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Concerns of parents about children's overweight and obesity during the COVID-19 pandemic: A qualitative study

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ABSTRACT

Background and aims: Since the end of 2019, the world has been dealing with a new crisis caused by the wide-spread and global outbreak of the coronavirus that has affected various aspects of life. The stay-at-home orders issued to prevent the virus from spreading have caused many problems for families, such as obesity and overweight, particularly among children. As parents play a key role in the prevention of childhood obesity, the present qualitative study aimed to examine the experiences of parents regarding the obesity or overweight of their children during the outbreak of coronavirus.

Design and methods: This study was performed using a qualitative descriptive approach. The sampling method was purposeful, and the required data were collected through in-depth, unstructured, and face-to-face interviews with 16 parents of children with obesity or overweight. The interviews were digitally recorded, transcribed verbatim, and analyzed using Graneheim and Lundman conventional content analysis approach.

Results: The findings were divided into five main themes, including overeating while stuck at home, leading to the sedentary life, disturbed sleep-wake rhythm of the children, indifference of the children towards their appearance, and the inability of parents to control the obesity of their children.

Conclusions: The COVID-19 pandemic has affected families of children with obesity in various ways. The experiences of such parents provide new insight into parental struggles around managing their child's obesity particularly during such stressful times.

Implications: An in-depth study of the experiences of the parents and perception of their challenges and concerns about childhood obesity during the COVID-19 pandemic can lead to the development of useful and effective strategies for the control of childhood obesity.

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Introduction

In January 2020, the World Health Organization (WHO) announced a new coronavirus outbreak and declared a public health emergency. On February 11, 2020, WHO announced an official name for the disease: coronavirus disease 2019 abbreviated to COVID-19. It is the most widespread disease since the outbreak of Severe Acute Respiratory Syndrome (SARS) in 2003 (World Health Organization, 2020) which infected and caused the death of millions of people worldwide. According to WHO, about 123 million people worldwide were infected with COVID-19 up to March 23, 2021, with about 2.7 million deaths (World Health Organization, 2021).

The virus was first identified in Wuhan, China, and after that spread rapidly to many countries around the world (She et al., 2020). In Iran, the outbreak of COVID-19 was first reported in Qom province in

February 2020. Since then, this virus has infected and caused the deaths of many people in Iran (Abdi, 2020).

The COVID-19 has a wide range of symptoms, the most common of which are fever, cough, and dyspnea. Moreover, it has a variable and complex nature that requires an appropriate emergency response. Non-pharmacological interventions were the only way to prevent the disease at the beginning of the outbreak due to the lack of vaccines; hence, the daily habits, mental health, and social and economic status of people were all greatly affected (World Health Organization, 2020). Accordingly, it had long-term consequences in various areas, such as social, economic, and health (Abawi et al., 2020), and has become a turning point in human history (Finer et al., 2020).

The virus has affected several aspects of the lives of people, including their lifestyles (Abawi et al., 2020). The school closures and sudden cessation of school programs for children and adolescents in most countries, as well as the stay-at-home and quarantine orders of governments, greatly influenced the diets, activities, and sleep behaviors of children and adolescents during this period (Browne et al., 2021). Pietrobello et al. observed a

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decrease in physical activities and an increase in food intake and sleep hours during the COVID-19 lockdown (Pietrobelli et al., 2020).

Given the above, it is argued that the COVID-19 epidemic exacerbates the risk factors for weight gain and obesity by obliging the children to stay at home all the time. Von Hippel and Workman in 2016 found that the prevalence of obesity and overweight in children increased significantly during summer, while there was no increase in their adiposity during three academic years since the school environments provided a routine mealtime, physical activity, and sleep schedule (Von Hippel & Workman, 2016).

Childhood obesity is one of the most serious public health challenges of the 21st century (Nittari et al., 2019) and has long been ringing as a global alarm bell. Today, it has become a public health issue and is growing rapidly in all developed, developing, and even low-income countries (Sahoo et al., 2015; Skinner et al., 2018).

