Early Discharge of Infants and Risk of Readmission for Jaundice

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abstract

OBJECTIVES: To examine the association between early discharge from hospital after birth and readmission to hospital for jaundice among term infants, and among infants discharged early, to investigate the perinatal risk factors for readmission for jaundice.

METHODS: Birth data for 781 074 term live-born infants born in New South Wales, Australia from 2001 to 2010 were linked to hospital admission data. Logistic regression models were used to investigate the association between postnatal length of stay (LOS), gestational age (GA), and readmission for jaundice in the first 14 days of life. Other significant perinatal risk factors associated with readmission for jaundice were examined for infants discharged in the first 2 days after birth.

RESULTS: Eight per 1000 term infants were readmitted for jaundice. Infants born at 37 weeks' GA with an LOS at birth of 0 to 2 days were over 9 times (adjusted odds ratio [aOR] 9.43; 95% CI, 8.34–10.67) and at 38 weeks' GA were 4 times (aOR 4.05; 95% CI, 3.62–4.54) more likely to be readmitted for jaundice compared with infants born at 39 weeks' GA with an LOS of 3 to 4 days. Other significant risk factors for readmission for jaundice for infants discharged 0 to 2 days after birth included vaginal birth, born to mothers from an Asian country, born to first-time mothers, or being breastfed at discharge.

CONCLUSIONS: This study can inform guidelines or policy about identifying infants at risk for readmission for jaundice and ensure that appropriate post-discharge follow-up is received.

WHAT'S KNOWN ON THIS SUBJECT: Studies examining early postnatal discharge and readmission for jaundice report conflicting results. Infants born 37 to 38 weeks' gestation have an increased risk for readmission for jaundice; however, the impact of early discharge on this group has not been investigated.

WHAT THIS STUDY ADDS: Early postnatal discharge was significantly associated with readmission for jaundice. Of the infants discharged early, those born 37 to 38 weeks' gestation, born via vaginal delivery, born to Asian mothers, or were breastfed had the greatest risk for readmission.

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The length of stay (LOS) in hospital after the birth of a child has been a controversial topic over the past few decades. A Cochrane Review found early postnatal discharge, defined as earlier than standard care, to have no adverse effects on breastfeeding and maternal depression when accompanied by a policy of nursing/midwifery home visits. However, they reported more research is needed to investigate infant morbidity, mortality, and hospital readmissions.[1]

One of the major concerns for infant health after early discharge is readmission for jaundice, because bilirubin levels do not peak until days 5 to 7 in some infants.[2] Although mild jaundice is extremely common among healthy term infants and requires no intervention, it can develop into severe jaundice and in extremely rare cases can lead to kernicterus, a condition that can cause neurologic damage and death. Failure to initiate and establish adequate breastfeeding can also play an important role in the development of severe jaundice, because caloric deprivation and/or dehydration is known to increase plasma bilirubin levels.[3] Early discharge from hospital may impact the establishment of breastfeeding if appropriate support and advice is not available, because face-to-face professional support has been shown to increase breastfeeding success.[4]

Literature examining the association between early postnatal discharge and readmission for jaundice has reported conflicting results. Ecological and time trend studies using population data in North America have shown both an increase[5,6] and a decrease[7] in readmissions for neonatal jaundice after the introduction of legislation or guidelines for early discharge. Case control studies have also shown inconsistent results.[8–10] Studies have also found that infants born at 37 to 38 weeks' gestational age were at increased risk for developing hyperbilirubinemia[11,12] and were more likely to be readmitted to hospital for jaundice compared with infants born at >40 weeks' gestational age;[10] however, the impact of early discharge on this group of infants has not been assessed.

To date there has been no population-based study investigating early discharge and readmission for jaundice that comprehensively adjusts for known major risk factors for jaundice, such as gestational age, breastfeeding, and Asian race,[2] and risk factors for readmission to hospital, including maternal age, birth order, and maternal smoking.[13] The aims of this study are to (1) examine the association between early discharge from hospital after birth, week of gestational age, and readmission to hospital for jaundice among term infants; and (2) investigate the perinatal risk factors for readmission to hospital for jaundice among infants discharged early.

