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COVID-19 lockdown impacts the wellbeing of parents with infants on a Dutch neonatal intensive care unit

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ABSTRACT

Purpose: Parents of infants admitted to a neonatal intensive care unit (NICU) experience additional stress due to restrictions on their presence and visits by other family members during the COVID-19 pandemic. Our study aims to describe how this impacted parents and how NICU staff could support them.
Design and methods: This was a cross-sectional study in which 25 parents (16 mothers, 9 fathers) of infants admitted to our NICU during the first COVID-19 lockdown completed online questionnaires with socio-demographic questions, the Parental Stressor Scale:NICU (PSS:NICU) and questions related to COVID-19.
Results: Being separated from, and not being able to hold their infant at all times were among the most important PSS:NICU stressors. Parents experienced additional stress because other family members were not allowed to visit. They indicated that NICU staff could support them by clearly explaining the reasons for visitor restrictions and by ensuring that they felt heard. Most parents supported the restrictions, but also mentioned that less strict measures would really help them.
Conclusions: Parents who participated in this study found it very stressful that they could not be with their infant together with their partner and other family members. Furthermore, parents recommended the hospital management to continuously reconsider whether particular restrictions could be lifted in case of a new lockdown. Together with clear communication, this would result in less parenteral stress.
Practice implications: Hospital management should be cautious on restricting the presence of parents and other family members and scale restrictions back whenever possible.

Introduction

Newborn infants admitted to a neonatal intensive care unit (NICU) are exposed to both external (e.g. painful procedures) and internal stressors (e.g. sepsis) (Cong et al., 2017). Parents can help minimize their infant's stress by providing, among other things, skin-to-skin care (Ding et al., 2019; Johnston et al., 2017; O'Brien et al., 2013; Pados & Hess, 2020). However, these parents also experience high levels of stress themselves because of the premature birth and NICU admission, possibly resulting in anxiety, depression symptoms, posttraumatic stress symptoms and feelings of guilt and shame (Al Maghaireh et al., 2016; Roque et al., 2017). Previous studies showed that parental stress related to the NICU admission might have negative long-term consequences regarding the parent-child interaction and the child's development (Forcada-Guex et al., 2011; Ionio et al., 2016; Potharst et al., 2012; Turpin et al., 2019).

Parents feel the need to be close to their newborn, and thus should be able to visit their admitted infant anytime (Govindaswamy et al., 2019; Treherne et al., 2017). As parent-infant closeness during the NICU stay is considered beneficial for both infants and parents, many European NICUs, including those in the Netherlands, do not restrict parental presence in normal circumstances (Pallás-Alonso et al., 2012). During the COVID-19 pandemic, however, many NICUs decided to impose a stricter visitation policy (Murray & Swanson, 2020; van Veenendaal et al., 2021). This decision was made based on the knowledge regarding COVID-19 obtained during springtime 2020.

Added to the stress of a NICU admission, in spring 2020 parents were facing restricted visitation policies. Verweij and colleagues underlined that it is important to register the consequences of the COVID-19

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pandemic on perinatal care because of the implied long-term bonding problems and psychosocial implications for parents (Verweij et al., 2020). This information can help to determine visitation policies in case of a new pandemic and help to optimally support parents during the NICU admission. We report a study aiming to describe the impact of COVID-19 –related visitation restrictions at the NICU on parents' wellbeing.

Patients and methods

Setting

This cross-sectional study was conducted from 21 April 2020 until 31 June 2020 in the open bay level 4 NICU of the Erasmus MC–Sophia Children's Hospital, Rotterdam, the Netherlands. Fig. 1 summarizes restrictions on the presence of parents and other family members prior to and during this inclusion period.

