

UNDERSTANDING THE IMPACT OF HOME CONFINEMENT ON MENTAL HEALTH, SLEEP, AND BEHAVIOR OF CHILDREN DURING THE COVID-19 PANDEMIC: A QUALITATIVE STUDY

ZROZUMIENIE WPŁYWU ZAMKNIĘCIA W DOMU NA ZDROWIE PSYCHICZNE, SEN I ZACHOWANIE DZIECI PODCZAS PANDEMII COVID-19: BADANIE JAKOŚCIOWE

Deldar Morad Abdulah^{1(A,C,D,E,F)}, Rasoul Sabri Piro^{2(A,B,D,F)}

¹Community and Maternity Health Nursing Unit, College of Nursing, University of Duhok, Duhok, Iraqi Kurdistan, Iraq

²Psychiatric and Pediatric Nursing Unit, College of Nursing, University of Duhok, Duhok, Iraqi Kurdistan, Iraq

Authors' contribution

Wkład autorów:

- A. Study design/planning
zaplanowanie badań
- B. Data collection/entry
zebranie danych
- C. Data analysis/statistics
dane – analiza i statystyki
- D. Data interpretation
interpretacja danych
- E. Preparation of manuscript
przygotowanie artykułu
- F. Literature analysis/search
wyszukiwanie i analiza literatury
- G. Funds collection
zebranie funduszy

Summary

Background. Theoretical models of behavior change focus on psychological constructs, including intention and self-efficacy, but they do not consider the role of stressors. In this study, the impact of home confinement was explored as an external stressor on mental health, sleep, loneliness, tiredness, and behavior of children during the coronavirus disease of the 2019 (COVID-19) pandemic.

Material and methods. Ten children aged 7-17 years who were restricted at home for at least one month during the COVID-19 outbreak were included. Semi-structured interviews with children were conducted to elicit their feelings, reflections, and responses to home confinement during the COVID-19 pandemic. The children expressed that they felt lonely and tired at home "sometimes" to "most of the time".

Results. The children had no sleep status quality as before the COVID-19 outbreak, including difficulty in falling asleep, insomnia, and hypersomnia. Most children had depression and anxiety symptoms with different severities. The children were irritable, aggressive, or nervous at home. Only one child reported that she was more active and had positive changes compared with before. Most children experienced some degree of conflict with their parents or siblings.

Conclusions. This study found that some children were affected by different kinds of emotional issues at home during the COVID-19 pandemic.

Keywords: emotional wellbeing, adaptive behavior, qualitative evaluation, disease outbreak, children

Streszczenie

Wprowadzenie. Teoretyczne modele zmiany zachowań koncentrują się na konstrukcjach psychologicznych, w tym intencji i poczuciu własnej skuteczności, ale nie uwzględniają roli stresorów. W niniejszej pracy zbadano wpływ zamknięcia w domu jako zewnętrznego stresora na zdrowie psychiczne, sen, samotność, zmęczenie i zachowanie u dzieci podczas pandemii koronawirusa – COVID-19.

Materiał i metody. W badaniu uwzględniono dziesięcioro dzieci w wieku 7-17 lat, które pozostawały w domach przez co najmniej jeden miesiąc podczas pandemii COVID-19. Przeprowadzono półstrukturalne wywiady z dziećmi, aby uzyskać informacje na temat ich uczuć, przemyśleń i odpowiedzi na zamknięcie w domu podczas pandemii COVID-19. Dzieci przekazały, że czują się samotne i zmęczone pozostając w domach, przy częstotliwości od „czasem” do „przez większość czasu”.

Wyniki. Dzieci nie wykazywały takiej jakości snu jak sprzed wybuchu pandemii COVID-19, zgłaszając między innymi trudności z zasypianiem, bezsenność i nadmierną senność. U większości dzieci występowały objawy depresji i lęku o różnym nasileniu. W domu dzieci były drażliwe, agresywne lub nerwowe. Tylko jedno dziecko podało, że było bardziej aktywne i doświadczyło pozytywnych zmian w porównaniu z okresem wcześniejszym. Większość dzieci doświadczyła w jakimś stopniu konfliktu z rodzicami lub rodzeństwem.

Wnioski. W badaniu stwierdzono, że niektóre dzieci zostały dotknięte różnymi rodzajami problemów emocjonalnych w domu podczas pandemii COVID-19.

Słowa kluczowe: dobrostan emocjonalny, zachowanie adaptacyjne, ocena jakościowa, epidemia, dzieci

Tables: 2

Figures: 1

References: 49

Submitted: 2022 Sep 27

Accepted: 2022 Nov 24

Abdulah DM, Piro RS. Understanding the impact of home confinement on mental health, sleep, and behavior of children during the COVID-19 pandemic: a qualitative study. Health Prob Civil. 2022; 16(4): 286-301. <https://doi.org/10.5114/hpc.2022.121517>

Address for correspondence / Adres korespondencyjny: Deldar Morad Abdulah, Community and Maternity Health Nursing Unit, College of Nursing, University of Duhok, Nakhoshkhana Street, 42001 Duhok, Iraqi Kurdistan, Iraq, e-mail: deldarmorad@gmail.com, phone: +9647507443319
ORCID: Deldar Morad Abdulah <https://orcid.org/0000-0002-8986-5793>, Rasoul Sabri Piro <https://orcid.org/0000-0002-1410-9141>

Copyright: © John Paul II University of Applied Sciences in Biala Podlaska, Deldar Morad Abdulah, Rasoul Sabri Piro. This is an Open Access journal, all articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0) License (<http://creativecommons.org/licenses/by-nc-sa/4.0/>), allowing third parties to copy and redistribute the material in any medium or format and to remix, transform, and build upon the material, provided the original work is properly cited and states its license.

Introduction

A new coronavirus disease called "coronavirus disease of 2019" (COVID-19) was announced by the World Health Organization (WHO) in January 2020. Its spread has been considered a public health emergency of international concern. This virus is determined to have a high risk of spreading across the world [1], including Iraqi Kurdistan [2]. On February 25, 2020, the Kurdistan Region's Ministry of Health reported that all necessary measures would be put in place to combat the new virus. The Ministry announced that the region was coordinating closely with the WHO to determine the required measures to fight against the virus [3]. After confirming four COVID-19 cases in the region [4], the Kurdistan Regional Government closed all governmental organizations and interconnected routes except for medical settings and security arms [3].

