The Experiences of Mothers in a Neonatal Unit and Their Use of the Babble App

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Abstract
To better understand the experiences of mothers with an infant admitted to a neonatal unit and ascertain their perspectives on an available information support app, Babble, eight mothers with an infant admitted to a Level II+ neonatal unit were interviewed. Thematic analysis was utilized and responses indicated that mothers of neonates experienced challenges around adapting to the maternal role and managing their expectations of motherhood. Relationships with staff were seen as pivotal in the development of maternal confidence and essential to the overall experience. Mothers prioritized informational support, but how mothers sought out this information depended on their individual needs. Mothers who reported using the Babble app found it to be a helpful supplementary resource, tailorable to their situation. Results suggest that greater staff awareness of parental perspectives and the development of adaptable and diverse resources, ensuring parents are provided with individualized and appropriate care, is needed.

Keywords
motherhood, neonatal, admission, Babble, information, staff

Introduction
For infants born with health difficulties or born prematurely, admission to a neonatal unit/neonatal intensive care unit (NICU) often occurs to ensure the infant is provided with the needed medical support and intervention that enables them to develop and thrive. Such hospitalization has, however, been associated with various adverse outcomes for the parents and the family as a whole (Carter et al., 2005; Davis et al., 2003). Parents of an admitted infant appear to experience greater distress (inclusive of increased anxiety, depression and trauma symptoms) when compared with parents of “healthy” infants (Carter et al., 2005; Gangi et al., 2013; Holditch-Davis & Shandor Miles, 2000; Obeidat et al., 2009; Treherne et al., 2017; Turner et al., 2015; Wigert et al., 2006). Parents specifically report fears for their infant’s survival and more generally, their future wellbeing, expressing that they feel out of control or helpless with regard to their parental role (Davis et al., 2003; Joseph et al., 2007).

Qualitative research has been prominent in the area of neonatal literature, likely due to the depth and richness of data that can be obtained through individual or group interviews (Al Maghaireh et al., 2016; Fenwick et al., 2008; Holditch-Davis & Shandor Miles, 2000; Obeidat et al., 2009; Treherne et al., 2017; Turner et al., 2015; Wigert et al., 2006). Reviews of qualitative studies exploring the topic have determined that almost all parents surveyed found the experience of neonatal admission stressful (Al Maghaireh et al., 2016; Obeidat et al., 2009).

Other common themes included parents report of stress related to the infant’s condition, difficulty with parental role alteration, and a general impact of hospitalization on parental psychological and emotional health (Al Maghaireh et al., 2016; Obeidat et al., 2009). Parents have additionally reported struggling with the balance of joy and grief, the disruption of parental expectations (specifically the denial of a “normal” experience with a full-term baby), and general challenges adjusting to the NICU environment (Arnold et al., 2013; Whittingham et al., 2014).

For mothers, the admission to a neonatal unit can be a particularly emotionally confronting experience. Mothers report struggling with separation from their infant, both physically and psychologically, as they are often unable to hold, touch or interact with their infant during their neonatal stay (Ballantyne et al., 2017). In particular, mothers of neonates expressed finding the adoption of the maternal role after admission challenging, reporting feelings of disenfranchisement and an impacted...
sense of “being a mother” (Fenwick et al., 2008; Lupton & Fenwick, 2001).

Mothers often develop expectations for their role as a parent during pregnancy, exploring and evaluating how they intend to perform this role (Reid, 2000). Thus, when events such as premature birth disrupt or delay their sense of identity as a new parent, mothers of sick or low birth weight infants appear to demonstrate less confidence in their parental role, as their expectations are not met (Reid, 2000; Singer et al., 1999). This loss of expected maternal role is evidenced as a key source of distress for mothers during neonatal unit admission (Al Maghaireh et al., 2016; Holditch-Davis & Shandor Miles, 2000).

The majority of research performed has focused on the experiences of parents of very medically fragile infant (those who are very premature or low birth weight infants) admitted to Level III units, also known as NICUs. Within a New Zealand context, there are six NICUs located in major centers, servicing a highly culturally diverse and geographically dispersed population. New Zealand additionally has multiple Level II+ units to support these higher level facilities. These Level II+ units provide care to infants born at or above 28 weeks’ gestation and born weighing 1,000 grams or above, or those discharged from a Level III unit, whose homes may be more conveniently located closer to a Level II+ unit. Given the unique nature of Level II+ units in the context of the New Zealand population, little research has been performed exploring parents’ experiences of these units. A Level II+ neonatal unit with 17 beds located in the Manawatū-Whanganui region, is the unit at the focus of the present work, with the goal of exploring the specific challenges faced by this group of parents.

