

The frequency and outcomes of maternal cardiac disease in high-resource settings: a systematic review and meta-analysis

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Purpose

Many studies in high-resource settings have identified cardiac disease as a leading cause of maternal deaths ^[1–3], with recent large-scale data showing a 25% increase in its prevalence ^[4]. However, the burden of maternal cardiac disease in high-resource settings has not been accurately assessed. This study aimed to estimate the frequency and outcomes of maternal cardiac disease and its subtypes in high-resource settings.

Methods

A systematic review was conducted by searching MEDLINE, Embase, CINAHL, and Google Scholar for studies on maternal cardiac disease in high-resource settings. Random-effects meta-analyses were performed, and heterogeneity was assessed.

Inclusion criteria:

- ✓ Population-based
- ✓ 2013–2023
- ✓ Journal articles, reports, grey literature

Population: Women during or up to six weeks after pregnancy in high-resource settings

Outcomes: Prevalence, incidence, and mortality of cardiac disease

Studies screened (n = 4147)

Studies assessed for eligibility (n = 285)

Studies included in review (n = 84)

Data extraction

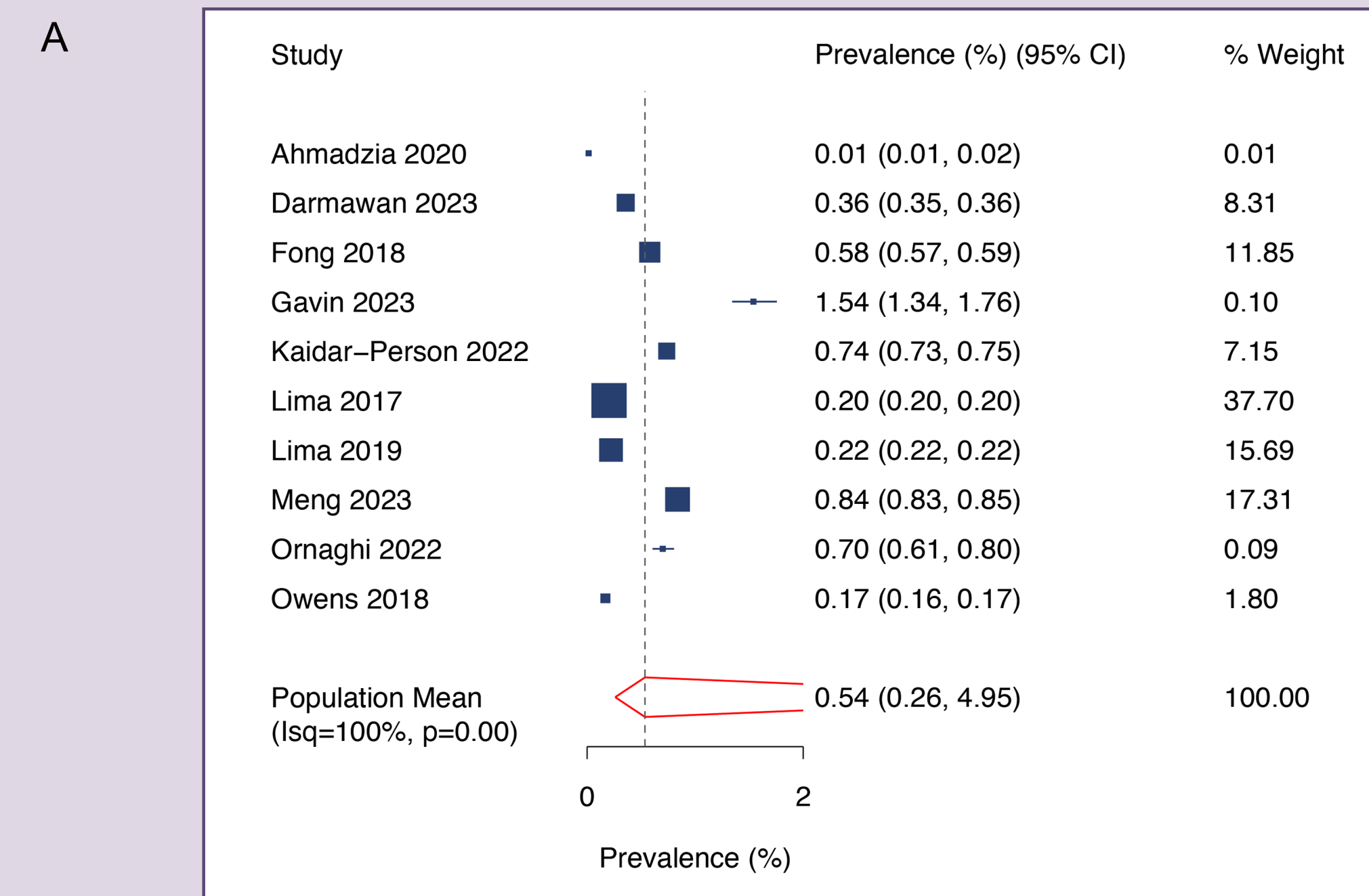
Meta-analyses

Risk of bias assessment

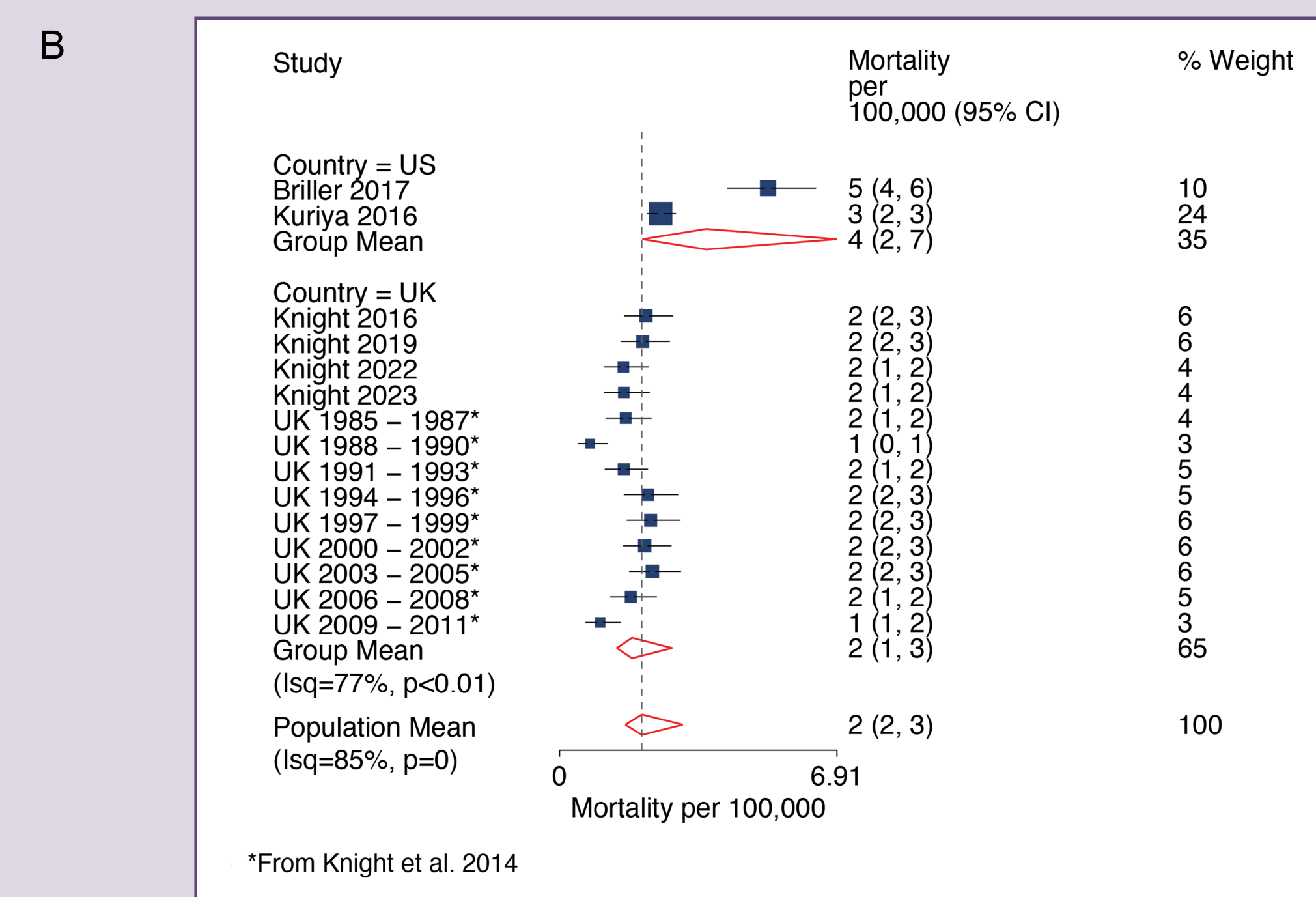
Publication bias assessment

Results

The systematic review identified 84 studies. The pooled prevalence of overall cardiac disease was 0.54% [95% confidence interval (CI) 0.26%–4.95%, I²=99.5%] (Fig A).



The pooled maternal mortality due to cardiac disease was 2 per 100,000 women giving birth (95% CI 2–3 per 100,000, I²=85%) (Fig B).