The SARS-CoV-2 virus's high infectiousness and mortality has been reported in both adult and child populations [5,6]. But children have a great fear of being infected by this virus and they react to this pandemic in different ways [7]. Children are more vulnerable to the psychological impacts of traumatic events, such as pandemics, which disrupt children's daily lives [7], and they struggle with school closures, home confinement, and social distancing. The lives of many people have been dramatically affected during the COVID-19 pandemic. In this regard, the governments apply several preventive measures to fight the COVID-19 pandemic. These preventive measures affect children's sense of structure and security in their daily lives and react to stress of their parents and other caregivers, community members, and their peers [8].

Children feel lonely and frustrated owing to home confinement and social distancing. They are preoccupied by the notion of coronavirus infection [7]. Social interaction has been dramatically reduced during the COVID-19 pandemic because of working families and children staying at home. This situation resulted in stressful circumstances with a major impact on sleep patterns [9].

Children may ask about what is happening now or what will happen in the future. They may have reactions of fear, worry, sadness, anger, or tearfulness. Children may be concerned about their and their family's safety and perceive the future as uncertain. Involvement in the COVID-19 pandemic is remarkably stressful for children, leading to traumatic stress and endangering children with a sense of insecurity; this leaves them helpless and vulnerable [10].

The effects of disease outbreaks on emotional wellbeing have been analyzed based on adult populations; thus, the literature has limited information on the emotions of children during the COVID-19 pandemic [11]. The extended school closure, home confinement, and public lockdown during the COVID-19 pandemic may have negatively affected children's physical and mental health [12,13]. For example, Brooks, Webster [13] reviewed the psychological effects of quarantine and included 24 studies in their study. The study reported negative psychological effects—namely, posttraumatic stress symptoms, anger, and confusion. Some stressors reported by Brooks and Webster were longer quarantine duration, infection fear, insufficient supply, stigma, and frustration. The included participants were hospital staff, school community members, healthcare workers, college students, and parents. Only a few studies specifically focused on the psychological wellbeing of children during the pandemic [14,15]. Morgül, Kallitsoglou [16] aimed to explore the psychological effects of lockdown during the COVID-19 pandemic on primary school children aged 5-11 years and their families in the United Kingdom. The caregivers of the children reported changes in emotional status and behaviors among children during the lockdown. The frequent symptoms for children were boredom (73.8%), loneliness (64.5%), and frustration (61.4%). In addition, 30% of the caregivers had irritability, restlessness, anxiety, sadness, anger, and worry and were more likely to argue with family members. Carey, Povey [14] explored the Irish children's health and experiences during school closures during the COVID-19 pandemic in a phenomenological qualitative study. They reported that the children experience adverse mental health effects, including depression, anxiety, anger, and loneliness. The physical health was affected through changes in sleep behaviors, physical activity levels,

boredom, and gaming usage. They continued that children are susceptible to effects of school closures, contact restrictions, and living with the COVID-19 pandemic. Therefore, we need more reports about the psychological effects of home confinement on children during the COVID-19 pandemic.

Individuals experience loneliness when they do not interact with other persons through social relationships. Social relationships, as the main part of a person's environment, provide a source of support. Individuals need social relationships to improve their health and wellbeing [17,18]. Conversely, social isolation is the objective lack of a wide social network [19]. Given this vital information, social isolation has a considerable impact on humans. These effects are health-related, hormonal, and neuroanatomical outcomes [20].

There have been few reports on the mental wellbeing and psychological effects of the COVID-19 outbreak at the peak time of the pandemic in children [16,21]. The current theoretical models of behavior changes are based on psychological constructs, such as intention and self-efficacy. These theories have not considered the role of external stressors [22,23]. In this regard, we aimed to explore the role of home lockdown as an external stressor on the mental health, sleep, loneliness, tiredness, and behavioral changes of children during the COVID-19 outbreak.

Research questions

The research questions were posed to the children who were confined at home during the COVID-19 complete lockdown. Our main research question was as follows: What are the impacts of home confinement on mental health among children during the COVID-19 lockdown? Within this main research question, we explored problems in children [14,24]. The children did not know how to explain their feelings during the lockdown; therefore, we asked them specific questions to elicit descriptions. We asked the children to respond to the following questions in their own words:

1. Did home confinement cause you to feel lonely during the COVID-19 lockdown at home?
2. Did home confinement cause you to feel tired during the COVID-19 lockdown at home?
3. Did home confinement cause you to have depression symptoms during the COVID-19 lockdown at home?
4. Did home confinement affect your sleep patterns during the COVID-19 lockdown?
5. Did the home confinement make you worried at home during the COVID-19 lockdown?
6. Did your behaviors toward siblings or parents change at home during the COVID-19 lockdown?

The interviewer asked questions in a pros and cons way to avoid the positivist answering. In this regard, the interviewer asked the children to explain the situation in more detail.

Material and methods

Study design and participants

In this descriptive qualitative research, ten children aged 7-17 years in Iraqi Kurdistan were included. The mean age of the children was 11.3 (SD: 3.56 and Std Err Mean: 1.13 years). The children were included in the study regardless of their socio-demographic characteristics. The participants were Kurdish and Muslims and had different socio-economic status; including monthly income and family size.

The children who were included in this study had been confined at home during the COVID-19 pandemic for at least 1 month. We employed a qualitative descriptive research approach. Such an approach is used when little is known about the investigated problems, such as the experiences of children during the lockdown. Written consent forms were taken from the children's parents for all children before inclusion in this study. Five boys and five girls participated in the study. The parents of the children agreed to ask our questions on this condition

to protect the confidentiality of their personal information. We tried to include the children from different socio-economic status as seen in the Table 1.

