

Stress in parents of newborns hospitalized in a Neonatal Intensive Care Unit

Estrés en padres de recién nacidos hospitalizados en una unidad de paciente crítico neonatal

Elisa Palma I.^a, Fernanda Von Wussow K.^b, Ignacia Morales B.^b, Javier Cifuentes R.^c, Sergio Ambiado T.^c

^aPsychologist, INDISA Medical Center, Santiago, Chile

^bMaster Degree in Psychology, University Los Andes, Santiago, Chile

^cNeonatologist, INDISA Medical Center, Santiago, Chile

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Abstract

Introduction: The birth of a child that requires hospitalization in a Neonatal Intensive Care Unit (NICU) can be very stressful for parents. **Objective:** To determine the stress level of parents of newborns (NB) hospitalized in a level III NICU in Santiago, and its association with clinical and sociodemographic variables. **Patients and Method:** Descriptive cross-sectional study. 373 admissions were evaluated. The sampling was non-probabilistic and included parents of RN admitted to the UPCN between 7 and 21 days of hospitalization. Only parents which have visited the RN at least three times were included. Instruments: i) Questionnaire to obtain data which could not be obtained from the medical record; ii) Parental Stress Scale: Neonatal Intensive Care Unit (PSS:NICU) which measures the perception of parents about stressors from the physical and psychological environment of the UPCN. **Results:** 100 parents of 59 hospitalized NB participated in the study. The average parental stress was 2.87 ± 0.69 . The subscale scores got higher was "Relationship with the baby and parental role". Complications in pregnancy, prenatal diagnosis or prenatal hospitalization, did not affect the stress level or the presence of prematurity, respiratory diseases, congenital malformations, genopathies or requirement of mechanical ventilation. **Conclusions:** Stress levels presented in parents are unrelated to gender and to the studied clinical variables.

Keywords:

Psychological stress, parents, neonatal intensive care units, premature infants.

Introduction

The hospitalization of a newborn (NB) in a Neonatal Intensive Care Unit (NICU) is generally an unexpected and stressful event for a family. Several investigations¹⁻¹⁰ agree that having a hospitalized NB produces high levels of stress in parents. The expectation of having a healthy child is interrupted by the shock that means to be separated from him/her and not being able to take care of their baby as imagined. Diagnoses are made up of complex and new language and the evolution is often uncertain.

Families are psychologically vulnerable after the birth of a sick or premature newborn. Stress is related with the appearance of symptoms of depression and anxiety. Although not all parents present this type of symptomatology, it is estimated that between 20% and 30% of the parents of an hospitalized NB present a mental health problem during the first year after birth¹², such as acute stress disorder¹, posttraumatic stress^{7,10,13} and postpartum depression^{14,15}. In the latter case, rates could reach 70% in the case of mothers^{10,16,17}.

In addition, it has been seen that the context of a NICU affects the relationship between the parents and the NB^{11,18-22}. There is a separation between them, the possibilities of physical contact are interfered by medical interventions and other people spend more time with the baby. This often produces feelings of incompetence and insecurity that affect the bond between them.

The NICU of INDISA Clinic is a highly complex unit (level III) and belongs to the private health sector. It is located in Providencia, Santiago, Chile. It has 22 intermediate treatment units (ITU) and 12 intensive care units (ICU); all of them are individual units. After admission, the attending physician explains to parents the NB health status, what is repeated on a daily basis. The visiting hours are between 9 am and 10 pm and they have continuous telephone access. The nurse coordinator performs a weekly talk to explain the operation of the unit. Parents are encouraged to touch their babies and hold them if the medical condition allows it, from the first day of their stay in the NU. Mothers can extract breast milk at the unit and also bring extracted milk from their homes. Both parents have training in basic NB care and CPR. Parents of NB with more serious conditions or long-term hospitalization have access to psychological care as part of the unit's services. This consists of an initial interview within the first 4 days in order to assess their emotional wellbeing, as well as the relationship with the baby and with the medical team. In the different stages of hospitalization, parents receive an explanation of their role in the NICU. Follow-up interviews are then conducted on a case-by-case basis.

