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ORIGINAL PAPER

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Preterm Parents' Stress and Coping Strategies in a Neonatal Intensive Care Unit in a University Hospital of Central Greece

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ABSTRACT

Background: The early birth of a newborn and the hospital care in the intensive care causes stress to parents. **Objective:** The main objective of this study was to investigate preterm parents' level of stress and which coping strategies do they use in a Neonatal Intensive care Unit in a University Hospital of Central Greece. **Methods:** This cross-sectional study used a group of 82 preterm parents in the Neonatal Intensive care unit in a University Hospital of Central Greece. They were asked to answer a questionnaire with the Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU), Coping Orientation to Problems Experienced (BRIEF/COPE), Daily Spiritual Experience Scale (DSES). The McNemar test was used to compare fathers' and mothers' views on psychological support. The paired t-test or the Wilcoxon-signed rank test was used to compare scores between fathers and mothers. The levels of importance are bilateral and the statistical importance was defined as 0.5. For the analysis SPSS 22.0 was used. **Results:** The most common cause of admission to NICU was low birth weight. The severity of the preterm's condition was found to be independently correlated with PSS-NICU score due to "sights and sounds" and due to "Infant Appearance and behaviour" in the NICU. The severity of the child's condition and the parents' DSES score were found to be independently correlated to the stress score due to their "parent-infant relationship". Mothers' and fathers' scores on the dimensions of the Brief-COPE Questionnaire were similar, suggesting a similar way of managing stress. Substance use, religion, humor were found to correlate with total score of PSS-NICU. More specifically PSS-NICU

correlated negatively with substance use ($r=-0.30$ $p=0.009$) and humor ($r=-0.28$ $p=0.016$) while it correlated positively with religion ($r=0.29$ $p=0.011$).

Conclusion: Mothers and fathers of preterm need support. Spirituality and religion, helps then face the challenges of having their baby hospitalized in a NICU.

Keywords: Neonatal Intensive Care Unit, preterm neonates, PSS-NICU, spirituality, DSES.

1. BACKGROUND

Prematurity is a major cause of perinatal, neonatal mortality and morbidity worldwide with significant medical, psychological, economic and social consequences (1). It is estimated that one million preterm neonates die each year due to complications of prematurity and is the most common cause of infant mortality under the age of five worldwide (2). According to the World Health Organization (WHO), preterm neonates are born alive before 37 weeks of gestation (<259 days) (3). The rate of preterm birth in the US is around 9-12% and 5-7% in Europe (4).

Preterm neonates during hospitalization have an increased risk of serious complications, resulting in potential neurodevelopmental problems. The more severe the prematurity, the more common it is to develop some form of severe or mild neurodevelopmental disorder, including cerebral palsy, epilepsy, moderate or severe mental retardation, sensory impairment in hearing or hearing, hearing or learning. mental retardation, difficulties in executive functions, visual-motor coordination, behavioral-emotional-socialization problems,

autism spectrum disorder (5).

The arrival of a new baby is an exciting moment but it creates stress for each of the parents, the couple and the family. The new member upsets the existing balances and demands from its members to adapt to the new parental roles. In the NICU environment, parents may feel their parenting role diminished as a result of professionals and policies governing interactions between parents and their infants (6, 7).

The preterm neonate may present a number of health problems and has to be admitted to Neonatal Intensive Care Units. Parents have to face uncertainty of their baby's survival, the separation from it, the long-term hospitalization, the long-term effects of prematurity, that may contradict the parents' expectations of the "perfect child", leading them to feel stress, anger, depression and post-traumatic stress disorder (8, 9). The causes of parental stress may be due to the severity of the disease, long-term effects of prematurity on the child's adult life. in socioeconomic, biological, and emotional factors (10).

2. OBJECTIVE

The main objective of this study was to investigate preterm parents' level of stress and which coping strategies do they use in a Neonatal Intensive care Unit in a University Hospital of Central Greece. Moreover, it was investigated if preterm parents' spirituality level helped them deal with their stress.

3. MATERIAL AND METHODS

Participants

This is a cross-sectional descriptive correlational study. The sample of the study includes 82 parents (41 mothers and 41 fathers) of preterm neonates who were admitted in the Neonatal Intensive Care Unit of a University Hospital of Central Greece. The Sample selection criteria were: 1. To know and understand the Greek language 2. not to suffer from any mental illness 3. To wish to participate in the research 4. one week of hospitalization in Neonatal Intensive Care Unit

The study was approved by the Ethical Committee of the University hospital of Larissa and parents were informed about the of the purpose of the study. All measures were taken to ensure confidentiality of the information given by participants. Parents gave their consent to participate in the study.