Table 1. Age and gender distribution of participants

| Participants | Age (Year) | Gender | Ethnicity | Religion | Income | Home ownership | Family size | Residential area |
|----------------|------------|--------|-----------|----------|--------|----------------|-------------|------------------|
| Participant 1 | 11 | Female | Kurdish | Islam | Low | Tenant | 8 | Urban |
| Participant 2 | 9 | Male | Kurdish | Islam | Middle | Owner | 6 | Urban |
| Participant 3 | 11 | Female | Kurdish | Islam | Middle | Owner | 5 | Urban |
| Participant 4 | 7 | Male | Kurdish | Islam | Middle | Owner | 5 | Urban |
| Participant 5 | 16 | Female | Kurdish | Islam | High | Owner | 3 | Urban |
| Participant 6 | 8 | Male | Kurdish | Islam | Low | Tenant | 5 | Urban |
| Participant 7 | 11 | Male | Kurdish | Islam | High | Owner | 5 | Urban |
| Participant 8 | 8 | Male | Kurdish | Islam | Low | Tenant | 4 | Urban |
| Participant 9 | 17 | Female | Kurdish | Islam | High | Owner | 6 | Urban |
| Participant 10 | 15 | Female | Kurdish | Islam | Middle | Tenant | 7 | Urban |
| Mean | 11.3 | | | | | | | |
| Std Dev | 3.56 | | | | | | | |
| Std Err Mean | 1.13 | | | | | | | |
| Range | 7-17 | | | | | | | |

To protect the qualitative approach of the study, we asked the children some open-ended questions in a semi-structured way. In this regard, the children were advised to avoid yes or no responses. The interviewer used probes to achieve sufficient and more detailed information about the children's psychological problems during home confinement.

The study sample was recruited using a snowballing technique via personal contacts. No participant refused to participate in this study. We included only ten children in this study to prevent the possible spread of disease between families. We tried to include children of both genders belonging to different age groups and from different geographic areas. The first child was selected by the second researcher among children of friends and acquaintances. For the next participant, the researcher asked the parents of the first child to present us with the name of a family from a different quarter of Duhok city. The researcher interviewed the second child after this step. Again, the researcher asked the parents of the second child to present us with a family outside the quarter for participation. This process continued until we included the required number of children in the study. In the case of there being more than one child in a family, the second researcher selected only one child. In the sampling process, the researcher tried to include both genders in different age groups. We had limitations when it came to including more children in the study because the lockdown was partially lifted during the data collection. The lockdown was lifted for a limited period per day. The data collection was performed in Duhok city in Iraqi Kurdistan between 18th and 25th April, 2020.

Authors' credentials

The second author of the study (a psychiatric nurse) visited the children at their homes. He graduated with a master's degree in psychiatry nursing. He is working as a lecturer at the psychiatry nursing unit at the University of Duhok since 2015. Furthermore, he has worked as a researcher in the psychiatry field for several projects, including sleep disorders, psychiatric disorders, and psychiatric interventions in this region. The interviewer had a previous relationship with the parents of the first child but not the parents of the other

children. In addition, the interviewer had no relationship with the children who were included in this study. The second author performed all interviews. The second author documented children's responses on paper for the study analysis. As mentioned above, we had limitations in visiting different areas for the recruitment of children because of the partial lockdown; therefore, we applied the snowballing technique. The study was performed based on requirements in the consolidated criteria for reporting qualitative research (COREQ), a 32-item checklist for interviews and focus groups [25].

Interviews

The second author of this study performed semi-structured interviews with the children. The author did a meeting with each child in a room without the presence of their parents to reduce the reporting bias, and guided the child a little about COVID-19 for 20-30 minutes. The interviewer discussed the topic with the child to be familiar with the process. Following this, the author asked the child to explain their feelings about experiencing home confinement because of the COVID-19 outbreak.

The aim of the study was explained to the parents before the interviews. The interviewer guided the children on what they had to do accordingly. The interviewer/facilitator asked the children to explain their feelings and reflections that had arisen during home confinement. They were guided to express their feelings based on the questions asked. The main points of the interviews with each child were written on paper in the Kurdish language. Later, the authors referred to the notes to translate the responses into the English language and analyze the data. The children were asked whether they felt lonely because of home confinement; whether they were tired, and whether they had dyssomnia, depression symptoms, and worry/anxiety. The interviewer explained depression symptoms to the children to ensure that they understood what was being asked. The children were asked to describe how their behaviors had changed during the home confinement during the COVID-19 outbreak. Finally, the author asked them to describe their relationships with parents/siblings during home confinement. To avoid any bias in the results, each interview was performed with a child in a separate and quiet room. The parents of the children were not present in the room during the interviews.

The children may not be familiar with psychological issues. Therefore, the interviewer gave the children some information about loneliness, tiredness, dyssomnia, depression, and worry/anxiety to have a clear background of their feelings before an interview. In addition, the children responded to the questions asked. The authors spent between 30 and 60 minutes writing the children's information.

The interviewer clarified the psychiatric terms so that the children would have a correct and uniform understanding of the concepts. The medical terms used in this study were explained using alternative vocabulary, considering the community's well-known words. The children could easily understand the concepts of loneliness and tiredness without any difficulty or complexity. For dyssomnia, the author asked the children whether they faced problems of falling asleep at night, sleep interruptions (insomnia), or difficulty waking up despite having more than 8 hours of sleeping (hypersomnia). For depression, the interviewer asked the children to explain how their moods changed during the confinement time and whether their internal motivation decreased, increased, or changed in any way for all personal and daily activities, whether they felt sad or not. For anxiety, the interviewer asked the children to explain whether they had worries about daily circumstances during the confinement time. In terms of behavior changes and relationships with siblings and parents, the interviewer asked the children to report their behavioral changes toward their siblings and parents.

Data analysis

The authors referred to the transcripts obtained from the interviews to analyze the information. The data obtained from the interviews were translated from Kurdish into the English language. The data were analyzed

using thematic content analysis and content analysis with a deductive approach using Graneheim and Lundman’s method [26]. The Graneheim & Lundman approach is a qualitative content analysis approach that concentrates on the interpretation of both the explicit and manifest content of a text along with analyzing the latent content of the text. The latent content of a text can be interpreted or interpolated from the text but is not explicitly stated in it. The Graneheim & Lundman approach suggests using concepts related to qualitative research when explaining the research procedure and measures to obtain trustworthiness. Also, this approach uses communication theory as a way to meet the issue of interpretation and clarify the underlying assumptions of qualitative content analysis. In a deductive approach, the researcher moves from theory to data or from a more abstract and general level to a more concrete and specific one [27]. Eriksson and Lindström [28] explain that in a conventional deductive approach the investigator tries to formulate categories based on an established theory or model.

