Original Article

Impact of COVID-19-Induced Home Quarantine on Parental Stress, as well as Anxiety and Depression among Children

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Abstract

Background: One of the most important harmful effects related to the coronavirus disease 2019 (COVID-19) is the psychological effects that can affect all population groups.

Objectives: This study aimed to evaluate the effect of home quarantine caused by COVID-19 on parents' stress, as well as children's anxiety and depression.

Methods: This study included 230 parents who had children aged 5-12 years. The data were collected using the Children Symptom Inventory (CSI-4) and the Impact of Event Scale-Revised (IES-R), which were sent to people through the social messenger WhatsApp. (22). Different variables including the impact of the event, avoidance, intrusion, hyperarousal, anxiety, and depression were measured and analyzed using these two questionnaires.

Results: The results of the correlation analysis showed that the impact of the quarantined event caused by the COVID-19 pandemic and the IES-R subscales in parents were directly and significantly related to the anxiety and depression scores in their children. In addition, multivariate regression analysis showed that higher IES-R scores by parents can significantly predict higher anxiety and depression scores in children.

Conclusion: Based on the findings of this study, it can be concluded that the home quarantine caused by the COVID-19 pandemic causes stress in parents and this also increases anxiety and depression in their children. Therefore, it is suggested that in addition to the management, control, and treatment of these types of pandemic diseases, special attention be paid to their psychological effects, especially during home quarantine.

Keywords: Children, COVID-19, Mental health, Parents, Quarantine

1. Background

The coronavirus disease 2019 (COVID-19) pandemic spread widely across the world in 2019 and was regarded as the biggest health threat according to the definition of the World Health Organization (WHO). COVID-19 is an infectious respiratory disease caused by the newest type of coronavirus and was unknown until the outbreak began in Wuhan, China in December 2019 (1). One of the solutions to control pandemic diseases is home quarantine, which was also implemented during the corona pandemic (2).

Quarantine refers to the separation and restriction of movement of people who are potentially susceptible to infectious diseases, and by keeping them away from each other, the possibility of contracting and spreading the disease agent is reduced. Quarantine differs from isolation, which emphasizes keeping a distance or not meeting the sick person; therefore, quarantine is a more unpleasant experience (3). Separation from loved ones and friends, the feeling of uncertainty and fear about getting sick, limiting freedom, and feeling bored, are some of the significant negative effects of home quarantine (4). People in quarantine face the fear of the consequences of this infectious disease, and quarantined people experience boredom, loneliness, and anger, and if they get sick, symptoms of infection (e.g., fever, hypoxia, cough), and side effects of drugs (e.g., insomnia caused by the use of steroids) can also lead to anxiety and psychological tension in them (5-8).

The results of previous research about severe acute respiratory syndrome (SARS), as well as the research that has been conducted with the onset of COVID-19 about the long-term and short-term psychological effects of home quarantine confirmed the adverse psychological effects of such pandemics in all ages and gender groups. The most short-term effects were about the acute experience of stress and extreme avoidance of loved ones, and the long-term effects were about symptoms of anxiety, panic, depression, post-traumatic stress disorder (PTSD), and even suicide (9-13). In various studies, the most reported mental disorder as a short-term and long-term consequence of quarantine is PTSD. The results of the aforementioned studies have revealed a significant relationship between anxiety and depression with PTSD (14-16).

Various studies have shown that anxiety and depression are common disorders in children. In addition, some evidence shows that anxiety and depression among children have a significant relationship with the psychological stress of parents (17,18).

COVID-19 is a sudden and unique pandemic, and due to home quarantine, it was not possible to be in the community and have psychological support ([7]). In the meantime, home quarantine and the closure of educational centers affect the life pattern of children due to less physical activity, watching more TV, and changes in sleeping hours. Such negative health effects are exacerbated when children are deprived of outdoor activities and interactions with their neighbors during outbreaks ([19]). Regarding parents, one of the major problems caused by quarantine is the financial problem, and unfortunately, these negative effects can be long-term ([3]).

For children who are quarantined at home with their parents or relatives, the stress caused by a drastic change in environment may be reduced to some extent. However, considering children who are separated from their caregivers, they need special attention, especially those who have been infected with COVID-19 or have been admitted to hospitals and medical monitoring centers due to suspicion. The children of parents who have been infected with COVID-19 or who have died from the disease may be placed in the care of relatives or social charity groups. Therefore, this group of children may be exposed to mental health problems due to the greater risk of infection, grief, and fear caused by the separation or loss of parents ([20]).

