

**Children's Indoor and Outdoor Play As Potential Correlates of Mental Health During the
COVID-19 Pandemic in Iran: A Brief Report on National Survey**

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Abstract

Over the past 16 months, Iranian children have had their schools closed. Prolonged COVID-19-related restrictions in conjunction with limited play activities can have significant mental health consequences in children. This study examines the relationship between indoor and outdoor play activities and the mental health of Iranian children during the COVID-19 pandemic. Using a cross-sectional design, a sample of Iranian parents ($n= 1182$) of children aged between 5 and 11 years completed an online survey including: Children's Play Scale (CPS), International Positive and Negative Affect Schedule Short Form (I-PANAS-SF), and the Strength and Difficulties Questionnaires (SDQ). Parents reported that their child spent significantly longer time playing outside at home (e.g., yard or balcony) and inside at home than anywhere else. Most children had not spent any time playing at indoor play centres, near water, and green spaces during the pandemic. Children were also reported to spend the minimum number of hours at indoor play centres, near water, green spaces, and playgrounds. Compared to the pre-COVID-19 context, significant declines in outdoor play during the pandemic were reported for 83% of children. Findings also revealed that there are significant but small negative correlation between mental health difficulties and total CPS scores ($r=-.427$, $p<.0001$). Correlations of CPS scores with Positive and Negative affect were weak but significant ($r=.211$, and $r=-.294$, respectively; $p<.0001$). These results indicate that it is necessary to find strategies to increase children's indoor and outdoor play activities, especially when they return to their schools with wider-spread social, emotional, and behavioural needs than before.

Keywords: Indoor play, outdoor play, physical activity, mental health, children, COVID-19, Iran

Children's indoor and outdoor play as potential correlates of mental health during the COVID-19 pandemic in Iran: a brief report on national survey

The pivotal role of outdoor play for healthy child development has been supported by a strong body of empirical research (Tremblay et al., 2015). Play, as a natural and self-directed behaviour, fosters cognitive functions, emotional wellbeing, and social relationships in early childhood, providing the essential factors for children to thrive and learn effectively. Through outdoor play, children can freely experience a wide range of options for unstructured activities, in which they can experiment adventurously and discover potential solutions to a problem, creatively solve problems, and decide how and with whom to spend their time, cultivating their creativity, self-esteem, and positive affect (Bento & Dias, 2017). In recent years, scholars have demonstrated the associations between outdoor child play and psychosocial, physical, emotional, and cognitive development, assessing several forms of play across all developmental trajectories (Lee et al., 2020; McCormick, 2017; Storli & Hansen Sandseter, 2019).

Since the recognition of the Coronavirus Disease 2019 (COVID-19) outbreak as an international public health emergency (Wang et al., 2020), many governments, including Iran, enacted localised lockdown and social distancing measures by closing universities, schools, nurseries, and other public places. Nationwide school closures began in Iran from March 6, 2020 and all schools have been closed for over the past 16 months. Although these preventative strategies decreased the risk of cross-infection, prolonged home confinements and school closures have adversely affected people's lifestyles, particularly those of school-aged children and adolescents.

Children and adolescents, like other groups of the population, have been affected by the COVID-19 pandemic (Wang et al., 2020), and they are most vulnerable to the drastic and

unprecedented impact of it, as they are forced to study remotely and stay home for a long period to comply with health-related measures and school closures. These health-related measures, isolation, and fear of being contaminated have resulted in limited interpersonal interactions with classmates, along with sharp decreases in access to green outdoor environments and in physical activities and play behaviours (Moore et al., 2020; Rajabi, 2020). There have been some counterbalancing efforts to create more outdoor environments during the pandemic for older adults, but serious attempts have not been made to facilitate children's social play behaviours (De Lannoy et al., 2020). As play is often considered flexible, spontaneous and ubiquitous amongst children at younger ages, they are less likely to have access to the outdoors and green spaces compared to before the COVID-19 outbreak, which may lead to short-run or long-run negative mental and physical health outcomes (Moore et al., 2020; Storli & Hansen Sandseter, 2019; Tremblay et al., 2015).

