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Original Research Article

Post-COVID Changes in Play Behavior of School Children

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Abstract: ***Background/Aim*:** The COVID-19 pandemic has significantly impacted children's play behavior. Study investigates the impact of the COVID-19 pandemic on the play behavior of Indian school children aged 10-12 years in rural and urban areas. It aims to assess changes in various forms of play, including indoor play, outdoor play, creative play, natural play and virtual play, before and after the pandemic. ***Methods*:** The study used a quantitative, descriptive approach with a self-constructed play behavior questionnaire. A sample of 150 children from urban and rural areas in selected districts of Kerala State in India. Was selected via multi-stage random sampling. ***Results:*** The findings highlight notable changes in children's play patterns, with a marked increase in virtual play and a decline in outdoor and natural play among both rural and urban children following the COVID-19 pandemic. Natural play was consistently higher in rural areas, while creative play became more common in urban settings after the pandemic. Virtual play was notably higher in urban areas throughout. Socio-demographic variables such as gender, number of siblings, and passive screen time were found to influence play behavior. ***Conclusion:*** The study provides valuable insights into how the COVID-19 pandemic altered play behaviors among Indian school children aged 10-12 years, with distinct patterns emerging between rural and urban settings. A significant shift towards virtual play and a decline in outdoor and natural play were observed across both areas, with rural children maintaining higher levels of natural play, while urban children engaged more in creative and virtual play after the pandemic. The study sheds light on the changes in play and their potential effects on children's social and cognitive development. The COVID-19 pandemic brought noticeable changes in children's play behaviors, with differences observed between rural and urban areas.

Keywords: Covid 19, Outdoor Play, Natural Play, Indoor Play, Creative Play, Virtual Play, Passive Screen Time.

INTRODUCTION

The United Nations recognizes play as a fundamental right of every child, offering numerous benefits throughout their lives (Barnett, 1990). Play is characterized by being intrinsically motivated and freely chosen by children (Rubin *et al*., 2007). Huizinga asserts that play predates culture and influences all aspects of life, from rituals to philosophy, arguing that civilization not only emerged from play but remains closely connected to it (Huizinga, 1980). The study of play has evolved from three major traditions: Jean Piaget's observations on the development of imitation and play in children, the role of play as a means of emotional expression and healing, and the educational philosophies of Montessori and Froebel, which emphasize the importance of free play in child development (Cohen, 2006).

Play is a key developmental factor that influences a child's future behavior (Bateson, 1976). It fulfills a range of functions, including shaping social, behavioral, moral, and cognitive growth (Martin & Caro, 1985). Additionally, play plays a critical role in brain development, as it supports the rapid formation of neuronal connections. Through play, children refine their neural networks, enabling them to engage in increasingly complex forms of play as they grow (Frost *et al*., 2012). Play and cognitive development are intertwined in children. Piaget viewed play and make-believe as a way for children to absorb new schemas, emphasizing the role of joyful interaction with objects in their development ("The Role of Play and Make-Believe in Children's Cognitive Development," 1976)**.** The rhetoric of "play as progress" highlights the

developmental aspect of play (Sutton-Smith, 2001). Free play is inherently complex, taking on many different forms, types, and stages (Hewes, 2014). It is essential for a child to engage in both indoor and outdoor play every day (Sawyers, 1994).

The early literatures on play suggest that play was not developed over time but was instead central to the beginnings of civilization (Anchor, 1978). Over the years, outdoor and indoor play, as well as games, have undergone significant changes. From ancient times, children engaged in various forms of play, such as marbles, yoyos, knuckleballs, hoops, and skipping. Games like hide and seek and running around were popular for centuries. Additionally, war games and different variations of football existed for many years. However, with the rise of video games and the increasing organization of sports like football and cricket, the landscape of games has seen a major shift.