Separation from parents and caregivers is considered a serious crisis for children and increases the risk of psychiatric diseases in them ([21]). Most of the existing psychological research about COVID-19 is related to the adult community (e.g., students and the general population) and the employees of health and treatment centers (e.g., hospitals dealing with COVID patients) ([7],[8],[10],[15],[16]); moreover, there is a dearth of research conducted on children in this regard ([17],[20]).

2. Objectives

Considering the high importance of attention to mental health in parents and children during home quarantine related to COVID-19, the main purpose of the present study was to evaluate the effect of home quarantine caused by COVID-19 on parents' stress, as well as children's anxiety and depression.

3. Methods

The current study was conducted in March 2020 when the incidence of COVID-19 was gradually increasing, and therefore, people around the world were forced to quarantine at home due to the reduction of distances. The statistical population of the current research was all children aged 5-12 years and their parents in Fuyang, China.

3.1. Sampling

The samples were selected using the purposive sampling method. To determine the sample size according to the F ratio, for up to three variables entered in the predictor block (i.e., the scores of the Impact of Event Scale-Revised [IES-R]) and four independent variables (e.g., parents' age, child's age, child's gender, and parent's education level) G*Power software (version 3.1.7) was used ([21]).

Considering the Type I Error (alpha) equal to 0.01 (confidence level=0.95), the power of the test equal to 0.95, and the average effect size equal to 0.15, the total sample size was estimated to be 225 people. In order to remove outlier data and eliminate incomplete questionnaires, 10% dropout was considered, and finally, 250 samples were obtained as the final sample size of this study. The inclusion criteria for this study were residency in the city, having a child aged 5 to 12 years, having a minimum level of elementary education, and being able to complete an online questionnaire. On the other hand, children with a diagnosis of anxiety and depression confirmed by a psychologist or psychiatrist were excluded from the study. Questionnaires were sent to 250 people who expressed their consent to participate in the study through WhatsApp social messenger. Finally, after eliminating the incomplete questionnaires, the data from 230 questionnaires were considered raw results.

3.2. Questionnaires

Considering that most of the people were in home quarantine, there was no physical access to them; as a result, the researchers were forced to convert the questionnaire into electronic versions using the Porsline Website (Available at: https://porsline.ir/). After the respondents completed the questionnaires, the results were recorded in the central profile related to questionnaire registration. Then, the researchers easily collected the raw data from the completed questionnaires. The questionnaires used for the present study included the Children Symptom Inventory (CSI-4) and Weiss and Marmer Impact of Event Scale-Revised (IES-R), which have also been used in similar studies ([22]). Different variables, including the impact of the event, avoidance, intrusion, hyperarousal, anxiety, and depression were measured and analyzed using these two questionnaires.

The CSI-4 questionnaire is a behavior grading tool that is used to evaluate behavioral and emotional disorders in children aged 5 to 12 years. This questionnaire has two parent and teacher forms, and the parent form and items related to generalized anxiety disorder and depressive disorder were used in this study. CSI-4 is rated on a four-point Likert scale (never=0, sometimes=0, often=1, and most of the time=1), and it showed good validity when used in similar studies ([22]-[25]). In the present study, the reliability of the questionnaire was evaluated using the test-retest method, and Cronbach's alpha

coefficient was calculated by SPSS software (Version 22). The value of this coefficient was estimated at 0.85 for generalized anxiety disorder and 0.81 for depression.

The IES-R questionnaire is a self-report tool and contains 22 items and three subscales, namely intrusion (n=8), hyperarousal (n=6), and avoidance (n=8). The respondents completed the frequency of each sign experienced over the past seven days from 0 (never) to 4 (too much). This questionnaire covers three PTSD criteria and is completed by the individual. The person should complete the questionnaire according to his symptoms in the last seven days. This questionnaire is rated on a five-point Likert scale (never=0, rarely=1, sometimes=2, often=3, almost always=4). Higher total scores on the questionnaire indicate higher levels of helplessness [22]. The results of the study of Panaghi et al. (2006), which was conducted on 272 people, showed that the IES-R has significant reliability and good consistency. In the aforementioned research, Cronbach's alpha coefficient was equal to 0.67 in the hyperarousal subscale in the age group of more than 20 years and 0.87 for the total score of the test [26], which indicates the appropriate validity of this questionnaire. Moreover, the face validity of the questionnaire was evaluated and confirmed by seven psychiatrists and three subspecialists in child psychiatry.

All the results of the questionnaires, as well as all the demographic characteristics of the study participants were kept confidential by the researchers. In addition, the publication of personal and private information was prevented.