This chronic problem endangers the health of children and is a risk factor for adulthood obesity. Children with obesity are also more likely to develop diabetes, cancer, respiratory problems (e.g., asthma and nocturnal apnea attacks), arthritis, liver problems, gastrointestinal disorders, precocious puberty, and psychosocial problems, such as depression, anxiety, low self-esteem, and social isolation (Sahoo et al., 2015). Therefore, we must seek safe and appropriate solutions to deal with this great and growing problem in human societies.

According to the protocols, involving parents in children's weight management strategies is the best course of action for the management of childhood obesity (Barlow, 2007; Lau et al., 2007) since healthy habits of children develop at home. It should be noted that these habits can have long-term effects on the weight status of children (Gray et al., 2018). Parents directly influence the social and physical environment of their children and indirectly impact their behaviors, habits, and attitudes through the process of socialization and provision of a model for them. Perception of this effect can be helpful in the prevention and treatment of obesity (Lindsay et al., 2006).

However, with the outbreak of COVID-19 and the closure of schools, the contributing factors of childhood obesity have intensified, and concerns of parents about how to control childhood overweight and obesity are growing day by day. Recent events during the COVID-19 epidemic have made it difficult for parents to control the obesity of their children and have also doubled their concerns. As obesity is a serious, chronic, and recurrent disease, it must receive special attention during the COVID-19 epidemic (Katsoulis et al., 2021).

Based on the literature review, there is no information on the concerns of parents about the obesity of their children and their reactions to mandatory changes in their lifestyle during the COVID-19 outbreak. Hence, a qualitative design can obtain in-depth information, recognize the subjective and unique nature of the experiences of parents, and capture the comprehensive summary of an experience about which little is known. This can help health policymakers to develop appropriate programs to control childhood obesity by addressing the lifestyle of children. As a result, a qualitative study was conducted to investigate the experiences of parents with the obesity and overweight of their children during the COVID-19 outbreak.

Materials and methods

Study design

This qualitative study was conducted based on the conventional content analysis approach developed by Graneheim and Lundman (Graneheim & Lundman, 2004) with the aim of explaining the experiences of parents with obesity and overweight of their children during the COVID-19 pandemic.

Sample and setting

Participants included 16 purposefully chosen parents of children with obesity and overweight living in Mashhad, Iran. When selecting

participants, we took into account the age (school age) and gender of the children (male/female), as well as and the education level of their parents (different academic degrees) and employment (employed and housewife) (Table 1). Parents, who were living with a child with obesity and were willing to participate in the study, met the inclusion criteria. The exclusion criterion was participant's unwillingness to continue the interview.

The study was conducted in three urban areas. The majority of families who live in these areas have high incomes and most of the houses are in the form of apartments. Iranian schools were closed when the COVID-19 outbreak began, and the closure has continued since then, with education continuing in the form of virtual education.

Procedures and data collection

The required data were collected through unstructured, face-to-face, and in-depth interviews. To select the participants, the researcher went to the schools and with the help of the health instructor and physical education teacher gathered the information from the students with a body mass index greater than the 85th percentile based on age and gender. The researcher then contacted parents with permission from school officials, introduced herself, and explained the research goals. If they were willing to participate in the study, they were asked to select their preferred place and time for the interview. Therefore, the interviews were conducted in various places, such as the workplaces of the parents, homes of participants, parks, and schools of the children. The sampling process continued until sufficient information about the research questions was obtained. When data saturation was reached, data collection came to an end.

Unstructured interviews

A general question was asked at the beginning of the interview: "Would you please share your experiences about the effects of COVID-19 on the overweight and obesity of your child?" Next, to elicit in-depth information about parental experiences, more specific research questions were posed, such as "Can you explain more?", "What do you mean?", and "How did it happen?"

Three participants were re-interviewed to complete the information gathered. They were prompted to clarify the situation by providing additional details about some of the information they had described.

