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## Prevalence of Behaviour Changes and Sedentary Lifestyle Among Children and Adolescents During COVID-19 Pandemic in Ghaziabad District of Uttar Pradesh.

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### Abstract

Background-The pandemic of the coronavirus has resulted in nationwide school closures, lockdown, and social distancing, resulting in sedentary lifestyle of children and adolescents for substantial amount of time. Objectives: To find the prevalence of lifestyle and behaviour changes among children and adolescents during Covid-19 pandemic. Methodology- Observational cross-sectional study conducted among the children (less than 18 years) in urban population of Ghaziabad city through a house-to-house survey, using a pre-designed, semi-structured questionnaire with a sample size of 666 study participants. Statistical analysis- using Logistic regression and odds ratio. Result - In this study 391 (58.7%) individuals were males and 275 (41.3%) females. Most of the study subject 275 (41.3%) belonged to the five-to-ten-year age group. Among the study participants in one-to-ten-year age group odds of not doing physical activity were twice (OR 1.93 [95% CI 1.129 – 3.290]) as much as those in adolescent (ten to eighteen years) age group. Odds of spending less than two hours in front of screen over and above online classes was more than twice 2.421 [95% CI 1.764-3.323] among children of parents who had lost their jobs during the pandemic. Conclusion: This study identifies causes responsible for an altered lifestyle among children and their parents during the pandemic and determines an approach to prevent and/or reduce the harmful effects of these changes.

Key message: this study identifies lifestyle and behaviour changes among children and their parents due to Covid-19 pandemic.

## 1. Introduction

World Health Organization declared the SARS-CoV 2 outbreak as a pandemic on March 11, 2020<sup>1</sup>

Healthy childhood development is a combination of physical activity (PA) and restricting sedentary behaviours (SB); together known as movement behaviors.<sup>2</sup> The extent to which quarantine measures have compromised children's movement behaviours is to be studied.

The purpose of this study was to assess the changes in physical activity, sedentary behaviours, leisure screen time, and mood changes in children across Ghaziabad district. We aim to improve and promote child health behaviours and daily lifestyle of children for future pandemics.

## 2. Materials and method

### Study design

This observational cross-sectional study was conducted from 27<sup>th</sup> July to 23<sup>rd</sup> Sept. 2021 among the individuals less than eighteen years of age, in urban population of Ghaziabad district through a house-to-house survey, using a pre-designed, semi-structured questionnaire. Approval was taken from the medical ethics committee of the institute prior to starting the survey. A written informed consent was taken from all the participants maintaining the anonymity.

### Sample size

To calculate the sample size, we assumed that the prevalence of changes in physical activity, screen time and mood swings among the children (less than eighteen years) during the COVID-19 pandemic was 50%. Since sufficient resources were available, at five percent degree of precision, and 99 % CL our sample size was calculated to be 664.

Out of the five zones of district Ghaziabad, 133 houses were selected randomly from each zone, resulting in 665 individuals. We randomly chose individuals less than eighteen years from each household; ultimately 666 children were selected residing in Ghaziabad city. We excluded those individuals whose parents refused to give consent for the study.

The questionnaire consisted of three sections to gather socio-demographic information, physical activity, screen time and mood swings among the children during the COVID-19 pandemic. Interviews assessed child Mental Wellbeing (MWB) by asking parents about their child's general mood and how their child's mood had been impacted by COVID-19 restrictions.<sup>38</sup> The information we gathered was analysed using the SPSS trial version 16. Appropriate statistical tests of significance were used to determine the results, and binomial logistic regression analysis was used to determine relation between various factors.

## 3. Results

### 1) Demographic characteristics

Table 1 demonstrates the complete socio-demographic characteristics where 391 (58.7%) males, with the mean  $\pm$  SD of  $8.37 \pm 4.3$  years of age and most of them [ 275 (41.3%)] belonged to five to ten years of age. Majority of the fathers of the children were graduates, 218 (32.7%). There were equal number of high school pass 148 (22.2%) and illiterate 148 (22.2%) mothers in the study. Most of the fathers and mothers were found to be self-employed 346 (52.0%) and unemployed/homemaker 474 (71.2%) respectively. Table The complete are

### 2) Changes in lifestyle during pandemic

Table 2 shows that 576 (86.5%) study participants were doing physical activity like running, cycling, aerobics & dancing, while 90 (13.5%) of the children were not doing any physical activity at all.

