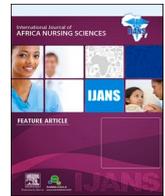


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## Nurses' perspectives on the impact of the COVID-19 pandemic on parental involvement in NICUs

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## ABSTRACT

**Background:** Nurses are key healthcare professionals in service provision to infants and their families in neonatal intensive care units and are pivotal in observing parental involvement in their infant's care. The COVID-19 pandemic led to various restrictions which impacted these units specifically.

**Aim:** To investigate nurses' perspectives regarding the impact of the COVID-19 pandemic on parental involvement in their infants' care whilst in neonatal intensive care units.

**Methods:** A quantitative cross-sectional online survey was used to collect nurses' perspectives. Thirty-five nurses working in this unit in three hospitals were recruited through purposive sampling to participate: one public academic hospital (n = 12) [Hospital A], one private hospital (n = 11) [Hospital B] and one public tertiary hospital (n = 12) [Hospital C]. Data were analysed using descriptive and inferential statistics and content analysis.

**Results:** A total of 80 % of nurses (n = 28) indicated the COVID-19 pandemic impacted parental involvement in the care of infants in neonatal intensive care units during the years 2020 and 2021. None of the hospitals restricted parents completely from being in the unit, however, involvement was impacted by implemented visitation restrictions. Two themes were identified from the nurses' perspectives namely, "changes in visitation regulations", and "reduced parental involvement".

**Conclusion:** Parental involvement requires physical parental presence, and restrictions in the wards reduced this involvement. Although reduced, parental presence in the hospitals allowed breastfeeding to continue, showing the importance of parental involvement was recognised. Evidence-based guidelines that promote parental involvement and family-centred care in hospitals need to be implemented worldwide to benefit admitted infants and families, despite pandemic restrictions.

## 1. Introduction

The outbreak of the COVID-19 pandemic in 2020, caused multiple global disruptions to the typical routine of life. These included physical and social restrictions in the form of national lockdowns, the suspension and/or reduction of essential and non-essential services, and a rise in morbidity across healthcare sectors (Alzueta et al., 2021; Mbunge, 2020; Nyasulu & Pandya, 2020). In South Africa specifically, five alert lockdown levels were implemented to help curb the spread of the virus, with level five being the highest most strict level (Pillai et al., 2020). These levels each had limitations on the number of people allowed in closed and open areas, the requirement of a face mask, and the need for regular

sanitization of hands (South African Department of Co-operative Governance, 2021). The severity of the lockdown level was directly correlated to the severity of the COVID-19 wave in a country (Pattinson et al., 2021). A notable disruption affecting many families worldwide was seen in hospitals, including neonatal intensive care units (NICUs), where caregivers experienced reduced access to their sick infants who were born with low birth weight, preterm, or with serious medical conditions such as respiratory difficulties (Cena et al., 2021; Pattinson et al., 2021; Shung-King et al., 2021).

The NICU environment, historically, is considered challenging for parental involvement due to infants' conditions, ward regulations, separation of infants from their parents, and restricted involvement of

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parents in their infants' care (Harding et al., 2019). Therefore, this environment is deemed a risk factor for appropriate infant development (Williams et al., 2018). Prior to the COVID-19 pandemic, South African NICUs had regulations and safety precautions such as allowing fathers and grandparents into the wards, allowing mothers to feed their infants eight times a day, and requiring all staff and visitors to wash their hands regularly with water and soap (South African Health Department, 2014). Reports in literature have shown that changes in the NICU environment in response to the COVID-19 pandemic may have had a negative impact on parental involvement and thus, parent-infant interaction, as well as infant management (Cena et al., 2021). This negative impact includes the hindrance of family-centred care where sick newborns are at a greater risk of less weight gain leading to delayed discharge from the hospital. However, this has not been fully examined in low- and middle-income countries from various NICU stakeholders' perspectives.