Table 1
Demographic characteristics of the participants ($P = 16$).

| ID code | Parents' Age | Child's age (year) | Child's gender | Parents' occupation | Parents' education |
|---------|--------------|--------------------|----------------|----------------------|-----------------------|
| P1 | 42 | 11 | Girl | Teacher | Bachelor |
| P2 | 45 | 12 | Boy | Employed | Bachelor |
| P3 | 43 | 12 | Girl | Teacher | Master |
| P4 | 40 | 8 | Boy | Employed | Bachelor |
| P5 | 40 | 12 | Girl | Teacher | Bachelor |
| P6 | 39 | 10 | Girl | Employed | PhD |
| P7 | 40 | 6 | Girl | Employed | Bachelor |
| P8 | 37 | 13 | Boy | | |
| | | 8 | Boy | Nurse | Bachelor/ MSc student |
| | | 10 | Boy | | |
| P9 | 38 | 13 | Boy | Employed/ Law Expert | Master |
| P10 | 41 | 8 | boy | Employed | MSc/ PhD student |
| P11 | 42 | 13 | Boy | Housewife | Bachelor |
| | | 12 | Boy | | |
| | | 10 | Girl | | |
| P12 | 40 | 12 | Girl | Nurse | Bachelor |
| P13 | 37 | 12 | Girl | Employed | Bachelor |
| P14 | 36 | 8 | Girl | Employed | Master |
| P15 | 35 | 9 | boy | Employed | MSc |
| P16 | 38 | 11 | Girl | Employed | Bachelor |

The interviews lasted about 30–60 min with an average of 40 min. Data were collected from May 2020 to February 2021.

Data analysis

The data were collected and analyzed simultaneously, with all interviews being audio-recorded and immediately transcribed before they were entered into Maxqda 2020 for coding and determining the basic concepts. Before starting data analysis, the authors determined the framework of analysis, the first author advanced the steps and the second author provided recommendations on the framework. All stages of the analysis were performed with the cooperation of the researchers, and disagreements were addressed by conversation and the exchange of ideas or through the use of an expert check.

Following the Graneheim and Lundman approach (Graneheim & Lundman, 2004), the analysis took place in five steps: (1) reading the whole text of the interview several times to understand the general meaning of the text and the data, (2) dividing the text into meaning units and condensing them, (3) abstracting the condensed meaning units, (4) reviewing the abstracted meaning units in light of the aim of the study, and (5) comparing and sorting meaning units into a theme and subthemes.

Trustworthiness of the study

Guba and Lincoln's criteria were used for the trustworthiness of the study (Lincoln & Guba, 1985). Therefore, sufficient time allocation, prolonged engagement, peer check, expert check, and member check were used to maintain the data credibility. In addition, external check, bracketing, a panel of experts, and sampling with maximum diversity were used to obtain data dependability, confirmability, and transferability, respectively.

Ethical considerations

This study was approved by the Institutional Review Board at Birjand University of Medical Sciences, Birjand, Iran. At the beginning of the study, all participants provided written informed consent and were informed that they could withdraw from the study at any time without consequences. The study did not collect any personally identifiable information, and all responses were kept anonymous. Each person in quotations, for example, was assigned a code.

Results

Interviews were conducted with 16 participants (15 mothers and 1 father). The data analysis resulted in 270 primary codes that were divided into five themes and 12 subthemes. The main themes included overeating while stuck at home, leading to the sedentary life, disturbed sleep-wake rhythm of the children, indifference of the children towards their appearance, and the inability of parents to control the obesity of their children during the COVID-19 outbreak which are explained in detail below (Table 2).

Overeating while stuck at home

This concept means that staying home during the ongoing pandemic has led to increased overeating in children. Following the school closures and the virtual education, as well as traffic restrictions and stay-at-home orders, children spent all their time at home, where they had constant access to food, leading to an increase in overeating.

"I think the number of her mealtimes has increased; she consumes snacks more than ever, which means she has an infinite number of mealtimes; she used to play in the courtyard and forget to eat, but now she always wants to eat something." (P3).

Table 2
Themes and subthemes.

| Themes | Subthemes |
|--|--|
| 1- Overeating while stuck at home | Availability of food and overeating Overeating in the absence of fun and entertainment Stress eating due to the COVID-19 |
| 2- Leading to the sedentary life | Child stops physical activities School closures and the child's reduced mobility Increased digital device usage of children |
| 3- Disturbed sleep-wake rhythm of the children | Child's irregular sleep schedule The child's disturbed peace of mind |
| 4- Indifference of the children towards their appearance | The child's lack of concern about the warnings and judgments of others The child with obesity compares his/her appearance with that of a thin child less. |
| 5- The inability of parents to control the obesity of their children | Creation of an emergency condition and impossibility of using previous solutions Deprivation of communication |

The children did not go to school, stayed at home, and had no special entertainment during the COVID-19 lockdown. Therefore, eating became a kind of entertainment, and they were constantly on the lookout for food and various snacks.

