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RESEARCH ARTICLE

Incidence, Risk Factors, and Reasons for 30-Day Hospital Readmission Among Healthy Late Preterm Infants

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ABSTRACT

OBJECTIVE: Late preterm infants have an increased risk of morbidity relative to term infants. We sought to determine the rate, temporal trend, risk factors, and reasons for 30-day readmission.

METHODS: This is a retrospective cohort study of infants born at 34 to 42 weeks' gestation in California between January 1, 2011, and December 31, 2017. Birth certificates maintained by California Vital Statistics were linked to discharge records maintained by the California Office of Statewide Health Planning and Development. Multivariable logistic regression was used to identify risk factors and derive a predictive model.

RESULTS: Late preterm infants represented 4.3% (n = 122 014) of the study cohort (n = 2 824 963), of which 5.9% (n = 7243) were readmitted within 30 days. Compared to term infants, late preterm infants had greater odds of readmission (odds ratio [OR]: 2.34 [95% confidence interval (CI): 2.28–2.40]). The temporal trend indicated increases in all-cause and jaundice-specific readmission infants ($P < .001$). The common diagnoses at readmission were jaundice (58.9%), infections (10.8%), and respiratory complications (3.5%). In the adjusted model, factors that were associated with greater odds of readmission included assisted vaginal birth, maternal age ≥34 years, diabetes, chorioamnionitis, and primiparity. The model had predictive ability of 60% (c-statistic 0.603 [95% CI: 0.596–0.610]) in late preterm infants who had <5 days length of stay at birth.

CONCLUSION: The findings contribute important information on what factors increase or decrease the risk of readmission. Longitudinal studies are needed to examine promising hospital predischarge and follow-up care practices.

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One in ten infants in the United States is born preterm (before 37 completed weeks of gestation). Late preterm infants (LPTs), born at 34 0/7 to 36 6/7 weeks' gestation, account for the majority (73%) of preterm births.[1] The recent increase in preterm birth in the United States (9.57% in 2014% to 10.23% in 2019) is mostly attributed to an increase in LPTs.[1,2] LPTs are physiologically and metabolically immature and are at increased risk of respiratory distress and other complications during birth hospitalization.[3,4] Moreover, compared to term infants, LPTs have a greater risk of neonatal death (<28 days) and infant mortality (<1 year) and a two- to three-fold increased rate of readmission in the neonatal period.[5,6] Indeed, an estimated 4% to 8% of LPTs are readmitted to the hospital within 28 to 30 days of birth.[7,8] Despite these data, much of the literature on prematurity is focused on very preterm (<34 weeks' gestation) and very low birth weight (<1500 g) infants.[2] An American Academy of Pediatrics (AAP) report in 2019 underscored the need for more evidence to prevent morbidity and improve the outcomes of LPTs.[2]

Although reducing unplanned hospital readmissions soon after discharge is a marker for improved quality of care, its use is problematic in the case of neonatal inpatient care, because factors other than health care quality may influence readmissions. Concern that discharge of mothers and their newborns too early or at <48 hours after birth could be associated with early readmission led to enactment of the federal law, "Newborns' and Mothers' Health Protection Act," in 1996.[9] This mandated that insurers may not restrict hospital stays to <48 hours and 96 hours, respectively, for vaginal and cesarean childbirth. The enactment of this mandate and recommendations from AAP led to a sharp decline in early discharge (ie, within 48 hours of vaginal birth) among term and late preterm infants.[10,11] However, studies conducted before and after the mandate reported conflicting findings on the association between duration of birth hospitalization and readmission rate, with some reporting that a short length of stay was associated with increased risk of readmission and others finding no statistically significant association.[8,12,13] Efforts to minimize the risk of readmission because of hyperbilirubinemia through bilirubin measurement at birth admission have also been implemented with varied success.