Results

The most prevalent cardiac disease subtypes were arrhythmias [0.68% (95%CI 0.30%–2.84%), I²=99.5%], congenital heart disease [0.21% (95%CI 0.15%–0.57%), I²=98.9%], and valvular heart disease [0.16% (95%CI 0.12%–2.12%), I²=99.9%].

High heterogeneity was the main limitation with different disease definitions and data sources being key sources of variation. 80% of the included data sets came from the United States of America and United Kingdom, limiting the representativeness of the findings for other high-resource settings.

Conclusions

- Estimates of the prevalence, incidence, and mortality of maternal cardiac disease and subtypes are available for high-resource settings, although estimates vary between studies, making the true burden uncertain. Further research using consistent disease definitions and comparable data sources is needed.
- Furthermore, data from a greater diversity of high-income countries are needed.

Reference:

- [1] Kallianidis AF, Schutte JM, Schuringa LEM, Beenackers ICM, Bloemenkamp KWM, Braams-Lisman BAM, et al. Acta Obstetrica et Gynecologica Scandinavica 2022;101:441–449. doi: <https://doi.org/https://dx.doi.org/10.1111/aogs.14312>
- [2] Syeda SK, Wen T, Wright JD, Goffman D, D’Alton ME, Friedman AM. Journal of Maternal-Fetal and Neonatal Medicine 2022;35:4768–4774. doi: <https://doi.org/https://dx.doi.org/10.1080/14767058.2020.1863368>
- [3] Felker A, Knight M, Patel R, Kotnis R, Kenyon S. In. Oxford: National Perinatal Epidemiology Unit, University of Oxford; 2024.
- [4] Owens A, Yang J, Nie L, Lima F, Avila C, Stergiopoulos K. Journal of the American Heart

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