METHODS

Study Population

All term infants (gestational age 37 to 41 weeks) born to women residing in NSW from January 2001 through December 2010 who were discharged from hospital in the first 14 days after birth were included in the study population. Infants born with severe neonatal morbidity in the birth admission were identified using the Neonatal Adverse Outcome Indicator and were excluded.[14] The adverse outcome indicator comprises a range of conditions and procedures including exchange transfusion; as such, infants who had severe jaundice requiring an exchange transfusion in the birth admission were excluded.

Data Sources

Data were obtained from the NSW Perinatal Data Collection (PDC) and the Admitted Patient Data Collection (APDC). The PDC is a legislated, population-based surveillance system of all births in NSW, including home births, of ≥20 weeks' gestation or an infant ≥400 g birth weight. The APDC is an administrative database of all hospital admissions in NSW and is based on information from hospital medical records, with diagnoses coded according to the *10th Revision of the International Classification of Diseases, Australian Modification* (ICD10-AM) and procedures coded using the Australian Classification of Health Interventions.

The 2 databases, PDC and APDC, were linked by the NSW Centre for Health Record Linkage using probabilistic linkage. This process enables each infant's PDC birth data to be linked cross-sectionally to their own hospital birth admission, and then longitudinally linked to subsequent admissions. Over 98% of birth records linked to an infant hospital record. The proportion of missing data were small: maternal age, 0.02%; mode of delivery, 0.04%; infant gender, 0.05%; and parity 0.07%.

Study Outcome

The primary outcome of the study was whether infants had been admitted to hospital after discharge home from the birth admission, in the first 14 days of life, with a diagnosis of jaundice (ICD10-AM codes P58, P59, R17). A validation study comparing data in the APDC to medical records found neonatal jaundice had a sensitivity of 80.0% and a positive predictive value of 90.9%.[15] As a test of face validity, we found 87% of infants who had a diagnosis of jaundice received a procedure code for phototherapy, similar to the reported high positive predictive value.

Primary Explanatory Variables

The 2 primary explanatory variables were LOS in hospital during the birth admission and gestational age. The LOS at birth was calculated by subtracting the day of discharge from date of birth. Inter-hospital transfers during the birth admission were

included as part of the calculation for LOS at birth. The LOS variable was divided into 3 groups: 0 to 2 days (discharged up to 72 hours after birth), 3 to 4 days, and ≥5 days. An LOS ≤2 days will include all infants discharged from hospital <48 hours, defined as a short stay for a healthy newborn by the American Academy of Pediatrics.[16] Gestational age was obtained from the PDC and divided into weeks of gestation (37 through 41). Reporting of gestational age (in weeks) has been shown to have 98% agreement with medical records.[17]

Other Explanatory Factors

Other explanatory variables included were known risk factors for jaundice as reported in the literature.[9,10] Covariates available for analysis from the PDC included maternal age, maternal smoking during pregnancy, parity, gestational diabetes, maternal country of birth, type of hospital at birth (public or private hospital), mode of birth (normal vaginal delivery, vacuum-assisted delivery, forceps-assisted delivery, caesarean section), infant feeding status at hospital discharge (exclusively receiving breast milk at discharge or not), and infant gender; phototherapy in the birth admission was obtained from the infant's APDC record. Infant feeding status at discharge was collected in the PDC from 2006.

Analysis

Firstly, descriptive statistics for maternal and infant characteristics in each of the 3 LOS groups were calculated. The frequencies of infants readmitted for jaundice for each LOS group were then stratified by gestational age and parity. Secondly, univariate analysis was performed to examine the association between gestational age, LOS, and readmission to hospital for jaundice. Because of a significant interaction between gestational age and LOS, these 2 variables were combined to create 1 variable with 15 categories (3 LOS variables stratified by 5 weeks of

gestational age). To adjust for confounding factors, multivariable logistic regression was performed, and all variables associated with jaundice ($P < .20$) were included in the multivariable logistic regression

model. As infant feeding status was only collected from 2006, the multivariable logistic models were also run for the years 2007 to 2010 to include breastfeeding. This sensitivity analysis was performed to examine

