

Psychological impact of home isolation on children aged 6-14 years during the COVID-19 pandemic in Tabuk, Saudi Arabia 2020

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ABSTRACT

الأهداف: التركيز على الأبحاث الناشئة فيما يتعلق بتأثيرات تدابير الإغلاق على الصحة العقلية، فهذه الدراسة تهدف إلى تقييم آثار العزلة المنزلية على مشاعر وسلوكيات الأطفال الذين تتراوح أعمارهم بين 6 و 14 عاماً خلال جائحة فيروس كورونا المستجد.

المنهجية: أجريت دراسة مقطعية خلال الفترة من يونيو 2020م إلى أغسطس 2020م على عدد 381 طفل في مدينة تبوك بالمملكة العربية السعودية. تم إعداد الاستبيان على "نماذج جوجل" وتم نشره إلكترونياً حتى يتسنى للجميع المشاركة فيه. تم استخدام تقنية كرة الثلج في أخذ العينات لإجراء هذه الدراسة، وطلب من الآباء الذين لديهم أطفال تتراوح أعمارهم بين 6 و 14 عاماً المشاركة في هذا الاستطلاع. تم إجراء الإحصاء الوصفي والانتشار اللوجستي متعدد الحدود لفحص العوامل الاجتماعية والديموغرافية والتنبيؤ بالتأثيرات النفسية على المشاعر والسلوكيات عند الأطفال.

النتائج: أربعة من كل عشرة أطفال أبلغوا عن تأثير نفسي شديد على المشاعر بنسبة (41.3%) غالبية الأطفال أظهروا تأثيراً نفسياً خفيفاً على السلوكيات بنسبة (74.8%) الأطفال الأكبر والأطفال الذكور والأسر ذات مستوى المعيشة المنخفض والأسر التي تعيش في منزل صغير ليس لديه مساحة خارجية للعب الأطفال فيها كانوا أكثر تأثراً بخطر التأثير النفسي للعزلة المنزلية على المشاعر والسلوكيات.

الخلاصة: هذه الدراسة كشفت أن الأطفال كان لديهم تأثير نفسي خفيف إلى شديد على السلوكيات والمشاعر أثناء العزلة المنزلية نتيجة جائحة فيروس كورونا المستجد. فلذلك يجب إعطاء كامل الأولوية وفي وقت مبكر لمساعدة الفتيان والأطفال الأكبر سناً وأطفال الأسر ذات الدخل المنخفض والأطفال الذين يعيشون في منازل صغيرة ومنازل بدون فناء خارجي أثناء فترة العزل المنزلي.

Objectives: To evaluate the impact of home isolation on feelings and behaviors of children aged 6-14 years during COVID-19 pandemic in Tabuk, Saudi Arabia.

Methods: A cross-sectional study was conducted between June and August 2020 in Tabuk, Saudi Arabia. A snowball sampling was applied, parents with children aged 6-14 years participated in this survey (N=361). questionnaires were distributed electronically.

Results: Four out of ten children reported severe psychological impact on feelings (41.3%), while a majority of the children demonstrated mild psychological impact on behavior (74.8%). Age was associated with risk of psychological impact on behavior (OR: 7.24, 95% CI: 1.35-16.18). Being male was associated with risk of psychological impact on feelings (OR: 2.38, 95% CI: 0.67-6.43), and behavior (OR: 3.50, 95% CI: 0.42-6.00). Living in a small house or without an outside play area was associated with risk of psychological impact on feelings and behaviors.

Conclusion: This study revealed that children experienced mild-to-severe psychological impact on behaviors and feelings during home isolation during COVID-19 pandemic. Priority should be given to boys, older age, children of low-income families, living in small houses and those without outside play areas.

