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Research paper

Beliefs and needs of fathers of newborns hospitalised in a neonatal unit: A descriptive correlational study

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ABSTRACT

Background: Transition to parenthood is a wonderful yet stressful period especially when it involves the newborn's hospitalisation. To support and facilitate this transition, it is essential to understand parental beliefs and needs. The father's perspective remains an understudied yet fundamental question.

Objectives: The objective of the study was to measure beliefs and needs of fathers of newborns hospitalised in a neonatal intensive care unit (NICU) and their correlations with sociodemographic variables.

Methods: Fathers with a newborn hospitalised for 4–15 days in a level III NICU in Western Switzerland completed the NICU Parental Beliefs Scale and the short form of the NICU Family Needs Inventory. For each item of the NICU Family Needs Inventory, fathers also answered with regard to their satisfaction level. Additional needs were collected with an added open-ended question. Simple linear regressions were used to correlate beliefs, needs, and the sociodemographic data.

Results: Seventy fathers were included. The average score for paternal beliefs was 68.44 (standard deviation = 10.29), indicating a good perception of their role. The majority (77%) considered all needs as very important or important, and 70% were very satisfied or satisfied. Fathers described communication as a very important, but unmet, need. Fathers' beliefs were higher in those who were not first-time fathers (71.88 ± 8.27 vs 66.06 ± 10.97 , $p = 0.028$), who had a paternity leave (72.68 ± 10.19 vs 66.05 ± 9.68 , $p = 0.014$), and who were of foreign nationality (71.86 ± 9.39 vs 63.85 ± 9.80 , $p = 0.002$).

Conclusions: Fathers with a newborn hospitalised in the neonatal unit had good paternal beliefs. Most of the listed needs were perceived as very important and had a good level of satisfaction. Significant differences between Swiss fathers and fathers of foreign nationality were measured. Reasons of these differences should be explored in a forthcoming study.

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1. Introduction

The hospitalisation of a critically ill newborn to a neonatal intensive care unit (NICU) can be very stressful for parents.^{1,2} In addition to negative self-conscious emotions, such as shame, guilt, and fear, of death, factors inducing parental stress include the high-technological environment, the newborn's appearance, and the

disruption in the parental role.^{3,4} In this context, it is essential to understand specific beliefs and needs of parents to better support them.⁵ Parental beliefs are parents' perception of their infants and beliefs/confidence about their parenting.⁶ They have been associated with parental stress, anxiety, and depression, often persisting well beyond discharge from the NICU.^{6,7} Parental needs can be defined as a necessity, which if satisfied relieves parents' distress and increases their sense of adequacy.^{2,8} Evidence shows that fathers of newborns in the NICU face unique challenges and struggle to balance work and family responsibilities.^{9–11} Because mothers are still recovering after delivery, fathers commonly accompany their newborn to the NICU, make initial decisions, support the mother, communicate with other family members, care for other

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children, and sometimes have to return to work within a few days of the newborn's birth.^{12,13} Knowledge of fathers' needs in these situations to which they have not been prepared is limited. Most of the studies that include fathers report combined results from parents (mothers and fathers), and fathers are under-represented in the study samples.^{14–16} Fathers may suffer from psychological disorders, such as anxiety, depression, social isolation, sleep disturbances, and fatigue.^{17–19} After 3 to 5 days of separation due to their newborn's hospitalisation, 24–28% of fathers suffer from acute stress disorder.^{20,21} One month after NICU admission, up to 33% of them develop post-traumatic stress disorder.^{19–21} Special attention to fathers' beliefs and needs is therefore recommended.

The majority of fathers describe their desire to be present for their newborn and to protect and love him/her.^{22,23} To guide them in the transition to fatherhood, their accompaniment should be provided before, during, and after birth throughout the hospital stay and discharge.²⁴

The transition to parenthood may differ for each person depending on his/her perception of the parental role, and this also applies to fathers. They need to “be clear about the things that the parent can do to best help his child in the hospital ... taking into account the knowledge of the neonatology service, confidence in his parental role and the interaction between the father and his child”.²⁵ Although some studies demonstrate the effectiveness of fathers' involvement in the care of their newborns in neonatology, a large proportion of fathers feel that their caregivers focus primarily on mothers and their newborns.^{26,27} Lack of recognition of the father's role by mothers or healthcare professionals can hinder paternal development, leading to feelings of guilt and powerlessness.^{23,28}

Understanding fathers' perception of their newborn and their own parental role and knowing their specific needs will inform practice and should reduce fathers' distress and improve their wellbeing.

The aim of this study was to investigate beliefs and needs of fathers of newborns hospitalised in a NICU and their correlation with fathers' sociodemographics.

