Rooming-in care for infants of opioid-dependent mothers

Implementation and evaluation at a tertiary care hospital

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Abstract

Problem addressed Infants born to opioid-dependent women are admitted to intensive care units for management of neonatal abstinence syndrome (NAS), serious morbidity, and prevention of mortality; however, the disadvantages of this approach include infants experiencing more severe NAS and exhibiting a greater need for pharmacotherapy owing to the interference with mother-infant bonding.

Objective of program To implement a rooming-in program to support close uninterrupted contact between opioid-dependent women and their infants in order to decrease the severity of NAS scores, lessen the need for pharmacotherapy, and shorten hospital stays.

Program description Opioid-dependent pregnant women were assessed antenatally by a multidisciplinary team and provided with education and support. Psychosocial issues were addressed in collaboration with a community program developed to support addicted mothers. The mother-infant dyad was admitted postpartum to a private room and attended by nurses trained in Finnegan scoring. Infants remained with their mothers unless persistently elevated scores made transfer to neonatal intensive care units necessary for initiation of pharmacotherapy.

Conclusion With the rooming-in program, the proportion of infants requiring pharmacotherapy decreased from 83.3% to 14.3% ($P<.001$) and the average length of stay decreased from 25 days to 8 days ($P<.001$). The rooming-in experience was rated favourably by participating mothers.

EDITOR'S KEY POINTS

- Infants born to opioid-dependent women are often admitted to intensive care units for neonatal abstinence syndrome monitoring. Most infants will require pharmacotherapy and a prolonged hospital stay. Kingston General Hospital in Ontario implemented a rooming-in program for these mother-infant dyads to improve neonatal outcomes.
- The rooming-in program at the hospital resulted in less use of hospital resources while improving the experiences of opioid-dependent women and the short-term health outcomes for their infants.
- This hospital's rooming-in program was successful because the opioid-dependent women were seen at least once in the multidisciplinary clinic, they were educated about neonatal abstinence syndrome and rooming-in goals, their social risk factors were identified, and they were given access to a community-based primary care worker who could support them at home and at their clinic appointments.

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Cohabitation hospitalière d'un nouveau-né avec une mère ayant une dépendance aux opiacés

Essai et évaluation dans un hôpital tertiaire

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Résumé

Nature du problème Les enfants nés de femmes ayant une dépendance aux opiacés sont admis dans des unités de soins intensifs pour une prise en charge du syndrome de sevrage néonatal (SSN), pour une importante morbidité et pour un risque élevé de mortalité; toutefois, cette façon de faire présente des désavantages, entre autres pour les bébés qui ont un SSN plus grave et qui démontrent un plus grand besoin de médication en raison de l'ingérence dans le développement des liens affectifs entre la mère et l'enfant.

Objectif du programme Mettre en place un programme de cohabitation hospitalière afin de favoriser un contact ininterrompu entre la femme ayant une dépendance aux opiacés et son enfant, et ainsi diminuer la gravité du SSN, réduire le besoin de médicaments et abréger la durée de l'hospitalisation.

Description du programme Des femmes enceintes présentant une dépendance aux opiacés ont été évaluées par une équipe multidisciplinaire pendant la période prénatale et ont reçu une formation et un soutien. Les problèmes d'ordre psychosocial ont été pris en charge en collaboration avec un programme communautaire créé pour aider les mères toxicomanes. Après l'accouchement, le couple mère-enfant a été admis dans une chambre privée et traité par des infirmières formées pour attribuer les scores de Finnegan. Les nouveau-nés sont restés avec leurs mères, sauf dans les cas où des scores constamment élevés exigeaient un transfert à une unité de soins néonataux intensifs pour un traitement pharmacologique.

Conclusion Avec le programme de cohabitation hospitalière, la proportion des nourrissons nécessitant une médication a diminué, passant de 83,3% à 14,3% ($P<,001$), et la durée de l'hospitalisation, de 25 à 8 jours ($P<,001$). Les mères participantes ont jugé que cette expérience de cohabitation hospitalière était une bonne initiative.

