



Comparison of the Parenting Education Effect with Multimedia and Social Media on Nurses' Parental Stress During the COVID-19 Pandemic

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Abstract

Background: The majority of female nurses have maternal responsibilities; therefore, psychological support, parenting education, and lifestyle modifications to reduce parental stress are particularly significant for this group.

Objectives: This study aimed to compare the effects of parenting education delivered through multimedia and social media on nurses' parental stress during the COVID-19 pandemic.

Methods: This quasi-experimental research was conducted in 2020 in selected hospitals in Tehran, where participants were randomly assigned to two experimental groups (social media and multimedia) and one control group (n = 20 per group). A total of 60 female nurses were recruited through convenience sampling. In the multimedia group, nurses received four DVDs, each containing five training sessions, over a period of four weeks. In the social media group, educational materials, including voice-narrated PowerPoint presentations, were delivered via Rubika and WhatsApp messengers in 20 sessions over four weeks. The control group received no intervention. The Parenting Stress Index was used for data collection both before the intervention and two weeks after its completion.

Results: There was no significant difference in parental stress scores between the three groups before the intervention ($P = 0.956$); however, the difference after the intervention was significant ($P < 0.0001$).

Conclusions: Education delivered through social media had a greater impact on reducing nurses' parental stress compared to multimedia. This method is recommended for educating nurses to reduce stress and enhance their performance.

Keywords: Parenting Stress, Nurse, Multimedia, Social Media, COVID-19

1. Background

The COVID-19 pandemic has created an unprecedented situation for millions of families worldwide (1), introducing new challenges for parents and their children in various aspects of life. Economic concerns, impaired physical and mental health, homeschooling difficulties, and work-life balance have all contributed to increased parental stress (2-4). Additionally, the fear of contracting the disease has led to adverse psychological effects and mental health disorders (5).

The study by Huang and Zhao indicated high levels of anxiety among healthcare workers (6). Furthermore, evidence has shown that nurses experienced moderate to high levels of stress during the COVID-19 pandemic (7). As the primary providers of care, nurses are on the front lines of the COVID-19 crisis and are thus more vulnerable to developing psychological disorders such as stress and anxiety (8).

Parenting stress is a psychological condition arising from the challenges and demands of parenting, which should be distinguished from other types of stress (9). It is closely associated with parental dysfunction (10).

According to Abidin's theory, the factors triggering parenting stress can be categorized into areas related to parents, children, and life events. Stressors related to the child include their temperament and behavioral characteristics, such as adaptability and regularity. Factors affecting parenting stress include parents' expectations and perceptions of their child and themselves as parents, personality traits, performance, mental health disorders, feelings of guilt or competence, and relationships with their spouse.

Environmental stressors include marital relationships, academic conflicts, health issues, social isolation, and job changes (9). Empowering parents to manage their relationships with their children can significantly reduce parental stress (11). However, employment can play a critical role in increasing this type of stress (12). Evidence has shown that nursing as a profession, being female, and having a young child in kindergarten are factors that heighten parental stress (13).

Stress in female nurses is higher than in male nurses, which may be attributed to their dual responsibilities of childcare and housework (14). Bashirian et al. reported that nurses experienced elevated stress levels in their relationships with their children during the COVID-19 pandemic (15). The COVID-19 pandemic has had far-reaching consequences across various aspects of life, including education (16). Virtual training has gained significant attention during the pandemic (17, 18). Distance learning methods, such as e-learning (web-based technologies) and mobile-based education, are increasingly replacing traditional teaching approaches (19).

Distance learning can offer effective solutions for addressing psychological challenges (20). Social media platforms are web-based services that enable users with shared interests to exchange audio and video content (21). These platforms enhance communication and foster intergroup competition (22), provide relevant information, enable rapid information transfer (23), and influence behavioral changes (24, 25).

Another popular distance learning method is multimedia education, which is among the most cost-effective and widely utilized educational strategies globally. Educational multimedia involves teacher-learner interactions through words and images to facilitate learning (26).

2. Objectives

Given the limited evidence regarding the effectiveness of different educational methods for reducing nurses' parental stress, particularly during the

COVID-19 pandemic, this study aimed to compare the impact of parenting education delivered via multimedia and social media on nurses' parental stress during the pandemic.