As such, targeted assessment of LPT health before discharge may prove useful. The AAP recommends that the duration of birth hospitalization be tailored.[14,15] However, in the absence of complications, the majority of LPTs receive similar care as term infants during birth hospitalization.[7] Birth hospitalization discharge can be anticipated in the absence of comorbidity, feeding problems, apnea, or failure to maintain body temperature. Current AAP guidelines and readiness for discharge assessment do not provide tailored vulnerability rankings of LPTs. Universal recommendations such as prolonging the duration of birth hospitalization, based solely on gestational age, are neither desirable nor likely to change outcomes. Therefore, identifying other potentially modifiable factors or ways to differentiate at-risk LPTs might be useful. Few studies have investigated maternal and infant variables associated with readmission. In this study, we aim to compare the rate of 30-day readmission among LPT to term infants using the most recent data from California; evaluate temporal trends, determine precipitators, and identify maternal and infant characteristics associated with readmission; and test the performance of a predictive model. By including readily available maternal, infant, and socioeconomic variables in our study, we aim to determine new factors that might be associated with readmission. Because hyperbilirubinemia has been identified as one of the primary reasons for readmission in previous studies,[8,15,16] our study also examined the temporal trend of readmission due to jaundice.

METHODS

Study Design

This is a retrospective cohort study of infants born at 34 to 42 weeks' gestation between January 1, 2011, and December 31, 2017, in California. Birth certificates maintained by California Vital Statistics were linked to hospital discharge records maintained by the California Office of Statewide Health Planning and Development (OSHPD). The OSHPD database contains detailed information on maternal and infant characteristics as well as discharge diagnoses and procedures, and has previously been linked effectively with California Vital Statistics.[17] Hospital discharge files provided diagnosis and procedure codes based on the *International Classification of Diseases, 9th and 10th Revisions, Clinical Modification* (ICD-9-CM, ICD-10-CM), as reported to the California OSHPD by health care facilities.[18] The OSHPD database has been previously used for studies investigating the association between maternal and infant characteristics at birth and neonatal outcomes.[18,19] Neonates had to meet the following criteria to be eligible: born at 34 0/7 to 42 6/7 weeks' gestation; not admitted to a NICU during birth hospitalization; no major congenital anomalies; not transferred from another hospital at birth; and discharged alive from birth hospitalization. By excluding neonates who needed specialized care, we were able to restrict our sample to those who were presumed healthy at birth.

The primary outcome was hospital readmission within 30 days of birth. To avoid double counting of infants who had multiple readmissions in the neonatal period, only initial readmission data were extracted. Gestational age at birth was categorized as late preterm (34–36 weeks), early term (37–38 weeks), and term (39–42 weeks), in accordance with AAP guidelines.[2] Birth weight was categorized as very low (<1500 g), low (1500–2499 g), normal (2500–3499 g), and high (≥3500 g). Hospital discharge records were the source of information for primary readmission diagnoses.

Socioeconomic, demographic, and maternal and infant characteristics were selected for inclusion in the modeling process on the basis of our conceptual model that was informed by literature

review, biological plausibility, and availability of data.[7,8,13,20–22] Candidate variables included duration of birth hospitalization, sex, birth weight, mode of delivery, adequacy of prenatal care, payer at the time of delivery, race and ethnicity, maternal educational level, maternal age, maternal diabetes (gestational and preexisting), maternal hypertension (gestational and preexisting), perinatal smoking, chorioamnionitis, and parity. Adequacy of prenatal care was assigned according to the Kotelchuck adequacy of prenatal care utilization index.[23] The Kotelchuck index uses time of prenatal care initiation and number of perinatal visits to categorize prenatal care into 4 levels: inadequate (<50% of expected visits), intermediate (50% to 59% of expected visits), adequate (80% to 109% of expected visits), and adequate plus (≥110% of expected visits).

