

# The novel Coronavirus (COVID-19) outbreak: Physical inactivity and children with Autism Spectrum Disorders

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## Abstract

*The novel Coronavirus disease (COVID-19), which has turned into a global outbreak (pandemic), has inevitably affected the lives and habits of individuals with special needs, such as Autism Spectrum Disorders (ASD), and their families. During the COVID-19 emergency, children with ASD found themselves to face the risks connected to the physical inactivity due to prolonged stay-at-home periods, the forced closure of training centers and, often, unsuitable online learning environments. Although this is a new issue, no research has yet examined the effects of physical inactivity on children with ASD during the COVID-19 outbreak. Therefore, the aim of this qualitative study was to examine the effects of physical inactivity on children with ASD during the COVID-19 pandemic from a parental perspective. One-to-one semi-structured phone interviews were conducted on parents of children with ASD (N = 12) and then analyzed using thematic analysis. Parents' opinions revealed that physical inactivity during the COVID-19 outbreak increased their children's sedentary behavior, excessive feeding habits and behavioral*

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*problems, thus leading to a decrease in their motor skills. Findings suggested that parents were unprepared about the appropriate physical activity program to be proposed during the forced COVID-19 quarantine.*

**Keywords:** COVID-19; Autism Spectrum Disorders; Children; Stay at home; Physical inactivity; Sedentary behavior; Obesity.

## 1. Introduction

The novel Coronavirus disease (COVID-19), with more than 4.2 million infected patients as of May 12, 2020, and a mortality rate of over 287.158 (Johns Hopkins University & Medicine, 2020), has caused worldwide concern. Various preventive measures have been taken by the World Health Organization (WHO) and governments in order to prevent the spread of this disease that, unfortunately, has turned into a global outbreak (pandemic). Such measures included: 1) quarantining cities, 2) declaring curfews, 3) closing public areas such as parks and sports grounds, 4) warnings, cancellations and prohibitions for travel, 5) public permits for people with chronic conditions and elderly people and 6) closure of schools.

Although the measures taken to limit the public's exposure to the virus have contributed to the stay at home of many people around the world, this has led people to move towards a sedentary life at home (Chen, Mao, Nassis, Harmer, Ainsworth, & Li, 2020). Suddenly, the education programs for children with developmental disabilities such as Autism Spectrum Disorders (ASD), who were formerly entitled to be physically active and receive special training at home, school, hospital or rehabilitation centers, was interrupted by the virus outbreak (Yarımkaya & Esentürk, 2020). These changes in the daily routines of children with ASD due to the COVID-19 has revealed risks affecting different perspectives of their lives (Narzisi, 2020). Children with ASD are more subject to the risk connected to physical inactivity due to the closure of training centers and often to inappropriate online learning environments.

ASD is a neurological and developmental disorder that begins early in childhood and lasts throughout a person's life (American Psychiatric Association – APA, 2013). As stated by WHO, people with ASD constitute a special risk group because of their sedentary lifestyle that increases the risk for chronic diseases such as diabetes, obesity, and heart disease (WHO, 2008). Physical inactivity is a major concern for children with ASD (Jones, Downing, Rinehart, Barnett, May, McGillivray *et al.*, 2017; Garcia-Pastor, Salinero, Theirs, & Ruiz-Vicente, 2019). This is due to the fact that children with ASD have fewer opportunities to participate in physical activity and exercise, which exposes them to the risk of developing other health problems (Pan, Tsai, & Hsieh, 2011). Studies show that compared to typically developing individuals, children with ASD have lower physical activity levels (Pan & Frey, 2006; MacDonald, Esposito, & Ulrich, 2011; Memari, Ghaheri, Ziaee, Kordi, Hafizi, & Moshayedi, 2013), tend to more

sedentary behavior (Curtin, Jojic, & Bandini, 2014; Zuckerman, Hill, Guion, Voltolina, & Fombonne, 2014), and are more likely to become obese (Egan, Dreyer, Odar, Beckwith, & Garrison, 2013; Phillips, Schieve, Visser, Boulet, Sharma, Kogan *et al.*, 2014). Many factors contribute to increase the sedentary behavior and the possibility of obesity in children with ASD (Hinckson, Dickinson, Water, Sands, & Penman, 2013). Many individuals with disabilities, including children with ASD, are more inclined to spend a large amount of time on inactive behavior, such as watching television or occupations that often involve inactivity (Must, Phillips, Curtin, Anderson, Maslin, Lividini *et al.*, 2014), and parents often use this as a tool to engage their children with ASD (Sandt & Frey, 2005). In addition, the limitations experienced by children with ASD in the areas of social, cognitive, behavioral and physical development negatively affect their physical activity levels (Pan & Frey, 2006; Bandini, Gleason, Curtin, Lividini, Anderson, Cermak *et al.*, 2013).

