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Tidig föräldrastress hos mammor med för tidigt födda barn

Early parental stress in mothers of preterm infants

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Sammanfattning

Bakgrund: Att bli mamma till ett för tidigt fött barn (<37 gestationsveckor) innebär en oväntad stress vilket påverkar hela familjen. Under de senaste årtionden har stora förbättringar skett inom perinatal vård och numera är chansen till överlevnad stor. Att barnet efter födseln vårdas på neonatal intensivvårdsavdelning (NICU) får konsekvenser för mamman både känslomässigt och i omvårdnaden av barnet. **Syfte:** Att undersöka föräldrastress och beskriva faktorer som påverkar tidig föräldrastress hos mammor till för tidigt födda barn när barnet är två månader i korrigerad ålder. **Metod:** Studien utfördes på fyra NICU i Sverige. Inklusionskriterierna för studien var att barnet var för tidigt fött samt vårdades på neonatalavdelning i minst 72 timmar. För att mäta upplevd föräldrastress fick mammorna (n=276) svara på enkäten Swedish Parental Stress Questionnaire (SPSQ) när barnet var två månader i korrigerad ålder. **Resultat:** Mammor vars barn inte vårdades på en samvårdsavdelning, som hade barn i kuvös, mammor till barn med äldre syskon, var äldre, rökte och/eller ammade helt upplevde mer föräldrastress än övriga mammor. **Slutsats:** Studien visar att faktorer i framför allt i miljön samt hos mamman har betydelse för upplevd föräldrastress. Våra resultat innebär att omhändertagandet bör bli bättre, både under tiden på neonatalavdelning men även efter utskrivning. Då studien också påvisar vikten av samvårdsavdelning bör förbättringar ske i den fysiska vårdmiljön för att minimera upplevelsen av föräldrastress.

Nyckelord: Barn, för tidigt född, förälder, föräldrastress, mamma, neonatalavdelning, prematur, SPSQ

Abstract

Background: When an infant is born preterm (<37 gestational weeks) unexpected stresses affect the whole family. Significant improvements in the perinatal care has been made in the recent decades and now the chance of survival is high. To become a mother in a Neonatal Intensive Care Unit (NICU) entail consequences for the mother emotionally and in her care for her infant. **Aim:** To investigate parental stress and describe factors associated to early parenting stress in mothers of preterm infants at two months of corrected age. **Method:** The study was conducted in four NICUs in Sweden. The inclusion criteria were that the infant was born prematurely and had a hospital stay for at least 72 hours. To measure perceived parental stress, the mothers (n=276) answered the Swedish Parental Stress Questionnaire (SPSQ) at two months of corrected age. **Results:** Mothers whose infants were not cared for in a NICU with co-care, whose infants were cared for in an incubator, who were multiparous, older, who smoked and/or who were breastfeeding exclusively, experienced more stress than their counterparts in various dimensions explored. **Conclusion:** The study shows that factors relating to the environment and the mother are associated to parental stress among mothers' of preterm infants. These findings show the need for improved support, both during the NICU stay and after discharge. These findings also highlight the need for improvements in the physical environment of the NICUs to reduce the risk for parental stress.

Keywords: Infant, preterm infant, parent, parental stress, mother, neonatal intensive care unit, premature, SPSQ

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Introduction

When an infant is born preterm (< 37 gestational weeks) the woman become a biological mother at a time that is not expected. Often the attention is focused on the infant's survival and his/her physical needs and less on the contact between the mother and her infant. The mother's feelings and the biological effects of being physically connected to the infant are vital for the bonding process (Bruschweiler Stern, 1998; Flacking, Ewald, Nyqvist, & Starrin, 2006). It is suggested that mothers of preterm infants may experience the identity as a mother later than mothers of infants born at term because of the separation from the infant after the birth (Zabielski, 1994).

Approximately 5% of all infants are born preterm but the figures are dependent on various national criteria for registration of fetal deaths and stillbirths (Graafmans, Richardus, Macfarlane, Rebagliato, Blondel *et al.*, 2001). The need for neonatal care is primarily caused by immaturity and adaption to extra uterine life and varies in extent and duration. Most of the preterm infants are born at 32-36 weeks and in this population the incidence of mortality and morbidity are low. In very preterm infants (<32 gestational weeks), the risks are higher but improvements in neonatal care have increased the survival of all preterm infants (Blennow, Ewald, Fritz, Holmgren, Jeppsson, Lundqvist *et al.* 2009; Lumley, 2003). Hence, the overall 1-year survival in infants born at 22 to 26 gestational weeks is about 70% in Sweden (Blennow *et al.*, 2009).