Statistical Analysis

Descriptive statistics were used to characterize the timing and precipitators of readmission. Demographic, maternal, and infant variables were summarized using means with standard deviations for continuous variables or frequencies for categorical variables. We applied the χ^2 test to compare the risk of readmission. The Mann-Kendall trend test was used to assess the temporal direction of all-cause and jaundice-specific readmission by gestational age. Multivariable logistic regression was used to estimate adjusted odds ratios (aOR) with 95% confidence intervals (CI). All candidate variables were included in a complete multivariable model for predicting 30-day readmission among late preterm infants. The multivariable logistic regression model used stepwise selection; any variable that met a *P* value threshold of <.2 was permitted to enter the model with entry order determined by greatest statistical significance, and a *P* value of <.05 was required to remain in the model. Model performance was evaluated by estimating the c-statistic, which is equivalent to the area under the receiver operating characteristic curve. All statistical analyses were performed using SAS version 9.3 (SAS Institute, Cary, NC).

The study was approved by the Committee for the Protection of Human Subjects within the Health and Human Services Agency of the State of California.

RESULTS

Cohort Characteristics and Rate of Readmission

Among 2 824 963 infants in the study cohort, LPTs represented 4.3% (*n* = 122 014) (Supplemental Figure 2). Our sample had a slightly higher proportion (53.0%) of male LPTs. Over one-half (69.6%) of LPTs had a normal birth weight (≥2500 g) and 43.4% were born via cesarean delivery. The average duration of birth hospitalization was 3 days, with a slightly shorter duration among those who were readmitted. Most mothers (79.3%) of LPTs had adequate or adequate-plus prenatal care. The readmission rate varied by gestational age, with infants born at 35 weeks having the highest rate (6.7%) followed by infants born at 34 (6.0%) and 36 (5.7%) weeks, and term infants having the lowest rate (≤2.8%). LPTs had increased odds of readmission compared to term infants (OR 2.34 [95% CI: 2.28–2.40]). Similarly, early-term infants had greater odds of being readmitted than term infants (OR 1.41 [95% CI: 1.39–1.43]) (Table 1).

Temporal Trend

The trend in all-cause readmissions over time increased for LPTs (*P* value <.001), remained stable in early-term infants, and slightly decreased for term infants (*P* value <.001) (Fig 1A). A similar trend was observed among infants admitted for jaundice. The trend in the proportion of babies readmitted due to jaundice increased for LPTs, remained stable in early-term infants, and declined in term infants (*P* value <.001) (Fig 1B).

Timing and Precipitators of Readmission

Readmissions occurred mostly in the first 15 days of life for all neonates (77.4%), with the highest proportion on day 3 (16.2%), day 4 (16.3%), and day 5 (11.5%). The principal diagnosis of readmission were jaundice (47.5%) and infection (15.5%) for all neonates. Mirroring the overall timing of readmission for all infants in the sample, most LPTs (69.3%) were readmitted in the first week of life. The primary precipitators of 30-day readmission among LPTs were jaundice (58.9%), infection (10.8%), temperature instability (4.7%), respiratory complications (3.5%), and gastrointestinal symptoms (2.6%) (Table 2).

Risk Factors

Our multivariable logistic regression model for all-cause readmission of LPTs at 30 days of life was adjusted for all covariates in Table 3. There was no association between duration of birth hospitalization and readmission. Compared to babies whose mothers self-reported as White, Asians had a greater adjusted odds of being readmitted (aOR: 1.17 [95% CI: 1.08–1.27]), and non-Hispanic Blacks had a lower adjusted odds of being readmitted (aOR: 0.78 [95% CI: 0.69–0.88]). Birth hospitalizations that were paid by using public payers or Medicaid had a greater risk of readmission than those paid by private insurance (aOR: 1.36 [95% CI: 1.28–1.45]). Self-payment was protective (aOR: 0.62 [95% CI: 0.52–0.75]). There was difference in the risk of readmission between babies whose mothers had less than a 12th grade education compared to those who had completed 12th grade. The