The COVID-19 pandemic brought unprecedented turmoil and disruption, affecting all facets of society. Livelihoods, employment, economic stability, and nearly every aspect of daily life were profoundly impacted by this global crisis. Although the pandemic's acute phase lasted only a few years, its effects continue to reverberate throughout society. The shift toward digital media, evolving marketing strategies, and changes in the employment landscape have taken unexpected directions. Furthermore, the pandemic has significantly shaped lifestyles and social dynamics, potentially leading to long-term physical and psychological consequences. Sedentary, isolated lifestyles adopted during the pandemic seem to have induced changes that persist even as restrictions have eased.

While adults' livelihoods and lifestyles were disrupted, it is essential to recognize the significant impact on children, especially those in school. The pandemic has left lasting marks on children's social and psychological development. Recent studies from various regions reveal that children are experiencing increased antisocial behavior, anxiety, depression, and reduced physical activity. Changes in sleep patterns, eating habits, screen time, physical activity levels, and leisure activities have also been observed (Alonso-Martínez *et al*., 2021; Masonbrink & Hurley, 2020; Ranjbar *et al*., 2021). Education, a cornerstone of childhood development, was particularly affected as schools closed and learning shifted to virtual platforms. In this era of unforeseen challenges, children—known for their natural curiosity—faced a transformed reality that reshaped their world of play in subtle yet profound ways.

COVID-19 pandemic has brought about significant changes in children's play behavior. A systematic review highlighted a noticeable shift, with a decline in outdoor activities and a marked increase in indoor play and screen time, particularly spent on video games (Kourti *et al*., 2021). Physical activity, especially outdoor sports and activities, saw a sharp decrease during the pandemic, while leisure screen time surged. Studies show that most children and youth experienced a reduction in outdoor play, walking, and biking (53%), with outdoor physical activities and sports dropping by 64%. In contrast, indoor play increased for 53% of children, and 79% reported spending more time on screens (Moore *et al.,* 2020).

This article analyzes the changes in play behavior among children aged 9 to 11 from both rural and urban backgrounds, comparing their behavior before and after the COVID-19 pandemic. We assess the time spent on various forms of play, including indoor play, creative play, outdoor play, and virtual play. Additionally, we document key characteristics of the respondents, such as age, gender, number of siblings, family structure, and, most importantly, their passive screen time.

METHOD

A quantitative research design with a descriptive approach was employed, and data were collected through questionnaires distributed at the schools.The population for this study consists of school-aged children aged 10, 11, and 12 years studying in selected schools in rural and urban areas of Kerala State in India.In this study, a multistage random sampling technique was adopted to obtain a representative sample of school-aged children (10, 11, and 12 years) from both rural and urban regions of Kerala. Initially, three districts—Pathanamthitta, Alappuzha, and Kottayam—were chosen for the study. In the next stage, rural and urban areas within each district were identified according to official government classifications. Subsequently, a list of schools with students in the specified age group was compiled separately for rural and urban sectors, and schools were randomly selected using the lottery method. In the final stage, students aged 10 to 12 years were identified from the attendance registers of the selected schools, and a random selection of participants was made using the lottery method.

Permission to conduct the study was obtained from school authorities of selected schools. School children and their families were informed about the study through the address obtained from the school registers.

Informed consent for inclusion in the study was obtained from the parents of school aged children and assent was obtained from children for participating in the research study.

The researcher carefully explained the play behavior questionnaire to the children, clarifying any questions they had. Ample time was provided for the students to reflect and respond based on their memories of play behavior before the COVID-19 pandemic.

A play behavior questionnaire, which includes selected play behaviors such as outdoor physical play, outdoor games, indoor play, natural play, creative play, and virtual play, before and after pandemic was administered. Respondents answered the questionnaire using a four-point Likert scale with the options: plays every day, plays more than once a week, plays once a week, and never plays.

The questionnaire for the play behavior study consists of the following categories of play:
Outdoor Physical Play*:* Outdoor physical play includes activities such as running around, playing police and thief, ball games, cycling, skateboarding, and hide and seek.