Almost three fourth 490 (73.6%) of children had healthy eating habits, like home cooked food, fruits and vegetable, while 141(21.2%) of the children were eating unhealthy food like fast food, fried snacks, sweets, pastries, chocolate, ice creams & soft drinks. Parents reported an increase in weight for 226 (33.9%) of the children. We found that 243 (36.5%) children did not experience any changes in mood during COVID-19, but 161 (24.2%) children were more irritated than before. Almost one fifth 141 (21.2%) of the children were troubled/sad/lonely.

There were 198 (29.7%) children who were spending more than two hours in front of screen per day while 142 (21.3%) children were spending more than five hours.

### 3) Physical activity

Results related to physical activity (Table 3) of the participants in the age group of ten to eighteen year were less likely than children of one to ten years of age [(OR 1.93 [95% CI 1.129 – 3.290]). Participants with a higher family income (> 50,000 INR), were less likely to do any physical activity (OR 2.064 [95% CI 1.184 – 3.599]) than those with an income less than 50,000 INR.

Children whose father's and mother's education level was above intermediate, were two times less likely to do physical activity (OR 2.495 [95% CI 1.521 – 4.093]) and (OR 2.052 [95% CI 1.162 – 3.623]) respectively.

Study participants with a reduction in family income per month were three times less likely to do physical activity (OR 3.107 [95% CI 1.466 – 6.587]).

Families with worsened economic status after the pandemic were twice less likely to do physical activity than those whose economic status remain unchanged. (OR 2.198 [95% CI 1.209 – 3.996])

### 4) Screen time

Participants with a family income (Table 4) of more than 50,000 INR had two times higher chances of increased screen time (OR 2.064 [95% CI 1.720 – 2.410]) compared to those with less than 50,000 INR. Comparison of children whose father and mothers' education level were more than equal intermediate with less than intermediate, were found to have an increased screen time (OR 1.922 [95% CI 1.408-3.73]) and (OR 1.720 [95% CI 1.408- 2.623]) respectively.

A significant association between participant's screen time behaviour and their father's employment status was observed, with an increased screen time of six times (OR 6.302 [95% CI 2.444-16.247]) higher than the children whose fathers were unemployed.

Odds of children spending more than two hours besides online classes was more in families with more than two children (OR 2.503 [95% CI 1.737-3.608]).

Odds of extended screen time was more than twice among children of parents who had not lost their jobs during the pandemic. (2.421 [95% CI 1.764-3.323])

Expected screen time was almost twice among participants who did not experience reduction in family income. (OR 1.970 [95% CI 1.353-2.867])

### 5) Changes in Mood

Changes in mood (Table 5) were eight times (OR 8.333 [95% CI 2.867-24.224]) higher among children, whose fathers' education level was less than equal to intermediate, similarly in maternal education. (OR 7.097 [95% CI 3.086-16.322]). Whereas, it was five times higher (OR 5.471 [95% CI 2.446-12.239]) among participants belonging to families with a reduction in income during pandemic.

## 4. Discussion

Current study was conducted to assess the immediate changes in lifestyle, physical activity, screen time, food habits, weight changes and mood swings in school-aged children in Ghaziabad district during the COVID-19 crisis. Studies showed that youth and children have poor level of physical fitness; engaging in more sedentary and recreational screen-based activities.<sup>7</sup>

According to the IAP Guidelines, a child of one to two years should spend a minimum of three hours on physical activity whereas, three to five years children should spend at least three hours on physical activity with a minimum of 60 minutes of moderate-to-vigorous activity. Further a child of five to eighteen years should have a minimum of three hours of structured physical activity per day.<sup>4</sup>

Results of our study showed that chances of not doing any physical activity was higher in ten to eighteen-year age group than in one-to-ten-year age group. Our observations are in agreement with Sarah Moore et al who found more physical activity in children than youth and reported an association

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between increased physical activity and decreased depressive symptoms.<sup>3</sup>

We observed that 576 (86.5%) study participants were doing physical activity like running, bicycling, aerobic & dancing, while 90 (13.5%) of the children were not doing any physical activity at all. Even though Moore et al reported biking (6.1%), walking or hiking (5.5%) as the top three activities<sup>4</sup>, we observed walking (56.0%), running (51.0%) and bicycling (37.7%) as the top three outdoor activities in our study.

