

The Impact of COVID-19 National Lockdowns on Maternal and Perinatal Outcomes in High-Income Countries: A Systematic Review and Meta-analysis.

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Introduction

There is increasing evidence that lockdowns, enforced to reduce the spread of COVID-19 in 2020-2021, impacted maternal and perinatal health outcomes, such as preterm birth (PTB) and stillbirth (SB) ^{1,2}. The impact was not consistent between high and low-middle-income countries and high-income countries (HICs) have not been explored in depth¹.



Aims:

1. To identify whether maternal, perinatal, and neonatal health outcomes changed during COVID-19 lockdowns in high-income countries.
2. Assess in which regions changes occurred, during which phase of lockdown, and if these varied by deprivation levels and ethnicity group.

Methods

We conducted a systematic review and meta-analysis of studies which explored the impact of COVID-19 lockdowns on maternal, perinatal, and neonatal health outcomes in HICs. The review was registered on PROSPERO (CRD42022327448). The search term included all key maternal and neonatal health outcomes, and word variants of COVID-19 lockdowns. Databases included: EMBASE, MEDLINE/PubMed, MedRxiv, Web of Science, and Cochrane.

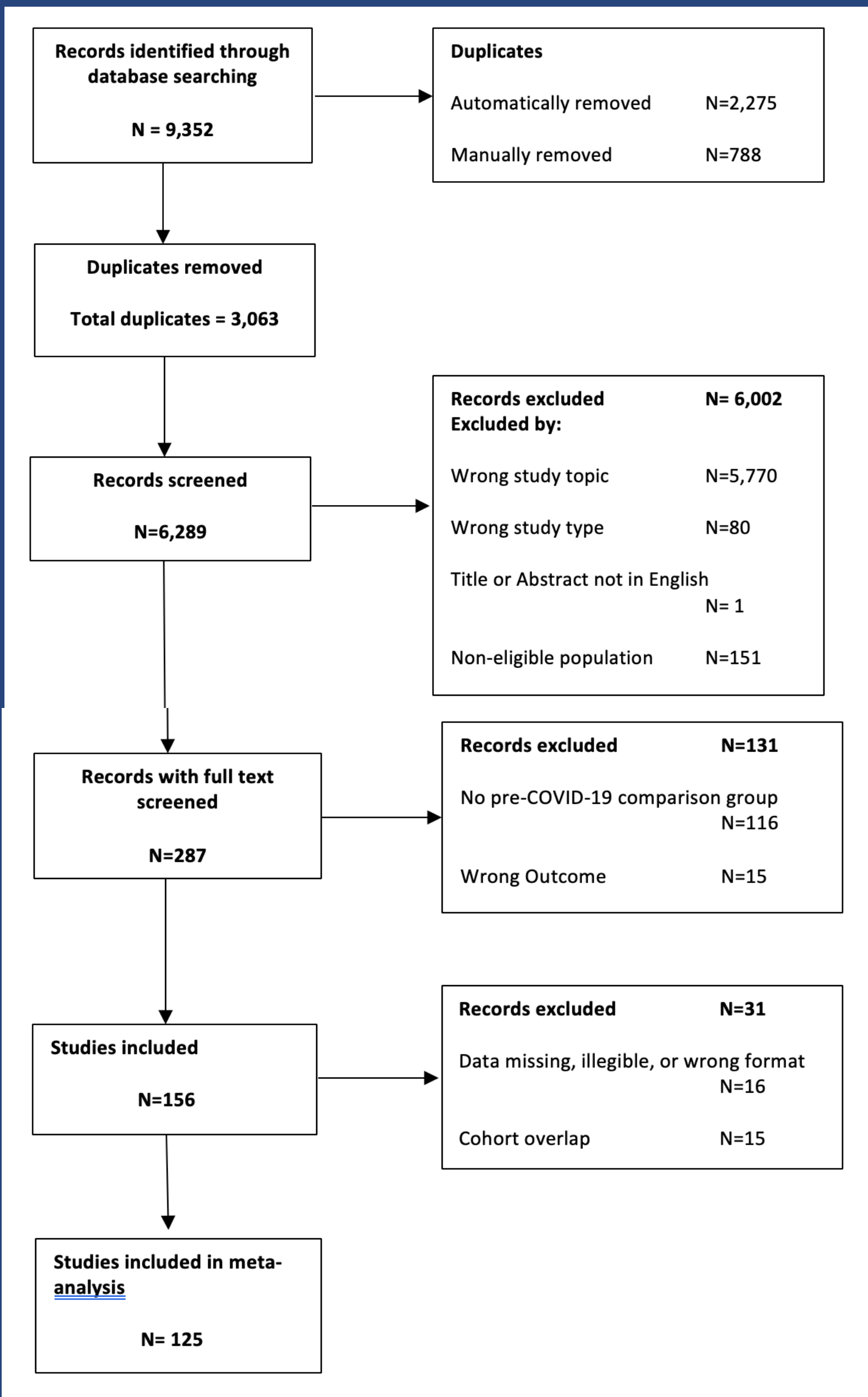
Selection Criteria:

- Data on at least one of the selected maternal and perinatal birth outcomes (listed in PROSPERO).
- Population: HICs (world bank classifications)
- Intervention: lockdown measures due to COVID-19
- Comparator: pre-covid pandemic comparison group

Analysis:

- Where more than three studies reported data for an outcome, the random effects pooled risk ratio, 95% confidence intervals, and heterogeneity were calculated in STATA.
- Data stratified by ethnicity group and deprivation level was meta-analysed when reported by more than three studies.
- Studies which used time-adjusted analysis were meta-analysed, to assess whether the lockdown impact was significant when controlling for previous temporal trends.

Figure 1.
PRISMA
Flowchart



Results

156 studies were identified as eligible, after removing studies which had a cohort overlap or missing data, 125 were meta-analysed. The only outcome to experience statistically significant changes over the lockdown period was PTB:

- Reported by the most studies (24) and included 27,593,931 live births
- Heterogeneity was considerable in the crude analysis, so regional subgroup analysis run.
- Regional subgroup analysis found a significant decrease in PTB in: (Figure 2.)
 - European studies (RR: 0.95 (95% CI: 0.92 – 0.98))
 - Australian studies (RR: 0.94 (0.90 – 0.99))
- Time-adjusted studies (8) also indicated a significant decrease over the lockdown period (RR: 0.92 (95%CI: 0.87 – 0.97))
- Data on PTB from second lockdowns (4) indicated a small increase (1.01 (1.01 – 1.02))
- Spontaneous PTB indicated a significant decrease (RR: 0.94 (0.90 – 0.98)) , iatrogenic (medically induced) PTB did not.
- Inequalities over lockdown:
 - PTB was the only outcome with sufficient data stratified by ethnicity and deprivation
 - Only the white ethnicity groups (RR:0.94 (95%CI:0.89-0.98)) experienced a significant decrease in PTB
 - Sample sizes for ethnic minority groups were much smaller and some had considerable heterogeneity.
 - PTB was significantly reduced in low deprivation settings (RR: 0.95 (95%CI: 0.91 – 0.98)).
 - Medium and high deprivation groups did not reflect significant changes over lockdown.
- Other outcomes with considerable, although non-significant, changes over lockdown were:
 - Stillbirth (RR: 1.08 (1.00-1.17))
 - Maternal depression (RR:1.25 (0.96 – 1.64))
 - Neonatal death (RR: 0.85 (0.71 – 1.01)).

Conclusion

- PTB was significantly impacted by lockdowns in HICs.
- The impact was not consistent across:
 - regions,
 - lockdown periods,
 - ethnicity groups,
 - deprivation levels.
- More regional and stratified data is needed to understand lockdowns impact.
- Lockdowns may have impacted PTB through changes to modifiable lifestyle risk factors; changes to socio-environmental determinants and their impact on PTB should be explored.

References:

- 1.Chmielewska B, Barratt I, Townsend R, Kalafat E, van der Meulen J, Gurol-Urganci I, et al. Effects of the COVID-19 pandemic on maternal and perinatal outcomes: a systematic review and meta-analysis. The Lancet Global Health. 2021;9(6):e759-e72.
- 2.Calvert C, Brockway M, Zoega H, Miller JE, Been JV, Amegah AK, et al. Changes in preterm birth and stillbirth during COVID-19 lockdowns in 26 countries. Nature Human Behaviour. 2023;7(4):529-44.

Figure 2.
Preterm birth
by region