The authors read and reread the transcripts and notes to determine the contents of the categories. The contents were arranged according to the previously determined themes as the unit of analysis. The results of the study were categorized into the following themes: loneliness and tiredness at home, dyssomnia, depression, anxiety, behavior changes at home, and overall relationship with parents and siblings at home (Figure 1 and Table 2). In this study, we tried to make a conclusion from the children’s experiences to psychological problems only. We are not intending to explain the causal relationships between concepts and variables. No statistical software was used for this study.

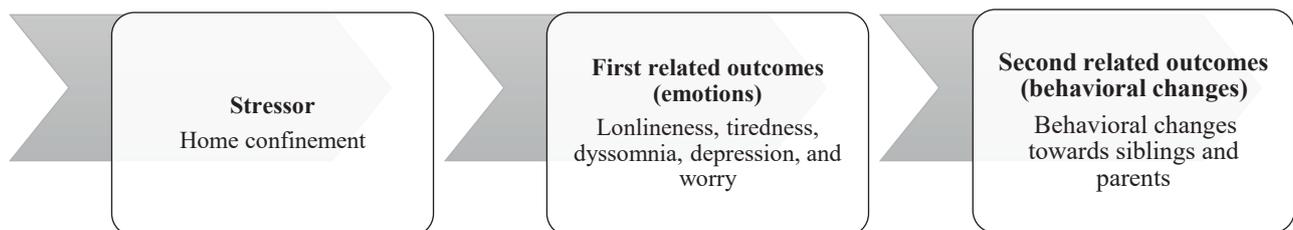


Figure 1. Schematic relation of home confinement as a stressor with effects in children

Table 2. Example of coding process of participates

| Question | Participant responses Female – 11 yrs. | Probes | Codes | Themes |
|--|---|---|----------------|------------|
| Did home confinement cause you to feel lonely during the COVID-19 lockdown at home? | During the coronavirus and social distancing, I sometimes felt lonely. | Please explain how did you perceive that you were alone during the confinement at home? | Mental effect | Loneliness |
| Did home confinement cause you to feel tired during the COVID-19 lockdown at home? | During obligatory home-staying periods, I strongly felt tired most of the time. | How has home confinement made you tired? Please explain more. | Mental effect | Tiredness |
| Did home confinement affect your sleep patterns during the COVID-19 lockdown? | I did not have any problem with my sleep. | I did not intend to sleep more or less at home. | Sleep effect | Dyssomnia |
| Did home confinement cause you to have depression symptoms during the COVID-19 lockdown at home? | I had a mild level of depressed mood. | Please explain your feelings when you experienced this situation. | Mood effect | Depression |
| Did the home confinement make you worried at home during the COVID-19 lockdown? | I was not anxious at all. I was ok. | Did staying at home for a long time make worries for you? | Anxiety effect | Anxiety |

| | | | | |
|--|--|--|-----------------|------------------------------------|
| Did your behaviors toward siblings or parents change at home during the COVID-19 lockdown? | I became more aggressive and sensitive. | Explain how and what relations made you aggressive or sensitive. | Behavior effect | Behavioral Changes |
| Did your behaviors toward siblings or parents change at home during the COVID-19 lockdown? | I experienced some conflict with my mother concerning my daily activities and timetable. | Explain how daily activities made conflict with your mother at home. | Behavior effect | Relation with parents and siblings |

Ethical views

Ethical approval of the study protocol was obtained from the College of Nursing at the University of Duhok (registered in March 2020). We obtained written consent forms from the parents of all the children before the interviews. The children’s parents agreed to have their children interviewed for study purposes. We protected the confidentiality of the children’s personal information. The study was performed under the modified World Medical Association Declaration of Helsinki.

Results

The children’s responses to the questions were assessed based on the themes delineated below. The participants were boys (n=5) and girls (n=5) aged between 7 and 17 years (Table 2). The themes were loneliness, tiredness, dyssomnia, depression, worry, behavior changes, and relationships with parents and siblings.

Loneliness

The study showed that the children felt lonely at home during COVID-19. The frequency of loneliness was sometimes to most of the time. One child felt too much loneliness. The children presented being lonely at home as being in a prison:

“I stayed at home for a long time. Staying at home is like a prison for me. We were used to visiting our relatives and friends at least twice a week and having guests and friends at our home weekly. However, I feel that we have been cut off from the entire world and there is no obvious horizon to recapture my former golden days since the lockdown was applied in our region. I feel that I am living in a prison. I am so alone at home. Maybe there will be no chance to go outside and see my friends again” (Participant 2).

The reasons for feeling loneliness were social distancing and staying at home. One child reported that he felt that he was being buried alive when staying at home:

“I feel that I am alone because I must stay at home. I feel I am going to be buried alive” (Participant 3).

One child reported,

“Most times, I feel lonely at home, and I suffer from the uncertainty of the future. When can I back to my school, to see my friends and teachers to have a fantastic time together again?” (Participant 4).

Only two children reported that they did not feel alone at home:

"I do not feel that I am alone at home because I am sure that this tough time is temporary, and we will overcome this unpleasant period. At the same time, by accessing advanced technology, I can visit my friends every day via video call programs" (Participant 7).

Similar feelings were reported by participant 10 as well.

Tiredness

We found that most children felt tired because of the obligation to stay at home. The children had different severities of tiredness, from no tiredness to strong tiredness:

"I feel extremely tired most of the time because I have to stay at home. I hate this exhausting routine in my life. This situation goes on and on, and I have to stay at home for so long. I feel that my energy is being drained, and I cannot find any new source of energy while I am trapped between four walls" (Participant 1).

One child reported that he was so tired and lacked the motivation to work on his school assignments. The level of tiredness was different from somewhat tired some days per week:

"I am so tired of the current situation. I am not motivated to complete my school assignments; I feel that life is paused and waiting for God to put things back to normal" (Participant 6).

Two children reported that they were very energetic and were not tired while staying at home:

"Participant 2 reported that we are so energetic when we come to our school assignments. We have the motivation to work at home and help our parents in family duties. Coronavirus has given us the chance to spend more time with our wonderful family" (Participants 2).

Similar feelings were reported by participant 4 as well.

Dyssomnia

Half of the children reported that they did not sleep as they had before the outbreak. They tended to have difficulty in falling asleep; sometimes they had insomnia, severe insomnia, or hypersomnia:

"It is very difficult for me to sleep. I used to sleep easily before the corona outbreak. However, now my parents come to my room and ask me to sleep; it is difficult for me to fall asleep. I wake up most times by 3 a.m., and then I am not able to sleep again" (Participant 3).

