

Effects of COVID-19 lockdown on lifestyle behaviours among children living in urban Mysuru – A cross sectional study

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Abstract

Introduction and Objectives: Getting enough exercise, preventing a sedentary lifestyle, and getting enough sleep all work together to promote healthy childhood growth. Although the COVID-19 outbreak affected children's day-to-day lives, it is unclear how much it may have impacted their development. Therefore, this study aims to gather information regarding the impact of the COVID-19 lockdown on parents and their children. **Methods:** A cross-sectional, online-based survey questionnaire was given to 71 parents aged 21 and above with children aged between three and five, residing in Mysuru. The paired t-test, McNemar's and Wilcoxon signed-rank tests were used to check associations between the selected variables and lockdown-related changes. A p-value of less than 0.05 was considered statistically significant. **Results:** There was a large increase in the consumption of homemade food (90.1%), self-feeding (34.3%) and an improvement in the household practices of cooking, storing, and feeding (95.8%) during the lockdown period. 56.3% of the parents were able to get their children more engaged in physical activities. The time that parents spent with their children increased during the lockdown period. Screen time and sleep duration also increased during the lockdown, which showed statistical significance. **Discussion:** Short-term changes in children's lifestyle habits in response to COVID-19 are concerning because they may raise their risk of obesity, diabetes, and cardiovascular disease. Initiatives to improve physical activity and reduce sedentary behavior in children are needed to prevent long-term health issues.

Keywords: COVID-19. Children. Physical activity. Sedentary lifestyle. Screen time.

Efeitos do confinamento pela COVID-19 no estilo de vida de crianças que vivem em Mysuru urbana – Estudo transversal

Resumo

Introdução e Objetivos: A promoção de um crescimento infantil saudável decorre da prevenção dos estilos de vida sedentários e de um tempo de sono suficiente. Apesar de ter afetado o dia a dia das crianças, desconhece-se o impacto da pandemia COVID-19 no desenvolvimento. Assim, este estudo pretende obter informação sobre o impacto do confinamento decorrente da pandemia COVID-19 nos pais e nas crianças. **Métodos:** Estudo transversal, baseado num questionário online realizado a 71 progenitores (idade superior a 21 anos) de crianças de três a cinco anos, residentes de Mysuru. Foram utilizados os seguintes testes estatísticos: t-test, Mc Nemar e Wilcoxon para as associações entre as variáveis selecionadas e as mudanças relacionadas ao lockdown. As diferenças com valor de $p < 0,05$ foram consideradas estatisticamente significativas. **Resultados:** Durante o confinamento, aumentou significativamente o consumo de alimentos confeccionados em casa

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(90,1%), a alimentação individual (34,3%) e os cuidados de higiene durante a confecção, armazenamento e alimentação (95,8%). 56,3% dos pais conseguiram envolver mais seus filhos em atividades físicas. O tempo partilhado entre pais e filhos aumentou durante o período de confinamento. O tempo ecrã e a duração do sono também aumentaram de forma estatisticamente significativa. **Discussão:** As mudanças a curto prazo nos hábitos de vida das crianças em resposta ao confinamento pela COVID-19 preocupam, pois podem aumentar o risco de obesidade, diabetes e doenças cardiovasculares. São necessárias iniciativas para melhorar a atividade física e reduzir o sedentarismo de modo a prevenir problemas de saúde a longo prazo.

Palavras-chave: COVID-19. Crianças. Atividade física. Estilo de vida sedentário. Tempo de tela.

Keypoints

What is known

- COVID-19 has resulted in considerable modifications to daily life.
- Getting enough exercise, preventing a sedentary lifestyle, and getting enough sleep promote healthy childhood growth.
- During the time of COVID-19, physical activity decreased, sleep patterns were disrupted, and sedentary behavior and screen time also increased.

What is added

- Parents made new dishes of nutritional value which increased consumption of homemade foods and reduced the consumption of junk food.
- Parents were able to get their children more engaged in physical activities.
- Parents became more frequently involved in their children's activities such as storytelling/singing during bathing, feeding, etc. during the lockdown period.