The experience of the parents of a hospitalized NB in a NICU is difficult to analyze taking into account all potential variables that affect it. In this study, we will evaluate the level of stress that parents report associated with the NICU. Also, the relationship between stress level and socio-demographic and clinical variables of mothers and their NB will be studied.

Patients and Methods

Design and population

A descriptive and cross-sectional study conducted between December 2013 and May 2014 at the NICU of INDISA Clinic. During this period, 373 patients were received, 37 (10%) were transferred from other centers and 171 (46%) NB were hospitalized for more than 7 days.

Sample

Non-probabilistic sampling. In this study, we included parents of newborns admitted to the NICU who at the time of the interview had a hospitalization of more than 7 days and less than 21 days and who at least visited the NB three times. The sample consisted of 100 parents (43 fathers and 57 mothers) from 59 NB admitted to the NICU. 82 are couple of parents. Only the parents of these 59 NB met the inclusion criteria and agreed to participate in the study.

Measurements were performed at some point between 7 and 21 days of hospitalization. The researchers considered that after 7 days, parents have a more complete view of the NICU. After 21 days, the most critical stage has passed and they have achieved a greater adjustment to the reality of hospitalization. The average day on which the survey was applied was on day 12, so parents already had a fairly complete view of the NICU and of the health status of their NB. Both parents were surveyed separately to explore possible differences by gender. In the case of multiple pregnancies, we considered the clinical variables of the NB that presented the greatest severity.

Instruments

1. *Questionnaire*: to obtain data from parents and newborns that could not be obtained from the clinical file. 2. Parental Stress Scale: Neonatal Intensive Care Unit (PSS: NICU) (Miles & Funks, 1987) that measures the parents' perception of the stress factors coming from the physical and psychological environment of the NICU. The scale is self-applied and it is composed of 41 items that are grouped into 4 subscales: "Sights and sounds", "Aspect and behavior of the NB", "Relationship with the baby and parental role" and "Staff behaviours and communications". Each mother and/

Table 1. Epidemiological data of women (mothers) and men (fathers)

Variable	Female		Male	
	n = 57	(100%)	n = 43	(100%)
Mean Age (years ± SD)	34 ± 5.8		36 ± 7.0	
Level of Schooling				
Middle School	1	(1.8%)	0	(0%)
High School	5	(8.8%)	8	(18.6%)
Technic Studies	15	(26.3%)	8	(18.6%)
University	31	(54.4%)	21	(48.8%)
Postgraduated	5	(8.8%)	6	(14.0%)
Residence place				
Metropolitan Region	52	(91.2%)	38	(88.4%)
Other	5	(8.8%)	5	(11.6%)
Social Security				
Isapre*	56	(98.2%)	38	(88.4%)
Fonasa**	1	(1.8%)	5	(11.6%)

*Private Social Security. ** Public Social Security.

Table 2. Clinical data of the mother

Variable	n = 100 (100%)*
Parity	
Primiparous (ou first time fathers)	61 (61%)
Multipararous (or second time fathers)	39 (39%)
Planned pregnancy	66 (66%)
Multiple pregnancy	15 (15%)
Complications during pregnancy	
Preclampsia/eclampsia	21 (21%)
PROM**	7 (7%)
Chronic disease	6 (6%)
Other	46 (46%)
Miscarriages/Abortions	18 (18%)
Previous diagnosis of infertility	15 (15%)
Prenatal hospitalization	43 (43%)
Antenatal Diagnosis	51 (51%)
Type of Birth	
Vaginal	13 (13%)
Scheduled Caesarea	31 (31%)
Unplanned Caesarea	56 (56%)
Place of birth	
INDISA Clinic	88 (88%)
Hospitalization of another child in a NICU	10 (10%)

*n = 100, including both parents. **PROM: premature rupture of membranes.