"He used to go to a sports club or a music class in his free time, but now he is using a laptop, a computer, and then he will have a snack or some food." (P9).

In addition to home lockdown and daily news about the coronavirus, including the number of infected and dead cases, families constantly discussing the coronavirus at home and the stress of being infected with the COVID-19 also led to overeating in children.

"The kids are stressed because they do not go out at all. Unfortunately, my daughter is so obsessed with it that she refuses to leave the house and keeps us from going out. This condition leads to overeating particularly of ice cream and other snacks." (P5).

leading to the sedentary life

Before coronavirus, parents would take their children to various sports clubs to help them control their weight. With the outbreak of COVID-19 and the closure of sports clubs and swimming pools, their children stopped physical activities since they did not like exercising at home and the parents were afraid of taking their children out for exercise during the ongoing pandemic.

"My son has not gone to the sports club for one year because of the epidemic peak outbreak of the coronavirus. He used to go to the football and volleyball clubs, as well as the swimming pool in summers." (P11).

Another concern expressed by parents following the closure of schools was a significant reduction in the activity of their children. In other words, most of the activities of children during the COVID-19 epidemic were limited to eating and sleeping.

"As he is stuck at home, he is sleeping, studying, or eating, meaning that the whole activity of the child is summarized in eating and sleeping." (P10).

Virtual education has also led to an increased and mandatory reliance of children on electronic devices, such as laptops, tablets, televisions, and mobile phones, all of which have had a significant impact on reducing the mobility of children.

"Now she has returned to her previous weight. Children's energies cannot be used up because schools are closed. I recall her playing with her

tablet for an hour or two a day, but she now has to use a tablet and a laptop more because of her studies.” (P3).

Disturbed sleep-wake rhythm of the children

Children stayed up late watching TV and woke up very late, almost at noon due to the school closures and virtual and offline education. Therefore, the parents were unable to regulate the sleep of their children during the COVID-19 epidemic. The disturbed sleep pattern naturally disrupted their diets which had a detrimental effect on their weights.

“Due to the outbreak of coronavirus, they stayed up until 3 am and slept until 2 pm when we got home from work. Then, they started studying and eating lunch. As they did not eat breakfast, so they ate their lunches all at once and in large portions, which was one of the reasons for their overweight.” (P8).

Parents also mentioned that the children became very impatient and nervous due to the limited communication and staying at home. This caused reduced peace of mind, nervousness, overeating, and overweight in children during the ongoing pandemic.

“We have had to stay at home since the outbreak of COVID-19. My daughter has become very aggressive and nervous because of spending so much time at home. When I told her something, she would become enraged and overeat.” (P14).

Indifference of children towards their appearance

Following the home lockdown and the lack of contact of children with their friends, they developed an apathy towards their appearances. In school, they had relationships with their classmates and were constantly judged on their appearances. Therefore, they received ongoing feedback about their obesity and overweight, which increased children's awareness and concern about their appearances. However, as the children had limited contact with their friends during the COVID-19 outbreak, they were not motivated to maintain their fitness levels.

“As children have been confined to their homes for about two years during the COVID-19 outbreak, they have no peers to compare themselves with and do not prioritize physical fitness.” (P7).

In addition, family circumstances can influence the child's attitude towards their own weight status as exemplified by the child who exclusively interacts with first-degree relatives, such as cousins and aunts, the majority of whom are obese as a result of their genetic heritage. These family members reactions to the obesity of the child is not negative, and the child is not motivated to lose weight due to comparison with others.

“For example, I can only tell my child to go to this or that aunt's house during the COVID-19 outbreak. Unfortunately, he sees people there who are overweight and obese themselves! They even believe that my child is more attractive than them, so there is no one to reprimand him for his obesity.” (P8).