TABLE 1 Maternal and Infant Characteristics and LOS at Birth, NSW, 2001–2010

	Birth LOS 0–2 d	Birth LOS 3–4 d	Birth LOS >4 d
Total	261 990 (33.5)	337 289 (43.2)	181 795 (23.3)
Infant variables			
Gestational age			
37 wk	12 163 (4.6)	18 037 (5.3)	18 197 (10.0)
38 wk	37 771 (14.4)	57 956 (17.2)	44 707 (24.6)
39 wk	71 118 (27.2)	94 405 (28.0)	50 381 (27.7)
40 wk	89 744 (34.2)	109 036 (32.3)	44 909 (24.7)
41 wk	51 194 (19.5)	57 855 (17.2)	23 601 (13.0)
Plurality			
Singleton	261 239 (99.7)	333 907 (99.0)	173 393 (95.4)
Twin/triplet	751 (0.3)	3382 (1.0)	8402 (4.6)
Gender			
Boy	131 267 (50.1)	172 067 (51.0)	95 456 (52.5)
Girl	130 723 (49.9)	165 222 (49.0)	86 339 (47.5)
Phototherapy in the birth admission			
No	261 728 (99.9)	330 782 (98.1)	163 870 (90.1)
Yes	262 (0.10)	6507 (1.9)	17 925 (9.9)
Exclusive breastfeeding on discharge[a]			
Yes	109 580 (84.6)	135 198 (86.7)	82 767 (84.5)
No	19 932 (15.4)	20 716 (13.3)	11 510 (15.5)
Maternal variables			
Maternal age			
<20 y	12 612 (4.8)	12 229 (3.6)	3971 (2.2)
20–24 y	51 152 (19.5)	43 601 (12.9)	14 373 (7.9)
25–29 y	80 874 (30.9)	92 878 (27.5)	42806 (23.6)
30–34 y	74 980 (28.6)	116 867 (34.6)	68 035 (37.4)
≥35 y	42 372 (16.2)	71 714 (21.3)	52 610 (28.9)
Maternal smoking			
No	209 904 (80.1)	301 060 (89.3)	166 684 (91.7)
Yes	52 086 (19.9)	36 229 (10.7)	15 111 (8.3)
Parity			
Primiparous	69 835 (26.7)	149 980 (44.5)	101 325 (55.7)
Multiparous	192 155 (73.3)	187 309 (55.5)	80 470 (44.3)
Hospital type			
Public	254 412 (97.1)	238 255 (70.6)	94 128 (51.8)
Private	7578 (2.9)	99 034 (29.4)	87 668 (48.2)
Mode of delivery			
Normal vaginal delivery	227 279 (86.8)	208 448 (61.8)	49 929 (27.4)
Vacuum-assisted vaginal delivery	13 709 (5.2)	30 109 (8.9)	13 047 (7.2)
Forceps-assisted vaginal delivery	5222 (2.0)	15 029 (4.5)	7419 (4.1)
Caesarean section	15 780 (6.0)	83 703 (24.8)	111 400 (62.3)
Gestational diabetes			
No	250 974 (95.8)	321 440 (95.3)	172 547 (94.9)
Yes	11 016 (4.2)	15 849 (4.7)	9248 (5.1)
Country of birth			
Australia	175 197 (66.9)	243 468 (72.2)	135 463 (74.5)
New Zealand, United Kingdom, Europe, and Americas	24 316 (9.30)	28 544 (8.5)	15 269 (8.4)
Southeast Asia and northeast Asia (eg, China)	26 024 (9.9)	31 289 (9.3)	15 775 (8.7)
Southern Asia (eg, India)	14 368 (5.5)	14 703 (4.4)	6630 (3.6)
Other	22 085 (8.4)	19 285 (5.7)	8658 (4.8)

All data are expressed as n (%).
[a] Based on 359 703 term infants born from 2007 to 2010.

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whether infant feeding status confounded the association between LOS/gestational age and jaundice. If exclusive breastfeeding changed adjusted odds ratios (aOR) by >10%, then it was considered a confounder.

A subgroup analysis was then performed to examine risk factors associated with readmission to hospital for jaundice among infants discharged early. Univariate and multivariable logistic regression was performed for the specific population of infants discharged in the first 2 days of birth. All significant variables ($P < .20$) were included in the final model. The multivariable logistic models for this subgroup analysis were run for the years 2007 to 2010 to include breastfeeding status.