Research questions

a) Neonatal care in the Neonatal Intensive Care Unit creates a higher level of stress in mothers than in fathers; b) Spirituality is one of the coping strategies that women use more than men in order to cope with stress due to their children hospitalization in NICU.

Research questionnaire

Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU)

In the Parental NICU Stress model (11), NICU environment stressors directly influence parents' stress response. Four major NICU environment stressors were identified and described in detail by Miles, Funk & Carlson (12). First, the factor "sights and sounds" was described as the physical

environment, including the machines, equipment, lights, noises, infants, and staff. Second, the factor "infant appearance and behaviour" was described as how a parent's infant looked and behaved, usually quite different to a healthy new born infant because of illness and medical treatments. Third, the factor "parent-infant relationship" was described as alterations to the normal parent-infant relationship and parental role, due to nurses being the primary caregivers. Fourth, the factor "staff" was described as staff communication and behaviour towards the parents about their infant's condition or treatment. PSS: NICU is designed to measure parental perception of stressors arising from the physical and psychosocial environment of the neonatal intensive care and it contains 46 items and four subscales: 1) Sights and Sounds; (5 items) 2) Infant Appearance and behaviour; (19 items) 3) parent-infant relationship; (10 items) and 4) Staff. (11 items).

Cronbach's alpha of each subscale was: "infant appearance and behaviour" 0.92, parent-infant relationship 0.90, Sights and Sounds 0.80, total score PSS-NICU 0.94. For grading method 2 are: infant behavior and appearance 0.83, parental role differentiation 0.83, images and sounds 0.73, total score 0.89 (12). PSS-NICU is a self-report questionnaire, which is rated on a five-point Likert-Scale: 1 = not at all stressful, 2 = a little stressful, 3 = moderately stressful, 4 = very stressful, and 5 = extremely stressful. Stress was defined as feeling anxious, upset or tense. Items describing situations that have not been experienced by the parents can also be answered with "not applicable." Miles and colleagues set an exclusion criterion for the situations described in the questionnaire. Since 2/3 of most parents did not experience a situation, it was deleted from the scale. Thus, the subscale "staff" was withdrawn due to the rare reference by parents (12). A final question was added by the research team, which asks parents to answer how stressful the overall experience at NICU was on a ten-point scale on the same 5-point scale (12). This scale was used because in a systematic review by Sabnis et al (7) it was the most frequently used in order to assess aspects of distress, in NICUs.

Coping Orientation to Problems Experienced (BRIEF-COPE)

The Brief-COPE is a 28 item self-report questionnaire designed to measure effective and ineffective ways to cope with a stressful life event (13). It was developed as a short version of the original 60-item COPE scale (14). Items form the following subscales: 1. Active coping, items 2 & 7 2. Use of informational support, items 10 & 23 3. Positive reframing, items 12 & 17; 4. Planning, items 14 & 25; 5. Emotional support, items 5 & 15; 6. Venting, items 9 & 21; 7. Humor, items 18 & 28; 8. Acceptance, items 20 & 24; 9. Religion, items 22 & 27; 10. Self-blame, items 13 & 26; Self-distraction, items 1 & 19; Denial, items 3 & 8; Substance use, items 4 & 11; Behavioral disengagement, items 6 & 16. Each of the 14 scales is comprised of 2 items; total scores on each scale range from 2 (minimum) to 8 (maximum). Higher scores indicate increased utilization of that specific coping strategy. Total scores on each of the scales are calculated by summing the appropriate items for each scale.

Participants give their answers on a four-point scale where they indicate the degree, they engage in each cop-

ing style. The answers include 1 = I haven't been doing this at all 2 = A little bit 3 = A medium amount 4 = I've been doing this a lot.

Brief-COPE has been validated for the Greek population by Kap-sou, et al (15). The Greek version of Brief-COPE support an eight-factor structure that includes Active coping, Behavioural disengagement, substance use, emotional support, religion, humor, denial, self-blame.

Daily Spiritual Experience Scale DSES

The Daily Spiritual experience scale (DSES) is a 16-item self report measure designed to assess ordinary experiences of connection with the transcendent in daily life. It includes constructs such as awe, gratitude, mercy, sense of connection with the transcendent and compassionate love. It also includes measures of awareness of discernment/inspiration and a sense of deep inner peace. It quantifies the spirituality of respondents measuring the frequency that the respondent considers to be associated with the divine according to religion or spiritual group he belongs. The overall score ranges from 16 to 94. The higher the score, the higher the level of daily spiritual experiences (16, 17).