TABLE 1 Crude Odds of 30-Day Readmission by Gestational Age Category

GA Category	*N* (%)	Crude Odds Ratio (95% CI)	*P*
Late preterm (34–36)	7243 (5.94)	2.34 (2.28–2.40)	<.0001
Early term (37–38)	26 470 (3.68)	1.41 (1.39–1.43)	<.0001
Term (39–42)	52 157 (2.63)	Reference	Reference

GA, gestational age in weeks

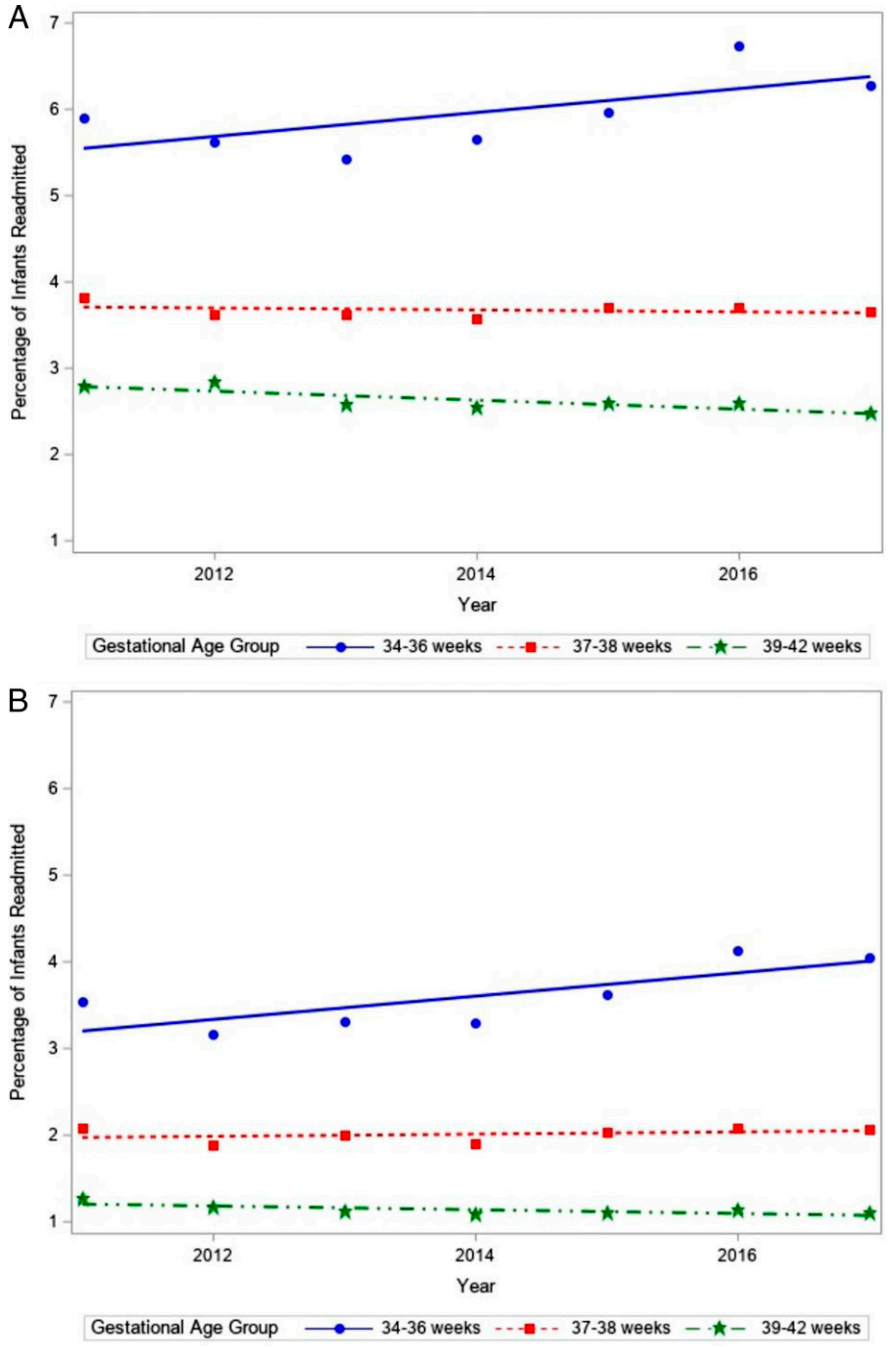

FIGURE 1 Percentage of infants readmitted within 30 days of life by gestational age group. A, All-cause readmission stratified according to gestational age category. B, Jaundice readmission stratified according to gestational age category. Blue, late preterm infants born at 34 to 36 weeks GA; red, early-term infants born at 37 to 38 weeks GA; and green, term infants born at 39 to 42 weeks GA. The line is the temporal trend and the circles, squares, and stars are the rate of readmission.

adequacy of prenatal care, as defined by the Kotelchuck adequacy of prenatal care utilization index, was not found to be a significant contributor to readmission.

Maternal and delivery variables independently associated with 30-day readmission among LPTs included maternal age ≥34 years (aOR:1.09 [95% CI: 1.03–1.16]), primiparity (aOR:1.32 [95% CI: 1.24–1.40]), diabetes (aOR:1.20 [95% CI: 1.13–1.28]), chorioamnionitis (aOR:1.29 [95% CI: 1.08–1.55]) and assisted vaginal birth (aOR:1.28 [95% CI: 1.12–1.46]). Newborns of mothers with diabetes (gestational or preexisting) had similar odds of being readmitted due to infection compared to other causes of readmission (OR: 1.09 [95% CI: 0.91–1.32]). There was no significant difference in the precipitator of readmission (infection versus noninfection) among newborns of mothers who had chorioamnionitis (OR: 0.81 [95% CI: 0.44–1.47]).