Outdoor Games*:* Outdoor games include sports such as cricket, football, tennis, badminton, volleyball, and hockey.

Indoor Play*:* Indoor play refers to activities like board games, paper-pencil games, playing with toys, word games, and hand games.

Natural Play*:* Natural play encompasses activities like climbing trees, playing in the mud, playing with pets, gardening, and collecting items such as pebbles, stones, feathers, leaves, or seeds.

Creative Play*:* Creative play involves activities like drawing, painting, crafting, playing musical instruments, role-playing, and dressing up.

Virtual Play*:* Virtual play includes engaging in virtual simulation games, virtual reality sports, artistic or creative games, adventurous games, and interactive virtual games.

Assessment of Psychometric Properties of Play Behaviour Questionnaire

The tool to assess school children's play behaviour was developed by identifying key perspectives, domains, and ensuring cultural appropriateness. Initially, 40 items were generated from literature reviews, similar tools, and focus group discussions with parents, children, teachers, and a counsellor. After removing overlapping items, 35 were organised into domains, followed by expert review. Five items with a Content Validity Index below 0.7 were eliminated, leaving 30 items. The response format was set as frequency of play (e.g., daily, weekly, never). A pilot study with 20 children (urban and rural) yielded a test-retest reliability of 0.82. Using the Spearman-Brown formula, reliability was calculated at 0.92.

RESULTS

Respondent Characteristics

The study involved 150 school-aged children from both rural and urban areas of Kerala. A play behavior questionnaire was used to evaluate how frequently these children participate in different types of play, including outdoor play, outdoor games, indoor play, natural play, creative play, and virtual play.

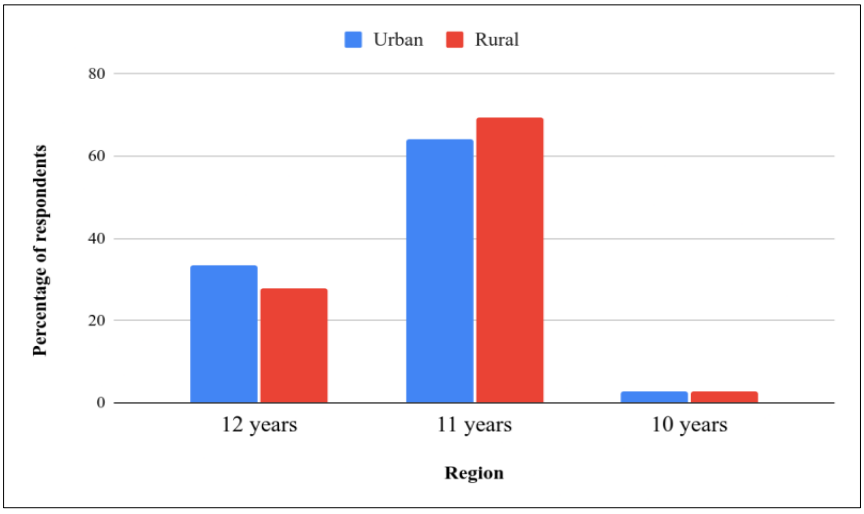

Figure 1: Plot showing the distribution of age of respondents in rural and urban regions

Age

In rural areas, the age distribution among respondents shows a predominant group of 11-year-olds (69.3%) with fewer 12-year-olds (28.0%) and 10-year-olds (2.7%) Conversely, in urban areas, the majority of children are 11 years old (64%), while 12-year-olds make up a smaller group (33.3%), and only a minimal number are 10 years old (2.7%).

Gender

In rural areas, the majority of respondents were male (61.3%), while a minority were female (38.7%). In contrast, urban areas saw equal participation, with males making up 49.3% and females 50.7%.

