

Postpartum Health Services Requested by Mothers with Newborns Receiving Intensive Care

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Abstract *Objectives* Our pilot study aimed to build knowledge of the postpartum health needs of mothers with infants in a newborn intensive care unit (NICU). *Methods* Between May 2008 and December 2009, a Certified Nurse Midwife was available during workday hours to provide health care services to mothers visiting their infants in the NICU at a large tertiary care center. *Results* A total of 424 health service encounters were recorded. Maternal requests for services covered a wide variety of needs, with primary care being the most common. Key health concerns included blood pressure monitoring, colds, coughs, sore throats, insomnia and migraines. Mothers also expressed a need for mental health assessment and support, obstetric care, treatment for sexually transmitted infections, tobacco cessation, breastfeeding assistance, postpartum visits, and provision of contraception. *Conclusions* Our study suggests that mothers with babies in the NICU have a host of health needs. We also found that women were receptive to receiving health services in a critical care pediatric setting. Intensive care nurseries could feasibly partner with in-patient mother–baby units and/or on-site obstetric clinics to increase access to health care for the mothers of the high-

risk newborns in their units. Modifications should be made within health care systems that serve high-risk infants to better address the many needs of the mother/baby dyad in the postpartum period.

Keywords Postpartum visit · Postpartum health care services · Neonatal intensive care unit · High-risk population · Maternal health

Significance

The early postpartum period is challenging for most new mothers. For mothers with a hospitalized infant, the challenges may be amplified. For this group of mothers, effective postpartum and interconception care has the potential to improve maternal health, pregnancy spacing, infant care, and future birth outcomes. However, more information is needed about the health needs and health-seeking behaviors of at-risk mothers of medically fragile infants. Our study contributes to this research need and demonstrates a potential system-based solution.

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Background

The postpartum period is often a stressful time for new mothers. In addition to learning how to care for their new infants, many women face significant personal health and social needs. This period can be even more challenging for mothers who experienced a poor birth outcome, given their increased likelihood of pregnancy- and/or delivery-related complications, disrupted postpartum recovery, and the inherent stress of having a hospitalized infant [6, 8, 12, 18].

New mothers report a host of postpartum health issues, including fatigue, breast tenderness, stress, backaches, headaches, pain at cesarean-section site, hot flashes, respiratory infections, urinary incontinence, perineal pain and infections, postpartum blues and depression, and dizziness [1, 2, 10–13, 18]. Ansara et al. [2] highlight that research on women's postpartum physical health tends to focus on maternal mortality or life-threatening conditions, yet in their study of 200 women, they found that 96 % reported at least one physical health problem 2 months postpartum, with excessive fatigue, bad headaches, and backaches being the most common. Webb et al. [26] found physical health problems consistently associated with both functional impairment and poor emotional health among postpartum women.

Limited research is available on the postpartum health needs of mothers with newborns receiving intensive care. The published literature tends to focus only on the mothers of preterm and/or low birth weight babies [11], overlooking an important cohort of mothers who have infants with congenital anomalies and other serious health conditions that also result in extended neonatal intensive care (NICU) stays. Additionally, the extant literature is largely limited to mental health and stress related issues for mothers of newborns in the NICU, neglecting the physical health issues that often coincide with a complicated birth and require postpartum management.

This is a critical gap, as maternal health concerns and obstetric complications are more prevalent among mothers of preterm infants. In recent analyses of delivery records sampled from 25 hospitals within the maternal-fetal medicine units network [3, 23], birth of a preterm infant at 23 to <34 weeks was associated with higher rates of pre-gestational diabetes, hypertension, tobacco use during pregnancy, and c-section than birth of a term infant. Compared with birth at 39 to <40 weeks, birth of an infant at 23 to <34 weeks was associated with a 9.10-fold odds of severe maternal morbidity [13]. Reddy et al. [23] found higher rates of composite serious maternal complications among mothers of infants born at 23–27 weeks (11.5 %), compared with those born at 28–31 (9.5 %) and 32–33 weeks (6.3 %), $p < .001$. These analyses underscore the degree of medical need among mothers of medically fragile infants who must recover from birth and manage their chronic health conditions while caring for a critically ill infant.

