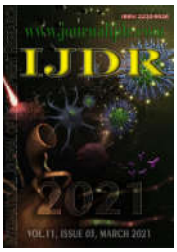
ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 11, Issue, 03, pp.45715-45719, March, 2021
https://doi.org/10.37118/ijdr.21469.03.2021



RESEARCH ARTICLE OPEN ACCESS

STRESS MATERNAL IN THE NEONATAL INTENSIVE CARE UNIT: EFFECT OF THE EDUCATIONAL BOOKLET

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ARTICLE INFO

Article History:
Received 05th January, 2021
Received in revised form
27th January, 2021
Accepted 20th February, 2021
Published online 30th March, 2021

Key Words:

Intensive Care Units, Neonatal;
Neonatal Nursing;
Stress, Psychological.

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ABSTRACT

Background: Maternal stress is experienced by mothers with children in the neonatal unit.The objective of this study was to evaluate the occurrence of maternal role-related stress in a Neonatal Intensive Care Unit before and after the application of an educational booklet. *Methods:*A quasi-experimental study was carried out. The stress level was assessed using the "relationship and parental role" subscale in a single group. Participants were evaluated in three moments: before the intervention (educational booklet) in the first three days of hospitalization of the newborn, and in two moments after the intervention (at the first and second week of hospitalization).Central tendency measures from the three moments were compared using the Friedman test. A significance level of ≤ 0.05 was set. ***Results:*** Eighty-six mother-baby dyads participated in the first two moments, and 70 in the third moment at the second week of hospitalization. The results show that the first three days of hospitalization were the most stressful, and there was a reduction in stress levels according to most of the evaluated items ($p < 0.05$) after the intervention except for the item "Being separated from my baby " ($p > 0.05$). ***Conclusion:*** It is concluded that the reading of the educational booklet had a positive effect in reducing the levels of stress related to the performance of the maternal role. ***Tweetable abstract*:** Educational technology offers information that reduces maternal stress during the premature baby's hospitalization.

Citation: ***Aliniana da Silva Santos; Lidiane do Nascimento Rodrigues; Talita Almeida de Oliveira; Maria Solange Nogueira dos Santos et al.*** "Stress maternal in the Neonatal Intensive Care Unit: effect of the educational booklet.*", International Journal of Development Research*, 11, (03), 45715-45719.

INTRODUCTION

The hospitalization ofa child in a Neonatal Intensive Care Unit (NICU) triggers a greater stress experience for parents, as this environment denotes that the baby's life is at risk (Foch et al,.2016). The complex environment of the NICU is surrounded by technologies. This fact added to the early separation of the mother-baby dyad, and the impossibility of taking care of the child makes mothers experience several feelings (especially those who experience hospitalization intensely), such as fear, sadness, anguish, anxiety, and even depression (Rolim et al., 2016). Maternal stress can be triggered

Another stressor is related to the unpredictability of the newborn's clinical condition (Kegler et al,. 2019). The mixed feelings experienced by mothers is commonly related to the feeling that they are mere spectators of the care for their children – they are deprived of changing diapers, cleaning and feeding(Bader et al.,2017). This feeling of incapacity in the face of the child's hospitalization and the lack of protagonism in the maternal role are the main factorsthat cause stress in NICU mothers (Ramos et al ,.2019). There are reports of maternal distress due to the health condition of NICU children added to the restrictions imposed to the care of the newborns, with mothers being deprived of any participation in it, making them struggle with idleness in the hospital environment (Almeida et al,. 2018), in addition to sadness and regret for not being able to perform

The quality of the mother-baby relationship is important to increase or soften the negative impact of hospitalization (Brader et al., 2019). Some mothers feel guilty and inefficient for being separated from their children and for not knowing how to take care of them (Penjvini et al.,2015). At the same time, they experience insecurity to care for their babies, in the face of scenarios that involve diversified technologies. If those women are not supported and helped, they feel that they are not able to provide the minimum care that their children need. In addition, physical tiredness compromises their well-being and hinders theirmaternal roleperformance (Santos et al., 2020). Failures in communication and support to mothers by health professionals are observed, affecting the interaction between mother and newborn, which may result in their distance or non-cooperation during hospitalization(Kadivar et al., 2016). It is essential that educational instruments are applied with mothers to facilitatethe care for their babies. Notably, this participation seems to reduce maternal stress levels. Given the above, the healthcare team plays a crucial role in helping mothers adapt to the hospital environment and enabling their participation in the baby's care during the stay in the NICU. Therefore, the communication between health professionals and mothers must be effective to reduce anxiety and suffering, especially through the enhancement of the understanding of the real situation of the newborn (Santos et al., 2017). In this context, thisstudy aimed to evaluate the occurrence of maternal role-related stress in a Neonatal Intensive Care Unit before and after the application of an educational booklet

MATERIALS AND METHODS

Study design: A quasi-experimental study was carried out andassessed the effect of an educational booklet(Santos et al., 2020)in the level of stress of mothers using the "relationship and parental role" subscale from the Parental Stress Scale (Portuguese version) (Souza and Dupas, 2012). in a single group. The study was registered on February 6, 2019 at the Brazilian Registry of Clinical Trials: RBR-4yy2f8.