2. Materials and methods

2.1. Study design, setting, and patient eligibility

This was a prospective, observational study, using self-completed questionnaires. This study was conducted in a level III NICU of a tertiary referral neonatology centre in Western Switzerland. Yearly, more than 700 newborns require hospitalisation in this NICU; of which, about 500 remain hospitalised for 4 days or more. We recruited, using a convenience sampling method, adult fathers who were able to speak, read, and write in French. Their newborns had to be between 4 and 15 days old, so fathers had time to internalise the fact of becoming a parent and were not in a situation of prolonged hospitalisation that could possibly result in additional or different needs. Fathers with a newborn with end-of-life care were excluded because their needs are very specific to their situation. Data collection took place from September 19, 2018, to January 3, 2019. The recruitment times were mainly between 4:00 pm and 8:00 pm, but other times were possible depending on the family availability and daily organisation.

2.2. Ethical approval and consent

The study was accepted by the centre's ethical committee. Written informed consent was obtained from participants at the time of enrolment.

2.3. Data collection and questionnaires

The selection of eligible fathers was carried out using the hospital software containing the patient's nursing record, in which all clinical and sociodemographic information about the newborn and his/her family is stored. The researchers went to patients' bedsides to meet fathers directly. If the father was absent, the researchers made arrangements with the mother of the newborn or with the patient's nurse to obtain information on the father's visiting hours and to be able to approach him more easily.

When meeting with the fathers, the researchers gave an oral presentation of the study and distributed the information sheet for the participants along with the informed consent form.

At enrolment, fathers' sociodemographic data, including age, nationality, marital status, educational background, occupational status, number of children and age, number of newborns hospitalised, term of the hospitalised newborn, and perception of the seriousness of the situation, were collected through a questionnaire.

Fathers completed two additional questionnaires: the NICU Parental Beliefs Scale (NICU-PBS), to measure their paternal beliefs, and the short form of the NICU Family Needs Inventory (NFNI), to measure the importance of their needs.

The NICU-PBS is a validated instrument for assessment of beliefs of parents with a newborn in the NICU.⁶ It consists of three subscales (parental role confidence, parent–baby interaction, and knowledge of the NICU) and has 18 items in total. Each item is scored from 1 (“strongly disagree”) to 5 (“strongly agree”). The minimum score is 18, and the maximum score is 90. A high score indicates a more positive parental belief.

The short form of the NFNI is a reliable self-report validated instrument to assess parents' needs during a newborn's hospitalisation in the NICU.²⁹ It was adapted by Alves et al.²⁹ from the original NFNI developed by Ward. It includes 22 items divided into two subscales, one focusing on parent-centred needs and another one focusing on newborn-centred needs. Each item is scored from 1 (“not important”) to 4 (“very important”). Each item could also be classified as not applicable, if the participants had never experienced one specific need; it was then considered as missing data for the analysis. Satisfaction for each item was also evaluated and scored in a similar manner from 1 (“not satisfied”) to 4 (“very satisfied”) or not applicable. Finally, an open-ended question was added at the end of the questionnaire to allow fathers to present needs not listed in the questionnaire: “Are there important needs that have not been listed yet? If so, which one(s)?”

The questionnaires were completed in the neonatology department using a paper and pencil and hand-delivered to scientific collaborators. When it was not convenient to fill in the questionnaires, a sealable envelope was enclosed for return to the nurses by the fathers. All the data were coded using a unique identifier for each participant that was only known by the research team and that was kept separated from the collected data.

2.4. Outcome measures

Primary outcomes were the scores generated by the NICU-PBS and the short NFNI questionnaires. Secondary outcomes were the needs identified by participants as important to them but those that were not directly assessed by the short form of the NFNI.

2.5. Statistical analyses

Analyses were carried out using Stata/IC software, version 15 (StataCorp LLC, College Station, Texas USA). Descriptive statistics were used for the variables relating to the demographic data,

paternal beliefs, and needs. We calculated means, standard deviations, and ranges for all the quantitative variables and frequencies and proportions for qualitative variables. The few missing data were not replaced, and the values were calculated based on the number of responses given. To correlate the importance of needs with the satisfaction, the importance of needs was dichotomised into 0 “not very important” (combining the notions of not important, slightly important, and important) and 1 “very important”, and the level of satisfaction was dichotomised into 0 “not very satisfied” (combining the notions of very dissatisfied, somewhat dissatisfied, and somewhat satisfied) and 1 “very satisfied” as recommended by Alves et al.²⁹ Responses “not applicable” were treated as missing data. Wilcoxon–Mann–Whitney rank-sum tests were conducted to assess the correlations between the beliefs and needs and sociodemographic data.

Responses to the open-ended question were analysed using content analysis with inductive and deductive methods as described by Mayring.³⁰ Domains of patient- and family-centred care were used for deductive coding.

3. Results

3.1. Participant demographics

Study enrolment is summarised in Fig. 1. Of the 256 fathers during the recruitment period, 120 did not meet the inclusion criteria. The main reasons for exclusion included the newborn's length of stay outside the 4- to 15-day period ($n = 69$) and fathers who did not speak French ($n = 44$). Of the 136 fathers who were eligible, 70 (51%) fathers were enrolled and completed the three

questionnaires, 54 (40%) could not be approached for logistical reasons, and 12 (9%) refused to participate.