Experiences of becoming a mother in a neonatal intensive care unit

When the infant needs care in a neonatal intensive care unit (NICU), the mother and the infant will most often be separated, for short or long periods. For many mothers the experiences of having a preterm infant cared for in a NICU is like being on a "roller-coaster" of emotions (Flacking *et al.*, 2006). The consequence of being separated and having a preterm infant may render feelings of not "belonging" and negative emotions such as anxiety, stress and powerlessness. (Wigert, Johansson, Berg & Hellstrom, 2006). However, mothers also report positive emotions such as feelings of happiness, security, satisfaction, well-being, closeness and relief after the NICU stay (Castell, 1990; Hurst, 2001a,b; Nystrom & Axelsson, 2002).

In neonatal care, much focus is paid on infant's nutritional needs and the importance of breast milk. Breastfeeding is triggered through biological mechanisms but it also reflects cultural

values of motherhood and is negotiable from the perspective of the individual (Dykes & Flacking, 2010). Hence, depending on the culture and personal preferences, many Swedish mothers do breastfeed, even when they have a preterm or very preterm infant (Flacking, Nyqvist & Ewald 2007; Flacking, Wallin & Ewald, 2007). For many mothers, the ability to nourish and breastfeed her infant is of vital importance and part of the process of being a mother (Flacking *et al.*, 2006).

In the NICU where there is a more accentuated power difference between mothers and professionals, compared to an ordinary maternity unit, the need for a supportive staff is increased. Feelings of maternal incompetence may be enforced by the facts that the professional staff take care of the infant, minimizes the mother and make her feel useless (Bruschweiler-Stern, 1998). A positive and trustful staff-mother relationship enables mothers to connect to their infants whereas a negative relationship may lead to disconnection (Lupton & Fenwick, 2001; Flacking *et al.*, 2006). As an example of building trustful relationships between parents-staff, mothers describes that it is important to talk to the same nurse at the NICU and receives honest answers to questioned asked (Sargent, 2009). Reis, Remple, Scott, Brady-Fryer and Van Aerde (2010) suggest that the bedside nurse is the most significant factor affecting the parent's satisfaction with their NICU experience. Research also indicates that the process of attaining a maternal identity is a process where mothers go from feeling like "outsiders" or "alienated" through different stages before they can feel fully engaged a process highly dependent of the staff interactions (Flacking *el al.*, 2006). The impact of the staff behavior and attitudes in NICUs are also crucial because the NICU *per se* may preclude a 'normal social life' (Lupton & Fenwick, 2001). Many studies suggest that the context drives parents and nurses into close relationships and even turning the parent-infant dyadic relationship into a "triadic" relationship (i.e. infant-parent-staff) (Bialoskurski, Cox & Hayes, 1999). Fegran and Helseth (2009) state that closeness increases the emotional involvement but that the commitment of being too close, in combination with too much emotional involvement, can be a burden to both parents and nurses.

Experiences of coming home after discharge from the neonatal intensive care unit

After the infant's discharge from the NICU, the mother's feelings are suggested to swing between feelings of emotional exhaustion and feelings of relief (Flacking *et al.*, 2006). A qualitative study in Sweden (Jackson, Ternestedt & Schollin, 2003) suggests that the mothers and the fathers did not feel prepared to take care of the infant after the NICU stay. The

mothers felt insecure and worried about the infant's medical status, whereas the fathers lacked the practical help from the NICU staff and were worried about the infant's care at home. After 18 months parents expressed that the relationship with the infant and the family as whole was more stable. Another Swedish study showed that many mothers experienced feeling of relief when the infant was perceived to be healthy and they described their infants as "a gift" or "a miracle" (Flacking, Ewald & Starrin, 2007). Many mothers also struggled at home as they felt ashamed because they could not fulfill the expectations of being a "good mother" or a "happy mother" and because they feared the infant's future medical conditions. Research indicates that mothers' psychological distress/problems do not decrease with time and this depressive state is associated with social isolation, post-traumatic symptoms and feelings of guilt persisting several years after the birth (Eriksson & Pehrsson, 2002).