Inability of parents to control the obesity of their children

The inability of parents to control the obesity of their children indicated that they were somehow struggling to control the overweight and obesity of their children during the COVID-19 outbreak. Therefore, they felt helpless, which is one of the reasons for the complexity and difficulty of controlling the weight of children during these days and the impossibility of using the previous solutions. For example, the closure of sports clubs, the increased parental fatigue and busyness at the

workplace due to coronavirus, overweight of parents, as well as their infection with COVID-19 made childcare and weight control difficult for parents.

“For example, I became infected with the coronavirus; I had a kind of tachycardia and dyspnea, so I almost did not have any mobility. I used to walk for an hour every day and be extremely active at my workplace. When I became infected with COVID-19, I stopped working, became inactive, and gained 4 kg. Also, I couldn't take care of my child.” (P8).

Deprivation of families from communication was another factor that contributed to the confusion of parents regarding the control of the obesity of their children since the sports clubs were closed, they could no longer safely take their children out or to the houses of relatives to play or increase their mobility. Therefore, the parents felt confused and powerless in controlling the overweight of their children.

“I used to take her to her aunt's house where she could play with her cousin. She would jump up and down and play and avoid gaining weight. Now, I do not even dare to take her to her aunt's house to play.” (P14).

Discussion

This study aimed to explore the experiences and concerns of parents about the overweight and obesity of their children during the COVID-19 pandemic. Following the widespread and global outbreak of the coronavirus and the numerous attempts of governments to deal with it, including lockdown, closure of schools, clubs, cinemas, and parks, the lifestyles of people suddenly underwent many changes. Therefore, one of the problems in most families was the overweight of children, which was a great concern for them.

One of the concerns expressed by parents was the proclivity of their child to overeat while staying at home during the ongoing pandemic. Pietrobelli and colleagues showed that consumption of high-energy foods increased in children with obesity while their activity decreased during the COVID-19 epidemic (Pietrobelli et al., 2020). In the present study, one of the main concerns expressed by parents during the COVID-19 outbreak was the tendency of their children to overeat due to lack of entertainment and fun at home as well as the constant availability of food, which caused them to eat more to fill their free time.

Rundle et al. also confirmed that the COVID-19 epidemic exacerbated all risk factors for summer weight gain (Rundle et al., 2020). In other words, with school closures and reduced activity among children during the summer, the prevalence of overweight and obesity among them increases. Families and their children underwent the same situation in lockdown during the outbreak of coronavirus.

Neshteruk et al. also indicated that parents of children with obesity reported an increase in the number of snacks consumed during the COVID-19 epidemic (Neshteruk et al., 2021). However, their findings differed from those of the present study in that they reported positive changes in the eating behaviors of children and families. For instance, the parents reported they had more time to prepare meals at home, particularly dinner, which gave them the opportunity to try healthier options, such as fruits and vegetables.

In the present study, the parents did not mention any positive points in this regard following the outbreak of COVID-19. One of the reasons could be that the majority of parents in our study were employed and worked in fields, such as nursing and teaching, and the outbreak of COVID-19 actually increased their workload. Nurses needed more time due to an increase in the number of patients with COVID-19 and teachers needed more time to provide educational content in the form of virtual education for students due to the virtualization of education while there was no suitable infrastructure for virtual education in Iran.

The present study also showed that the overeating of children increased due to increased stress during the COVID-19 epidemic.

Almandoz et al. found that the majority of adult participants (61.2%) mentioned stress eating during home lockdown (Almandoz et al., 2020). In the present study, this problem was found among obese school-aged children.

Other parental concerns about the obesity of their children included their inactive lifestyle following the closure of clubs and schools, as well as their increased use of electronic devices. Pietrobelli reported inappropriate activity of the children (Pietrobelli et al., 2020) but the details were not clear. In the present study, the cause of inactivity of children during the COVID-19 outbreak was investigated by conducting in-depth interviews with parents.

Neshteruk also reported an increase in leisure-based screen time, with most families reporting a significant increase in leisure time, TV watching, as well as tablet and phone use of children. The reason was that the children were bored and stuck indoors and also had more time for screen use due to less structured school schedules and no extracurricular activities. Nevertheless, the results of the aforementioned study revealed variation in activity levels, ranging from high to low among children. About half of the parents believed that children either maintained or increased their activity level, compared to before the epidemic. One of the reasons was that the children had more time to go out following an increase in their leisure time and reduced time at school (Neshteruk et al., 2021).