A smartphone application (app), known as Babble, has been developed in New Zealand, with the aim of enhancing parents’ access to information and general support during their neonatal stay (Spargo & de Vries, 2018). Parents of neonates are reported to spend around 20 hr a week seeking out information, most commonly online, during their neonatal stay, suggestive of this population’s desire to access informational support (Orr et al., 2017). However, evidence suggests that there are concerns about the accuracy of much of the information provided online, and when under stress, parents report not knowing where to turn (Cleveland, 2008; Spargo & de Vries, 2018).

Several studies have explored new parents’ utilization and engagement with an app for meeting information needs. These studies found that the ability to easily access information helped support their learning, leaving them feeling more reassured and in control, thus improving their confidence (Danbjørg et al., 2015; Shorey et al., 2015). Recent literature suggests that parents are open to online initiatives, such as a neonatal care app (Williams et al., 2020). In light of these findings, the Babble app presents itself as a suitable support for this population, aiming to meet parental needs, supplement information from health care providers and support parental involvement in the decision-making process.

Although widely available, Babble is primarily used by those admitted to the mid-sized, urban Level II+ unit from which the app originates and those admitted to the largest Level III unit (NICU), located in the largest city in New Zealand. Babble provides information about the neonatal experience for parents, including information about the neonatal unit itself and care in general (Spargo & de Vries, 2018). Babble additionally includes other parents’ stories and parents are able to write journal entries, take photos and record key milestones, all of which can be shared with their friends and whānau through email or social media (Spargo & de Vries, 2018). At this stage, no research has been performed on how parents experience the Babble app and their views of its feasibility and usefulness during the neonatal experience.

Present Work

As reviewed here, the experiences of parents in the neonatal unit has been a prominent area of research for many years. Much qualitative research has taken place, exploring the impact of the neonatal admission and discharge process on parents. However, no research has considered the impacts of an app targeted at supporting parents during their infant’s admission to a neonatal unit, despite availability of such initiatives and the expressed desire of parents to access consistent and accurate information (Cleveland, 2008). Further, little has been done to explore the experiences of Level II+ unit settings, a unique neonatal context. The present study therefore has two primary aims: (a) identify and explore (from the parents’ own perspective) experiences in a neonatal setting, specifically in a Level II+ unit, and (b) assess the feasibility and usefulness of the Babble app across the neonatal experience.

Methods

Participants

Eight mothers admitted to the Level II+ unit of interest participated in an interview exploring their experiences of their admission, discharge, and Babble. Participants were aged between 22 and 35 ($M = 30, SD = 4.87$). Six identified as New Zealand European (Pākehā), one participant identified as Pākehā and Māori (the indigenous people of New Zealand), and another as American. Their infants were admitted for 15 days on average, and for reasons ranging from prematurity, hypoglycemia, small for gestational age, and intrauterine growth restriction. Five of the mothers interviewed reported having utilized the Babble app during the neonatal experience. Interviews lasted around 53 min on average and took place between 1 and 12 months post-discharge.
Procedure

Recruitment occurred between March 2019 to June 2019. Any parent with an infant admitted to the unit of interest (the mid-sized, urban Level II+ unit where Babble originates), for any reason and any length of time, in the previous 12 months was invited to take part. Recruitment took place through various avenues including posters in the unit, advertisements included in the Babble app, and letters sent to parents who had been admitted to the Level II+ neonatal unit of interest after March 2018. In addition, a specific invitation for parents was presented in a nationwide, online survey (a component of an overarching study looking at parental experiences of the neonatal unit and the role of the Babble app), should participants select they were admitted to the unit of interest. Via these recruitment means, 20 parents confirmed a time and date to be interviewed. Ethical approval for this research was granted by the Massey University ethics committee.

Interviews were held in a location of participants’ choosing; six participants opted to have the interview in their home, with one participant offering to host herself and another participant for their interviews. Two of the eight interviews were completed over Skype. Interviews were audio-recorded, and the interviewer took additional field notes. Recordings were then transcribed and identifying information removed.

Materials

A semi-structured interview schedule was used consisting of 5 topics, encompassing 29 open-ended questions. Questions focused on parents’ experiences of the birth (e.g., how was your pregnancy and birth experience?), the admission (e.g., what was the experience of neonatal admission like for you?), information access (e.g., how did you learn about your baby and the care they were provided?), the Babble app (e.g., how did you find the app to use?) and the discharge process (e.g., how was the discharge process for you?). General socio-demographic information was obtained at the beginning of the interview and data about the infant’s health and wellbeing was obtained through questions spread throughout the interview.