NICU professionals facilitate parental access in NICUs, which in turn benefits parental involvement and parent-infant interaction (Feeley et al., 2016). As a result of stricter hospital regulations and reduced services i.e., limited NICU access following the COVID-19 outbreak, parental and family involvement dramatically declined in several countries worldwide (Montes et al., 2020; Vavouraki, 2020). This changed how caregivers experienced their infants' first few weeks of life which may have led to less emotional and mental acceptance of infants by families, caregivers feeling less confident about parenthood, and decreased breastfeeding (Kim & Yun, 2020; Kostenzer et al., 2021; Mahoney et al., 2020). Contrary to this response to the pandemic, the World Health Organization's (2020) recommendations have indicated that contact between infants and parents in NICUs should still occur regardless of the mother's or infant's COVID-19 status (Pereira et al., 2020). This is especially true directly after an emergency birth due to the benefits that parent-infant contact has for both mothers and infants (Lubbe et al., 2020).

Fostering parental involvement in their infants' care whilst in NICU is highly recommended and includes aspects such as physical presence, infant holding, and parent-infant interaction (Feeley et al., 2016; Pineda et al., 2018; Reynolds et al., 2013). This involvement in the care of infants is beneficial for both infants and mothers and includes improved feeding and weight gain of infants, and increases confidence in mothers (Crenshaw, 2014; Feeley et al., 2016; Montes et al., 2020; Reynolds et al., 2013). The contribution of professionals, such as nurses who are central healthcare professionals within the NICU and are part of an interprofessional team, is necessary to promote parental involvement before infants and their families are discharged to their homes (Craig et al., 2015). To nurture the development of this involvement, professionals require access to parents.

Emerging research indicates that there has been a large focus on the impact of the COVID-19 pandemic on infants, mothers, and NICU staff individually; however, limited literature has directly focused on the impact of this disease on parental involvement in their infant's care whilst in NICU from varying perspectives (Bembich et al., 2021; Garfield et al., 2021; Kostenzer et al., 2021; Tscherning et al., 2020). In Africa, South Africa specifically, there is limited research available focusing on parental involvement in NICUs during the COVID-19 pandemic, however, there is recent research focusing on feeding practices in public hospital NICUs during the pandemic (Coutts et al., 2021).

NICU nurses play a critical role in supporting families and the daily running of NICUs. As a result, they are in the best position to observe the impact of the COVID-19 pandemic on parental involvement in this environment. This is particularly true as nurses have been forever present in NICUs prior to and during the pandemic compared to parents who were not (Lee, 2020). Most public and private NICUs in South Africa do not provide lodging units i.e., rooming in, for mothers who are not admitted to the hospital (South African Medical Research Council & University of Pretoria Maternal and Infant Health Care Strategies Unit, 2020; South African Western Cape Department of Health, 2020). Nurses are constant healthcare professionals in NICUs, and are therefore, often

the first point of contact for caregivers seeking information regarding the progress of their infants' health and preparing to care for their infants once they are discharged home (Montes et al., 2020). Furthermore, nurses promote neurodevelopmental care as well as the physical and emotional bonding between infants and caregivers through feeding and infant care guidance, and further train mothers to continue this care at home (Feeley et al., 2016; Maleki et al., 2022).

Limited research is available from healthcare professionals on their perspective of parental involvement in NICUs during the pandemic, with available research only being from high-income countries (Bembich et al., 2021; Garfield et al., 2021; Mahoney et al., 2020; Muniraman et al., 2020; Murray & Swanson, 2020). A study conducted in South Korea, a high-income country, investigated the experiences of nurses regarding perinatal women and newborn care during the COVID-19 pandemic (Kang et al., 2021). Nurses reported increased workload, reduced breastfeeding, and a negative impact on family-centred care due to restrictions on visitors in NICUs (Kang et al., 2021). The limited research in low-and-middle-income countries has, therefore, warranted the need for research investigating parental involvement in NICUs during the pandemic.

It is valuable to gather the perspectives of constant NICU stakeholders, i.e. registered nurses, as they are ever present in NICU wards compared to parents. Investigating their perspectives on parental involvement in NICUs during the COVID-19 pandemic will provide insight into how parental involvement was promoted and maintained during this time. Furthermore, gaining these valuable insights will assist decision-making when creating a resilient healthcare system during future times of crises, such as outbreaks and/or natural disasters. Nurses are vital healthcare professionals in NICUs to ensure the complex care of vulnerable infants and their families and are at the forefront of observing parental involvement. Their perspectives on this matter are salient, therefore, the study aimed to investigate nurses' perspectives on parental involvement in their infant's care whilst in NICUs during the COVID-19 pandemic.