Maternal hypertension (aOR: 1.02 [95% CI: 0.96–1.08]) and perinatal smoking (aOR: 1.01 [95% CI: 0.89–1.14]) were not associated with readmission. LPTs who were delivered via cesarean delivery (aOR: 0.73 [95% CI: 0.70–0.77]), were female (aOR: 0.87 [95% CI: 0.82–0.91]), or who had low birth weight (aOR: 0.89 [95% CI: 0.84–0.94]) had a lower risk. The mean duration of birth hospitalization was higher among those born via cesarean delivery compared to the overall study sample (3.0 days versus 1.9 days). Similarly, LPTs with very low birth weight had a higher mean duration of birth hospitalization than the overall study sample (15.8 days versus 2.2 days). The final model for predicting 30-day readmission included 10 variables (birth weight, sex, mode of delivery, payment type, race and ethnicity, maternal education, maternal age, diabetes, chorioamnionitis, parity) (Supplemental Table 4) and had a c-statistic of 0.586 (95% CI: 0.579–0.593). In a sensitivity analysis excluding LPTs who had a prolonged duration of birth hospitalization (≥5 days) (Supplemental Table 5), there was a slight improvement in model performance (c-statistic 0.603 [95% CI: 0.596–0.610]).

DISCUSSION

Late preterm infants might appear outwardly mature but are often at increased risk of morbidity. In this retrospective cohort study in California, over a 7-year period, we found a 30-day readmission rate of 5.9% and

TABLE 2 Causes of Readmission by Gestational Age Category

	Gestational Age Group		
	34–36 Weeks *N* (%)	37–38 Weeks *N* (%)	39–42 Weeks *N* (%)
Jaundice	4263 (58.9)	14225 (53.7)	22270 (42.7)
Infection	783 (10.8)	3579 (13.5)	8944 (17.2)
Temperature instability	338 (4.7)	1122 (4.2)	3021 (5.8)
Respiratory complications	254 (3.5)	913 (3.5)	2025 (3.9)
Gastrointestinal symptoms	186 (2.6)	599 (2.3)	1524 (2.9)
Other	1419 (19.6)	6032 (22.8)	14373 (27.6)

an increasing temporal trend in readmission of LPTs. Most readmissions occurred in the first week of life and often had a principal diagnosis of jaundice. Infection, temperature instability, respiratory complications, and gastrointestinal symptoms were also found to be important causes of readmission.

