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ORIGINAL ARTICLE

COVID-19 restrictions and psychological well-being of fathers with infants admitted to NICU—An exploratory cross-sectional study

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Abstract

Aim: To describe the impact of the COVID-19 restrictions on the caregiving activities and psychological well-being of fathers with infants admitted to neonatal units.

Methods: Cross-sectional study using adapted COPE-IS and COPE-IU tools. Participants' recruitment occurred online via social media and parents' associations. Online survey in English, French and Italian were distributed and promoted via websites and social media platforms of parent's associations. The study was undertaken across 12 countries in Asia, Australia, Africa and Europe.

Results: A total of 108 fathers of NICU infants completed the survey. COVID-19 related restrictions were categorised into 3 types: no restrictions, partial and severe restrictions. Fathers who experienced partial restrictions reported more involvement in caregiving activities but high levels of emotional difficulties and sleeping problems compared to those who experienced full or no restrictions.

Conclusion: Given the impact on the psychological well-being of fathers, restrictions should be avoided as much as possible in the neonatal unit and fathers given free access to their infants if they follow appropriate infection control precautions.

KEYWORDS
caregiving, COVID-19, fathers, neonatal unit, NICU, restrictions

Abbreviations: COVID-19, Corona Virus Disease, 2019; FINESSE, Fathers in Neonatal Environment Supporting Salubrious Experiences Group; NICU, neonatal intensive care unit, otherwise called neonatal unit.

†FINESSE Group (Fathers In Neonatal Environment Shaping Salubrious Experiences) International group of researchers interested in the study of NICU fathers in the care of their infants.

1 | INTRODUCTION

COVID-19 has directly and indirectly affected people globally with implications that are beyond its infectious nature.[1] To slow or prevent the spread of COVID-19 virus, restrictions were instituted in many public areas including health facilities. Due to the vulnerability of neonatal unit (NICU) infants and the risk of infection,[2] some NICUs instituted stringent measures to prevent potential infection of infants during the COVID-19 pandemic.[3] These measures included restricted family presence resulting in reduced provision of parent-infant skin-to-skin care.[4]

Having a baby in NICU can be stressful for both mothers and fathers who may develop emotional, post-traumatic or psychosomatic symptoms.[5] Mothers and fathers report comparable levels of depressive symptoms in the NICU and after 1 month, 15% of mothers and 8% of fathers met the criteria for post-traumatic stress disorders.[5] Notably, Shaw and colleagues[6] reported that 4 months after NICU discharge, 33% of fathers and 9% of mothers reported severe psychosomatic symptoms. Finally, a recent meta-analysis highlighted that parental NICU distress should be considered as a global healthcare issue as the alteration in the parental role emerged as the major source of stress for both mothers and fathers worldwide.[7]

Parental presence and promotion of physical and emotional closeness in NICU are among the major preventive factors associated not only with better infants' neurobehavioral outcomes,[8] shorter hospitalisation, but also with reduced parental mental problems.[9,10] The effects of reduced parental engagement in the NICU may be long-lasting including affective bonding with infants in mothers[11] and fathers.[12] Fathers who are allowed skin-to-skin contact feel more competent in their parental role.[13,14] Moreover, when fathers are closely involved in NICU caregiving, maternal symptoms of depression may be mitigated.[15] Finally, father-delivered skin-to-skin care has been significantly associated with better state regulation,[16] reduced pain sensitivity,[17] and greater sense of attachment and bonding in fathers.[18,19] As such, the restrictions instituted in response to COVID-19 pandemic may harm NICU infants and their parents.[20]

