



Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care

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The Silent Threat: Nocturnal Systolic Blood Pressure and Cardiorenal Risk in Chronic Kidney Disease

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Objectives : Nocturnal systolic blood pressure (NSBP), measured by ambulatory blood pressure monitoring (ABPM), better captures nocturnal blood pressure patterns than conventional measurements. However, its prognostic significance for cardiorenal outcomes in patients with chronic kidney disease (CKD) remains incompletely defined. This study aimed to systematically evaluate the association between NSBP and cardiorenal outcomes in patients with CKD through a meta-analysis of observational studies.

Methods : PubMed, Embase, and Web of Science were systematically searched from inception to December 2025 for observational studies of adult, non-dialysis CKD patients who underwent ABPM and reported multivariable-adjusted hazard ratios (HRs) for NSBP. Two investigators independently screened the titles, abstracts, and full texts, with disagreements resolved by a third investigator. The study protocol was prospectively registered. Outcomes included kidney failure, cardiovascular events, cardiovascular mortality, all-cause mortality, and a composite renal outcome (kidney failure or death). HRs were pooled per 10-mmHg increase in NSBP using random-effects models. Heterogeneity was assessed with the I^2 statistic and publication bias by funnel plots.

Results : A total of 14 studies were included, reporting renal failure (7 studies), cardiovascular events (4 studies), cardiovascular mortality (2 studies), all-cause mortality (4 studies), and composite renal outcomes (7 studies). Each 10-mmHg increase in NSBP was associated with a significantly higher risk of kidney failure (HR = 1.22, 95% CI: 1.16–1.28), cardiovascular events (HR = 1.18, 95% CI: 1.08–1.30), cardiovascular mortality (HR = 1.24, 95% CI: 1.11–1.39), all-cause mortality (HR = 1.19, 95% CI: 1.06–1.34), and composite renal outcomes (HR = 1.18, 95% CI: 1.11–1.25). Funnel plots did not suggest significant publication bias.

Conclusions : This meta-analysis indicated that elevated NSBP measured by ABPM was associated with increased risks of adverse cardiorenal outcomes in patients with CKD. These findings highlight the clinical importance of nocturnal blood pressure assessment and support the integration of ABPM into risk stratification and management of CKD patients.

Figure1 Forest plot of the association between nocturnal systolic blood pressure and renal failure in patients with CKD.png



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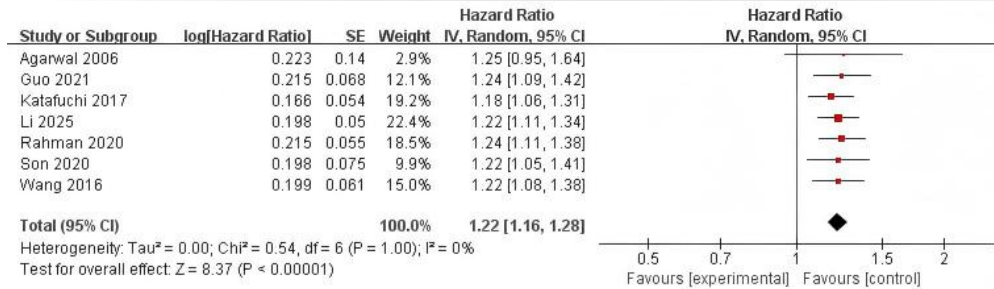


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