Parental stress

The time after the delivery is a period of increased psychological vulnerability for many women (Hagan, Evans & Pope, 2004). Many factors have been acknowledged as stressful factors for parents such as the infant's immaturity and illness, concern about medical and behavioral outcomes, lack of information, poor family functioning and lack of social support, which may lead to depressive symptoms, decreased self-esteem and impaired later attachment (Coyne, 1995; Doering, Moser, & Dracup, 2000; Holditch-Davis & Miles, 2000; McGrath, Boukydis, & Lester, 1993; Redshaw & Harris, 1995; Shields-Poe & Pinelli, 1997; Singer, Salvator, Guo, Collin, Lilien, *et al.*, 1999).

Studies have shown that postnatal depression is the most prevalent postpartum mood disorder and has therefore received research attention in recent years. Bergstrom, Wallin, Thomson and Flacking, (2012) show an even higher risk for postpartum depression among mothers to preterm infants compared to term infants. The Edinburgh Postnatal Depression Scale (EPDS) is used widespread in research for diagnosis of depression. A limitation with EPDS, it can limit the understanding of postnatal distress and anxiety because not all anxious mothers are depressed (Miller, Pallant, & Negri, 2006). The Swedish Parenthood Stress Questionnaire (SPSQ) (Ostberg, Hagekull & Wettergren, 1997) is used to measure parental stress and is partly adapted and modeled after Parenting Stress Index (Abidin, 1999) The SPSQ is designed to measure the perceived stress that parents can directly relate to parenting. (Ostberg *et al.*, 1997). Parental stress can be measured from birth until the child reaches adolescence.

However, fewer studies focus on early parenting stress, the first months of life of the infant and thus much more research is conducted on parental stress in later childhood years.

Studies show that mothers of preterm infants are vulnerable and may experience emotional problems, anxiety and stress to a higher extent than mothers of term infants. However, studies are lacking on parental experience of stress and factors associated to stress. Thus, the aim of this study is to investigate factors associated to early parental stress in mothers of preterm infants at two months of corrected age. Hence, the specific research questions addressed was what maternal and infant factors are associated to maternal stress at two months of corrected age?

Methods

Research design

This study was conducted as a prospective cohort study and it is a part of a larger study. It was originally conducted as an intervention study aimed to evaluate the effects of facilitation support in the implementation of Kangaroo Mother Care (KMC) guidelines and those details are described elsewhere (Wallin, Rudberg & Gunningsberg, 2005). In this study, the time frame for early parental stress was defined at two months corrected age of the infant; i.e. the data of parental stress were collected at two months after the child's expected birth date.

Settings

This study was conducted in Sweden, in four neonatal units (called NICU A, NICU B, NICU C and NICU D) located at four county hospitals. All units experienced full patient occupancy (NICU A 104%, NICU B 93%, NICU C 122% and NICU D 113%) during the time the study was conducted in the year of 2002. Two of the units (NICU A and NICU C) were organized as co-care for mothers and infants. The co-care units allowed the mothers to be cared for post-partum in the NICU and the mothers could room in for 24 h/day during the infants hospital stay.

Sample

The criteria for inclusion were: preterm birth (<37 gestational weeks) and infant being cared for in a NICU unit for at least 72 hours, which resulted in 663 mothers assessed for eligibility. Exclusion criteria's were: non-Swedish speaking mothers, severe maternal medical or psychological problems, infant transferal to another hospital unit severe congenital malformation or infant death during the hospital stay, in total 51 mothers fulfilled exclusion criteria. 189 mothers (30%) did not want to participate in the study. Out of the 423 mothers who received the questionnaire, 123 mothers of twins were excluded (this will be reported in another paper). In addition, 24 mothers were excluded because of insufficient data in the returned questionnaire. The final sample consisted of 276 mothers of singleton preterm infants (Figure 1).