Pandemic-related restrictions on parental and/or family presence in the NICU can impact on parents' stress and especially fathers who have reported lack of full involvement in the care of their infants before COVID-19.[21] For instance, separation from their infants can increase fathers' risk of emotional distress and anxiety.[22] A fathers' initiative project to champion the inclusion of fathers in the care of infants, developed 12 practical recommendations,[23] which include supporting co-parenting; unrestricted access to baby and mother; and actively promoting father-infant relationship (bonding and attachment). However, anecdotal reports from clinicians and families suggest that, with COVID-19 restrictions, fathers were separated from their infants in the NICU to varying degrees. To date, no study has specifically explored how the COVID-19 restrictions in NICUs have impacted on fathers' mental health and well-being. Thus, the general aim of this study was to describe the impact of COVID-19 restrictions on the psychological well-being of fathers of infants admitted to a NICU. Firstly, we provide a quantification of the restriction to NICU and caregiving activities faced by fathers. Secondly, we assessed the association of these restrictions with paternal emotional response and psychosomatic symptoms.

Key Notes

- The COVID-19 pandemic resulted in restrictions of parents of NICU infants.
- Fathers experienced varied levels of restrictions in NICUs during the COVID-19 pandemic.
- Fathers who experienced partial restrictions were more involved in caregiving but experienced high psychological difficulties, so we posit that restrictions should be the last option and that fathers should undertake similar COVID-19 precautions as NICU staff.

2 | METHODS AND MATERIAL

2.1 | Participants and procedures

An online cross-sectional survey was undertaken between May 2020 and May 2021. Fathers were eligible to participate if they (a) were 18 years and over; and (b) had a baby in NICU or had a baby discharged from NICU during the pandemic. Fathers who meet these criteria could participate in the study if they have been admitted to NICU during the pandemic.

The primary survey was developed in English and translated into French and Italian by mother-tongue colleagues. The questionnaire was developed by modifying the USA-based National Institutes of Health (NIH) Coronavirus Perinatal Experiences - Impact Survey (COPE-IS) and the Impact Update (COPE-IU).[24] These two tools were developed to study the perinatal experiences of expectant and new mothers of full-term healthy infants during the COVID-19 pandemic; and as such, some items were adapted for fathers in the NICU context. The tools have nine scales (see below) and have recently been validated among 800 women:

1. Uncertainty about the future Cronbach's alpha = 0.871
2. Social impacts: Distress about social support Composite reliability (CR), using McDonald's omega, CR = 0.76
3. Social impact: Support received Composite reliability (CR), using McDonald's omega, CR = 0.75
4. Economic stressors: Worries about economic needs (partner) Cronbach's alpha = 0.840
5. Economic stressors: Worries about economic needs (self) Cronbach's alpha = 0.788

6. Economic stressors: Worries about increased work demands (self/partner) Cronbach's alpha = 0.777
7. Economic stressors: Worries about savings and non-financial work disruptions Cronbach's alpha = 0.775
8. Physical Health disruptions Composite reliability (CR), using McDonald's omega, CR = 0.78
9. COVID-19 related distress Cronbach's alpha = 0.772

Additionally, using current evidence about fathers in the NICU, we developed questions that specifically targeted fathers' experiences in the NICU. Questions, such as 'What activities are you (did you) participating (participate) in the neonatal unit?' and 'I experienced the following restrictions in the neonatal unit' were added to the tool. Open-ended questions were included to capture fathers' experiences. The final survey comprised 39 items and was delivered using Edith Cowan University Qualtrics platform.

2.2 | Ethics

Ethics clearance was obtained from Edith Cowan University Human Research and Ethics Committee (REMS NO: 2020-01505-ADAMA). Additionally, the consent form was embedded into the online survey link and a 'forced response' applied to ensure that participants completed the consent before proceeding with the survey. Participation was voluntary, and participants were advised that once they completed the survey, their data could not be traced and removed, in case they changed their mind.

2.2.1 | Pilot survey

As the adapted questionnaires were not yet validated at the time of the study, it was imperative to ensure the rigour of our tool before data collection.[25] Therefore, we tested the instrument with some fathers of NICU infants and parent support groups, to ascertain the internal validity of the tool. Feedback from the pilot was used to refine the formulation of items and enhance the survey structure.