POINTS DE REPÈRE DU RÉDACTEUR

- Les nouveau-nés de mères ayant une dépendance aux opiacés sont souvent hospitalisés dans des unités de soins intensifs pour la surveillance du syndrome de sevrage néonatal. La plupart de ces enfants ont besoin de médicaments et d'une hospitalisation prolongée. Au Kingston General Hospital en Ontario, on a fait l'essai d'un programme de cohabitation mère-enfant afin d'améliorer l'état de santé néonatal.
- Le programme de cohabitation hospitalière mère-enfant a eu comme effet de réduire le recours aux ressources hospitalières tout en améliorant les connaissances des mères toxicomanes ainsi que l'état de santé à court terme de leurs enfants.
- Le succès de ce programme de cohabitation à l'hôpital repose sur le fait que les femmes ayant une dépendance aux opiacés ont été vues au moins une fois à la clinique multidisciplinaire, qu'on les a renseignées sur le syndrome de sevrage néonatal et sur les buts de la cohabitation à l'hôpital, qu'on a identifié leurs facteurs de risque d'ordre social et parce qu'on les a mis en contact avec un intervenant de première ligne de leur communauté capable de leur fournir un soutien à domicile ou lors de leur rendez-vous à la clinique.

Cet article a fait l'objet d'une révision par des pairs.
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Infants born to women who are dependent on opioids are likely to experience withdrawal symptoms during the hours and days immediately following birth.[1,2] Finnegan et al first described this phenomenon and termed it *neonatal abstinence syndrome (NAS)*.[3] Standardized assessment tools and treatment protocols have resulted in the successful management of these infants.[4] This in turn has contributed to the establishment of methadone maintenance as the standard of care for opioid-dependent pregnant women.[5-7] Many jurisdictions, including Ontario, have recently seen an increasing number of women dependent on opioids during their reproductive years.[8,9] These women might be using illicitly acquired prescription opiates or heroin; participating in methadone-maintenance or buprenorphine-treatment programs; or legitimately using prescribed analgesics such as oxycodone, hydromorphone, or codeine for chronic pain. According to a 2013 Provincial Council for Maternal and Child Health report, the number of infants admitted to hospitals in Ontario with a diagnosis of NAS increased from 168 during the fiscal year 2003 to 2004 to 855 during the fiscal year 2012 to 2013, with the number of beds per day used for assessment and treatment of NAS increasing from 5.5 to 32.1.[8]

Historically, infants born to opioid-dependent women have been admitted to neonatal intensive care units (NICUs) where they are monitored for symptoms of NAS, with pharmacotherapy being instituted for those infants who exhibit severe and prolonged withdrawal signs.[2,10,11] While this has allowed the successful management of NAS and avoidance of the most serious morbidity (seizures) and mortality, there have been notable disadvantages to this approach: namely, these infants paradoxically appear to experience more severe NAS and exhibit a greater need for pharmacotherapy owing to the inevitable interference with mother-infant bonding that occurs when an infant is admitted to NICU or a special care nursery.[12]

Several published studies have demonstrated that babies allowed to room-in with their mothers experience less-severe signs of NAS and are less likely to require pharmacotherapy and the attendant prolonged hospitalization.[12-16] Furthermore, as babies are kept in close contact with their mothers, rooming-in allows for more successful bonding and results in a greater likelihood that babies will remain in their mothers' custody at the time of discharge, rather than being apprehended by child protective services.[16]

Background

Across Ontario there has been increasing attention in the academic press and lay media to the rising incidence of opioid dependence in the population, which has resulted in a marked increase in pregnant women presenting for prenatal care who disclose a history of opioid dependence[17-20] (also Young A, written communications, 2013). Following the 2010 publication of Abrahams and colleagues' article describing the successful use of rooming-in to manage opioid-dependent infants,[14] clinicians at Kingston General Hospital (KGH) in Ontario who worked with opioid-dependent pregnant women, as well as their infants, began to discuss the possibility of introducing a similar model at our institution.