or father marked the option that best represented the level of stress for each item on the subscale, 1 being “not stressful” and 5 “extremely stressful.” This scale has been widely used in the neonatal literature^{1,5,8,17,23-31} and has been shown to have high validity and reliability⁴. Authors’ permission was obtained for their use. The severity of the NB was determined in two ways: 1) the type of intervention that the NB was receiving or had received (mechanical ventilation, CPAP, surgery, NPO for more than 48 hours) and 2) the Neonatal Therapeutic Intervention Score (NTISS)³², calculated daily by the attending physician, which considers the treatments received by the NB regardless of weight or gestational age. The NTISS range is between 0 and 47 points, with an average reported in the literature of 12.3 ± 8.732.

Statistical analysis

A sample size of at least 70 respondents was defined, calculated with an estimated mean of 3 in the stress indicator for the population, with an estimated standard deviation of 0.85, a 95% confidence level and a precision level of + 0.2. For the comparison of discrete variables, the chi-square test was used; for the continuous variables, the Student’s t-test was used.

Ethical matters

Parents who participated in the study had to previously sign an informed consent. The treatment team was not aware of the results of the survey and participation in this study did not involve changes or variations in the clinical management of the patients. The study was approved by the Scientific Ethics Committee of the “Servicio Metropolitano Oriente” and the Medical Subdivision of INDISA Clinic.

Results

A summary of the socio-demographic characteristics of the mothers and fathers is presented in Table 1 and the clinical data of the mothers’ pregnancy and delivery is shown in Table 2. N = 100 (57 mothers and 43 fathers); in the case of men, the data of the partner was used.

The clinical history of the NB is summarized in Table 3. N = 100 is considered since the responses of mothers and fathers were taken separately, even though the data corresponded to the same NB. 48% of the parents had preterm infants of 32 weeks or less, and 15% of the parents had a NB with malformation or genopathy.

The maximum NTISS during the pre-survey hospitalization was 10.0 ± 5.9 and the NTISS on the day before the survey was 7.0 ± 3.9. There was no signifi-

Table 3. Newborn clinical data

Variable	n = 100 (100%)*
Gestational age	
< 28 weeks	10 (10%)
> 28 and < 32 weeks	38 (38%)
> 33 and < 36 weeks	29 (29%)
> 37 weeks	23 (23%)
Birth Weight	
< 1000 g	13 (13%)
< 1500 g	25 (25%)
< 2500 g	31 (31%)
≥ 2500 g	31 (31%)
Diagnosis at admission	
Prematurity	71 (71%)
Respiratory illness	42 (42%)
Malformation/Genopathy	15 (15%)
Infection	11 (11%)
Other	9 (9%)
Transferred from another center	12 (12%)
Severity	
NTISS pre-survey	7.0 ± 3.9
Maximal inpatient NTISS	10.0 ± 5.9
Intervention	
Invasive mechanical ventilation	23 (23%)
Non invasive mechanical ventilation (CPAP)	23 (23%)
Surgery	7 (7%)
NPO > 48 hrs	50 (50%)

*n = 100, including both parents.

cant correlation between the stress level in any of its subscales and the NTISS of the day prior to the survey or the maximum NTISS during hospitalization. This could reflect the fact that the type of intervention that the baby was receiving at the time of the survey (or before it) did not affect the level of stress of the parents.

Table 4 shows the results obtained in the PSS: NICU in this study and those reported by Miles et al. (1993). The range for all subscales is between 1 and 5 points. The subscale of "Relationship with the baby and the parental role" (3.23 ± 0.92) and "Appearance and Behavior of the Baby" (3.22 ± 0.99) showed the highest stress scores.

The question with the highest score obtained on the whole scale was the item "Being separated from my baby" from the subscale "Relationship with the baby and the parental role" (4.2 ± 0.99), followed by the item "Feeling helpless and unable to protect my baby from pain and painful procedures" (4.0 ± 1.29) and from the item "Feeling helpless about how to help my baby at this stage" (3.8 ± 1.26).