Postpartum women in general may be less likely to attend to their own needs due to the pressures of motherhood and to attention focused on the baby [19]. A study by Bialoskurski et al. [6] suggests that mothers of infants in the NICU frequently rank their own needs second to those of their infant and prioritize health-related information about their baby. Phillips et al. [22] demonstrated that mothers in the NICU benefit from enhanced support to

encourage healthy behaviors such as staying smoke-free and continuing to breastfeed. Additionally, while postpartum depression affects approximately 13 % of new mothers [21], mothers of preterm infants are at greater risk, with up to 40 % experiencing postpartum depression [25]. Mothers of NICU infants are at increased risk for psychological distress [24], high anxiety [4], and symptoms of posttraumatic stress disorder [15], and many experience health issues that can persist for months following hospital discharge [4, 15, 24]. Bennett et al.'s [5] Medicaid claims data analysis after complicated birth finds, "Innovative postpartum health care delivery models have potential to target women at highest risk, improve utilization of recommended post-delivery preventive health services, and ultimately, to reduce women's development of obesity, diabetes and heart disease".

For mothers who have experienced a high-risk pregnancy, a potentially traumatic birth experience, disrupted postpartum recovery and a hospitalized infant, health challenges postpartum may be amplified. Effective postpartum and interconception care provides the opportunity to improve maternal health, pregnancy spacing, and future birth outcomes. However, there is limited research on the health needs and health-seeking behaviors of this group of mothers. To address this gap, our study aimed to increase knowledge of the reported health needs of mothers with infants in a NICU and explore one method for enhancing access to health services.

Methods

Project Setting

This study was conducted in a Level IV NICU embedded in a large tertiary academic medical center, physically located next to the labor and delivery unit. The NICU offers all Level III capabilities as well as surgical repair of complex congenital or acquired conditions and a full range of pediatric medical and surgical subspecialists and pediatric anesthesiologists on site. The medical center also offers comprehensive prenatal care, including maternal-fetal medicine specialty services, serving a large catchment area. This NICU is not structured to provide private infant rooms or beds for mothers to support overnight rooming-in.

Our research was conducted from May 2008 through December 2009. During the time of this study, approximately 700 infants were admitted each year to the 58-bed unit, with an average stay of 19 days. Seventy percent of the infants in the unit were born at the hospital, while 30 % were transported from other hospitals. Forty-two percent of the infants were white, 23 % were African American, and 13 % were Hispanic. Medicaid insured the majority of the

infants. Mothers of the NICU infants came from 50 counties within the state and from two neighboring states.

Baseline Assessment

Prior to beginning our research, an advisory council was formed to provide information and guidance to the study. Members included the NICU medical director, nurse manager, and discharge planner; the March of Dimes Family Support Coordinator; parents; and representatives from lactation, psychiatry, genetics, and maternal-fetal medicine. Interviews were conducted with the advisory council to assess the standard services offered to NICU mothers. We found that NICU staff routinely send mothers to the Emergency Room for their urgent health matters and/or encourage them to see their local health care provider for less urgent matters. Mothers with babies in the NICU do not receive priority services in the Emergency Room and may experience extended waits for care. Lactation support is provided to mothers as they visit their babies in the NICU, but lactation consultants have limited access to clinicians who can prescribe needed medications. Screening for depression and tobacco use is not routine, but mothers with urgent mental health issues are referred to a psychiatric nurse practitioner for evaluation. The prenatal clinic does not track postpartum utilization rates and does not proactively reach out to mothers who experience a poor birth outcome. The advisory council acknowledged that the mothers of babies in the NICU had needs that were not routinely assessed or met. Further, there was a lack of “ownership” in terms of which providers might assume responsibility for caring for this group of women.