2.3 | Data collection procedure

Fathers were invited via websites and social media platforms and through support organisations for NICU parents including the Canadian Premature Babies Foundation (Canada), Miracle Babies Foundation and Life's Little Treasures (Australia), Vivere Onlus (Italy), SOS Préma and the Toulouse University Hospital (France) and the Finesse Group social media platforms. Fathers from any part of the world could participate in the study if they met the inclusion criteria.

2.4 | Data reduction

Responses to items on restrictions were recoded into three categories: no restrictions (i.e., fathers had 24/7 access to the NICU); partial restrictions (i.e., fathers had limited access, limited bedside access and/or one-parent allowed every 24 h); severe restrictions (i.e., only mothers could access the NICU).

Fathers rated their emotional responses to these restrictions—sadness, anxiety, anger and happiness—on a continuous scale from low (1) to high (10). Psychosomatic symptoms referred to difficulties falling asleep/waking up, nightmares, gastro-enteric issues, difficulties in remembering things, mood instability, headaches, dizziness and crying spells. Fathers responded on a 5-point Likert scale- from 0 = not at all to 4 = all the time. Length of stay was recoded into a dichotomous variable: short stay, less than 7 days; long stay, more than 7 days.

2.5 | Data analysis

Descriptive statistical analyses were performed, and crosstabs and chi-squared tests were used to analyse categorical data. Analysis of variance (ANOVA) was performed to investigate whether the emotional responses or the psychosomatic symptoms differed among the different levels of restrictions in our sample population, that is assessing whether the type of restrictions imposed on fathers had an impact on their emotional well-being. Post-hoc Scheffé analysis examined whether fathers who experienced different restrictions differed from one another with respect to their emotional response and psychosomatic symptoms. Using SPSS 20.0, all statistical tests were 2-tailed, and the significance level was 0.05.

3 | RESULTS

3.1 | Fathers' characteristics

Our sample consisted of 108 fathers of newborns admitted to a NICU during the COVID-19 pandemic. Fathers responded to the survey from different countries with a greater representation from Europe (especially UK, France, Italy). Majority (88.7%) of the fathers were between ages 25–44 with some level of education. Majority (60.4%) were first-time fathers; all of them were co-habiting with the mother with 88.0% having full-time employment. Majority (38.0%) of the infants were less than 28 weeks gestation and single birth (87.0%). (Table 1).

The average duration of hospitalisation was 49.5 days (SD = 50 days) and length of stay ranged from 1 to 207 days. Only one father tested positive for COVID-19, and nine fathers had symptoms suggestive of COVID-19. One baby's mother tested positive for COVID-19. Four fathers had visited friends or relatives who were

TABLE 1 Sociodemographic data of 108 fathers

Fathers	N	%
Age (years) (*n* = 108)		
18–24	5	5.2
25–34	45	46.4
35–44	41	42.3
45–54	5	5.2
55–64	1	1.0
Educational level (*n* = 108)		
Secondary school	28	22.2
High school	22	20.4
Bachelor	24	25.9
Postgraduate or above	29	26.9
Other	5	4.6
First-time fathers (*n* = 106)		
Yes	64	60.4
No	42	39.6
Cohabitating with the mother (*n* = 76)		
Yes	76	100.0
No	0	0.0
Employment status pre-pandemic (*n* = 108)		
Full-time job	95	88.0
Part-time	4	3.7
Unemployed	2	1.9
Other (freelance)	7	6.4
Work status change during pandemic (*n* = 108)		
Yes	26	24.1
No	82	75.9
Country of residence (*n* = 108)		
Australia	7	6.6
Canada	6	5.7
Denmark	1	1.0
France	27	25.5
Germany	1	0.9
Ghana	4	3.8
Ireland	4	3.8
Italy	15	14.2
Norway	1	0.9
United Kingdom of Great Britain and Northern Ireland	39	36.8
United States of America	2	1.9
Prefer not to say	1	1.0
Infants		
Gestational age (*n* = 108)		
<28 weeks	41	38.0
28–32	21	19.4
32–36	36	33.3
≥37 weeks	10	9.3
Birth weight (*n* = 107)		
<1000 g	39	36.1
1001–1500 g	26	24.1
1501–2500 g	31	28.7
≥2501 g	11	10.2
Multiple births (*n* = 108)		
Triplets or more	3	2.8
Twin	11	10.2
Single	94	87.0
Sex (*n* = 107)		
Female	58	57.0
Male	49	43.0
Length of stay in Neonatal Unit (*n* = 103)		
Short (≤7 days)	20	18.3
Long (>7 days)	83	76.1