Measures and procedures: The "change in parents' role" subscale was used in this study. The original translated and validated scale (Souza and Dupas.,2012) is composed of 26 items distributed in three subscales which are "sight and sounds", "look and behaviour", and "relationship and parental role".In this research, only the sub-scale "relationship and parental role" was used and its items indicate whether mothersexperience stress related to the following situations:"Being separated from my baby","Not feeding my baby myself"; "Not being able to care for my baby myself"(for example, changing diapers, bathing); "Not being able to hold my baby when I want"; "Feeling helpless and unable to protect my baby from pain and painful procedures";"Feeling helpless about how to help my baby during this time"; and"Not having time to be alone with my baby"(Souza and Dupas.,2012). The answers were marked on a reversed Likert scale from 1 to 5, in which 1 means "not stressful" and 5 means "extremely stressful"(Souza and Dupas, 2012).The subscale was applied at three different times. The first time wasduring the assessment of maternal stress before applying the booklet (day 0 to day 3 of the newborn's hospitalization in the NICU). Then, the educational intervention using the booklet(Santos et al., 2020)was performed (booklet reading and reflection) by a nursing technician trained by the researcher. From that, two more evaluative moments were developed – one in the first week (between 4 and 7 days of hospitalization) and the other in the second week (between 8 and 14 days). The research was carried out from November 2018 to June 2019, in a public hospital in the city of Fortaleza, Ceara, Brazil. The sample consisted of mother-baby dyadsin the NICU with a gestational age of 31 to 36 weeks and 6 days. The sample size was calculated using the finite population formula, with P = 80% (expected percentage of mother-child bond), significance level of 5% (α= 0.05), and relative sampling error of 8.6% (absolute sampling error = 6.9%). Considering that the population was finite (N = 210 mothers), the sample of size (n) was equal to 80. The final sample was composed by 86 mother-baby dyads in the pre-intervention/first week with a loss of 16 dyads in the second week of follow-up. Mothers with less than eight years of education were excluded as this was the minimum educational level required to understand the educational booklet (Santos et al., 2020), as well as mothers of newborns with congenital malformation, and those who were discharged before the post-intervention phase at the first week of hospitalization, in view of the need to compare variables before and after the intervention. Babies who were discharged before the second week of hospitalization were considered as losses. The following data collection instruments were applied: 1) a socio-demographic form; 2) the "relationship and parental role" subscale (Souza and Dupas. 2012); 3) the educational booklet with explanations about equipment, procedures and care routines in the NICU, and care routines that can be performed by the mothers(Santos et al.,2020).

Analysis: Data were tabulated and analyzed in a descriptive and inferential manner using simple frequencies, averages, and standard deviation. The variables were tested for normality using the Kolmogorov-Smirnov test. The central tendency measures were compared between the three moments using the Friedman test. A significance level of 5% ($p < 0.05$) was setin the assessment of the effect of the educational technology on maternal stress. Data were processed using the statistical software SPSS 20.0 (license number 10101131007).

Ethical considerations: Ethical aspects of research involving human beings were respected and the project was approved by the General Hospital of Fortaleza Ethics Committee. Participation was voluntary and all mothers signed the free and informed consent form.

RESULTS

Eighty-six mother-baby dyads participated in the pre-intervention and post-intervention moments in the first week of hospitalization, with a loss of 16 dyads after the third moment (at thesecond week of hospitalization), totaling 70 dyads. The 16 follow-up losses were due to 12 discharges from the babies in the first week, and four transfers to other hospitals. The mothers' mean age was27 years (SD = 7.3) and 61.6% of the sample were between 20 and 34 years old. Most motherswere brown by self-report (72.1%), married or cohabiting(82.6%),have finished elementary school (48.8%)or high school (45.3%), were unemployed (73.3%), with a monthly family income of 1 to 2 minimum wages (59.3%), and have had only one child (53.5%).