Subsequently, the children with a family income of more than 50,000 INR, odds of not doing physical activity were two times higher than those with an income less than 50,000 INR, possibly due to more awareness with a better access to the digital media.<sup>5</sup>

Allin et al, have reported that mothers have greater responsibility in child care and risk management.<sup>6</sup> In accordance to this finding, we found that mothers, whose education level was more than equal to intermediate, were more aware of the pandemic situation and odds of not doing physical activity among their children were twice as those mothers with less than intermediate level of education. Whereas, odds of not doing physical activity were three times higher among children from families with no reduction in income and living in a more protected environment.

Earlier studies show that a child less than two years of age should not have any exposure of digital media except occasional video calls with close relatives. Children in the age group of two to five years should not be spending more than one hour in front of screen.<sup>7</sup> In our study, 49 children 27.8% in the age group one to five year had one to two hours of screen time, in five ten-year age group, 33.5% of children were spending more than two hours in front of screen. Similarly, in ten-to-eighteen-year age group, 34.9% children were spending more than two hrs in front of screen. Carroll. et al reported in their study that online learning activities led to an increase in screen time among children and they were also playing more video games due to lack of outdoor activity.<sup>8</sup>

Lin Y M et al conducted a parent education program on sleep quality, screen time, and psychosocial

impact among pre-schoolers and reported that the average screen time was  $211 \pm 83.8$  min/day for children. Significant reduction was also observed in the screen time of children in the experimental group after the intervention, and they presented improvement in quality of sleep and attention score for psychosocial adaptation.<sup>9</sup>

Overall development of children depends upon a fine balance between sedentary lifestyle and physical activity. These activities consist of an hour of play time, adequate duration of sleep, and time for other basic requirements like schoolwork, meals, hobbies, and family interaction. If any of these activities is displaced due to screen use, then it is called excessive screen time and it should be reduced.<sup>7</sup> In our study, 29.7% children were spending more than two hours in front of screen per day while 21.3% children were spending more than five hours in front of screen. On the other hand, 18.5% children were not having any change in their screen time during the pandemic.

Caroll N. et al. identified a common concern among the parents regarding increased children misbehaviour since COVID-19. They noticed that their children were frequently irritable and frustrated with less of patience. Some parents attributed their child's behaviour as restlessness; believing its reasons as monotony of life and boredom. Children were upset from their inability to meet their friends and family.<sup>8</sup> Furthermore, Gilbert A. et al. reported that parents of 74% of children were having worse mental wellbeing (MWB) during COVID-19 restrictions. In terms of PA behaviours, if a child's perceived PA decreased following COVID-19 restrictions, they were 53% less likely to have the same or better MWB than a child whose perceived PA stayed the same or increased.<sup>10</sup>

The salient factors of our study are associated with the children's mood swings were parental education and reduction in family income during COVID-19 pandemic. Mood swings were observed eight times more in the children with fathers' education less than equal to intermediate than those whose fathers were having an education level more than intermediate. Similar results were obtained for mothers' education. Moreover, chances of mood swings were five times higher among participants belonging to

families with a reduction in income during pandemic.

A study conducted by Saurabh K and Ranjan S claimed that the most common psychological responses experienced during quarantine were Worry (68.59%), helplessness (66.11%) and fear (61.98%). Children and youth under quarantine were having significantly more psychological issues than those who were not quarantined. Participants of quarantined group were experiencing fear ( $p < 0.0001$ ), nervousness ( $p < 0.0001$ ) and annoyance ( $p < 0.001$ ) most significantly.<sup>11</sup>

The lacunae of the study were the limited sample size, and the study being restricted to urban areas in a single district in India, therefore the findings need to be supported by conducting the research upon a larger and varied demographic base. We also need to evaluate the long-term consequences, and the lasting impact of the pandemic upon the behavioural changes among children in the population.

To conclude, the effect of lockdown and quarantine during the COVID-19 pandemic on behaviour and lifestyle changes of individuals especially children is significant. This study identifies causes responsible for an altered lifestyle among children and their parents during the pandemic and determines an approach to prevent and/or reduce the harmful effects of these changes.