3. Methods

This quasi-experimental study was conducted in 2020 with three groups (two experimental groups and one control group) in four hospitals affiliated with an organization in Tehran, Iran. The organization has eight hospitals in Tehran. A research assistant placed the names of the eight hospitals in a container. Before selecting the hospitals, the researchers predetermined that the first, second, and third selected hospitals would correspond to the multimedia, social media, and control groups, respectively. After initial sampling, the number of nurses in the second hospital was insufficient, so the fourth hospital was also included in the social media group using the same method. Sampling was conducted using a convenience method. Sixty female nurses, all with children aged 2 - 5 years, were included in the study. The sample size was calculated with a 95% confidence interval, 90% test power, based on a previous study (27), and accounting for a 10% attrition rate. Accordingly, 20 nurses were recruited for each group.

During the study, one nurse from the multimedia group and two nurses from the social media group were excluded due to contracting COVID-19 and unwillingness to continue participating. Ultimately, 19 nurses in the multimedia group, 18 nurses in the social media group, and 20 nurses in the control group completed the study.

Inclusion criteria included informed consent to participate, not attending similar educational programs during the study, not receiving simultaneous individual psychological treatment, not using psychiatric medications (either the mother or her children), having at least one child aged 2 - 5 years, and holding at least a bachelor's degree in nursing. Exclusion criteria included failure to respond to two text messages reminding participants to review educational content in the multimedia group and failure to confirm reading the content for two sessions (via the phrase "Was studied") in the social media group.

The research tools included:

(1) Demographic Characteristics Questionnaire: This included questions on the mother's age, spouse's age, mother's educational level, number of children, child's age and gender, mother's work shifts, and history of using information resources related to parenting.

(2) The Parenting Stress Index (PSI-SF): Developed by Abidin (2012) (28) includes 36 items divided into three sub-scales: "Parental Distress," "parent-child dysfunctional interaction," and "difficult child characteristics." The "parental distress" sub-scale (items 1 - 12) assesses the level of stress caused by individual factors, such as depression or conflict with a spouse, arising from the limitations associated with raising a child. The "parent-child dysfunctional interaction" sub-scale (items 13 - 24) measures dissatisfaction with the parent-child relationship, particularly when the parent does not approve of the child. The "difficult child characteristics" sub-scale (items 25 - 36) evaluates the parent's perception of the child's ability to self-regulate.

Scoring is based on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree) (29). The scoring range for each sub-scale is 12 - 60, while the total score range for the questionnaire is 36 - 180. Higher scores indicate greater parenting stress. The overall stress score is obtained by summing the scores from the three sub-scales.

The validity and reliability of the PSI questionnaire have been confirmed, with a Cronbach's alpha coefficient of 0.92 (30). Iranian researchers have also validated this tool, reporting a Cronbach's alpha coefficient of 0.90 (29). Both the demographic characteristics questionnaire and the PSI were completed by all participating nurses.

The researchers developed educational content aimed at reducing parenting stress.

The researchers developed educational content aimed at reducing parenting stress. The final content consisted of two main parts: Parenting skills and lifestyle methods for mothers. Seven psychiatric nursing professors and psychology specialists reviewed and validated the educational content. The session topics included: Parenting during the COVID-19 pandemic, characteristics and developmental stages of children aged 2 - 5, kindergarten readiness, separation anxiety, fostering a positive parent-child relationship, loving and receptive communication, recognizing and addressing children's feelings through reflective listening and sharing, effective parenting methods, creating a sense of responsibility and value in the child, behavior modification techniques, recording a child's behavior, approaches to encouraging and disciplining children, child feeding practices, managing sleep and sleep-related problems, addressing negative behaviors in children and strategies for managing them, understanding and managing emotions (both parental and child), and time management for stress reduction. The full educational content is presented in [Table 1](#).

For the multimedia group, 20 educational sessions were prepared as voiced PowerPoint presentations supplemented with relevant images. These sessions were compiled onto digital versatile discs (DVDs). Each DVD contained five training sessions, with a total duration of 90 minutes. One DVD was provided to the participants weekly over the course of one month, resulting in a total of four DVDs containing six hours of training.