positive for COVID-19. Twelve had friends or relatives hospitalised for COVID-19; and six had a friend/relative who died of COVID-19.

3.2 | Restrictions and limitations to caregiving activities

In our sample, fathers experienced different types of restrictions during their stay at the NICUs: 19 fathers experienced no restrictions (17.6%), 70 fathers experienced partial restrictions (64.8%) and 19 experienced severe restrictions (17.6%). Fathers who experienced partial restrictions reported greater involvement in physical caregiving activities (e.g., holding and cuddling), χ^2 (1, n = 108) = 6.14, p <0.04, they talked more to their infant in the incubator, χ^2 (1, n = 108) = 6.14, p <0.04, they fed their infant more frequently, χ^2 (1, n = 108) = 10.70, p <0.002, they engaged in bathing more often, χ^2 (1, n = 108) = 6.53 p <0.03, and they assisted more with medical procedures χ^2 (1, n = 108) = 6.01, p <0.049, compared to their counterparts who experienced no or severe restrictions (Table 2).

3.3 | Fathers' emotional response to the restrictions

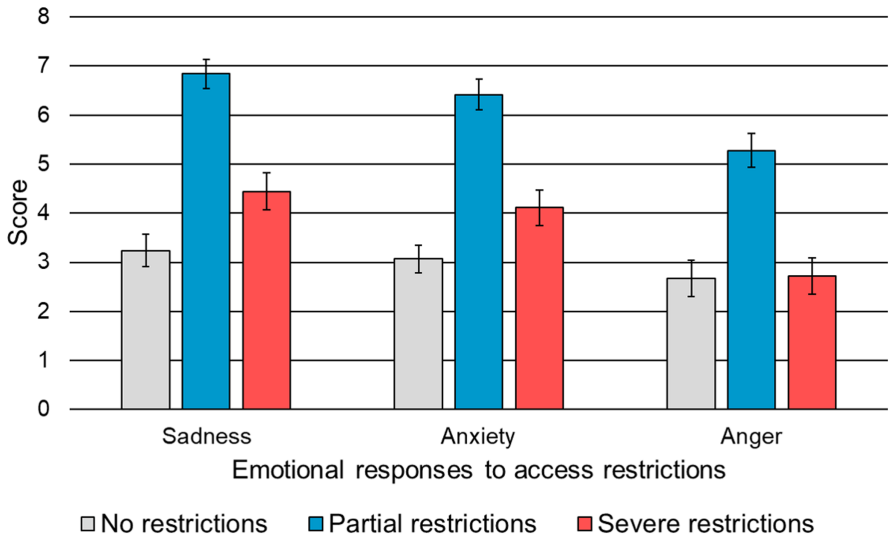
Fathers who experienced partial restrictions (M = 6.84; SD = 3.15) disclosed greater sadness, F (2, 95) = 9.44, p <0.001, anxiety, F (2,90) = 7.73, p <0.001 and anger, F (2,80) = 4.74, p <0.01, when compared to those who reported no or severe restrictions (see Figure 1). No significant differences emerged for happiness.