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**Table 1:** Socio-demographic profile of study participants

<b><u>Socio-demographic characteristics</u></b>	<b><u>Number (n=666)</u></b>	<b><u>Percentage (%)</u></b>
<b>Age of children (in years)</b>		
1-5	176	26.4
5-10	275	41.3
10-18	215	32.3
<b>Gender of children</b>		
Male	391	58.7
Female	275	41.3
<b>Type of family</b>		
Nuclear	457	68.6
Joint/ Three Generation	209	31.4
<b>Family income per month (in INR)</b>		
Less than 10 thousand	156	23.4
10 thousand -50 thousand	306	45.9
50 thousand -90 thousand	90	13.5
90 thousand -1.30 lakh	49	7.4
1.30 lakh -2.10 lakh	25	3.8
2.10 lakh and above	40	6.0
<b>Education of father</b>		
Post Graduate	80	12.0
Graduate	218	32.7
High School	176	26.4
Middle school	82	12.3
Primary school	36	5.4
Illiterate	74	11.1
<b>Education of mother</b>		
Post Graduate	55	8.3
Graduate	138	20.7
High School	148	22.2
Middle school	117	17.6
Primary school	60	9.0
Illiterate	148	22.2
<b>Employment of father</b>		
Government job	70	10.5
Private job	208	31.5
Self employed	346	52.0
Unemployed	42	6.3
<b>Employment of mother</b>		
Government job	26	3.9
Private job	63	9.5
Self employed	103	15.5
Unemployed/ Homemaker	474	71.2

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<b>Number of family member</b>		
Less & equal 4 members	355	53.3
More than 4 members	311	46.7
<b>Number of children in the family</b>		
Less & equal 2	507	76.1
More than 2	159	23.9

**Table 2:** Distribution of children according to lifestyle changes during pandemic.

<u>Children lifestyle related statistics</u>	<u>Number</u> <u>(n=666)</u>	<u>Percentage (%)</u>
<b>Mood swings seen in children</b>		
Aggressive than before	82	12.3
Irritated than before	161	24.2
More troubled/sad/lonely	141	21.2
Nervous than before	39	5.9
No change (Feeling alright)	243	36.5
<b>Physical activity of children</b>		
Doing Physical activity	576	86.5
Not doing any physical activity	90	13.5
<b>Food habit of Children</b>		
Eating healthy food	490	73.6
Eating unhealthy food	141	21.2
No change in eating habit	35	5.3
<b>Weight changes seen in children</b>		
Increase	226	33.9
Decrease	259	38.9
No change	181	27.2
<b>Time spent by children in front of screen (T.V/Laptop/Mobile) increased by</b>		
>5 Hour	142	21.3
2-5 Hour	198	29.7
1-2 Hour	131	19.7
<1 Hour	72	10.8
No change	123	18.5

**Table 3:** Relationship of Physical activity with socio-demographic variable.

Variable	Category	Physical activity during the pandemic		Total	p value	OR (CI)
		Not doing physical activity (%)	Doing physical activity (%)			
Age of children	1-10 year	196 (34.0%)	380 (66.0%)	576	Reference	
	10-18 year	19 (21.0%)	71 (78.9%)	90	<0.016	1.93 (1.129-3.290) *
Type of family	Nuclear	72 (15.8%)	385 (84.2%)	457	Reference	

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Variable	Category	Physical activity during the pandemic		Total	p value	OR (CI)
		Not doing physical activity (%)	Doing physical activity (%)			
	Joint or 3 Generation	18 (8.6%)	191 (91.4%)	209	0.406	1.870 (0.428-8.176)
Family Income	Less than 50k	73 (15.8%)	389 (84.2%)	462	Reference	
	More than 50k	17 (8.3%)	187 (91.7%)	204	<0.011	2.064 (1.184-3.599) *
Education of father	Less than equal Intermediate	66 (17.9%)	302 (82.1%)	368	Reference	
	More than intermediate	24 (8.1%)	274 (91.9%)	298	<0.001	2.495 (1.521-4.093) *
Education of mother	Less than equal Intermediate	74 (15.6%)	399 (84.4%)	473	Reference	
	More than intermediate	16 (8.3%)	177 (91.7%)	193	<0.001	02.052 (1.162-3.623) *
Occupation of father	Employed	86 (13.8%)	538 (86.2%)	624	Reference	
	Unemployed	4 (9.5%)	38 (90.5%)	42	0.438	1.519 (0.529-4.362)
Number of children in the Family	Less than equal to 2	66(13.0%)	441 (87.0%)	507	Reference	
	More than 2	24(15.1%)	135(84.9%)	159	0.504	0.842 (0.508-1.395)
Number of family member in the family	Less than equal to 4	36 (11.6%)	275 (88.4%)	311	Reference	
	More than 4	54 (15.2%)	301 (84.8%)	355	0.172	0.730 (0.464-1.147)
Reduction in family income	Yes	82 (15.6%)	442 (84.4%)	524	Reference	
	No	8 (5.6%)	134 (94.4%)	142	<0.003	3.107 (1.466-6.587) *
Economic status after the pandemic	No change/Improved	14 (7.8%)	166 (92.2%)	180	Reference	
	worse/ Critical	76 (15.6%)	410 (84.4%)	486	<0.010	2.198 (1.209-3.996) *