However, in the present study, all parents expressed concern about their reduced mobility and activity of children. They reported that their children spent more time at home on virtual education, sleeping, and electronic devices, rather than spending time outdoors to increase their mobility. This could be because the present study was conducted in the early months of the COVID-19 outbreak in Iran. During this period, parents and children were often more cautious in their communication due to the low levels of awareness and high levels of stress.

Parents were also concerned about the disturbed sleep-wake rhythm of their children during the COVID-19 period. Following the closure of schools, most children stayed up late at night and woke up late in the morning, and their nutrition diet changed. In the study conducted by Neshteruk, parents reported altered sleep-and-wake cycles among children as well (Neshteruk et al., 2021). Pietrobelli et al. also confirmed the adverse change in sleep behaviors of Italian children during three weeks of COVID-19 lockdown (Pietrobelli et al., 2020).

Almandoz et al. also reported a range of psychological traumas, such as anxiety and depression, in adults with obesity since the onset of stay-at-home orders (Almandoz et al., 2020). Children are more sensitive and vulnerable by nature, and thereby may be more vulnerable to psychological traumas, compared to adults during the COVID-19 outbreaks and home lockdown policies. In the present study, some parents reported the boredom, aggression, and nervousness of their children during the lockdown.

Parents also mentioned the indifference of their children towards their appearance, which was due to being less connected to their friends. They could not compare their appearance to that of their peers; moreover, reactions of others to their appearance and weight were reduced due to the coronavirus and lockdown. Imani Jajarmi found that the social distancing policy in Iran suspended most social interactions and affected families and education (Imani Jaajarmi, 2020).

In addition, parents were unable to control the overweight and obesity of their children during the COVID-19 period. Following the outbreak of coronavirus, the lives of families underwent many changes, including restrictions on their ability to communicate with others, difficult working conditions for parents, and the inability to use sports clubs. Hence, previous weight control strategies for children were not effective, leaving parents feeling helpless in this regard. For example, the extreme fatigue of parents due to their difficult working conditions and their infection with COVID-19 were among the special conditions that posed challenges to the management of childhood obesity.

Parents were desperate to control the obesity of their children due to their concerns about their infection with COVID-19. A mother was

unsure whether to prevent her child from overeating due to obesity or overweight or restrict her nutrition to strengthen her immune system and prevent her from developing COVID-19 disease. Almandoz et al. reported that the majority of participants were unable to lose weight as they were recommended to stay at home. For example, almost half of them reported a decrease in exercise time and intensity (Almandoz et al., 2020). This study, like the present one, mentioned that weight management was difficult during the COVID-19 outbreak, with the exception that the participants in the present study were children with obesity and parents were responsible for their weight management. Therefore, the difficulty of parents in controlling the weight of their children has been reported with terms “inability and helplessness”.

Following interviews with parents, Davidson et al. pointed out some of the factors affecting parental management of child's obesity, including parents' perception of their children's weight status and their desire and motivation to take action in this area (Davidson & Vidgen, 2017). The results of the present study showed that due to the recent condition in most families during the COVID-19 outbreak, parents lacked the motivation and concentration to manage the overweight and obesity of their children which left them worried and confused.

In addition to the problems and challenges associated with the weight of children during the outbreak of COVID-19, Neshteruk et al. pointed to new opportunities for co-participation created by pandemic conditions. These opportunities include more outdoor time, more meals cooked and consumed at home, family walks, riding bikes, and playing in the backyard (Neshteruk et al., 2021). However, in the present study, parents were confused and desperate in controlling the weight of their children during pandemic conditions due to the high anxiety of families in face of pandemic conditions and lack of awareness of possible solutions in the current situation.

Practice implications

Given nurses' educational, supportive, and managerial roles, the findings of this study assist nurses, particularly pediatric and family nurses, in gaining a comprehensive understanding of parents' problems, concerns, and challenges regarding childhood obesity and overweight and its management during the COVID-19 pandemic, allowing nurses to work and plan to assist them accordingly.

