# The effect of Renin Angiotensin System blockers versus Calcium Channel Blockers on progression towards chronic kidney disease in hypertensive patients: A Systematic Review And Meta-analysis of randomized controlled trials


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## Introduction

- Decline in estimated **Glomerular filtration rate (eGFR)** is associated with further progression of chronic kidney disease.
- **Renin Angiotensin System blockers (RAS),** which can be **angiotensin receptor blockers (ARBs)** or **Angiotensin converting enzymes Inhibitors (ACEIs),** have reno-protective effect, but results are variable.
- **Calcium channel blockers (CCBs)** are shown to have a role in protecting renal function but differ across studies.
- Hence, the relative effect of **ARBs** or **ACEIs** as well as **CCBs**, and their administration as monotherapy, remain uncertain.

## Aim of the study

To summarize and determine the pooled effect of **RAS blockers** versus **CCBs** on progression towards hypertensive Chronic Kidney Disease (CKD) amongst diabetic as well as non-diabetic patients with CKD of any stage from I-IV.

## Methods

**Data Sources**:
All language studies in PubMed, the Cochrane Library Central, Clinical Registry of unpublished Trials, WHO, Embase, Scopus, ProQuest, reference lists, and expert contacts up to September 2019.

**Study Selection:**

- The study included all the full text articles that investigated diabetic and non-diabetic patients with any CKD stage of I-IV (eGFR ≥ 15 ml/min per 1.73m$^3$ or Urinary albumin excretion levels (UAE) ≤ 300mg/d )during **RAS** based treatment an intervention in direct comparison with **CCBs** treatment based approach as comparator at baseline and at the end of follow-up.
- However, pooling of all the included studies using meta-analysis was not feasible due to substantial study heterogeneity and the small number of included studies.

- So, studies were selected for systematic review, however, all meta-analyzable studies were quantitatively analyzed on the basis of main outcomes such as

**(i)** Relative risk for CKD progression and
**(ii)** Mean differences in average SBP and DBP between two groups.

## Results

- Review with seven included trials, and meta- analysis using IVhet model was done on three studies for primary CKD outcome and four studies for secondary BP outcomes (Fig. 1).
- **RAS** blockers and **CCBs** did not show any statistically significant differences in terms of its effects on further progression CKD with RR of 0.90 [95% CI 0.69, 1.16] (Fig. 2).
- There was no statistically significant difference in BP at final end points between **CCBs** and **RAS** inhibitors with WMD of -2.09 mmHg [95% CI -5.96, 1.79] for mean SBP change and -0.71 mmHg [95% CI -2.16, 0.73] for mean DBP change (Figs. 3 a and b).

