

## Original Article

# Reducing Maternal Stress in Pediatric Hospitalization during the COVID-19 Pandemic by Improving Family-Centered Care with Bedside Telehealth: A Pilot Randomized Clinical Trial

Sajjad Khaksar, Maryam Maroufi, Faramarz Kalhor\*

### Abstract

**Objective:** Stress and anxiety in the mother as one of the most important members of the child's health can delay recovery and prolong hospitalization of the child. However, families feel very anxious or stressed because of the limitations imposed by COVID-19; therefore, it is important for physicians and nurses who work with children and families to recognize and reduce family stress. This study aimed to investigate the effect of implementing an educational-supportive program on improving family-centered care with bedside telehealth.

**Method:** In this clinical trial, 40 parents with hospitalized children were selected and randomly assigned to control and intervention groups. The intervention group received a supportive training program, including teaching parental roles and supportive methods for the child and mother during the illness, while nurse counseling and support role was performed virtually as part of the intervention. After the virtual and visual implementation of the training, the father established online video communication with the child and the mother as the primary caregiver. Data collection tools were a demographic questionnaire and Stress Response Inventory (SRI) completed by the mother before and after seven days of intervention. The control group received routine care.

**Results:** After the intervention, mothers in the intervention group showed significantly lower levels of stress than before the intervention ( $P < 0.05$ ). Stress level of mothers in the control group did not demonstrate significant difference before and after the intervention ( $P > 0.05$ ). Also, a comparison of mothers' stress scores post-intervention showed significant difference between the two groups ( $P < 0.05$ ).

**Conclusion:** Planning and maintaining family integrity during the COVID-19 pandemic along with educating and supporting fathers through the supportive role of spouses can reduce stress of mothers with hospitalized children.

**Key words:** COVID-19; Fathers; Hospitalization; Mothers; Pediatrics; Stress

Nursing and Midwifery Care Research Center, Faculty of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran.

### \*Corresponding Author:

Address: Nursing and Midwifery Care Research Center, Faculty of Nursing and Midwifery, Isfahan University of Medical Sciences, Hazar Jarib Street, Isfahan, Iran, Postal Code: 7346181746.

Tel: 98-31 37927574, Fax: 98-31 6699398, Email: faramarz@nm.mui.ac.ir

### Article Information:

Received Date: 2021/09/28, Revised Date: 2021/12/25, Accepted Date: 2022/05/29



**M**others have the most important role in a child's health. Hospitalization of children can affect mental performance and attitude of parents, especially the mother, with a significant impact on the physical and mental health of the child and adverse effects on the child's illness and care during hospitalization (1).

Stress and anxiety in parents and caregiver can lead to similar problems in the child, which may prevent the mother from adapting to the hospital environment and supporting her child. Any behavioral disturbance of parents, including the mother, can affect their child negatively (2, 3). Family-centered care as a philosophy and an essential component of child care emphasize the central role of the family in children's lives, maintaining the integrity of the child's family, providing unique care, and promoting infant, child, and family health (4).

According to the concept of family-centered care, parents should be involved in all therapeutic care processes for the sick child inside and outside the hospital. Family-centered care has different benefits for parents, such as helping to maintain family relationships, while gaining skills and a sense of competence to care for the child after discharge, reducing stress and anxiety, improving relationships with health care workers, and being able to make important care decisions. This therapeutic method has many advantages for the child, such as reducing emotional stress and behavioral disorders, improving adaptation to illness and hospitalization, and increasing sense of security (5, 6). However, given that COVID-19 is now engulfing the world and considering its devastating impact, metropolises are literally under siege, making physical or social distance the best way to reduce transmission of COVID-19; thus, some pediatric hospitals have limited presence of family members and even presence of fathers, in some cases, to ensure the safety of patients, staff, and family members. This raises the question for committed staff on how to adhere to the principles of family-centered care (7, 8). On the other hand, studies have shown that poor parental bonding is associated with higher levels of parental stress, not only affecting the child's outcomes negatively but also affecting the parents themselves. Any disturbance in parental relations can be very stressful for parents, negatively affecting their ability and sense of adjustment (9); therefore, family-centered interventions and father participation can have significant effects on improving maternal support (10).

Past intervention studies have rarely examined the effects of fathers' support, their parenting role, and their relationships during infancy while focusing on maternal stress. However, different evidence shows that father involvement is very important for the developmental outcomes of children (9, 11). Absence of the father may reduce economic and social resources, increase sources of stress in the family, and reduce emotional support of the child and the mother. These, in turn, may increase the child's vulnerability to the disease and reduce the

resources needed to prevent and treat the child's illness (12).

