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Research Article

Identifying mothers experiencing emotional distress in the neonatal intensive care unit. Application of PPTSD questionnaire in a Greek NICU population

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Abstract

The birth of a high-risk infant such as an extremely premature infant can represent an important traumatic experience for mothers. Perinatal Post Traumatic Stress Disorder Questionnaire (PPTSDQ) explores retrospectively maternal post-traumatic stress reaction. This shelf-rating questionnaire explores the potential for experiencing posttraumatic symptoms related to childbirth and the ensuing post-natal period. The PTSD questionnaire was originally developed by DeMier and Hynan and their colleagues at the University of Wisconsin and has been widely used in research and in clinical practice for identifying mothers experiencing significant emotional distress during the post-natal period, so they may be referred for mental health services. The present study aims to introduce this tool in perinatal settings as an early intervention. It has been widely used with other measures of post-traumatic stress and depression, such as the Openness Scale from the NEO-PR, the self-report measure of depression BDI-II, the IES (Impact Event Scale) and the EPDS (Edinburgh Postnatal Depression Scale).

Although already a useful clinical instrument the current study used the revised version. This modification refines the response options from dichotomous choices to a Likert scale format by Callahan Borja and Hynan.

Numerous qualitative and quantitative studies state that premature delivery is a highly stressful event and document the full range of post-traumatic sequelae, such as intrusive recollections, behavioral avoidance, and hyperarousal, as well as attachment difficulties following childbirth. Furthermore, the severity of neonatal complications and gestational age have been found to be predictive of PTSD symptomatology in parents as measured by the PPQ. For this reason, the current study aims to give increased focus to mothers having a premature birth and often expecting their children to die. The sample comprises 25 mothers of prematurely born infants hospitalized in the NICU and 25 mothers of full-term infants born in the maternity ward of the same Greek hospital who responded to the Perinatal PTSD Questionnaire and equally the PERI a postnatal complication rating inventory and the clinical interview for parents CLIP.

Mothers of high-risk infants present post-traumatic stress reactions related to prematurity. The Perinatal PTSD Questionnaire identifies postnatal maternal distress but should not substitute a clinical interview, yet findings indicate that equally identifies pre-existing distress symptoms associated with maternal personality traits that emerged with the traumatic event of the unexpected birth.

Due to the consistency of the population of the experimental group, who come mostly from the provinces, the possibility of a follow-up of the cases is quite limited.

Introduction

Post-traumatic stress and childbirth

Women can suffer extreme psychological distress as a consequence of their experiences during childbirth [1,2]. Up to 5.6% of mothers have Post Traumatic Stress Disorder (PTSD) as a result of the childbirth experience. Women are at higher risk if they have psychological or psychiatric problems prior to their pregnancy. PTSD is also related to poor family and social support after birth and a lack of feeling of security [3,4].

Premature delivery particularly is a highly stressful event for mothers [5,6]. Mothers of premature infants perceive premature birth as a life-threatening event for their newborn and experience stress and anxiety [7]. The mother-infant dyad undergoes a physical, spatial and psychological separation. Except for the bodily separation, the mother and the child are also spatially separated by an inevitable transfer of the premature infant to a NICU [6,8-10]. Stress and anxiety increase as the hospitalization of the infant in the NICU is prolonged [11,12]. Since the first article about maternal reactions to premature birth was published in 1959 by Kaplan and Mason [13], numerous studies report post-traumatic symptoms and attachment difficulties related to prematurity. Many studies point out that parents of premature infants show significantly higher level of anxiety and depression than parents of full-term infants [8,9].