As seen in the literature, physical inactivity and obesity issues in children with ASD have been well-documented by numerous studies (Corvey, Menear, Preskitt, Goldfarb, & Menachemi, 2016). However, the aforementioned previous studies were carried out in the absence of any outbreak. In recent days, an outbreak of COVID-19 has emerged as a possible barrier for children with ASD that can lead to a lack of physical activity. Long-term home and sedentary lifestyle during the COVID-19 crisis has brought many challenges that prevent participation in physical activity for children with ASD and their parents. While it is still a new topic, there is no research examining the physical inactivity levels of children with ASD during the COVID-19 outbreak. Considering this gap in the literature, the aim of this qualitative study is to examine the physical inactivity levels of children with ASD from the perspective of parents in the current insecure setting. In line with the interviews with parents, the study focused on parental perspectives about the effects of physical inactivity during the COVID-19 outbreak on children with ASD.

## 2. Methodology

### 2.1. Study Design

In this study, a descriptive qualitative methodology was used to investigate the effects of physical inactivity on children with ASD. Descriptive qualitative methodology is an interpretive research model

(Sandelowski, 2000) that allows individuals to examine their life experiences (Abramsky, Kaur, Robitaille, Taggio, Kosemetzky, Kaur *et al.*, 2018). Therefore, a descriptive research can be a valuable resource that gives an idea of how individuals experience the social world and in areas that have not been adequately researched (Gregor, Bruni, Grkinic, Schwartz, McDonald, Thille *et al.*, 2018). The descriptive qualitative approach has been found appropriate for the present research, given the scarcity of research examining the parental perspectives on the effects of physical inactivity on children with ASD during the COVID-19 outbreak.

## 2.2. Participants

Participants of the study are twelve parents (7 mothers, 5 fathers) of children with ASD who live in Ankara, the capital city of Turkey. Criterion sampling method was used to determine the parents (Creswell, 2009). The selection criteria included parents with a child with ASD according to the Diagnostic and Statistical Manual of Mental Disorders, 5<sup>th</sup> Edition – DSM-5 (APA, 2013) criteria and willing to conduct phone interviews. In line with these criteria, support was received from a local association to identify parents. With the permission of the director of the association, the primary researcher interviewed the participant candidates over the phone explaining them the purpose of the study and participation process. Then, consent forms were sent via e-mail to parents who agreed to voluntarily participate in the study and a telephone appointment was taken. Parents who participated in the study were aged between 44 and 67 years and their children were between 9 and 19 years old. According to the parents, their children were used to attend special education and rehabilitation programs 3 days a week before the COVID-19 outbreak. They were engaged in a physical activity program at special education and rehabilitation centers and performed physical activities 2 hours a day, 3 days a week. However, since special education and rehabilitation centers are currently closed and children have to stay at home, they have not been receiving any external support and participating in a regular physical activity program (see Tab. 1 for participant characteristics). Pseudonyms were used in the study to protect parents' identities.

Table 1 - *Participant characteristics*

Name of parent	Parents				Children		
	Gender	Age	Perceived income	Education level	Gender	Age	Diagnosis
Ahmet	Male	48	Middle	High School	Male	14	ASD
Ayşe	Female	54	Middle	High School	Male	11	ASD
Berk	Male	52	Middle	High School	Female	16	ASD
Aynur	Female	49	Middle	University	Male	12	ASD
Emre	Male	61	Middle	High School	Female	14	ASD
Merve	Female	53	Middle	High School	Male	11	ASD
Duygu	Female	44	Middle	High School	Female	17	ASD
Ozan	Male	67	Middle	High School	Male	19	ASD
Canan	Female	56	Middle	University	Female	11	ASD
Sevgi	Female	48	Middle	University	Male	9	ASD
Kübra	Female	51	Middle	High School	Female	18	ASD
Yunus	Male	45	High	Doctorate	Male	12	ASD

Note: ASD = Autism Spectrum Disorder.