Introduction

The COVID-19 outbreak was declared a global pandemic by WHO on January 30, 2020, and as of January 12, 2022, over 312,173,462 confirmed cases had been diagnosed in over 130 countries, resulting in about 5,501,000 deaths. In India, there were 35,875,790 confirmed cases and more than 450,000 deaths as of January 3, 2022¹. COVID-19 is highly contagious and can be transmitted from person to person through direct contact or droplets from an infected person's coughing or sneezing. Fever, headache, dry cough, and diarrhea are some of the primary symptoms while respiratory symptoms include rhinorrhea, sore throat, sneezing, pneumonia, and acute respiratory distress syndrome^{2,3}. This led to over 100 countries mandating social distancing, often known as 'lockdown', to minimize the rate of COVID-19 transmission. As a result of these lockdowns, jobs, education, travel, and recreation were disrupted, as were levels of physical activity, leading to a rise in sedentary behavior⁴.

The COVID-19 pandemic poses a direct threat to human health, but the controlled lockdown may also have had an indirect impact on health. The Indian government implemented one of the world's largest lockdowns on March 25, 2020, consisting of non-pharmaceutical interventions (NPIs) such as physical separation and limits on non-essential travel to slow the spread of the virus and minimize peak incidence^{5,6}. Even though children appear to have a lower risk of severe infection, these actions may

have had a significant impact on their lifestyle. The controlled lockdown may have had an impact on children's levels of physical activity. Even though indoor physical activity can help with overall levels, the advantages of playing outside and in nature are obvious. Physical activity decreased, sedentary behavior and screen time increased, and sleep patterns were disrupted as a result of this pandemic. There is strong evidence that spending time outside and in nature promotes healthy movement habits in children and adolescents, allowing them to get more daily physical exercise, engage in less sedentary behavior, and sleep better^{7,8}. Given the enormous and ongoing changes in child and family lifestyles throughout the pandemic, there is a growing feeling that the COVID-19 virus epidemic and accompanying restrictions will have major long-term physical and mental health repercussions for young people and their families⁹.

The COVID-19 virus outbreak has resulted in considerable changes to children's, young people's, and families' daily lives, with precise suggestions and restrictions varying from country to country. Most children and teenagers were being home-schooled or learning through online activities, which replaced school attendance. Families were seeking guidance and solutions to maintain healthy routines, including healthy movement behavior and opportunities to spend time outdoors, during the initial response to the COVID-19 outbreak and guidelines for physical distancing, behavior restrictions, and overall instructions to stay home^{10,11}.

Therefore, it is essential to understand the change in physical inactivity and sedentary lifestyle due to the lockdown among both children and their parents. This study, therefore, aims to gather information regarding the impact of lockdown due to COVID-19 on physical activity, sleep, and lifestyle changes associated with the COVID-19 lockdown.

Methodology

A cross-sectional study was conducted after the COVID-19 lockdown period from March to May 2022. A purposive sampling method was used for recruiting parents from the general population living in urban Mysuru. Data were collected using a web-based E-survey link that was shared among the participants. The inclusion criteria were parents aged 21 or above, living in Mysuru, and with a child aged between three and five. Professionals who were unable to fill out the questionnaire due to a lack of a Facebook/WhatsApp/Instagram account or lack of a smartphone were excluded from the study. The study was approved by the institutional ethics committee. The survey's purpose and procedure were added to the web-based E-survey. The participant's consent was deemed to be given when they completed the survey and submitted it successfully. Within the survey questionnaire, there was no separate declaration seeking consent.

The required sample size for this online survey was calculated using the formula for estimating proportions:

$$\text{Sample size, } n = \frac{Z^2 PQ}{L^2}$$

where $Z = 1.96$; $P = 90\%$ for the online survey response rate, $Q = (100-P)$ and $d = 7\%$.