Analysis

Inductive thematic analysis, as per Braun and Clarke’s (2006) guidelines, was used to carry out qualitative analysis of the interview transcripts, to identify, analyze and report themes and patterns within the data. Braun and Clarke (2006) suggest that thematic analysis offers an accessible, systematic and theoretically flexible approach to analyzing qualitative data. Thus, it was considered an appropriate method for the present work. In addition, thematic analysis has been used widely to investigate parents’ experiences in the NICU, supporting this decision (Arnold et al., 2013; Russell et al., 2014; Treherne et al., 2017; Turner et al., 2015; Whittingham et al., 2014).

An inductive approach was utilized to avoid potential assumptions and biases and to ensure the findings were grounded in participant’s responses. In line with the Braun and Clarke’s (2006) thematic analysis method, transcripts were first read and then re-read, so as to allow for familiarization with the data. Initial codes of interest were then generated based on commonality and salience of responses across the data. These initial codes were organized in potential themes and were reviewed and refined in relation to consistency across the entire dataset. Finally, themes were named and defined with a written analysis completed to accompany each theme identified.

Results

Three key themes were identified pertaining to maternal experiences of the neonatal unit and their perspectives on their use of the Babble app. These themes were (a) becoming a mother of a neonate, (b) relationships, and (c) the power of information.

Becoming a Mother of a Neonate

Establishing a maternal identity, managing expectations, connecting with their infant and embracing the parental role were all identified as significant aspects of the neonatal experience related to motherhood. Mothers primarily found that the experience of being a parent in neonates was marred by feeling distant from their infant, experiencing negative emotions and a lack of control. In contrast, some mothers interviewed reported that they appreciated their neonatal stay for the time it afforded them to learn about their infant and the care they needed.

Expectations: “I Didn’t Know What To Expect And It Wasn’t What I Expected”

All mothers identified that their expectations of the birth and postnatal period impacted their neonatal experience. Around half of mothers interviewed reported that they were aware of (or expected) the need for admission, either as a result of their own research or medical professionals informing them during pregnancy. Those who were aware that the admission could be a possibility reported that this knowledge minimized the shock and allowed them to prepare for this experience, both mentally and practically (e.g., organizing caregivers for other children, protecting against negative emotions), with one mother reporting “from the start we expected to go so we wouldn’t be . . . I guess, disappointed?”
In contrast, mothers who were unaware of the need for neonatal admission reported significant distress and uncertainty when the admission occurred. The lack of knowledge and assurance experienced by these mothers meant that they were less able to prepare and consequently seemed more negatively impacted by the process as a whole. These mothers emphasized feeling that their baby was “taken away” and appeared to experience the absence of their infant to a greater extent, possibly attributable to the lack of opportunity to mentally prepare or put coping strategies in place prior to the birth. One mother stated that she had “no indication that there was going to be any trouble whatsoever and it’s like, I’m groggy, waking up from anesthetic, here’s your baby, oh no, we’re taking him away.” Even mothers who reported they were aware of the need for admission, considered there were aspects that they were unable to prepare for (e.g., infant being sicker or smaller than expected). These reports indicate that even when the admission is anticipated, there are often factors that are outside of a mother’s control that may impact their experience of the admission process and their understanding of their maternal role.

**Embracing Motherhood: Whose Baby Is It?**

A majority of mothers interviewed expressed an impacted sense of “feeling like a parent” and observed various effects on their sense of their own motherhood. Most mothers reported a prominent, omnipresent feeling their babies were not “theirs” while admitted. They often battled with feeling that they should ask for permission to engage in parenting tasks (e.g., picking their baby up, holding them or caring for them), which affected their sense of motherhood and bond with their infant. One participant considered this to be an incredibly difficult part of the experience, stating:

> Like you have to ask permission to hold your child. You can’t just go and pick them up, you have to be like oh is it okay? Is it okay if we pick him up now? Can we do this? Can we change him? Can we give him a bath? You know like everything.

Many mothers reported feeling as though they had no input in the admission or in the various care processes and decisions that followed, leaving them disempowered and uninvolved in their infant’s care and decision-making processes. When this occurred, mothers were more likely to withdraw and allow nurses to take over, feeling undermined in their role as a parent and their parental choices. Many mothers recognized that the nurses were simply doing their job and acting out of necessity, but still struggled with their perceived lack of parental autonomy and inability to “have a say” in the medical care of their infant, with one mother stating, “I feel like all of our decisions got taken away.”

Some mothers combatted the negative feelings associated with their diminished sense of parenthood by involving themselves fully in the care of their child, working to re-establish their position as the primary caregiver of the infant. One mother reported that her greatest coping strategy was “trying to make sure I was doing as much as I could for them, so that I didn’t feel removed from [them] or felt that somebody else was looking after them.” For her and others like her, this further grew her confidence in caring for her infant and her role as a mother, ultimately strengthening her relationship with her infant.