Keywords: COVID-19, psychology, children, home isolation, social distancing, quarantine

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The coronavirus disease (COVID-19) has no known cure at present, and has affected nations across the globe, spreading at an exponential rate and imposing a major health threat to the population.¹ Further, the COVID-19 pandemic has created a significant challenge for health authorities.² Consequently, different preventive measures have been implemented by governments, such as physical and social distancing, more rigorous hygiene practices, wearing protective facial coverings and lockdowns in affected countries,³ which have resulted in dramatic changes to peoples' daily lives.⁴ Operational definition of feeling is the basic perception of events experienced through sense organs with subsequent generation of emotional reaction, while operational definition of behavior is the activities generated in response to external or internal stimuli including observable activities and non con-conscious processes. As a result of school closures and strict restrictions regarding going outside, children have been one of the most disadvantaged population groups during the lockdown period.^{5,6} While children appear to be less prone to COVID-19 than adults, initial reports from different affected countries suggested that children and adolescents have been psychologically affected, manifesting a behavioral problems.⁷ Another critical issue concerns emotional problems. Previous studies have shown that a long period of home isolation can have a major, negative psychological effect on adults triggering negative moods such as depression, anxiety and stress.⁸⁻¹¹ While studies have been conducted throughout the world on the psychological issues resulting from the COVID-19 pandemic, these have been limited to adults only.¹²⁻¹⁴ It is perhaps inevitable that an increase in COVID-19 cases would lead to emotional and behavioral changes among children and have an adverse effect on their physical and mental health development.¹⁵⁻¹⁷ Therefore, the purpose of this study was to investigate the potential psychological impact of home isolation on feelings and behaviors among children aged 6-14 years in Tabuk, Saudi Arabia during the COVID-19 pandemic.

Methods. A cross-sectional design was applied consisting of an online questionnaire survey. Due to the restriction resulting from the COVID-19 pandemic, it was not feasible to carry out this survey in person.

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The study was conducted in Tabuk city, the largest city in the north western region of Saudi Arabia that lies close to the Jordan-Saudi Arabia border, with a population of approximately 1 million. Parents living in Tabuk city who were recruited to take part were instructed to ask the pre-determined questions about the psychological impact of home isolation to their children. The survey consisted of entirely closed questions. Feedback from the parents was gathered during the active survey period (June-August 2020). The sample size was calculated using Epi Info version 7 (Centers for Disease Control and Prevention [CDC], Atlanta, Georgia, USA). The calculated sample size was N=384 based on the assumption of an anticipated 50% frequency response and 5% margin of error, confidence interval of 95% and a design effect of 1.0. A snowball non-probability sampling technique was used to recruit the participants.

The inclusion criteria were as follows: parents (of children aged 6-14 years) who were of any gender, any nationality, living in Tabuk, able to read and write, able to access an Internet facility at home or by mobile. The exclusion criteria were as follows: adults who were not parents, adults who were parents, with children aged less than 6 years or more than 14 years, not able to read write, outside the study period, not living in Tabuk, not willing to participate in the study, having children with any disability/illness (physical or mental).

The questionnaire was developed by a panel of experts following a comprehensive literature review. The questions used to measure psychological impact evaluate 2 internalizing conditions: feelings and behaviors. These emotional and behavioral conditions were selected because of their critical importance as demonstrated in the literature and were evaluated using a set of categorical questions that had 3 possible responses ('Yes', 'No', and 'I Don't Know'). The questionnaire was first prepared in English and then semantic translation was conducted using Arabic by bilingual language experts. The survey consisted of 3 parts. Demographics questions were used to gather information on the child's age and gender. Other risk factors, including parents' educational level, employment status, employment sector, occupation, and family income were recorded together with details about the number of family members, number of rooms in the house and play area outside the house. The section concerning psychological impact of home isolation consisted of 15 questions on feelings and 8 questions on behaviors. The survey used age-appropriate language suited to children aged 6-14 years. The questionnaire was prepared on Google Forms and was distributed online. The survey link was sent

through social media (such as WhatsApp, Snapchat, Facebook and Twitter). Telephone calls were also made to invite the participants. After clicking on the survey link, the study participants were directed to an introductory page, which included the title and purpose of the study. Consent for participation and confidentiality of the data were explained, and after reading this, the participants were asked to click on 'Start the survey'. On completion of the questionnaire, participants were then directed to click the 'Submit' option.