Type of Family

In rural areas, a greater proportion of children come from joint families (56%) compared to those from nuclear families (44%). In urban areas, the distribution is more balanced, with 50.7% of respondents coming from joint families and 49.3% from nuclear families.

No of Siblings

In rural areas, a significant majority of respondents (78.7%) have siblings, while only a minority (21.3%) are single children. Similarly, in urban areas, most participants (70.7%) have siblings, whereas a smaller proportion (29.3%) are single children.

Passive Screen Time per Day

Passive screen time refers to the duration when children use electronic devices such as smartphones, tablets, or televisions with minimal active involvement. During this time, they engage in activities like watching movies, videos, or TV shows, where their participation is largely passive.

In rural areas, shorter screen times are more common, with the highest percentage of children watching between 30 minutes to 1 hour per day. In contrast, urban children tend to have longer screen times, with the highest percentage watching 1 to 2 hours per day.

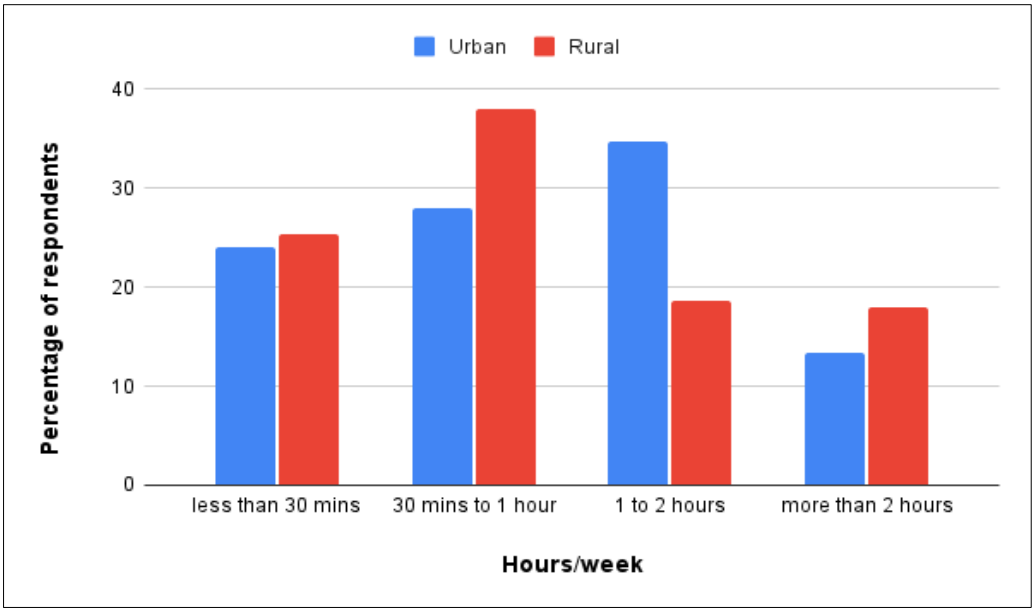

Figure 2: Graph showing the distribution of passive screen time of children in rural and uran region

In rural areas, the majority of participants (38.7%) reported having a passive screen time of 30 minutes to 1 hour per day. Additionally, 25.3% watch for less than 30 minutes, 18.7% have a screen time of 1 to 2 hours, and another 18.7% watch for more than 2 hours daily. In urban areas, a different pattern emerges. The majority of children (34.7%) reported having a screen time of 1 to 2 hours per day. Meanwhile, 28% watch for 30 minutes to 1 hour daily, 24% watch for less than 30 minutes, and 13.3% watch for more than 2 hours per day.