To ensure participant engagement, the researcher sent a weekly text message reminding the nurses to study the provided educational content. Additionally, the researcher's phone number was made available to the nurses for addressing their questions and concerns.

In the social media group, the researcher installed an Iranian messaging app called Rubica on the nurses' smartphones and provided instructions on how to use it. A social group was created within the app, allowing all members to receive the content and exchange opinions. The researcher distributed the educational materials as voiced PowerPoint presentations, each lasting 15 - 20 minutes, over the course of four weeks. Five training modules were sent each week at a specific time, totaling 20 PowerPoint presentations shared via Rubica.

The training content provided to both experimental groups was identical. Nurses were encouraged to discuss any questions or ambiguities with the group administrator. In the control group, no intervention was performed. Two weeks after the intervention, the Parenting Stress Index (PSI) was completed again by nurses in all three groups. The intervention and data collection took place from September to December 2020.

Data analysis was conducted using SPSS software (version 21) with descriptive and inferential statistical tests. The Kolmogorov-Smirnov test was used to verify data normality, with a significance level set at $P < 0.05$. The statistical analyst was blinded to the group allocations (control or intervention).

This research was approved by the Ethics Committee of Aja University of Medical Sciences under the code [IR.AJAUMS.REC.1398.231](#). The study adhered to the principles of the Helsinki Declaration (31). The researcher explained the purpose and methods of the study to the participants, who then signed informed consent forms. The participants were assured that all information would remain confidential. At the conclusion of the study, the educational content was also provided to the control group.

4. Results

Table 1. Summary of the Content of Training Sessions

Meeting Time	Objectives and Content of the Meeting
The 1th session	Acquainting the mother with ways to raise children during the corona pandemic
The 2th session	Acquaintance of the mother with the characteristics and developmental stages of the 2 - 5-year-old child
The 3th session	Familiarity of the mother with the kindergarten and selection criteria and solving related problems
The 4th session	Mother's familiarity with separation anxiety
The 5th session	Familiarizing the parent with how to evaluate his relationship with his child
The 6th session	Mother's familiarity with how to have a romantic relationship with their child
The 7th session	Acquainting the mother with the techniques of recognizing the children's feelings through reflective listening and sharing them in the parent's feelings
The 8th session	Acquainting the mother with the methods of creating a sense of responsibility and value in the child
The 9th session	Acquainting the mother with the level of discipline regarding her relationship with her child
The 10th session	Familiarity of the mother with the rules related to correcting the behavior of their child
The 11th session	Acquainting the mother with the methods of correcting their child's behavior
The 12th session	Familiarizing mothers with how to record their children's behavior and its appropriate consequences
The 13th session	Acquainting the mother with how to correct behavior using effective encouragement, negative reinforcement and punishment
The 14th session	Acquainting the mother with solutions to her child's eating problems
The 15th session	Familiarity of the mother with her child's sleep and sleep problems and their solutions
The 16th session	Acquainting the mother with ways to deal with children's negative behaviors, such as throwing tantrums, screaming, stubbornness
The 17th session	Acquainting the mother with ways to deal with children's negative behaviors such as biting and harming others
The 18th session	Acquainting the mother with the alphabet of emotions and strategies for managing her own emotions and feelings in the role of a parent
The 19th session	Acquaintance of working mother with time management techniques

The mean ages of the nurses and their spouses were 34.24 ± 4.60 years (ranging from 26 to 44 years) and 37.58 ± 4.26 years (ranging from 28 to 47 years), respectively. The demographic information of the participants is presented in [Table 2](#).

To analyze the data, the normal distribution of quantitative variables was assessed using the Kolmogorov-Smirnov test. The one-way ANOVA test indicated no significant difference in the total parenting stress scores among the multimedia, social media, and control groups before the intervention ($P = 0.956$). However, after the intervention, the differences were statistically significant ($P < 0.0001$) ([Table 3](#)).

