


# Impact of COVID-19 lockdown measures on institutional delivery, neonatal admissions and prematurity: a reflection from Lagos, Nigeria

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## ABSTRACT

We assessed the effect of COVID-19 lockdown on deliveries and neonatal admissions according to gestation in Lagos, Nigeria. During lockdown (April–June 2020), there was a marked fall of about 50% in in-hospital deliveries and admissions to the neonatal wards for both in and outborn infants compared with prelockdown (January–March 2020) and a comparison period (April–June 2019). However, the proportion of preterm infants was broadly similar in each period. Lockdown markedly reduced hospital deliveries and healthcare-seeking for sick newborns but did not influence the overall proportion of preterm births among in-house deliveries and outborn neonatal admissions.

Studies from high-income countries (HICs)<sup>1–3</sup> have reported that COVID-19 lockdown measures markedly reduced preterm births, and this may shed light on mechanisms of preterm birth and possible preventive strategies. In contrast, reports from Nepal<sup>4</sup> and India,<sup>5</sup> low-income and middle-income countries (LMICs), noted that institutional deliveries reduced significantly during lockdown and preterm birth increased in Nepal. We are not aware of reports of the effects of lockdown on deliveries and preterm births from sub-Saharan Africa. The Lagos State Government instituted lockdown measures on 27 March 2020.<sup>6</sup> Nationally, lockdown measures in Nigeria were eased in phases from May 2020 and lasted until 30 October 2020.<sup>7</sup> During this period, there were restrictions on movements, all businesses, schools and religious houses were shut down, but health services remained open. We assessed the effect of lockdown on deliveries and neonatal admissions at the Lagos University Teaching Hospital (LUTH), a referral hospital for primary, secondary and other tertiary facilities in Lagos and neighbouring states. LUTH is the largest neonatal unit in the country and served as a COVID-19

referral and delivery centre for COVID-19 positive pregnant women.

We reviewed the hospital delivery registers, admission registers and case note records for all inborn and outborn admissions to the neonatal wards during lockdown (April–June 2020), prelockdown (January–March 2020) and a comparison period (April–June 2019). Gestational age estimation was based on the best obstetric estimates or Ballard score. Data were deidentified and analysed using Poisson regression,  $\chi^2$  and  $\chi^2$  for trend tests.

During lockdown, there was a fall of about 50% in both hospital deliveries and admissions to the neonatal wards ( $p < 0.001$ ; Poisson regression analyses of both outcomes). There was some decrease in the proportion of moderate to late preterm deliveries during lockdown, but this was of borderline statistical significance ( $\chi^2$  test  $p = 0.045$ ;  $\chi^2$  for trend test  $p = 0.19$ ). There was a reduction in both inborn and outborn neonatal admissions, but their distribution remained similar across the three periods. The distribution of preterm births among neonatal admissions was similar before and after lockdown measures were introduced (table 1).

The findings from HICs of an unprecedented reduction in the birth of extreme preterm and extremely low birth weight deliveries<sup>1–3</sup> have suggested that mechanisms including improvements in ambient air quality, reductions in maternal stress and reduced exposure to infections reduced preterm birth.<sup>3</sup> We found that lockdown did not affect preterm births disproportionately, and we note the increased risk of preterm births in the Nepal study.<sup>4</sup> Lockdown measures worsen existing socioeconomic inequalities and economic hardship,<sup>8</sup> and confinement to homes with larger family sizes may actually increase exposure to infection.



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**Table 1** Deliveries and neonatal admissions according to study period\*

	Previous year April–June 2019	Prelockdown January–March 2020	Lockdown April–June 2020	$\chi^2$ P value	$\chi^2$ for trend p value
Deliveries n	254	253	121	<0.001†	
Term ( $\geq 37$ weeks)	179 (70.5)	169 (66.8)	96 (79.3)	0.045	0.19
Preterm (<37 weeks)	75 (29.5)	84 (33.2)	25 (20.7)		
Extreme preterm (<28 weeks)	4 (1.6)	6 (2.4)	3 (2.5)		
Very preterm (28–<32 weeks)	23 (9.1)	20 (7.9)	12 (9.9)	–	–
Moderate to late preterm (32–<37 weeks)	48 (18.9)	58 (22.9)	10 (8.3)		
Neonatal admissions (n)	375	364	176	<0.001†	
Place of delivery					
Inborn	116 (30.9)	103 (28.3)	57 (32.4)	0.57	0.92
Outborn	259 (69.1)	261 (71.7)	119 (67.6)		
Gestational age					
Term ( $\geq 37$ weeks)	259 (69.1)	251 (69.0)	122 (69.3)	0.97	0.97
Preterm (<37 weeks)	116 (31.0)	113 (31.0)	54 (30.7)		
Extreme preterm (<28 weeks)	11 (2.9)	19 (5.2)	5 (2.8)		
Very preterm (28–<32 weeks)	39 (10.4)	36 (9.9)	17 (9.6)	–	–
Moderate to late preterm (32–<37 weeks)	66 (17.6)	58 (15.9)	32 (18.2)		

\*All data are n (%).

†P value from comparing mean numbers using Poisson regression model.

Interestingly, in the study of the Netherlands, the reduction of preterm deliveries occurred mainly among higher socioeconomic groups.<sup>3</sup>

A highly concerning finding was the marked reduction in in-hospital deliveries at LUTH. This was not observed in the study in Ireland that was also based on hospital records<sup>2</sup> but was noted in the studies from Nepal<sup>4</sup> and India.<sup>5</sup> The equally concerning fall in outborn neonatal admissions also indicates that lockdown had a marked negative effect on healthcare-seeking behaviour among families of sick newborns. Our study is limited in being small, single centre and retrospective in nature. Assessment of the effects of lockdown measures in different contexts, including LMICs, will provide greater insights into their effects on health and also mechanisms of preterm birth. Strategies to counter the negative effects of lockdown on the health of vulnerable populations will need to be tailored to specific contexts.

**Collaborators** Neonatal Nutrition Network.

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