Perinatal Post Traumatic Stress Disorder Questionnaire (PPTSDQ) was originally developed by DeMier & Hynan and their colleagues at the University of Wisconsin and has been widely used in research and in clinical practice for identifying mothers experiencing significant emotional distress during the post-natal period, so they may be referred for mental health services. The PPTSD questionnaire explores retrospectively maternal post-traumatic stress reaction. The present study aims to introduce this tool in perinatal settings as an early intervention. It has been widely used with other measures of post-traumatic stress and depression, such as the Openness Scale from the NEO-PR, the self-report measure of depression BDI-II, the IES (Impact Event Scale), and the EPDS (Edinburgh Postnatal Depression Scale). Numerous qualitative and quantitative studies state that premature delivery is a highly stressful event and document the full range of post-traumatic sequelae, such as intrusive recollections, behavioral avoidance, and hyperarousal, as well as attachment difficulties following childbirth. Furthermore, the severity of neonatal complications and gestational age have been found to be predictive of PTSD symptomatology in parents as measured by the PPQ. For this reason, the current study aims to give increased focus to mothers having a premature birth and often expecting their children to die. Thus, the research hypothesis is to assess the use of PPTSDQ as a tool for early intervention of PTSD symptomatology of mothers with premature infants compared to mothers with healthy neonates, identifying its possible predictors. This shelf-rating questionnaire explores the potential for experiencing posttraumatic symptoms related to childbirth and the ensuing post-natal period. Although already a useful clinical instrument the current study used the revised version. This modification refines the response options from dichotomous choices to a Likert scale format by Callahan Borja and Hynan.

The modified version [14] offers supplementary analysis. In the current study, we choose the Likert scale format (modified version) which, may offer supplementary analysis compared to the initial version (dichotomous choice). That factor analysis would reveal PTSD including intrusive recollections, avoidance and heightened arousal. As a result, this measure rapidly identifies distressed parents, directly at the point of service, so that they may be referred to mental health services.

Materials and methods

Procedure

Demographic characteristics were collected from the medical files with the consent of the mothers either in the maternity ward or of those whose infants were hospitalized in the NICU. Maternal demographic information includes occupation, and educational level. The Greek translation of the questionnaire was realized by a bilingual psychologist and a neonatologist. Mothers were contacted during their infants' hospitalization in the NICU respectively mothers of the control group, after being thoroughly informed of the objective of the study, were visited onsite. The total sample of both experimental and control group participants in the research acknowledged they were at least 18 years old and provided full consent for the above survey. Mothers who had twins or multiple infants were asked to respond in accordance with the birth of their first infant.

Instruments

In the current research for further analysis of the original measure and the established literature, we include the PERI questionnaire which is an eighteen-item postnatal complication rating inventory indicative of the severity of the postnatal complications on a scale from 0 to 3 [15]. Equally in the full sample of mothers we acquire additional information offered by the thematic analysis of the CLIP (clinical interview for parents) were they report their experience during childbirth and hospitalization of their infant in the NICU. The CLIP greatly strengthens the available evidence base [16,17]. The criterion of the use of the other instruments is to determine which variables were most salient to influence/predict symptoms of traumatic distress in mothers.

In Switzerland, the original version (dichotomous) of the PPQ (Perinatal Posttraumatic Stress Disorder Questionnaire) has been extensively used with great success [18]. Although already a useful clinical instrument, the current study sought

to refine the PPQ by changing the item response options from dichotomous choices to a Likert scale format [14]. By doing so, it was hypothesized that factor analysis of items would reveal factors similar to the diagnostic framework associated with PTSD. Psychometrically, it was also expected that the measure's internal reliability would be improved. Finally, the change in response scaling gave a broad range of possible scores, without lengthening the measure, to improve the predictive utility.