Each question was recorded with a response, which was recoded as follows: 1 = 'Yes', -1 = 'No' and 0 = 'I don't know'. The psychological impact of home isolation on children was measured using the cumulative score of questions mentioned in the respective section of the questionnaire. The total score for the feelings subscale score was categorized as normal (0-6), mild (7-9), moderate (10-12) and severe (13-15) psychological impact on feelings. The total score for the behaviours subscale score was subdivided into normal (0-2), mild (3-4), moderate (5-6) and severe (7-8) psychological impact on behaviors. Family income was divided into 2 categories: low-income family (<10,000 SAR), and high-income family (>10,000 SAR). Family size was divided into two categories: small family (<5 members), and big family (>5 members). House size was divided into two categories: small house (<5 rooms), and big house (>5 rooms).

While developing the questionnaire, appropriate scales were defined. Two different researchers cross-checked the data to ensure good quality. Survey data were collected in Google Forms and analyzed using SPSS (version 26.0). The feelings and behaviors of the children were considered the dependent variables, while sociodemographic characteristics (age, gender, monthly family income, family size, house size and play area outside the house) were the independent variables. The internal accuracy of the questionnaire was checked using the Cronbach alpha test, from which it was determined that the reliability of the questionnaire was acceptable (0.861 reliability coefficient). Descriptive statistics were calculated, which included frequency, percentage, mean and standard deviation. Multinomial logistic regression analysis was performed to investigate the effect of home isolation on feelings and behaviors. A p-value of <0.05 was considered statistically significant.

The study included bold-frame instructions indicating that the research would be kept confidential and participants were anonymous as they did not include their names on the questionnaire. Voluntary submission of the completed online questionnaire was considered full consent to participate. Ethical approval

of the study was obtained from the Local Research and Ethics Committee at KSAFH (Ethical Approval Number: KSAFH-REC-2020-330).

Results. Formally invited participants were 384 and those who respond were 361 thereby response rate were 94%. Tables are shown at the end of the text and for each table brief demonstration are set out below: **Table 1** presents the sociodemographic results for the participants. From the study sample (N=361), approximately 45.4% children were aged between 6 and 8 years, while the mean age was 9.06 years (SD=2.43 years). Half the children were male (51.2%). A majority of the children's parents were college/university graduates (70.4%), had full-time work (57.6%) and were employed in the government sector (84.8%). Approximately 40% of the children's parents had a monthly income more than 10,000 SAR (39.6%). Seven out of 10 children's parents had 5 or more family members in the house (72.3%). Most of the children's parents had big house with 5 or more rooms (45.7%) and had a play area outside the house (63.4%) (**Table 1**).

Table 2 presents the responses regarding the psychological impact of home isolation on children's feelings. The parents asked their children the questions identified in **Table 2**. When asked about COVID-19, approximately 78.6% of the children thought that COVID-19 is a serious disease. A majority of the children were worried that they might have caught COVID-19 (73.9%). Three quarters of the children agreed that they were suffering because they could not leave their house and had to stay at home (75.1%). Most of the children were unhappy because they did not see and meet their friends (77.8%). Approximately 73% of the children felt either lonely or bored. Six out of 10 children felt isolated from others during the home isolation 10 periods (64.8%).

Table 3 illustrates the psychological impact of home isolation on children's behaviors. The parents asked the following questions of their children. Out of 361 children, a large majority knew about the COVID-19 virus (92.5%). When asked about following the recommendations to protect from the virus, most of the children agreed that they had followed them (96.4%). Three quarters of the children were afraid of germs and did not want to touch things (77.6%). A majority (67.3%) of the children agreed that they were punished by their parents because of not obeying their orders during the home isolation period.

Table 4 reports the varying degrees of psychological impact of home isolation on the feelings and behaviors of children during the pandemic. Among the 361

Table 1 - Sociodemographic of the study participants (N=361).