Data collection

Maternal and infant factors

All data on infant characteristics: gender, way of delivery, gestational age at birth, birth weight, incubator care and breathing support, were obtained from the infant's medical record by a contact nurse working at each of the NICUs. The data on mother's characteristics: parity, maternal age, and mode of delivery, were also obtained from the infant's medical record. Data on smoking and educational level were obtained from self-reported answers to questions in the questionnaire sent out to mothers at two months of infant's corrected age (described below). At two months of infant's corrected age, mothers received a phone call where they were asked about their breastfeeding at present. The definition of breastfeeding by the Socialstyrelsen (2005) and the World Health Organization (WHO) (2003) was used. Exclusive breastfeeding was defined as only providing breast milk with the exception of medicines and vitamins, partial breastfeeding as providing breast milk in addition to formula, all this regardless of the method used for giving the infant breast milk. No breast milk was defined as not providing any breast milk.

Parental stress

To measure parental stress, the Swedish Parental Stress Questionnaire (SPSQ) was used. The questionnaire was sent out to mothers at the infants age of corrected age. The mothers received the questionnaire by mail and returned it in a prepaid envelope. The SPSQ is designed to measure the perceived stress that parents can directly relate to parenting. It is based on 34 selected questions from Parenting Stress Index (PSI) and comprises five

dimensions: Restrictions of Role, Sense of Competence, Social isolation, Relationship with Spouse and Health Problems (Osteberg, *et al.*, 1997).

The SPSQ is considered to be a valid instrument for measuring parental stress in Sweden (Osteberg *et al.*, 1997). The instrument consists of items, scored on 5-point Likert-type scales, in which mothers were asked to mark the degree to which they agreed or disagreed with each statement. In the conducted study, one item was excluded (i.e. "When I am invited out I don't think I will have a good time"). Eleven of the items were positively worded and hence the score was shifted when analyzing so that a lower score always indicated low stress and a high score high stress (1 – 5 score). For each dimension, the score was calculated as the mean of the responses (1 - 5). The total score was calculated as the mean of all responses.

Statistical analysis

Data were analyzed using the statistical package SPSS 20.0 for Windows and a two-sided 95% level of significance was used. The independent variables investigated were: NICU co-care, maternal age, level of education, parity, breastfeeding at two months of corrected age, prevalence of smoking, infant's gender, gestational weeks at birth, way of delivery, breathing support and incubator care. The association between independent variables with two categories and parental stress in each of the five dimensions (incompetence, role restriction, social isolation, spouse relationship problems, health problems) and the total score (dependent variables) were analyzed with independent samples T-tests with Bonferroni correction. Associations between independent variables with four categories and one way ANOVA with Scheffe's post hoc test was used.

Ethical considerations

Ethical approval was obtained by the Research Ethics Committee of the Medical Faculty at Uppsala University (01-029). Mother-infant couples participating were assured confidentiality and all participant mothers were well informed about the study and participation was voluntary. Mothers' integrity, respect, and autonomy were maintained through the process, as well as minimizing physical and psychological impact on the individual (World Association Declaration of Helsinki, 2008).

Results

Characteristics of mothers and infants

The mothers' age ranged from 19 to 46 years (mean 31 years, SD 5). Most of the mothers were married or cohabiting (95%) and half of the mothers had a university or college education. Twice as many mothers were primiparous and 9% smoked. Data on mothers' characteristics are presented in Table 1.

Two of the studied NICUs were stated as Co-care units (NICU A and NICU C) and hence 99 mothers (36%) had experienced co-care. The hospital stay for infants ranged from 4 to 101 days (mean 26 days, SD 20). The gestational age at birth ranged from 24 weeks to 37 weeks (mean 32 weeks, SD 3). The infants' birth weight ranged from 508 to 4125 grams (mean 2019 grams, SD 676). In the study 121 infants were born vaginally and 152 infants were born by Caesarean section. For those infants who were cared for in an incubator, the numbers of days ranged from 1 to 87 days (mean 10 days, SD 11). There were 143 infants who needed breathing support, 142 infants needed CPAP (mean 10 days, SD 16) and 26 infants who needed ventilator (mean 4 days, SD 4). Data on infant characteristics are presented in Table 2.

Parental stress related to the environment in the neonatal intensive care unit

A significant difference was found between the feeling of parental stress among mothers of infants cared for in a co-care unit or not. Mothers who had not experienced co-care felt more stress in the dimension of incompetence ($p < 0.01$). No significance differences were found regarding co-care and the dimensions of restrictions of role, social isolation, relationship with spouse, parent health and in the total score (Table 3).