In as much as the effects of COVID-19 on the prevalence and correlates of physical play activities and subjective well-being have been actively studied in Western, Educated, Industrial, Rich, and Democratic (WEIRD) samples (Henrich et al., 2010), limited research has been conducted on the links between children's play activities and mental health in non-WEIRD countries (Kovacs et al., 2021; Jackson et al., 2021). In the present study, we investigated correlates of children's play activities and mental health difficulties during the COVID-19 outbreak in Iran.

Methods

Study Design and Participants

This study was designed as a cross-sectional online questionnaire survey that was administered during the spread of COVID-19 pandemic in Iran. We developed a self-

administered voluntary online survey on the official website of “PorsLine”, which is recognized as a professional online questionnaire survey and voting platform. The study was approved by the University of Tehran Research Ethics Committee (REC).

Participants were recruited through nurseries, primary schools, and social media announcements. Participants aged 18 years and over, declaring that they are parent of children between 5 and 11 years, and reside in Iran were eligible to participate. In total, a sample of 1182 parents completed an anonymous e-questionnaire between July and October 2020. Parents/caregivers ages ranged from 18 to 60 years ($M = 35.6$; $SD = 5.86$). Most (79.5%) were female. Children’s ages ranged from 5 to 11 years ($M = 7.18$, $SD = 2.02$), and their gender groups were relatively balanced (girls 44.5%). The majority of the parents were married (96.3%), were homemakers (58.0%), had a bachelor's degrees or higher (60.7%), had an average income of $>£270$ per month (69.2%), and around half of the parents (50.8%) had access to the outdoor yard.

Measures

The Children’s Play Scale (CPS; Dodd et al., 2021). This is a new parent-report questionnaire that measures children's time spent playing in a range of different places, specifically in nature. The CPS estimates how frequently, adventurously, and for what duration children play in seven different places including: at home or in other people's home, outside at home or at other people's homes (e.g. in a yard or balcony), at a playground, in trees/woodlands/grassy spaces (this category will be referred to as green space), in the street or public space close to home (referred to as street), outdoors near water, at indoor play centres and pools (e.g. soft play, trampoline parks, swimming pools). Items are scored on a 7-point and 5-point Likert-type scale. Frequency items are scored

from 1=everyday; 2=four-six times per week; 3=two-three times per week; 4=once a week; 5=one to three times a month, 6=less than once a month, 7=never. Length items are scored from 1=less than half an hour; 2=around an hour; 3=two-three hours; 4=more than four hours; 0=not at all. Before administering the Persian version of the CPS, a rigorous translation procedure was conducted in this study (Brislin, 1970). A precise process involving several stages was used to translate English version of the CPS into simplified Persian. Two independent translators, who were fluent and expert in both English and Persian, cross-checked the translations, back-translated them into English, and then verified that the meanings of the original English and the translated Persian versions were identical. To score the CPS subscales, numeric mappings were used separately to calculate the frequency and length of play in each place. A total CPS score was created by summing the frequency and length of play scores. In this study, the CPS had good Internal consistency (Cronbach's alpha = .81).

The Strengths and Difficulties Questionnaire–Parent version (SDQ-P; Goodman et al., 1998). The SDQ-P (Persian version validated by Shahrivar et al., 2009) is a 25-item parent-report screening tool aimed to measure positive and negative emotional and behavioural attributes of children and adolescents. The SDQ-P consists of five subscales, each consisting of five items, assessing conduct problems, peer relationship problems, emotional symptoms, hyperactivity/inattention and prosocial behaviour. All items are scored on a 3-point Likert-type scale ranging from 0 (*not true*) to 2 (*certainly true*). Previous research showed that the Persian version of the SDQ and its subscales had adequate psychometric properties and internal reliability coefficient (Aguilar-Vafaie & Gharehbaghy, 2009). In the present study, internal consistency (Cronbach's alpha) ranged from moderate to good: $\alpha =$

.81 for conduct problems; $\alpha = .79$ for peer relationship problems; $\alpha = .84$ for emotional symptoms; $\alpha = .69$ for hyperactivity/inattention; and $\alpha = .86$ for prosocial behaviour.