In 2011, 2 of the article authors (A.N. and G.A.D.) had the opportunity to meet with Abrahams, Director of the Fir Square Combined Unit at Children's and Women's Hospital Health Centre of British Columbia in Vancouver. The Fir Square Combined Unit has used the rooming-in model of care as the standard practice for opioid-dependent women and their infants for the past 10 years. The unit's experience has been the subject of several recently published articles attesting to the safety of this approach.[12,14,16] Author K.D. was a co-author for the 2012 Ontario clinical practice guidelines on the management of NAS.[21]

Program objective

Kingston General Hospital serves an average of 30 opioid-dependent pregnant women a year. In 2011, obstetric, pediatric, NICU, and family medicine staff wanted to develop a rooming-in program for eligible mothers and infants; such a program would require a unique collaboration between hospital- and community-based caregivers including physicians, nurses, social workers, and community support workers. Our goal was to implement a rooming-in program to support close uninterrupted contact between opioid-dependent women and their infants in order to improve neonatal outcomes.

Program description

At KGH, all opioid-dependent pregnant women are seen at a multidisciplinary antenatal clinic. In the fall of 2011, interested clinical staff at KGH agreed to prepare eligibility criteria for opioid-dependent pregnant women who wished to receive rooming-in care. In order to reduce confounding variables, the first patient chosen to participate in the rooming-in program had no involvement with child protective services, was taking a stable dose of methadone with multiple carry doses, was not taking any other medications associated with signs of NAS, had no complicating concurrent medical conditions, and was planning to breastfeed.

The patient received antenatal education about the signs of NAS (a modified Finnegan tool was used for NAS scoring) and nonpharmacologic management from a nurse practitioner (L.N.), as well as a social worker (B.H.) who attended the multidisciplinary antenatal clinic for opioid-dependent women. The patient delivered at term. She and her infant were admitted to a semiprivate

room across the hall from the NICU and were attended to by an NICU nurse. The infant was transferred to the NICU on the first evening of life owing to increasing irritability and the mother's anxiety about her ability to console the child. Oral morphine was started at 24 hours of life and tapered over the following weeks. The total length of stay (LOS) was 23 days.

This experience was reviewed during a debriefing meeting with clinical staff and nursing management. It was agreed that for the program to succeed there needed to be a period of education for postpartum nursing staff to take on the responsibility of NAS scoring. It was decided that mother-infant dyads would be provided with a private room to optimize their experience, keeping unnecessary ambient noise and light disturbance to a minimum.

In October 2012, a new program initiative called *Thrive* was announced by the Kingston Community Health Centres and funded by the South East Local Health Integration Network in Ontario to support pregnant opioid-dependent women in the region. One author (A.N.) volunteered to sit on the community advisory group for the program; this occasioned close collaboration with the family community support workers in the program, one of whom (J.M.) joined the hospital rooming-in working group.

In November 2012, the rooming-in working group recommended that the most appropriate location for postpartum care of these mother-infant dyads was in the pediatrics unit. This location provided a private room where the mother could receive usual postpartum care and, upon discharge, could stay until discharge of her infant. This recommendation was approved by the Division of Maternal-Fetal Medicine and the Division of Neonatology, as well as the hospital Obstetrics Gynecology/Pediatrics Program Council, which included physicians, nurses, midwives, nurse practitioners, residents, and a patient advocate.

From December 2012 to April 2013, a series of interprofessional education sessions was undertaken, including presentations from the Division of Maternal-Fetal Medicine, the Managing Obstetrical Risk Efficiently program, and the Department of Pediatrics, as well as in-service nursing education sessions and the Department of Obstetrics and Gynecology's annual continuing medical education event.

In June 2013, an opioid-dependent mother (and also a patient of one of the authors [G.A.D.]) from the multidisciplinary antenatal clinic was prescribed oral opioids for chronic pain; she and her newborn were admitted to a private room in the pediatrics unit. They were supported by a Thrive member (J.M.) who had been involved in the woman's care since early in her pregnancy. The attending physician for the infant was A.N., and NAS scoring was performed by the assigned nurse who had attended the in-service training sessions. The infant was discharged after 72 hours without requiring transfer to the NICU or initiation of oral morphine pharmacotherapy.

In July 2013, 4 of the authors (B.H., J.M., A.N., and L.N.) began meeting weekly to review all known opioid-dependent mothers attending the multidisciplinary antenatal clinics at KGH who might be candidates for the rooming-in program. Owing to the very positive experience for most mother-infant dyads, by November 2013 it was clear that the only necessary exclusion criteria were planned apprehension by child protection services or existence of another neonatal condition that would require admission to the NICU. By September 30, 2014, 21 mother-infant dyads had been enrolled in the rooming-in program (**Figure 1**). Of these, only 3 infants (14.3%) required transfer to the NICU for oral morphine therapy to control withdrawal symptoms.