Finally, to estimate the number of infants who would need to stay in hospital at birth longer than 2 days to avoid 1 readmission for jaundice, the number needed to treat was calculated for groups of infants who had the greatest risk for readmission. The number needed to treat was calculated using the inverse of the absolute risk reduction of readmission for jaundice between infants discharged in the first 2 days and those discharged after 2 days. This study had ethics approval from the NSW Population and Health Services Research Ethics Committee.

RESULTS

There were 804 350 term infants born in NSW from 2001 to 2010 who had a linked birth and hospital admission. Almost 2% (n = 15 389) of these infants were identified as having severe neonatal morbidity in the birth admission and were excluded. Of these infants, 781 074 were discharged from the hospital in the first 14 days after birth. One third (33.5%) of these infants were discharged from hospital in the first 2 days after birth, 43.2% were discharged on days 3 or 4, and 23.3% stayed in hospital for 5 days or more

(Table 1). The infants who were more likely to be discharged in the first 2 days were infants of mothers aged 20 to 29 years, infants who had mothers who smoked, infants who were not the first born, infants born via normal vaginal births, infants born in a public hospital, or infants born at ≥40 weeks' gestational age (Table 1).

Eight infants per 1000 were readmitted with a diagnosis of jaundice in the first 14 days of life (Table 2). In 91% of the readmissions, jaundice was the principal diagnosis, whereas in 2.2% of readmissions feeding difficulty was the principal and jaundice the secondary diagnosis. The majority of readmissions (66%) occurred on days 3 to 6 after birth and the mean LOS for each readmission for jaundice was 2.0 days.

The proportion of infants readmitted for jaundice declined as gestational age and LOS increased (Fig 1). Infants discharged in the first 2 days were twice as likely to be readmitted to hospital with jaundice compared with infants discharged on days 3 or 4 (OR, 1.99; 95% CI, 1.87 to 2.01; data not shown). After adjusting for all other

covariates in the multivariable analysis, the infants who had the greatest risk for readmission for jaundice were infants born at 37 weeks' gestation who had an LOS at birth of 2 days or less (Table 2). Almost 1 in 20 (4.6%) infants in this group were affected and were >9 times (aOR, 9.43; 95% CI, 8.34 to 10.67) more likely to be readmitted for jaundice than infants born at 39 weeks' gestation who had an LOS at birth of 3 to 4 days (Table 2). These estimates did not significantly change when breastfeeding was added to the model in the sensitivity analysis. Maternal parity was particularly important, with 7.3% of infants at 37 weeks' gestation to first-time mothers and 3.7% of infants born to multiparous mothers readmitted for jaundice (Fig 1).

When we looked specifically at infants discharged in the first 2 days after birth, the most significant risk factors for readmission were births at 37 to 38 weeks' gestation, those following a vaginal delivery, those who were breastfed, and those who had a Southeast Asian country of birth (Table 3). Infants who were first born, born to mothers aged

TABLE 2 Crude and Adjusted Association Between LOS and Gestational Age With Readmission to Hospital for Jaundice, NSW, 2001–2010

	n Readmitted for Jaundice/Total	Crude OR	aOR[a]
LOS at birth and gestational age			
0- to 2-d stay			
37 wk	562/12 163	7.89 (7.01–8.88)	9.43 (8.34–10.67)
38 wk	796/37 771	3.51 (3.15–3.91)	4.05 (3.62–4.54)
39 wk	845/71 118	1.96 (1.76–2.18)	2.22 (1.99–2.49)
40 wk	633/89 744	1.16 (1.03–1.30)	1.37 (1.22–1.55)
41 wk	286/51 194	0.92 (0.79–1.05)	1.08 (0.93–1.25)
3- to 4-d stay			
37 wk	388/18 037	3.58 (3.14–4.08)	3.68 (3.22–4.20)
38 wk	646/57 956	1.84 (1.64–2.05)	1.97 (1.76–2.21)
39 wk	576/94 405	Ref	Ref
40 wk	303/109 036	0.45 (0.39–0.52)	0.44 (0.39–0.51)
41 wk	122/57 855	0.34 (0.28–0.42)	0.33 (0.27–0.41)
≥5-d stay			
37 wk	177/18 197	1.60 (1.35–1.89)	0.96 (0.81–1.15)
38 wk	299/44 707	1.10 (0.95–1.26)	0.81 (0.69–0.93)
39 wk	233/50 381	0.78 (0.65–0.88)	0.52 (0.44–0.61)
40 wk	115/44 909	0.42 (0.34–0.51)	0.27 (0.22–0.34)
41 wk	25/23 601	0.17 (0.11–0.25)	0.12 (0.08–0.18)