Parental stress related to maternal factors

In Table 3 associations between parental stress and mothers' characteristics are presented. The mother's level of education was not associated to parental stress in any dimension. Multiparous mothers experienced more stress in the dimensions of spouse relationship problems ($p < 0.05$) and health problems ($p < 0.01$), compared to primiparous mothers. Mothers who smoked experienced more feelings of stress in the dimension of social isolation ($p < 0.01$) and spouse relationship problems ($p < 0.05$), compared to mothers who did not smoke.

Mothers younger than 24 years felt less stress in the dimensions of role restriction ($p<0.05$) and health problems ($p<0.05$) compared to older mothers in the study. The same applied to mothers who were aged 24-28 years compared to older mothers in the group 29-33 ($p<0.05$) years and >34 years ($p<0.05$). Mothers 29-33 years had the same significance compared to the >34 years old mothers ($p<0.05$). No significant difference in dimensions sense of competence, social isolation and relationship with spouse was found (not presented in table).

There was no association between mothers who breastfed and mothers who did not breastfeed at two months of corrected age, on any of the dimensions regarding parental stress. However, significant differences were found when comparing mothers who exclusively breastfed with those mothers who partially breastfed. Mothers who breastfed exclusively experienced more stress in the dimension of restriction of role ($p<0.01$), health problems ($p<0.05$) and in the total score ($p<0.05$) compared to mothers who partially breastfeed (Table 3).

Parental stress related to infants factors

Factors relating to the infant such as breathing support, gestational age at birth, way of delivery and gender were not associated to the experience of stress among the mothers in any dimension. Mothers whose infants had been cared for in an incubator experienced more stress in the dimension of incompetence ($p<0.05$), health problems ($p<0.01$) and in the total score ($p<0.05$) compared to mothers whose infants had not been cared for in an incubator (Table 3).

Discussion

This study shows that mothers who do not experience co-care, whose infants are cared for in an incubator, who are multiparous, older or who smoke and/or who are breastfeeding exclusively experience more stress than their counterparts in various dimensions explored.

To identify associated factors for experienced feeling of stress among mothers of preterm infants helps us identifying the mothers in advance and increase the chances to give mothers the right or a better support. The risk factors for parenting stress have been previously studied in Sweden (Ostberg, 1998), but not in the population of mothers of premature infants.

To use co-care is also important for the parents. Flacking, Lehtonen, Thomson, Axelin,

Ahlqvist, Hall Moran, et al, (2012) revealed that it is important with early skin-to-skin contact, family-centered care, increased visiting hours, family-room and behavior of space at the NICU. Parental stress is affected by the environment and the nurse has a big role to care for both mothers and infants. The result is significant in the dimension of incompetence, thus it is important to let the mother be a part of the care of the infant. All mothers' have the right to the same accurate information regardless of age, education or prior experience. Studies have demonstrated that when parents learn to understand the meaning of their newborn's behavioral cues, they report decreased levels of stress with their NICU experience (Cleveland, 2008; Kaaresen, Ronning, Ulvund & Dahl, 2006). Nursing behaviors to meet the parents needs include emotional support, parent empowerment, and welcoming environment with supportive unit policies (Cleveland, 2008).

This study shows that younger mothers' have less feelings of parental stress compared to older mothers, which may be due to the life experiences. Older mothers may have children previously, which demonstrated a risk factor in itself. With age the awareness of the risks and consequences' may increase, which further increases the experience of stress. The educational level of the mother made no difference in the experienced parental stress in our study. Tommiska, Ostberg and Fellman, (2002) showed the same result, mothers' educational level was not relevant to the experienced stress. The educational level is a factor that may have an effect on experienced stress according to previous studies, in which higher maternal education has been associated with lower parental stress (Ostberg, 1998). The same study presented that mother's age and parity was associated with stress in a greater extent. In contrast to our study, Ortenstrands' (2005) showed no statistically significant correlations between parental stress and the woman's age and smoking habits.