Design

Based on input from our advisory council, we developed an intervention to deliver health services to mothers of NICU infants. Services were made available to all mothers of infants in the unit free of charge, with the aim of broadly assessing the health needs of the mothers based on their proactive seeking of study services. This pilot study also sought to ascertain clinicians’ ability to meet those needs. During the study period, a certified nurse midwife (CNM) was available to provide care for mothers with babies in the NICU on weekdays from 8a.m.–6p.m. Participants included mothers of NICU babies who were born at the hospital and those whose babies were transferred to the hospital for care, regardless of an infant’s diagnosis or length of stay. Mothers who had a health need and requested care received a visit from the CNM at their baby’s bedside. The midwife listened to their concerns and provided consultation and services, including referrals. When possible, the midwife provided services to the woman in the NICU setting. If a

more extensive clinical examination was required, the woman was seen in a private room in the prenatal clinic located elsewhere in the building. Our research was reviewed by the University of North Carolina’s Institutional Review Board and considered exempt. No consent was required because we did not collect any identifying information about the women for study purposes.

Recruitment and Data Collection

Postcards describing the available service and providing basic wellness messages were given to mothers upon their infant’s NICU admission. The messages were framed to highlight how a mother’s health influenced her ability to care for her infant, with the slogan “Taking care of you so you can take care of them”. The CNM conducted in-service presentations for NICU nurses about the study and about the general needs of postpartum mothers. These nurses have the most extensive contact with mothers, and they rapidly became the primary referral source. The nurses were pleased to have a readily available resource for the mothers, as they reported seeing maternal health concerns yet feeling frustrated that they could not do much to help. The CNM’s pager number was on the postcard, on chart stickers, and posted around the NICU, and her schedule was modified so she could attend to mothers quickly. The CNM recorded basic information about each health care encounter in a study database, including: the services delivered by the CNM, location of service delivery, length of time for service provision, and if a referral for additional care and/or a prescription were provided. In this study, services provided to the women served as a marker of their expressed health needs.

Results

Population Served

During the study period, a total of 424 health care encounters were recorded, an average of 21 encounters per month. Some women may have experienced more than one encounter during the study period, and more than one service may have been provided per encounter. As described in Table 1, the most common service requested by women was for primary care, including chronic disease screening and management (i.e. blood sugar screening, blood pressure monitoring), diagnosis and treatment of minor infections (i.e. strep throat and lower respiratory infections), and management of headaches and backaches.

Mental health assessment and support included screening for depression, anxiety and trauma and referring to the

Table 1 Health services requested and accessed by NICU mothers during encounters with the certified nurse midwife (n = 424)

Services provided during encounters ^a	Number of encounters in which the service was provided	Proportion of total encounters (n = 424) (%)
Primary care	179	42
Mental health assessment and support	95	22
Obstetric care	88	21
Breastfeeding support	67	16
Family planning	61	14
Postpartum visit	31	7
Nutrition assessment and counseling	14	3
Bereavement counseling and support	7	2
Tobacco cessation counseling and treatment	7	2
Assistance with health insurance	7	2
Sexually transmitted infection screening and treatment	4	1
Dental care	3	<1
Other	2	<1
Domestic violence assessment and referral	1	<1

^a Services from more than one category were often provided during a single encounter

perinatal mood disorders clinic. Obstetric-related care included any post-delivery services in response to sequelae from labor and delivery, such as cesarean section incision checks, concerns about bleeding, and episiotomy pain. The most frequently reported obstetric problem was with cesarean-section incisions (61 % of obstetric services). Postpartum visits and family planning services were categorized separately. The CNM provided 31 postpartum visits (7 % of encounters) for NICU mothers. Family planning services (14 % of encounters) included conversations focused on reproductive life planning and provision of contraceptive methods, including insertion of intrauterine devices and contraceptive implants.

Despite the fact that there was no systematic tobacco use screening of mothers of hospitalized infants, the CNM provided tobacco cessation assistance during seven encounters, in line with prior research demonstrating that an infant's NICU stay can be a window of opportunity to encourage parental cessation [17]. Another commonly requested service was assistance with breastfeeding (16 % of encounters). Additional services provided by the CNM included assistance with navigating health insurance, nutrition counseling, bereavement support, and referral for intimate partner violence. Oral health care included dental screening and assessment then referral for acute oral health issues.