Research has shown that the general involvement of fathers with children and engagement in child-related work reduces mothers' stress (13). However, the experience of paternal presence has not always been positive as some fathers have reported inability to care for their children, which can affect children negatively. In addition, high stress in fathers can lead to severe physiological reactions and aggressive behaviors from them, resulting in problems in child care and failure to meet the expectations of nursing staff and other family members in fulfilling the role of the father (14).

Pediatric nursing staff also face the fact that they cannot effectively care for children in need of health services without involvement of the family in their assessments (15). Among care providers, nurses play a key role in the successful implementation of Family-Centered Care (FCC). They are often the first point of contact with patients' families and have a constant bedside presence that allows them to assess family abilities, emotional states, needs, and preferences to record family members' information to meet the needs of the whole family (16); thus, the restrictions imposed by COVID-19 on the presence of family members should not violate the principles of family-centered care. Hence, setting patient care goals is a priority during the epidemic and causes normal family interaction. Rapid adaptation of methods and tools for family-centered care is necessary to circumvent the limitations of physical presence (8).

This study investigated the effect of paternal involvement using bedside telehealth through video calls on the stress of mothers considering the contradictions observed in the implementation of family-centered care and paternal engagement in the protection and support of children and mothers.

## Materials and Methods

The present study was a clinical trial with experimental and control groups and a pre-test and post-test design, registered on IRCT with IRCT20210421051029N1 ID. The study was conducted in selected hospitals of Isfahan University of Medical Sciences, and the research samples were mothers and fathers with hospitalized children. The number of participants in the study was estimated at 44 based on a formula and with the probability of losing 10% of the samples, 22 people were assigned to each group. Z1 indicated a 95% confidence factor, which was 1.96, Z2 represented the 80% test power factor equal to 0.84, and S showed an estimation from the mean standard deviation of the variable (maternal stress score) in each of the groups. Finally, d indicated the minimum difference between the mean score of the variable in two groups, reflecting the stress between the two groups, which was significant at 0.8 s. Two participants did not attend the intervention, and two others did not cooperate during the study to complete the questionnaire, leading to their exclusion (n = 2 from

each group). The remaining 40 participants were randomly assigned to control and intervention groups using Randomized Allocation Software (RAS) with the same blocks ( $n = 20$  in each group). According to the developed program, fathers participated in the child's bedside care during the hospitalization using the relevant technology (video call), in addition to presence of mothers as companions of the patient.

The inclusion criteria were parents' ability to use video calling, presence of the father in the family (not passed away, etc.), and child hospitalization for at least 7 days, while the exclusion criteria were absence and non-participation of the father in two or more sessions, dissatisfaction and the unwillingness of the child's family to continue working with the researchers, death of the child, and the child's discharge before the end of the supportive training program.

Data were collected for five months from December 2020 to May 2021 using a questionnaire on the first day of the child's hospitalization and seven days after filling in the first questionnaire (after the intervention). The demographic questionnaire assessed the number of children, education, occupation, economic status, family insurance coverage, sex, previous hospitalization, and length of hospital stay. The SRI questionnaire assessed the emotional, somatic, cognitive, and behavioral stress responses. This test is a self-report tool investigating the emotional, physical, cognitive, and behavioral responses to stress, and participants should determine how much they experience each of these symptoms on a 5-point Likert scale (from no = 0 to completely = 4). The SRI has 39 items and 7 subscales: tension (6 items), aggression (4 items), somatization (3 items), anger (6 items), depression (8 items), fatigue (5 items), and frustration (7 terms). To get the score for each tension subscale, 16 points are considered for aggression, 12 points for somatization, 24 points for anger, 32 points for depression, 20 points for fatigue, and 28 points for frustration; thus, the sum of the minimum and the maximum scores will be 0 and 156, respectively.

The SRI instrument developed by Koh *et al.* was also tested for reliability in 2001. The reliability resulting from Cronbach's alpha (internal consistency) ( $n = 215$ ) was 0.97, and the reliability of the retest method was 0.96 at a 3-week interval ( $n = 62$ ). (17) The validity of SRI instruments in Iran was investigated using Cronbach's alpha coefficient in a study conducted on 15 mothers of hospitalized children (0.941), and its validity was investigated from factor analysis by the principal components method and varimax rotation. To evaluate the convergence validity of the SRI, its correlation rate with the recent general stress assessment scales of the perceived questionnaire and SCL90-R was significant (2). Cronbach's alpha in the present study was 0.963.