The experience of stress among the mothers related to breastfeeding at two months corrected age shows that mothers breastfeeding exclusively are more likely to experience a role restriction and/or health problems than mothers breastfeeding partially. One explanation may be that mothers who are breastfeeding exclusively may experience lack of time to do something they would like to do and thereby feeling "tied down" as their presence is needed by their infant. Weimers, Svensson, Dumas, Naviér and Wahlberg (2006) showed that mothers had a need for support of breastfeeding. The mothers had feelings that the nurses at the NICU should be more knowledgeable and also more patient with current breastfeeding. The general opinion in Sweden is to promote breastfeeding and it can be a cause for stress

among mothers as they may feel pressured from nurses to breastfeed. Hence, a more facilitative and person-centered approach to breastfeeding might be needed in health care in order to provide support.

Incubator care was the only independent variable that showed significance related to infant characteristics and parental stress. In Ortenstands' (2005) study was parental stress not associated with the infants' health in the terms of prematurity, disability, chronic illness or care on the NICU. Similar to Ostbergs' (1998) study, maternal stress was not associated to infant gender or age. Flacking et al., (2007) show in their study that breastfeeding duration in mothers of very preterm infants was not influenced by infant characteristics but by socioeconomic status. Similar to our study the mother's characteristics had the greatest impact on experienced maternal stress at two months of infant's corrected age. When the infants are cared for in an incubator it makes the infant more inaccessible in care situations and there will be a distance between the mother and her infant. As our results shows, these mothers experience parental stress, particularly with regard to feeling of incompetence, which could be explained by the incubator care.

Clinical implications

When an infant is born preterm the woman become a mother earlier than she expected. The care is focused on the infant's survival and their physical needs prior to the contact between the mother and the infant. The nurse has an important role to support the mother in the care for their infant in the NICU. The authors believe that the findings from this study are valuable for nurses working in the NICU. To have a positive, trustful and supportive relationship with the mother can facilitate her in "becoming a mother".

Parental support and intervention programs have been shown to reduce maternal distress and thereby promote the infant's development (Jotzo & Poets, 2005; Meyer, Coll, Lester, Boukydis, McDonough & Oh, 1994 Nordhov, Ronning, Dahl, Ulvund, Tunby & Kaaresen, 2010). In addition, with regard to our findings, it is of outmost importance to bring about a change in the environment so that the mother-infant pair never get separated but co-cared. Being a mother and especially to an infant born preterm the mothers are faced with unexpected stresses. This might be especially prominent in mothers with older children at

home and therefore efforts must be made to facilitate this potential struggle, both in the NICU and after discharge.

This study increases our knowledge as health care professionals on how to better support these mothers and perhaps, in advance, predict which ones are more likely to experience parental stress. Furthermore, by establishing teams between NICUs and Child Health Care, the transition from NICU to the situation at home might be facilitated for mothers and the family as a whole.

Strengths and limitations

There are certain limitations in this study. A large number of mothers did not want to participate in this study. Because of ethical reasons we could not investigate whether these mothers were different in any aspect than the participating mothers, which is a validity problem. Thus, it could be hypothesized that mothers not participating are more likely to experience stress and hence the risk for not detecting significant factors are increased. The instrument, SPSQ, has been validated and standardized and proved sensitive and stable in finding differences in parenting problems in certain risk populations. However, the instrument has not been previously used in parents of preterm infants (Ostberg, 1998). Thus, it is reasonable to question the validity of using this instrument to capture parental stress in this population. Furthermore, the infant's age of two months corrected age was used (and not postnatal age) as the time point to collect data, which needs to be taken into consideration when comparing these findings with findings from other research. A major strength in this study was that it was conducted in four NICUs, enhancing the possibility to generalize our findings to other NICUs in similar contexts.

Suggestions for further research

A longitudinal study of mothers and fathers of preterm infants would give us more information about the feeling of parental stress and how it may develop over time. In addition, the SPSQ instrument contains many questions and is complex. It would be of great advantage if a shorter but yet valid instrument could be constructed and used as a measure for quality improvements in neonatal care.

Conclusion

Our findings highlight the need for improved support for multiparous, older mothers, smoking mothers, mothers of infants cared for in an incubator and mothers who were breastfeeding exclusively. Co-care in the NICU also showed good effect of parental stress. An improved support is needed both during the infant's NICU stay but also after discharge, which emphasize the potential need for cross-institutional teams such as between NICUs and the Child Health Care.