3.3. Statistical Analysis

After extracting the raw data, it was first recorded in Excel and then transferred to SPSS software (version 22). In the following, after removing the effect of confounding demographic variables, the collected data were analyzed using descriptive and inferential statistics indicators (e.g., frequency, mean, standard deviation, range of changes) through independent samples t-test, Pearson's moment correlation coefficient, and hierarchical regression analysis. In order to determine the effectiveness and prediction of anxiety and depression scores from IES-R components, two separate multivariate regression analyzes were performed.

4. Results

The results of the present study showed that out of 230 participants in the study, 91.7% (n=211) and 8.3% (n=19) of the cases were mothers and fathers, respectively. The mean ages of mothers and fathers were 37.5±1.3 and 41.8±2.1 years, respectively. Moreover, the mean ages of boys and girls whose parents participated in the research were equal to 0.9±6.8 and 1.1±6.9 years, respectively. The tests were conducted on children with the age range of 5 to 12 years, and after determining the frequency of the evaluated children's gender, it was found that 51.7% (n=119) were girls and 48.3% (n=111) were boys. The percentages of parents with one, two, three, and four children and more were equal to 51.3% (n=118), 36.1% (n=83), 9.1% (n=21), and 3.5% (n=8), respectively (Table 1).

The results of the correlation analysis showed that the impact of the quarantined event caused by the COVID-19 pandemic and the IES-R subscales in parents were directly and significantly correlated with the anxiety and depression scores in their children. The independent Student's t-test results showed no significant difference between the two gender groups of parents and children in terms of anxiety and depression levels (P>0.05). In addition, the results of other correlation analyses revealed a direct and significant relationship between children's anxiety and the number of children, as well as between the levels of depression and the child's age (P<0.05) (Table 2).

The results of the Durbin-Watson (DW) test indicated that the assumption of independence of errors for performing regression analysis for each dependent variable was established (Table 3) and was in an acceptable range (1.5 to 2.5) [27]. The results of hierarchical multivariate regression analysis, before and after controlling demographic

Table 1. Demographic characteristics of the participants

Variables		Frequency	
		Number	**Percentage**
Parents' gender	Male	19	8.3
	Female	211	91.7
Children' gender	Male	111	48.3
	Female	119	51.7
Number of children in the family	1	118	51.3
	2	83	36.1
	3	21	9.1
	4≤	8	3.5
Variables		Mean	Standard deviation
Parents' age (year)	Male	41.8	2.1
	Female	37.5	1.3
Children's age (year)	Male	6.8	0.9
	Female	6.9	1.1

Table 2. Correlation of IES-R total scores and its subscales among parents with children's anxiety and depression scores

Variables		Mean±SD	Variables					
Name	Code		V1	V2	V3	V4	V5	V6
Impact of Event	V1	36.7±16.6	1					
Avoidance	V2	14.9±6.7	0.69**	1				
Intrusion	V3	12.6±7.1	0.91**	0.31**	1			
Hyperarousal	V4	10.4±7.2	0.96**	0.45**	0.92**	1		
Anxiety	V5	2.1±0.8	0.38**	0.33**	0.18**	0.39**	1	
Depression	V6	0.8±0.3	0.38**	0.09*	0.41**	0.41**	0.62**	1

variables, are shown in Table 3. After removing the effect of demographic variables, obtaining more scores in the subscale of intrusion (P=0.003, β=0.469) and hyperarousal (P<0.0001, β=0.895) by parents can significantly predict more scores in children's anxiety. In addition, none of the IES-R components in parents could significantly predict children's depression scores (P>0.05).

In separate multivariate regression analyses, other children's anxiety and depression scores were predicted based on their parents' IES-R total scores after controlling for confounding demographic variables (Table 4). Based on the results presented in Table 4, after removing the effect of demographic variables, obtaining higher scores in IES-R by parents significantly predicts higher scores in children's anxiety (P=0.016, β=0.362). In addition, the results showed that higher scores in IES-R by parents can significantly predict higher depression scores in children (P<0.0001, β=0.412) (Table 4).

Table 3. Hierarchical linear regressions to predict anxiety and depression scores based on IES-R dimensions

Dependent variables	Independent variables		R^2	R^2 Change	F Change	Beta to Enter	P	DW
Anxiety	Demographic variable		0.063	0.051	5.396	0.256	0.041	
	IES-R dimensions	Avoidance				0.152	0.165	0.921
		Intrusion	0.312	0.256	8.124	0.469	0.003	
		Hyperarousal				0.859	0.0001	
Depression	Demographic variable	Child's age	0.035	0.036	4.234	0.159	0.051	
	IES-R dimensions	Avoidance				0.099	0.225	2.171
		Intrusion	0.185	0.163	12.165	0.321	0.078	
		Hyperarousal				0.232	0.145	