Intervention measures were performed in two stages for the fathers of the intervention group, including the training and the support stages. The educational-supportive program included training and supporting

fathers with hospitalized children and their mother as the patient's primary caregiver. The content was about the child at a toddler age (behaviors and physical symptoms) and the child's illness, the effect of hospital conditions on the child and mother, teaching the role of the father in supporting the child physically and emotionally, supporting the spouse in critical situations, understanding and knowing each other, working together to solve problems, and not blaming oneself for the child. The content was based on the needs of the research units, through the researcher's relationship with them, studying existing articles and scientific texts, information from supervisors, consultants, pulmonologists and child psychiatrists and professors of pediatric nursing.

A 90-minute face-to-face individual training session was held for fathers in the intervention group father. Subsequently, although face-to-face training and presence of fathers at the children's bedside are important, fathers of the intervention group received virtual training using PowerPoint slides because of the limitations resulting from the COVID-19 pandemic. After a 90-minute session, an internet package was purchased for the parents of the intervention group; therefore, to exchange views and information between parents and researchers, the father was contacted and asked to study the educational content shared in the virtual group (WhatsApp group) before communicating with the child through video calls and social networks over 4 days (twice a day). Then, the fathers, with the cooperation and supervision of the researcher, performed the observed training by making video communication twice a day for 15 to 30 minutes each time with a video call for their child.

The father was asked to bring relaxing teaching behaviors and skills, as well as storybooks that contain colorful pictures and fun characters, musical instruments, their child's latest artwork such as a painting, or whatever they intend to show him. This not only allows the child to continue to communicate with the parents with interest, but also leads to a sense of calm in the children. At the end of the video call, people could play music and sing with each other or play age-appropriate games, and at the end, they were asked to use a "kiss" to say goodbye.

The control group completed the questionnaires at the time of admission and seven days after admission. The control group received the educational content after the completion of the research. In order not to share information between the control and intervention group samples, the trained fathers had very limited presence in the hospital. Also, because of the COVID-19 pandemic and small number of samples, the possibility of exchanging information between samples in the control and intervention groups was very low. However, the parents of the intervention group were advised not to share information.

Data were analyzed using SPSSwin16 software at the alpha level of 0.05 with Chi-square test and ANCOVA

test (Dependent Variable: Mother’s stress after, covariate: Mother’s stress before). The four excluded samples were not analyzed because they had not completed the initial questionnaire (Figure 1).

**Ethical Considerations**

To collect data, researcher was referred to selected hospitals after receiving ethics approval from the ethics committee of Isfahan University of Medical Sciences with code ID IR.MUI.RESEARCH.REC.1399.630 and getting written permission from the School of Nursing and Midwifery of Isfahan University of Medical Sciences. Then, the researcher presented the letter of introduction and explained the objectives of the research to the officials of the center and got their consent and cooperation. Selection of the samples meeting the inclusion criteria and inviting the parents to take part in the research were the next steps. To comply with the ethical standards, the researcher got written consent from the child’s legal guardian after providing the participants with sufficient information and ensuring privacy and confidentiality of information throughout the research process.

**Results**

The mean age of mothers was 29 years. Most parents of children taking part in the study had a diploma or a lower level of education. Most of the families taking part

in the study were also poor financially, and most of the families were under insurance coverage. Based on the statistical test, there was no significant difference between the two groups in terms of maternal age, level of education, economic status, and insurance coverage of families ( $P < 0.05$ ) (Table 1).

The mean age of the children taking part in this study was 24.5 months, of which 40% were hospitalized only once, about 30% were hospitalized two to three times, and about 27% were hospitalized over three times. 60% of these were hospitalized for less than a week, 40% of them for one to two weeks, and 5% of them were hospitalized for three weeks or more. Over 90% of families had one child and less than 10% had one or two children, but there was no statistically significant difference between the control and intervention groups ( $P > 0.05$ ).

Before the intervention, the mean stress scores of mothers in the control and intervention groups were 44.15 (22.01) and 41.05 (6.19). After the supportive training intervention, the mean stress scores of the mothers in the intervention and control groups were 29.85 (6.21) and 45.40 (20.67), respectively, indicating that there was significant difference between the two groups after intervention ( $P < 0.05$ ,  $F = 6.708$ ,  $\eta^2 = 0.153$ ) (Table 2).