Play Behavior of School Children before and After Covid 19

Table 1: Paired Sample Test for Play Behavior of School Children Before and After COVID-19 in selected rural & urban areas

Demographic region	Types of play before and after covid 19	Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
URBAN	Outdoor play	1.307	1.896	.219	.870	1.743	5.969	74	**0.000**
	Outdoor Games	.120	1.026	.118	-.116	.356	1.013	74	.314
	Indoor play	-.067	2.440	.282	-.628	.495	-.237	74	.814
	Natural play	.760	2.130	.246	.270	1.250	3.090	74	**0.003**
	Creative play	-.013	1.438	.166	-.344	.317	-.080	74	.936
	Virtual play	-3.533	2.384	.275	-4.082	-2.985	-12.834	74	**0.000**
RURAL	Outdoor play	1.373	2.917	.337	.702	2.044	4.078	74	**0.000**
	Outdoor Games	.027	2.482	.287	-.544	.598	.093	4	.926
	Indoor play	-.173	2.698	.312	-.794	.447	-.556	74	.580
	Natural play	.600	2.020	.233	.135	1.065	2.572	74	**0.012**
	Creative play	-.627	1.894	.219	-1.063	-.191	-2.865	74	**0.005**
	Virtual play	-3.360	2.464	.285	-3.927	-2.793	-11.809	74	**0.000**

The study looked at how children's play habits changed before and after COVID-19 in rural areas. Study found that children spent less time playing outdoors and in nature after the pandemic started. There was no change in how often they played outdoor games, indoor games, or engaged in creative play. However, the most significant change was an increase in the time spent on virtual play. These findings suggest that COVID-19 led to a decrease in outdoor and natural play, while virtual play became more common among children in these rural areas.

The COVID-19 pandemic significantly altered children's play habits in urban areas. Outdoor and natural playtime decreased, while creative and virtual playtime increased. The frequency of outdoor games and indoor play remained mostly unchanged. Overall, children spent less time outside and more time on creative and virtual activities during the pandemic.

Comparison of Play Behavior among School Children in Selected Rural and Urban Areas before and After Covid-19 Pandemic

Table 2: Comparison of play behavior before and after Covid 19 in selected rural and urban areas

Play behavior at selected rural and urban areas		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Outdoor play before COVID	Equal variances assumed	.662	.417	1.725	148	.087
	Equal variances not assumed			1.725	144.894	.087
Outdoor games before COVID	Equal variances assumed	12.680	.000	-1.216	148	.226
	Equal variances not assumed			-1.216	136.404	.226
Indoor play before COVID	Equal variances assumed	.174	.677	-1.332	148	.185
	Equal variances not assumed			-1.332	147.487	.185
Natural play before COVID	Equal variances assumed	1.871	.173	6.326	148	**.000**
	Equal variances not assumed			6.326	143.560	**.000**
Creative play before COVID	Equal variances assumed	2.870	.092	-1.089	148	.278
	Equal variances not assumed			-1.089	139.443	.278
Virtual play before COVID	Equal variances assumed	13.632	.000	-3.776	148	**.000**
	Equal variances not assumed			-3.776	101.918	**.000**
Outdoor play after COVID	Equal variances assumed	.018	.894	1.916	148	.057
	Equal variances not assumed			1.916	148.000	.057
Outdoor games after COVID	Equal variances assumed	5.705	.018	-1.595	148	.113
	Equal variances not assumed			-1.595	140.883	.113
Indoor play after COVID	Equal variances assumed	2.083	.151	-1.393	148	.166
	Equal variances not assumed			-1.393	143.632	.166
	Equal variances assumed	5.999	.015	5.963	148	**.000**

Natural play after COVID	Equal variances not assumed			5.963	141.787	**.000**
Creative play after COVID	Equal variances assumed	2.653	.105	-2.400	148	**.018**
	Equal variances not assumed			-2.400	145.099	**.018**
Virtual play after COVID	Equal variances assumed	.975	.325	-2.791	148	**.006**
	Equal variances not assumed			-2.791	142.704	**.006**

The comparison of play behavior among school children in rural and urban areas before and after the COVID-19 pandemic reveals several key findings. Both before and after the pandemic, outdoor playtime showed no statistically significant difference between urban and rural areas. Similarly, outdoor game frequency and indoor playtime remained consistent across both settings. However, natural playtime was significantly higher in rural areas both before and after the pandemic. Creative playtime showed no significant difference before the pandemic but became significantly higher in urban areas after the pandemic. Virtual playtime was significantly higher in urban areas both before and after the pandemic. Overall, the pandemic did not significantly alter the general playtime patterns between rural and urban areas, but specific types of play, like natural and virtual play, exhibited notable differences.