The other component of the survey is the Perinatal Post Traumatic Stress Disorder Questionnaire [13,14], an auto questionnaire that consists of 14 items. PTSDQ is already a useful clinical instrument to document the full range of post-traumatic sequelae intrusive recollections, behavioral avoidance, and hyperarousal, consisting of descriptors fitting criterion D (disruption in arousal) of the Diagnostic and Statistical Manual (DSM) – IV _ TR diagnostic framework for PTSD with good internal consistency (a = 0.86) attachment difficulties following childbirth. Post-traumatic stress disorder (PTSD) is classified among the anxiety disorders in the Diagnostic and Statistical Manual for mental disorders [19,20]. The first 3 items concern the reoccurrence and the intrusion of undesirable memories around the delivery of their infant (*Do you have bad dreams of giving birth or of your baby's hospital stay?*). Items 4 to 9 concern the active avoidance of memories and the relative emotions around the events of the delivery, the passive avoidance (inability to remember those events), the emotional blunting, the loss of interest, the withdrawal (*Have you lost interest in doing things you usually do?*). Items 10 to 14 are related to hypersensitivity, irritability, reactivity, and hyperarousal (*Are you more irritable or angry with others than usual?*). The modified version of PPQ can take values from 0 to 56. The severity of neonatal complications and gestational age have been found to be predictive of PTSD symptomatology. The point of the clinical utility of the PTSDQ is to detect mothers who are in need of a referral for therapy. The clinical range is set at a score of 19 or above.

Population

A convenience sample of 25 healthy mothers who gave birth to a premature neonate (< 36 weeks gestational age) as well as a sample of 25 mothers who gave birth to a full-term neonate were recruited from the NICU and the Maternity ward accordingly in the Agios Panteleimonas general hospital of Pireaus, Greece during a period of 12 months. The number of participants was calculated so that the statistical strength was 80% and $p < 0.05$ by taking into account the annual number of births and premature births delivered in this general hospital with GPower 3.1. The Greek health care system divides Greece into 7 sanitary sectors. The NICU where the current protocol was conducted, corresponds to the 2nd Sanitary Sector, the most extended including the island complexes of Dodecanese, Cyclades, Northern Aegean, Piraeus and West Attica, covering an area of 1700000 habitats. For this reason, we accept a large number of neonates from provinces. Since we are situated relatively close to the military airport handling air transfer and neonates from other island complexes or provinces are frequent. Dyads were selected according to the following criteria: the premature neonates were without co-morbidities such as genetic anomalies, congenital malformations, and mothers' mental illness or substance abuse. Exclusion criteria were a lack of informed consent and the mother's inability to understand verbal and written Greek. Data about the mother included origin, residence, marital status, parity, and maternal age at the time of birth. Information about the newborn includes gender, gestational age, birth weight, type of delivery (cesarean or vaginal) length of hospitalization and severity of their postnatal complications.

The PTSDQ questionnaire was given to the mothers at the end of the hospitalization though the initial study by Callahan, 2006 was conducted online within 5 years of the birth and in some cases after 10 years or more.

Statistical analysis

Data analysis was conducted using the Statistical Package for Social Sciences 22.0 (SPSS Inc., Chicago, IL, USA). Continuous data were expressed as means (± standard deviation) and medians (range), while categorical and dichotomous variables were expressed as absolute values (N) and percentages (%) of the groups. The Kolmogorov-Smirnov test for normality and normality plots were used to check the normal distribution of continuous variables. The Student's *t* - test and ANOVA test were used to examine whether a quantitative normally distributed variable presented differences between groups. Mann-Whitney test was used for variables that were not distributed normally. Pearson's R was used to assess the correlation between two quantitative normally distributed variables, while Spearman's rho was used for variables that were not normally distributed. Pearson's chi-squared test and Fischer's exact test were used to determine if there were differences between groups in terms of the percentages of some characteristics. When two or more independent variables were found to be at an alpha level of 0.2 ($p < 0.2$), multivariate linear regression was performed. A linear regression was conducted and coefficients beta (B) and 95% confidence intervals, as well as R^2 and $_{adj.}R^2$ were calculated. A two-tailed $p < 0.05$ was considered to demonstrate statistical significance.