Post-hoc tests revealed significant differences in the total parenting stress scores between the multimedia, social media, and control groups in pairwise comparisons after the intervention ($P < 0.05$). The total stress score in the social media group was notably lower than in the multimedia group. The paired *t*-test demonstrated a significant reduction in the mean parenting stress score in both the multimedia and social media groups after the intervention ($P < 0.0001$). Conversely, no significant change was observed in the control group ($P = 0.809$) ([Table 3](#)).

The one-way ANOVA test revealed no significant differences in the scores of the parental distress sub-scale ($P = 0.176$) and the parent-child dysfunctional interaction sub-scale ($P = 0.32$) among the three groups

before the intervention. Furthermore, the Kruskal-Wallis test indicated no significant difference in the scores of the difficult child sub-scale across the three groups before the intervention ($P = 0.858$) ([Table 4](#)).

However, after the intervention, the Kruskal-Wallis test and the Median test demonstrated statistically significant differences in the total scores of the parental distress, parent-child dysfunctional interaction, and difficult child sub-scales among the three groups ($P < 0.0001$) ([Table 5](#)).

5. Discussion

This study compared the effects of an educational program aimed at empowering nurses in parenting and lifestyle through multimedia and social media on their parenting stress. Before the intervention, no significant differences were observed in the total parenting stress scores or its dimensions between the experimental and control groups. However, two weeks after the intervention, the nurses' parenting stress in the experimental groups was significantly lower than in the control group.

Additionally, the total parenting stress score in the social media group was lower than in the multimedia group, suggesting that social media education had a greater effect on reducing parenting stress compared to multimedia education. In the multimedia teaching method, interaction between the instructor and the

Table 2. Individual Characteristics of Nurses in Multimedia, Social Media, and Control Groups^a

Variables	Groups			Test, Value, df, P-Value
	Multimedia	Social Network	Control	
Age (y)	39.9 ± 4.97	33 ± 4.27	34.80 ± 4.50	One-way ANOVA, F = 1.085, df = 2, P = 0.345
Spouse's age (y)	37.35 ± 4.8	38.10 ± 4.8	37.30 ± 4.26	One-way ANOVA, F = 0.215, df = 2, P = 0.807
First child age (y)	7.3 ± 4.55	5.7 ± 3.69	7.45 ± 3.85	Kruskal Wallis, value = 3.453, df = 2, P = 0.178
Second child age (y)	2.55 ± 2.44	1.7 ± 1.95	1.85 ± 2.07	Kruskal Wallis, value = 0.899, df = 2, P = 0.638
Third child age (y)	0.2 ± 0.61	0.1 ± 0.45	0.05 ± 0.22	Kruskal Wallis, value = 0.582, df = 2, P = 0.748
Number of children	1.75 ± 0.64	1.55 ± 0.60	1.55 ± 0.51	Kruskal Wallis, value = 1.324, df = 2, P = 0.516
Education status				Chi-square, value = 5.49 df = 2, P = 0.064
Bachelor's degree	18 (90)	14 (70)	19 (95)	
Master's degree	2 (10)	6 (30)	1 (5)	
Shift work				Fisher's exact test, value = 10.535, P = 0.348
Morning	13 (65)	12 (60)	8 (40)	
Evening	0 (0)	1 (5)	1 (5)	
Night	0 (0)	2 (10)	3 (15)	
Morning & evening	2 (10)	1 (5)	3 (15)	
Evening & night	4 (20)	3 (15)	1 (5)	
In Rotation	1 (5)	1 (5)	4 (20)	
Child' gender				Chi-square, value = 5.196 df = 4, P = 0.224
First				
Girl	12 (60)	8 (40)	13 (65)	
Boy	7 (30)	12 (60)	7 (35)	
Missing data	1 (5)	0 (0)	1 (1.7)	
Second				Chi-square, value = 3.06, df = 6, P = 0.911
Girl	6 (30)	6 (30)	6 (30)	
Boy	6 (30)	4 (20)	6 (30)	
No second child	7 (35)	10 (50)	8 (40)	
Missing data	1 (5)	0 (0)	0 (0)	
Third				Fisher's exact test, value = 2.285, P = 1
Girl	1 (5)	0 (0)	0 (0)	
Boy	1 (5)	1 (5)	1 (5)	
No third child	18 (90)	19 (95)	19 (95)	
Information sources				Fisher's exact test, value = 6.855, P = 0.545
Book	4 (20)	7 (35)	7 (35)	
Magazine	0 (0)	0 (0)	1 (5)	
Radio and TV	3 (15)	2 (10)	3 (15)	
Internet	13 (65)	9 (45)	9 (45)	
Other sources	0 (0)	2 (10)	0 (0)	

Abbreviations: SD, standard deviation; df, degree of freedom.