Table 4. Subscale stress level

Subscale	x ± D.S.	Miles et al. (1993)
Sights and sounds	2.70 ± 0.77	2.62 ± 0.89
Infant behaviour and appearance	3.22 ± 0.99	3.12 ± 0.96
Relationship with the baby and parental role	3.23 ± 0.92	3.62 ± 1.13
Staff behaviours and communications	2.30 ± 0.94	*
Total stress level	2.87 ± 0.69	3.14 ± 0.85
General stress level	3.59 ± 1.07	**

*Authors eliminated this sub-scale in 1993. **Authors eliminated this question in 1993.

The total stress level is the average of the scores obtained on the 4 subscales, reaching an average of 2.87 ± 0.69 . The overall stress level was obtained from the final question on the scale "How stressful is your overall experience of having your baby hospitalized in the NICU?" and scored an average of 3.59 ± 1.07 . It should be mentioned that if the subscale "Relation with the staff" is not included (it was eliminated by the authors of the scale in 1993), the total stress level increases from 2.87 to 3.05 points. This increase could be due to the fact that the relationship with the staff would not be more relevant in the stress levels presented by the parents.

Table 5 shows the stress subscale scores in relation to the characteristics of the parents and the pregnancy. Women presented higher stress levels than men in all the subscales considered, being the subscale "Relationship with the baby and the parental role" the one that presented the highest stress scores among them. In the case of men, the subscale with the highest scores was "Appearance and behavior of the baby". However, the differences observed between men and women in relation to the stress level were not significant ($p > 0.05$). Likewise, differences between primiparous (or first-time parents) and multiparous, single and multiple pregnancies, and planned and unplanned pregnancies were not significant in terms of stress levels in any of the subscales, nor in the total stress level.

Parents who had complications during pregnancy, previous diagnosis of infertility or hospitalization of an older child in a NICU did not present significantly higher stress levels than those who did not.

Table 6 shows the results of the stress subscales and the total stress level of the parents in relation to the characteristics of the NB. None of the variables studied showed statistically significant differences in the results of the stress subscales and in the total stress level.

Table 5. Subscales and total parental stress in pregnancy and parents data*

Parents	Sights and Sounds		Infant Behavior and appearance		Relationship with the baby and parental role		Staff behaviours and communications		Total stress level	
	x	DS	x	DS	x	DS	x	DS	x	DS
Total	2.70	0.77	3.22	0.99	3.23	0.92	2.30	0.94	2.87	0.69
Gender										
Female	2.80	0.78	3.34	0.99	3.39	0.91	2.37	1.05	2.98	0.71
Male	2.58	0.76	3.06	0.98	3.02	0.90	2.20	0.78	2.72	0.64
Parity										
Primiparous	2.72	0.78	3.25	0.98	3.27	0.91	2.31	0.94	2.90	0.68
Multiparous	2.70	0.77	3.22	0.99	3.23	0.92	2.30	0.94	2.87	0.69
Multiple pregnancy										
Yes	2.71	0.78	3.25	0.97	3.28	0.90	2.34	0.95	2.90	0.68
No	2.70	0.77	3.22	0.99	3.23	0.92	2.30	0.94	2.87	0.69
Planned pregnancy										
Yes	2.70	0.77	3.22	0.99	3.23	0.92	2.30	0.94	2.87	0.69
No	2.71	0.78	3.26	0.95	3.29	0.89	2.34	0.90	2.91	0.66
Pregnancy complications										
Yes	2.73	0.77	3.27	0.99	3.28	0.92	2.37	0.94	2.91	0.69
No	2.71	0.78	3.25	0.99	3.28	0.90	2.31	0.94	2.89	0.68
Previous diagnosis of infertility										
Yes	2.73	0.78	3.27	0.98	3.28	0.89	2.32	0.94	2.91	0.68
No	2.70	0.77	3.23	0.99	3.26	0.92	2.31	0.94	2.88	0.69
Hospitalization of another Child in a NICU										
Yes	2.73	0.77	3.22	0.98	3.28	0.89	2.33	0.93	2.89	0.67
No	2.70	0.77	3.22	0.99	3.23	0.92	2.30	0.94	2.87	0.69

*All values $p > 0.05$, non significant.

