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THE IMPACT OF SOCIAL ISOLATION DURING THE COVID-19 PANDEMIC ON THE CLINICAL AND MENTAL PROFILE OF CHILDREN TREATED AT A SCHOOL OUTPATIENT CLINIC

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ABSTRACT

In December 2019, a new coronavirus-SARS-CoV-2 was detected in the city of Wuhan, China. On January 30, 2020, the United Nations declared COVID-19 an international public health emergency. Epidemiological and social measures, including the closure of schools and non-essential services, were implemented to prevent the spread of the virus. Those measures changed the daily routines of many people around the world. Despite their efficacy in containing the pandemic, they created risk factors for children's physical and mental health. OBJECTIVE: To evaluate the impact of social isolation caused by the COVID-19 pandemic on the clinical and mental profile of children treated in school outpatient clinics. METHODS: This is an observational, individual, cross-sectional, analytical, and descriptive study. A questionnaire was administered to those responsible for the children seen at the school outpatient clinic in the preschool and school-age groups about their clinical and mental health conditions. RESULTS: The questionnaire was applied to 60 volunteers, and the nutritional assessment (BMI) revealed that 70% of the children were considered eutrophic, followed by 16.67% as obese and 10% as overweight. Additionally, 86.67% of children reduced their physical activity during isolation. Regarding sleep, 86.67% showed changes, and 86.66% had increased screen time. Children with increased screen time also had changes in their sleep. Morbidities corresponded to 54.23%; delays in vaccination represented 56%; and loss of follow-up in health services reached 95%. Changes in behavior were 68.33%, followed by mood at 71.67%, and changes in interpersonal relationships at 50%. DISCUSSION: Our study reveals a decrease in physical activity, an increase in sedentary lifestyle and an increase in screen time, which are risk factors for weight gain in children. There was an increase in sleep changes associated with increased screen time, which can affect children's physical and mental development. The COVID-19 pandemic and social isolation have caused changes in children's lives, limiting social activities and interactions, increasing psychosocial stress and psychological distress, and possibly leading to damaging effects on mental health. In our study, children demonstrated changes related to behavior, mood, and interpersonal relationships. CONCLUSION: The COVID-19 pandemic and social isolation have changed children's daily lives and limited many activities, causing impacts on physical and mental health. Children are in a gradual process of physical and mental development. Lack of energy expenditure, increased screen time, sedentary lifestyle, and sleep disorders can affect physical health and lead to changes in physical, cognitive, social, and emotional development, in addition to being considered risk factors for weight gain in children. In the context of this pandemic, the increase in psychosocial stress and consequent psychological suffering in children has created conditions for the emergence of psycho-emotional changes and psychological disorders. In addition to the closure of several social and health services associated with delayed vaccinations, the physical and mental health of the pediatric population is compromised.

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Keywords: COVID-19. Pandemic. Social isolation. Quarantine. Children's health. Mental health. Obesity. Pediatrics.

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INTRODUCTION

In December 2019, a new coronavirus – the SARS-CoV-2 RNA virus of the beta coronavirus family, emerged in China, epidemiologically linked to groups of pneumonia patients in Wuhan City and spread around the world in a short period[1].

The UN declared COVID-19 an international public health emergency on January 30, 2020. Epidemiological and social measures, including the closure of schools and non-essential services and campaigns to encourage people to stay in their homes and avoid crowds, were implemented to prevent the rapid spread of the virus[2].

According to data published by the United Nations Children's Fund (UNICEF) in 2020, 77% of the world's children and adolescents (1.8 billion) lived in countries with social distancing policies, and of that number, 72% (1.3 billion) were out of the school environment. In Brazil, this decision took place on April 1, 2020, by provisional measure 934/2020, corresponding to 60 million children who were unable to attend school for about 2 years. [3,4]

The closure of schools and services limited social interactions and reduced children's daily activities. The lack of energy expenditure in outdoor games, at school, associated with spending a lot of time in front of screens and poor diet during quarantine, are considered contributing factors to the number of cases of overweight and obesity among children[5,6]. Interrupting school activities for a prolonged period can be very harmful, especially for the physical and mental development of children [5,7].