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Figure

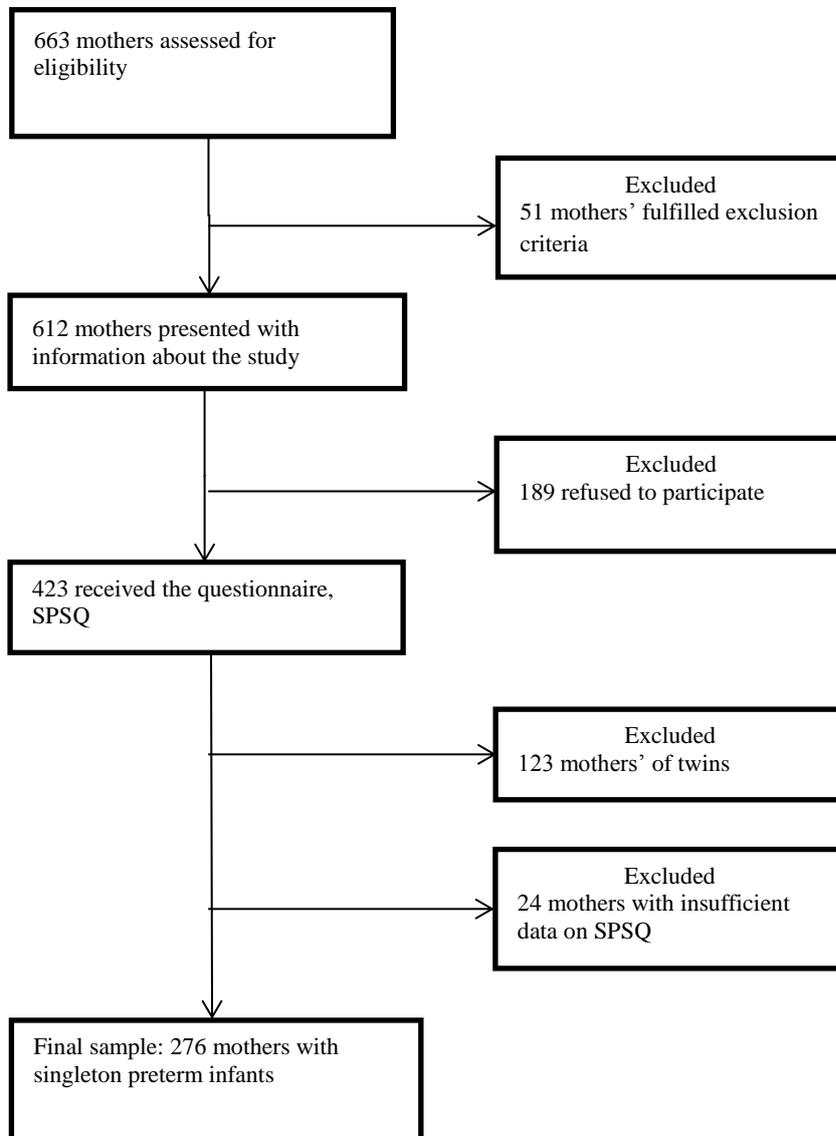


Figure. 1: The inclusion and exclusion of mothers

Tables

Table 1: Mothers' characteristics

<i>Demographic variables</i>	<i>n=276</i>	<i>n (%)</i>
<i>NICU</i>	99	36
NICU A	30	12
NICU B	66	24
NICU C	69	25
NICU D	111	40
<i>Mothers' age</i>		
<24	19	7
24-28	80	29
29-33	101	37
>34	75	27
<i>Marital status</i>		
Single	7	3
Married/Cohabiting	261	95
<i>Maternal educational</i>		
Upper secondary school or less	137	50
University/College	135	49
<i>Parity</i>		
Primiparous	180	65
Multiparous	96	35
<i>Breastfeeding</i>		
Exclusive	155	56
Partial	52	19
No	62	23
<i>Smoking</i>		
No	75	91
Yes	25	9