The similar sleep problem was reported by participants 4, 6, and 8 as well.

"I sleep, and I have no problem falling asleep. However, I have a problem getting up in the morning, and I sleep for many hours" (Participant 9).

Half of the children reported that they did not have any problems sleeping.

"I do not have any problems sleeping. I sleep and awake regularly the same as before the outbreak" (Participant 1).

Also participants 2, 4, 7, and 10 did not reported the sleep problems.

Depression

Most children reported that they had depression symptoms at home since the home confinement due to the COVID-19 outbreak. Only two children did not report depression at home during the outbreak. The reasons for depression were as follows:

"I am depressed [have depression symptoms] at home most time. I feel that I have lost my freedom because I cannot go outside to play with my friends. I cannot go to school to meet my school friends. We just call each other and have no other relationships, and this style of virtual communication is not enjoyable and does not give me any energy. This style takes all my energy and motivation and makes me very sad" (Participant 1).

The depressive symptoms were reported by participants 2–4, 6, and 8–10 as well.

Only two participants reported that they had no depression symptoms during the COVID-19 outbreak:

"I am not depressed at home [depression symptoms]. I play games with my brother and sister. My parents are always at home, and we sometimes play with them" (Participant 5).

A similar experience was reported by participant 7.

Worry

Only one child reported having anxiety at the beginning of the outbreak. However, at the time of the interview, she had returned to a normal level of worry:

"I was very anxious at the beginning of the outbreak because all formal and social media covered coronavirus news and allocated most of their time and programs to this topic. It was a new and unknown phenomenon that made me increasingly anxious. But after a while, I was used to adapting myself to the current situation. Now I play with my brother and sister. My parents are always here [home]. We play together until late at night" (Participant 10).

Behavior changes and relationships with parents and siblings

The children reported that they had been irritable, aggressive, or nervous at home during the COVID-19 outbreak. Moreover, the children did report changes in their behavior since home confinement due to the COVID-19 outbreak. Most children reported that they had experienced some degree of conflict with their parents or siblings that they had not had before the outbreak.

The children who were more irritable, aggressive, or sensitive during the COVID-19 outbreak compared with the previous time were more likely to have conflicts with their parents or siblings:

"I have become more aggressive and sensitive compared with before the corona outbreak. It is hard for me to tolerate talking to my parents, brothers, and sisters compared with before the outbreak. I experienced conflicts with my parents, brothers, and sisters about my daily activities, which I had not previously. They want to make themselves happy by listening to music loudly, but I prefer to have a calm environment. I see all their activities in contrast to mine; thus, it makes me irritable and aggressive" (Participant 1).

"I became irritable. I sometimes became aggressive with my brother and mother. I cannot see my friends and play with them. There is no opportunity to play football at home. I do not like to play games with my brother" (Participant 3).

Other children reported similar behaviors. They had conflicts with their parents and siblings, which they had not had before the outbreak. They had lost the opportunity to play with their school friends as they had previously done. In addition, at home, they could not engage in the same activities that they had previously engaged in with their friends:

"I am aggressive now because I lost all I had planned for this year, and it is intolerable for me. For this reason, I have had conflicts with my mother. I am not happy that I have lost the opportunity to play with my friends" (Participant 6).

"I became aggressive. I got into conflicts with my sisters during that period. I had not had these conflicts with my sisters before this time. I see this as something normal and relevant to conditions that gradually will be better" (Participant 2).

Similar aggressive behaviors were reported by Participant 9.

One child reported that he had a good relationship with his family despite being nervous sometimes:

"I was nervous sometimes. But I have a good relationship with my family and don't want to make my life stressful with an issue. I think this situation will end—hopefully after not too much time" (Participant 8).

Another child reported that he had experienced no remarkable changes in behavior compared with before the outbreak. However, he had experienced conflicts with his sister during this time:

"I had no remarkable changes. But I experienced conflicts with my sister. My sister plays video games loudly until late at night. She does not allow me to rest and sleep. I asked her several times to lower the sound of the video games, but it was not helpful" (Participant 4).

Only one child reported that she was more active and had positive changes compared with before. In addition, three children reported that they had no conflicts with their parents and siblings and had good and stable relationships with their families:

"I became more active, and I had positive changes like time management and multiple activities to keep myself busy. I had a better relationship with my parents than before because I used this time as an opportunity to be closer to my family and make a timetable for different recreational and educational activities" (Participant 5).

"I experienced no change in my behavior. I had a good relationship with my family members" (Participant 7).

Participant 10 reported no change in behaviors as well.

Discussion

The present study revealed that the children felt lonely and tired at home sometimes to most of the time during the COVID-19 lockdown. Half of the children reported that they did not sleep as well as before the outbreak; some children had difficulty falling asleep, and different children reported having insomnia and hypersomnia. The children had depression symptoms as they stayed at home because of the COVID-19 outbreak. Only one child reported having anxiety at the beginning of the outbreak. However, she had reached a normal level of worry at the time of data collection. They have been irritable, aggressive, or nervous at home during the COVID-19 outbreak. Only one child reported that she was more active and had positive changes than before. The children

had experienced some degree of conflict with their parents or siblings. Only three children reported that they had no conflicts with their parents and siblings and had good and stable relationships with their families.

The impacts of home confinement on children during the outbreaks have been reported in the literature. For example, Wang and colleagues (2020) reported that 53.8% of individuals experienced a moderate to severe psychological impact during the COVID-19 outbreak in China. In addition, 16.5% and 28.8% had moderate to severe depressive symptoms and moderate to severe anxiety symptoms, respectively. Moreover, 8.1% had moderate to severe stress levels [29]. Biomedical scientists who seek effective therapies should not overlook the social and psychological aspects of COVID-19's effect on children.

Individuals are likely to have a fear of becoming sick or dying, feelings of helplessness, and stigma during an outbreak [30]. In general, it is estimated that 10%-30% of the public were fairly worried about the infection by a virus [31], and this anxiety was related to younger age and a high level of self-blame [32].