Statistical analysis

Mean values, standard deviations (SD) and median and interquartile range were used to describe the quantitative variables. Absolute (N) and relative (%) frequencies were used to describe the qualitative variables. The McNemar test was used to compare fathers 'and mothers' views on psychological support. The paired t-test or the Wilcoxon-signed rank test was used to compare scores between fathers and mothers. The Pearson or Spearman correlation coefficient (r) was used to control the relationship between two quantitative variables. The correlation is considered low when the correlation coefficient (r) ranges from 0.1 to 0.3, moderate when the correlation coefficient ranges from 0.31 to 0.5 and high when the coefficient is greater than 0.5. Linear regression analysis was used to find independent factors related to the stress and quality of life scales from which dependence factors (b) and their standard errors (standard errors = SE) were derived. Parental demographics, neonatal data, pregnancy and childbirth data, spirituality score, and stress management scale dimensions were used as independent variables. Due to the sample size, the linear regression analyses were performed by the stepwise method. For the dimensions of the stress scale logarithmic transformations were made due to the asymmetry of their distributions. The significance levels are bilateral and the statistical significance was set at 0.05. The statistical program SPSS 22.0 was used for the analysis.

4. RESULTS

The sample consists of 82 parents (41 mothers, 41 fathers) of 41 premature infants who were treated in the Neonatal Intensive Care Unit of a University Hospital of Central Greece. The mean gestational age was 32 weeks (SD

		mother		father		P
		N	%	N	%	
Severity of the child's condition ¹ , mean (SD) median (median range)		5,03 (2,84)	4 (3 - 8)	5,61 (3,17)	6 (3 - 9)	0,231+
In every NICU should be offered psychological support	NO	10	25,6	12	29,3	0,727++
	YES	29	74,4	29	70,7	
Psychological support would be helpful	NO	5	12,8	10	25,0	0,063++
	YES	34	87,2	30	75,0	
I would receive psychological support if it was offered by NICU	NO	5	13,2	9	22,5	0,125++
	YES	33	86,8	31	77,5	

Table 1. Data concerning the severity of the children and the psychological support of the parents 110-point scale with ere higher values indicating less severity +Wilcoxon test; ++McNemar test

	mother		PPaired t-test
	mean (SD)	mean (SD)	
DSES score	46.1 (14.2)	45.1 (16.1)	0.486

Table 2. Parents' DSES score. Mothers and fathers scored similarly to DSES spirituality

= 3.3 weeks) and the mean birth weight was 1626.5 g (SD = 586.4 g). The most common cause of admission to Neonatal Intensive Care Unit was low birth weight.

The mean age of mothers was 32.1 years (SD = 6.1 years) and of fathers was 35.6 years (SD = 7.1 years). Also, 43.6% of the mothers were high school graduates and 35.0% of the fathers were graduates of a vocational school. 32.4% of mothers and 27.3% of fathers had occasional work while 41.7% of mothers and 70.6% of fathers had a permanent job. 15.0% of mothers and 55.0% of fathers smoke. Also, 5.6% of mothers and 56.4% of fathers smoked during pregnancy. 46.2% of mothers had moderate stress during pregnancy and 62.5% of fathers had no stress at all. 2.4% of mothers had experience of hospitalization in a Neonatal Intensive Care Unit by their previous child while the corresponding percentage of fathers was 7.5%. In this study, we evaluated the levels of parenting stress in parents with preterm infants. The results failed to identify group differences between the mothers and the fathers of preterm.

The severity of the children as well as data related to the psychological support of the parents are given in Table 1.

Mean score on the scale of severity of the child's condition according to mothers was 5.03 points (SD = 2.84) and according to fathers was 5.61 points (SD = 3.17). 74.4% of mothers and 70.7% of fathers believed that every NICU should offer psychological support while 87.2% of mothers and 75.0% of fathers thought that psychological support would be useful. 86.8% of mothers and 77.5% of fathers would receive psychological support if offered by the NICU.

Mothers and fathers' scores in BRIEF- COPE questionnaire is presented in Table 3. Higher values indicate more frequent use of the respective stress management strategy.

Mothers 'and fathers' scores on the dimensions of the Brief-COPE Questionnaire were similar, suggesting a similar way of managing stress.