Participants

Eligible were parents of neonates already admitted when the restrictions were imposed and parents of neonates admitted during the study period. Another criterion was being admitted for more than seven days, since we wanted to include parents who had ample experience with the restrictions. Those who were unable to read Dutch were excluded because only questionnaires in Dutch were available. After signed agreement of participation and use of the data, parents were asked to register on the *KLIK* website (www.hetklikt.nu). Parents completed the online questionnaires once on postnatal day 8 or later (before discharge). The institutional ethics review board waived the need for approval because the study was judged to be an observational study without the exposure to procedures or additional rules of behavior.

Fig. 1. Restrictions on the presence of parents and other family members during COVID lockdown.

Measures

Parent and infant characteristics

Parents provided information about their birth country, older siblings at home, education level and working situation. The infant characteristics (gestational age and postnatal age) were retrieved from the medical records.

General stress levels

Parents indicated on a visual analogue scale (VAS) from 0 (no stress) to 10 (much stress) their current level of stress related to NICU admission and COVID-19.

NICU-related stress symptoms

The Parental Stressor Scale: Neonatal Intensive Care Unit (PSS:NICU) was developed as a means to give insight in the parental perception of stressors arising from the NICU environment (Miles et al., 1993). This validated questionnaire consists of 26 items, with 3 subscales (see Table 2). All items are scored on a Likert scale from 1 (not at all stressful) to 5 (extremely stressful). If parents reported 'not applicable' on an item, the stress level on that item was scored as 1 (no stress) as advised by the authors (metric 2) (Miles et al., 1993; Schappin et al., 2013). The total score therefore ranges from 26 to 130; the reliability for this metric ranges from 0.73 to 0.83 for the subscales (Miles et al., 1993).

Questions specifically related to experiences during COVID-19

Eight closed questions were related to COVID-19 (Table 3). One open question regarded any other concerns related to COVID-19 not included in the closed questions. Another open question focused on what helped them to deal with possible stress. Lastly, two open questions dealt with parents' perspective on how the COVID-19 restrictions were communicated, and how the NICU staff could help them deal with stress.

Data analysis

All data were extracted from the *KLIK* database, and analyzed with IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM. Infant and parent characteristics and all ratings are presented as median (interquartile range) for continuous variables. All data are presented for the total population and for mothers and fathers separately.

It appeared that one of the seven items of the PSS:NICU subscale "Parental Role Alteration" ('not able to be alone with the infant') was missing on the *KLIK* website. Therefore, we recalculated this total subscale score by multiplying the score by 7/6.

With respect to the open questions, all individual responses were coded into topics by the first author (NM). Topics were then classified into themes. For example, both 'talking 'with the partner' and 'talking with a psychologist' were assigned to the theme "talking about their situation".

Results

Parent and infant characteristics

Parents of 48 infants were eligible for inclusion; see Fig. 2. Eventually, parents of 22 infants agreed to participate (response rate 46%). Gestational ages ranged from 25 weeks and 4 days to 41 weeks and 1 day (median 28^{+2} weeks). Since the infant population included four twins, 18 parental couples were invited to fill in the questionnaires, of whom 16 mothers and 9 fathers actually filled them in. The parental characteristics are presented in Table 1. The infant's postnatal age on the day the questionnaire was filled in ranged from 8 to 88 days.

General stress levels

The median stress level related to the NICU hospitalization was higher than the stress level related to COVID-19; i.e. 8 (IQR 4 to 10) compared to 6 (IQR 4 to 9.5), respectively. Fig. 3 presents the VAS stress related to both the NICU hospitalization and the COVID-19 restrictions for mothers and fathers separately.

NICU-related stress symptoms

Total PSS:NICU scores varied from 35 to 115 (Table 2). Parental role alteration was the subscale with the highest rating (median 2.8 (IQR 1.9 to 3.7)). Five of the 26 items had a median score of 4 (very stressful, the highest median score), namely: 'being separated from my baby' (IQR 3 to 5), 'not being able to hold my baby when I want' (IQR 2 to 4.5),

Table 1
Parental characteristics.