As a result, the required minimum number of participants for this study was calculated to be 71. The option in Google Forms that prevents the submission of partially-answered or partially-filled in items made it impossible to submit an incomplete survey form. As a result, when the number of responses reached 71, the web-based open E-survey link was closed and responses were analyzed.

Before the web-based open E-survey questionnaire was given to the real study population, a pilot study was conducted on 30 healthcare professionals who were later eliminated from the research. The objective of the pilot study was two-fold: first, to test and develop research methods, and second, to impose the type of analysis and processes that would be required when the questionnaire was developed. The Cronbach's alpha

score is 0.821. As a result, the material validity and reliability of the instrument were established.

The questionnaire contained 2 parts: part 1 included details regarding socio-demographic factors like gender, education, occupation, total family members, monthly family income, area of residence, etc. and part 2 included changes in the behavior of the child during lockdown and after lockdown, like food intake, self-feeding, hygiene practices, physical activities, screen time, time spent with parents, sleep duration, etc. Thus, a draft of the web-based open E-survey questionnaire was created.

Statistical analysis: the data collected were entered in a Microsoft Excel 2019 spreadsheet followed by analysis using SPSS version 26 (Statistical Package for the Social Sciences) Windows, Version 26.0. (IBM Corp. Released 2019. IBM SPSS Statistics for Armonk, NY, USA). The demographic factors such as gender, education, occupation, income, etc. were represented using percentages. The associations between the selected variables and lockdown-related changes were found using the paired t-test, McNemar's test and Wilcoxon signed-rank test. The data distribution was represented using appropriate tables. A p-value of less than 0.05 was considered statistically significant.

Results

Using an online questionnaire, 71 responses were collected from participants. Descriptive analysis of the demographic details of the participants showed the following findings (Table 1).

From the above table, we see that the majority of the participants i.e., 41 (57.3%) were females. The majority of the fathers were graduates (36 [50.7%]) followed by 31 (43.7%) of whom were postgraduates. Among the mothers, 41 (58.6%) were graduates followed by 24 (34.3%) and 6 (7.1%) who had postgraduate and high school qualifications respectively.

A higher proportion of the fathers (40 [55.7%]) and 21 (29.5%) of the mothers were in professional positions.

The majority belonged to a nuclear family type (47 [66.2%]) and 64 (90.2%) of the participants were from the urban area. The median number of family members was found to be four and the median number of siblings was one.

From table 2, it is seen that there was a great increase in the consumption of homemade food (64 [90.1%]) during the lockdown period. Though there was no increase in food intake (38 [53.6%]), there was an increase in self-feeding (32 [45.1 %]) during the

Table 1. Demographic characteristics of the participants (n = 71)

Variable	Characteristics	Frequency (n)	Percentage (%)
Gender of the child	Male	30	42.3
	Female	41	57.3
Education qualification of the father	Postgraduate	31	43.7
	Graduate	36	50.7
	Intermediate/diploma	2	2.8
	High school	2	2.8
Education qualification of the mother	Postgraduate	24	34.3
	Graduate	41	58.6
	High school	6	7.1
Occupation of the father	Legislators, senior officials, managers	1	1.4
	Professional	40	55.7
	Technicians and associate professionals	13	18.6
	Clerks	2	2.9
	Skilled worker and shop and market sales	13	18.6
	Skilled agriculture and fishery worker	2	2.9
Occupation of the mother	Professional	21	29.5
	Technicians and associate professionals	17	23.9
	Clerks	3	4.2
	Skilled worker and shop and market sales	3	4.2
	Unemployed/homemaker	27	38.2
Type of family	Nuclear	47	66.2
	Joint	22	30.9
	3 rd generation	2	2.8
Area of residence	Rural	7	9.8
	Urban	64	90.2

lockdown. The participants also felt that there was an improvement in the household practices of cooking, storing, and feeding (68 [95.8%]) during the lockdown.

55 (78.6%) participants agreed that they had tried new dishes of nutritional value during the lockdown period which was probably also reflected in the reduction of junk food consumption (58 [82.9%]) during the lockdown.