The findings of this study can also help health policymakers to explain supportive policies for families during the COVID-19 outbreak and turn challenges into opportunities.

Study limitations

This study recorded the experiences of a small sample of people located in a country; hence, the findings cannot be generalized to other individuals although efforts had been made to maximize the diversity of participants. Since this study was conducted during the COVID-19 epidemic, it was very difficult to reach the participants and arrange interviews with them, which slowed down the research process. Therefore, the researcher tried to attract the trust of participants by providing safe conditions for conducting the interview, such as maintaining an appropriate social distance at the time of the interview and determining the location of the interview based on the participants' preferences.

Conclusion

The present study was conducted using in-depth reviews of parents' experiences, and the results showed that parents caring for children with obesity faced concerns and challenges in controlling their overweight and obesity during the COVID-19 pandemic. Awareness about these issues can play an important role in all societies to fundamentally solve childhood obesity. Given the clear effects of COVID-19 on childhood obesity and overweight, health policymakers are suggested to develop programs to turn challenges into unique opportunities for families

and help them manage their anxiety during an epidemic. This can happen by raising awareness, providing effective training regarding childhood obesity, providing facilities for families to have fun and move around in a safe environment, regularly disinfecting public places, and monitoring the use of masks in public places.

Conflicts of interest

The authors declare that they have no competing interests.

Authors' contributions

Mahdiye Razi: Conceptualization, Methodology, Data curation, Formal analysis, Investigation, Software, Writing – original draft, Writing – review & editing. Ahmad Nasiri: Formal analysis, Supervision, Writing – review & editing.