**Table 1. Demographic Characteristics in the Intervention and Control Groups at Baseline [Mean (SD), Freq. Number (%) of Participates, [n = 40]**

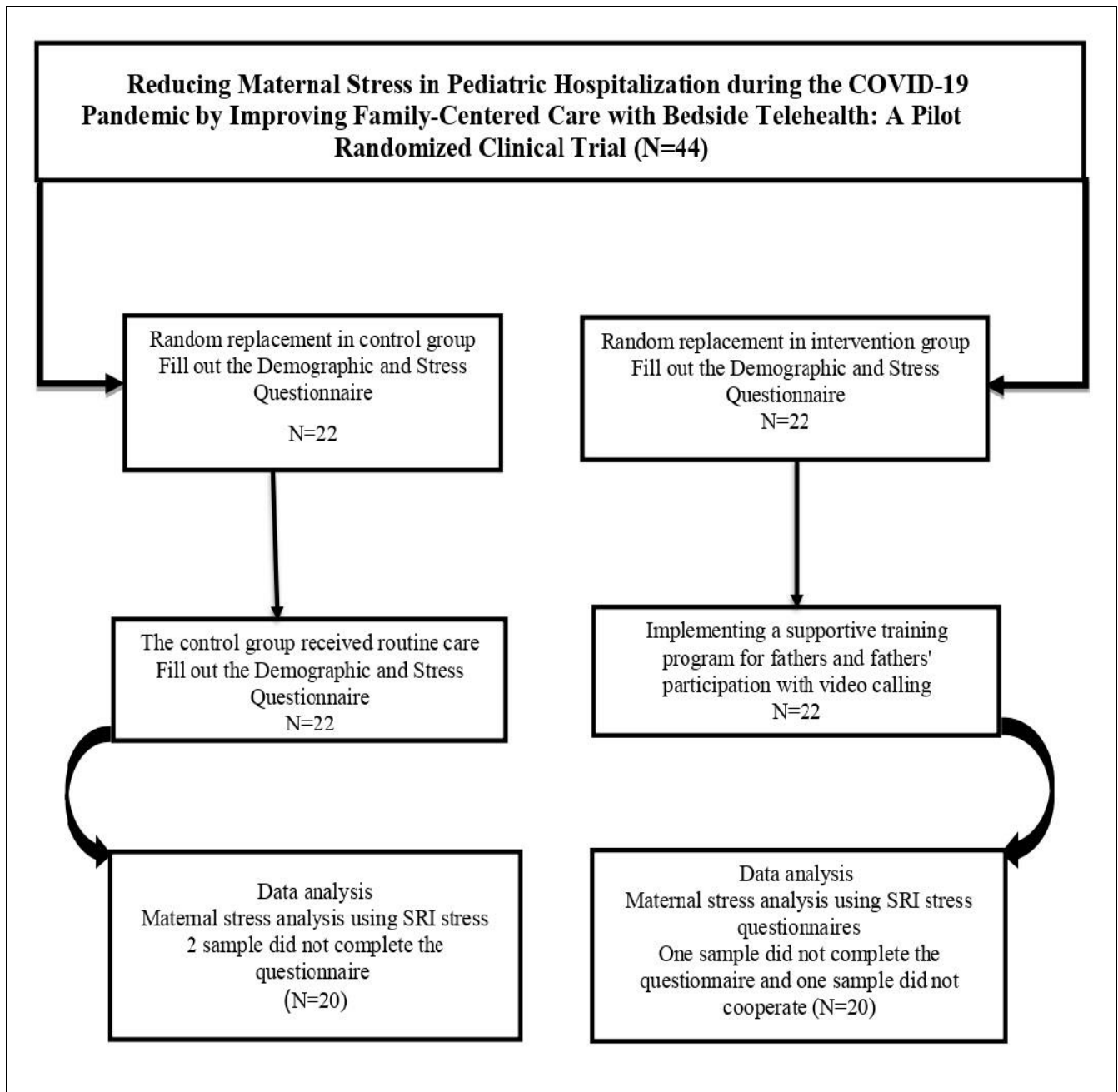
		Intervention	Control	P
	Years			
Age of mother	20-24	2(10%)	4(20%)	0.956*
	25-29	6(30%)	8(40%)	
	30-34	9(45%)	7(35%)	
	35-39	2(10%)	0(0%)	
	40-44	1(5%)	1(5%)	
	Mean (SD)	30.55(3.45)	27.6(3.39)	
	Father			
Education	under diploma	7(35%)	2(10%)	0.403*
	diploma	10(50%)	9(45%)	
	Bachelor and higher	3(15%)	5(25%)	
	Mother			
Insurance	under diploma	4(20%)	2(10%)	0.801*
	diploma	10(50%)	8(40%)	
	Bachelor and higher	6(30%)	10(50%)	
	Yes	19(95%)	18(90%)	
Economic status	No	1(5%)	2(10%)	0.868*
	Good	1(5%)	2(10%)	
	Moderate	8(40%)	6(30%)	
	Poor	11(55%)	12(60%)	0.241*

\*Chi-square test

**Table 2. Mean (SD) and Comparison of Mother Stress Scores in the Pre- and Post-Intervention Phases for Both Groups**

		Mean (SD)	F	P*	$\eta^2$
Control	Before	44.15(22.01)	6.708	0.014	0.153
	After	45.40(20.67)			
Intervention	Before	41.05(6.19)			
	After	29.85(6.21)			

\*ANCOVA (Dependent Variable: Mother's stress after, covariate: Mother's stress before).