Results

Participants included 50 women with surviving infants that formed two groups. One group of 25 women with full-term healthy infants and one group of 25 women with premature (less than 36 weeks GA) infants. Totally, the sample consisted of 54 preterm and full-term infants. Four preterm twin births took place, while none of full-term infants' mothers gave a twin birth. For premature infants, the mean days for PTV were 1.31 ± 2.27, while the mean time interval for CPAP was 13.79 ±

21.94 days. The premature infants of the sample were able to totally feed in a mean time interval of 14.17 ± 10.61 days after their labor. The demographic characteristics of the sample are presented in Table 1. Statistical analysis of demographic data revealed a statistical significant difference between the birth of a premature infant and mother's place of stay ($x^2(1, N = 54) = 10.26$, $p = 0.002$, Crammer's $V = 0.44$), mother's place of origin ($x^2(2, N = 54) = 7.87$, $p = 0.03$, Crammer's $V = 0.38$), mothers educational level ($x^2(2, N = 54) = 7.18$, $p = 0.03$, Crammer's $V = 0.37$) and type of delivery ($x^2(1, N = 54) = 5.87$, $p = 0.03$, Crammer's $V = 0.33$). Moreover, mother's age was found to be a statistically significant factor between preterm and full-term infants ($t = 2.51$ (52), $p = 0.02$, 95% CI: 0.69 - 6.17, Cohen's $d = 0.69$, 95% CI: 0.13 - 1.23). No other demographic factor was found to be statistically significant.

The comparison of the mean scores of the two groups (maternity-NICU) for PPTSDQ presents a value of 9.52 ± 8,07 in the NICU group and 6.28 ± 5.88 for the maternity group. No statistically significant difference was detected between the two scores ($t = 1.75$ (52), $p = 0.09$). The length of hospitalization could be a differentiated factor that varies significantly among the two groups. More specifically, for the experimental group (premature infants) an average of 46.07 ± 33.22 days, while in the control group it was 3.56 ± 1.08 days ($z = -6.39$, $p < 0.001$). For the whole sample, bivariate analysis showed that place of living and gestational age were statistically related to RRSTDQ score. It seems that mothers who used to live in the rest of Greece reported higher PPSTDQ score than mothers who used to live in Athens ($t = -2.55$ (52), $p = 0.01$, 95% CI: -1.79 - -0.21, Cohen's $d = -0.71$, 95% CI: -1.27 - -0.15). Moreover, there was a statistically significant negative and weak correlation between gestational age and PPSTDQ score (Spearman's rho = -0.30, $p = 0.03$). Linear regression model for the whole sample (dependent variable: PPTSDQ score, independent variables: demographic data) was statistically significant ($F_{7,46} = 2.85$, $p = 0.02$, $R^2 = 0.30$ and $_{adj.}R^2 = 0.20$) and showed that among the possible predictors, only the days of hospitalization were found to be statistically significant ($p = 0.03$). For preterm infants, bivariate analysis revealed that there was a positive, moderate and statistically significant correlation between

Table 1: Demographic characteristics of the sample.