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References

- Abawi, O., Welling, M. S., Van Den Eynde, E., Van Rossum, E. F. C., Halberstadt, J., Van Den Akker, E. L. T., & Van Der Voorn, B. (2020). COVID-19 related anxiety in children and adolescents with severe obesity: A mixed-methods study. *Clinical Obesity*, 10(6), Article e12412. <https://doi.org/10.1111/cob.12412>.
- Abdi, M. (2020). Coronavirus disease 2019 (COVID-19) outbreak in Iran: Actions and problems. *Infection Control and Hospital Epidemiology*, 41(6), 754–755. <https://doi.org/10.1017/ice.2020.86>.
- Almandoz, J. P., Xie, L., Schellinger, J. N., Mathew, M. S., Gazda, C., Ofori, A., ... Messiah, S. E. (2020). Impact of COVID-19 stay-at-home orders on weight-related behaviours among patients with obesity. *Clinical Obesity*, 10(5), Article e12386. <https://doi.org/10.1111/cob.12386>.
- Barlow, S. E. (2007). Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary report. *Pediatrics*, 120, S164–S192. <https://doi.org/10.1542/peds.2007-2329C>.
- Browne, N. T., Snethen, J. A., Greenberg, C. S., Frenn, M., Kilanowski, J. F., Gance-Cleveland, B., ... Lewandowski, L. (2021). When pandemics collide: The impact of COVID-19 on childhood obesity. *Journal of Pediatric Nursing*, 56, 90–98. <https://doi.org/10.1016/j.pedn.2020.11.004>.
- Davidson, K., & Vidgen, H. (2017). Why do parents enrol in a childhood obesity management program?: A qualitative study with parents of overweight and obese children. *BMC Public Health*, 17, 1–10. <https://doi.org/10.1186/s12889-017-4085-2>.
- Finer, N., Garnett, S. P., & Bruun, J. M. (2020). COVID-19 and obesity. *Clinical Obesity*, 10(3), Article e12365. <https://doi.org/10.1111/cob.12365>.
- Graneheim, U. H., & Lundman, B. (2004). Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today*, 24(2), 105–112. <https://doi.org/10.1016/j.nedt.2003.10.001>.
- Gray, L. A., Hernandez Alava, M., Kelly, M. P., & Campbell, M. J. (2018). Family lifestyle dynamics and childhood obesity: Evidence from the millennium cohort study. *BMC Public Health*, 18(1), 500. <https://doi.org/10.1186/s12889-018-5398-5>.
- Imani Jaajarmi, H. (2020). Social impacts of the spread of coronavirus in Iranian society. *Social Impact Assessment*, 1, 87–103. <https://www.sid.ir/en/journal/ViewPaper.aspx?id=739454>.
- Katsoulis, M., Pasea, L., Lai, A. G., Dobson, R. J. B., Denaxas, S., Hemingway, H., & Banerjee, A. (2021). Obesity during the COVID-19 pandemic: Both cause of high risk and potential effect of lockdown? A population-based electronic health record study. *Public Health*, 191, 41–47. <https://doi.org/10.1016/j.puhe.2020.12.003>.
- Lau, D. C., Douketis, J. D., Morrison, K. M., Hramiak, I. M., Sharma, A. M., & Ur, E. (2007). 2006 Canadian clinical practice guidelines on the management and prevention of obesity in adults and children [summary]. *Canadian Medical Association Journal*, 176(8), S1–S13. <https://doi.org/10.1503/cmaj.061409>.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. SAGE., 289–332 <https://us.sagepub.com/en-us/nam/naturalistic-inquiry/book842#preview>.
- Lindsay, A. C., Sussner, K. M., Kim, J., & Gortmaker, S. (2006). The role of parents in preventing childhood obesity. *The Future of Children*, 16(1), 169–186. <https://doi.org/10.1353/foc.2006.0006>.
- Neshteruk, C. D., Zizzi, A., Suarez, L., Erickson, E., Kraus, W. E., Li, J. S., & Armstrong, S. C. (2021). Weight-related behaviors of children with obesity during the COVID-19 pandemic. *Childhood Obesity*, 17(6), 371–378. <https://doi.org/10.1089/chi.2021.0038>.
- Nittari, G., Scuri, S., Petrelli, F., Pirillo, I., di Luca, N. M., & Grappasonni, I. (2019). Fighting obesity in children from European World Health Organization member states. Epidemiological data, medical-social aspects, and prevention programs. *La Clinica Terapeutica*, 170(3), e223–e230. <https://doi.org/10.7417/ct.2019.2137>.
- Pietrobelli, A., Pecoraro, L., Ferruzzi, A., Heo, M., Faith, M., Zoller, T., ... Heymsfield, S. B. (2020). Effects of COVID-19 lockdown on lifestyle behaviors in children with obesity living in Verona, Italy: A longitudinal study. *Obesity (Silver Spring)*, 28(8), 1382–1385. <https://doi.org/10.1002/oby.22861>.
- Rundle, A. G., Park, Y., Herbstman, J. B., Kinsey, E. W., & Wang, Y. C. (2020). COVID-19-related school closings and risk of weight gain among children. *Obesity (Silver Spring)*, 28(6), 1008–1009. <https://doi.org/10.1002/oby.22813>.
- Sahoo, K., Sahoo, B., Choudhury, A. K., Sofi, N. Y., Kumar, R., & Bhadoria, A. S. (2015). Childhood obesity: Causes and consequences. *Journal of Family Medicine And Primary Care*, 4(2), 187–192. <https://doi.org/10.4103/2249-4863.154628>.
- She, J., Liu, L., & Liu, W. (2020). COVID-19 epidemic: Disease characteristics in children. *Journal of Medical Virology*, 92(7), 747–754. <https://doi.org/10.1002/jmv.25807>.
- Skinner, A. C., Ravanbakht, S. N., Skelton, J. A., Perrin, E. M., & Armstrong, S. C. (2018). Prevalence of obesity and severe obesity in US children, 1999–2016. *Pediatrics*, 141(3), Article e20173459. <https://doi.org/10.1542/peds.2017-3459>.
- Von Hippel, P. T., & Workman, J. (2016). From kindergarten through second grade, U.S. children's obesity prevalence grows only during summer vacations. *Obesity (Silver Spring)*, 24(11), 2296–2300. <https://doi.org/10.1002/oby.21613>.
- World Health Organization (2020). *Mental health and psychosocial considerations during the COVID-19 outbreak*. WHO.
- World Health Organization (2021). *Coronavirus (COVID-19) dashboard*. WHO Retrieved March 23, 2021 from <https://covid19.who.int>.