Table 4. Hierarchical linear regressions to predict anxiety and depression scores based on the total score of IES-R

Dependent variables	Independent variables	R^2	R^2 Change	F Change	Beta to Enter	*P*	DW
Anxiety	Demographic variable (number of children)	0.063	0.051	5.396	0.256	0.041	1.941
	The total score of IES-R	0.167	0.085	7.956	0.362	0.016	
Depression	Demographic variable (child's age)	0.025	0.025	4.124	0.165	0.059	2.215
	The total score of IES-R	0.132	0.125	23.542	0.412	0.0001	

5. Discussion

The findings of the present study showed a significant correlation of parents' intrusive thoughts and hyperarousal with children's anxiety. Furthermore, a significant correlation was observed between parents' hyperarousal and children's depression. These results were consistent with the findings of similar studies conducted by Rezaei et al. (2020) (22), Weissman et al. (1984) (28), and Woodruff-Borden et al. (2002) (29).

Intrusive and unwanted thoughts are among the symptoms of PTSD and appear involuntarily and automatically in a person's consciousness. Intrusive and stressful memories can be characterized by frequent re-arranging of events or verbal rumination. Moreover, these memories can show themselves in the form of emotional mental images or verbal thoughts (22). Unwanted thoughts are among the symptoms associated with anxiety disorders, and hyperarousal is also defined as a tendency to sudden and short-sighted behaviors, which is one of the symptoms of PTSD. In a previous similar study, Hosseinpour et al. (2018) confirmed the correlation of the mentioned variables with some mental disorders, especially anxiety and depression (22).

Based on the results of the present study, it can be said that the fear of illness, financial problems caused by home quarantine, temporary or permanent unemployment, limited social communication, the vagueness of the end of the pandemic, concerns about the family and those around, and fear of the future, are the most important negative psychological factors caused by COVID-19 pandemic that affects the psyche of parents. These psychological effects predict anxiety

and depression in children ([1](#),[4](#),[5](#),[7](#),[11](#),[16](#),[19](#),[20](#),[22](#)).

Home quarantine at least increases the hours of communication and interaction of children with their parents; however, it seems that this slight increase is associated with a decrease in the quality of communication since when parents experience the stress caused by quarantine or the outbreak of this disease, they have personal concerns and responsibility towards their children ([19,20,22](#)). If parents face intrusive thoughts and hyperarousal, this hinders a sufficient quality relationship with children and probably causes symptoms of anxiety and depression to appear in children.

Due to the importance of the issue, the health and treatment systems of the countries formulated and announced strategies for psychological help to children. The National Health Commission of China provided guidelines for the mandatory quarantine of children suspected of having the coronavirus and hospitalization. These strategies included increasing children's communication time with their parents, increasing children's access to disease information through comic books and movies, guiding children to create a list of regular daily activities, providing night lights and small gifts, and referring children to psychiatrists if they suffer from anxiety, as well as lack of sleep and appetite ([30](#)).

According to the results of this study and the confirmation of the effect of parents' intrusive thoughts and hyperarousal on children, the need for the intervention of psychiatrists during the implementation of home quarantine due to a pandemic, such as COVID-19, seems necessary for families. These interventions can be included in two levels (first: management and treatment of parents' stress, and second: reduction of children's anxiety and depression), in an interactive and confrontational manner, which can cause positive psychological effects and financial savings for the government and health organizations.

5.1. Limitations

The most important limitations of the present study were limited resources and research background in the field of psychological effects of pandemic diseases in the world, especially in developing countries, limited research findings related to children's mental health, lack of assessment of the role of cultural and geographical factors on reducing parental stress, and children's anxiety when facing a crisis similar to COVID-19. Another limitation of the present study included the onset of this study which was at the beginning of the COVID-19 pandemic, and over time from the pandemic, parents' stress and children's anxiety might fluctuate greatly, which could not be evaluated in this study.

6. Conclusion

Based on the findings of the present study, it can be concluded that home quarantine caused by the COVID-19 pandemic causes stress in parents and this also increases anxiety and depression in their children. Therefore, it can be said that the mental health of both mentioned groups is strongly affected. Considering that at the time of the beginning and then the peak of the COVID-19 pandemic, the priority of the government and healthcare organizations was to control the virus and then treat the patients with COVID-19; accordingly, less attention was paid to the management of the psychological effects of this pandemic. Therefore, based on the findings of this research, it is suggested that at the same time as managing the prevention and treatment of such diseases, it is necessary to pay attention to the management of their mental health. It seems that among the available solutions to control parents' stress and children's anxiety and depression, educating people through different media can be very effective.

Acknowledgments

Footnotes

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