Table 2: Infants' characteristics

<i>Demographic variables</i>	<i>n=276</i>	<i>n (%)</i>
<i>Gender</i>		
Boy	142	51
Girl	134	49
<i>Infants age at birth</i>		
< 32 weeks	94	34
≥ 32 weeks	182	66
<i>Weight</i>		
< 2500g	207	75
≥ 2500g	69	25
<i>Way of delivery</i>		
Vaginal	121	44
Sectio	152	55
<i>Incubator</i>		
Yes	187	68
No	89	32
<i>Ventilator/CPAP</i>		
Yes	143	52
No	133	48

Table 3: Parental stress related to maternal and infant factors

results-dimensions																		
Type of NICU care	Incompetence			Role restriction			Social isolation			Spouse relationship problems			Health problems			Total score		
	mean	SD	p	mean	SD	p	mean	SD	p	mean	SD	p	mean	SD	p	mean	SD	p
Co-care yes	1.83	0.49	<0.01*	3.44	0.81	0.53	2.01	0.66	0.65	1.94	0.76	0.53	2.37	0.64	0.65	2.28	0.47	0.12
No co-care	2.02	0.62		3.50	0.78		2.04	0.62		2.00	0.80		2.41	0.70		2.38	0.50	
Mothers																		
<i>Maternal educational level</i>																		
Upper secondary school or less	1.90	0.57	0.15	3.39	0.84	0.06	2.04	0.66	0.72	2.02	0.87	0.29	2.35	0.65	0.21	2.32	0.52	0.38
University/collage	2.00	0.60		3.58	0.72		2.01	0.62		1.92	0.67		2.46	0.70		2.37	0.46	
Primiparous	1.93	0.56	0.48	3.43	0.77	0.22	2.07	0.58	0.14	1.89	0.68	<0.05*	2.28	0.61	<0.01*	2.31	0.45	0.12
Multiparous	1.98	0.62		3.56	0.81		1.95	0.70		2.13	0.91		2.59	0.74		2.40	0.54	
Smoking	1.90	0.51	0.75	3.40	0.81	0.59	2.40	0.73	<0.01*	2.36	1.09	<0.05*	2.31	0.64	0.53	2.41	0.57	0.50
No smoking	1.95	0.59		3.49	0.79		1.99	0.61		1.94	0.73		2.40	0.68		2.34	0.48	
Exclusive breastfeeding	1.99	0.62	0.18	3.60	0.76	<0.01*	2.02	0.65	0.43	1.98	0.71	0.41	2.46	0.73	<0.05*	2.39	0.49	<0.05*
Partial breastfeeding	1.86	0.55		3.22	0.74		1.94	0.57		1.89	0.76		2.18	0.56		2.20	0.46	
Infants																		
Gender girl	1.97	0.53	0.64	3.46	0.79	0.74	2.01	0.64	0.63	2.00	0.75	0.59	2.35	0.66	0.30	2.35	0.47	0.87
boy	1.93	0.63		3.50	0.79		2.05	0.63		1.96	0.81		2.44	0.69		2.34	0.51	
Gestational age at birth <32 weeks	1.92	0.51	0.56	3.41	0.78	0.30	2.06	0.60	0.59	1.99	0.80	0.95	2.41	0.65	0.78	2.33	0.44	0.64
Gestational age at birth >32 weeks	1.96	0.62		3.51	0.79		2.02	0.66		1.98	0.77		2.39	0.69		2.36	0.51	
Way of delivery, Vagnial	1.99	0.56	0.28	3.51	0.78	0.63	2.03	0.66	0.92	1.99	0.79	0.99	2.38	0.72	0.92	2.36	0.48	0.60
Seccio	1.91	0.59		3.46	0.80		2.03	0.62		1.99	0.78		2.39	0.64		2.33	0.50	
Breathing support	1.93	0.55	0.64	3.48	0.74	0.92	2.02	0.62	0.80	1.97	0.80	0.87	2.45	0.73	0.15	2.34	0.48	0.92
No breathing support	1.97	0.62		3.49	0.83		2.04	0.65		1.99	0.77		2.34	0.61		2.35	0.50	
Incubator care	2.00	0.61	<0.05*	3.53	0.78	0.11	2.07	0.63	0.14	2.01	0.81	0.43	2.47	0.66	<0.01*	2.40	0.50	<0.05*
No incubator care	1.84	0.52		3.37	0.80		1.95	0.65		1.93	0.72		2.24	0.68		2.24	0.50	

* =Significance at T-test