## 2. Materials and methods

### 2.1. Study design

This research study made use of a quantitative cross-sectional design to determine nurses' perspectives on parental involvement in their infants' care whilst in NICU during the COVID-19 pandemic. Sub-aims of the study included how the different hospitals reacted to the pandemic and the level of parental access into the NICUs.

### 2.2. Participants description

Thirty-five NICU nurses who fit predetermined criteria participated in the study and were recruited from three hospitals through purposive sampling: Hospital A (n = 12), Hospital B (n = 11), and Hospital C (n = 12). This sampling method was used as it is valuable in obtaining information from select individuals who are especially knowledgeable about or experienced with a phenomenon of interest, i.e. the NICU environment during the COVID-19 pandemic, as well as their availability and willingness to participate, and presence of a working NICU (Cresswell & Plano Clark, 2018). Across the three hospitals, there were a total of 82 NICU nurses who could potentially participate in the study. The hospitals had approximately the following number of nurses in the NICU: Hospital A = 17, Hospital B = 31, and Hospital C = 34. The number of nurses per unit varied, especially due to the pandemic and its related restrictions. For this study, the sample size of participants was estimated to be a maximum of 25 nurses per hospital, to ensure that the groups would be comparable. The inclusion criteria of the participants are outlined in Table 1.

**Table 1**  
Inclusion criteria of the participants.

Inclusion Criteria
Participants:
Were NICU nurses who were actively working during the COVID-19 pandemic in the years 2020 and 2021 when the virus was at its peak
Were proficient in English
Had been awarded at least one tertiary education qualification
Worked in one of the selected hospitals
Had a minimum of 3–5 years of experience working in the NICU

\*NICU – neonatal intensive care unit.

### 2.3. Setting

The study took place in a government-funded academic hospital, a private hospital and a government-funded tertiary hospital. Government-funded hospitals, also known as public hospitals, are solely dependent on funds provided by the state and cater to all citizens, whereas private hospitals depend on patients with health insurance. In South Africa, an academic hospital provides specialised care and training of healthcare professional students from an associated teaching institution. Tertiary hospitals provide highly specialised medical care to patients nationally (South African Department of Health, 2012).

### 2.4. Instrument

The data collection tool used to gather nurses' perspectives on the impact of the COVID-19 pandemic on parental involvement in NICUs was a self-developed survey compiled by the researchers using various academic sources and scientific literature (Chung et al., 2019; Condon & Corkindale, 1998; Department of Health, 2020; Feeley et al., 2016; Fortney & Steward, 2017; Hollowell et al., 2020; Kang et al., 2021; Latorre et al., 2021; Lee et al., 2020; Mahoney et al., 2020; Montés et al., 2020; Muniraman et al., 2020; Murray & Swanson, 2020; Phuma-Ngaiyaye & Kalembo, 2016; Reynolds et al., 2013; Rocha et al., 2020; Shaw et al., 2021; Turner et al., 2014; Verd et al., 2020; Western Cape Department of Health, 2020). The survey was offered online via Qualtrics as well as paper-based. All nurses (N = 35) chose to complete the paper-based survey, possibly due to the convenience of the survey's availability in the ward. The survey contained 31 close-ended and nine open-ended questions that probed nurses' demographic information, parental involvement and general NICU information. Quantitative and qualitative data were collected and the survey took 20–30 min for the nurses to complete.

### 2.5. Procedures

The developed survey was piloted with two qualified nurses working in the academia setting as well as in the NICU to identify any flaws in the questions asked (Lowe, 2019). Their suggestions for changes were implemented accordingly prior to sending out the final survey to participants. These changes included bolding important and similar words in the question for easy reading, the exclusion of asking which health council participants are registered with as all nurses in South Africa register with the SANC, and increasing the estimated duration time to complete the survey. Once permission to distribute surveys to the NICU nurses was obtained from the respective heads of the units, all available nurses from the different hospitals were invited to participate and provided with information letters by the primary researcher during the morning shift change meetings between May and June 2022. Informed consent was obtained, and nurses were given the option of completing the survey online or in hard copy. All chose to complete the hard copy survey. The nurses were given three days to complete the survey, which took approximately 20–30 min to complete in one sitting. Although this time was short, nurses could complete it anytime within these three days according to their busy schedules with reminders sent out by the ward matrons. Data collection was conducted by the primary researcher who

left the Qualtrics link, 25 paper surveys and 25 information letters and informed consent forms in an envelope with the ward matron, and collected them from her three days later. More copies of these documents were available upon request, however were not necessary as the extras were given back to the primary researcher.