Sociodemographic	n	(%)
<i>Age of the child (years)</i>		
6-8	164	(45.4)
9-11	132	(36.6)
12-14	65	(18.0)
Mean \pm SD (years)	9.06 \pm 2.43	
<i>Gender of the child</i>		
Male	185	(51.2)
Female	176	(48.8)
<i>Parent's highest education</i>		
No schooling	5	(1.4)
Primary school	25	(6.9)
Intermediate school	77	(21.3)
College/University	254	(70.4)
<i>Parent's employment status</i>		
Unemployed	26	(7.2)
Full-time work	208	(57.6)
Part-time work	100	(27.7)
Retired	27	(7.5)
<i>Parent's employment sector</i>		
Government	306	(84.8)
Non-government	55	(15.2)
<i>One of parents works as medical staff</i>		
Yes	107	(29.6)
No	254	(70.4)
<i>Parent's occupation</i>		
Doctor	54	(15.0)
Nursing staff	25	(6.9)
Other medical staff	21	(5.8)
Technical staff	7	(1.9)
Non-medical staff	254	(70.4)
<i>Monthly family income (SAR)</i>		
<3,000	19	(5.3)
3,000-5,000	46	(12.7)
6,000-10,000	153	(42.4)
11,000-20,000	119	(33.0)
>20,000	24	(6.6)
<i>Total no. of family members</i>		
<3 members	8	(2.2)
3 members	22	(6.1)
4 members	70	(19.4)
5 or more members	261	(72.3)
<i>No. of rooms in the house</i>		
<3 rooms	12	(3.3)
3 rooms	69	(19.1)
4 rooms	115	(31.9)
5 or more	165	(45.7)
<i>Play area outside the house</i>		
Yes	229	(63.4)
No	132	(36.6)

*Not primary outcomes. SAR: Saudi Riyals

children, 1% had normal feelings, whereas the proportions of children has mild, moderate, and severe psychological impact of home isolation. Approximately 17% had normal behaviors, while the percentages of children with mild, moderate, and severe psychological impact of home isolation on behaviors were summarized in **Table 4**.

Table 5 presents the output of multinomial logistic regression modelling that differentiates the varying degree of psychological impact on children during home isolation. The analysis indicates that the fitted models for feelings and behaviors were good (behaviors: $\chi^2 = 653.88$, $p < 0.0001$, co-efficient of determination Nagelkerke $R^2 = 0.752$; feelings: $\chi^2 = 732.34$, $p < 0.001$, coefficient of determination Nagelkerke $R^2 = 0.872$). These results suggest that the above models satisfactorily differentiate between the mild, moderate and severe psychological impact of home isolation on feelings and behaviors from a normal status.

The statistical results indicate that older age was significantly associated with children being at risk of psychosocial impact on feelings (OR: 3.77, 95% CI: 0.93-7.86) and behaviors (OR: 7.24, 95% CI: 1.35-16.18). Being male was significantly associated with being at risk of psychosocial impact on both feelings and behaviors, as was monthly family income (feelings: [OR: 2.72, 95% CI: 0.96-5.98] and behaviors: [OR: 2.87, 95% CI: 0.22-8.59]). Those children living in small houses were more likely to be at risk of psychosocial impact on both feelings and behavior's than children living in big houses. Play area outside of the house was significantly associated with being at risk of psychosocial impact on feelings (OR: 2.08, 95% CI: 0.78-5.53) and behaviors (OR: 2.29, 95% CI: 0.19-8.20) as shown in **Table 5**.

Discussion. While the global implementation of lockdown has reduced the spread of the COVID-19 virus, it has affected the emotional and psychological state of the population.¹⁸ Older age was clear indicator of psychological impact on both feelings and behaviors across the sample. Gender was also an important risk factor, as boys were more likely than girls to be at risk of psychological impact on behaviors. This finding also echoes results from studies conducted in other countries.^{19,20}

This result is in accordance with other studies in which the relation between age and levels of stress throughout isolation have been analyzed.^{21,22} Various research studies have been conducted around the world that demonstrate the state of people's psychological wellbeing during lockdown; however, those studies

Table 2 - Psychological impact of home isolation on the feelings of the children (N=361).