The International Positive and Negative Affect Schedule Short Form (I-PANAS-SF; Thompson, 2007). I-PANAS-SF is a 10-item checklist designed to measure positive and negative affect in children and adolescents. The I-PANAS-SF is the brief version of PANAS developed by Watson et al. (1988). The shortened version of PANAS includes 5 items for Positive Affect (PA) and 5 items for Negative Affect (NA) measured on a 5-point Likert-type scale from 1 (*very slightly or not at all*) to 5 (*extremely*). Total scores for PA and NA range from 5 to 25. While higher scores on the positive affect subscale represent higher degree of positive affect, higher scores on negative affect subscale represent higher degree of negative affect. The I-PANAS-SF demonstrates good cross-cultural validity and adequate psychometric properties overall. Lotfi et al. (2020) examined psychometric properties of the full and short form of the PANAS in Iran, supporting that the scale had good internal consistency ($\alpha = .81$). In this study, Internal consistency (Cronbach's alpha) was $\alpha = .83$ for positive affect and $\alpha = .86$ for negative affect.

Statistical Analysis

The analysis was conducted in three steps. In the first step, missing values and outliers were deleted and the normality and multicollinearity of the data were tested (Tabachnick & Fidell, 2007). Overall, gender-specific, age group, and other characteristics' means (standard deviations) for all variables were calculated. Mean (standard errors) hours spent playing in each place and the percentage of children who never spent time to play in each place were plotted. Gender differences regarding the five subscales of the SDQ, the total difficulty score, and total scores for the PA and NA were tested using independent t-

tests. Finally, Pearson correlation was used to establish the possible associations between different study variables. All analyses were performed in RStudio (1.1.456).

Results

Emotional and Behavioural Problems, Positive Affect, and Negative Affect

The mean total difficulties score was 12.47 (SD=6.03) for boys and 11.51 (SD=5.76) for girls ($p<.05$). In the age-group 5–7, boys scored higher than girls did on total difficulties ($t(1144.9)=1.33, p<.001$), emotional symptoms ($t(1138)=1.87, p<.01$) and hyperactivity inattention ($t(1147)=2.21, p<.01$), and lower on prosocial behaviour ($t(1150)=-1.94, p<.001$). In the age-group 8–11, boys scored higher than did girls on emotional symptoms ($t(1175)=2.87, p<.05$), hyperactivity inattention ($t(1169)=.66, p<.001$), conduct problems ($t(1149)=1.67, p<.001$) and overall difficulties ($t(1151.7)=1.74, p<.001$), and lower on peer problems ($t(1169)=-1.27, p<.01$) and prosocial behaviour ($t(1150.2)=8.14, p<.001$). In all age-groups, boys scored higher than girls did on negative affect ($t(1132.6)=2.26, p<.05$), and lower on positive affect ($t(1110.5)=-1.81, p<.001$).

Length and Frequency of the Indoor and Outdoor Play

The total amount of time that children spent playing outdoors in each place is presented in Figure 1. This plot illustrates the mean hours (SEs) spent playing in each place, as estimated based on parents' reports. Child spent significantly longer time playing outside at home (e.g., yard or balcony) and inside at home than anywhere else. Excluding the time spent at home, children spent most of their time playing in the streets, which included public places or pavements near home. Children were also reported to spend the minimum number of hours at indoor play centres, near water, in green spaces and playgrounds.

Compared to the pre-COVID-19 context, declines in outdoor play activities during the pandemic were reported for 83.4% of children. Figure 2 presents the percentages of children who never spent time playing in each place during the pandemic. This plot indicates that most children did not spend any time playing at indoor play centres (86%), near water (71%) and green spaces (64%). Only 3% and 20% of children did not spend any time at all playing at home and outside at home, respectively. *[Figure 1 and Figure 2 near here]*