### 2.6. Data analysis

Quantitative data were analyzed descriptively and inferentially using the Statistical Package for Social Sciences v28, while qualitative data were analyzed using inductive qualitative content analysis (Vaismoradi et al., 2013). A significance level of 5 % was used for all statistical analyses with  $p < 0.05$  indicating statistical significance. For the only continuous variable, age, a Shapiro-Wilk test was conducted to test for normality, and since the p-value was greater than 0.05 ( $p = 0.100$ ), age is normally distributed, and the parametric ANOVA could be used to test for significant differences in age between participant groups across the three hospitals. Non-parametric tests were used for the categorical data, namely the Chi-square test for cross-tabulations with pairwise z-tests which compares the proportions between each pair of columns. Majority of the closed-ended categorical questions were ordinal in nature with the remaining closed-ended questions being multiple responses options where the respondents had to select all options that applied. For missing values, pairwise deletion was used over listwise deletion as the latter leads to a smaller sample size and lower statistical power as the entire record is excluded from analysis if a single value is missing. The steps of inductive qualitative analysis were closely followed as demonstrated in Fig. 1.

### 2.7. Ethical considerations

Institutional Review Board clearance [XXX] was obtained before the commencement of data collection from [XXX]. Permission was additionally obtained from the Gauteng Department of Health [XXX] and the ethical boards of the three data collection sites all located in the metropolitan area of Tshwane in the province of Gauteng, South Africa. All participants signed voluntary informed consent forms and were assigned numeral codes to ensure confidentiality and anonymity.

### 2.8. Rigour

Strategies to ensure validity and reliability in this study included the split-half method and the use of evidence-based sources to develop the survey, as well as piloting the survey with expert nurses. Specifically, in assessing the reliability of the questionnaire using the split-half method, McNemar's test was used as it's a statistical test to assess changes or differences in proportions between related measurements. The split-half method entails taking the responses from an instrument, measuring a similar construct, and dividing it in half. The variables considered in the split-half method were binary (respondents answered yes or no to certain questions), and, accordingly, McNemar's test was used as binary responses from the same respondents were used (i.e., paired binary data were compared). A p-value greater than 0.05 is desired, as it would show that there were no significant differences in the responses by the same respondents to questions that were very similar (as they were measuring

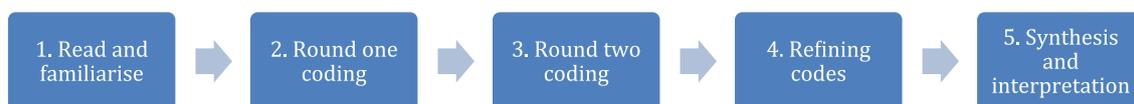


Fig. 1. Steps followed for inductive qualitative analysis.

the same construct). The results indicated the  $p$ -value exceeding 0.05 ( $Z = -1.236, p = 0.216$ ), thus no significant differences in responses were found, affirming the questionnaire's reliability.

### 3. Results

This study described NICU nurses' perspectives on the impact of the COVID-19 pandemic on parental involvement in their infants' care in NICUs. The demographic data of the nurses included in this study is presented in Table 2.

Most nurses ( $n = 28$  of 35; 80.0 %) perceived that the pandemic had an impact on parental involvement in NICUs during the years 2020 and 2021. Nurses reported that prior to the pandemic, parents very often ( $n = 9$  of 35; 25.7 %) and always ( $n = 18$  of 35; 51.4 %) held their babies, however, this changed in 2020 and 2021 when 37.5 % ( $n = 9$  of 24 that responded to this question) of nurses reported that parents rarely held their babies due to not being allowed into the ward and out of fear of infecting their babies. Nurses were asked about parental visitation regulations in the NICU ward across hospitals (Table 3) and feeding methods prior to and during the COVID-19 pandemic (Table 4). In determining whether responses between the three hospitals differ significantly from each other, multiple pairwise comparisons are involved and only significant results are reported in Tables 3 and 4.