Sedentary behavior in children is associated with an increase in chronic diseases and cognitive decline, with a higher risk of overweight, obesity, metabolic syndrome, and type II diabetes, in late childhood and adulthood[8].

The direct effects of the COVID-19 pandemic on childhood are related to the clinical manifestations of the disease, while its indirect effects include impairments in learning, development, and socialization; distancing from family life; stress, favoring an increase in symptoms of depression and anxiety; increased time spent using screens/media and increased rates of overweight and obesity in children and adolescents[10].

During the COVID-19 pandemic, there was a reduction in the vaccination coverage rate, which also caused several impacts on the health of the entire population due to the postponement and cancellation of appointments, exams, and procedures[11].

Therefore, these measures to reduce the spread of the virus have impacted changes in the daily functioning of billions of people worldwide. Although they have been proven

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effective in the containment of the pandemic, they generated risk factors for the physical and mental health of children, as well as having an impact on monitoring and preventing children's health[12].

Therefore, this study was proposed to understand the impacts of isolation during the COVID-19 epidemic on the physical and mental health of children.

OBJECTIVES

To evaluate the impacts of social isolation caused by the COVID-19 epidemic on the mental health and clinical profile of children undergoing treatment at a school outpatient clinic in Southern region of São Paulo.

MATERIAL AND METHOD

We performed an observational, individual, cross-sectional, analytical, and descriptive study.

We conducted the study at the "*Policlínica*", an outpatient medical service-school of medical specialties linked to the University of Santo Amaro-UNISA in the Southern region of São Paulo. The clinic contributes to the training of various health professionals, in addition to offering free medical care to the entire population.

During the medical consultation between March and September 2023, we applied a questionnaire (Appendix 1) with closed questions to those responsible for the clinical condition and mental health in the following age groups: preschoolers from 2 to 4 years old[36], and school-age children from 5 to 10[3]years old. [36]

With the following variables: Age, gender, weight and height/height, and anthropometric data (BMI). Clinical assessment and diagnoses; Morbidities and health segments; Vaccination status, sleep changes, carrying out physical activity; Periods dedicated to immobile activities, such as screen time; Emotional, behavioral, and interpersonal relationship changes; And another with the socio-economic characteristics of the parents.

For nutritional assessment, we used the z-score with anthropometric data according to age and gender BSP.

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ETHICAL ASPECTS

Data collection was only conducted after approval by the Ethics and Research Committee of the University of Santo Amaro on March 13, 2023. CAEE: 67455223.8.0000.0081.

The free and informed consent was made under the guidelines of the Ethics and Research Committee of the University of Santo Amaro.

Individual participation was voluntary. Possible doubts were clarified and participants signed the free and informed consent form and gave their assente with verbal clarifications about the research objectives, guaranteeing the confidentiality of the data collected. In addition to being informed about their freedom to withdraw consent at any stage of the study.

INCLUSION AND EXCLUSION CRITERIA

For convenience, the selection of participants took place in a non-probabilistic way.

All children in the age range established by the researcher in the designated period were included in the study as parents or guardians of the children who signed the Free and Informed Consent Form (FICF) indicating their agreement to participate.

Children outside the age range established as parents or legal guardians who felt uncomfortable responding or felt discomfort related to their physical, mental, moral, intellectual, social, cultural, or spiritual background were excluded from the study.

STATISTICAL ANALYSIS

To analyze the results, the following tests were applied:

1. Pearson's Chi-square test [35], to study the two age groups: Preschoolers, aged from 2 to 4 years old [2,36] (less than 5 years old) and school-age children from 5 to 10 years old [2,36], with ages greater than or equal to 5 years.
2. McNemar test[35], to compare, for each child, the variables observed in the study during the COVID-19 pandemic period.

The significance for all results was defined as $p<0.05$.