	Premature infants			Control group			Total		
	N	%		*N*	%		*N*	%	
Gender									
Male	18	62.1		17	68.0		35	64.8	
Female	11	37.9		8	32.0		19	35.2	
Mother's place of stay									
Athens	12	41.4		21	84.0		33	61.1	
Rest of Greece	17	58.6		4	16.0		21	38.9	
Mother's place of origin									
Athens	11	37.9		11	44.0		22	40.7	
Rest of Greece	14	48.3		4	16.0		18	33.3	
Other country	4	13.8		10	40.0		14	25.9	
Mother's occupation									
Householding	13	44.8		15	60.0		28	51.9	
Civil servant	2	6.9		1	4.0		3	5.6	
Private clerk	9	31.0		7	28.0		16	29.6	
Freelancer	5	17.2		2	8.0		7	13.0	
Mothers educational level									
Basic	17	58.6		11	44.0		28	51.9	
Technological educ.	6	20.7		13	52.0		19	35.2	
University	6	20.7		1	4.0		7	13.0	
Marriage									
Yes	23	79.3		22	88.0		45	83.3	
No	6	20.7		3	12.0		9	16.7	
Labor									
Natural childbirth	9	31.0		16	64.0		25	46.3	
Caesarian	20	69.0		9	36.0		29	53.7	
	Mean (SD*)	**Median (IR**)**	**95%CI‡ of Mean**	**Mean (SD)**	**Median (IR)**	**95%CI of Mean**	**Mean (SD)**	**Median (IR)**	**95%CI of Mean**
Mother's age	31.55 (5.0)	30.0 (7.0)	29.65 33.46	28.12 (5.0)	28.0 (6.0)	26.06 30.19	29.96 (5.25)	30 (6.25)	28.53 31.40
Gestations	1.97 (1.18)	2.0 (1.0)	1.52 2.41	1.80 (0.76)	2.0 (1.0)	1.48 2.12	1.89 (1.0)	2.0 (1.0)	1.62 2.16
Labours	1.79 (0.98)	2.0 (1.0)	1.42 2.16	1.76 (0.78)	2.0 (1.0)	1.44 2.08	1.78 (0.88)	2.0 (1.0)	1.54 2.02
Number of children	2.03 (0.87)	2.0 (1.0)	1.71 2.36	1.72 (0.68)	2.0 (1.0)	1.44 2.0	1.89 (0.79)	2.0 (1.0)	1.67 2.11
Weeks of gestation	31.60 (2.77)	32.50 (4.75)	30.55 32.66	39.14 (1.11)	39.0 (2.0)	38.68 39.60	35.09 (4.36)	35.0 (7.0)	33.90 36.28
Infants' weight	1624.83 (456.04)	1600.0 (665.0)	1451.36 1798.30	3280.40 (300.85)	3300.0 (505.0)	3156.21 3404.59	2391.30 (919.34)	2375.0 (1771.25)	2140.36 2642.23
Days of hospitalization	46.07 (33.22)	37.0 (45.50)	33.43 58.71	3.56 (1.08)	3.0 (1.0)	3.11 4.01	26.39 (32.27)	10.50 (36.25)	17.58 35.20

*Standard deviation; **Interquartile range; ‡Confidence interval

PPSTDQ score and days of hospitalization (Spearman's rho = 0.45, $p = 0.02$), as well as maternal age ($r = 0.59$, $p < 0.001$). Linear regression model for premature infants (dependent variable: PPTSDQ score, independent variables: demographic data) was statistically significant ($F_{8,20} = 3.52$, $p = 0.01$, $R^2 = 0.59$ and $_{adj.}R^2 = 0.42$) and revealed that maternal age ($p = 0.02$) was statistically significant predictor of PPSTDQ score in preterm infants. Days of hospitalization were found to be a marginal statistically significant factor of PPSTDQ score ($p = 0.05$). When other possible predictors (PTV, days of PTV, days of CPAP, days of hood, time of initial feed, start of full feed, PERI score) entered the model, it was found no statistically significant ($F_{13,15} = 1.74$, $p = 0.16$, $R^2 = 0.67$ and $_{adj.}R^2 = 0.28$). Maternal age was still found to be a significant predictor ($p = 0.03$). Due to the small number of preterm infants participated in the study, the last finding should be interpreted with cautious. The results of the linear regressions are presented in Table 2.

The analysis of PPTSDQ score among the two groups has not remarkably differentiated. For this reason, we formulate the hypothesis, but we consider that these results reflect the fact that labor itself constitutes a traumatic event. To determine the relationship between the perinatal complications, PERI evaluation, and of the PPSDQ scores, the findings were consistent with our initial hypothesis. The supplementary analysis indicates that the infants' complications rating significantly increases the values of PPSTDQ score ($r = 0.362$, $p < 0.001$ or Spearman's rho = 0.40, $p = 0.030$) in the NICU sample Table 3.

Discussion

In the present research, we formed one group of premature newborns and one group of full-term newborns. The homogeneity of this division offers the best representation of our statistical results.