During the COVID-19 outbreak, children spent more time with their families in a limited space. Such a situation can induce stress in some children, especially in circumstances of preexisting family difficulties. Furthermore, it can disrupt daily life routines and working schedules. Moreover, it can lead to deteriorating positive social interaction, lower levels of relaxation, and disrupted sleep patterns among people [9]. One study aimed to explore citizens' wellbeing during the COVID-19 outbreak and reported that individuals who have higher social participation and a sense of belonging have better sleep quality [33]. Conversely, the lack of regular social interaction exerts stress and negatively affects sleep quality. This association is mediated by depression and stress owing to loneliness [34]. Persons who are restricted at home are at a higher risk of developing sleep disturbances. Moreover, sleep disturbances are highly prevalent in children, and they are correlated with behavioral and emotional problems [35,36] as sleep is an important factor in regulating behavior and emotions [37,38]. Children's sleep must be prioritized by families during a situation like the COVID-19 period. A study examined the effects of the COVID-19 epidemic on 30,861 children's behaviors and parents' mental health in China. It reported that children's behaviors and parents' physical, emotional, and cognitive well-being are substantially associated with epidemic-related factors. These factors significantly predicted children's behavior and parents' physical, emotional, and cognition [39].

One child was stressed and anxious and had concerns about being infected by the COVID-19 virus. One reason for this is that seeing people wearing masks and gloves on television may have posed a serious concern to some children because children spent the most time at home without seeing other children during the lockdown.

The home confinement situation during the COVID-19 outbreak put some children in a stressful situation, where they experienced daily stress, anxiety, depression, and sleep disruption [9]. Witnessing events or experiencing traumatic stress results in intense, confusing, and frightening emotions in children [10]. As a grave psychosocial and medical issue, trauma has deleterious impacts on young people [40]. The distress of the COVID-19 outbreak is clear from the children's stories; the minds of children who participated in the study were preoccupied by the coronavirus.

Continuous exposure to external or internal stimuli, such as home confinement and social distancing, activates unwelcome and distressful recurrent and intrusive memories of traumatic experiences [41]. These symptoms are likely associated with anhedonia and senselessness of responses [42]. Continuous exposure to a traumatic event or a series of chronic traumatic events activates biological stress response symptoms in children [43,44] and leads to behavioral and emotional impacts similar to PTSD [45].

Acute stress improves immune function, whereas chronic stress suppresses it. These impacts are beneficial for some types of immune responses and harmful for others. Acute stress improves the memory of events in the brain, but these events have the potential energy to threaten the human organism. At the same time, chronic stress is responsible for establishing adaptive plasticity in the brain. Accordingly, local neurotransmitters and systemic hormones interact with each other and establish structural and functional changes. These changes

result in the suppression of continuous neurogenesis [43]. During an outbreak, children try to fight against acute stress. However, because exposure to acute stress is continuous, the children lose their energy to combat the continuous stress. Therefore children need an environment for continuous support at home during a lockdown related to a disease outbreak, in this case, of COVID-19.

Perceived stress has been reported in SARS survivors with no signs of the disease one year after the outbreak [46]. The physical impacts on the neurodevelopment process are the outcomes of early exposure to stress and trauma. These physical effects result in a personal long-term response to stress and susceptibility to psychiatric disorders. Regular exposure of children to stress may affect their ability to regulate, determine, and express their emotions. Accordingly, such exposure can have adverse effects on a persons' core identity and their ability to communicate with others [47]. Briefly stated, we think that home confinement during the COVID-19 pandemic has played a role as an external stressor for mental wellbeing and behavioral changes in children, as confirmed by healthcare workers [48].

Limitations of the study

To avoid the spread of the disease between families, the authors of this study had some technical difficulties when it came to including participants in the study; therefore, the sample size was limited. In addition, we could not select the children purposively because of limitations (requirements and lockdown); therefore, the authors decided to recruit the sample through a snowballing technique. The limitations reported here did not allow us to recruit the sample through the purposive technique. The sampling technique did not allow us to include some participants from rural areas.

Recommendations

The WHO recommends that parents assist children in establishing positive ways of coping with stress and anxiety during the COVID-19 pandemic. Children need to engage in creative activities at home (e.g., playing, drawing, and painting activities). Children express their positive feelings in safe and supportive environments in close situations with their parents and family; to ensure their security. The separation of children and their caregivers should be avoided as much as possible. Children need regular contact and communication with their parents at home. Parents must preserve the familiar daily routines and create new routines for children at home during the lockdown. Some age-appropriate activities that are suggested to engage children are learning activities and socializing with others. Stressed children need more attachment to their parents. Despite all children being affected by the pandemic, more sensitive children may need more help from their parents in terms of psychological support. To alleviate emotional issues, children's concerns must be responded to because children take cues from adults' behaviors to manage their emotions during the COVID-19 outbreak [49].

Implication for practice

The management of sleep problems during home confinement as much as possible could reduce stress and accordingly prevent disruption of social relationships [9]. To diagnose the early mental disorders and behavior changes of children, we suggest special health psychology programs for the parents. The parents need to adapt to the COVID-19 crisis positively because children learn how to face and manage adverse or new circumstances from their parents. We paid special attention to parents in the recommendations section, as the parents are the sole available persons around children during a lockdown. But it could be a weak point because the parents may not be aware of the suitable and correct strategies to alleviate the consequences of a pandemic.

Conclusions

This study showed that children have had a high level of stress during the COVID-19 outbreak lockdown at home. Children feel loneliness and frustration due to home confinement and social distancing. Their minds are preoccupied by the coronavirus infection. We found that among our participants, children's behavior changed during the COVID-19 outbreak. This study showed that the psychological aspect of children is one of the important health issues that must be considered during pandemics. The mental health of the children could develop further issues for themselves or their families. The parents may ignore the psychological aspects of their children during the lockdown owing to paying more attention to their children's physical health status.

Disclosures and acknowledgements

The authors declare no conflicts of interest with respect to the research, authorship, and/or publication of this article. The research was funded by the authors.