^a Values are expressed as No. (%) or mean ± SD.

learners was minimal, with the researcher sending weekly messages to the nurses. In contrast, the social media group received daily messages. Consequently, nurses in the social media group received smaller portions of educational content at each stage, which likely increased their motivation to study.

In the multimedia group, training was provided via DVDs, requiring nurses to use a personal computer or laptop, which introduced time and location constraints

for studying the educational content. Conversely, in the social media group, educational content was delivered through the Rubika messenger app, allowing nurses to access the material on smartphones at any time and from any location. These findings align with those of previous studies (1, 32, 33).

James Riegler et al. reported that remote parenting psychiatric interventions effectively reduced depression, parental stress, and dysfunctional family

Table 3. Comparing the Total Parenting Stress Score of Nurses Before and two Weeks After the Intervention in Three Groups^a

Parenting Stress and Groups	Before Intervention	After Intervention	Value, df, P-Value
Multimedia	82.8 ± 15.35	71.16 ± 9.974	$t = 4.577^b$, $df = 18$, $P < 0.0001$
Social media	81.50 ± 18.44	51.11 ± 3.48	$t = 8.762^b$, $df = 17$, $P > 0.0001$
Control	82.9 ± 15.23	82.30 ± 1.74	$t = -0.245^b$, $df = 19$, $P = 0.809$
Value; df; P-value	$F = 0.045^c$, $df = 2$, $P = 0.956$	$F = 37.796^c$, $df = 2$, $P < 0.0001$	

Abbreviations: SD, standard deviation; df, degree of freedom.

^a Values are expressed as mean ± SD.

^b Paired *t*-test.

^c One way ANOVA.

Table 4. Comparison of Scores of Nurses' Parenting Stress Sub-scales Between Three Groups Before the Intervention

Sub-scales and Group	Mean ± SD	Mean Rank	Value, df, P-value
Parental distress			$F = 1.792^a$, $df = 2$, $P = 0.176$
Multimedia	30.50 ± 7.71	-	
Social media	26.50 ± 6.84	-	
Control	29.25 ± 5.83	-	
Parent-child dysfunctional interaction			$F = 1.16^a$, $df = 2$, $P = 0.32$
Multimedia	25 ± 5.66	-	
Social media	27 ± 4.55	-	
Control	27.25 ± 5.07	-	
Difficult child			Value $b = 0.305$, $df = 2$, $P = 0.858$
Multimedia	27.30 ± 9.47	30.88	
Social media	28 ± 9.87	31.8	
Control	26.40 ± 8.33	28.83	

^a One-way ANOVA.

^b Kruskal Wallis.

dynamics in families of military veterans during the COVID-19 pandemic (1). Both the current study and Riegler's study were conducted during the COVID-19 pandemic and utilized virtual education methods. Riegler employed "Online Parenting Pro-Tips" and web-based education to teach child development and positive parenting through video conferencing. This training spanned two weeks and included six sessions.

Although live webinar training, as used in Riegler's study, allows for more interaction between instructors and learners, it requires live video conferencing and access to high-bandwidth internet. In contrast, the present study utilized multimedia and social media training methods, which require fewer resources and are more cost-effective than live online training.

Ngai et al. demonstrated that mothers who received behavioral therapy via telephone had significantly lower levels of parenting stress compared to those who

received only usual postpartum care at six weeks (33). However, their study differs from the current one in terms of the target population and educational method.

The findings of Zahedpasha's study highlighted the effectiveness of virtual education in reducing stress and anxiety among parents of premature infants hospitalized in neonatal intensive care units. Their study utilized virtual education and Telegram application groups over a four-day period, with training delivered in groups of 2 - 10 parents (both mothers and fathers) at different times. While their study shares similarities with the current study in terms of using virtual education, it differs in target population and educational content (32).