Despite greater awareness of the vulnerability of LPTs, the readmission rate in our study was within the range of readmission rates (range: 3.5% to 8%) reported by other studies in the United States in the last decade.[7,8,21,22,24] Similarly, the increased odds of readmission among LPTs relative to term infants was consistent with earlier studies.[8,22,25] The unchanged risk of readmission among LPTs and the increasing temporal trend are of concern. It appears that changes in practices such as minimum hospital birth stay, predischarge screening for hyperbilirubinemia, increase in breastfeeding practices, and AAP recommendations regarding readiness for discharge criteria[14,26,27] might have fallen short in achieving population-level impact. It is possible that interfacility variations in practice might have masked the progress that has been achieved by hospitals that adhered to AAP recommendations. Goyal and colleagues examined the duration of birth hospitalization and found that adherence to AAP discharge guidelines and the minimum stay mandate were not universally practiced, and that adherence varied by hospital.11 Understanding

TABLE 3 Adjusted Associations Between Variables and 30-Day Readmission Among Late Preterm Infants

	Outcome				
Variables	Not Readmitted *N* (%)	Readmitted *N* (%)	Crude OR (95% CI)	Adjusted OR (95% CI)[a]	Adjusted Model *P*
Total late preterm infants	114771 (94.1)	7243 (5.9)			
Length of stay, d mean (SD)[a]	3.37 (4.3)	3.36 (3.0)	1.00 (0.99–1.01)	1.01 (1.00–1.01)	.0853
Birth weight, g					
<1500	195 (0.2)	9 (0.1)	0.70 (0.36–1.36)	0.77 (0.39–1.51)	<.0001
1500–2499	34891 (30.4)	1977 (27.3)	0.86 (0.81–0.91)	0.89 (0.84–0.94)	.441
2500–3499	74182 (64.6)	4903 (67.7)	Reference	Reference	Reference
≥3500	5503 (4.8)	354 (4.9)	0.97 (0.87–1.09)	0.96 (0.86–1.08)	.5288
Sex					
Male	60561 (52.8)	4119 (56.9)	Reference	Reference	Reference
Female	54210 (47.2)	3124 (43.1)	0.85 (0.81–0.89)	0.87 (0.82–0.91)	<.0001
Delivery mode					
Vaginal	61868 (53.9)	4419 (61.0)	Reference	Reference	Reference
Assisted vaginal	2555 (2.2)	248 (3.4)	1.36 (1.19–1.55)	1.28 (1.12–1.46)	.0004
Cesarean delivery	50348 (43.9)	2576 (35.6)	0.72 (0.68–0.75)	0.73 (0.70–0.77)	<.0001
Prenatal care					
Inadequate	12024 (10.5)	750 (10.4)	0.96 (0.88–1.04)	0.94 (0.86–1.02)	.1414
Intermediate	8377 (7.3)	555 (7.7)	1.02 (0.92–1.12)	1.01 (0.92–1.12)	.8079
Adequate	33961 (29.6)	2216 (30.6)	Reference	Reference	Reference
Adequate plus	57065 (49.7)	3546 (49.0)	0.95 (0.90–1.01)	0.99 (0.94–1.05)	.6949
Unknown	3344 (2.9)	176 (2.4)	0.81 (0.69–0.94)	0.83 (0.71–0.97)	.0187
Payment type					
Medi-Cal/public	52914 (46.1)	3774 (52.1)	1.27 (1.2–1.33)	1.36 (1.28–1.45)	<.0001
Private payment	54568 (47.6)	3077 (42.5)	Reference	Reference	Reference
Other payment	3781 (3.3)	267 (3.7)	1.25 (1.10–1.43)	1.33 (1.17–1.51)	<.0001
Self-payment	3327 (2.9)	119 (1.6)	0.63 (0.53–0.76)	0.62 (0.52–0.75)	<.0001