### 2.3. Data Collection

The data were collected in two ways: personal information forms and semi-structured interviews. Personal information form was used to obtain demographic information (gender, age, income level, diagnosis and educational status) about parents and their children. Semi-structured interview questions were prepared for interviews with parents in order to examine the problems linked to their children's physical inactivity. Interview questions were reviewed in terms of content validity by five experts (1 Professor, 2 Associate Professor, 2 Dr. Lecturer) with experience in the field of adapted physical activity, physical education pedagogy and qualitative study. Interview questions were finalized in line with the opinions of the experts (spelling mistakes, comprehensibility, and scope). A pilot study was then conducted to ensure clarity of the interview questions. A parent (mother) of an ASD child participated in the pilot study. The primary investigator interviewed the mother on the phone explaining her the purpose of the pilot study. During the phone interview, the mother had to ask questions on the interview form. It resulted that the mother had no

difficulty in understanding any question. Mother interviewed for pilot study is not included in the current study.

Interviews started after having received the consent forms signed by parents. Because of the quarantine and stay-at-home measures all interviews were conducted on the phone. Each interview lasted about 30-35 minutes and a recorded voice described the content validity. Interview questions included: a) What kind of changes did affect your child's life in terms of physical activity during the COVID-19 outbreak? b) How many hours per day did your child spend on physical activity before the COVID-19 outbreak? How many now? c) How many meals did your child eat at home before the COVID-19? How many now? d) Do you think that long-term staying at home during the COVID-19 outbreak will lead your child to physical inactivity? and e) How did the physical inactivity during COVID-19 outbreak affect your child better or worse?

#### *2.4. Data Analysis*

The data were analyzed using a thematic line-by-line analysis defined by Braun and Clarke (2006). For the analysis, support from two experts (2 Dr. Lecturer) experienced in the field of qualitative study was received. The analysis started with transcribed and reviewing the data by the interviewer to ensure the accuracy of all interviews. The reviewed data were sent to the participants via e-mail and their accuracy was checked. Transcripts were repeatedly read by the analysis team (researchers and experts). Then, the analysis team independently analyzed and coded the data. In this process, the analysis team independently grouped similar codes. Then, to discuss the codes created, the analysis team came together to determine the importance and relationship of the codes and compare the analyses with each other. The analysis team gave a name to each theme and sub-theme that emerged by discussing among its codes in accordance with the essence of the study. For the validity and reliability of the data, the analysis team used Miles and Huberman's (1994) reliability formula [ $\text{Consensus} / \text{Consensus} + \text{Dissensus} \times 100$ ]. The themes and sub-themes created were repeatedly examined by the analysis team to ensure consistency. In order to make the codes in the themes and sub-themes more understandable, direct quotations were frequently included. As a result, three main themes and seven sub-themes were created with a complete harmony of the analysis team.

### 3. Results

The COVID-19 outbreak caused changes in the lives of typically developing individuals, as well as some changes in daily routines among children with ASD and their families. This process, which is difficult for typically developing individuals, has unfortunately caused much more difficulties for individuals with ASD (APA, 2013) who are extremely dependent on routines and are extremely sensitive to changes in the environment. According to the parents, children with ASD, who have been involved in physical activities regularly at school or in the rehabilitation center and whose days are planned, turned to physical inactivity and their quality of life was negatively affected as a result of changes in their daily routines.

Three main themes were created as a result of the analysis of the data obtained from the parents in order to reveal the problems experienced by children with ASD, who turned to physical inactivity due to the COVID-19 outbreak: 1) obesity, 2) sedentary behaviors, and 3) physical and psychological health. The first theme (*obesity*) includes the sub-themes of excess weight gain and losing weight control. The second theme (*sedentary behavior*) includes the sub-themes of technological tool addiction and desire of constant rest. The third theme (*physical and psychological health*) includes sub-themes of behavior problems, decline in motor skills and physical appearance (see Tab. 2).