Mothers reported taking comfort and seeking reassurance from staff members during the early stages of admission, expressing that they did not want to question or challenge staff about their infant, or the care provided. For some mothers, this resulted in fear of taking over the parenting role as discharge approached, as they felt they had not grown into that role during the admission period, and therefore lacked confidence in their mothering abilities. Being discharged from the unit meant a need to learn to be a “parent” in a different context, without staff or readily accessible medical support. One participant reflected that “it was really easy to kind of just let the nurses be the experts and then all of a sudden it was like oh my god, I’ve got to do this myself.” However, through supported involvement and communication with staff, some mothers reported that they were able to make the transition to home easily and adjusted to their role as the parent more smoothly.

**The Emotional Fallout: “If I Wasn’t As Strong Of A Person As I Am, It Probably Would Have Definitely Broken Me. Like It Did Break Me For A Long Time”**

Many mothers reported experiencing varying degrees of emotional distress during their infant’s neonatal stay. These results indicate the diversity of the parental experience, both across different people and within one’s internal experiences. Almost all mothers reported some degree of emotional distress (e.g., crying, feeling worried or nervous), and some reported significant emotional distress (e.g., postnatal depression, anxiety, trauma responses). Being away from family and support systems were seen to be particularly challenging as articulated by this participant, “it was quite difficult in the sense . . . Like I struggled, ‘cause I couldn’t see my daughter, you know? That made everything worse. So, I quite often cried while in the hospital, like I struggled.” Even mothers who themselves did not experience significant emotional distress, acknowledged that aspects of the situation could have been highly distressing for themselves (under different circumstances) and expressed significant empathy for other mothers in more difficult circumstances.

Some mothers reported a concern with the lack of support available to them generally, as well as for their experience of emotional distress; one participant stated “I never actually got any help. And I feel like at the time I definitely needed it.” The reported lack of support indicated that some mothers
felt isolated and distressed during their infant’s neonatal stay, finding needs were going unmet in relation to aspects of their experience.

By “putting it into perspective” and “comparing their situation to other, smaller, sicker babies,” several mothers interviewed found they were able to protect themselves against significant stress or gain perspective in particularly stressful moments. This ability to “perspective take” was enhanced when there was an absence of visual cues indicating that their infant was unwell and other information mothers were able to obtain in that context to support their view (e.g., talking to nurses, talking to peers, seeing their baby get bigger and healthier). Mothers also spoke about recognizing that their baby was in the right place, staying relaxed, and maintaining their routine, as important ways in which they managed their mental state throughout the experience. One mother stated, “I think I was able to put it into perspective quite well. There were a lot of other really sick and really prem babies around us, whereas he seemed happy and healthy.”

Some mothers were unable to identify a specific coping strategy that protected against distress. For some, the nature of the experience is all-consuming and overwhelming, leading to a degree of avoidance of emotions to be able to manage. As one participant reported:

I kind of just bottled it down and pushed through? I felt like I didn’t really have another option . . . what was I meant to do like sit there and cry while I’m trying to learn to feed my son kind of thing?

**Relationships**

The impact of the admission on various relationships within a mother’s world was identified as a common theme throughout the experiences of the mothers interviewed. Changes across personal relationships were evidenced, and mothers often spoke of the relationship between themselves and other staff members, considering communication, support and connection as important to these interactions.

**Friends and Family/Whānau**

Just over half of the mothers interviewed reported some impact of their baby’s health status and admission on their relationships with their friends and whānau (family). Some mothers reported that their family struggled with the choices that were made within the neonatal context (e.g., some mothers limited extended family access to the infant while they were admitted). Others reported that family members found it difficult to interact with the baby after discharge, given the medical needs and appearance of the infant. Some mothers reported that they did not have a large amount of social support, due to wider circumstances unrelated to the neonatal admission. These mothers acknowledged that this lack of support was difficult and spoke of being saddened by this. Perceived lack of social support reportedly increased mothers’ feelings of isolation and increased distress, compounded by disrupted expectations of the parental experience and the experience of a “different” postpartum period. One parent reported that others found it difficult to empathize and understand what she had been through, distancing her from her usual support people. Another participant echoed this sentiment, stating “it was really hard to explain to someone how . . . what happened and how you’re feeling at the time? And for them to fully understand how, and what was going on. And I didn’t feel like they were listening.”

Several of the mothers interviewed additionally acknowledged an impact of the neonatal admission on their parenting of their other child(ren). Specifically, siblings of an admitted infant were reported to find the time their mother spent away from them difficult; and mothers reported finding it hard to manage their other children’s needs, alongside the needs of the admitted infant.

When significant others were considered, the majority interviewed reported that the experience had a positive impact on their relationship with the baby’s father, their partner. These mothers reported that they turned to their partner for support and found that this was a positive influence on their experience.