Baseline characteristics are described in Table 1. More than half of the fathers (60%, $n = 42$) surveyed were married. The majority had secondary school education (70%, $n = 49$). More than three-quarters of the participants worked full-time (87%, $n = 57$). Almost half of the fathers were on parental leave (42%, $n = 29$), and more than half of the participants (57%, $n = 40$) were first-time fathers. Half of the newborns hospitalised in the neonatology department were born premature (51%, $n = 36$). More than half of the participants (57%, $n = 40$) rated the severity of their newborn's situation as stable to mild.

3.2. Fathers' beliefs

NICU-PBS scores are reported in Table 2. The mean overall perception of the father's belief score was 3.80 ± 0.57 . Perception varied amongst participants, with mean scores ranging between 2.39 and 4.89. The domain with the highest mean item scores by order of importance was parental role confidence (3.92 ± 0.59), the parent–baby interaction (3.81 ± 0.62), and the knowledge of the NICU (3.61 ± 0.81). The items that were rated the lowest were the ones in relation with knowledge of newborn characteristics and behaviours. The items that were rated the highest were those assessing confidence in asking questions to the medical team or in parental behaviour with their child.

3.3. Parental needs

NFNI scores are reported in Table 3. Most needs were perceived as very important or important by participants with a mean item

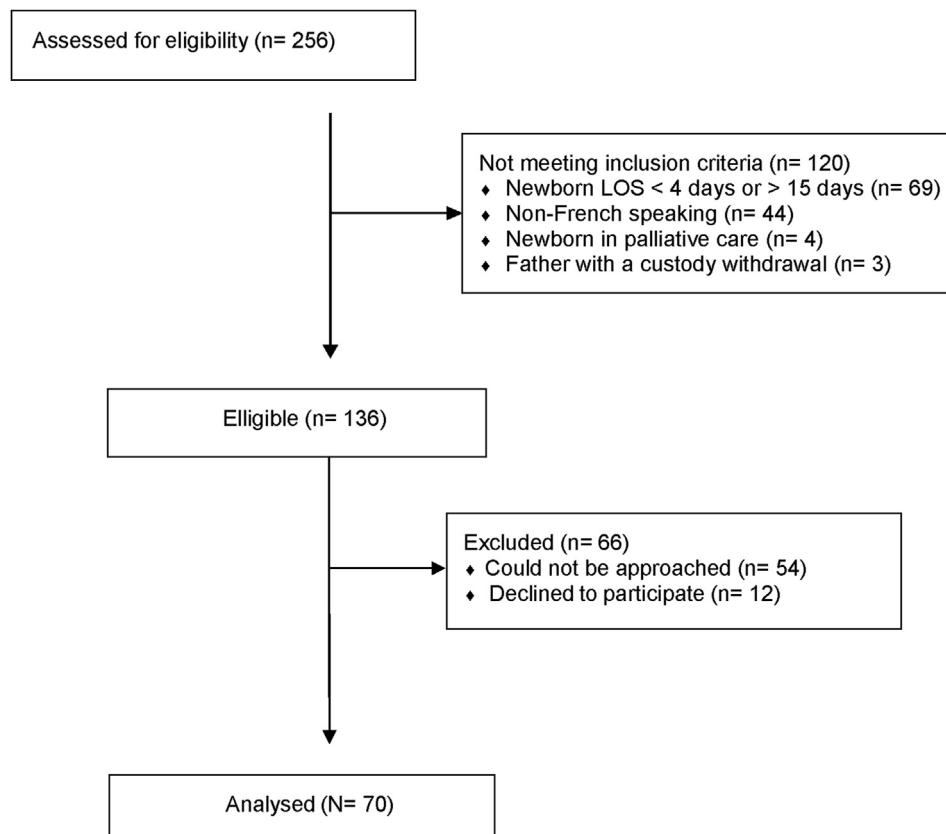


Fig. 1. Flow chart of participation. LOS, length of stay.

Table 1
Participants' sociodemographic characteristics.

Variable	N = 70 (%)
Age	
18–29 years	18 (26)
30 years and older	52 (74)
Nationality	
Swiss	31 (44)
European	29 (42)
Dual nationality	7 (10)
African	3 (4)
Marital status	
Married	42 (60)
Not married	28 (40)
Education	
Compulsory school	21 (30)
Secondary school	49 (70)
Employment	
Full-time	57 (81)
Not full-time	13 (19)
Paternity leave	29 (42)
Number of hospitalised newborns	
One	64 (91)
Two or more	6 (9)
First-time fathers	40 (57)
Had already had a child hospitalised in the NICU	7 (10)
Term of the newborn at birth	
Premature (24–36 weeks)	36 (31)
Full-term, near full-term (37–42 weeks)	26 (37)
Perception of the seriousness of the situation	
Stable to mild	40 (57)
Mild to severe	30 (43)