Correlations

The coefficients for the associations between mental health, positive/negative affect and the time children spent playing are reported in Table 1. Only significant correlations ($r > 0.1$, $p < .001$) are reported here (Cohen, 1992). We assessed correlations between mental health and total hours spent playing (across all places) and total hours spent playing outdoors (across outdoor places only: near water, green spaces, playground, and street). We identified a significant but small negative correlation between mental health difficulties and total CPS scores ($r(1180) = -.43$, $p < .0001$). Emotional symptoms showed a significant but weak-negative correlation with the length of play ($r(1180) = -.12$, $p < .001$) and total CPS scores ($r(1180) = -.26$, $p < .0001$). Peer problems was weakly correlated with the frequency of play ($r(1180) = -.14$, $p < .0001$) and CPS total scores ($r(1180) = -.27$, $p < .0001$). Correlations of CPS scores with Positive and Negative affect were weak but significant ($r(1180) = .21$, and $r(1180) = -.29$, respectively; $p < .0001$ for both). Total hours spent playing outdoors were weakly but negatively correlated with mental health ($r(1180) = -.20$, $p < .001$), emotional symptoms ($r(1180) = -.37$, $p < .0001$), peer problems ($r(1180) = -.19$, $p < .0001$), and negative affect ($r(1180) = -.21$, $p < .001$). Positive affect showed a weak but significant correlation with total hours spent playing outdoors ($r(1180) = .12$, $p < .0001$). *[Table 1 near here]*

Discussion

This study explored the associations between frequency and length of play and mental health difficulties amongst children across Iran during the second wave of the COVID-19 outbreak. The results showed that most of children in this sample played outdoors and spent time outside less during the COVID-19 outbreak compared with before home confinement. Due to the lockdown, children were completely restricted to their homes where they spent most of their time playing outside (i.e., in yard or balcony).

Having an outdoor space in the COVID-19 confinement situation was reported to have a positive influence in the frequency of physical activities (Pombo et al., 2020). Since outdoor play activity is important to improve mental health and well-being amongst children (Jackson et al., 2021), school closure and lack of outdoor activity are likely to batter children's lifestyle and can potentially promote neuropsychiatric manifestations in addition to monotony, distress, impatience and annoyance. Therefore, it was not surprising to see that spending more time playing outside, in household, was related with lower mental health difficulties (Ghosh et al., 2020). In the last few years, outdoor play has been postulated as having a positive effect on physical health and fitness outcomes (Herrington & Brussoni, 2015). Although organized physical activity is important, it is unlikely to sufficiently meet the recommended 60 min per day of moderate-to-vigorous physical activities (Tremblay et al., 2011), after all children are 25% less active in organized activities, when compared to outdoor play time (Nettlefold et al., 2011).

Our results also identified gender differences in the associations between play activities and mental health, with the correlations higher for boys than girls. Usually boys tend to display higher levels of moderate to vigorous physical activities while using play

areas (Anthamatten et al., 2014), whereas girls have more enjoyment for calmer activities such as playing tag games, walking, creative tasks, hiding, sitting, and relaxing what could help explain our findings (Hyndman & Chancellor, 2015). Being more physically intense on the exploration of playground features, boys may suffer the most in the lack of them. Also, these results are in line with a review of studies conducted on Canadian adolescents, that suggests outdoor play was found to be associated with less occurrence of psychological symptoms amongst females than males (Piccininni et al., 2018).

The findings from this study can assist educational leaders and policymakers better understand and prioritise outdoor play activities to mitigate against poor mental health of Iranian and other children during the pandemic. As schools have been closed for sustained periods in Iran, we should carefully monitor the changes in the length and frequency of play activities indoors and outdoors to better safeguard and promote children's physical and mental health under the influence of the COVID-19 outbreaks.

Study Limitations and Future Directions

There are some limitations associated with the above findings that deserve some attention. First, despite the good response rate across all the participating study cities, our findings might be context specific and may not all be generalisable to other children living in Iran or to other non-western samples. Second, data were collected via online questionnaires which may be prone to response bias. In the current situation the use of observational or objective measures was feasible given the social distancing and stay-at-home orders during the outbreak. Third, the current study was correlational in nature, thus precluding any causal inferences regarding the effect of indoor/outdoor play activities on children's mental health and well-being. As such, these findings should be interpreted cautiously. As this is a

brief report on preliminary findings of a national study in Iran, further investigation with stratification (e.g., the role of parental factors, gender differences, and demographic variables) should be prioritised to better understand the impacts of COVID-19 pandemic on children's behaviours and development.

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Declaration of Conflicting Interests

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this paper.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the University of Tehran Research Ethics Committee (Ref:250199154) and national research committee and with the 1964 Helsinki declaration and its later amendments.

Consent to Participate

Informed consent was obtained from all individual participants (parents/caregivers) included in the study. All potential participants were informed on how their data would be processed and kept confidential and their rights as participants before being asked to give informed consent.