[a] Adjusted for maternal age, maternal smoking status, type of hospital at birth, parity, mode of birth, infant gender, gestational diabetes, phototherapy in birth admission, and maternal country of birth.
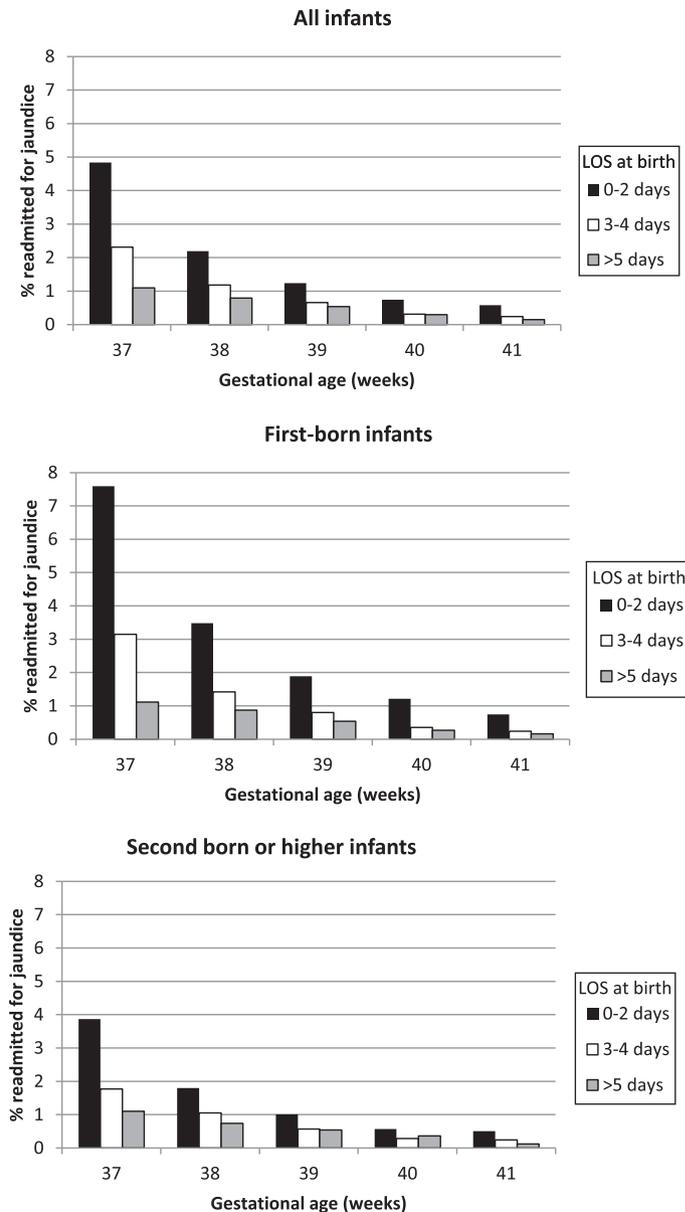
All infants

First-born infants

Second born or higher infants

FIGURE 1
Proportion of infants admitted for jaundice by LOS at birth and gestational age; all infants, infants born to primiparous and multiparous women, NSW 2001–2010.

<20 years of age or born to mothers who had gestational diabetes were also at risk for readmission for jaundice. Using the unadjusted analyses to calculate the number needed to treat, we estimated that 31 infants born at 37 weeks' gestation, or 83 infants born at 38 weeks' gestation, would have to stay in hospital for 3 days or more during the birth admission to avoid 1 infant being readmitted for jaundice.