Discussion

If the 4 subscales are considered, what most stresses the parents (without differences by gender) is the alteration in the mother-father-child relationship due to the hospitalization. NICU noises and images (e.g. alarms, monitors, other hospitalized NB, etc.) and the relationship with the staff generate lower levels of stress in the parents. This is consistent with other studies that have investigated parental stress in the context of NICU^{4,5,8,17,20,23,24,27,31}.

Several studies indicate that mothers present higher levels of stress than fathers, as well as greater anxious and depressive symptomatology^{5,27,33,34}. However, in this study, differences in stress levels of men and women are not statistically significant, so the gender variable would not be affecting the parents' reaction to their child's hospitalization.

Likewise, the stress presented by parents does not seem to be related to other pregnancy variables such as parity, pregnancy planning, medical complications, previous hospitalization of the mother, previous diag-

nosis of infertility or having an older child hospitalized in a NICU. This differs from the studies by Carter et al.^{5,6} and Dudek-Shriber⁸, in which higher stress scores in mothers are associated with having complicated pregnancies and not having previous experience of having a child hospitalized in a NICU^{5,6,8}.

When considering the clinical variables of the NB, no significant differences were found either. This is in agreement with some studies that show that the level of stress is not necessarily associated with the severity of the newborn, but with other factors^{1,13,17,23}. Authors argue that the psychological trauma of having a sick child is more related to the alteration in their parental role than to gestational age, birth weight and even length of stay in the NICU^{1,21}. However, another study⁸ indicates that there are differences in stress levels when considering the gestational age of the newborn, the length of hospitalization and the diagnosis of the newborn.

It is worth mentioning that the item on the scale with the highest stress score is the "Being separate from my baby" (part of the subscale "Relationship with the baby and parental role"), which is consistent with

Table 6. Subscales and total parental stress in regards newborn characteristics*

Newborn	Sights and Sounds		Infant Behavior and appearance		Relationship with the baby and parental role		Staff behaviours and communications		Total stress level	
	x	DS	x	DS	x	DS	x	DS	x	DS
Total	2.70	0.8	3.22	1	3.23	0.92	2.30	0.94	2.9	0.69
Gestational age										
≤ 31+6	2.70	0.77	3.22	0.99	3.23	0.92	2.30	0.94	2.87	0.69
> 32 y ≤ 36 +6	2.73	0.77	3.27	0.97	3.29	0.89	2.32	0.94	2.91	0.67
≥ 37	2.71	0.78	3.25	0.99	3.28	0.90	2.31	0.94	2.89	0.68
Birth weight (g)										
> 1500	2.72	0.77	3.25	0.97	3.26	0.91	2.31	0.94	2.89	0.68
< 1500 y > 2500	2.70	0.78	3.22	0.99	3.24	0.92	2.30	0.94	2.87	0.68
≥ 2500	2.71	0.78	3.25	0.99	3.28	0.90	2.31	0.94	2.89	0.68
Prematurity										
Yes	2.70	0.77	3.22	0.99	3.23	0.92	2.30	0.94	2.87	0.69
No	2.71	0.78	3.25	0.99	3.28	0.90	2.31	0.94	2.89	0.68
Respiratory disease										
Yes	2.70	0.77	3.22	0.99	3.23	0.92	2.30	0.94	2.87	0.69
No	2.71	0.78	3.25	0.99	3.28	0.90	2.31	0.94	2.89	0.68
Malformations/genopathy										
Yes	2.73	0.79	3.26	0.98	3.30	0.88	2.37	0.93	2.92	0.67
No	2.70	0.77	3.22	0.99	3.23	0.92	2.30	0.94	2.87	0.69
Infectious										
Yes	2.74	0.79	3.25	0.97	3.27	0.92	2.35	0.95	2.91	0.68
No	2.70	0.78	3.22	0.99	3.24	0.92	2.30	0.94	2.87	0.69
Invasive mechanical ventilation										
Yes	2.74	0.81	3.28	0.97	3.30	0.91	2.36	0.95	2.92	0.68
No	2.70	0.77	3.22	0.99	3.23	0.92	2.30	0.94	2.87	0.69
Non-invasive mechanical ventilation (CPAP)										
Yes	2.70	0.77	3.22	0.99	3.23	0.92	2.30	0.94	2.87	0.69
No	2.71	0.78	3.25	0.99	3.28	0.90	2.31	0.94	2.89	0.68
Surgical										
Yes	2.74	0.82	3.20	0.95	3.39	0.94	2.36	0.97	2.93	0.68
No	2.70	0.77	3.22	0.99	3.23	0.92	2.30	0.94	2.87	0.69