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RESULTS

The questionnaire was administered to 60 volunteers and guardians of children, with corresponding ages: 2 to 10 years old (preschoolers[2,36]: 2 to 4 years old and school-age children[2,36]: 5 to 10 years old).

Concerning gender, 45% (n=27) of girls and 55% (n=33) of boys, and about age, under 5 years old corresponded to 55% (n=33), and with age greater than or equal to 5 years old it corresponding to 45% (n=27).

Regarding nutritional assessment, BMI was used from the z-score, eutrophic 70%, obesity 16.67%, overweight 10%, and thinness 3.33%.

Table 3 - Percentages of nutritional diagnosis

	n	%
Eutrophic	42	70
Z-score Preschoolers: z-score ≥-2 and <+2 School-age children: z-score ≥-2 and ≤ +1		
Obesity	10	16.67
Z-score Preschoolers: z-score >+3 School-age children: z-score ≥+2 and ≤ +3)		
Overweight	6	10
Z-score Preschoolers: z-score ≥+2 and ≤ +3 School-age children: z-score ≥ +1 and ≤ 2)		
Thinness	2	3.33
Z-score: Preschoolers: z-score ≥-3 and <-2 School-age children: z-score ≥ -3 and < -2).		
Total	60	100

Regarding physical activity, 86.67% (n=52) of children interrupted an activity during isolation. After this period, 93.33% of children were physically active (n=56).

Comparing physical activity during social isolation with nutritional assessment, revealed that children participating in a particular type of physical activity had adequate anthropometric parameters eutrophic X^2= 13.1 (p=0.0003).

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The changes in sleep corresponded to 66.67% (n=40), and screen time increased by 86.66% n=52. Children who spent more time in front of screens also showed changes in sleep (p = 0.0075).

The corresponding morbidity rate is 54.23% shown (Table 5). The most common are rhinitis (35.90%) and asthma (17.95%), followed by intestinal constipation 10.26%, atopic dermatitis 7.69% and precocious puberty 5.13%. The others corresponded to 1%: Heart disease- atrial tachycardia, sickle cell anemia, wheezing under investigation, ADHD-Attention deficit hyperactivity disorder, behavior and learning disorder, subclinical hypothyroidism, strabismus, cryptorchidism, and vitamin D hypovitaminosis.

Table 1 – Morbidities

Morbidities	n	%
Rhinitis	14	35.90
Asthma	7	17.95
Intestinal constipation	4	10.26
Atopic dermatitis	3	7.69
Precocious puberty	2	5.13
Others	9	23.08
Total	39	100.00

Table 1- Recommendations regarding the need for sleep duration according to age[23].

AGE GROUP	SLEEP DURATION IN 24 HOURS	NAPS
4 -12 months old	12 to 16 hours	Included
1 - 2 years old	11 to14 hours	Included
3 - 5 years old	10 to 13 hours	Included
6 - 12 years old	9 to12 hours	
13 - 18 years old	8 to 10 hours	

Delays in vaccination accounted for 56% (n=34), and loss of follow-up in health services accounted for 95% (n=57).

MENTAL HEALTH

The changes presented during the isolation period revealed that 68.33% (n=41) of the children showed some behavior change, the most frequent being agitation (35%, n= 21) and irritability (26, 66%, n=16). (Table 2).

Table 2 - Behavior change

Behavior changes	%	N
Agitation	35%	n=21

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Irritability	26.6%	n=16
Aggressiveness Confrontational Emotional	3.33% 1.66% 1.66%	n=2 n=1 n=1
Total	69.95%	n=41

Table 2 – The Brazilian Society of Pediatrics (SBP) recommendations on use of screen time[25].

AGE GROUP	SCREEN TIME
Children under 2 years old	Not recommended
2 - 5 years old	Usage is limited to one hour per day
6 – 10 years old	Between 1-2 hours

Compared to age, school-age children presented significantly greater behavioral changes than preschoolers. For this result, the Chi-square test of X^2= = 8.40 (p=0.0037) was obtained.

Mood changes (Table 8) corresponded to 71.67% (n=43) the most common were: anxiety (88.10%, n=37), followed by sadness 11.90% (n=5).