TABLE 2 Crosstabs between restrictions and activities with the newborn

Activities with the newborn	Access restrictions								
	No restrictions		Partial restrictions		Severe restrictions		Total		
	N	%	*N*	%	*N*	%	*N*	%	X^2
Skin-to-skin contact	16	15.8	47	46.5	13	12.9	76	75.2	4.19
Holding/cuddling	14	13.9	54	53.5	9	8.9	77	76.2	6.14*
Staying close to baby's incubator	15	14.9	62	61.4	12	11.9	89	88.1	6.24*
Talking to my baby	17	16.8	64	63.4	15	14.9	96	95	2.60
Changing my baby's diaper	16	15.8	52	51.5	13	12.9	81	80.2	2.50
Feeding my baby	16	15.8	44	43.6	7	6.9	67	66.3	10.70**
Bathing/washing my baby	12	11.9	26	25.7	10	9.9	48	47.5	6.53*
Assisting during medical procedures	11	10.9	23	22.8	9	8.9	43	42.6	6.01*
Limited or partial contact	2	2	11	10.9	1	1	14	13.9	1.33
No contact	0	0	3	3	1	1	4	4	0.91

Note: *$p < 0.05$; **$p < 0.01$.

FIGURE 1 Fathers' emotional response to COVID-19 restrictions



3.4 | Psychosomatic symptoms in response to restrictions

Fathers who experienced partial restrictions reported greater difficulties falling asleep compared to fathers who experienced no or severe restrictions, $F(2,89) = 4.04$, $p < 0.05$.

No significant differences emerged for the other psychosomatic symptoms (see Table 3).

4 | DISCUSSION

The current study suggests that fathers experienced varied levels of restrictions and involvement in caring for their infant, and that partial restrictions had significant impact on their psychological well-being.

Most fathers experienced partial restrictions to NICU access. Access restrictions had an impact on the caregiving activities that fathers could perform when present in the NICU. These activities included cuddling and holding, feeding, bathing/washing and assisting with medical procedures. Previous research[19,26] has largely demonstrated that actively engaging in these caregiving activities as early as possible during the NICU stay is a major catalyst for the development of parental self-confidence and attachment to baby. For both mothers and fathers, performing such caregiving acts is part of a learning process that supports and boosts appropriate parental role development, which is crucial for family adjustment after discharge.[27] As such, based on the findings reported here, during the

TABLE 3 Means and ANOVA analysis of psychosomatic symptoms

	Restrictions						
	No restrictions		Partial restrictions		Severe (only mother allowed access)		
	M	SD	M	SD	M	SD	*F*
Difficulties falling asleep	1.07_{α}	1.26	2.15_{β}	1.42	1.44_{α}	1.59	4.04*
Difficulties waking up	0.50	0.76	0.92	1.32	0.94	1.38	0.66
Nightmares	0.21	0.42	1.02	1.28	0.75	1.00	2.83
Gastrointestinal symptoms	0.71	0.99	0.84	1.28	0.50	0.73	0.54
Difficulty in remembering things	1.07	0.91	0.97	1.19	0.88	1.14	0.10
Mood instability	0.86	0.66	1.57	1.28	1.19	1.22	3.33
Headache	0.93	0.91	1.16	1.18	0.63	0.91	1.93
Dizziness	0.14	0.36	0.57	1.02	0.38	0.80	1.36
Crying spells	0.57	0.60	1.44	3.1	0.63	0.88	1.05

Note: *$p < 0.05$. Subscripts are only reported for significant comparisons, according to pair-wise Scheffé post-hoc comparisons, $p < 05$.

COVID-19 pandemic, many fathers had limited access to the NICU and partial or severe limitations to caregiving engagement, which may lead to a less than optimal post-discharge caregiving experience.

Fathers with partial restrictions were more involved in caregiving activities compared to counterparts with no or severe restrictions. This finding is somewhat surprising as a linear association between access limitations and caregiving activities may be expected. Nonetheless, it should be noted that with fathers who had full access, most probably also featured full access for mothers; in this case, most caregiving activities and skin-to-skin care are most probably provided by mothers, leaving fewer caregiving opportunities for fathers. This could also be due to cultural variations/perceptions with respect to fathers' parenting/caregiving role. Additionally, it is possible to speculate that fathers who had less access to the NICU may have invested more in direct caregiving engagement when they did have access, trying perhaps to compensate for the reduced amount of time they had access to the unit and their infant. In other words, fathers who experienced partial limitations may have been more involved when they were present as the amount of time usually spent by mothers in caregiving was now allocated to them by changes in the NICU access policies during the COVID-19 pandemic.