*All values $p > 0.05$, non significative.

other studies^{17,23}. The physiological and socio-emotional benefits of early physical contact between hospitalized parents and infants have been well recognized in recent decades^{22,35}. This result highlights the importance of fostering closeness and early physical contact (touching, talking, holding, etc.) and that the parents take care of the baby (feeding, changing, bathing, etc.) whenever it is medically possible^{9,23,31}. The type of interaction that may occur during visiting hours may work as a protective factor to the stress that causes separation with the NB. Also, parent's access to the medical team by phone would favor the connection with their NB. These practices deliver the message that their presence and involvement is important for the recovery of the NB and it can prevent the appearance of depres-

sion or anxiety in parents and favor the bond between them^{1,9,31,36}.

The authors of the scale, in a review in year 1993⁴, eliminated the subscale "Staff behaviours and communications" since few parents registered answers in this subscale. However, in this study, it was decided to use it because of the relevance of the role of health staff in helping parents adjust to the stress of hospitalization of a child in a NICU⁵ and in helping them to recognize the signs of the newborn, to trust themselves as caregivers and to favor the bonding with the NB³⁷. In other words, the alteration in the parental role can be attenuated as the staff helps them feel more competent and secure as parents.

The results obtained allow us to conclude that the

support and education to deal with the stress of hospitalization, as well as practices that promote the bond between parents and NB, should be delivered to all parents, regardless of whether it is the father or mother, the history of pregnancy and delivery, the diagnosis of the NB or its severity. Support and education are all those practices carried out by the entire NICU team (medical doctors, midwives, nurses, nursing assistants, psychologists, speech therapists, etc.) who help parents better cope with hospitalization, whether at the cognitive level (understanding of diagnosis, treatments and prognosis of newborns, etc.), emotional level (allowing parental emotional expression, anxiety and stress reduction techniques, etc.) and behavioral level (stimulating the baby's physical contact with his/her parents, incorporating parents into care, teaching stimulation techniques, basic care, etc.)

One of the limitations of this study is that we do not analyze other factors that may influence parents' stress levels such as personality variables, presence of mental health issues, social networks, etc. These factors could be represented in the overall stress level score that is unrelated to the questions on the scale used. The higher scores in the overall level of stress than in the total stress level is consistent with other studies^{8,38}. It has been found that mothers of premature infants

at 6 months corrected age report that one of the sources of greater stress comes from personal and family problems prior to the child's birth or that arose during hospitalization³⁸. On the other hand, only the 59 NB parents, who represent 34.5% of all babies born during the study period, could be accessed. We do not know if the population of parents that could not be accessed has the same response as the population included in this study or there are variables associated with non-participation that may affect their response to the different stressors investigated.

Given the results of this study, it seems necessary that health professionals working in a NICU can design interventions that aim at reducing the stress that parents present, regardless of gender, prenatal condition, pregnancy and diagnosis or severity of the newborn.

In future studies, it would be relevant to evaluate the effect of parental involvement in the care of the newborn and the promotion of an early physical contact in the stress associated with the alteration of the parental role. Also, it would be important to measure the level of stress at different times of the hospitalization to study eventual variations over time as well as to study the impact of the presence of different specific pathologies of the NB on stress levels.

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