Questions	Yes	No	Don't know	Total
1. Do you think that COVID-19 is a very serious disease?	284 (78.6)	67 (18.6)	10 (2.8)	361(100)
2. Are you worried that you may catch COVID-19 virus?	267 (73.9)	79 (21.9)	15 (4.2)	361(100)
3. Are you worried that your friends and family may catch COVID-19 virus?	320 (88.6)	30 (8.3)	11 (3.0)	361(100)
4. Are you afraid to leave the house right now?	208 (57.6)	145 (40.2)	8 (2.2)	361(100)
5. Are you worried you might transmit the infection to someone else?	262 (72.6)	92 (25.5)	7 (1.9)	361(100)
6. Are you worried you will not have enough food and other essential items during the pandemic?	95 (26.3)	260 (72.0)	6 (1.7)	361(100)
7. Are you sharing your worries and emotions with your family members?	279 (77.2)	67 (18.6)	15 (4.2)	361(100)
8. Are you suffering from not leaving your house and staying at home?	271 (75.1)	81 (22.4)	9 (2.5)	361(100)
9. Are you unhappy because of not seeing and meeting your friends?	281 (77.8)	65 (18.0)	15 (4.2)	361(100)
10. Are you nervous because of your parents' worries?	108 (29.9)	241 (66.8)	12 (3.3)	361(100)
11. Do you feel ignored or neglected?	140 (38.8)	213 (59.0)	8 (2.2)	361(100)
12. Do you feel lonely or bored?	263 (72.9)	82 (22.7)	16 (4.4)	361(100)
13. Do you feel isolated from others?	234 (64.8)	114 (31.6)	13 (3.6)	361(100)
14. Do you feel home isolation is good?	172 (47.6)	175 (48.5)	14 (3.9)	361(100)
15. Do you feel normal during the COVID-19 pandemic?	114 (31.6)	241 (66.7)	6 (1.7)	361(100)

Values are presented as number and percentage (%)

Table 3 - Psychological impact of home isolation about behaviors of the children (N=361)

Behaviors	Yes	No	Don't know	Total
1. Are you following the recommendations to protect yourself from COVID-19?	348 (96.4)	4 (1.1)	9 (2.5)	361 (100)
2. Do you sleep well?	324 (89.7)	31 (8.6)	6 (1.7)	361 (100)
3. Do you eat well?	323 (89.5)	30 (8.3)	8 (2.2)	361 (100)
4. Are you afraid of germs and not want to touch things?	280 (77.6)	64 (17.7)	17 (4.7)	361 (100)
5. Are you punished by your parents because of not obeying their orders?	243 (67.3)	105 (29.1)	13 (3.6)	361 (100)
6. Do you play games with your parents?	282 (78.1)	72 (19.9)	7 (1.9)	361 (100)

Values are presented as number and percentage (%)

Table 4 - Comparison of varying degrees of psychological impact of home isolation on the feelings and behaviors of children during the pandemic (N=361).

Categories	Feelings n (%)	Behaviors n (%)
Normal	3 (0.8)	61 (16.9)
Mild	38 (10.5)	270 (74.8)
Moderate	171 (47.4)	28 (7.8)
Severe	149 (41.3)	2 (0.6)

were limited to adult populations.^{23,24} There are few available studies to date that assess the psychosocial effects of home isolation on children during COVID-19 pandemic.^{7,25} In this cross-sectional study, a number of risk factors were presented to analyzed the psychological impact of home isolation on feelings and behaviors among children aged 6-14 years during the COVID-19 pandemic, from which it was determined that older age, being male, belonged to a low-income family group,

Table 5 - Multinomial logistic regression model differentiating the mild, moderate and severe psychological impact of home isolation on feelings and behaviors.