When exploring parental involvement NICUs during the COVID-19 pandemic (Table 3), 41.2 % of nurses ( $n = 14$  of 34 that responded to this question) reported lodging parents, i.e., parents who are admitted into the hospital, were allowed to be in the ward for as long as they wanted, while few nurses ( $n = 6$  of the 34 that responded to this question; 17.6 %) stated these parents were not allowed in the ward at all. Hospital A had significantly stricter visitation duration regulations in the NICU during the COVID-19 pandemic when compared to Hospital B since Hospital A's responses to no visitation ( $n = 4$  of 12; 36.4 %) were significantly higher ( $z = 2.211; p = 0.027$ ) than those of Hospital B ( $n = 0$  of 11; 0.0 %), indicating that hospital B let allowed parents to visit.

According to just over half of the nurses from Hospital A ( $n = 6$  of the 11 that responded; 54.5 %), in-patient parents were allowed into the ward for 1 h a day, while just over one-third ( $n = 4$  of the 11 that responded; 36.4 %) indicated out-patient parents, i.e., parents who are not lodging in the hospital, were allowed for less than an hour to an hour a day. In contrast, all nurses from Hospital B ( $n = 11$  of 11; 100 %) reported in-patient parents were allowed in the ward for as long as they wanted, while just over three-quarters of nurses ( $n = 7$  of the 9 that responded; 77.8 %) reported out-patient parents were allowed in the

ward for as long as they wanted. One-quarter of nurses from Hospital C contrastingly indicated in-patient parents were allowed in the ward for less than an hour a day ( $n = 3$  of 12; 25.0 %) and for as long as they wanted ( $n = 3$  of 12; 25.0 %), while 58.3 % ( $n = 7$  of 12) reported out-patient parents were not allowed in the ward.

Feeding methods used prior to and during the COVID-19 pandemic were explored. All nurses ( $N = 35$ ; 100 %) indicated the most prevalent feeding methods i.e., breastfeeding and tube feeding, were the same before and during the pandemic (Table 4). Breastfeeding prevalence in Hospital C was significantly higher before the pandemic than in Hospital B ( $p = 0.006$ ). During the pandemic, three-quarters ( $n = 8$  of 12; 66.7 %) of nurses from Hospital C reported breastfeeding was more prevalent in their ward compared to one-quarter ( $n = 3$  of 12; 25.0 %) of nurses from Hospital A ( $z = -2.048; p = 0.041$ ). Prior to the pandemic, nurses from Hospital B reported their unit did not have syringe or cup feeding, while nurses from Hospitals A and C reported that they did. During the pandemic, nurses reported that syringe and cup feeding was more prevalent in Hospitals A and C and was still not present at all in Hospital B.

Participants were requested to elaborate on some of their selections from the close-ended questions in the form of open-ended questions. From these, two themes were identified that described the nurses' perspectives on the impact of the COVID-19 pandemic on parental involvement in the care of their infants in the NICU namely, changes in visitation regulations, and reduced parental presence and parent-infant interaction. Table 5 outlines the identified themes and subthemes.

#### 3.1. Changes in visitation regulations

Nurses from all three hospitals ( $n = 24$ ; 68.6 %) indicated there were changes to hospital visitation regulations, including their lodging unit being closed or limiting mothers at some point during the COVID-19 pandemic to reduce the spread of the disease. This was mostly seen during the highest levels of lockdown i.e., lockdown levels 4 and 5 from March 2020 to May 2020. Furthermore, nurses reported the closure of the lodging unit reduced the number of parents in the NICU, as most parents could not travel daily to visit their admitted infants or did not have negative test results for COVID-19 to be allowed in. As a result, nurses reported reduced parental presence meant reduced parental involvement in the NICU, as supported by the following excerpts:

"Mothers were not admitted in the lodge when they don't have negative results."  
(Participant 14) "Fathers were not allowed to visit during the week, they were only allowed to visit on Sundays for one hour." (Participant 23)

Table 2  
Demographics of the nurses.