Additionally, fathers who experienced partial restrictions also reported significantly higher psychosomatic symptoms (i.e., difficulty falling asleep), sadness, anxiety and anger feelings compared to counterparts who experienced severe or no restrictions. Previous studies already reported on the emotional and psychosomatic dimensions of paternal distress in the NICU. Abdullah et al.[28] reported high anxiety and sleeping difficulties among mothers and fathers in neonatal unit in pre-COVID-19 era. The fact that these symptoms were mostly reported by fathers with partial NICU restrictions is only apparently counterintuitive. It is possible that fathers who had no access to the NICU may have completely relied on maternal presence. This is indirectly suggested by previous studies in which fathers who were not involved in caregiving in the NICU also reported lower desire to be engaged and reduced feelings of attachment to the infant.[13,14] Moreover, in fathers with severe restrictions, cultural beliefs and models of peripheral engagement of fathers in childcare may have been maximised.[29] On the contrary, the high levels of emotional and psychosomatic symptoms experienced by fathers who had partial restrictions could probably be due to anticipatory anxiety and uncertainty as they are unsure of what the next restrictions or health outcome of their infant will be.[30] As such, fathers who have had some opportunity to be close to their infants and be involved in their care may leave the NICU with increased perceived levels of anxiety or heightened reactivity to their infant's health outcome than those who had severe or no restrictions.

It is also possible that in areas that had severe restrictions, the burden of COVID-19 was high and the potential risk to the infants made fathers reconcile to the severe restrictions whereas in areas with partial restrictions, fathers found it difficult to understand the rationale of the restriction.

4.1 | Strengths and limitations

To the best of our knowledge, this is the first international study to describe the perspective of fathers with infants in NICU during the COVID-19 pandemic. Despite the originality of this project, some methodological limitations were observed. Firstly, not all questions were answered by participants. We hypothesize that some of the items were very sensitive to fathers during this challenging period. Secondly, the number of participants in many individual countries is low resulting in potentially underpowered results. Perhaps men are reluctant to share their emotional difficulties and/or engaging in research on child health issues. Additionally, methodological shortcomings such as the use of invalidated tool—at the time of data collection—that was not back-translated as per the WHO guidelines could also affect the quality of the study. As the study recruited

participants from social media platforms, it was challenging to estimate the response rate. Moreover, we are unsure of the level of fathers' care engagement/involvement and NICU visitation policies in the participating countries prior to the COVID-19 pandemic. Also, the psychological difficulties experienced by fathers may not be due to restrictions only but rather due to other worries such as the loss of the traditional breadwinner role because of employment concerns in the pandemic, as 24.1% of fathers changed work status during the pandemic. As data on fathers' previous mental health were not part of this study, it is possible that the psychosomatic symptoms reported by fathers emanated from existing mental health issues but were not necessarily COVID-19 restrictions related. Finally, the study did not weigh the risk of restricting fathers' access to NICU against the risk of NICU infants contracting COVID-19 virus.

5 | CONCLUSIONS AND IMPLICATIONS

This study shows that fathers experienced varied restrictions—severe, partial and none. Although there were a certain number of mental and psychosomatic difficulties experienced by fathers, the level of these difficulties experienced by fathers who had partial restrictions were higher than those who had severe or no restrictions. We posit that the family/partner disruptions or anticipatory anxiety from uncertainty could be the probable cause of this. We recommend that restrictions to the neonatal unit should be the last option and that fathers should be treated like primary caregivers and instead of restrictions, they should be provided with education on infection prevention precautions. Units should undertake efficient COVID-19 safety processes to provide unrestricted access albeit with appropriate precautions like temperature checking or rapid antigen testing. Additionally, NICU staff should endeavour to minimise other forms of restrictions in the NICU to prevent or reduce the risk of harmful effects reported in the current study.