TABLE 3 Continued

Variables	Outcome: Not Readmitted *N* (%)	Outcome: Readmitted *N* (%)	Crude OR (95% CI)	Adjusted OR (95% CI)[a]	Adjusted Model *P*
Unknown	181 (0.2)	6 (0.1)	0.59 (0.26–1.33)	0.61 (0.27–1.39)	.2387
Race					
White	26401 (23.0)	1573 (21.7)	Reference	Reference	Reference
Black	7142 (6.2)	353 (4.9)	0.83 (0.74–0.93)	0.78 (0.69–0.88)	<.0001
Hispanic	57633 (50.2)	3715 (51.3)	1.08 (1.02–1.15)	0.96 (0.90–1.03)	.2498
Asian	17403 (15.2)	1228 (17.0)	1.18 (1.10–1.28)	1.17 (1.08–1.27)	<.0001
Other	6192 (5.4)	374 (5.2)	1.01 (0.90–1.14)	0.95 (0.84–1.07)	.3938
Maternal education, y					
<12	21036 (18.3)	1475 (20.4)	1.09 (1.02–1.18)	1.08 (1.00–1.17)	.0398
12	28165 (24.5)	1805 (24.9)	Reference	Reference	Reference
>12	60044 (52.3)	3601 (49.7)	0.94 (0.88–0.99)	0.98 (0.92–1.04)	.5158
Unknown	5526 (4.8)	362 (5.0)	1.02 (0.91–1.15)	1.09 (0.96–1.24)	.1888
Maternal age, y					
<18	2019 (1.8)	144 (2.0)	1.13 (0.95–1.34)	0.86 (0.72–1.03)	.0996
18–34	84635 (73.7)	5357 (74.0)	Reference	Reference	Reference
>34	28097 (24.5)	1741 (24.0)	0.98 (0.93–1.04)	1.09 (1.03–1.16)	.0058
Unknown	20 (<0.1)	1 (<0.1)	0.79 (0.11–5.89)	0.87 (0.12–6.55)	.8956
Any diabetes	19385 (16.9)	1397 (19.3)	1.18 (1.11–1.25)	1.20 (1.13–1.28)	<.0001
Any hypertension	23487 (20.5)	1440 (19.9)	0.97 (0.91–1.02)	1.02 (0.96–1.08)	.618
Any perinatal smoking	4611 (4.0)	294 (4.1)	1.01 (0.90–1.14)	1.01 (0.89–1.14)	.8923
Chorioamnionitis	1533 (1.3)	134 (1.9)	1.39 (1.17–1.67)	1.29 (1.08–1.55)	.0053
Parity					
Null	38884 (33.9)	2860 (39.5)	1.27 (1.20–1.34)	1.32 (1.24–1.40)	<.0001
1	35030 (30.5)	2014 (27.8)	0.99 (0.93–1.06)	1.04 (0.98–1.11)	.23
2–4	36859 (32.1)	2139 (29.5)	Reference	Reference	Reference
≥5	3887 (3.4)	223 (3.1)	0.99 (0.86–1.14)	0.93 (0.81–1.07)	.3191
Unknown	111 (0.1)	7 (0.1)	1.09 (0.51–2.34)	1.25 (0.58–2.70)	.5684

[a] Adjusted OR (odds ratio): adjusted for all other variables in model.

predischarge care practices at hospitals that have successfully reduced the risk of readmission is vital to inform future care practices.

The association between duration of birth hospitalization and readmission may be confounded by birth weight, mode of delivery, and unmeasured variables, such as infant comorbidities, parental readiness, and breastfeeding status. Strata-specific analysis of readmission by recommended length of stay, mode of delivery, and birth weight illustrated this complexity. However, the protective effect of cesarean delivery and low birth weight observed in the multivariable model in this study might be mediated by the duration of birth hospitalization, because longer initial hospital stays allow for issues such as hyperbilirubinemia, temperature instability, and feeding problems to be resolved before discharge. Identifying infants who could benefit from longer birth hospitalization is an important actionable solution in reducing the rate of readmission.