40 (56.3%) of the parents felt that they were able to get their children more involved in physical activities and 60 (84.5%) of them became more frequently involved in their children's activities, such as storytelling/singing songs during bathing, feeding, etc. during the lockdown period (Fig. 1).

From table 3, we find that in the majority, the amount of time spent (in hours) with the children after the lockdown was less than five hours in 29 (41.4%) while the time spent had increased to 5-10 hours for 34 (48.6%) of the parents during lockdown. Using Mc Nemar's test, the amount of time spent by the parents with their children during and after lockdown showed a statistically significant increase ($p < 0.0001$). This difference was also significant using the Wilcoxon signed-rank test for comparing the average time spent during and after lockdown.

When the parents were asked if screen time had increased during the lockdown, 56 (78.8%) of the parents replied 'yes' while 15 (21.2 %) of the parents replied 'no'. The Wilcoxon signed-rank test for comparing the average time spent during and after lockdown shows a statistically significant difference ($p = 0.001$) (Table 4).

31 (43.6%) parents felt that their children's sleep duration increased during the lockdown while 40 (56.4%) did not find any difference in sleep duration. When a paired t-test was applied for analyzing sleep duration during and after the lockdown, it showed statistical significance ($p < 0.001$) (Table 5).

From figure 2 we see that during and after the lockdown the mother was the chief caretaker of the child followed by the father and grandparents.

Discussion

This study was carried out to assess physical activity and sedentary behavior in children and their parents to assess the impact of the COVID-19 pandemic. According to this study, during the lockdown period, there was a substantial increase in the consumption of homemade meals, an improvement in cooking, storage, and feeding activities, as well as a decrease in junk food intake. The

Table 2. Descriptive analysis of the responses by the parents

Question	Yes	No
	n (%)	n (%)
Do you think your child's food intake was higher during the lockdown, compared to afterwards?	33 (46.4)	38 (53.6)
Was there an increase in the consumption of homemade food compared to readymade food (Maggi, Cerelac, etc.) during the lockdown period?	64 (90.1)	7 (9.9)
Was your child's self-feeding better during the lockdown period?	32 (45.1)	39 (54.9)
Were the household practices of cooking, storing, and feeding better during the lockdown period?	68 (95.8)	3 (4.2)
Were any new dishes with nutritious foods tried during the lockdown period?	56 (78.9)	15 (21.1)
Did junk food consumption go down during this period?	59 (83.1)	12 (16.9)
During the lockdown, were you able to get your children more involved in physical activities than usual?	40 (56.3)	31 (43.7)
Did you engage more frequently with your children in storytelling/singing songs etc., while bathing or feeding during this period?	60 (84.5)	11 (15.5)

Table 3. Frequency table showing the amount of time parents spent with their child

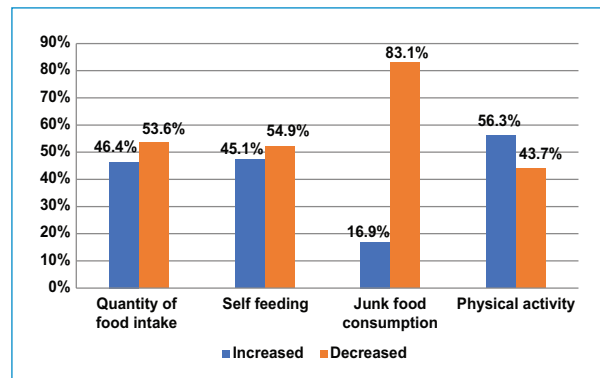
Question	Frequency (n)	Percentage (%)
The duration of time spent with the child in a day (in hours) after the lockdown		
< 5 hours	29	41.4
5-10 hours	26	37.2
10 hours	15	21.4
The duration of time spent with the child in a day (in hours) during the lockdown		
< 5 hours	8	11.4
5-10 hours	34	48.6
10 hours	28	40.0

Table 4. Impact of lockdown on screen time and parenting

Variables	Category	Median	IQR	p-value
Screen time (hours)	After lockdown	1.5	1-2	< 0.001*
	During lockdown	4	2-6	
Time spent by parent with child (hours)	After lockdown	5.50	4-10	< 0.001*
	During lockdown	10	6-15	

*Wilcoxon signed rank test.

majority of the parents were able to get their children more involved in physical activities, and they became more regularly involved in their children's activities such

**Figure 1.** Changes during lockdown.

as storytelling/singing songs while washing, feeding, and so on. Furthermore, the amount of time spent with the children increased during the lockdown period. The study also found that the children's screen time and sleep duration increased during lockdown compared to the post-lockdown period.