As fathers may show signs of postnatal depression later than mothers, it is imperative to explore the long-term impact of COVID-19 related mental health and psychosomatic difficulties on father-infant relationships and to support engaged fathers in line with NICU mothers. A longitudinal study on fathers who had a baby in the NICU during the pandemic could provide holistic evidence on the impact on the father-infant bonding and attachment.

AUTHOR CONTRIBUTIONS

EAA conceptualised the research design, developed the data collection tools, collected data, managed data, drafted the manuscript, undertook critical review of the manuscript and approval. **FK, LP, NF and EvT** conceptualised the research design, developed the data collection tools, collected data, analysed data, drafted the manuscript, undertook critical review of the manuscript and final approval. **JI** conceptualised the research design, developed the data collection tools, collected data, drafted the manuscript and, undertook critical review of the manuscript and final approval. **MK** conceptualised the research design, developed the data collection tools, collected data, analysed data, drafted the manuscript, undertook critical review of the manuscript and final approval. **FINESSE Group** members Conceptualised the research design, developed the data collection tools, collected data and final approval.

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CONFLICT OF INTEREST

No conflict of interest has been declared by all the authors.

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REFERENCES

1. Khan N, Naushad M. Effects of Corona virus on the world community. 2020. doi:10.2139/ssrn.3532001
2. Yu N, Li W, Kang Q, et al. Clinical features and obstetric and neonatal outcomes of pregnant patients with COVID-19 in Wuhan, China: a retrospective, single-centre, descriptive study. Lancet Infect Dis. 2020;20:559-564.
3. Hugelius K, Harada N, Marutani M. Consequences of visiting restrictions during the COVID-19 pandemic: an integrative review. Int J Nurs Stud. 2021;121:10400.
4. Bembich S, Tripani A, Mastromarino S, Di Risio G, Castelpietra E, Risso FM. Parents experiencing NICU visit restrictions due to COVID-19 pandemic. Acta Paediatr. 2021;110:940-941.
5. 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;17:230-237.
6. Shaw RJ, Bernard RS, DeBlois T, Ikuta LM, Ginzburg K, Koopman C. The relationship between acute stress disorder and posttraumatic stress disorder in the neonatal intensive care unit. Psychosomatics. 2009;50:131-137.
7. Caporali C, Pisoni C, Naboni C, Provenzi L, Orcesi S. Challenges and opportunities for early intervention and neurodevelopmental follow-up in preterm infants during the COVID-19 pandemic. Child Care Health Dev. 2021;47:140-141.
8. Montirosso R, Del Prete A, Bellù R, Tronick E, Borgatti R, NAC for Q of L (NEO-ASG). Level of NICU quality of developmental care and neurobehavioral performance in very preterm infants. Pediatrics. 2012;129:e1129-e1137.
9. Montirosso R, Fedeli C, Del Prete A, Calciolari G, Borgatti R, N-ASG. Maternal stress and depressive symptoms associated with quality of developmental care in 25 Italian neonatal intensive care units: a cross sectional observational study. Int J Nurs Stud. 2014;51:994-1002.
10. He FB, Axelin A, Ahlqvist-Björkroth S, Raiskila S, Löyttyniemi E, Lehtonen L. Effectiveness of the close collaboration with parents