Variables	All	Mother	Father
Parent couples	18		
Questionnaires filled in by			
Mother and father (separately)	7	7	7
Mother only	9	9	
Father only	2		2
Postnatal age in days[a], median (IQR)	28 (14 to 56)		
Individual parents	25	16	9
Birth country			
The Netherlands	20	11	9
Other	5	5	0
Older siblings at home	9	6	3
Educational level			
Low	7	6	1
Middle	15	8	7
High	3	2	1
Work			
Maternity leave		15	
Student		1	
Paid employment			8
Sick leave			1

[a] Postnatal age on the day the questionnaire was filled in.

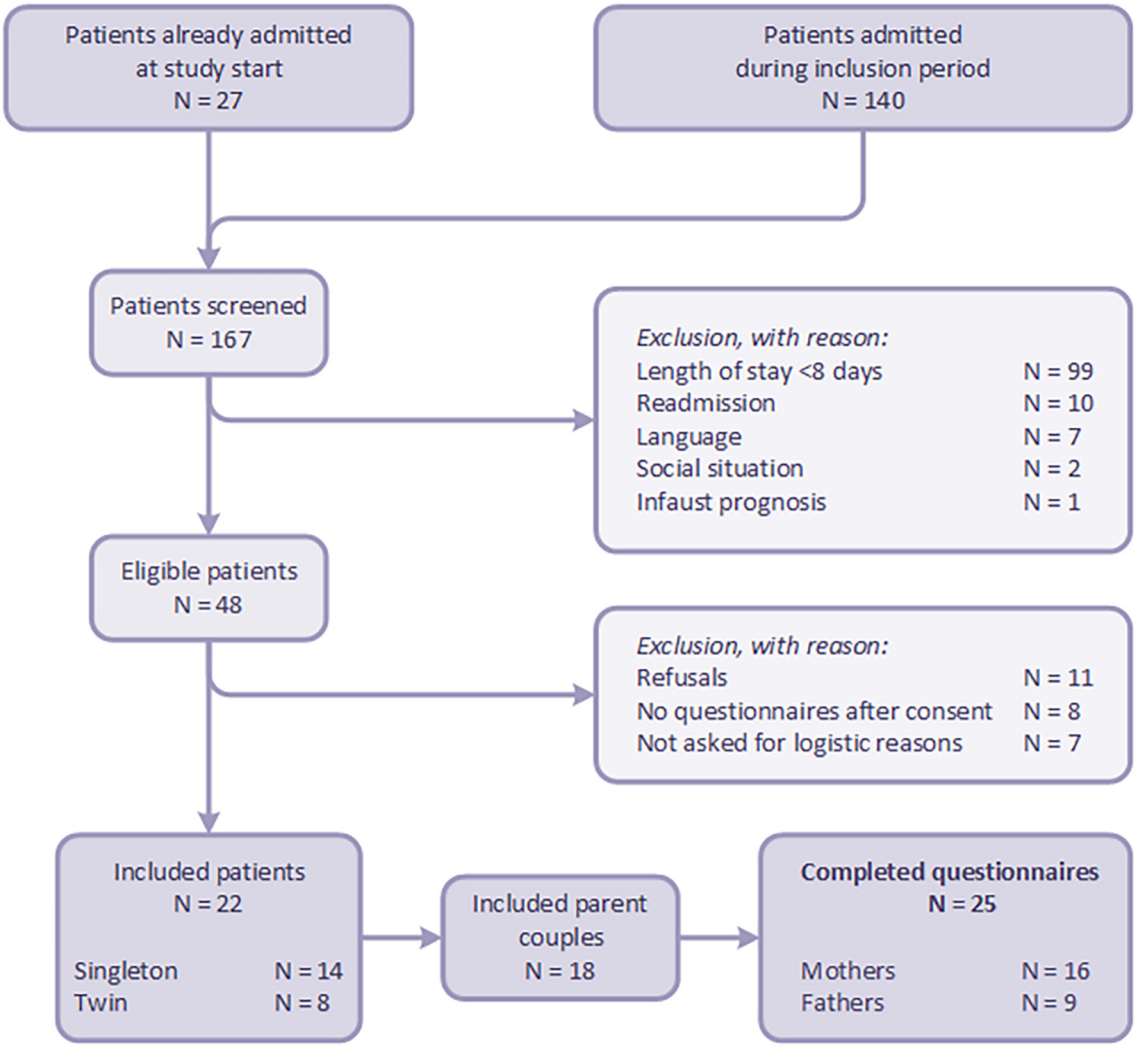

Fig. 2. Inclusion flowchart.

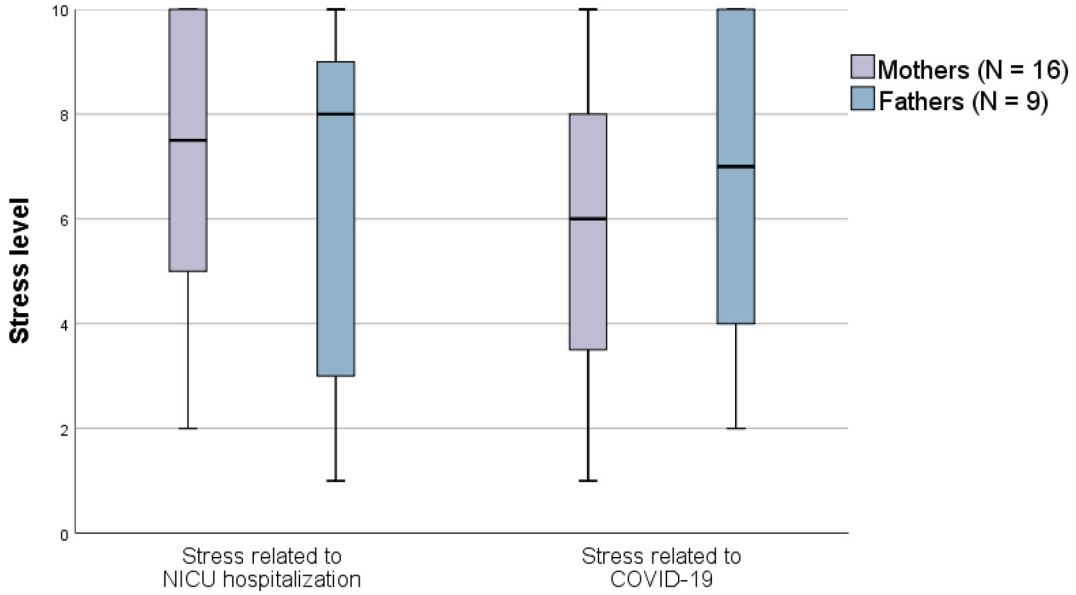

Fig. 3. General stress level on a scale from 0 (no stress) to 10 (a lot of stress).

'when my baby seemed to be in pain' (IQR 3 to 5), 'the limp and weak appearance of my baby' (IQR 3.5 to 5), and 'when my baby looked sad' (IQR 2 to 5).

Stress related to COVID-19

Table 3 shows the level of stress that parents experienced related to specific consequences of the COVID-19 restrictions. They experienced most stress from not being allowed to be with their infant limitlessly and be with their infant together with their partner, with 15 (68%) and 14 (64%) of the parents rating this as being 'very' to 'extremely stressful', respectively. Almost all parents stated that they were sufficiently to excellently able to share their concerns with both friends and family ($N = 24$, 96%) and healthcare providers ($N = 23$, 88%). Twelve of the 25 participants (48%) rated their abilities to experience closeness to their infant as good or excellent.

The most frequently mentioned concern ($N = 7$, 28% of parents) not included in the closed questions was that other visitors were not allowed. One mother wrote: "if I would have been able to introduce my infant to my family this would have helped to take away some of the worries during this traumatic period". A father highlighted that it worried him "not being able to receive any visitors while you really have a need for this in the current situation". In contrast, another mother considered the current COVID-19 restrictions as positive because these protected them from all stimuli outside of the hospital.