Forty percent (n = 170) of the encounters resulted in at least one prescription. The types of prescriptions ranged from antibiotics to oral contraceptives, migraine medication, anti-hypertensives, and nicotine replacement products. Fourteen percent (n = 59) of the encounters resulted

in at least one referral to additional specialty services, largely for mental health or lactation services. As described in Table 2, the length of time the midwife spent with each woman ranged from less than 10 min to several hours, with 37 % of women's needs in an encounter being met within 10 minutes. Although the majority of the encounters were less than 30 min, some women presented with very complex situations and required up to four hours of attention to address their needs. Encounters for services such as blood pressure monitoring and c-section wound checks were most likely to be brief and provided at the infant's bedside. The longest encounters were for more complex situations, such as finding emergency dental services.

We found that the women were initially very reluctant to leave their infants' bedsides to receive health care services. Therefore, almost a third of the care was provided to

Table 2 Characteristics of clinical encounters

	N (%)
Duration	
Under 10 min	155 (37 %)
10–30 min	87 (21 %)
Over 30 min	182 (42 %)
Location	
Infant's bedside	122 (29 %)
Prenatal clinic	302 (71 %)
Services delivered	
Referral to specialty provider	59 (14 %)
Prescription	170 (40 %)

mothers in the NICU setting. Privacy did not appear to be a great concern, as curtains could be drawn around the infant's bed during maternal assessment and treatment. For some mothers, care began and ended at the infant's bedside. Following initial assessment near their baby, other women agreed to go to a different location for additional care. After negotiation with hospital administration, the in-clinic services were provided in the obstetric clinic located a short elevator ride from the NICU. This proximity to the NICU allowed mothers to receive essential care while still being quickly available to their baby. Once mothers were persuaded to go to the clinic, they often disclosed additional health concerns.

Discussion

Similar to mothers of healthy babies, mothers of infants in the NICU have many postpartum health needs. While our study addressed the expressed needs of mothers of NICU infants, a complete health assessment given during the early-postpartum and later-postpartum period would likely identify additional needs. One notable observation was that 42 % of the health encounters focused on primary care needs. Even though NICUs discourage sick parents from visiting their infants, the mothers in our study remained at their infants' bedsides. Given the fragile health of infants in the NICU, treating maternal colds, coughs, flu and strep throat should be a priority.

Mothers play a critical role in feeding their infants, responding to their cues, and providing them with safe environments. Lactation services, mental health screening and treatment, and tobacco cessation programs are essential and should be provided as part of routine mother/baby NICU care. Further, in the absence of exclusive, on-demand breastfeeding, which is particularly challenging for these mothers to effect, ovulation can return as early as 45 days post-delivery [16]. For mothers of NICU infants, their elevated risks for recurring poor birth outcomes would be significantly compounded by a rapid, repeat pregnancy. In our study, family planning services were requested 61 times. If family planning services were offered proactively, we believe that additional women would seek the services.

While few clinicians would argue against the importance of postpartum care, we identified a number of barriers to providing services to NICU mothers. Delivering dyadic care is hampered by the health care system's separation of the mother and infant through unlinked medical records. While the mother/baby relationship is symbiotic, most mothers are discharged from the hospital within 96 hours, moving into separate out-patient systems of care. In our study setting, most providers caring for mothers in

the postpartum unit are unable to document or bill for services in the woman's out-patient medical record upon discharge. Further, we found that obstetric clinics did not proactively reach out to this cohort of mothers who, in turn, were focused on their critically ill infant, not their own health. This leads to a dichotomy in which an infant is receiving state-of-the-art treatment at the same time that his or her mother has fallen out of the health care system. This gap may be even more pronounced for mothers of transfer infants who likely have no existing connection to maternal services at their baby's hospital. Many tertiary hospitals with NICUs also have linked high-risk obstetric clinics. Securing space in a busy obstetric clinic for drop-in NICU mothers, particularly those who have not been seen in the clinic before, can be complex. By engaging women at their infant's bedside, we were able to meet immediate requests for services and then arrange for further evaluation and services in the obstetric care clinic.

