Hospital Admissions from Respiratory Diseases in Preterm Children Under Five in Brazil: A Longitudinal Registry-Based Cohort Study

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Preterm born children have higher morbidity from respiratory illness than full-term counterparts, and this burden increases with gestational age decrease. The first year carries the highest risk of hospitalisation.

BACKGROUND

The global prevalence of preterm births ranges from 4% to 16%.[1] In Brazil, the prevalence is 11%.[2] Prematurity is associated with a significant increase in both mortality and morbidity, particularly in relation to respiratory conditions. We estimated the risk of respiratory-related hospitalisations and deaths by premature status in Brazil.

METHODS

We conducted a population-based cohort study in Brazil using nationwide linked administrative databases for registry for social programmes, records of live births, hospitalisations, and mortality. We included live births between January 1, 2011, and November 30, 2018. We examined the incidence of respiratory-related hospitalisations in children under five, as per the International Classification of Diseases-10 (Chapter X) comparing those born preterm (less than 37 weeks) with term live births. Mean ratios (MR) and 95% confidence intervals (CI) were calculated using the Ghosh-Lin model.[3] Adjustment for maternal characteristics— maternal age, marital status, parity, race/ethnicity, previous foetal loss, prenatal appointments, years of schooling, state of residency, and municipal deprivation level—was achieved via inverse probability weighting treatment estimated through entropy balancing.

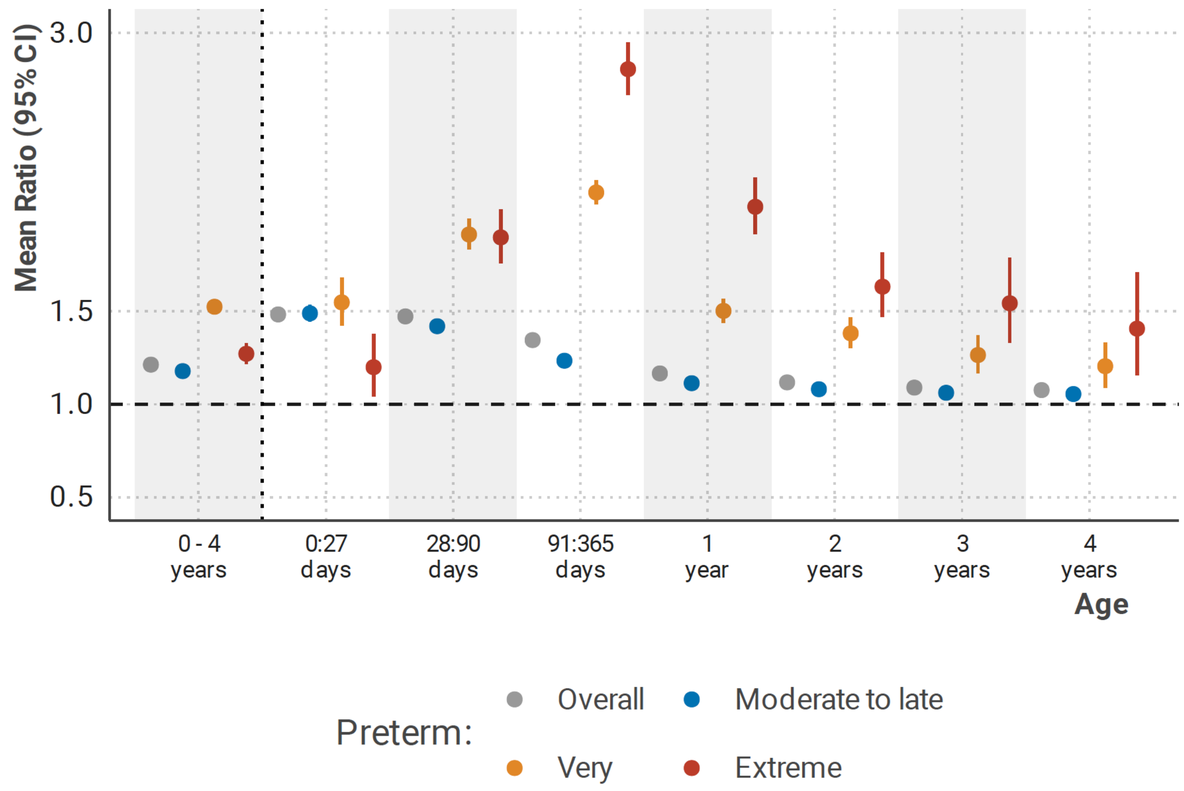
RESULTS

The analysis included 11,641,212 live births, out of which 1,263,346 (10.8%) were preterm births(Table 1). The under-five MR comparing preterm to term children was 1.21 (95%CI 1.20 to 1.22), peaking at 1.48 (95%CI 1.44 to 1.53) within the first 27 days. The degree of prematurity has a dose-dependent effect, with gestational age, extreme preterm live births having 180% (MR: 2.80, 95%CI 2.67 to 2.95) more hospitalisations between 3 and 12 months old than term infants. The difference in hospitalization rates between preterm and term children decreased with age, reaching 1.08 (95%CI 1.04 to 1.11) at four years old (Figure 1).

Table 1: Baseline characteristics of singleton live-born included in the study

Characteristic	Term N = 10,377,866	Preterm N = 1,263,346
Moderate to late preterm (32 to 37 weeks)		1,102,793 (87.3%)
Very preterm (28 to less than 32 weeks)		112,782 (8.9%)
Extremely preterm (less than 28 weeks)		47,771 (3.8%)
Age mother - years(IQR)	24 (20, 29)	24 (19, 30)
Sex - Female	5,079,897 (48.9%)	595,295 (47.1%)
Number of prenatal appointments		
None	178,007 (1.7%)	37,719 (3.0%)
1 to 3	723,195 (7.0%)	200,937 (16.1%)
4 to 6	2,859,082 (27.7%)	513,436 (41.0%)
≥7	6,561,544 (63.6%)	499,403 (39.9%)
Weight for gestational age		
Adequate	8,028,895 (77.4%)	693,887 (54.9%)
Small	896,725 (8.6%)	75,074 (5.9%)
Large	1,452,246 (14.0%)	494,385 (39.1%)
Low birth weight (<2,500g)	377,282 (3.6%)	461,454 (36.5%)
Low Apgar 5' <7	78,690 (0.8%)	46,972 (3.9%)
Number of Hospitalisations (Respiratory)	987,654	150,023
Deaths (%)	65,600 (0.6%)	62,703(4.9%)

Figure 1: Mean Ratio comparing preterm and term children number of hospitalisations from respiratory diseases



CONCLUSIONS

Our findings indicate that preterm newborns have a higher number of hospitalisations from respiratory illness than full-term children, particularly in their first year, with increased morbidity with decrease of gestational age at birth. This understanding can help shape better health strategies to address premature birth issues by identifying important periods of vulnerability.

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