

ABSTRACT

Background: Congenital heart disease (CHD) is the most common congenital anomaly and remains a major contributor to infant morbidity and mortality. While several maternal factors have been identified, the role of maternal hypertension as an independent risk factor for CHD is still limitedly explored in Indonesia.

Objective: To determine whether maternal hypertension is an independent risk factor for congenital heart disease.

Methods: This study used an unmatched retrospective case–control design based on secondary data from the Pediatric Cardiology Registry of RSUP Dr. Sardjito from January 2021 to December 2024. Cases were children aged 0–18 years with CHD confirmed by echocardiography, while controls were children without CHD confirmed by echocardiography. Maternal hypertension was defined as documented blood pressure $\geq 140/90$ mmHg or use of antihypertensive medication during pregnancy. Potential confounders included maternal age, maternal diabetes, maternal rubella infection, and the presence of genetic syndromes. Data were analyzed using bivariate analysis followed by multivariate logistic regression.

Results: Maternal hypertension was significantly associated with congenital heart disease (CHD) in children, with syndrome acting as a strong confounder but not eliminating the effect. After adjustment, children born to hypertensive mothers had approximately three and a half times higher odds of CHD compared with children born to normotensive mothers (adjusted OR ≈ 3.41 ; 95% CI: 1.63–7.13). The presence of syndrome was also independently associated with CHD (adjusted OR ≈ 3.26 ; 95% CI: 1.71–6.21). Maternal age ≥ 35 years, maternal diabetes, maternal rubella infection, and child age did not remain independently associated with CHD.

Conclusion: Maternal hypertension is an independent risk factor for congenital heart disease. Early identification and optimal management of hypertensive disorders during pregnancy may reduce the risk of CHD in offspring.

Keywords: congenital heart disease, congenital heart defect, maternal hypertension, preeclampsia, gestational hypertension, risk factor, pediatric