Analyses of the PSS: NICU showed that "parent-infant relationship" is more stressful for mothers while "Infant

	Mother		father		P Wilcoxon test
	mean (SD)	median (inter-quartile range)	mean (SD)	median (inter-quartile range)	
Active coping	2.83 (0.54)	2.75 (2.5 - 3.13)	2.66 (0.49)	2.63 (2.38 - 2.88)	0.210
Behavioral disengagement	2.03 (0.79)	2 (1 - 2.5)	2.07 (0.81)	2.5 (1 - 2.5)	0.762
Substance use	1.79 (0.85)	1.5 (1 - 2.5)	1.91 (0.80)	2 (1 - 2.5)	0.922
Emotional support	2.60 (0.75)	2.5 (2.25 - 3.25)	2.41 (0.65)	2.5 (2.13 - 2.75)	0.189
Religion	2.83 (0.74)	3 (2.5 - 3)	2.58 (0.76)	2.5 (2 - 3)	0.139
Humor	2.08 (0.79)	2.5 (1.5 - 2.5)	2.38 (0.83)	2.5 (2 - 3)	0.095
Denial	2.40 (0.53)	2.5 (2.25 - 2.75)	2.43 (0.61)	2.5 (2 - 2.75)	0.775
Self-Blame	2.56 (0.46)	2.5 (2.25 - 2.75)	2.47 (0.5)	2.5 (2.25 - 2.75)	0.152

	Mother		Father		P Wilcoxon test
	mean (SD)	median (inter-quartile range)	mean (SD)	median (inter-quartile range)	
Sights and Sounds	2.81 (0.87)	2.67 (2 - 3.33)	2.8 (0.96)	2.83 (2 - 3.5)	0.896
Infant Appearance and behaviour	3.56 (0.8)	3.6 (3 - 4.17)	3.54 (0.93)	3.5 (3 - 4.22)	0.862
parent-infant relationship	3.61 (0.91)	3.7 (3 - 4.22)	3.51 (0.85)	3.5 (2.82 - 4.09)	0.312
TOTAL SCORE PSS-NICU	3.44 (1.31)	4 (2 - 4)	3.5 (1.3)	4 (2.5 - 4.5)	0.769

Table 4. Parental stress in mothers and fathers after preterm birth assessed with the PSS: NICU questionnaire after admission of the neonate to a neonatal intensive care unit.

ing strategy.

Then the results of the multivariate regression analyses (table 6) are given having as dependent variables the dimensions of the PSS-NICU scale and as independent the demographics of the parents, the spirituality score and the dimensions of the Brief-COPE scale. The following results were found using the stepwise method.

Table 6. multivariate regression analyses (dependent variables PSS-NICU scale - independent variables parents' demographics, DSES, Brief-COPE scale)

The severity of the preterm's condition and the educational level of the parents were found to be independently correlated to the stress score due to "sights and sounds" in the NICU. Specifically, the less the parents believed that their child's condition was severe, the less stressed they were due to "sights and sounds" in the NICU. Also, the higher the parental edu-

Appearance and behaviour" is the most stressful for fathers (Table 4).

Table 5 shows the Spearman correlation coefficients of the dimensions of the PSS-NICU scale with the dimensions of the Brief-COPE scale in both parents. Substance use, religion, humor were found to correlate with total score of PSS-NICU. More specifically PSS-NICU correlated negatively with substance use ($r=-0.30$ $p=0.009$) and humor ($r=-0.28$ $p=0.016$) while it correlated positively with religion ($r=0.29$ $p=0.011$).

The stress from the "sights and sounds" on the NICU was not found to be significantly correlated with stress strategies (Brief -cope). On the contrary, parents stressed due to the "Infant Appearance and behaviour" of the preterm made frequent use of «Religion» and «Expression of negative feelings», as stress coping strategies, while

those stressed due to their parental role, used more frequently "Active positive coping", "Seeking support" and "Expression of negative feelings". Also, parents with higher scores in PSS-NICU, scored lower in "Substance use" and "Humor", indicating less use of these specific stress coping strategies and higher scores in the "Religion" dimension, suggesting more frequent use of this particular stress cop-

		SIGHTS AND SOUNDS	LOOKS AND BEHAVE	PARENTAL ROLE	TOTAL SCORE PSS-NICU
Active positive coping	r	-0.07	0.04	0.25	0.11
	P	0.555	0.758	0.036	0.379
Behavioral disengagement	r	0.09	0.13	0.10	-0.04
	P	0.442	0.275	0.389	0.735
Substance use	r	-0.02	-0.03	0.00	-0.30
	P	0.829	0.827	0.999	0.009
Seeking support	r	0.08	0.14	0.24	0.19
	P	0.484	0.229	0.039	0.109
Religion	r	0.15	0.22	0.20	0.29
	P	0.202	0.050	0.081	0.011
Humor	r	-0.09	0.01	0.07	-0.28
	P	0.432	0.962	0.570	0.016
Avoidance	r	0.06	0.09	0.07	-0.10
	P	0.640	0.428	0.545	0.416
Expression of negative feelings	r	0.16	0.25	0.29	0.08
	P	0.167	0.033	0.011	0.510

Table 5. Spearman correlation between parental PSS-NICU scale with the dimensions of the Brief-COPE

educational level, the less stress they felt due to sights and sounds in the NICU.