NICU, neonatal intensive care unit.

score of 3.11 ± 0.47 . Newborn-centred needs were considered more important than parent-centred needs, with mean item scores of 3.55 ± 0.36 and 2.59 ± 0.7 , respectively. In fact, 11 of the 12 newborn-centred needs were the top needs when newborn- and father-centred needs were combined and ranked together. The most important need was “To be able to visit the neonatal intensive care unit (NICU) at any time”, followed closely by the needs to have information about their newborn's health and what was being done with their child. The least important need was “To have a pastor,

clergy, or other person from my church visit”. The total mean item score for the satisfaction of the needs was 3.48 ± 0.37 , with a mean item score of 3.58 ± 0.38 for the newborn-centred needs and a mean item score of 3.31 ± 0.47 for the parent-centred needs. The satisfaction of the needs followed closely the trends of the importance of the needs. For more than half of the fathers, “To have a support group of other families available”, “To talk about the possibility of my infant's death”, and “To have a pastor, clergy, or other person from my church visit” were not applicable for 41, 43, and 55 fathers, respectively. The relationships between the fathers' beliefs, needs, and the sociodemographic characteristics are presented in Table 4.

3.4. Relationship between importance and satisfaction of needs

By dichotomising the answers, we could couple the importance of needs with their satisfaction in Table 5 (supplementary material). We found that the items that were very important and not satisfied were the following: “To have comfortable chairs at my infant's bedside” for 18 fathers; “To know which staff members could give information about my infants' health and general well-being” and “To talk to the doctor caring for my infant every day” for 16 fathers; and “To be given information about individuals that could help with problems concerning my situation”, “To know exactly what is being done for my infant”, and “To talk to the same nurse most of the time” for 15 fathers.

3.5. Additional needs described

Twenty-one fathers (30%) responded to the open-ended questions:

“Communication” between healthcare professionals and parents appeared to be important, especially regarding information related to their newborns' health. “I would have appreciated receiving some sort of simplified medical record describing the main elements of my daughter's hospitalization in neonatology ...” (ID 70). Communication about the newborn's health and daily care also appeared important for fathers. “I find that there is a lack of information about how much time to spend with our child and how to behave ...” (ID 69). “Too many

Table 2
NICU-PBS scores.

NICU-PBS items	Item mean (M ± SD)
NICU-PBS total scale (n = 70) (18 items)	3.80 ± 0.57
Knowledge of the NICU subscale (three items)	3.61 ± 0.81
I know what characteristics and behaviors are common in premature babies hospitalized in the NICU. (n = 69)	3.33 ± 1.11
I know what characteristics and behaviors to expect in my baby while he/she is in the NICU.	3.56 ± 0.99
I know why my baby has the characteristics and behaviors that he/she does in the NICU.	3.94 ± 0.93
Parental role confidence subscale (seven items)	3.92 ± 0.59
I am sure that what I do for my baby will be what is best to help him/her deal with being in the NICU.	4.16 ± 0.79
I feel comfortable in caring for my baby in the NICU.	4.07 ± 0.95
I am sure about what things I can do to best help my baby get through the NICU experience. (n = 69)	3.84 ± 0.88
I am sure that I can meet my baby's emotional needs while he/she is in the NICU.	3.97 ± 0.83
I feel confident in telling the nurses and doctors about what will best help my baby while he/she is in the NICU.	3.87 ± 1.07
I am clear about how to help take care of my baby in the NICU.	4.00 ± 0.85
I know how my baby will probably respond to me while he/she is in the NICU.	3.63 ± 0.85
Parent–baby interaction subscale (eight items)	3.81 ± 0.62
I am sure about how my emotions will affect my baby while he/she is in the hospital.	3.76 ± 1.08
I am clear about how my baby will react when he or she is getting too much stimulation in the NICU.	3.57 ± 1.06
I am sure about the things that I can do to make my baby feel most secure while he/she is in the NICU. (n = 69)	3.85 ± 0.93
I know how my baby's appearance and behaviors are different from a full-term baby's appearance and behaviors. (n = 64)	3.44 ± 1.19
I know the best times to communicate with or interact with my baby.	3.96 ± 0.82
I am confident in asking the doctors and nurses questions about my baby's medical condition.	4.77 ± 0.46
I know what my baby will do when he or she is stressed.	3.64 ± 1.04
I am clear about what my baby will look or act like when he or she is ready to communicate with me.	3.61 ± 0.98

NICU, neonatal intensive care unit; NICU-PBS, NICU Parental Beliefs Scale.

Table 3
Short form NFNI scores.