DISCUSSION

This is the first study to look at the association between early discharge from hospital after birth and readmission for jaundice for term infants stratified by gestational age. We found that infants discharged from hospital in the first 2 days after birth were more likely to be readmitted for jaundice compared with infants who stayed ≥3 days, and this association decreased with increasing gestational age. Infants

born at early term (37 to 38 weeks) and discharged in the first 2 days after birth were the group most likely to be readmitted to hospital for jaundice. Other significant risk factors for readmission for jaundice among infants discharged in the first 2 days included being born via a vaginal delivery, being exclusively breastfed at discharge, being born to a primiparous mother, having a mother aged <20 years, and being born to a mother who had an Asian country of birth.

Early discharge from hospital after birth has previously been shown to be associated with readmission to hospital for jaundice. However, previous studies used data from >20 years ago, conducted in single centers, and had various methodological limitations, such as not adjusting for known confounders.[8–10] Although these studies had limitations, our study had an unadjusted twofold odds ratio (OR, 1.99) of readmission to hospital for jaundice for infants discharged early compared with discharge on day 3 or 4, which is in the mid range of the 2 aforementioned studies (aOR, 1.34; 95% CI, 1.10 to 1.64[9]; and aOR, 2.40; 95% CI, 1.09 to 5.30[10]). The results in the 2 previous studies may also be underestimated given the interaction with gestational age. Another study conducted in the United States in the early 1990s found no association between LOS at birth and readmission for jaundice; however, 97% of the study population were discharged from hospital in the first 48 hours.[8]

Among infants discharged in the first 2 days after birth, we have shown for the first time a number of maternal and infant characteristics to be significant risk factors for readmission for jaundice; infants born via a vacuum-assisted vaginal delivery, to an Asian mother, or to a mother who did not smoke. However, these factors have been shown to be associated with jaundice

TABLE 3 Crude and Adjusted Association Between Perinatal Risk Factors and Readmission to Hospital for Jaundice for Infants Discharged in First 2 Days After Birth, NSW, 2007–2010

	Crude OR	aOR
Infant variables		
Gestational age		
37 wk	4.04 (3.63–4.50)	4.57 (3.96–5.23)
38 wk	1.77 (1.61–1.95)	1.84 (1.61–2.09)
39 wk	Ref	Ref
40 wk	0.59 (0.53–0.65)	0.62 (0.53–0.71)
41 wk	0.47 (0.42–0.54)	0.47 (0.38–0.56)
Gender		
Boy	1.45 (1.35–1.56)	1.35 (1.23–1.50)
Girl	Ref	Ref
Exclusively breastfed at discharge		
No	Ref	Ref
Yes	2.54 (2.11–3.06)	2.10 (1.73–2.54)
Maternal variables		
Maternal age		
<20 y	0.97 (0.82–1.16)	1.21 (0.94–1.56)
20–24 y	0.93 (0.83–1.04)	1.01 (0.89–1.20)
25–29 y	Ref	Ref
30–34 y	1.07 (0.98–1.18)	1.03 (0.91–1.16)
≥35 y	1.18 (1.07–1.32)	1.04 (0.92–1.22)
Parity		
Primiparous	1.87 (1.74–2.01)	1.50 (1.34–1.68)
Multiparous	Ref	Ref
Hospital type		
Public	Ref	Ref
Private	0.78 (0.63–1.00)	0.53 (0.37–0.76)
Mode of delivery		
Normal vaginal delivery	1.74 (1.42–2.12)	2.00 (1.55–2.58)
Vacuum vaginal delivery	5.29 (4.26–6.58)	4.88 (3.67–6.47)
Forceps vaginal delivery	3.62 (2.77–4.72)	3.67 (2.62–5.13)
Caesarean section	Ref	Ref
Country of birth		
Australia	Ref	Ref
New Zealand, Europe, and Americas	1.19 (1.18–1.54)	1.19 (0.99–1.44)
Southeast Asia and northeast Asia (eg, China)	4.84 (4.46–5.26)	3.72 (3.30–4.19)
Southern Asia (eg, India)	2.36 (2.07–2.69)	1.72 (1.44–2.05)
Other	1.49 (1.31–1.70)	1.29 (1.08–1.56)
Gestational diabetes		
Yes	1.75 (1.53–2.01)	1.23 (1.02–1.47)
No	Ref	Ref
Maternal smoking		
No	Ref	Ref
Yes	0.44 (0.95–0.50)	0.64 (0.54–0.76)

Clinically, these infants should be treated differently from infants born at ≥39 weeks' gestation, however, keeping infants in hospital longer during the birth admission is not an economical solution, because we found that 87 infants born at 38 weeks' gestation would have to stay in hospital for longer than 2 days to avoid 1 readmission for jaundice.