Table 1.Characterization of the mothers, Fortaleza, Ceara, Brazil, 2019

Variables	f (%) *
Socio-demographic variables	
Age	
14-19	16 (18.6)
20-34	53 (61.6)
35-43	17 (19.8)
Marital status	
Single	15 (17.4)
Married/cohabiting	71 (82.6)
Educational level	
Elementary school	43 (50)
High school	39 (45.3)
University education	04 (4.7)
Skin color	
White	16 (18.6)
Black	07 (8.1)
Brown	63 (73.3)
Currently employed	
Yes	23 (26.7)
No	63 (73.3)
Family income	
(minimum wages)	
Less than 1	33 (38.4)
Between 1 and 2	51 (59.3)
Between 3 and 4	02 (2,3)
Number of children	
<2	46 (53.5)
≥2	40 (46.5)
Clinic variables	
Type of Delivery	
Vaginal	27 (31.4)
Cesarean	59 (68.6)
Planned pregnancy	
Yes	42 (48.8)
No	44 (51.2)
Number of prenatal consultations	
<6	37 (43)
≥ 6	49 (57)

f = Frequency*

Table 2. Description of the mothers' responses to the items of the subscale "relationship and parental role" in the three moments of evaluation. Fortaleza, Ceara, Brazil, 2019

Occurrence of stress	Pre-intervention		1st week		2nd week		
	N (%)	AV ± SD*	N (%)	AV ± SD	N (%)	AV ± SD	p^a
1. Being separated from my baby		4.0 ± 1.2		4.0 ± 1.1		3.6 ± 1.4	0. 188[b]
Not stressful	2 (2)		3 (3)		8 (11)		
A little stressful	12 (14)		9 (10)		10 (14)		
Somewhat stressful	10 (12)		10 (12)		10 (14)		
Very stressful	23 (27)		28 (33)		22 (31)		
Extremely stressful	39 (45)		36 (42)		22 (31)		
2. Not feeding my baby myself		3.8 ± 1.1		3.2 ± 1.5		2.4 ± 1.4	<0.0001[b]
Not stressful	2 (2)		17 (20)		28 (40)		
A little stressful	13 (15)		16 (19)		13 (18)		
Somewhat stressful	11 (13)		8 (9)		8 (11)		
Very stressful	35 (41)		19 (22)		15 (21)		
Extremely stressful	25 (29)		26 (30)		7 (10)		
3. Not being able to take care for my baby myself		3.9 ± 1.0		3.5 ± 1.3		2.8 ± 1.3	<0.0001[b]
Not stressful	1 (1)		7 (8)		15 (21)		
A little stressful	10 (12)		16 (19)		17 (24)		
Somewhat stressful	15 (17)		12 (14)		13 (18)		
Very stressful	31 (36)		28 (32)		20 (28)		
Extremely stressful	29 (34)		23 (27)		6 (9)		
4. Not being able to hold my baby when I want		3.9 ± 1.1		3.7 ± 1.2		3.02 ± 1.4	<0.0001[b]
Not stressful	1 (1)		6 (7)		11 (15)		
A little stressful	10 (12)		10 (12)		19 (27)		
Somewhat stressful	16 (19)		10 (12)		9 (13)		
Very stressful	26 (30)		35 (40)		21 (30)		
Extremely stressful	33 (38)		25 (29)		11 (15)		
5. Feeling helpless and unable to protect my baby from pain and painful procedures		4.2 ± 1.1		4.1 ± 1.0		3.7 ± 1.3	0.048[b]
Not stressful	2 (2)		2 (2)		4 (5)		
A little stressful	7 (8)		9 (11)		12 (17)		
Somewhat stressful	9 (11)		3 (3)		8 (11)		
Very stressful	21 (24)		37 (43)		21 (30)		
Extremely stressful	47 (55)		35 (41)		26 (37)		
6. Feeling helpless about how to help my baby during this time		4.0 ± 1.2		3.6 ± 1.3		3.1 ± 1.4	0.002[b]
Not stressful	4 (5)		6 (7)		10 (14)		
A little stressful	10 (12)		16 (19)		16 (23)		
Somewhat stressful	6 (7)		16 (19)		14 (20)		
Very stressful	29 (34)		17 (20)		16 (22)		
Extremely stressful	37 (43)		31 (35)		15 (21)		
7. Not having time to be alone with my baby		3.8 ± 1.2		3.4 ± 1.3		3.2 ± 1.4	0.005[b]
Not stressful	5 (6)		5 (6)		11 (16)		
A little stressful	11 (13)		21 (24)		17 (24)		
Somewhat stressful	11 (13)		15 (17)		8 (11)		
Very stressful	27 (31)		23 (27)		18 (25)		
Extremely stressful	32 (37)		22 (26)		17 (24)		

*AV = Average SD = Standard deviation [a]Friedman test [b]$p < 0.05$

Table 2 shows the occurrence of maternal role-related stress during the child's hospitalization in each moment of data collection.Table 2 showed that the educational booklet was effective in reducing the stress levels experienced by mothers during the baby's hospitalization ($p < 0.05$) except for the item "Being separated from my baby" ($p > 0.05$).At the NICU where the study was conducted, mothers who are discharged after delivery do not have a place to spend the night in the hospital. When assessing stress in relation to the maternal role performance, it was noted that the first three days of hospitalization were the most stressful, with higher averages of stress compared to the first and second week of hospitalization. Comparisonsbetween the pre- and post-intervention results showed that the educational booklet was effective in reducing the maternal role-related stress based on the scale items used in the study.