	Importance Item mean M ± SD	Satisfaction Item mean M ± SD
NFNI total scale (n = 70) (22 items)	3.11 ± 0.47	3.48 ± 0.37
Newborn-centred needs (12 items)	3.55 ± 0.36	3.58 ± 0.38
To be able to visit the neonatal intensive care unit (NICU) at any time (n = 70; n = 68)	3.96 ± 0.27	3.94 ± 0.29
To know which staff members could give information about my infants' health and general well-being	3.86 ± 0.35	3.68 ± 0.5
To know exactly what is being done for my infant (n = 70; n = 68)	3.84 ± 0.47	3.66 ± 0.61
To feel accepted by the hospital staff (n = 69; n = 68)	3.84 ± 0.37	3.78 ± 0.51
To talk to the doctor caring for my infant every day (n = 70; n = 69)	3.79 ± 0.51	3.51 ± 0.8
To be allowed to help with my infant's physical care (n = 68; n = 60)	3.69 ± 0.67	3.75 ± 0.47
To be given information about individuals that could help with problems concerning my situation (n = 68; n = 61)	3.63 ± 0.60	3.56 ± 0.53
To know that my infant is being treated for pain (n = 66; n = 57)	3.77 ± 0.46	3.74 ± 0.48
To have comfortable chairs at my infant's bedside (n = 70; n = 66)	3.39 ± 0.91	3.41 ± 0.7
To talk to the same nurse most of the time (n = 70; n = 66)	3.33 ± 0.77	3.32 ± 0.73
To have a specific staff person to call at the hospital when unable to visit (n = 65; n = 52)	3.51 ± 0.85	3.63 ± 0.66
To have classes about premature infants and their special care needs (n = 54, n = 29)	3.28 ± 0.88	2.66 ± 0.94
Parent-centred needs (10 items)	2.59 ± 0.70	3.31 ± 0.47
To have a place to sleep near the neonatal intensive care unit (n = 64; n = 48)	3.58 ± 0.81	3.48 ± 0.8
To have a waiting room for the neonatal unit (n = 68; n = 48)	3.18 ± 0.81	3.41 ± 0.74
To have another person with me when visiting the NICU (n = 69; n = 58)	2.97 ± 1.11	3.72 ± 0.45
To have a place to be alone while in the hospital (n = 65; n = 49)	3.02 ± 0.99	3.22 ± 0.77
To be given reading material concerning my infant's medical concerns (n = 68; n = 45)	2.92 ± 0.91	2.67 ± 0.98
To have comfortable furniture in the waiting room (n = 68; n = 58).	2.78 ± 1.03	3.24 ± 0.8
To talk about the possibility of my infant's death (n = 50; n = 23)	3.38 ± 1.07	3 ± 0.95
To have a telephone near the waiting room (n = 62; n = 36)	2.69 ± 1.24	3.72 ± 0.51
To have a support group of other families available (n = 61; n = 27)	2.61 ± 1.07	3.33 ± 0.78
To have a pastor, clergy, or other person from my church visit (n = 51; n = 10)	1.51 ± 0.82	2.5 ± 1.08

NFNI, NICU Family Needs Inventory; SD, standard deviation.

different staff and inconsistency in advice on diet and care" (ID 67). Some fathers demonstrated "positive engagement" by proposing digital tools for communication improvement and keeping contact with their newborn "online medical monitoring via a smartphone application or web page" (ID 70) and "having the possibility of seeing my baby from home (videoconferencing)" (ID 20).

"Satisfaction with care" emerged as a theme. "Very satisfied with the quality of listening and empathy of the nurses and doctors." (ID 52).

The "NICU environment" seemed to be an issue for some fathers. Equipment used to care for their newborn (e.g., skin-to-skin contact) and the level of noise appeared unsatisfactory. "Chairs are not very comfortable during long use" (ID 24). "Rather unsatisfied for the baby: the noise in the room during the Kangaroo moment with the child" (ID 53). "There's no place for the father-to-be to rest..." (ID 56). The need for "peer support" also emerged as an important need. "I think parents of sick children can help each other. So, a way to get to know each other could be interesting" (ID 45).

3.6. Beliefs, needs, and sociodemographics

Correlations between beliefs, needs, and sociodemographics are reported in Table 5. Beliefs of fathers were significantly higher in fathers of foreign nationality than in Swiss fathers (71.86 ± 9.39 vs 63.85 ± 9.80 , $p = 0.002$). They were also higher in fathers who had a paternity leave than in those who did not have one (72.68 ± 9.39 vs 66.05 ± 9.68 , $p = 0.014$) and higher in those who already had a child than in those who were first-time fathers (71.88 ± 8.27 vs 66.06 ± 10.97 , $p = 0.028$). Regarding fathers' needs, no significant differences were observed.

4. Discussion

Fathers' perception on their beliefs and needs remains an understudied yet fundamental question. In this study, we have shown that overall beliefs were good, especially when considering

parental role confidence. Beliefs related to what being hospitalised in a NICU entails were lower, indicating that there is room for improvement in this domain. Notably, explaining fathers what characteristics and behaviours are common in premature infants hospitalised in the NICU could be improved. Amongst the 22 needs presented to the fathers, most were considered very important or important, especially those that were centred on their newborn. In fact, 11 of the 12 newborn-centred needs were the top needs when newborn- and father-centred needs were combined and ranked together.