**Relationships With Staff: “The Staff Are Definitely The Star Of The Show”**

The importance of the relationship that is built between staff and parents and the communication that takes place within this relationship was evident across each interview, emphasized by the prominence of staff interactions within maternal narratives.

Most mothers interviewed reported various negative and anxiety-provoking incidents related to a perceived lack of communication during their neonatal experience. These reports of poor communication included, but were not limited to, staff communication with mothers, communication with other services and communication within the neonatal service. Perceived poor communication was seen to extend beyond content, into tone, timing and the mothers’ pre-existing relationship with the deliverer of information. One mother found her experiences of poor communication from staff challenging, stating, “just being told what happened or what was going on . . . it would have been nice.”

Mothers found the perceived lack of communication became more pronounced as they approached discharge. Some mothers reported that they considered they were not given adequate information about discharge or their infant’s needs; as a result, from their perspective, further care or management that was required was missed out on. These experiences left mothers feeling confused and worried about their infant’s future wellbeing. In addition, in these instances, mothers struggled to come to terms with the avoidable nature of the perceived miscommunication.
Despite these incidences of reported poor communication, the majority of mothers reported that staff (namely nurses), and the relationship they developed with these staff members, were essential supports throughout their neonatal experience. The nature of these findings reiterates the importance of staff communication and relationship building throughout their infant’s admission for mothers. Examples where communication was poor were readily recounted, likely due to the negative impact on the mother’s confidence, general wellbeing and overall experience. Conversely, examples of where staff were supportive and helpful were also readily remembered, due to their significant positive impact on the mother’s confidence, general wellbeing and overall experience.

Overwhelmingly, mothers reported that the nurses who cared for their infants were “lovely,” ‘amazing’ and “supportive.” Mothers identified specific traits such as calmness, confidence, knowledge, trust and willingness to help, as essential to enhancing their neonatal journey. These traits helped mothers feel connected to, and thus, able to build relationships with staff, which in turn, helped them feel more supported and confident. Mothers reported taking comfort in staff expertise and found that staff being accommodating and willing to answer any question increased their sense of capability in their maternal role. Acknowledging the important informational role that staff play, one mother stated, “the nurses, I think were the biggest information [source]. They’re like the whole world in there!”

Mothers were quick to acknowledge when they felt staff had gone “above and beyond” what was considered required of them. These incidents were reported to be the most meaningful and memorable for mothers. Mothers identified things such as: listening to parent requests; supporting feeding and caring for the infant; helping mothers with practical things (e.g., food, payments, parking); and taking the time to explain things, as all aspects of nursing they would consider “going above and beyond.” A participant recounted that

she [a nurse] taught me how to feed them both together which was incredible because I know that’s completely outside their scope as a nurse, but she made me being able to feed them together possible. Which was just incredible.

These examples of “going above and beyond” left mothers feeling supported and encouraged in their parental role, enhancing their experience in general.

**The Power of Information**

A significant portion of the interviews discussed the important role of information for mothers of neonates, specifically how information helped empower mothers and build their confidence. The Babble app was cited by those who used it as one such essential information source, and parental perspectives on the app are discussed in-depth as a subtheme here.

**Information-Seeking Behavior**

Over half the mothers interviewed reported the importance of researching and gathering information as a way to manage their neonatal journey. These mothers acknowledged their personal informational needs and engaged in information-seeking behaviors accordingly. Some considered themselves as people who needed to know everything, and others considered themselves as needing to manage their information intake to avoid feelings of anxiety. One mother embodied the former, stating “I’m someone who likes to be prepared for everything. So, I did a lot of research online myself, like talking to other people who had had their twins early.” Another spoke to the importance of managing herself with regard to the information she accessed, “I really have a tendency to overthink, so I have to be careful to get the right balance of getting the right information versus overinforming.”

Information sources that were referenced were primarily staff, the Babble app, the internet, peers, and social media sites dedicated to mothers in neonatal units. Given the lack of control and disempowerment mothers reported feeling at times, getting as much information as they were able to may be seen as a way of mothers attempting to gain control over the situation and an understanding around the experience of parenting a neonate in general. In addition, mothers also reported that the manner in which information was delivered was important to them in helping them feel in control and capable in their role.

Mothers acknowledged that they often engaged in information-seeking behavior prior to admission (e.g., while in the maternity ward, awaiting induction) and spent significant time gathering as much information as possible. Mothers acknowledged the importance of balancing the information they gathered from less reliable sources such as Google, recognizing there is a large amount of variability with regard to trustworthiness in the information available through such mediums. Being provided with inaccurate information was considered to be destabilizing and disempowering. Comparatively, accurate, consistent and understandable information, (like that available from staff or the Babble app), was rated as highly important for mothers to feel empowered and in control during their neonatal experience.