Variables	Feelings			Behaviors		
	Mild OR (95% CI)	Moderate OR (95% CI)	Severe OR (95% CI)	Mild OR (95% CI)	Moderate OR (95% CI)	Severe OR (95% CI)
<i>Age (years)</i>						
6-8	Reference					
9-11	1.85 (0.43, 3.65)†	1.30 (0.43, 3.92)*	0.96 (0.46, 1.74)	1.58 (0.10, 6.12)*	2.43 (0.11, 7.85)†	6.41 (2.34, 18.95)†
12-14	1.48 (0.23, 3.03)†	1.99 (0.269, 3.37)*	3.77 (0.93, 7.86)*	2.04 (1.33, 7.29)*	7.24 (1.35, 16.18)†	4.10 (1.29, 10.16)*
<i>Gender</i>						
Female	Reference					
Male	1.69 (0.67, 3.11)*	1.77 (0.68, 4.60)	2.38 (0.67, 6.43)*	1.48 (0.10, 4.12)*	2.54 (0.11, 7.85)*	3.50 (0.42, 6.00)*
<i>High income family</i>						
Yes	Reference					
No	2.72 (0.96, 5.98)†	0.57 (0.22, 1.47)	1.87 (0.42, 2.82)*	1.67 (0.37, 6.14)*	2.87 (0.22, 8.59)*	1.76 (1.14, 8.52)*
<i>Big Family</i>						
Yes	Reference					
No	0.85 (0.47, 1.55)	0.73 (0.22, 2.42)	0.27 (0.04, 1.62)	1.75 (0.50, 4.08)	1.37 (0.10, 3.45)	1.58 (0.12, 5.19)
<i>Big House</i>						
Yes	Reference					
No	1.11 (0.57, 2.18)*	1.83 (0.67, 5.01)*	2.24 (0.50, 6.64)*	3.91 (1.78, 9.60)*	6.60 (4.11, 10.59)†	5.90 (1.48, 11.32)*
<i>Play area outside the house</i>						
Yes	Reference					
No	1.24 (0.66, 2.31)*	2.08 (0.78, 5.53)*	0.98 (0.43, 1.78)	1.26 (0.09, 4.54)*	1.36(0.11, 5.18)*	2.29 (0.19, 8.20)*

**p*-value <0.05, †*p*-value <0.01, OR: odds ratio, CI: confidence interval

living in small house and without an outside play area were more likely to impact feelings and behaviors. These results merit further discussion.

This research determined that severe quarantine restrictions affect the feelings and behaviors of the children and is in line with the other studies conducted in both developed and developing countries.^{26,27} The present study revealed that during the COVID-19 pandemic, a significant proportion of children reported stress and fear of being infected with the COVID-19 virus, similar to the findings in other studies.²⁸ This study demonstrated that children knew the facts relevant to COVID-19 and followed the recommendations for protection. Similar results were noted among children in developed countries.^{29,30} Moreover, it was observed that 7 out of 10 children claimed that they were becoming bored and suffering from not leaving their houses, and were unhappy because they could not meet with their friends. Consistent with other studies, it was found that approximately three-fifths of children felt isolated from others and thought home isolation was not good.^{31,32} Low household income was

another indicator of psychological impact among the studied sample, which is congruent with other studies, suggesting that the economic impact of the lockdown presents an important trigger for mental distress among children.³³

Other studies have shown that the lockdown caused by COVID-19 has heavily influenced life by completely changing our routines and isolating us from our loved ones.^{34,35} Conversely, the lockdown has allowed more room for people to find time with their loved ones at home. This result was in accordance with those of other regional and international studies.^{36,37} The results from the current study identified that children living in small houses were more vulnerable to high psychological effect during a pandemic. Finally, it had also been shown that houses with no outdoor play areas could cause major psychological effects on feelings and behaviors of the children. This result supports the finding of the other studies.^{28,38}

Study limitations. The strength of this study is that it was conducted during the critical time of lockdown. Despite efforts to circulate the survey on all possible social

media channels, greater participation was expected. Thus, the response rate for the survey was limited. Most of participants were children aged 6-8 years, and it was therefore to answer questions on their own as their parents were required to ask them to answer the survey questions. However, considering the situation, this was the possible best practical methodology to reach to the children to understand the nature of the psychological impact.

In conclusion, the study demonstrated that home isolation affects the feelings and behaviors of male children more than female children. Children aged 12-14 years and belonging to low-income families were more vulnerable to high psychological impact. House size and having a play area outside the house had a major effect on psychological impact on feelings and behaviors. Accordingly, health authorities should focus on post-pandemic strategies to address these emerging issues.

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