Table 3 - Frequency of mood changes

	n	%
Anxiety	37	88.10
Sadness	5	11.90
Anhedonia	1	2.38
Total	43	100.00

Table 3 - Nutritional diagnosis percentages

	n	%
Eutrophic	42	70
Z-score Preschoolers: z-score ≥-2 and <+2 School-age children: z-score ≥-2 and ≤ +1		

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Obesity	10	16.67
Z-score Preschoolers: z-score >+3 School-age children: z-score ≥+2 and ≤ +3)		
Overweight	6	10
Z-score Preschoolers: z-score ≥+2 and ≤ +3 School-age children: z-score ≥ +1 and ≤ 2)		
Thinness	2	3.33
Z-score: Preschoolers: z-score ≥-3 and <-2 School-age children: z-score ≥ -3 and < -2).		
Total	60	100

Regarding age, school-age children had significantly greater mood changes than preschoolers. For this result, we obtained X^2= 6.62 (p= 0.0101).

Changes in interpersonal relationships accounted for 50% (n=30) of the study.

Concerning age, school-age children had more significant relationship changes than preschoolers, for this result we obtained X^2= 7,18(p= 0.0074).

At the socio-economic level, 67.79% (n=40) lost their employment relationship with a reduction in family income.

DISCUSSION

The COVID-19 pandemic and social isolation have limited social interactions and reduced children's daily activities, leading to a lack of energy expenditure associated with increased screen time and a sedentary lifestyle are considered contributing factors to the increased incidence of the disease in overweight and obesity among children[6,7].

The study carried out in Massachusetts assessed the impact of the COVID-19 lockdown on body mass index, obesity, overweight, and associated factors among children aged from 2 to 18 years old. Data was collected from electronic medical records, with anthropometric data, three months before and after the social isolation at the Cambridge Health Alliance in Massachusetts, USA. During this period, school closures may have limited access to healthy foods, increased unhealthy eating, and decreased physical activity. This study indicated that average BMI, overweight and childhood obesity increased significantly, and obesity was more prevalent in children aged from 2 to 5 years old,

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suggesting that throughout social isolation during the COVID-19 pandemic, it was significantly associated with increased child weight[39].

Another longitudinal study in Italy identified that there was an increase in the consumption of unhealthy foods, such as fried foods and sugary drinks, a decrease in sports activities, and an increase in screen time and sleep throughout social isolation during the COVID-19, being considered risk factors for increased body weight in children.[40,41]

Our study *exhibited* that 86.67% of children interrupted some form of physical activity during social isolation. The nutritional diagnosis, although 70% of the children attended were within adequate anthropometric parameters/eutrophic, 16.67% were obese, and 10% were overweight. The comparison of physical activity during the social isolation period with nutritional assessment indicated that children who performed a particular type of physical activity had adequate anthropometric parameters according to age and gender.

Adequate sleep is essential for children's physical, emotional, and mental development and affects learning, memory, attention, and behavior. Excessive screen use can compromise child development, with cognitive, language, and socio-emotional delays, in addition to causing changes in mood, sleep, and behavior. In our study, we observed that 66.67% had changes in their sleep and 86.66% increased screen time use. Children spending more time in front of screens has also been linked to changes in sleep.

Vaccination plays a fundamental role in the control, elimination, and eradication of diseases and has a significant impact on increasing life expectancy and reducing infant mortality rates. During the period of the COVID-19 pandemic, according to data from FIOCRUZ 2020, there was a reduction in the vaccination coverage rate, in addition to a reduction in the number of pediatric outpatient visits, which compromised prevention, promotion, and longitudinal health care for the pediatric population. Through our research, we discovered that 56% of children were late for vaccinations, 54.23% presented some morbidity, and 95% were lost to follow-up in health services.

Mental health is part of the comprehensive care of every child and adolescent. Exposure to stressors can trigger behavioral and cognitive changes and promote the development of mental health-related disorders. In times of crisis, children are more vulnerable to developing mental disorders.