Association of Play Behavior before and after Covid 19 with Selected Socio Demographic Variables in Children

Table 3: Association of Play Behavior before and after Covid 19 with Selected Socio Demographic Variables in Children

Pre/Post Covid	SOCIODEMOGRAPHIC VARIABLES AFTER COVID		RURAL AREAS			URBAN AREAS		
			Chi-square	df	p-value	Chi-square	df	p-value
Before Covid	Gender	Male	11.885	2	0.003	9.124	2	0.010
		Female						
	Type of family	Joint family	2.230	2	0.328	.690[a]	2	0.708
		Nuclear Family						
	No. of siblings	Single child	17.428	2	0.001	22.953[a]	2	0.001
		Child with siblings						
	Passive Screen time per day	< 30 mins	10.302[a]	6	0.112	22.432[a]	6	0.001
		30 mins - 1 hour						
		1 hour - 2 hours						
		> 2 hours						
After Covid	Gender	Male	24.320[a]	2	0.000	6.284[a]	2	0.043
		Female						
	Type of family	Joint family	4.654[a]	2	0.098	.358[a]	2	0.836
		Nuclear Family						
	No. of siblings	Single child	1.271[a]	2	0.530	9.883[a]	2	0.007
		Child with siblings						
	Passive Screen time per day	< 30 mins	14.155[a]	6	0.028	11.734[a]	6	0.048
		30 mins - 1 hour						
		1 hour - 2 hours						
		> 2 hours						

The study shows that before COVID-19, children's play behavior was significantly influenced by gender in both rural and urban areas, but not by the type of family. Having siblings affected play behavior in both urban and rural areas. Additionally, daily screen time was significantly linked to play behavior in urban areas. The study on the association of play behavior post-COVID-19 with selected sociodemographic variables reveals that the gender of respondents in both rural and urban areas significantly influences their play behavior. However, the type of family does not show any association with children's play behavior. Additionally, in urban areas, the number of siblings is associated with children's play behavior. Children's daily passive screen time is significantly associated with their play behavior in both urban and rural areas after the Covid 19 pandemic.

DISCUSSION

Decrease in Outdoor Play

The study findings revealed that outdoor play has been significantly decreased following the Covid 19 pandemic among rural and urban children. In rural regions, children's outdoor playtime decreased from an average of 9.67 hours per week to 8.36 hours, a statistically significant decline ($t = 5.969$, $p = 0.001$). Similarly, in urban areas, outdoor playtime

dropped from 8.97 hours to 7.60 hours per week ($t = 4.078$, $p = 0.001$). The decline in outdoor play can be attributed to pandemic-related restrictions, which limited children's opportunities to interact with peers and participate in physical activities outside the home. Even after life returned to normal post-pandemic, many children did not fully resume their pre-pandemic outdoor play habits.

Despite the overall reduction in outdoor playtime, the frequency of outdoor games remained largely unchanged in both rural and urban areas. This suggests that children continued playing outdoor games, but for shorter durations. The introduction of turf fields and other enclosed playgrounds, along with the steady popularity of games like cricket and football, may have contributed to this consistency in outdoor game frequency.