The most important need was being able to visit the NICU at any time. Visiting is not only a fundamental right for parents of hospitalised newborns but also a fundamental need to establish parent–infant bonding that is crucial for a healthy infant's development.³¹ It also a fundamental part of family-centred care; the presence of parents is indeed essential for them to be able to participate, be engaged, and be empowered.^{32,33} Being present means, they can communicate with their newborn and with staff and participate in care. These are the prerequisite for being engaged and empowered. One father in our study mentioned new digital ways of maintaining the link with their infant and the staff, which has particular relevance in this pandemic context.

Satisfaction of needs followed the trend of the importance with the same items being the most and the least satisfied. For more than half of the participants, "To have a support group of other families available", "To talk about the possibility of my infant's death", and "To have a pastor, clergy, or other person from my church visit" were perceived as not applicable to their situation. This could be linked to the fact that most fathers do not see the life of their child at risk and/or that fathers do not feel at ease thinking of the possibility of death in their children. This is not surprising considering that despite the high morbidity and mortality in the NICU population, palliative care is not consistently applied and embraced in the NICU.^{34,35} The most important needs that were not satisfied were also found in the additional needs expressed by

Table 4
Relationships between the fathers' beliefs, needs, and sociodemographics.

Sociodemographics	n (%)	NICU-PBS, total mean (SD)	p-value	NFNI, total mean (SD)	p-value	
Age	18–29 years	18 (26)	70.56 (10.99)	0.34	14.26 (5.18)	0.15
	30 years and older	52 (74)	67.69 (10.05)		12.49 (4.77)	
Nationality	Swiss	31 (44)	63.85 (9.80)	0.002	11.70 (4.84)	0.06
	Other	39 (56)	71.86 (9.39)		13.92 (4.78)	
Marital status	Married	42 (60)	69.14 (10.67)	0.52	12.84 (5.19)	0.82
	Other	28 (40)	67.37 (9.81)		13.09 (4.51)	
Level of education	Primary education	21 (30)	71.47 (9.53)	0.12	14.17 (5.13)	0.20
	Secondary education	49 (70)	67.07 (10.44)		12.41 (4.75)	
Employment	Full-time	57 (81)	69.43 (10.04)	0.13	13.20 (4.76)	0.49
	Part-time	13 (19)	64.42 (10.78)		11.78 (5.51)	
Paternity leave	No	41 (58)	66.05 (9.68)	0.014	13.46 (5.43)	0.35
	Yes	29 (42)	72.68 (10.19)		12.42 (4.46)	
Number of hospitalised newborns	One	64 (91)	68.07 (10.48)	0.40	13.06 (5.05)	0.46
	Two or more	6 (9)	71.83 (8.30)		11.66 (2.86)	
First-time father	Yes	40 (57)	66.06 (10.97)	0.028	13.38 (4.24)	0.43
	No	30 (43)	71.88 (8.27)		12.36 (5.69)	
Had already had a child hospitalised in the NICU	No	63 (90)	68.35 (10.40)	0.83	13.13 (4.83)	0.43
	Yes	7 (10)	69.33 (10.07)		11.27 (5.65)	
Perception of the seriousness of the situation	Stable	40 (57)	69.23 (9.97)	0.49	12.88 (4.96)	0.91
	Instable	30 (43)	67.38 (10.82)		13.02 (4.90)	

NICU, neonatal intensive care unit; NFNI, NICU Family Needs Inventory; NICU-PBS, NICU Parental Beliefs Scale; SD, standard deviation. The bold values are highlights the p-value < 0.05.

fathers. They were related to the physical environment of the NICU, with needs of having comfortable chairs near the baby that could be improved. This has been also pointed in other studies to improve with family comfort in addition to the clinical care of the infant.⁵ Most needs were centred on communication and information, notably regarding what was being done for their child in the hospital and also regarding treatment to follow-up after discharge. It has been demonstrated that the need for accurate and honest information is the most important need for parents, as evidenced in a recent systematic review, but is also an area of improvement.^{5,15,32} The only need that was considered unimportant was “To have a pastor, clergy, or other person from my church visit”, and this was consistent with other studies.^{36,29}

Beliefs were higher in fathers on paternity leave and those who had other dependent children. Taking a paternity leave has been positively associated with subsequent father involvement.³⁷ Involvement with children helps establish father identities that emphasise parent–child interactions.³⁸ Our results indicate that fathers who were on paternity leave were more confident in all of the three domains investigated: knowledge of the NICU, parental role confidence, and parent–baby interaction. Whether this difference was due to increased preparation to become a father or to having more time exclusively dedicated to fatherhood was not investigated here. Unsurprisingly, a father's beliefs were higher in men who had already children, especially in the parent–baby interaction domain. It has been demonstrated that becoming a father for the first time is associated with finding new fatherhood identity and its associated challenges, which can lead to negative feelings, fears, and increased levels of stress.³⁹ These challenges have already been overcome in fathers who had other dependent children, thus increasing their level of knowledge and confidence. Interestingly, beliefs of fathers of foreign nationality were ranked higher than those of Swiss fathers. This difference might be related to several socio-economics and religious and cultural factors that were not explored in this study.