References:

1. World Health Organization. Coronavirus disease 2019 (COVID-19): situation report, 43. Geneva: WHO; 2020.
2. Abdulah DM, Qazli SSA, Suleman SK. Response of the public to preventive measures of COVID-19 in Iraqi Kurdistan. *Disaster Medicine and Public Health Preparedness*. 2020; 1-9. <https://doi.org/10.1017/dmp.2020.233>
3. www.kurdistan24.net [Internet]. Erbil: Kurdistan24 TV; 2020 March 16. KRG confirms three more coronavirus cases as five others recover [cited 2022 Aug 10]. Available from: <https://www.kurdistan24.net/en/story/22024-KRG-confirms-three-more-coronavirus-cases-as-five-others-recover>
4. Kurdistan Regional Government. Situation update of Coronavirus (COVID-19) [Internet]. Erbil: Kurdistan Regional Government; 2020 [cited 2022 Aug 10]. Available from: <https://gov.krd/coronavirus-en/situation-update/#what-is-kr-g-doing>.
5. Ludvigsson JF. Systematic review of COVID-19 in children shows milder cases and a better prognosis than adults. *Acta Paediatrica*. 2020; 109(6): 1088-1095. <https://doi.org/10.1111/apa.15270>
6. Liguoro I, Pilotto C, Bonanni M, Ferrari ME, Pusiol A, Nocerino A, et al. SARS-COV-2 infection in children and newborns: a systematic review. *European Journal of Pediatrics*. 2020; 179: 1029-1046. <https://doi.org/10.1007/s00431-020-03684-7>
7. Abdulah DM, Abdulla BMO, Liamputtong P. Psychological response of children to home confinement during COVID-19: A qualitative arts-based research. *International Journal of Social Psychiatry*. 2020; 67(6): 761-769. <https://doi.org/10.1177/0020764020972439>
8. Bartlett JD, Griffin J, Thomson D. Resources for supporting children's emotional well-being during the COVID-19 pandemic: child trends [Internet]. Bethesda: Child Trends; 2020 March 19 [cited 2022 Aug 8]. Available from: <https://www.childtrends.org/publications/resources-for-supporting-childrens-emotional-well-being-during-the-covid-19-pandemic>.
9. Altena E, Baglioni C, Espie CA, Ellis J, Gavrilloff D, Holzinger B, et al. Dealing with sleep problems during home confinement due to the COVID-19 outbreak: practical recommendations from a task force of the European CBT-I Academy. *Journal of Sleep Research*. 2020; 29(4): e13052. <https://doi.org/10.1111/jsr.13052>
10. Smith M, Robinson L, Segal J. Helping children cope with traumatic events. Los Angeles: HelpGuide.org; 2022 Nov 2 [cited 2022 Nov 16]. Available from: <https://www.helpguide.org/articles/ptsd-trauma/helping-children-cope-with-traumatic-stress.htm>.

11. Wang G, Zhang Y, Zhao J, Zhang J, Jiang F. Mitigate the effects of home confinement on children during the COVID-19 outbreak. *The Lancet*. 2020; 395(10228): 945-947. [https://doi.org/10.1016/S0140-6736\(20\)30547-X](https://doi.org/10.1016/S0140-6736(20)30547-X)
12. Brazendale K, Beets M, Weaver R, Pate R, Turner-McGrievy G, Kaczynski A, et al. Understanding differences between summer vs. school obesogenic behaviors of children: the structured days hypothesis. *International Journal of Behavioral Nutrition and Physical Activity*. 2017; 14(1): 100. <https://doi.org/10.1186/s12966-017-0555-2>
13. Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, et al. The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *The Lancet*. 2020; 395(10227): 912-920. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)
14. Carey A, Povey R, Taylor J. "Waiting out the day, not living, not fun": a qualitative investigation of children's experiences of school closures due to COVID-19. *Preventing School Failure: Alternative Education for Children and Youth*. 2022: 1-14. <https://doi.org/10.1080/1045988X.2022.2132199>
15. Layachi A, Schuelka MJ. The Impact of the COVID-19 related school closure on the mental health and well-being of children with SEN and their parents in Algeria. *International Journal of Disability, Development and Education*. 2022: 1-18. <https://doi.org/10.1080/1034912X.2022.2092080>
16. Morgül E, Kallitsoglou A, Essau CAE. Psychological effects of the COVID-19 lockdown on children and families in the UK. *Revista de Psicología Clínica con Niños y Adolescentes*. 2020; 7(3): 42-48. <https://doi.org/10.21134/rpcna.2020.mon.2049>
17. Cohen S. Social relationships and health. *American Psychologist*. 2004; 59(8): 676. <https://doi.org/10.1037/0003-066X.59.8.676>
18. House JS, Landis KR, Umberson D. Social relationships and health. *Science*. 1988; 241(4865): 540-545. <https://doi.org/10.1126/science.3399889>
19. de Jong Gierveld J, Van Tilburg T, Dykstra PA. Loneliness and social isolation. In: Vangelisti AL, Perlman editors D., editors. *The Cambridge handbook of personal relationships*. Cambridge: Cambridge University Press; 2006. p. 485-500. <https://doi.org/10.1017/CBO9780511606632.027>
20. Caspi A, Harrington H, Moffitt TE, Milne BJ, Poulton R. Socially isolated children 20 years later: risk of cardiovascular disease. *Archives of Pediatrics & Adolescent Medicine*. 2006; 160(8): 805-811. <https://doi.org/10.1001/archpedi.160.8.805>
21. Morelli M, Cattelino E, Baiocco R, Trumello C, Babore A, Candelori C, et al. Parents and children during the COVID-19 lockdown: the influence of parenting distress and parenting self-efficacy on children's emotional well-being. *Frontiers in Psychology*. 2020; 11: 2584. <https://doi.org/10.3389/fpsyg.2020.584645>
22. Bandura A. Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review*. 1977; 84(2): 191. <https://doi.org/10.1037/0033-295X.84.2.191>
23. Prochaska JO, Norcross JC. *Systems of psychotherapy: a transtheoretical analysis*: Oxford: Oxford University Press; 2018.
24. Camacho-Montaña LR, Iranzo A, Martínez-Piédrola RM, Camacho-Montaña LM, Huertas-Hoyas E, Serrada-Tejeda S, et al. Effects of COVID-19 home confinement on sleep in children: a systematic review. *Sleep Medicine Reviews*. 2022: 101596. <https://doi.org/10.1016/j.smr.2022.101596>
25. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007; 19(6): 349-357. <https://doi.org/10.1093/intqhc/mzm042>
26. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today* 2004; 24(2): 105-112. <https://doi.org/10.1016/j.nedt.2003.10.001>