A study by Moore *et al*., examined changes in healthy movement behaviors among Canadian children and youth aged 5-17 during the COVID-19 pandemic, revealing a decrease in outdoor activities and an increase in indoor play and screen time (Moore *et al*., 2020). Most studies concluded that children reduced their physical activity, particularly outdoor play. Medrano and Cadenas-Sanchez conducted a longitudinal analysis of Spanish children, finding a significant decrease in physical activity by 91 minutes per day and an increase in screen time by 1.8 hours daily due to strict confinement measures (Medrano *et al*., 2021). Wang *et al*., highlighted that decreased outdoor play and increased screen time are linked to physical and mental health issues in children (Wang *et al*., 2023). A systematic review by Liu *et al*., identified a reduction in outdoor play and an increase in indoor play behavior among children aged birth to 12 years (Liu *et al*., 2022). Barron and Emmett found that the COVID-19 lockdown severely impacted outdoor play, which is closely associated with the presence of friends, leading to significant restrictions on children's ability to play outdoors beyond their gardens (Barron & Emmett, 2020).

Reduction in Natural Play Time

After the covid 19, significant reduction of natural play was observed among urban and rural areas. Children are becoming nature deficit- reduced green time (Driessnack, 2009). Before the pandemic, children in rural areas engaged in more natural play than those in urban areas, and this disparity persisted post-pandemic. These results are consistent with findings from a systematic review that examined the effects of natural play on the health and development of children aged 2-12 years. The review suggests that natural play positively impacts children's health and developmental outcomes (Sánchez-López *et al*., 2020).

Virtual Play Boomed

Followed by the pandemic, virtual playtime saw a dramatic increase among both urban and rural children, rising from 2.72 to 6.08 hours in urban areas ($t = -11.809$, $p = 0.001$) and from 1.24 to 4.77 hours in rural areas ($t = -12.834$, $p = 0.001$). This shift towards digital entertainment was significant, accompanied by a notable decrease in outdoor and natural play activities. Despite these overall trends, rural children continued to engage more in natural play compared to their urban counterparts, both before and after the pandemic.

A longitudinal analysis by Medrano and Cadenas-Sanchez (2020) assessed changes in lifestyle behaviors among Spanish children during COVID-19 confinement. The study revealed a significant reduction in physical activity by 91 minutes per day and an increase in screen time by 1.8 hours per day, attributed to strict confinement measures (Medrano *et al*., 2021).

CONCLUSION

The play behavior of children has been varied after covid 19. The study compared children's play behaviors in rural and urban areas before and after the COVID-19 pandemic. It found that while outdoor playtime remained similar in both settings throughout, natural play was consistently higher in rural areas. Urban areas showed a significant increase in virtual playtime during and after the pandemic, while creative playtime saw a notable rise specifically in urban areas post-pandemic. Overall, the pandemic influenced specific types of play differently between rural and urban environments, with virtual play becoming more prominent in urban settings.

Strength & Limitations

To assess the play behavior of school-aged children, various types of play, such as outdoor physical play, outdoor games, indoor play, natural play, creative play, and virtual play, were evaluated using a structured questionnaire. School children from both urban and rural areas were selected for data collection to identify any potential variations.

The participants of the study are school children aged 10,11 and 12 years. Consequently, the experiences of younger children are not represented in this study, which should be addressed in future research.

Implications for Practice

The results of this study highlight the variations in the play behavior of school-aged children. According to the WHO, both moderate- and vigorous-intensity physical activities improve health. The decline in physical play and the increase in virtual play behavior reflect young children's attitudes toward physical inactivity. While school children in developed countries have physical activity guidelines, developing countries like India have limited established guidelines. The increased reliance on virtual play and the decrease in natural play indicate that children are becoming more dependent on devices and spending less time in nature.

Ethical Approval and Informed Consent

The study was accorded Ethical Committee Approval vide Ethics Committee (Institutional Ethics Committee of the Research Centre, Bishop Benziger College of Nursing, Kollam.) No. BBCON/2867/22 dated 27/10/2022.

Informed consent was obtained from the participants and their parents of the school children for their participation in the study. The study was carried out/not carried out in accordance with the principles as enunciated in the Declaration of Helsinki.

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