Early follow-up visits from health professionals may reduce hospital readmission for early postnatal discharge infants.[23] In NSW, the Midwifery Support Program offers mothers midwifery support at home after early discharge, however, there are many variations of early discharge criteria and protocols across hospitals.[24] Postnatal home visits provide health checks for mother and infant, and can also provide lactation counseling to ensure effective feeding and avoid dehydration. A home visit to identify infants who have jaundice would need to occur within 2 to 3 days of discharge. A limitation of our study was that individual details regarding the number or frequency of postnatal home visits were not available for infants who were discharged from the hospital early.

Australia does not have national clinical guidelines for detection and management of neonatal jaundice; however, some state and hospital-based guidelines are available with varying recommendations. Guidelines from the United States,[25] Canada,[26] and Norway[27] recommend the use of transcutaneous bilirubinometers (TcB) or serum bilirubin measurements (TSB) to universally screen all infants before discharge. An aim of universal TcB screening is to assess the risk for the infant developing hyperbilirubinemia and TcB screening levels can be used to determine the timing and location of post-discharge follow-up.[2] Routine TcB screening has been associated with reduced hospital readmissions for jaundice,[28,29] however, screening

in the birth admission.[18,19] We have also shown that first-time mothers, and although not quite statistically significant, younger mothers age <20 years were more likely to have infants who were readmitted for jaundice, adjusted for all other risk factors. A study comparing newborns discharged <30 hours after birth with those discharged 30 to 78 hours after birth found infants of mothers aged <18 years and discharged early had the greatest risk for readmission for jaundice.[9]

Infants born at 37 to 38 weeks' gestation have been shown to have an increased risk for readmission for jaundice previously[10]; however, the impact of early discharge on these infants has not been investigated. An increasing amount of research about early term infants has shown these infants have more neonatal morbidity,[20] poorer long-term general health,[21] higher health service use and costs,[13] and poorer educational results[22] than infants born at 39 to 41 weeks' gestation.

infants using TcB levels has a number of possible limitations; it may lead to unnecessary use of phototherapy[30] and possible increase in costs and use of hospital resources.[29] Infants below standard TcB or TSB cut-offs may still develop hyperbilirubinemia, so even infants who have low pre-discharge screening levels should receive postnatal follow-up.[31] Studies have shown that the use of TcB and TSB in outpatient settings are also reliable[32,33] and can reduce readmissions for phototherapy.[34] The results of this study could be used by hospital postnatal discharge programs to ensure the most at-risk infants receive adequate information or screening before discharge and follow-up at home.

The main strength of this study is the large, contemporary linked population-based dataset, with very few missing data, minimizing loss to follow-up. Validation studies comparing these linked population datasets to medical records have shown that gestational age and jaundice are accurately reported.[35] We have also adjusted for a comprehensive list of known risk factors for jaundice. The limitations of the study include the calculation for LOS at birth; we were only able to calculate LOS in days rather than hours. However, in NSW during our study period the median LOS did not vary, ranging between 3.4 and 3.7 days,[36] suggesting our cut-off for early discharge, <3 days, was consistent and reliable over time. Information about bilirubin levels at discharge and at readmission was also not available in our routinely collected datasets, however, future prospective studies could address these limitations.

CONCLUSIONS

Infants discharged in the first 2 days after birth were more likely to be readmitted to hospital for jaundice compared with infants who had a longer postnatal hospital stay, particularly infants born "early term"

at 37 and 38 weeks' gestation. All parents should receive information about neonatal jaundice, however, national or state guidelines are imperative for universal risk assessment of infants. This study can be used to inform clinical guidelines, to ensure at-risk infants receive pre-discharge screening and post-discharge follow-up, and to reduce infant readmissions for jaundice.

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