intervention on parent-infant closeness in NICU. BMC Pediatr. 2021;21:28.
11. Provenzi L, Fumagalli M, Bernasconi F, et al. Very preterm and full-term Infants' response to socio-emotional stress: the role of post-natal maternal bonding. Inf Dent. 2017;22:695-712.
12. Garnica-Torres Z, Gouveia A Jr, da Silva PJ. Attachment between father and premature baby in kangaroo care in a neonatal unit of a public hospital. J Neonatal Nurs. 2021;27:334-340.
13. Feeley N, Waitzer E, Sherrard K, Boisvert L, Zelkowitz P. Fathers' perceptions of the barriers and facilitators to their involvement with their newborn hospitalised in the neonatal intensive care unit. J Clin Nurs. 2013;22:521-530.
14. Olsson E, Eriksson M, Anderzén-Carlsson A. Skin-to-skin contact facilitates more equal parenthood - a qualitative study from Fathers' perspective. J Pediatr Nurs. 2017;34:e2-e9. doi:10.1016/j.pedn.2017.03.004
15. Kim THM, Delahunty-Pike A, Campbell-Yeo M. Effect of Fathers' presence and involvement in newborn care in the NICU on Mothers' symptoms of postpartum depression. J Obstet Gynecol Neonatal Nurs. 2020;49:452-463. doi:10.1016/j.jogn.2020.05.007
16. Erlandsson K, Dsilna A, Fagerberg I, Christensson K. Skin-to-skin care with the father after cesarean birth and its effect on newborn crying and prefeeding behavior. Birth. 2007;34:105-114.
17. Mörelius E, Örtenstrand A, Theodorsson E, Frostell A. A randomised trial of continuous skin-to-skin contact after preterm birth and the effects on salivary cortisol, parental stress, depression, and breastfeeding. Early Hum Dev. 2015;91:63-70.
18. Chen EM, Gau ML, Liu CY, Lee TY. Effects of father-neonate skin-to-skin contact on attachment: a randomized controlled trial. Nurs Res Pract. 2017;2017:1-8.
19. Adama EA, Sundin D, Bayes S. Ghanaian fathers' experiences of caring for preterm infants; a journey of exclusion. J Neonatal Nurs. 2017;23:275-281. doi:10.1016/j.jnn.2017.05.003
20. van Veenendaal NR, Deierl A, Bacchini F, O'Brien K, Franck LS. Supporting parents as essential care partners in neonatal units during the SARS-CoV-2 pandemic. Acta Paediatr Int J Paediatr. 2021;110:2008-2022.
21. Filippa M, Saliba S, Esseily R, Gratier M, Grandjean D, Kuhn P. Systematic review shows the benefits of involving the fathers of preterm infants in early interventions in neonatal intensive care units. Acta Paediatr Int J Paediatr. 2021;110:2509-2520.
22. Prouhet PM, Gregory MR, Russell CL, Yaeger LH. Fathers' stress in the neonatal intensive care unit: a systematic review. Adv Neonatal Care. 2018;18:105-120.
23. Fisher D, Khashu M, Adama EA, et al. Fathers in neonatal units: improving infant health by supporting the baby-father bond and mother-father coparenting. J Neonatal Nurs. 2018;24:306-312.
24. Thomason, M. E., Graham, A., & VanTieghem MR. The COPE-IS: Coronavirus Perinatal Experiences – Impact Survey. 2020.
25. van Teijlingen E Hundley V. The Importance of Pilot Studies, Social Research Update. University of Surrey; 2001. Accessed November 24, 2021. http://www.soc.surrey.ac.uk/sru/SRU35.html
26. Flacking R, Lehtonen L, Thomson G, et al. Closeness and separation in neonatal intensive care. Acta Paediatr Int J Paediatr. 2012;101:1032-1037.
27. Provenzi L, Barello S, Fumagalli M, et al. A comparison of maternal and paternal experiences of becoming parents of a very preterm infant. J Obstet Gynecol Neonatal Nurs. 2016;45:528-541.
28. Abdullah KL, Chong MC, Chua YP, Al Kawafha MM. Stress, anxiety, depression and sleep disturbance among Jordanian mothers and fathers of infants admitted to neonatal intensive care unit: a preliminary study. J Pediatr Nurs. 2017;36:132-140.
29. Valizadeh S, Mirlashari J, Navab E, Higman W, Ghorbani F. Fathers: the lost ring in the chain of family-centered care: a phenomenological study in neonatal intensive care units of Iran. Adv Neonatal Care. 2018;18:3-11.
30. Grupe DW, Nitschke JB. Uncertainty and anticipation in anxiety: an integrated neurobiological and psychological perspective. Nat Rev Neurosci. 2013;14:488-501.

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