Four parents with other children notably regretted that siblings could not visit the newborn sibling. One mother explained "the fact that my other children cannot meet their twin brothers is very difficult and emotionally extremely tough".

Ways to deal with the COVID-19 restrictions as a NICU parent

Talking about the situation, primarily with the partner but also with other family members or as psychologist, was mentioned as most effective (9 mothers and 3 fathers) in dealing with stress. Five fathers mentioned playing sports or a game as a distraction from stress. Two mothers mentioned that the moments they were able to be with their infant helped. One of these mothers explained that it helped "to talk about our situation with a psychologist, friends and family and be with our girl as much as possible". Other factors that were considered helpful were positive thinking, putting things into perspective and using the webcam to see their infant. One mother mentioned that taking medication helped deal with her stress. Another mother explained that she found it important to deal with the stress, since she realized that her admitted twin boys would also notice her stress.

Parental perspective on COVID-19 restrictions on the NICU ward

While 15 parents (60%) were satisfied with how the restrictions on the presence of parents and other family members had been communicated, the other ten found the restrictions unclear and/or the way staff members adhered to these restrictions not consistent. Four of these parents specifically were frustrated because they failed to grasp why certain decisions had been made. One father illustrated that "without a clear explanation, the logic behind the measures was lacking, while this was much clearer after talking about this to the neonatologist during our weekly appointment".

One mother stated that the situation of the individual parent should be taken into account since she experienced her physical recovery after

Table 2
Stress related to NICU admission as a parent during COVID-19.

	All (N = 21) Median (IQR)	Mother (N = 14) Median (IQR)	Father (N = 7) Median (IQR)
PSS:NICU total score	67 (50 to 89)	66 (50 to 91)	67 (45 to 87)
Subscale scores[a]			
Sights and Sounds	2.3 (1.8 to 3.0)	2.4 (1.7 to 3.0)	2.3 (1.8 to 3.2)
Infant Behavior and Appearance	2.8 (1.9 to 3.4)	2.6 (2.0 to 3.5)	2.9 (1.9 to 3.3)
Parental Role Alteration	2.8 (1.9 to 3.7)	2.8 (2.3 to 4.3)	2.2 (1.7 to 3.5)

[a] Mean subscale scores were calculated per subscale and per parent.
1 = not at all stressful; 2 = a little stressful; 3 = moderately stressful; 4 = very stressful, 5 = extremely stressful.

Table 3
Parental stress related to COVID-19.

	All ($N = 25$)			Mother ($N = 16$)		Father ($N = 9$)	
	Rating 4 or 5; N (%)	*N*	*Median (IQR)*	*N*	Median (IQR)	*N*	Median (IQR)
How much stress do you experience related to…[a]	Very/extremely stressful						
Become sick by COVID yourself	4 (17%)	24	2 (1 to 3)	15	2 (1 to 3)	9	2 (1 to 2.5)
Your infant becoming sick by COVID	8 (32%)	25	3 (1.5 to 4)	16	3 (2 to 4)	9	2 (1 to 3)
Infect your infant with COVID	6 (24%)	25	3 (1 to 3.5)	16	3 (1 to 4)	9	2 (1 to 3)
Healthcare professionals infecting your child	5 (20%)	25	3 (1 to 3)	16	2.5 (1 to 4)	9	3 (1 to 3)
Not being able to be with your child limitless *singletons only*	15 (68%)	22	4 (3 to 5)	13	4 (3.5 to 5)	9	4 (3 to 4.5)
	14 (74%)	*19*	*4 (3 to 5)*	*12*	*4.5 (4 to 5)*	*7*	*4 (3 to 4)*
Not being able to be with your child together with your partner *singletons only*	14 (64%)	22	4 (3 to 5)	13 *12*	4 (3 to 5)	9	4 (3 to 5)
	13 (68%)	*19*	*4 (3 to 5)*		*4 (3 to 5)*	*7*	*4 (3 to 5)*
To what extent are you able to…[b]	Good/excellent						
Share your concerns with friends and family	18 (72%)	25	4 (3 to 5)	16	4 (4 to 5)	9	4 (3 to 5)
Share your concerns with healthcare givers	17 (68%)	25	4 (3 to 4)	16	4 (3 to 4)	9	4 (3 to 5)
Experience closeness to your infant	12 (48%)	25	3 (3 to 4)	16	3 (3 to 4)	9	4 (3 to 4)