Demographics	Hospital A (Academic) $n = 12$	Hospital B (Private) $n = 11$	Hospital C (Tertiary) $n = 12$	Overall/Total $n = 35$	Test Statistic	p-values
<b>Age - n (%)</b>						
Age [Mean (SD)]	45.25 (13.039)	41.73 (7.030)	40.67 (8.184)	42.57 (9.760)	$F(2, 32) = 0.709$	0.500
<b>Highest qualification - n (%)</b>						
BNurs	1 (8.3 %)	2 (18.2 %)	2 (16.7 %)	5 (14.7 %)	$z$ range: $-1.864$ to $1.713$	$p$ range: 0.062 to 1.000
Certificate in neonatal nursing	0 (0.0 %)	3 (27.3 %)	2 (16.7 %)	5 (14.7 %)		
Additional qualifications	2 (16.7 %)	2 (18.2 %)	2 (16.7 %)	6 (17.6 %)		
Other (e.g., Nursing diploma)	8 (66.7 %)	4 (36.4 %)	6 (50.0 %)	18 (52.9 %)		
<b>Years of experience - n (%)</b>						
<5 years	4 (33.3 %)	5 (45.5 %)	3 (25.0 %)	12 (34.3 %)	$z$ range:	$p$ range:
5–10 years	6 (50.0 %)	2 (18.0 %)	6 (50.0 %)	14 (40.0 %)	$-1.600$	0.110
>10 years	2 (16.7 %)	4 (36.4 %)	3 (25.0 %)	12 (25.7 %)	to $1.600$	to 1.000

**Table 3**  
Parental visitation regulations in the NICU ward across hospitals.

Variable	Hospital A (Academic) n = 12	Hospital B (Private) n = 11	Hospital C (Tertiary) n = 12	Overall/ Total n = 35	Significant z Test Statistics	Significant p-values
<b>In-patient parents - n (%)</b>						
No visitation	4 (36.4 %)*	0 (0.0 %)*	2 (16.7 %)	6 (17.6 %)	2.211*	0.027*
Less than 1 h a day	1 (9.1 %)	0 (0.0 %)	3 (25.0 %)	4 (11.8 %)	–	–
1 h a day	6 (54.5 %)*×	0 (0.0 %)*	1 (8.3 %)×	7 (20.6 %)	2.872*	0.004*
					2.406×	0.016×
3 h a day	0 (0.0 %)	0 (0.0 %)	2 (16.7 %)	2 (5.9 %)	–	–
For as long as they wanted	0 (0.0 %)*	11 (100 %)*×	3 (25.0 %)×	14 (41.2 %)	–4.690*	<0.001*
					3.682×	<0.001×
I don't know	0 (0.0 %)	0 (0.0 %)	1 (8.3 %)	1 (2.9 %)	–	–
<b>Out-patient parents - n (%)</b>						
They were not allowed	3 (27.3 %)	0 (0.0 %)*	7 (58.3 %)*	10 (31.3 %)	–2.806*	0.005*
Less than 1 h a day	4 (36.4 %)	1 (11.1 %)	3 (25.0 %)	8 (25.0 %)	–	–
1 h a day	4 (36.4 %)*	0 (0.0 %)*	1 (8.3 %)	5 (15.6 %)	2.203*	0.043*
3 h a day	0 (0.0 %)	1 (11.1 %)	0 (0.0 %)	1 (3.1 %)	–	–
For as long as they wanted	0 (0.0 %)*	7 (77.8 %)*×	0 (0.0 %)×	7 (21.9 %)	–3.628*	<0.001*
					3.742×	<0.001×
I don't know	0 (0.0 %)	0 (0.0 %)	1 (8.3 %)	1 (3.1 %)	–	–

\*Asterisk (\*) and cross (×) are used to indicate respective significant differences.

