

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

Beatrice Nkolika Ezenwa ^{1,2}, Iretiola B Fajolu,^{1,2} Helen Nabwera,³ Duolao Wang,³ Chinyere V Ezeaka,^{1,2} Stephen Allen³

To cite: Ezenwa BN, Fajolu IB, Nabwera H, *et al.* Impact of COVID-19 lockdown measures on institutional delivery, neonatal admissions and prematurity: a reflection from Lagos, Nigeria. *BMJ Paediatrics Open* 2021;**5**:e001029. doi:10.1136/bmjpo-2021-001029

Received 21 January 2021
Accepted 9 April 2021

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)^{1–3} 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 Nepal⁴ and India,⁵ 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 2020.⁶ Nationally, lockdown measures in Nigeria were eased in phases from May 2020 and lasted until 30 October 2020.⁷ 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, χ^2 and χ^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 (χ^2 test $p = 0.045$; χ^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^{1–3} have suggested that mechanisms including improvements in ambient air quality, reductions in maternal stress and reduced exposure to infections reduced preterm birth.³ We found that lockdown did not affect preterm births disproportionately, and we note the increased risk of preterm births in the Nepal study.⁴ Lockdown measures worsen existing socioeconomic inequalities and economic hardship,⁸ and confinement to homes with larger family sizes may actually increase exposure to infection.



© Author(s) (or their employer(s)) 2021. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

¹Department of Paediatrics, University of Lagos College of Medicine, Lagos, Nigeria

²Department of Paediatrics, Lagos University Teaching Hospital, Surulere, Nigeria

³Department of Clinical Sciences, Liverpool School of Tropical Medicine, Liverpool, UK

Correspondence to

Dr Beatrice Nkolika Ezenwa; beatriceezenwa@yahoo.com

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

	Previous year April–June 2019	Prelockdown January–March 2020	Lockdown April–June 2020	χ^2 P value	χ^2 for trend p value
Deliveries n	254	253	121	<0.001†	
Term (≥ 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 (≥ 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.³

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 records² but was noted in the studies from Nepal⁴ and India.⁵ 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.

Contributors BNE and SA designed the concept and drafted the manuscript. All authors participated in data acquisition, analysis and critically reviewing the manuscript for intellectual contents and all approved the final version submitted.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None.

Patient and public involvement This research was a retrospective analysis of anonymised hospital records and was done without patient or public involvement. Patients were not invited to comment or to contribute to the methodology, interpret the results or contribute to the writing of the manuscript.

Patient consent for publication Not required.

Ethics approval The study's ethical approval was obtained from the Lagos University Teaching Hospital Health Research and Ethics Committee (LUTHHREC/EREV/0520/28).

Provenance and peer review Not commissioned; externally peer reviewed.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iD

Beatrice Nkolika Ezenwa <http://orcid.org/0000-0001-7437-3211>

REFERENCES

- Philip RK, Purtill H, Reidy E, *et al*. Unprecedented reduction in births of very low birthweight (VLBW) and extremely low birthweight (ELBW) infants during the COVID-19 lockdown in Ireland: a 'natural experiment' allowing analysis of data from the prior two decades. *BMJ Glob Health* 2020;5:e003075.
- Hedermann G, Hedley PL, Bækvad-Hansen M, *et al*. Danish premature birth rates during the COVID-19 lockdown. *Arch Dis Child Fetal Neonatal Ed* 2021;106:93–5.
- Been JV, Burgos Ochoa L, Bertens LCM, *et al*. Impact of COVID-19 mitigation measures on the incidence of preterm birth: a national quasi-experimental study. *Lancet Public Health* 2020;5:e604–11.
- Kc A, Gurung R, Kinney MV, *et al*. Effect of the COVID-19 pandemic response on intrapartum care, stillbirth, and neonatal mortality outcomes in Nepal: a prospective observational study. *Lancet Glob Health* 2020;8:e1273–81.
- Kumari V, Mehta K, Choudhary R. COVID-19 outbreak and decreased hospitalisation of pregnant women in labour. *Lancet Glob Health* 2020;8:e1116–7.
- Lagos state infectious diseases (emergency prevention) regulations, 2020. Available: <https://pwcnigeria.typepad.com/files/infectious-diseases-regulations-2020.pdf> [Accessed 14 Dec 2020].



- 7 Nigeria Center for Disease Control (NCDC). Confirmed COVID-19 cases by state. Available: <https://ncdc.gov.ng/news/237/update-on-covid-19-in-nigeria> [Accessed 14 Dec 2020].
- 8 Nwosu CO, Oyenubi A. Income-Related health inequalities associated with the coronavirus pandemic in South Africa: a decomposition analysis. *Int J Equity Health* 2021;20:21.