization in the Covid-19 ward, parents experienced feelings of fear of their child's condition, stress from hospitalization in an isolated ward with no ability to leave, and a heavy responsibility without the support of present additional family members or friends. A sense of acceptance was then expressed following an acceptance of the required hospitalization for the benefit of the child's recovery and protection against infection. Nurses play a significant role during Covid-19 in promoting parental and family involvement in the child's

care despite restricted visitations (Rimmensberger et al., 2020). The emotions experienced by the parents can be explained by the need to maintain physical and social distance which significantly affected their ability to maintain family centered care while their child was an inpatient (Hart et al., 2020). Restricted visiting policies in pediatric wards is especially complex since children are dependent on their parents for basic care and surrogate decision-making. In addition to the stress resulting from routine hospitalization experience, these limitations add anxiety to the complicated psychosocial impact on the hospitalized child and their parents (Virani et al., 2020). found that parents to hospitalized children with Covid-19 might even suffer from mental-health problems, such as post-traumatic stress disorder, and concluded that identifying the parents' emotions is important to assist them in caring for their children and promoting their recovery.

The requirement that only one parent should be present in the ward was found to be a major difficulty for both parents in a study on parents to newborns in a neonatal intensive care unit during the Covid-19 pandemic in Italy (Bembich et al., 2021). Parents' anger, sorrow and relational suffering were common due to separation from the other parent. Indeed, parental mutual support is a crucial resource for emotional adaptation in this distressing experience (Bembich et al., 2021). In this context, Raphael et al. (2021) state that a parent present with a child hospitalized during the Covid-19 pandemic faces significant challenges, including being absent from work and home and thus unable to care for their other children. Whereas the other parent may feel guilt from being absent from not being with their hospitalized child (Raphael et al., 2021).

Our findings show that parents' emotions towards the healthcare staff on the pediatric Covid-19 ward moved from emotional loneliness to emotional connection with the staff. During their child's hospitalization, parents developed feelings of empathy, identification and appreciation of the healthcare staff. In addition, their feelings of loss of control due to the loss of privacy and independence switched to a sense of confidence in the healthcare staff.

A study of parents of hospitalized newborns (Bembich et al., 2021) found that they developed adaptation strategies to the Covid-19 hospitalization restrictions. These included accepting the situation, such as rationalization and the understanding that hospitalization protects their baby. However, these coping strategies were in a situation where they were required to be separated from their newborn for various periods of time. Whereas, in our study, enabling parents to be present with their hospitalized child 24/7, and with the support and care of a multi-professional team, may have assisted them in being able to develop a sense of control and confidence.

Practice implications

Health policymakers need to establish a national plan to address inpatient childcare during a pandemic. From the beginning of the hospitalization, the healthcare staff should place emphasis on providing an explanation to the child, the parents and family members regarding the restrictive policies and their rationale. Family communication should be maintained on a daily and consistent basis (Rimmensberger et al., 2020). A communication plan, such as contacting the team and distanced family members by videoconferencing, can reduce both the parents' and the child's uncertainty and improve their emotional state (Hart et al., 2020). As parental presence in pediatric wards is important for the hospitalized child's health and recovery, a main challenge of the healthcare staff is striking a balance between preventing harm from visiting restrictions and maintaining the benefits of protecting the child, the family and the caregivers (Virani et al., 2020). As Covid-19 infection necessitates forced quarantine that requires social distancing and an impromptu change of domestic habits, resulting in shameful feelings induced by social rejection by friends or neighbors, health care providers may be able to assist in dealing with these emotions of shame by utilizing therapeutic approaches that help develop positive self-perceptions or engage in healing behaviors (Cavalera, 2020). Such

interventions may be implemented by shared groups for parents, in which they can share their feelings and ways of coping with each other, under professional guidance.

Limitations

The study was conducted in one hospital in Israel and may not represent the emotional coping of parents to children hospitalized in pediatric Covid-19 wards in other countries. Moreover, only two fathers participated in the study and it is important to examine whether this was due to a patriarchal attitude, whereby mothers are typically the caregivers of children and fathers more often work outside the home limiting their ability to be full time caregivers of their ill children. Another limitation is related to the interviews with the parents after their child's discharge from the hospital, which may have potentially risked recall bias. However, because the telephone interviews took place within three months from the time of hospitalization, recall bias is less likely to have occurred in this short time frame (Althubaiti, 2016). Future research should meet the importance of interviewing the hospitalized children themselves and examine their emotions and needs during their hospitalization in a Covid-19 ward.

Conclusion

Children's fear of fully protected staff should be reduced through constant explanations and the use of creative means, such as games and play (Rimmensberger et al., 2020). A multi-professional team should can be involved in dealing with the psychological and emotional distress of parents of children hospitalized during a pandemic. Supportive care, such as psychological and spiritual care, can be offered to the healthcare staff dealing with complex aspects of the pandemic. This care intervention can assist with the staff's own risk of infection, their need for full personal protective equipment while caring for children who test positive for Covid-19, and the need to limit the presence of staff and family members within the pediatric department (Rimmensberger et al., 2020).

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Authorship: We confirm that all authors meet the following four criteria:

1. Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
2. Drafting the work or revising it critically for important intellectual content; and
3. Final approval of the version to be published; AND
4. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Author contributions

Study design: MS, AM, VSM, CG, MI.

Data collection: MS, AM, VSM, CG.

Data analysis: MI.

Manuscript writing: MI.

Critical revisions for important intellectual content: MI.

Author statement

All authors have seen and approved the final version of the manuscript being submitted. The article is the authors' original work, hasn't received prior publication and isn't under consideration for publication elsewhere.

Declaration of competing interest

No conflict of interest has been declared by the authors.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pedn.2021.11.025>.

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