DISCUSSION

In this study, most mothers reported to be married or cohabiting. This is an important fact since mothers who haveemotionally involved partners, who areconcerned with their well-being,have an important source of family support, which in turn mayaffect the baby's care and evolution positively (Oliveira et al,.2013).

Another characteristic found among the participants was cesarean delivery, which is the most prevalent delivery method in premature births due to the risks involved and to preserve mother's and baby's lives(Naidon et al., 2016). The item "Being separated from my baby" was the only one that showed no statistical difference between the threeanalyzed moments. The child's hospitalization is a major difficulty for a mother, particularly at discharge after delivery, as the mother goes home, and the child remains hospitalized (Donelli., 2017).Although it is necessary, this may hamper the development of the maternal role (Medina et al,.2018). Newborn care is inherent to motherhood, however, in the NICU environment there are many restrictions. The mothers' experience within the NICU is permeated by the desire to participate in the care of their children (Fraga et al., 2019). However, the baby's care is often restricted to health professionals due to the clinical condition of the newborns or due to a lack of awareness about the importance of inserting mothers in basic care routines(Fraga et al., 2019). Some mothers feel guilty for being separated from their children and for not knowing how to take care of them (Penjvini et al., 2015). The fact that NICU mothersare unable to hold, caress, and cuddletheir babies causes frustration.Mothers who are encouraged to touch their babies inside the incubators usually are afraid due to the clinical situation to which the baby is exposed (Santos and Teixeira., 2017).

Whenever women can breastfeed, hold, and interact with their babies, they begin to feel useful and to recognize their role as mothers (Mercer.,2006). The literature reports that maternal participation in the child's recovery is related to breastfeeding and participating in care routines (Roso et al., 2014). It was observed that NICU mothers encouraged to breastfeed their babies felt proud, fulfilled all feeding schedules, and breastfed their children with great happiness (Donelli et al.,2017).Mothers who are encouraged to touch, hold their babies, and participate in the NICU care routines experience interactions with their child, have reduced stress, and understand the importance of their presence for their babies's treatment, getting calmer in the face of the hospitalization(Roso et al., 2014). The nursing team must recognize the mother as an active participant in the care provided in the NICU and must train them to take care of their babies. Professionals should also have sensitivity to understand the mothers' moment of distress, in order to help themto understand what is happening (Cartaxo et al,. 2014). Properly orientedmothers usually choose to be close to their babies and to take care of them. The physical touch is a form of proximity between mother and child, along with to skin-to-skin contact, holding or caressing the baby, among other interactions (Mäkelä et al.,2018). The educational booklet (Santos et al., 2020) informed mothers about maternal care that could be performed at the hospital and the importance of the interaction between mother and child.(Afio et al.,2014).The participants' knowledge about the study subject was improved (Kegler et al.,2019). In this sense, educational instruments facilitate the work of the health team in the guidance of family members, favor learning, and complement verbal guidelines making them easier to understand and corroborating with the change of behaviors

Limitations

The study was conducted in just one NICU, thus, it is not possible to generalize the implications of the education booklet on the maternal stress experienced in other intensive care units.

Clinical implications: This study showed that the encouragement of maternal participation in care routines at the NICU reduces the maternal level of stress, being considered as part of the humanization of neonatal care.The importance of educational technologies for nursing care is emphasized and it is believed that knowledge and professional support help mothers to minimize stress experienced in their trajectories in the NICU.

CONCLUSION

In conclusion, it was found that reading the booklet reduced the stress related to the maternal role experienced by mothers in the neonatal unit, therefore, the effect of using educational technology improved maternal stress during hospitalization. Thus, reading the booklet with the guidelines for maternal care, contributed to the mother's care for the baby. Educational technology is important in the care context, as it contributed to the reduction of maternal stress.

Conflict of interest statemen: The authors declare that there are no conflicts of interest.

Acknowledgments and funding: This research was supported by the fellowships granted by Coordination for the Improvement of Higher Education Personnel (CAPES) and National Council for Scientific and Technological Development (CNPq)

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