[a] 1 = not at all stressful; 2 = a little stressful; 3 = moderately stressful; 4 = very stressful; 5 = extremely stressful.
[b] 1 = inadequately; 2 = mediocre; 3 = sufficient; 4 = good; 5 = excellent.

a cesarean section as a complicating factor in visiting her infant without her partner.

Parents mentioned that the following measures could help them cope: clear, transparent communication (7 parents), health professionals initiating a conversation with parents and listening to their needs and experiences (6 parents), and making an exception to the rule depending on the situation of the parents and the infant (3 parents). In general, most parents could appreciate the restrictions on the presence of parents and other family members, but also mentioned that less strict measures would really help them.

Discussion

Our study results confirm that most parents of infants admitted to the NICU during COVID-19 lockdown found this period very stressful, among other things because of the restricted visiting rules. Not being able to hold their infant whenever they liked, and not being able to visit the infant together with their partner were often mentioned.

As Veenendaal and colleagues described in their systematic review on family integrated care practices during COVID-19 pandemic, the psychological impact of the visitation restrictions on parents is often not assessed (van Veenendaal et al., 2021). A survey study among parents focused on the practical consequences of the restrictions on parents' ability to visit and care for their child. (Muniraman et al., 2020). Only one preliminary report from Italy, based on interviews with nine mothers and one father, specifically described parents' experiences during a period of COVID-19 visitation restrictions (one parent per baby, one hour per day) (Bembich et al., 2020). Most of these parents had suffered from being separated from the partner and the newborn. To our knowledge, we are the first to both quantitatively and qualitatively report the impact of these restrictions on parents' wellbeing during the NICU stay.

One of the most important consequences of the COVID-19 restrictions seems to be that parents were unable to support each other in the NICU ward. This is in line with a study which reported that mothers seem to experience more stress when being with the baby in the NICU without the father (Hagen et al., 2016).

Our results highlight the importance of allowing siblings and other family members to the NICU, in line with a previous study by Hagen and colleagues (Hagen et al., 2019). The roles of other family members, such as grandparents, is not well investigated, apart from a Scottish study that showed that grandparents played an important supportive role (McHaffie, 1991).

Only half of the parents in our study stated that they experienced “good” to “excellent” closeness to their infant. For parents in general, closeness is not simply about being with their infant physically (being able to hold and take care of their infant), but also having an autonomous role in taking care of the infant (Treherne et al., 2017). Closeness is considered important for its positive impact on the child's brain development on the long term, as well as on well-being of the parent and the parent-infant dyad (Flacking et al., 2012). Murray and Swanson (2020) suggest that alternative methods of communication such as videoconferencing may help families at home to feel close to their infant.

Parents in our study mentioned that talking about their situation with family or friends or a psychologist helped them cope with the stress experienced during the COVID-19 visitation restrictions. It is therefore imperative that mental health professionals such as psychologists support families during COVID-19 (Darcy Mahoney et al., 2020; Murray & Swanson, 2020). Mothers and fathers in our study seemed to cope with stress a little differently. While some fathers sought for distraction, mothers specifically mentioned that being with their infant helped them to cope. Hagen and colleagues described that fathers often tried to hide emotions in order to protect themselves against further pain (Hagen et al., 2016).