**Table 4**  
Feeding methods prior to and during COVID-19 as reported by nurses.

Feeding method	Hospital A (Academic) n = 12	Hospital B (Private) n = 11	Hospital C (Tertiary) n = 12	Overall/ Total n = 35	Significant z Test Statistics	Significant p-values
<b>Prior COVID-19 – n (%)</b>						
Bottle feeding	1 (8.3 %)	3 (27.3 %)	0 (0.0 %)	4 (5.6 %)	–	–
Breastfeeding	5 (41.7 %)	2 (18.2 %)*	9 (75.0 %)*	16 (22.2 %)	–2.725	0.006*
Syringe feeding	4 (33.3 %)*	0 (0.0 %)*×	7 (58.3 %)×	11 (15.3 %)	2.107*	0.035*
					–3.037×	0.002×
Cup feeding	4 (33.3 %)*	0 (0.0 %)*×	6 (50.0 %)×	10 (13.9 %)	2.107*	0.035*
					0.035×	0.006×
Tube feeding	6 (50.0 %)	6 (54.5 %)	9 (75.0 %)	21 (29.2 %)	–	–
<b>During COVID-19 – n (%)</b>						
Bottle feeding	1 (8.3 %)	2 (18.2 %)	2 (16.7 %)	5 (6.9 %)	–	–
Breastfeeding	3 (25.0 %)*	4 (36.4 %)	8 (66.7 %)*	15 (20.8 %)	–2.048*	0.041*
Syringe feeding	4 (33.3 %)*	0 (0.0 %)*†	7 (58.3 %)×	11 (15.3 %)	2.107*	0.035*
					–3.037×	0.002×
Cup feeding	3 (25.0 %)	0 (0.0 %)*	7 (58.3 %)*	10 (13.9 %)	–3.037*	0.002*
Tube feeding	4 (33.3 %)*	2 (18.2 %)×	10 (83.3 %)*×	16 (22.8 %)	–2.484*	0.013*
					–3.125×	0.002×

\*Asterisk (\*) and cross (×) are used to indicate respective significant differences.

**Table 5**  
Identified themes and subthemes.

Identified theme	Identified subtheme
Changes in visitation regulations	No lodging allowed Fathers not allowed Change in visiting hours Only mothers allowed to visit NICU
Reduced parental presence and parent-infant interaction	Affected parent-infant bond Distressed mothers Parents weren't allowed in the unit No parents allowed in the NICU

or only on certain days. Mothers were sometimes only allowed into the unit at specific times and when needed, for example, by the doctor. Some nurses (n = 3; 8.5 %) reported that the reduced opportunity parents had to interact with their infants made them even more cautious when eventually allowed into the unit. Another factor that had an impact on the involvement of parents with their infants was the hygiene regulations, particularly the use of personal protective equipment i.e., masks. This can be seen in the following excerpts from nurses:

“Parents were scared that they were going to expose their sick babies to the virus if they hold them.” (Participant 3) “Mothers could only visit and breastfeed/RMC during specific times.” (Participant 6)

Findings demonstrate the impact that pandemic-related restrictions had on the involvement of parents in the care of their infants in NICU wards and highlight the importance of increasing their involvement amidst a restrictive pandemic.

### 3.2. Reduced parental presence and parent-infant interaction

Various regulations implemented in NICUs during the COVID-19 pandemic included limited visiting hours, parental access, and the number of visitors allowed in the unit. These regulations were reported to have impacted parental involvement in NICUs, for example, only mothers were allowed into the unit, while fathers were not allowed at all

## 4. Discussion

Findings from this study indicate that, from nurses' perspectives, the COVID-19 pandemic and related restrictions had a negative impact on parental involvement in the care of their infants in NICUs. This was due to reduced parental presence which may have been a hindrance to family-centred care for newborns at risk of less weight gain possibly

leading to delayed discharge. The consequences of these restrictions align with findings of two studies, from high-income countries, which also concluded that restrictions in NICUs limited parental presence and involvement (Karakul et al., 2022; Mahoney et al., 2020). Successful parental involvement in NICUs can only be facilitated when there is adequate parental presence (Pineda et al., 2018). In the current study, it was found that an asset-based approach was used in all three NICUs, whereby the consequences of the pandemic were reduced to improve healthcare outcomes through the use of resources available to the hospitals i.e., the parents to facilitate and promote parental involvement while simultaneously adhering to the regulations (Cassetti et al., 2019). Parents were allowed into the wards, however, their presence was dependent on their COVID-19 status and different lockdown levels; meaning healthy parents were allowed in the wards, but their visitation duration was limited.