Consistent with the results on the original PPQ numerous variables (gestational age at birth, birth weight, complications severity, and days of hospitalization) were expected to be predictive of scores on the Post Traumatic Stress Disorder Questionnaire. The original studies by Callahan, 2006, reveal that only the severity rate of the infant's complications significantly increased the ability to predict scores of the Post Traumatic Stress Disorder Questionnaire in mothers [14].

Table 2: Linear regression for preterm infants and the whole sample.

	Variable	B	95% CI of B	*p*
Preterm infants	Weight	0.001	-0.001 – 0.004	0.30
	Maternal age	0.14	0.02 – 0.26	0.02*
	Place of living	0.07	-1.09 – 1.23	0.90
	Marriage	0.34	-0.90 – 1.59	0.57
	Gestations	0.11	-0.79 – 1.0	0.80
	Labors	0.14	-0.89 – 1.17	0.78
	Gestational age	-0.02	-0.39 – 0.36	0.92
	Days of hospitalization	0.03	0 – 0.05	0.04
Total	Place of living	0.69	-0.12 – 1.50	0.09
	Gestations	-0.34	-1.29 – 0.60	0.47
	Labors	0.72	-0.32 – 1.76	0.17
	Gestational age	-0.02	-0.32 – 0.28	0.88
	Type of labor	0.54	-0.26 – 1.35	0.18
	Weight	0.001	-0.001 – 0.002	0.36
	Days of hospitalization	0.02	0.002 – 0.05	0.03*

*$p < 0.05$

Slightly differentiated from the conclusion of DeMier, et al. and Quinnell and Hynan [21], the results indicated that although the severity of the infants' complications was the strongest predictor of Post-Traumatic Stress scores in those studies, gestational age added a small but significant increment to the prediction of PTSD. DeMier, et al. also report the length of an infant's hospitalization was predictive [22]. Finally, both DeMier and Callahan, 2006 and Hynan reported that the infants birth weight added a significant increment in the prediction Post Traumatic Stress scores.

Similarly, we found that the case of cesarean delivery (regardless of whether the infant was born prematurely and classified as high-risk or not) was correlated with scores on both the PPTSDQ and the IES.

In precedent research by Ryding, et al. [23], the occurrence of PTSD was observed following cesarean delivery and is consistent with Callahan, 2006 and Hynan's report of PPQ scores increase after cesarean delivery [14].

Results of the maternity group reveal that the severity of perinatal complications is not the only variable that affects the PPSDQ score. It is essential to consider the symptoms of the mothers who develop important reactions though their infants present less intense perinatal complications.

Undoubtedly women's experiences are strongly interrelated with their expectations [24]. Women can suffer for years from PTSD and its consequences.

The use of PPSDQ both in the Maternity and the NICU service could stand as an immediate act of prevention since it can easily identify distressed mothers [14,18,21].

Extended hospitalization has a tremendous impact on the family life of premature neonates. Mothers undergo a detrimental separation by not being able to experience the first contact with their newborn earlier than 5, 6, or even 7 days after birth [25,26].

Often parents can't afford to live close to the hospitalized infant. The mean score of hospitalization is 47,65 days. Consequently, premature infants may rest unvisited for extended periods of time [26].

It is commonly accepted that psychologically maternal personality and existence define that of the infant [27,28]. Equally depressed or anxious mothers poorly support their infants which may become a differentiating factor for the newborn's hospitalization [29].

Family and social support after birth can help women recover from a traumatic experience [30,31].