**The Babble App**

Of the eight mothers interviewed, five actively used the Babble app during their infant’s admission. Some of those interviewed who did not use Babble expressed thoughts around the app and provided an explanation as to why they did not use it. Their perspectives have therefore been included when considering this theme. Use of the Babble app was seen by mothers to empower and support their experience, by providing them with accessible, trusted information.

Mothers who used the app reported it to be a useful supplementary tool alongside the information provided by
nurses and other staff members involved in maternal care. They identified that it met several of their needs, including the ability to research and educate themselves in their own time, share in peer experiences, get visual guidance on different aspects of the care and provide a starting point for gathering more information. Mothers reported appreciating that the information came from a trusted source and allowed for consolidation of information they had received from nurses, doctors and other staff. In addition, the provision of other families’ stories outlined in the app was seen as important in preparing them for what their own journey could look like. The visualization elements provided in the app further helped parents become more familiar with and provided context to, some of the more challenging visual stimuli present in the unit. One mother stated, “it was good to see what a baby looks like with a CPAP on and stuff, ‘cause I can’t really visualize that.”

Mothers also spoke about the delivery and manageability of the information provided, finding that what was included in the Babble app was relevant and easily understood. One participant said:

The information that’s in there [the Babble app], was really relevant and not too in-depth that you got lost, and you couldn’t understand it because I guess, that’s where you should be asking the nurse or the doctor.

By providing a resource that mothers could access in their own time and on an as-needed basis, the information provided in the app reportedly helped mothers feel more confident and comfortable in the neonatal environment. The ability to review and reconfirm the information provided by staff was highly praised by parents, with many mothers using the app proactively, as is indicated by one mother stating: “I had questions for the nurse when she came in because I’d read about it you know [on the app], and I could go more into detail with it.”

In addition, some mothers reported that their partners used the Babble app also, and this was beneficial for them as they were not always able to be involved or present in the unit and care of their infant to the same extent. In these cases, the app provided support to other family members who are typically disempowered throughout the neonatal experience, but, when empowered with information, are then more capable of supporting the immediate family, leading to a reduction in these parents feeling isolated and alone.

Mothers who did not use the Babble app referred to it as “not being what was wanted or needed.” These mothers reported thinking that it was not targeted at them (e.g., for sicker babies only), or that they did not have the time to go through the app as they were only admitted for a short period of time.

**Discussion**

The present work identified three main themes encompassing the maternal experience of a Level II+ neonatal unit in New Zealand and their perspectives of the Babble app. As identified, mothers spoke to the impact of the admission on their sense of motherhood, altering their expectations and views of their role and relationship with their infant. Commonly, mothers also identified the importance of staff support, specifically the essential nature of communication and connection within staff-parent relationships. Mothers also expressed the importance of information in empowering them and enhancing their security in their parental role. Specifically, the Babble app was cited as an important supplementary tool, for use in conjunction with staff support.

Although the present research uniquely explored the experiences of Level II+ units in New Zealand, many of the findings of past research across varying neonatal levels were echoed. Mothers in our study reported some emotional distress associated with the neonatal experience, similar to that of past work performed internationally (Al Maghaireh et al., 2016; Obeidat et al., 2009). Such similarities are indicative of the universality of aspects of the neonatal journey and suggesting that perhaps the level of unit has little impact on the overall experience itself.

Previous work has repeatedly identified the difficulties mothers have with the adoption of the maternal role following neonatal admission and the impacted sense of “becoming a parent” that many parents report (Al Maghaireh et al., 2016; Holditch-Davis & Shandor Miles, 2000; Lupton & Fenwick, 2001; Miles et al., 1992; Russell et al., 2014; Seideman et al., 1997). Mothers in the present work expressed similar sentiments but identified that engaging in parenting tasks and asserting themselves as the parent were helpful strategies in supporting their maternal identity. Such proactive involvement echoes past research determining that performing parental duties were seen to help parents better assimilate to the parental role and connect with their infant (Heydarpour et al., 2017; Lupton & Fenwick, 2001; Russell et al., 2014; Wigert et al., 2006).

In alignment with previous work, mothers in the present study emphasized the relationships developed with staff members as essential to their experience (Russell et al., 2014). One parent identified that staff are “the whole world in there” and this sentiment was evident throughout many of the responses given. The importance of staff communication was reiterated, with mothers expressing the value of clear, warm, considered and accurate information being provided to them by staff. Communication was seen to be highly influential on parental perception of the general experience of admission, with good communication being seen as significantly improving the experience, and bad communication significantly worsening it. Beyond communication, mothers identified that staff investing time into building relationships with them and “going above and beyond” allowed mothers to learn more than they would have otherwise, and as a result, their confidence as a parent developed, and their general wellbeing improved. Considering the consistency with which parents report the importance of communication and staff
relationships, the integral nature of staff to the experience of being admitted to the unit is clear and important for units to reflect on, to ensure the best care is provided.