Parents were not allowed to hold their infants, therefore, nurses reported parents were unable to interact or bond with their infants (Karakul et al., 2022). This directly had an impact on feeding methods used in NICUs, although these methods did not change significantly across all three hospitals, before and during the COVID-19 pandemic. In Hospital A (academic), nurses reported that syringe and tube feeding ( $n = 4$  of 12; 33.3 %) became prevalent during the pandemic, and breastfeeding ( $n = 3$  of 12; 25.0 %) decreased. These changes may be attributed to the reduced parental presence in the wards, leading to feeding being nurses' primary responsibility using such methods, as parents were not allowed in to breastfeed (Coutts et al., 2022). Hospital B (private) nurses reported breastfeeding ( $n = 4$  of 11; 36.4 %) became more prevalent during the pandemic. The fact that private hospitals used a less restrictive approach to visitation, compared to other hospitals may have facilitated increased breastfeeding practices. Breastfeeding plays an important role in parent-infant interaction and is believed to protect infants' immunity (Lubbe et al., 2020). The feeding methods used in Hospital B (private) were more parent-dependent as compared to Hospitals A (academic) and C (tertiary), where nurses used cup and syringe feeding to feed the infants which were less parent-dependent.

Restrictions to reduce the spread of the COVID-19 disease, including the need to quarantine when infected, led to changes in nurses' daily routines, which may have impacted the quality of care provided to infants in NICUs, especially feeding (Coutts et al., 2022). These restrictions also led to nurses developing feeding methods where they could feed more than one infant at a time, such as hanging syringes from drip stands and holding two infants at a time, because of units often suffering from overcapacity (Coutts et al., 2022).

Results from this study indicate to promote and maintain parental involvement in the care of their infants in NICUs, physical parental presence and an interprofessional team approach are necessary; especially with constant NICU healthcare professionals, i.e., nurses, facilitating this involvement. Caregivers are central to neonatal care regardless of pandemics that require social distancing. Emerging research is discovering the importance of physical parental presence in NICUs, especially in supporting and promoting feeding and early communication in NICUs (Harding et al., 2021). This study showed that, where possible, nurses and hospitals in South Africa strived to maintain a family centered focus in the wards, especially in the private setting. Parents were only prohibited if they were positive for COVID-19, indicating that hospitals from various settings promoted parental presence in the wards within safe boundaries.

Guidelines protecting parental presence in NICUs and encouraging parental involvement in feeding practices are becoming more prevalent (Australian Department of Health, 2022; World Health Organization & Human Reproduction Programme, 2022). Although the NICUs included in the current study permitted parents despite COVID-19 concerns, there is a lack of guidelines enforcing and protecting this involvement in low-and-middle-income countries, especially in the public setting (Saggers et al., 2020). Guidelines must therefore support nurses in promoting increased parental presence and involvement due to their salient role in

NICUs and continuously encourage safe hygienic practices (Saggers et al., 2020; Şimşek et al., 2022). Allowing parents in NICUs to feed their infants, will improve the interaction between them and their infants and promote a healthy caregiver-infant dyad. This will in turn promote adequate development as well as provide responsive caregiving, which is part of the main Nurturing Care Framework goals for children and is best facilitated by nurses (Daelmans et al., 2021).

There are limitations to this study, including that the cohort was small and results can therefore not be generalized. Changes within the COVID-19 period related to different alert lockdown levels were not explored and may show differences as they ranged from level five to level one. Future research on nurses' perspectives of parental involvement in NICUs should explore differences in perspectives between the day and night staff. Additionally, future research should also explore parents' perspectives on their own involvement in NICUs.

## 5. Conclusion

It is evident the COVID-19 pandemic impacted parental involvement in the care of their infants in NICUs during 2020 and 2021. This kind of involvement requires physical parental presence within safe boundaries and the restriction on parental presence in the wards significantly reduced parental involvement and parent-infant interaction, as well as family-centred care. To maintain and increase parental involvement in NICUs, guidelines for nurses that promote parental involvement, improve feeding strategies, and encourage safe hygiene practices, need to be revised and implemented worldwide, especially in the public sector of low-and-middle-income countries, despite barriers such as pandemics and/or natural disasters. Increased parental presence and parent-infant interaction will be beneficial to infants in NICUs and will promote appropriate neurodevelopment and family-centred care.

## CRediT authorship contribution statement

**Sthembiso Ncube:** Writing – review & editing, Writing – original draft, Methodology, Investigation. **Jeannie van der Linde:** Writing – review & editing, Supervision, Conceptualization. **Maria du Toit:** Writing – review & editing, Supervision, Conceptualization. **Marien Alet Graham:** Writing – review & editing, Formal analysis. **Renata Eccles:** Writing – review & editing, Supervision, Conceptualization.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data is available upon request from the corresponding author due to university regulations and consent taken.

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