In spite of these barriers, our project demonstrated that many immediate maternal health needs may be addressed while the baby is hospitalized. Over half of the services provided to mothers were given in encounters of 30 min or less, and over a quarter of the services were delivered at their infant's bedside. Some of the longer encounters included the 31 postpartum visits that were provided to these mothers; many might not have received this visit without onsite services. The CNM maintained other clinical and research responsibilities in addition to being available to NICU mothers, demonstrating that providing services to this population is time efficient.

We also found that 40 percent of encounters resulted in a prescription, suggesting that mothers of NICU infants need support from a Licensed Independent Provider. NICU nurses expressed satisfaction with being able to refer mothers to the CNM, and they reported that the mothers were generally receptive to being referred to the CNM. NICU staff and the CNM reported that messages highlighting the importance of maternal self-care to infant well-being were well-received by mothers, but future research should further explore the most effective messaging for this population.

While the majority of services provided by the CNM would be included in the pregnancy global fee postpartum package code, services that are "incidental to pregnancy" could be billed outside of this package. While insurance companies expect that traditional postpartum services will be provided as needed, there may be an opportunity for hospitals to provide and bill for more extensive services, such as primary care, for these mothers. Avoiding hospital readmissions, improving preventive care, addressing perinatal mood disorders, and facilitating birth spacing can affect costs and longer term outcomes. With the increasing national attention on providing interconception care to

mothers with adverse pregnancy outcomes [9] and the challenges of engaging these women in care [7, 14, 20, 27], building bridges to at-risk mothers by providing them immediate access to health services while their infant is in the NICU could be a very effective and efficient approach.

Our findings must be interpreted in the context of the study design. While health services were made available to all mothers in the NICU, they were provided only to mothers who requested help directly or through NICU staff. This may not be a representative sample or a complete picture of all NICU mothers' postpartum health needs. As noted above, information was collected by encounter, not by woman or by service; therefore, some women may have experienced more than one encounter during the study period, and more than one service may have been provided per encounter. Due to limited funding, services were only provided during regular working hours; therefore, mothers who visited only during evenings and weekends were not able to receive services and are not represented in this data. While a standard health assessment tool would have given us an understanding of all of the women's health conditions, our study was focused on providing services requested by women directly and expediently. We did not collect infant length of hospital stay, which may influence maternal health over time. This variable is one that we will include in future studies. We did not have a comparison group of new mothers of healthy infants; therefore, we cannot determine the extent to which the postpartum health needs of the women in our study differ. However, even without clear differences, the ability to serve stressed, high-risk postpartum mothers is critical.

Finally, we chose not to collect individual data about the women who received CNM services. This choice ensured that the consent process did not deter women from receiving necessary care, but it prevented us from linking the services requested by women with their medical records. Such a linkage would have allowed us to compare a woman's immediate concerns with her other documented health and psychosocial needs. While these are limitations, we look forward to building on the foundation created by our pilot study in future research.

Recommendations

Leaving a mother's basic health needs unmet at the same time that her infant is receiving some of the most intensive, specialty care in the world begs further discussion. Modifications should be made within health care systems that serve medically fragile infants to better address the needs of their mothers in the postpartum period. As during pregnancy, a mother's physical and mental health postpartum may affect the well-being of her infant. Our study

suggests that NICUs can partner with maternity providers to increase access to care for mothers of NICU infants. We found it feasible to provide these services and that NICU mothers will avail themselves of this care. Framing outreach messages that highlight the importance of maternal self-care for infant well-being appears to be effective with this population. Regional tertiary care centers are well-positioned to care for high-risk mothers who have pressing health needs yet may be unable to access their usual providers due to distance.

More research is needed to increase our understanding of the health needs of postpartum mothers with infants in a NICU, comparing and contrasting health challenges based on infant diagnosis and length of stay. The impact of improved maternal care on mothers' ability to navigate the NICU experience and fully assume complex infant caregiving responsibilities should be explored. Services provided to NICU mothers can offer valuable care as women transition through this difficult time. However, this care cannot substitute for the services provided by a medical home. Services provided to NICU mothers should include linkage to a medical home, since caring for a family, particularly one that includes a medically fragile infant, requires long-term care coordination. Women need quality, consistent health care as individuals, to support them in their role as mothers, and to help them achieve their own health goals.

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