Mothers placed significant emphasis on staff relationships and interactions, indicating that the Babble app did not replace human connection, with staff being the primary support sought. Although parents reported positive experiences with the Babble app, as a one-dimensional, electronic resource, it is incapable of replacing these rich and multi-layered connections. As not all mothers interviewed here used the Babble app, the findings around its usefulness may not be truly reflective of its potential. Only just over half the sample utilized the app; perhaps future research looking at a wider population of app users may be more appropriate to determine its efficacy.

Our findings thus emphasize the importance of individualized care, and the importance of recognizing each parents’ informational needs; some parents will not find the app helpful or necessary and will prefer staff contact exclusively. Parents within the unit need to be considered as individuals with unique preferences; some parents may want all the information they can access, and others may find that overwhelming. Several studies have explored such a concept, supporting the nuances of individual informational needs and coping styles evidenced here (Lalor et al., 2008; Miller, 1980; Miller et al., 1988). Striking the balance between the provision of necessary support, and overwhelming parents with excessive information was identified as essential for improving parental experiences. Our findings suggest that an app, like Babble, may be capable of meeting parental needs across this continuum, given it is up to parents how much they use it.

Interestingly, mothers in the present study spoke to the impacts of the neonatal admission on their wider family. Consistent with previous research looking at the hospitalization of children with chronic illnesses, the mothers in our study spoke about the difficulties that extended family or grandparents had with managing the infant’s hospitalization (Nabors et al., 2018). Mothers reported that some of their family members struggled with their choices about the care of the infant or found it difficult to interact with the “sick” infant, due to medical needs or the appearance of the infant. Some research has been performed around the impact of the infant’s admission on the siblings of the infant (Camhi, 2005; Latva et al., 2007). Although such exploration was beyond the scope of the present work, our research uniquely found mothers considered the admission had impacted their relationship with their other children. These mothers found it difficult to manage their other children’s needs while the infant was admitted, and as to be expected, these children found spending time away from their mothers and newborn sibling difficult. A better understanding of familial perspectives, and how to better support these groups, is essential to ensure they are best placed to then support the family of the hospitalized infant.

It became evident throughout the interviews that there were some common aspects to the experience of having an infant admitted to a neonatal unit across the mothers interviewed. However, these experiences were also overwhelmingly diverse and affected by many different factors, inclusive of individual vulnerabilities, resource access and different support. All mothers interviewed asserted that their own experiences, independent of the neonatal experience, and other life factors (e.g., family conflict, relationship breakdowns, relationship difficulties, and financial stressors), were influential on their neonatal journey. Given the varying degrees of emotional distress reported, individual vulnerabilities and wider circumstances should be taken into consideration for any future targeted support.

The importance of staff building relationships with parents, and communicating appropriately within that relationship, were key takeaway points from the interviews. Balancing expertise and empowering parents are essential for staff to ensure that infants leave the unit accompanied by confident and capable parents. For parents, relying on staff expertise, and balancing this with developing their own skills, requires a gradual release of responsibility by staff, and an increase in responsibility for parents. It was clear from the interviews that, from the mothers’ perspectives, all parties wanted the best for the infant; therefore, this shift of power was essential (yet difficult at times) as staff and parents navigated and negotiated the needs of the admitted infant and their roles within the neonatal context. These findings highlight that staff involvement and positive interactions cannot be emphasized enough as essential to supporting parents; better understanding the maternal views on these relationships may be useful to help staff better understand the patient-family perspective.

Mothers described engaging in various approach (leaning into the experience and taking on caring tasks) and avoidance (sitting back and letting staff take over) coping tactics. Some mothers identified their own tendency to “push through,” potentially predisposing them to experience any negative emotions later on, once discharged and away from support. Staff noticing those who withdraw or who are “pushing through” may be an important step to provide necessary support to enhance parental wellbeing and the parental relationship with the admitted infant. The accounts outlined in this study may be useful for staff to educate themselves with, working to identify signs that parents under their care may be taking an avoidance approach. Staff should take note of the importance of parent-staff relationships and consider the role that this relationship plays in building confidence and supporting parents more generally. However, given the pressures on staff and the importance of staff within the neonatal experience, learning more about staff perspectives and focusing future research to the wellbeing of staff as a key resource may be an interesting and unique take on the neonatal journey.
Mothers spoke to the provision of, and access to, information as key in empowering them in their parental role. In previous studies, mothers have identified the importance of information in their experiences (Ballantyne et al., 2017; Cleveland, 2008; Heermann et al., 2005; Vazquez & Cong, 2014), but the consideration that the information provided helped empower them in their maternal role and management of the neonatal experience appeared distinctly framed within the present work. Mothers in previous studies, as well as the present study, have repeatedly reinforced their need and desire for clear, coherent and consistent information (Aagaard & Hall, 2008; Cleveland, 2008). Given the emphasis on information and evidenced need for it, health care professionals and units should consider how best to ensure that parents are provided with appropriate and accurate information throughout their neonatal stay.