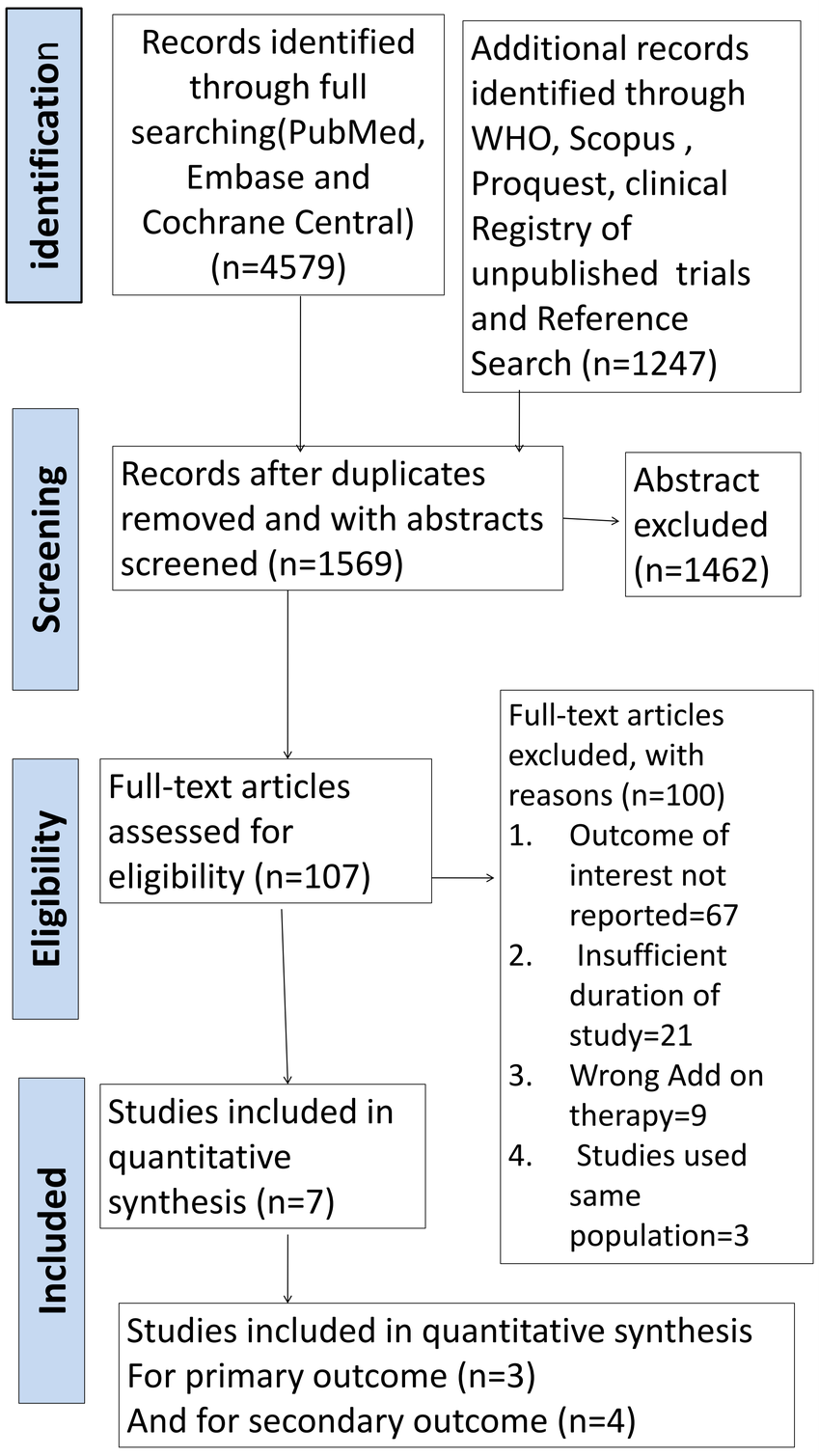


**Fig. 1: Study flow diagram**

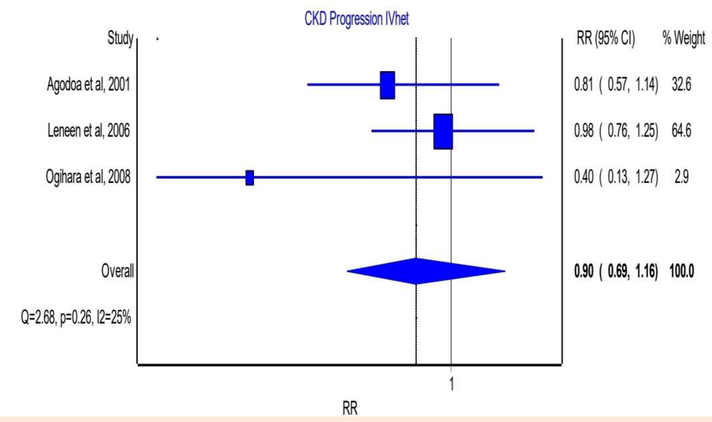


**Fig. 2: Forest plot for CKD progression**

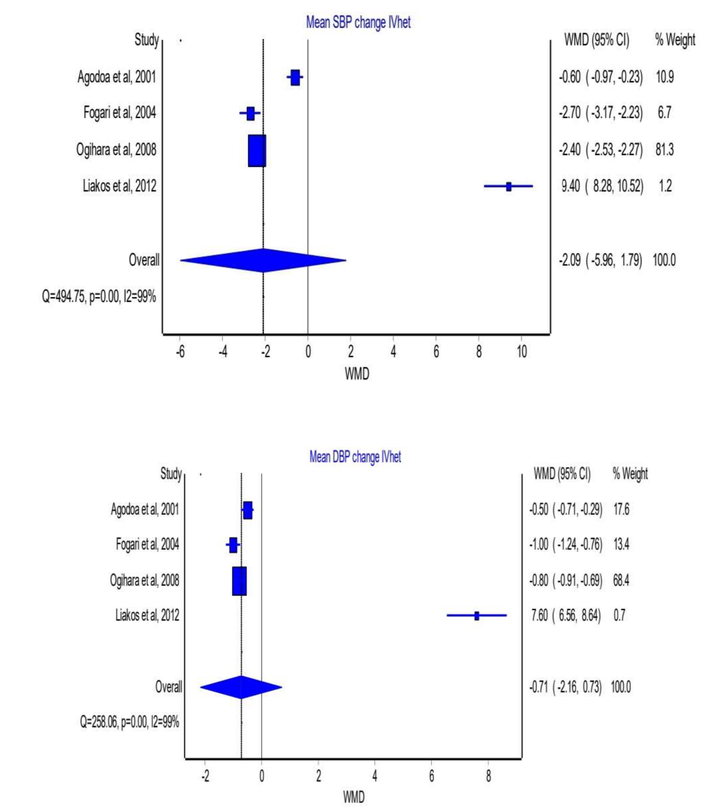


**Fig. 3: Forest plot for a. Mean SBP change; b. Mean DBP change**

## Concluding remarks

- Evidence asserts **no** difference between **RAS** and **CCB** concerning the risk of progression for CKD and in terms of mean BP differences.
- However, the study has some **limitations,** which could be addressed via robust findings from well designed and well conducted RCTs.

## References


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2. Zhang Z, Chen C, Lv S, Zhu Y, Fang T. Comparing the Efficacy of Angiotensin Converting Enzyme Inhibitors with Calcium Channel Blockers on the Treatment of Diabetic Nephropathy: A Meta- Analysis. Iran J Public Health. 2019 Feb;48(2):189–97.