The parents in our study highlighted that being told why certain COVID restrictions are imposed is helpful. They also seemed to appreciate that exceptions were made based on the clinical condition of the mother and the infant, though this should always be weighed against the need for restrictions.

In a meta-analysis by Caporali et al. (2020), the ‘sights and sounds' subscale of the PSS:NICU was found the least relevant source of stress for NICU parents (Caporali et al.),(Caporali et al.) corresponding with our study results. We would expect the COVID-19 restrictions to have the greatest impact on the ‘parental role alteration’ subscale, which Caporali and colleagues already found to be the most relevant source of stress for NICU parents in general by. Since studies from countries worldwide and up to 1991 were included in this meta-analysis, it is difficult to compare findings because of the possible impact of different parental visitation restrictions and cultural differences.

We do not know how the restrictions on the presence of parents and other family members affected the spread of the COVID-19 virus. Neither do we the long-term consequences of these restrictions on a family after NICU discharge. During a second, partial COVID-19 lockdown, parental presence was not restricted, but siblings, grandparents and others were still not allowed. We believe NICU wards should be very reluctant in restricting the presence of parents and other family members, in view of minimizing the consequences on psychosocial wellbeing and bonding (Verweij et al., 2020). Testing NICU parents for COVID-19 could be considered, which should enable scaling back restrictions as much as possible and determine the effect of any restrictions on the spread of the COVID-19 virus. Because of this additional stress factor for a parent

population already at risk for psychological disorders such as PTSS, follow-up studies are necessary.

Practice implications

In summary, the following recommendations for the hospital management during a period of restricted parental visitation in the NICU. To start with, families (parents, siblings and other family members) should be kept together where possible. It is important to communicate clearly why restrictions on the presence of parents and other family members have been imposed. Make sure that mental health professionals can be consulted and consider videoconferencing, so that parents can feel closer to the infant and participate in decision-making.

Limitations

This study has some limitations. First, we could not compare our results with a historical control group, and thus could not distinguish between stress related to the NICU hospitalization and stress related to COVID-19-related restrictions. Fig. 3 does show, however, that both mothers and fathers indicate the NICU hospitalization and COVID-19 to cause high stress levels with a median VAS stress between six and eight. This VAS stress scale was not validated, though in general a VAS is recommended to determine the level of perceived stress (Lesage et al., 2012). Second, the sample size was relatively small and there was a large range in postnatal age at the time of the data collection. The first lockdown in the beginning of 2020 is too recent, however, to study the long-term consequences of this stressful experience.

Conclusion

In conclusion, parents of infants admitted to the NICU during COVID-19 lockdown primarily experienced stress because they could not be with their infant together with their partner, and because siblings and others were not allowed to visit. This study emphasizes that it is key to be very cautious concerning these restrictions and scale these down whenever considered possible. Future studies should focus on the long-term psychological consequences and follow-up of these parents.

Author contributions

Naomi Meesters conceptualized and designed the study, included patients, carried out the initial analyses, drafted the initial manuscript, and approved the final manuscript as submitted.

Monique van Dijk conceptualized and designed the study, critically reviewed and revised the manuscript, and approved the final manuscript as submitted.

Fernanda de Sampaio de Carvalho conceptualized and designed the study, critically reviewed and revised the manuscript, and approved the final manuscript as submitted.

Lotte Haverman conceptualized and designed the study, critically reviewed and revised the manuscript, and approved the final manuscript as submitted.

Irwin Reiss conceptualized and designed the study, critically reviewed and revised the manuscript, and approved the final manuscript as submitted.

Sinno Simons conceptualized and designed the study, included patients, critically reviewed and revised the manuscript, and approved the final manuscript as submitted.

Gerbrich van den Bosch conceptualized and designed the study, included patients, supervised initial analyses, critically reviewed and revised the manuscript, and approved the final manuscript as submitted.

Declaration of Competing Interest

None.

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