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**Table 4:** Summarizes the screen time of children during the pandemic

Variable	Category	How much time is the child spending in front of a screen (Laptop/Mobile/TV) apart from attending online classes now?		Total	p value	OR (CI)
		More the 2 hours (%)	Less than 2 hours (%)			
Type of family	Nuclear	191 (41.8%)	266 (58.2%)	457	Reference	
	Joint or 3 Generation	101 (48.3%)	108 (57.7%)	209	0.115	1.302(0.937-1.810)
Family Income	Less than 50k	172 (37.2%)	290 (62.8%)	462	Reference	
	More than 50k	120 (58.8%)	84 (41.2%)	204	<0.001	2.409 (1.720-3.373) *
Education of father	Less than equal Intermediate	135 (36.7%)	233 (63.3%)	368	Reference	
	More than intermediate	157 (52.7%)	141 (47.3%)	298	<0.001	1.922 (1.408-2.623) *
Education of mother	Less than equal Intermediate	189 (40.0%)	284 (60.0%)	473	Reference	
	More than intermediate	103 (53.4%)	90 (46.6%)	193	<0.002	1.720 (1.227-2.410) *
Occupation of father	Employed	287 (46.0%)	337 (54.0%)	624	Reference	
	Unemployed	5 (11.9%)	37 (88.1%)	42	<0.001	6.302 (2.444-16.247) *
Number of children in the Family	Less than equal 2	195(38.5%)	312 (61.5%)	507	Reference	
	More than 2	97 (61.0%)	62 (30.0%)	159	<0.001	2.503 (1.737-3.608) *
Number of family member in the family	Less than 4	125 (35.2%)	230 (64.8%)	355	Reference	
	More than 4	167 (53.7%)	144 (46.3%)	311	<0.001	2.134 (1.563-2.914) *
Parents lost their job during pandemic	Yes	138 (35.0%)	256 (65.0%)	394	Reference	
	No	154 (56.6%)	118 (43.4%)	272	<0.001	2.421 (1.764-3.323) *
	Yes	211 (40.3%)	313 (59.7%)	524	Reference	

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Variable	Category	How much time is the child spending in front of a screen (Laptop/Mobile/TV) apart from attending online classes now?		Total	p value	OR (CI)
		More the 2 hours (%)	Less than 2 hours (%)			
Reduction in family income	No	81 (57.0%)	61 (43.0%)	142	<0.001	1.970 (1.353-2.867) *

**Table 5:** Summarizes the mood swings of children during the pandemic.

Variable	Category	Mood swing seen in children		Total	P value	OR (CI)
		Mood swings seen (%)	No mood swings seen (%)			
Education of father	Less than equal Intermediate	364 (98.9%)	4 (1.1%)	368	<0.001	8.333 (2.867-24.224) *
	More than intermediate	273 (91.6%)	25 (8.4%)	698	Reference	
Education of mother	Less than equal Intermediate	465 (98.3%)	8 (1.7%)	473	<0.001	7.097 (3.086-16.322) *
	More than intermediate	172 (89.1%)	21 (10.9%)	193	Reference	
Reduction in Family income	Yes	503 (96.0%)	21 (4.0%)	524	<0.001	5.471 (2.446-12.239) *
	No	134 (94.4%)	8 (5.6%)	142	Reference	