Limitations of this study include the small sample size and the fact that fathers needed to speak and understand French to participate, which creates a bias in sample representativeness. The lack of cut-offs in the scales used and the fact that they are recent and have not been used extensively in other studies limits our interpretation of the results. Factors such as socio-economic status

and cultural and religious orientations were not collected and explored in this study but might be of importance in the needs and beliefs of fathers as recently published.⁴⁰ The results of a review of psychosocial interventions and support programs for fathers of NICU infants will also inform us on the way to tailor the response to fathers' needs.⁴¹

5. Conclusion

In this study, we show that knowledge of the NICU and characteristics and behaviours of the NICU child could be improved. More broadly, fathers would like to have more communication with healthcare professionals and more information during hospitalisation and also at discharge. The physical environment could also be improved for more comfort and proximity with their child.

These elements should be improved and implemented into the clinics to better fathers' experience in the NICU, reduce fathers' distress, and improve their wellbeing.

Interestingly, we noted that parents of foreign nationality had higher beliefs than Swiss fathers. Reasons for these differences should be explored in a future study.

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CRediT authorship contribution statement

L.R. contributed to the conception and design of the work analysis or interpretation of data for the work, drafting of the article, and final approval of the version to be submitted and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. M.D.F. contributed to acquisition, analysis of data for the work, drafting of the article, and final approval of the version to be submitted and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. S.L. contributed to acquisition, analysis of data for the work, drafting of the article, and final

approval of the version to be submitted and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. A.-S.R. contributed to the conception or design of the work and revising it critically for important intellectual content and final approval of the version to be submitted and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflict of Interest

The authors have no conflicts of interest to declare.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.aucc.2021.02.012>.