The COVID-19 pandemic and social isolation have caused changes in children's lives, limiting activities and social interaction, increasing psychosocial stress and qualified psychological suffering, which can bring adverse effects and damage to mental health[25,31]

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and a predisposition to increased disorders related to mental health, sleep, and eating disorders.

The association between stress due to the pandemic and increased screen time use has promoted sleep disturbances, impacted physical and mental health, promoted changes in mood, behavior, and relationships.

In our study, during the period of isolation due to the COVID-19 pandemic, it was discovered that 68.33% of children showed behavioral changes, the most frequent being agitation 35%, followed by irritability 26.66%. Mood changes corresponded to 71.67%, and the most common were anxiety 88.10% and sadness 11.90%. Changes in interpersonal relationships represented 50% of the study.

Comparisons by age statistically revealed that school-age children presented changes related to behavior, mood, and changes in interpersonal relationships, significantly greater than preschoolers.

CONCLUSION

The COVID-19 pandemic and social isolation have affected children's daily lives and restricted several activities, compromising their physical and mental health. Children are in a gradual process of physical and mental development.

Lack of energy expenditure; the increase in screen time and sedentary lifestyle; Sleep disorders can compromise children's physical and cognitive health and can cause changes in physical, social, and emotional development, in addition to being considered risk factors for weight gain in children. Childhood obesity is perceived as a chronic disease that can cause anatomical, functional, metabolic, and emotional changes in children. Its prevention, monitoring, and treatment are crucial because it also increases the risk of metabolic and cardiovascular disorders.

In this pandemic context, several challenges were introduced and expanded, and psychosocial stress increased, consequently causing psychological distress in children, favoring the emergence of psycho-emotional changes and psychological disorders.

In addition to the closure of several social and health services, there was interruption or loss of follow-up, associated with vaccination delays, compromised prevention, the line of longitudinal care, and treatments carried out for the pediatric population.

As a result, it is evident from the study that the social isolation resulting from the COVID-19 pandemic altered the daily lives of children, limited their activities and social

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interaction, restricted health promotion, and increased levels of associated stress, all of which had a direct or indirect impact on the physical and mental health of children.

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APPENDIX

QUESTIONNAIRE

Name:

Gender:

Age:

Weight:

Height:

BMI:

Comorbidities: Yes ( ) or No ( ). If yes, which one?

Some healthcare treatment was lost due to a lack of follow-up:

Yes ( ) or No( ) If so, which one? and for how long?

Vaccination status: updated ( ) or No ( )

Attended school or daycare before the pandemic: Yes ( ) or No ( )

School/daycare activities were interrupted during the pandemic: Yes ( ) or No ( )

Currently attending school or daycare: Yes ( ) or No ( )

School performance: changed ( ) or hasn't changed ( )

Behavior changes: Yes ( ) or No ( ). If yes, which one?

(irritability, aggressiveness, confrontation, agitation or other)

Mood changes: Yes ( ) or No ( ). If yes, which pattern is presented:

Anxiety, sadness, anhedonia.

Interpersonal relationship: Changed ( ) or hasn't changed ( )

Sleep changes: Yes ( ) or No ( )

Appetite: bigger ( ) or smaller ( )

Currently performing physical activity: Yes ( ) or No ( )

Was carrying out physical activity currently during isolation: Yes ( ) or No ( )

Time for immobile activities (screen time outside school hours):

Adequate ( ) or not appropriate ( ) for the age group.

PARENT QUESTIONNAIRE

Those responsible for the child: Parents; Mother; Father; Relatives (grandfather, grandmother, uncles, brothers, others).

Education:

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How many children:

How many members live in the same house:

Housing: rented ( ) ; owned ( ); lives with relatives or friends ( )

Have you had any housing changes during the pandemic period:

Yes ( ) or No ( )

Currently working: Yes ( ) or No ( )

Have you lost any jobs during the pandemic:

Yes ( ) or No ( )

There was a reduction in family income: Yes ( ) or No ( ).

Religiosity: Yes ( ) or No ( ). If yes, which one?