Table 2 - *Summaries of themes and sub-themes*

<i>Themes</i>	<i>Sub-themes</i>	<i>Frequency f</i>	<i>Percentage %</i>
Obesity	Excess weight gain	12	100
	Losing weight control	10	83.3
Sedentary behavior	Technological tool addiction	10	83.3
	Desire of constant rest	8	66.6
Physical and psychological health	Behavioral problems	7	58.3
	Decline in motor skills	5	41.6
	Physical appearance	4	33.3



### 3.1. Theme 1: Obesity

All of the parents participating in the study stated that their children with ASD were at risk of obesity as a result of physical inactivity. Parents referred that they had tried to keep up with this process with their children, but that they had difficulty in controlling their weight due to the physical inactivity caused by the radical change of their daily routines.

#### 3.1.1. Excess weight gain

As referred by parents, their children, who could not leave the house due to quarantine, spent a lot of time at home. Parents stated that the biggest share of this time period was the meal and snack times that, along with physical inactivity, resulted in a rapid excess weight gain.

*“We sit at home a lot, since he does not go out, it seems like he sees the physical activity as a homework. Normally he does his homework. However, eating is not homework, but a pleasure, and he constantly seeks something to eat; if we do not give him food, his day is messed up. He used to be physical active; sport and exercise compensated for this situation. He has gained about 1.5 or even 2 kilos and I'm afraid.”* (Yunus)

#### 3.1.2. Losing weight control

Parents stated that their children with ASD did not achieve weight control with the consequent decrease in their physical activity levels. Parents, who emphasized that the balance between food and physical activity before COVID-19 outbreak was within normal ranges, stated that this situation caused excessive weight gain.

*“In a child with ASD, nutrition, if any, is greatly important. They tend to gain weight. We had a very clear diet program when there was no quarantine. Now in quarantine, even if my child is following the same diet, he has limited activity. So, as long as he stays still, I can't make this balance.”* (Duygu)

### 3.2. Theme 2: Sedentary behavior

All parents involved in the study were concerned about the increased sedentary behavior of their children due to physical inactivity during the

COVID-19 outbreak. According to parents, children with ASD exhibit sedentary behavior such as constant watching television at home, using tablets, sleepiness and desire to lie down.

### *3.2.1. Technological tool addiction*

In the interviews with parents, it was determined that the children with ASD increased their usage demands for technological devices such as mobile phones, tablets, laptops, etc. compared to normal times. In fact, parents resorted to views that described this situation as “addiction”. It was stated that in normal times, daily occupations reduce leisure time at home and limit the use of technological tools. However, according to them, the quarantine process spread the use of technological tools. Some of the parents stated that although they had tried to restrict the use of technological devices, they failed. It is not so easy for parents to overcome the problems mentioned above. As shown by Sevgi and Ozan:

*“Sometimes he really sleeps with the phone in his hand. If I do not give it to him, there are a lot of problems and he makes us suffer all day long. We used to go out and do our normal activity programs, but inactivity affected me a lot in this process.”* (Sevgi)

*“I have no choice but to hide those tools anymore, he is constantly watching videos. And everything I've done so far will be wasted. What I should offer him as alternative activities, what I can do; I'm having trouble about this.”* (Ozan)

### *3.2.2. Desire of Constant Rest (Sleepiness, desire to lie down)*

Parents stated that their children with ASD are at a constant rest during certain periods (medication change, medication amount increase, seizure periods, etc.). However, the parents said that their children with ASD started to be more desiring for constant rest than usual times due to physical inactivity and lack of activity during the COVID-19 outbreak. As the main reason for this, parents showed that their children are isolated from an active life. As discussed by Ahmet, physical inactivity and lack of activity negatively affected children with ASD in this process.

*“Of course, health comes above all. My child's immunity is already very weak. I'm hesitant even allow her to go to the balcony. But this physical inactivity and lack of activity made her desire just to sleep, lie down and not move. She wants to eat on the sofa. I don't know what to do if she gets used to it.”*  
(Ahmet)

### 3.3. Theme 3: Physical and psychological health

In the study, parents associated many problems caused by physical inactivity with the health aspect. Parents stated that in this process in which their children with ASD are physically inactive, both psychological and physical health have been negatively affected.