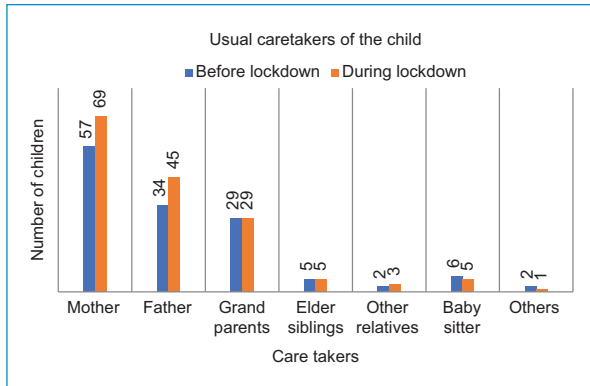
This study showed an increase in the consumption of homemade meals and a decrease in junk food intake. This was different when compared to a study carried out in Italy by Angelo Pietrobelli et al. where there were no changes in reported vegetable and fruit intake while the intake of potato chips, red meat, and sugary drinks increased significantly during the lockdown¹². Another study conducted by Rubén López-Bueno et al. in Spain, showed a reduction in daily fruit and vegetable consumption during the COVID-19 confinement¹³.

In our study, the majority of the parents were able to get their children more involved in physical activities,

Table 5. Impact of lockdown on sleep

Variables	Category	Mean	SD	t	p-value
Duration of sleep (hours)	After lockdown	8.74	2.357	-4.943	< 0.001*
	During lockdown	9.63	2.051		

*Paired t-test.

**Figure 2.** Multiple bar diagram showing the child's caretakers during and after the lockdown.

and they became more regularly involved with their children while different studies carried out around the world showed a negative effect of the COVID-19 pandemic on physical activities. 36 percent of parents in the US, 94 percent of parents in South Korea, and 42 percent of parents in the Netherlands said their child was less physically active during the COVID-19 epidemic than they were before the pandemic¹⁴⁻¹⁶. However, a study carried out in Germany by Steffen C. E. Schmidt et al. reported an increase in habitual physical activity among children and adolescents, similar to our study¹⁷.

According to our data, screen time increased during the lockdown compared to the post-COVID period. This was in line with previous studies around the world^{12,18,19}.

Our study's findings also showed that there was a significant change in sleep duration during the pandemic period. This was in line with earlier studies that had been carried out globally during the pandemic^{12,13,20,21}.

Our study adopted an open, web-based E-survey methodology. The cost-effectiveness, minimal time commitment, participant accessibility, and environmental friendliness of the survey method were strengths to this study. Some of the limitations of our study include the small sample size, the parent-report design of the study, and the potential for recall bias. Furthermore, the

findings might not apply to other countries. Future research should evaluate the COVID-19 virus outbreak's long-term effects as well as the changes in children's and adolescents' activity patterns.

Conclusion

The results demonstrate that, on average, the children's food habits improved and parents were able to enhance their children's participation in physical activity while the children's screen time and sleep duration increased during lockdown in comparison to the post-lockdown period. To avoid long-term health concerns during the present and potential future pandemics, initiatives to increase physical activities and limit sedentary behavior, particularly screen time, in children are needed, otherwise, beyond the immediate impact of viral infection, the devastating COVID-19 pandemic will have unintended consequences.

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Conflicts of interest

None.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

Use of artificial intelligence for generating text. The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript, nor for the creation of images, graphics, tables, or their corresponding captions.

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