References

- [1] Loewenstein K, Barroso J, Phillips S. The experiences of parents in the neonatal intensive care unit: an integrative review of qualitative studies within the transactional model of stress and coping. *J Perinat Neonatal Nurs* 2019;33(4):340–9.
- [2] Ward K. Perceived needs of parents of critically ill infants in a neonatal intensive care unit (NICU). *Pediatr Nurs* 2001;27(3):281–6.
- [3] De Rouck S, Leys M. Information needs of parents of children admitted to a neonatal intensive care unit: a review of the literature (1990–2008). *Patient Educ Counsel* 2009;76(2):159–73.
- [4] Barr P. Guilt, shame and fear of death predict neonatal intensive care unit-related parental distress. *J Reprod Infant Psychol* 2015;33(4):402–13.
- [5] Govindaswamy P, et al. Needs and stressors of parents of term and near-term infants in the NICU: a systematic review with best practice guidelines. *Early Hum Dev* 2019;139:104839.
- [6] Melnyk BM, Oswalt KL, Sidora-Arcoleo K. Validation and psychometric properties of the neonatal intensive care unit parental beliefs scale. *Nurs Res* 2014;63(2):105–15.
- [7] Melnyk BM, et al. Maternal anxiety and depression after a premature infant's discharge from the neonatal intensive care unit: explanatory effects of the creating opportunities for parent empowerment program. *Nurs Res* 2008;57(6):383–94.
- [8] Amorim M, et al. Needs of parents of very preterm infants in Neonatal Intensive Care Units: a mixed methods study. *Intensive Crit Care Nurs* 2019;54:88–95.
- [9] Deeney K, et al. Experiences of fathers of babies in intensive care. *Paediatr Nurs* 2009;21(1):45–7.
- [10] Provenzi L, Santoro E. The lived experience of fathers of preterm infants in the Neonatal Intensive Care Unit: a systematic review of qualitative studies. *J Clin Nurs* 2015;24(13–14):1784–94.
- [11] Hearn G, Clarkson G, Day M. The role of the NICU in father involvement, beliefs, and confidence: a follow-up qualitative study. *Adv Neonatal Care* 2020;20(1):80–9.
- [12] Logan RM, Dormire S. Finding my way: a phenomenology of fathering in the NICU. *Adv Neonatal Care* 2018;18(2):154–62.
- [13] Mackley AB, et al. Forgotten parent: NICU paternal emotional response. *Adv Neonatal Care* 2010;10(4):200–3.
- [14] Fegran L, Helseth S, Fagermoen MS. A comparison of mothers' and fathers' experiences of the attachment process in a neonatal intensive care unit. *J Clin Nurs* 2008;17(6):810–6.
- [15] Baughcum AE, et al. Healthcare satisfaction and unmet needs among bereaved parents in the NICU. *Adv Neonatal Care* 2020;20(2):118–26.
- [16] Franck LS, et al. Measuring neonatal intensive care unit-related parental stress. *J Adv Nurs* 2005;49(6):608–15.
- [17] Busse M, et al. Parents' responses to stress in the neonatal intensive care unit. *Crit Care Nurse* 2013;33(4):52–9. quiz 60.
- [18] Al Maghaireh DF, et al. Systematic review of qualitative studies exploring parental experiences in the Neonatal Intensive Care Unit. *J Clin Nurs* 2016;25(19–20):2745–56.
- [19] Garten L, et al. Pilot study of experiences and needs of 111 fathers of very low birth weight infants in a neonatal intensive care unit. *J Perinatol* 2013;33(1):65–9.
- [20] Lefkowitz DS, Baxt C, Evans JR. Prevalence and correlates of posttraumatic stress and postpartum depression in parents of infants in the Neonatal Intensive Care Unit (NICU). *J Clin Psychol Med Settings* 2010;17(3):230–7.
- [21] Aftyka A, et al. Post-traumatic stress disorder in parents of children hospitalized in the neonatal intensive care unit (NICU): medical and demographic risk factors. *Psychiatr Danub* 2014;26(4):347–52.
- [22] Goodman JH. Becoming an involved father of an infant. *J Obstet Gynecol Neonatal Nurs* 2005;34(2):190–200.
- [23] Halle C, et al. Supporting fathers in the transition to parenthood. *Contemp Nurse* 2008;31(1):57–70.
- [24] Deave T, Johnson D, Ingram J. Transition to parenthood: the needs of parents in pregnancy and early parenthood. *BMC Pregnancy Childbirth* 2008;8:30.
- [25] Melnyk BM, et al. Testing the theoretical framework of the COPE program for mothers of critically ill children: an integrative model of young children's post-hospital adjustment behaviors. *J Pediatr Psychol* 2007;32(4):463–74.
- [26] Yogman MW, Kindlon D, Earls F. Father involvement and cognitive/behavioral outcomes of preterm infants. *J Am Acad Child Adolesc Psychiatry* 1995;34(1):58–66.
- [27] Noergaard B, et al. Fathers' needs and masculinity dilemmas in a neonatal intensive care unit in Denmark. *Adv Neonatal Care* 2017;17(4):E13–e22.
- [28] Goodman JH. Paternal postpartum depression, its relationship to maternal postpartum depression, and implications for family health. *J Adv Nurs* 2004;45(1):26–35.
- [29] Alves E, et al. A short form of the neonatal intensive care unit family needs inventory. *J Pediatr* 2016;92(1):73–80.
- [30] Mayring, *Qualitative Inhaltsanalyse: Grundlagen und Techniken*. Auflage: neuauflage, 11, vollständig überarbeitete Aufl. Weinheim: Beltz; . p. 144 p.
- [31] Goldberg S. Parent-infant bonding: another look. *Child Dev* 1983;54(6):1355–82.
- [32] Davidson JE, et al. Guidelines for family-centered care in the neonatal, pediatric, and adult ICU. *Crit Care Med* 2017;45(1):103–28.
- [33] Ramezani T, et al. Family-centered care in neonatal intensive care unit: a concept analysis. *Int J Community Based Nurs Midwifery* 2014;2(4):268–78.
- [34] Catlin A, et al. Palliative and end-of-life care for newborns and infants: from the national association of neonatal nurses. *Adv Neonatal Care* 2015;15(4):239–40.
- [35] Cortezzo DE, et al. Neonatologists' perspectives of palliative and end-of-life care in neonatal intensive care units. *J Perinatol* 2013;33(9):731–5.
- [36] Govindaswamy P, et al. Fathers' needs in a surgical neonatal intensive care unit: assuring the other parent. *PLoS One* 2020;15(5):e0232190.
- [37] Huerta MC, et al. Fathers' leave and fathers' involvement: evidence from four OECD countries. *Eur J Soc Secur* 2014;16(4):308–46.
- [38] Pragg B, Knoester C. Parental leave use among disadvantaged fathers. *J Fam Issues* 2017;38(8):1157–85.
- [39] Baldwin S, et al. Mental health and wellbeing during the transition to fatherhood: a systematic review of first time fathers' experiences. *JBI Database System Rev Implement Rep* 2018;16(11):2118–91.
- [40] Merriitt L, Spencer B. Needs of socioeconomically diverse fathers of premature hospitalized infants: a multicenter study. *Adv Neonatal Care* 2021;21(1):E11–22. <https://doi.org/10.1097/ANC.0000000000000767>. PMID: 32769372.
- [41] Ocampo MJ, Tintero JA, Rojas-Ashe EE. Psychosocial interventions and support programs for fathers of NICU infants - a comprehensive review. *Early Hum Dev* 2020:105280.