27. Graneheim UH, Lindgren BM, Lundman B. Methodological challenges in qualitative content analysis: a discussion paper. *Nurse Education Today* 2017; 56: 29-34. <https://doi.org/10.1016/j.nedt.2017.06.002>
28. Eriksson K, Lindström UÅ. Abduction—a way to deeper understanding of the world of caring. *Scandinavian Journal of Caring Sciences*. 1997; 11(4): 195-198. <https://doi.org/10.1111/j.1471-6712.1997.tb00455.x>
29. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, Ho RC. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health*. 2020; 17(5): 1729. <https://doi.org/10.3390/ijerph17051729>
30. Hall RC, Hall RC, Chapman MJ. The 1995 Kikwit Ebola outbreak: lessons hospitals and physicians can apply to future viral epidemics. *General Hospital Psychiatry*. 2008; 30(5): 446-452. <https://doi.org/10.1016/j.genhosppsych.2008.05.003>
31. Rubin GJ, Potts H, Michie S. The impact of communications about swine flu (influenza A H1N1v) on public responses to the outbreak: results from 36 national telephone surveys in the UK. *Health Technology Assessment*. 2010; 14(34): 183-266. <https://doi.org/10.3310/hta14340-03>
32. Sim K, Chan YH, Chong PN, Chua HC, Soon SW. Psychosocial and coping responses within the community health care setting towards a national outbreak of an infectious disease. *Journal of Psychosomatic Research*. 2010; 68(2): 195-202. <https://doi.org/10.1016/j.jpsychores.2009.04.004>
33. Xiao H, Zhang Y, Kong D, Li S, Yang N. Social capital and sleep quality in individuals who self-isolated for 14 days during the coronavirus disease 2019 (COVID-19) outbreak in January 2020 in China. *Medical Science Monitor: International Medical Journal of Experimental and Clinical Research*. 2020; 26: e923921-923921. <https://doi.org/10.12659/MSM.923921>
34. Wakefield JR, Bowe M, Kellezi B, Butcher A, Groeger JA. Longitudinal associations between family identification, loneliness, depression, and sleep quality. *British Journal of Health Psychology*. 2020; 25(1): 1-16. <https://doi.org/10.1111/bjhp.12391>
35. Hysing M, Sivertsen B, Garthus-Niegel S, Eberhard-Gran M. Pediatric sleep problems and social-emotional problems. A population-based study. *Infant Behavior and Development*. 2016; 42: 111-118. <https://doi.org/10.1016/j.infbeh.2015.12.005>
36. Mindell JA, Leichman ES, DuMond C, Sadeh A. Sleep and social-emotional development in infants and toddlers. *Journal of Clinical Child & Adolescent Psychology*. 2017; 46(2): 236-246. <https://doi.org/10.1080/15374416.2016.1188701>
37. Simon EB, Oren N, Sharon H, Kirschner A, Goldway N, Okon-Singer H, et al. Losing neutrality: the neural basis of impaired emotional control without sleep. *Journal of Neuroscience*. 2015; 35(38): 13194-13205. <https://doi.org/10.1523/JNEUROSCI.1314-15.2015>
38. Walker MP, van Der Helm E. Overnight therapy? The role of sleep in emotional brain processing. *Psychological Bulletin*. 2009; 135(5): 731. <https://doi.org/10.1037/a0016570>
39. Wang Z, Bai R, Liang J, Qi J, He X. The effect of the COVID-19 outbreak on children's behavior and parents' mental health in China: A research study. *Research Square*. 2020 Apr 16. <https://doi.org/10.21203/rs.3.rs-22686/v1>
40. De Bellis MD, Zisk A. The biological effects of childhood trauma. *Child and Adolescent Psychiatric Clinics*. 2014; 23(2): 185-222. <https://doi.org/10.1016/j.chc.2014.01.002>
41. Pagel J. The neuropharmacology of nightmares. In: Lader M, Cardinali DP, Pandi-Perumal SR., editors. *Sleep and sleep disorders: a neuropsychopharmacological approach*. New York, NY: Springer; 2006. p. 225-240. https://doi.org/10.1007/0-387-27682-3_27
42. Argyropoulos SV, Nutt DJ. Anhedonia revisited: is there a role for dopamine-targeting drugs for depression?. *Journal of Psychopharmacology*. 2013; 27(10): 869-877. <https://doi.org/10.1177/0269881113494104>

43. McEwen BS. The neurobiology of stress: from serendipity to clinical relevance. *Brain Research*. 2000; 886(1-2): 172-189. [https://doi.org/10.1016/S0006-8993\(00\)02950-4](https://doi.org/10.1016/S0006-8993(00)02950-4)
44. Tsigos C, Chrousos GP. Hypothalamic–pituitary–adrenal axis, neuroendocrine factors and stress. *Journal of Psychosomatic Research*. 2002; 53(4): 865-871. [https://doi.org/10.1016/S0022-3999\(02\)00429-4](https://doi.org/10.1016/S0022-3999(02)00429-4)
45. Charney DS, Deutch AY, Krystal JH, Southwick SM, Davis M. Psychobiologic mechanisms of posttraumatic stress disorder. *Archives of General Psychiatry*. 1993; 50(4): 294-305. <https://doi.org/10.1001/archpsyc.1993.01820160064008>
46. Lee AM, Wong JG, McAlonan GM, Cheung V, Cheung C, Sham PC, et al. Stress and psychological distress among SARS survivors 1 year after the outbreak. *The Canadian Journal of Psychiatry*. 2007; 52(4): 233-240. <https://doi.org/10.1177/070674370705200405>
47. Lubit R, Rovine D, Defrancisci L, Eth S. Impact of trauma on children. *Journal of Psychiatric Practice*. 2003; 9(2): 128-138. <https://doi.org/10.1097/00131746-200303000-00004>
48. McKenzie SH, Harris MF. Understanding the relationship between stress, distress and healthy lifestyle behaviour: a qualitative study of patients and general practitioners. *BMC Family Practice*. 2013; 14(1): 1-8. <https://doi.org/10.1186/1471-2296-14-166>
49. World Health Organization. Mental health and psychosocial considerations during the COVID-19 outbreak [Internet]. Geneva: WHO; 2020 [cited 2022 Aug 10]. Available from: https://www.google.com/url?client=internal-element-cse&cx=partner-pub-3317167162609756:3134777453&q=https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf&sa=U&ved=2ahUKEwixpo76-eroAhXGjqQKHV3fBA0QFjAAegQIABAC&usg=AOvVaw2wV_JlcTeVo0ZI-y2EhrMG