The severity of the preterm's condition was found to be independently correlated with the stress score due to "Infant Appearance and behaviour" of the preterm. Specifically, the less the parents believed that their child's condition was severe, the less stress they felt due to "Infant

Appearance and behaviour" of the preterm. The severity of the child's condition and the parents' DSES score were found to be independently correlated to the stress score due to their "parent-infant relationship". Specifically, the less the parents believed that their child's condition was severe, the less stress they felt about their "parent-infant relationship". Stressed parents due to their "parent-infant relationship" used more daily spiritual activities. Substance use and parents' DSES score were found to be independently correlated with total score PSS-NICU with those making more substance use and less daily spiritual activities feeling less stressed.

5. DISCUSSION

In recent decades, the rapid development of technology and developments in perinatal medicine have improved the treatment of preterms in the neonatal intensive care unit, leading to a higher survival rate, reduced mortality but increased morbidity (18). The increased survival rate of preterms requires control of parental feelings because they will have to be able to support the child after leaving the NICU (19). In this study, the levels of preterm parenting stress was evaluated. The results failed to identify group differences between the mothers and the fathers of preterm. A team of researchers in India has investigated the causes of stress between parents with a child in NICU. This study was prospective and parents were assessed for stress using PSS-NICU. The questionnaire was given to the parents 48 hours after the introduction of the child in the NICU. In this study, there was no difference in parenting scores by gender or socioeconomic status (20).

Howe et al (21) nevertheless in their study presented different parenting stress patterns with fathers of preterm infants having overall higher stress scores than mothers.

In our study coping strategies such as religion, humor and substance use were found to correlate statistically significant with total score of PSS-NICU. More specifically religion was used as a stress coping strategy by those with higher stress. Bryant-Davis & Wong (22) pointed as well that to cope with the infant's hospitalization, faith and trust in God seem essential to bear the suffering they experience as a result of having an infant at the NICU. In our study expression of negative feelings, seeking support and active positive coping were some of the coping strategies parents used to deal with stress they felt due to their parental role. Brelsford et al (23) also expressed that mothers and fathers of preterm infants need support, information from healthcare providers, and social support to master the parenting role.

In our study mothers 'and fathers' scores on the dimensions of the Brief-COPE Questionnaire were similar, suggesting a similar way of managing stress. Demographic characteristic of our sample was not found to correlate with coping strategies. Previous study by Shaw et al (24) concluded that mothers with more years of education were more likely to use problem-focused coping as assessed by the Brief COPE, and that mothers with more years of education were significantly more likely to have PTSD at one month follow up.

The severity of the preterm's condition and the educa-

tional level of the parents were found to be independently correlated with the stress score due to "sights and sounds" in the NICU. The severity of the preterm's condition was found to be independently correlated with the stress score due to "Infant Appearance and behaviour" of the preterm. Specifically, the less the parents believed that their child's condition was severe, the less stress they felt due to looks and behave of the preterm. The severity of the child's condition and the parents' DSES score were found to be independently correlated to the stress score due to their "parent-infant relationship". Specifically, the less the parents believed that their child's condition was severe, the less stress they felt about their "parent-infant relationship". Gray et al (25) reported that parenting stress is related to the child's health status. Parents with sick preterm tend to score significantly higher in stress scale.

Stressed parents due to their "parent-infant relationship" used more daily spiritual activities. Substance use and parents' DSES score were found to be independently correlated with total score PSS-NICU with those making more substance use and less daily spiritual activities feeling less stressed. Brelsford et al (2016) stated that spiritual coping is important when discussing palliative care in a hospital setting, but continues to be salient in non-life-threatening hospital situations. Investigations of parenting stress are important as they provide a framework to identify key variables that may contribute to the experience of stress. (Tsu-Hsin et al, 2014) Mothers and fathers of preterm need support. With spirituality and religion, they are able to face the challenges of having a baby in a NICU.

Limitation of the study

Limitations of the study include the use of self-report questionnaires which are a valuable type of measure in psychological research, but sole reliance on them is a limitation because of the potential for subjective report bias.

6. CONCLUSION

Mothers and fathers of preterm need support. Spirituality and religion, helps then face the challenges of having their baby hospitalized in a NICU.

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