Program evaluation

In the 13 months preceding the implementation of the rooming-in program, 24 women taking chronic opioid therapy delivered single, full-term infants who were not apprehended by child protection services. As per usual practice, all 24 infants were admitted directly to the NICU for observation and NAS scoring within hours of birth. During the 13 months subsequent to the implementation of the rooming-in program, 21 women taking opioid therapy gave birth to full-term infants and were admitted to a private room in the pediatrics unit with their babies. Women whose infants were apprehended at birth by child protective services were excluded from the analysis, as KGH policy required that these infants be admitted to the NICU for supervision and protective custody while awaiting placement.

The requirement for oral morphine therapy for the neonates in the rooming-in cohort was significantly lower than those admitted directly to the NICU (3 of 21 [14.3%] vs 20 of 24 [83.3%]; $P<.001$). The mean (SD) LOS was also significantly shorter among the rooming-in cohort (7.9 [7.8] days vs 24.8 [15.6] days; $P<.001$) (**Table 1**).

Women who participated in the rooming-in program completed a survey after discharge. Anonymous responses were obtained from 14 of the 21 participating women (**Tables 2, 3,** and **4**). On a 5-point scale (1=least satisfied, 5=most satisfied), 100% of women rated their overall experience as 4 or higher and 86% reported breastfeeding their infants for an average duration of 2.5 months. This compares favourably with the general population of all women delivering at KGH, 78% of whom breastfeed for any duration.

Discussion

Using a community- and hospital-based multidisciplinary team, we were able to design and implement a program to support a rooming-in program for opioid-dependent

women with their newborns. This cohort study demonstrates a statistically significant decreased need for pharmacotherapy and hospital LOS.

As a tertiary care referral centre with a level 3 NICU, KGH has traditionally received transfers of opioid-dependent pregnant women or newborn infants from regional hospitals requiring NICU admission for pharmacotherapy of severe NAS. This approach was assumed to be the optimal way to ensure safe resolution of signs of withdrawal.

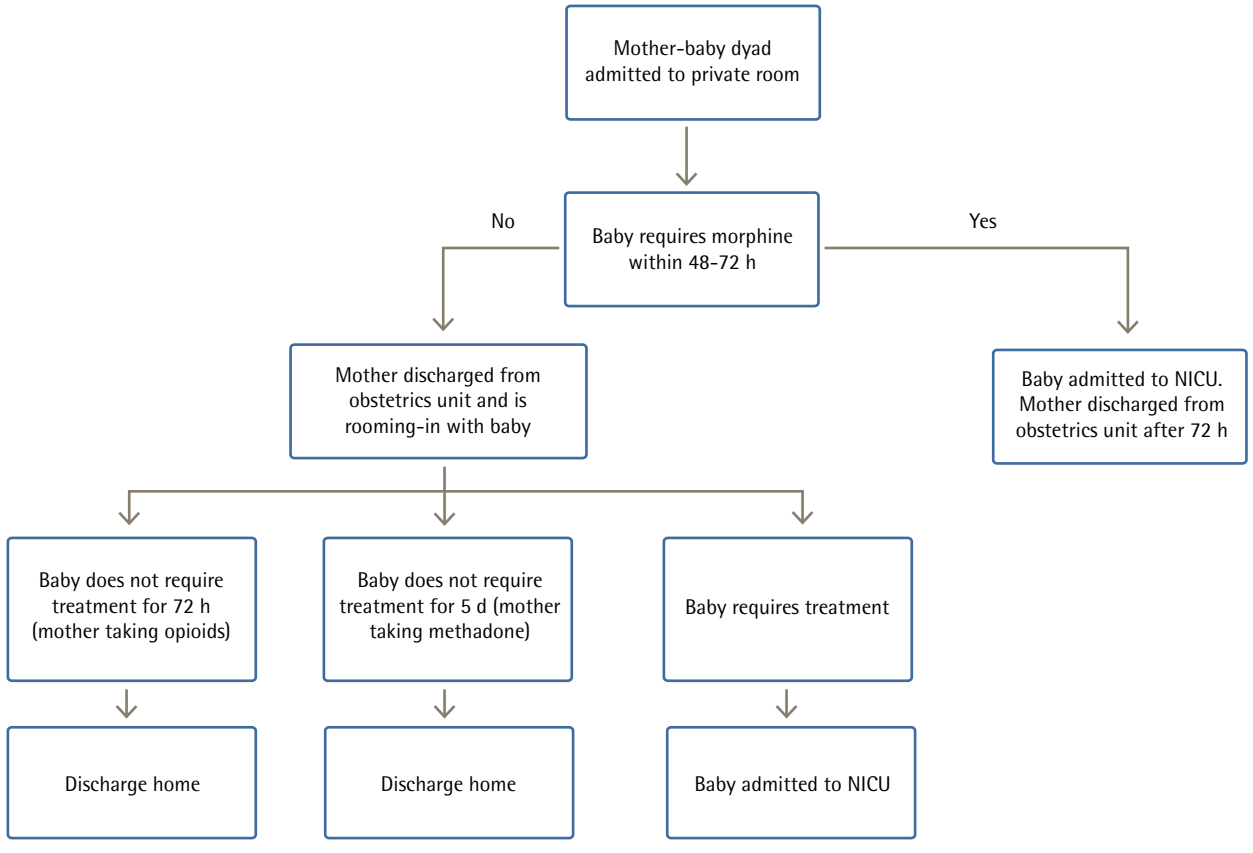
For those of us working with this vulnerable population, the favourable outcomes described by Abrahams et al,[14] as well as others,[13,15] suggested that not only could rooming-in potentially reduce bed use and save hospital resources, it could also safely mitigate some of the negative psychosocial stressors with which our patients struggle.