This study demonstrated a significant reduction in nurses' parenting stress in the multimedia group following the intervention. Additionally, there was a notable improvement in the mean scores of the sub-

Table 5. Comparison of the Sub-scales the Total Parenting Stress of the Subjects two Weeks After the Intervention Between the Test and Control Groups

Sub-scales and Groups	Mean ± SD	Mean Rank	Median <	Medium ≥	Test, Value, df, P-value
Parental distress					Value = 33.507 ^a , df = 2, P < 0.0001, median ^b = 24, chi-square = 26.506, df = 2, P < 0.0001
Multimedia	26.47 ± 6.95	35.24	12	7	
Social media	16.22 ± 1.99	10.50	0	18	
Control	28.45 ± 6.38	39.73	16	4	
Parent-child dysfunctional interaction					Value = 18.593 ^a , df = 2, P < 0.0001, median ^b = 22, chi-square = 21.733, df = 2, P < 0.0001
Multimedia	22.32 ± 5.26	25.66	7	12	
Social media	20.22 ± 1.93	18.86	2	16	
Control	27.45 ± 5.6	41.30	17	3	
Difficult child					Value = 29.734 ^a , df = 2, P < 0.0001, median ^b = 19, chi-square = 23.687, df = 2, P < 0.0001
Multimedia	22.37 ± 5.15	35.26	13	6	
Social media	14.67 ± 14.67	11.53	0	18	
Control	26.40 ± 9.41	38.78	14	6	

Abbreviations: SD, standard deviation; df, degree of freedom.

^a Kruskal Wallis.

^b Median's test.

scales, including “parental distress,” “parent-child dysfunctional interaction,” and “difficult child characteristics,” compared to pre-intervention scores. Similarly, in the social media group, parenting stress and its sub-scales significantly decreased after the intervention. Evidence suggests that the capacity of social networks can be effectively utilized for education, fostering idea exchange, identifying problems and solutions, building social relationships, and managing organizational activities (34). Education through social networks is multimodal, offering flexibility in terms of time and place. This method facilitates the easy transfer of information, thereby enhancing the teaching and learning process (35).

A limitation of this study was the initial reluctance of some nurses to install the Rubika software on their phones. To address this, the researcher explained the study's objectives and encouraged participation by emphasizing the potential benefits of the intervention.

4.1. Conclusions

This study demonstrated that teaching parenting skills and lifestyle strategies through multimedia and social media effectively reduces parenting stress among female nurses. Given that nursing is one of the most stressful professions and female nurses often balance

multiple responsibilities, including maternal duties, it is essential to provide psychological support, empower nurses in parenting and healthy living, and offer targeted training to alleviate parenting stress, particularly during challenging times like the COVID-19 pandemic.

When designing interventions for nurses, factors such as the cost of the intervention, the novelty of the approach, and the demanding nature of nurses' work schedules should be considered. Based on the findings, multimedia training methods and, especially, social media platforms are recommended to empower nurses in parenting and healthy lifestyle practices while reducing their parenting stress. Furthermore, fostering interaction between participants and instructors and encouraging peer engagement are critical for maximizing the effectiveness of such training programs.

Future research should focus on comparing emerging remote training methods, such as online classes and webinars, to explore their potential for improving participant engagement and enhancing outcomes in stress reduction and empowerment initiatives.

Footnotes

Authors' Contribution: All authors were responsible for the study conception and design, data collection and analysis, preparing draft of manuscript and made critical revisions to the paper for important intellectual content and English editing.

Conflict of Interests Statement: The authors of the article declare that there is no conflict of interest in writing this article.

Data Availability: The dataset presented in the study is available on request from the corresponding author during submission or after publication.

Ethical Approval: The Ethics Committee of Aja University of Medical Sciences approved this study (ID: IR.AJAUMS.REC.1398.231).

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Informed Consent: Informed consent was obtained from all participant. The nurses were allowed to voluntarily participate in the study, and withdraw whenever they liked. Nurses were assured that all information would be kept confidential.

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