#### 3.3.1. Behavioral problems

Parents interviewed emphasized the increase in the behavioral problems of their children with ASD. Parents stated that their children with ASD in the quarantine process exhibited a lot of behavioral problems, especially due to inactivity. Parents stated that their children with ASD displayed anger attacks, incompatibility and aggressive behaviors as a result of physical inactivity. As shown by Berk:

*“Inactivity even bored me. We used to play games on the street three days a week with my son and do different activities. I always felt the happiness on his face. But now he says he wants to go out at 5 in the morning and cries with the ball in his hand for hours. He thinks that I did not make him do any activity for no reason because I could not explain the outbreak; he doesn't even want to eat the food I give. It doesn't care what I say.”*  
(Berk)

Ayşe shared her thought that the anger attacks of her child with ASD increased in this process and this process would leave him a deep trace:

*“It is very difficult to gain something, but it can be so easy to lose. Physical inactivity is the most valuable thing he expresses in himself. Just as we have a lot of difficulty when our oxygen is low, similar things happen when my child's activity is reduced.”*

*He can't get his energy off and is very rebellious and doesn't listen to advice.” (Ayşe)*

Aynur, on the other hand, mentioned that her child did not listen to her advices and that they often oppose each other:

*“I think moving comes after eating. It is because he finds himself successful when he scores a goal. We do something at home, but it is not enough for him, either from us or home. And he always does the opposite of what I say. And this reduces the bond between us. He does not come near me, sits alone in uninhabited places.” (Aynur)*

### 3.3.2. Decline in Motor Skills

Parents stated that their children with ASD had a sedentary period and as a result they experienced health problems. In the interviews with the parents, they stated that their children with ASD had sufficient physical activity levels in normal times, but that motor skills such as walking, coordination and balance are currently decreasing. In this regard, Merve and Emre stated that they are upset because of the decline in some of the motor skills of their children with ASD that were acquired before the outbreak.

*“We haven't had such a break from physical activities for 3.5 years. I feel like my efforts are going down the drain day by day. For example, he walked so beautifully on a board, but now, he cannot do what I prepare with the conditions at home. It really makes me sad.” (Merve)*

*“I can say that there is a real decline now. I can observe and see the difference because I know my child well before. Before the outbreak, he was able to do more than one move at the same time, now he is behind it and cannot even concentrate.” (Emre)*

### 3.3.3. Physical appearance

Parents stated that as a result of physical inactivity, their children with ASD started to experience posture disorders. Parents who stated that activities of their children with ASD was restricted during the COVID-19 outbreak, stated that they had problems especially in terms of physical

appearance such as weight gain and becoming hunchbacked. Expressing her sadness on this matter, Canan's opinion is as follows:

*“My child participates in physical activities accompanied by a private fitness coach. The weight and humpback posture of him was greatly reduced. However, with this process, my son's posture march changed everything. This makes me very sad. I try to find videos from social media and cure these problems, but it is not enough.”* (Canan)

#### 4. Discussion

This is the first study examining the effects of physical inactivity on children with ASD from the parents' perspective during the COVID-19 outbreak. Considering that parents are the basic figures of their children's physical activity experiences (Baranowski, 1997; Sallis, Proschaska, & Taylor, 2000), this study has been thought to guide the physical activities that will be presented to children with ASD during the COVID-19 outbreak. According to the findings of the study, which is expected to contribute to the literature, parents think that their children with ASD are turning to physical inactivity due to the stay-at-home measure undertaken because of COVID-19 outbreak. Parents said that due to the sudden changes in their children's lives, they did not know anything about the most suitable physical activity programs to be presented to their children. According to parents, children with ASD, who have been regularly involved in physical activities at school or in the rehabilitation center and whose daily routines have been planned before, now present with sedentary behaviors such as constant watching TV, using tablets, sleeping and lying down. Studies investigating sedentary behaviors in individuals with ASD show that many individuals with ASD tend to spend a great deal of time on sedentary behavior, such as watching television or occupations often involving activity (Sandt & Frey, 2005; Must *et al.*, 2014). Therefore, sedentary behaviors resulting from changes in their routine during the COVID-19 outbreak, should be carefully considered and parents should be supported to create new physical activity-based routines accordingly.