> Separation of mother-infant dyads in the early postpartum period is detrimental to the development of mother-infant bonding and attachment. It is predictive of infant abandonment, abuse, and neglect in the non-addicted population, and is even more likely to be so for high-risk populations.[14]

We believe our rooming-in experience was successful for 2 key reasons. First, all opioid-dependent pregnant women were seen at least once in our multidisciplinary clinic where they were educated about NAS and the rooming-in goals and where staff could identify and address social risk factors before admission for labour and delivery. Second, all women had access to a community-based primary care worker who supported them at home and accompanied them to their clinic appointments and reinforced the rooming-in goals.

Our results compare favourably with those of the Vancouver Fir Square Combined Unit and 2 centres in Europe.[13,15] We found a decrease in the need for pharmacotherapy, from 83.3% of infants receiving usual care in the NICU to only 14.3% of those rooming-in; Abrahams et al[14] reported a decrease in pharmacotherapy from 55.3% of infants receiving usual care to 25% of

Figure 1. Flowchart of infants admitted to rooming-in and those admitted to the NICU



NICU—neonatal intensive care unit.

those rooming-in. Our LOS decreased from 24.8 to 7.9 days, whereas the LOS at the Fir Square Combined Unit decreased from 23.5 to 11.8 days.[12] Saiki et al in the United Kingdom and Hünseler et al in Germany reported decreases in pharmacotherapy from 45% to 11% and 88.7% to 79.2%, respectively, and decreases in LOS from 19.8 to 15.9 days and 41.5 to 33 days, respectively.[13,15]

Limitations

Adoption of a more "low tech" approach has achieved better outcomes for infants, their mothers, and the hospital. The NAS scoring tool that was used to quantify withdrawal severity relies to some extent on subjective judgment and might therefore be a possible source of bias. We sought to minimize this by using the same tool in both cohorts, and maintaining the same criteria for initiating pharmacotherapy before and after implementation of rooming-in.

Conclusion

Using a multidisciplinary team model that involved various professionals from the hospital, the university, and the community, KGH was able to make a smooth transition from a practice of admitting all infants born to opioid-dependent women directly to the NICU to one that permitted rooming-in and only resorted to NICU admission if pharmacotherapy was required. Length of stay and the need for pharmacotherapy were dramatically reduced within the first year of implementation, and mothers rated their experience with the program favourably.

Future research might focus on medium- and long-term neonatal and childhood outcomes, including rates and duration of breastfeeding; quality of mother-infant bonding and involvement of child protective services; and growth, development, and behavioural effects on children exposed to the rooming-in model of care as infants.