Table 3: Correlations of PPTSD and quantitative variables

Correlations										
			PPTSDQ	Gestations	Labors	Number of children	Gestational age	Weight	Days of hospitalization	Weight at discharge
Spearman's rho	PPTSDQ	Correlation Coefficient	1,000	,301	,277	,093	-,348	-,204	,445*	,217
		Sig. (2-tailed)	.	,113	,145	,632	,064	,288	,015	,257
	Gestations	Correlation Coefficient	,301	1,000	,941*	,689*	-,247	,097	,088	,257
		Sig. (2-tailed)	,113	.	<,001	<,001	,196	,615	,649	,178
	Labors	Correlation Coefficient	,277	,941*	1,000	,778*	-,207	,098	,054	,141
		Sig. (2-tailed)	,145	<,001	.	<,001	,281	,612	,781	,465
	Number of children	Correlation Coefficient	,093	,689*	,778**	1,000	-,094	,016	,022	-,212
		Sig. (2-tailed)	,632	<,001	<,001	.	,627	,933	,908	,269
	Gestational age	Correlation Coefficient	-,348	-,247	-,207	-,094	1,000	,732*	-,847*	-,440*
		Sig. (2-tailed)	,064	,196	,281	,627	.	<,001	<,001	,017
	Weight	Correlation Coefficient	-,204	,097	,098	,016	,732*	1,000	-,823*	-,183
		Sig. (2-tailed)	,288	,615	,612	,933	<,001	.	<,001	,341
	Days of hospitalization	Correlation Coefficient	,445*	,088	,054	,022	-,847*	-,823*	1,000	,485*
		Sig. (2-tailed)	,015	,649	,781	,908	<,001	<,001	.	,008
	Weight at discharge	Correlation Coefficient	,217	,257	,141	-,212	-,440*	-,183	,485*	1,000
		Sig. (2-tailed)	,257	,178	,465	,269	,017	,341	,008	.
	PPTSDQ	Correlation Coefficient	1,000	,403*	,451*	,374*	-,294	-,014	,438*	,496*
		Sig. (2-tailed)	.	,030	,014	,046	,122	,943	,017	,006
	PERI	Correlation Coefficient	,403*	1,000	,761*	,747*	-,279	,106	,655*	,790*
		Sig. (2-tailed)	,030	.	<,001	<,001	,143	,586	<,001	<,001
	PTV days	Correlation Coefficient	,451*	,761*	1,000	,786*	-,263	,179	,491*	,621*
		Sig. (2-tailed)	,014	<,001	.	<,001	,167	,353	,007	<,001
	CPAP days	Correlation Coefficient	,374*	,747*	,786*	1,000	-,369*	-,074	,537*	,691*
		Sig. (2-tailed)	,046	<,001	<,001	.	,049	,704	,003	<,001
	Hood days	Correlation Coefficient	-,294	-,279	-,263	-,369*	1,000	,135	-,280	-,423*
		Sig. (2-tailed)	,122	,143	,167	,049	.	,484	,141	,022
	Diffuse oxygen (days)	Correlation Coefficient	-,014	,106	,179	-,074	,135	1,000	-,102	,207
		Sig. (2-tailed)	,943	,586	,353	,704	,484	.	,599	,281
	Initial feed	Correlation Coefficient	,438*	,655*	,491*	,537*	-,280	-,102	1,000	,697*
		Sig. (2-tailed)	,017	<,001	,007	,003	,141	,599	.	<,001
	Total feed	Correlation Coefficient	,496*	,790*	,621*	,691*	-,423*	,207	,697*	1,000
		Sig. (2-tailed)	,006	<,001	<,001	<,001	,022	,281	<,001	.

*Correlation is significant at the 0.05 level (2-tailed).

Conclusion

Physical maternal closeness improves sleep, and parental participation in pain management may reduce pain and pain medication [32].

Maternal response to premature birth mediates the risk for later adverse outcomes such as sleeping and feeding disorders [8,18,33].

PTSDQ is a measure presently available that could be rapidly used in obstetric settings.

The usefulness of this research is to develop according to measures in the perinatal centers.

Limitation of the study

Due to the consistency of the population of the experimental group, who come mostly from the provinces, the possibility of a follow-up of the cases is quite limited.

Conflict of interest and funding

No author has a conflict of interest and research has been conducted without funding.

The protocol of the research project has been approved by the Ethics Committee of the Hospital the work was undertaken according to the ethical standards laid down in the Declaration of Helsinki (1995) as revised in Edinburgh (2000).

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