Physiologically, bilirubin levels in LPT often peak between day 4 and day 7,[26] corresponding to the high 7-day readmission rate because of jaundice observed in our study. Studies have found associations between screening for hyperbilirubinemia and subthreshold phototherapy with lower odds of readmission due to jaundice.[28] Eggert et al demonstrated that the introduction of universal predischarge bilirubin screening for newborns was associated with a reduction in readmission for jaundice (0.55% to 0.43%).[29] A decrease in readmission for phototherapy after subthreshold phototherapy during birth hospitalization was also reported by Wickremasinghe et al; however, the number needed to treat was large.[28] Although Kuzniewicz et al did not find a similar reduction in readmission rate, they demonstrated that introduction of universal bilirubin screening among infants ≥34 weeks' gestation was associated with a reduction in the incidence of severe hyperbilirubinemia.[30] Tailored predischarge bilirubin screening and subthreshold phototherapy could contribute to minimizing the risk of early readmission.

Our findings support the emerging evidence from Shapiro-Mendoza,[7] Kuzniewicz,[8] and Escobar[22] that there are multiple risk factors for readmission among LPTs. Our study contributes new data regarding the association between readmission and maternal diabetes, chorioamnionitis, assisted vaginal delivery, maternal age ≥34 years, and primiparity. Similar to other studies,[7,16,22] our results show increased odds of readmission among infants whose mothers self-reported as Asian and lower odds among non-Hispanic Black mothers, compared to White mothers. Although some studies have suggested that a lower rate of exclusive breastfeeding among Black mothers might contribute to a lower incidence of jaundice resulting in readmission,[7,31] we believe this pathway is more complicated. Socioeconomic status, payer at the time of birth hospitalization, and maternal education are intertwined with race and ethnicity. These complex relations may be confounded by unmeasured factors, including level of trust in the health care system, health care use practices, and access to resources. Further examination of this conceptual pathway is needed to better understand the relationship of socioeconomic status and race and ethnicity with readmission.

Our predictive model based on routinely collected data demonstrated poor discriminatory ability. Inclusion of rich predictive variables, such as infant clinical status (dehydration, breastfeeding, weight loss), parental perception of discharge readiness, and laboratory results (bilirubin level) might improve model performance in future studies. Disease-specific risk stratifications based on maternal and infant variables, such as early-onset neonatal sepsis,[32] have demonstrated good performance in identifying at-risk infants. Similarly, an approach based on the main causes of readmission among LPTs identified in this study might have better predictive ability.

This large population-based cohort enabled us to estimate the absolute risk of readmission, identify rare risk factors, and evaluate the most recent temporal trends. However, the study also had limitations, including possible errors in the administrative database that is missing International Classification of Diseases codes on discharge files. We lacked information on breastfeeding status, level of neonatal inpatient care, diagnostic tests, treatments received during birth hospitalization, and follow-up care provided after discharge. Data on interfacility variations in care during birth hospitalization and discharge readiness were not available. Although we adjusted for confounding variables, we cannot exclude the possibility of unmeasured factors and possible interactions.

CONCLUSIONS

LPTs face the greatest risk of hospital readmission within the first week of life. There is emerging evidence that early detection and proactive management of jaundice could minimize the risk of readmission in this population. Our findings advance understanding of maternal and infant factors beyond length of stay that are associated with readmission. This information could eventually contribute to future risk classification matrices to differentiate LPTs who are at increased risk of readmission and could benefit from tailored predischarge care during birth hospitalization, such as breastfeeding support, prevention of dehydration, screening for hyperbilirubinemia, thermal care at home, and early follow-up visits. Future studies are needed to test new approaches to narrow the equity gap and rate of preterm birth and examine hospital and follow-up care practices that could successfully reduce the rate of readmission in this vulnerable population.

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