We hope that our experience will encourage all hospitals in Canada providing newborn care to opioid-dependent women and infants to consider the rooming-in model of care.

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Contributors

All authors contributed to the concept and design of the program; data gathering, analysis, and interpretation; and preparing the manuscript for submission.

Table 1. Neonatal outcomes

OUTCOMES	NICU GROUP (N = 24)	ROOMING-IN GROUP (N = 21)	*P* VALUE
Infants requiring morphine, n (%)	20 (83.3)	3 (14.3)	< .001
Mean (SD) LOS, d	24.8 (15.6)	7.9 (7.8)	< .001

LOS—length of stay, NICU—neonatal intensive care unit.

Table 2. Participant ratings of the rooming-in program (on a 5-point scale from 1 = least satisfied to 5 = most satisfied): *14 of the 21 rooming-in participants completed the survey.*

QUESTIONS	N/N	MEAN ANSWER (RANGE)	PROPORTION OF RESPONDENTS WHO RATED 5 ON SURVEY, %
How well was the rooming-in program explained to you during your prenatal visits?	14/14	4.7 (3-5)	79
Did you feel well prepared for caring for your baby while you were rooming-in?	14/14	4.8 (4-5)	79
Did you feel well supported by ...			
• nursing staff?	14/14	3.5 (1-5)	21
• social workers?	13/14	4.6 (3-5)	69
• doctors?	14/14	4.9 (4-5)	93
• others?	12/14	4.8 (4-5)	83
Did you find the team approachable and accessible?	14/14	4.7 (4-5)	71
How would you rate your overall rooming-in with your baby?	14/14	4.6 (4-5)	64
If you have had a baby while taking methadone in the past and did *not* room-in, how did this most recent experience compare?	5/5	5 (5)	100

Table 3. Results of the yes-or-no answer portion of the survey: *14 of the 21 rooming-in participants completed the survey.*

QUESTIONS	N/N	NO. OF YES RESPONSES
Would you recommend rooming-in to other mothers?	13/14	13
Has your baby had any health problems?	3/14	3
Did you breastfeed?*	12/14	12

*Average length of time breastfeeding was 2.5 mo.

Table 4. Participant comments about the rooming-in program: *14 of the 21 rooming-in participants completed the survey.*

QUESTIONS	N/N	COMMENTS
Is there anything you wish you had known before you tried rooming-in?	3/14	"No, I felt I was explained [*sic*] everything very well"
		"I wish I had more clearly understood that although the baby is the patient there must always be a person (parent/family member) present"
		"That I could be discharged before the baby to bring clothing and prepare to make food arrangements"
If you had to room-in again, what other supports would you like to have?	6/14	"More info to read while in hospital like breast feeding books"
		"Financial supports for food, parking etc"
		"I wish nurses would've left us alone more—I didn't like that they all scored different and I'm not sure that my baby really needed morphine"
		"More food supports"
		"Food, parking cost"
		"Nurses to have better understanding of addiction and methadone"
Is there anything else you would like us to know?	4/14	"How very much we appreciated the help and expertise of the staff. We were understandably concerned about the health of the baby, on morphine, but felt that we could ask any question and would receive the best information possible. Many thanks"
		"It was stressful waiting to see how methadone effected [*sic*] my son. I was fortunate that he recovered quickly [with] minimal symptoms. It was frustrating being in the hospital at the time. However it only took a couple weeks after being home that I realized how precious that time was. What a great five days to focus solely on bonding with my new son. In reality it's truly unfortunate all mothers don't get more one on one time with their newborn before returning to crazy family life. Thank you"
		"My husband and I had a great experience and felt very supported. We also felt that staff sent us home with the knowledge of what to look for with our baby and so we felt very confident when we left the hospital. Our baby has been very healthy and we are happy! Thank you!"
		"I really encourage mothers to do the rooming in it's a amazing experience [*sic*]. I've done it both ways. Our 2 yr [*sic*] old had to stay in the NICU and it was very hard especially not being able to hold your baby when you want to and he was put on morphine. Baby J is 9 months. Did rooming in. No morphine needed and we were home in 6 days and me and J have a amazing bond. Thank you for giving us the opportunity for rooming in. I hope all hospitals will try this program"

NICU—neonatal intensive care unit.

Competing interests
None declared

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