Data Availability Statement

The research materials can be accessed by contacting the corresponding author. At the end of the study, the dataset will be made open access.

Contributions

MR designed the study and led data collection. MR did the statistical analysis and GA interpreted findings. MR, GA, and GQ wrote the first draft of the article. GA and AP provided support in editing the manuscript. All authors read and approved the final manuscript.

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Table 1*Correlations Between Total Time Spent Playing and Mental Health Symptoms*

Variables	Total hours spent playing			Hours spent playing outdoors		
	Frequency	Length	Total CPS	Frequency	Length	Total CPS
Total Difficulty	-.091*	-.092**	-.427***	-.075 ^{ns}	-.098*	-.301**
Prosocial Behaviours	.032 ^{ns}	-.041 ^{ns}	.012 ^{ns}	.021 ^{ns}	-.049 ^{ns}	.017 ^{ns}
Emotional Symptoms	-.098*	-.115**	-.255***	-.044 ^{ns}	-.095***	-.371***
Conduct Problems	.041 ^{ns}	.002 ^{ns}	-.033 ^{ns}	.091*	.014 ^{ns}	-.0127 ^{ns}
Hyperactivity Inattention	-.037 ^{ns}	-.099 ^{ns}	-.098 ^{ns}	.011 ^{ns}	-.032 ^{ns}	-.024 ^{ns}
Peer Problems	-.142***	-.097***	-.271***	-.094**	-.098*	-.196***
Positive Affect	.163**	.095***	.211***	.092**	.065*	.115***
Negative Affect	-.124***	-.096**	-.294***	-.072*	-.087*	-.214**

Note: Total CPS: frequency and length of play

ns = not significant; Significant results indicated in bold: *p <.05; **p <.001; ***p <.0001 (2-tailed)

Figure 1

Estimated mean (SEs) number of hours for children who played in each place during the COVID-19 pandemic

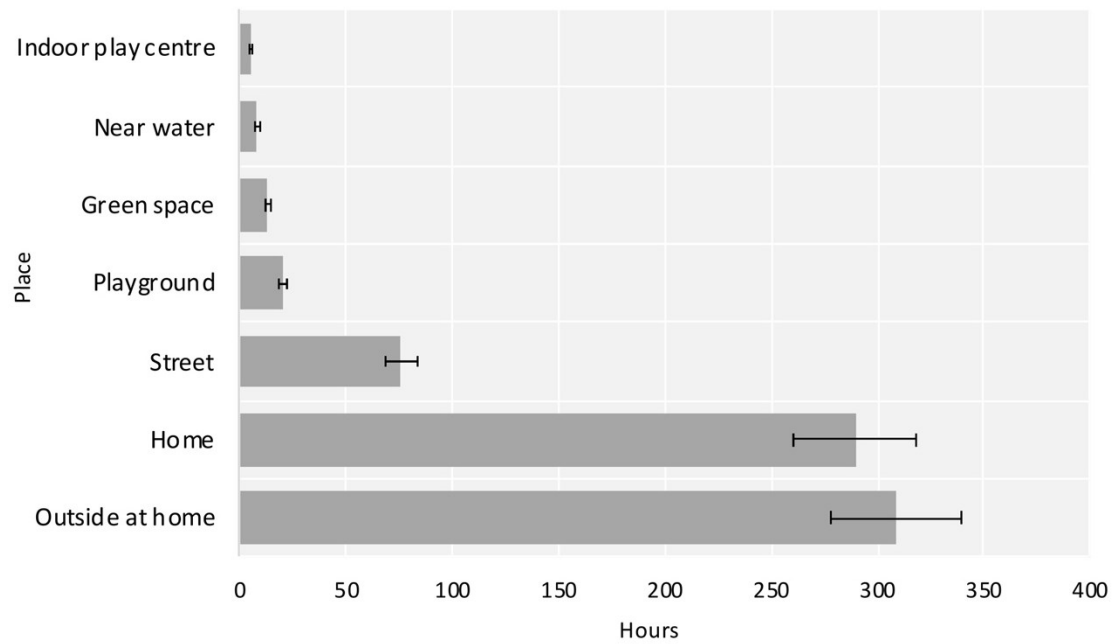


Figure 2

Percentage of children who "never" played in each place during the COVID-19 pandemic