**Figure 1. Flowchart of the Study of Reducing Maternal Stress by Family Center Care**

## Discussion

This study aimed to determine the effect of implementing an educational-supportive program for fathers on improving family-centered care with bedside telehealth and its effect on the stress of mothers of hospitalized children. The findings of this study suggest that the educational-supportive intervention of fathers virtually and video calls could decrease the mean stress scores of mothers in the intervention group significantly compared to the control group.

Mothers in the intervention group reported lower levels of stress than mothers in the control group who received routine care. This was while the mothers in the control group did not change their stress level and still reported high levels of stress. Therefore, parental intervention and the use of video calls seem to be effective in improving family-centered care and reducing maternal stress (18, 19). This reduction of stress in the mothers of the intervention group and the lack of stress reduction in the mothers of the control group can be examined from different perspectives. The study conducted by Jafarpour *et al.* showed that there was a direct and significant relationship between maternal support and stress (20). Therefore, when mothers were supported, they could better adapt to the hospitalization of the child and the hospital, which can affect different areas (21, 22). However, with the outbreak of the COVID-19 pandemic, the mental state of parents with children hospitalized is further affected (23). The study of Hamdi *et al.* showed that mothers' depression improved after the intervention, but their anxiety did not change; therefore, in future studies, it seems necessary to focus on different aspects of mothers' psychological functioning with participation of fathers (24). But one weakness of our study was lack of examination of fathers' stress as a family member. Fathers, like mothers, are exposed to stress (25), and it is necessary to pay more attention to psychological issues in them, especially in stressful conditions of the COVID-19 pandemic.

In this study, virtual interactions such as video calling and virtual training were used due to the pandemic conditions of COVID-19. Because the restriction created by COVID-19 led to a defect in family-centered care (7, 8); therefore, as in the present study, a study conducted by Hoffenkamp *et al.* used video interaction showed positive effects on parental bonding, especially for fathers. However, unlike the present study, no significant effect on stress was observed (26). Hamdi *et al.* also reported their educational intervention through WhatsApp, as in the present study, reporting a reduction in maternal stress (24).

Research conducted by Jafarpour and Hemdi showed that educational and supportive programs reduced maternal stress, which was in line with this study. However, unlike the present research, fathers were not present, and only Hemdi used WhatsApp for interventions. Hoffenkamp used video interactions in the presence of fathers similar to the present study.

Although there were positive effects on parental bonding, especially for fathers, there were no significant effects on stress, which is inconsistent with results obtained in the current study. Similar to the present study, the intervention performed by Bendixen for fathers showed a significant reduction in maternal stress (27), but the difference between this study and the present study was the research environment and the type of intervention. Hence, the present study was conducted with help from social networks, but Bendixen performed the study in-person.

The above studies showed that educational-supportive programs could be effective in reducing mothers' stress in general. Although fathers' participation, type of the educational-supportive program, intervention environment, and other conditions were effective in mothers' stress, the results generally showed that video interaction with the participation of fathers in form of an educational-supportive program could be a useful complement to standard hospital care.

## Limitation

Because of the conditions created by the Covid-19 pandemic, families had limited cooperation, which led to families not cooperating well in completing the questionnaires. Also, other support received by the mother, family differences in interpersonal and marital relationships, and other stressful issues other than the issue of hospitalization of the child were considered as limitations of the study. On the other hand, we had to conduct the study with a smaller number of samples. It is better to include more samples in future studies in this field. Fathers' stress and the effects of video calling on children themselves should also be examined in different contexts.

## Conclusion

Restrictions on attendance because of the COVID-19 pandemic have led to the breakdown of families with hospitalized children, especially mothers who are the primary caregivers for children. However, the results of this study showed that training and supporting fathers through social networks and their online involvement could affect stress in mothers with hospitalized children. Using an educational-supportive program and participation of fathers and all family members through video communication technologies can reduce mothers' stress, which matters in rapid recovery of children. Further research is recommended using larger samples and consideration of other variables such as fathers' anxiety and stress.

## Acknowledgment

The author would like to thank all the professors who contributed to the validity of the educational content, the participants in this study, and the nurses working in the pediatric wards of the selected hospitals.

## Conflict of Interest

None.

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