Babble was uniquely profiled in the present study, and as such, the present work opens the door for future research around such initiatives targeted to support parents in the neonatal unit. Parents who used the app viewed it positively and considered it to be a useful addition to the information and support provided by staff. Mothers found the ability to access information in their own time (as needed) empowering; meaning they were more prepared and readily able to advocate for themselves and their child. Most commonly, the app was cited as a resource allowing parents to return to, and consolidate information provided by staff. Rather than replacing the relationship between staff and parents, the app was seen to support information provided within the context of that key relationship. Mothers recommended its use as an adjunct to traditional care formats (as it is designed for) and thus, promoting and introducing it as such is important. Our findings suggest that introducing the app as early as possible is helpful to parents, allowing them time to prepare and explore information related to the possible admission at their own pace, with several mothers reporting using prior to the birth was helpful.

**Limitations**

Interviews with parents were conducted between 1 week to 1-year post-discharge from the neonatal unit. As there is significant variation in time passed since admission, it is possible that the experiences reported by mothers who were admitted longer ago were possibly less reliable. However, other research has utilized similar timeframes and found that as the neonatal experience is particularly monumental, details are remembered well (Russell et al., 2014; Wereszczak et al., 1997).

The use of the qualitative approach was deemed appropriate to gather a rich data set, allowing parents to express themselves in-depth and gathering nuanced descriptions of the experience. Mothers who participated in the research were highly motivated and eager to be interviewed. Although attempts were made to include hard-to-reach participants, the majority of those interviewed were well-educated mothers. In addition, the experiences outlined here focus on the experiences had by parents in a small, regional neonatal unit, therefore indicating potentially a lack of generalizability to bigger cities or bigger units within New Zealand. The themes found here are tied to the participants included and the time period collected, providing specific accounts as to the experiences of mothers in a Level II+ unit in New Zealand.

Although fathers were invited to participate, exclusively mothers opted to take part in the present research, thus, omitting the paternal voice. Mothers interviewed reported that fathers of the infant felt excluded from their care and perceived that their needs went unmet, with the primary focus of staff being on the maternal experience. Fathers were also theorized (by the mothers in this study) to benefit from the Babble app, with two mothers reporting that their partners used and appreciated the Babble app, given their feelings of exclusion from traditional care formats. In light of recent events, specifically the COVID-19 pandemic, it is likely that resources such as the Babble app are even more pertinent for parents, in particular fathers, where access to infants in neonatal units has been significantly limited to prevent infection.

**Future Research Perspectives**

As aforementioned, greater research into a wider population of Babble app users, would likely support and expand on the findings presented here. Further research looking at the experiences of fathers and the wider networks surrounding families experiencing neonatal admission, including the siblings of the admitted infant, is needed to better understand the context surrounding parents admitted to neonatal units. In addition, exploring paternal perspectives of the app may be worthwhile to further understand the role of Babble for wider family members as well as the ways in which it may be able to bridge the gap between parent and unit, especially in unique circumstances, such as those presented by the COVID-19 pandemic.

Future research looking at the role of psychosocial assessments for parents designed to best understand their unique situation and needs may be warranted in light of the findings presented here, and the significant emotional reactions and feelings of isolation and distress identified. Further explorations of other neonatal perspectives (e.g., Level III, Level II, bigger cities, exclusively rural populations) may be supportive to this aim, to develop a greater understanding of different parents unique needs and experiences.

**Conclusion**

In conclusion, our findings largely suggest that mothers find managing their expectations and developing a sense of their own motherhood particularly challenging in the context of the neonatal unit. Strong connections with family and staff,
and the importance of clear communication was identified as essential in helping mothers manage throughout the admission. Mothers emphasized the importance of information and utilized a variety of information-seeking styles, aligning with their individual needs. The Babble app was seen by users as an essential adjunct to personally delivered information in the context of supportive relationships, and as a way to enhance relationships with other family members and friends, through the sharing of information. Such findings suggest it is essential for health care professionals to recognize the role of their relationships with parents, consider the individual needs and experiences of parents, and develop targeted support informed by these perspectives to improve outcomes for this population.

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**Ethical Statement**

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