Parents in the study stated that their children with ASD had clear meal times at school or at home prior to the COVID-19 outbreak, so that they could control their children's weight, but now children are constantly going to the kitchen seeking for something to eat. Parents stated that their children,

who are physically inactive at home, started to gain excess weight as a result of their frequent feeding and that they were worried that their children would become obese. Researchers suggest that children's sedentary behavior and reduced physical activity are closely related to their weight status (Sisson, Broyles, Baker, & Katzmarzyk, 2010), and this relationship between sedentary behavior and weight gain can lead to a decrease in individuals' level of independence and especially health-related quality of life (Dunlop, Jing, Arntson, Semanik, Jungwha, Chang *et al.*, 2015). It is considered that children with ASD who already have a high risk of overweight and obesity compared to their normal developing peers (Curtin, Anderson, Must, & Bandini, 2010; Egan *et al.*, 2013) may be more exposed to these risks due to the sedentary life at home during the COVID-19 outbreak.

According to parents, a number of problems have arisen in the physical and psychological health of children with ASD, whose routines have changed due to the COVID-19 outbreak and turned to physical inactivity at home. Parents expressed that they observed decreases in their gross-motor skills of their children with ASD (especially walking, running and jumping) and more behavioral problems (non-verbalism, aggression) in their children with ASD compared to the pre-outbreak. According to Yarımkaya and Esentürk (2020) inactive life and low physical activity level during COVID-19 outbreak can have negative effects on the health and quality of life of children with ASD. In addition, long stay at home turns into a source of stress for children with ASD, which can lead to a number of mental health problems. Therefore, there is a serious need for activity recommendations that will support the developmental areas of children with ASD and increase their quality of life during the COVID-19 outbreak. WHO (2020) recommends physical activity at home to keep individuals psychologically healthy and keep immune functioning during the COVID-19 outbreak. Performing safe, simple and easily applicable exercises in the home environment can be extremely effective for maintaining the physical activity level (Chen *et al.*, 2020). Exercises that can be done without leaving home help strengthen muscles and bones and prevent from wasting time in front of the screen (computer, tablet etc.) (Yarımkaya & Esentürk, 2020).

#### *4.1. Limitations of the study*

Since this qualitative study involved a small sample made of 12 parents, the transferability of the results to the perspectives of other parents of children with ASD may be limited. Furthermore, the results may not

represent the entire population as middle-high income parents living in Ankara participated in the study. Results are also limited to the possible effects of physical inactivity during the COVID-19 outbreak on children with ASD, because all the factors that may affect the conditions of children with ASD, such as behavioral problems, decreased motor skills and desire for constant rest, were not examined.

#### *4.2. Implications for practice and future research*

Our findings, indicating that children with ASD tend to physical inactivity and are at risk of gaining excess weight due to the COVID-19 outbreak, showed that children with ASD need to perform physical activity at home. An important way to facilitate this would be to guide parents on physical activity. Physical activity examples suggested by WHO (2020) or scientific studies (Chen *et al.*, 2020; Narzisi, 2020; Yarımkaya & Esentürk, 2020; Zhu, 2020) which can be done during the COVID-19 outbreak, can be compiled and shared with parents. Before this, parents should be educated on the duration, severity and mediation of physical activity. Given that the parents in the study focus on the lack of an appropriate physical activity program, educating parents for their child's physical activities and providing them with exemplary activity programs can produce extremely beneficial results. However, more studies are needed in Turkey and other countries to reach more effective and comprehensive findings on the effects of physical inactivity during COVID-19 on the development areas of children with ASD and the solutions for this. Future studies may investigate parents' knowledge and needs about their children's physical activity during any other possible health emergency, and offer recommendations accordingly.

### 5. Conclusion

This qualitative study evaluated parental perspectives on the effects of physical inactivity on children with ASD during the COVID-19 outbreak. According to the findings of the study, parents stated that their children with ASD turned to physical inactivity due to the COVID-19 outbreak. Parents stated that physical inactivity during the COVID-19 outbreak increased sedentary behavior, excessive feeding behavior and behavioral problems in children with ASD and led to a decrease in their motor skills. In addition, the findings reveal that parents do not know especially what to do about physical activity in this process and that they lack a appropriate physical

activity program. As ASD researchers, we must support parents to help children with ASD to be physically active during the COVID-19 outbreak, and encourage them to participate in physical activity with their children with ASD.

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