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## **The Effect of Curcumin in Chronic Kidney Disease with Animal Model : A Systematic Literature Review**

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**Objectives:** Worsening of chronic kidney disease (CKD) is influenced by inflammatory process, oxidative stress, and apoptosis. While, curcumin is well-known for its anti-inflammatory, anti-oxidant, anti-apoptosis effect. This study aims to determine the effect of curcumin in improving or preventing worsening of CKD.

**Methods:** A systematic literature was performed using Pubmed and BMJ. Curcumin and chronic kidney disease were used as the search term. A systematic review of published studies was performed with PRISMA statement. Studies which had randomized control trial with Animal Model as design study were included.

**Results:** Four randomized control trials (RCTs) had been selected and identified from 139 studies. All RCTs showed that there are improvements in kidney function on curcumin effect. Overall, curcumin has several effects which lead to the decline in Cr, BUN and urine protein/cr/albumin, also the rise of CCr. Two RCTs showed a decrease in body weight of kidney, but the other two RCTs showed different results which were not significantly different and curcumin, on contrary, increased the body weight. The improvement of kidney function resulted from the benefit of curcumin as an anti-inflammatory, anti-oxidant, and anti-apoptosis agent. Curcumin was able to protect and improve kidney by inhibiting prostaglandin E2 production and nitric oxide, protecting from oxidative injury, increasing the level of reduced glutathione, declining TNF- $\alpha$ , and reducing lipid peroxidation.

**Conclusions:** Curcumin prevents worsening of CKD and might be improving renal function by its anti-inflammatory, anti-oxidant, anti-apoptosis effect. However, further clinical trials with larger populations are needed to more accurately evaluate the effect of curcumin in renal function.

Figure 1. PRISMA algorithm

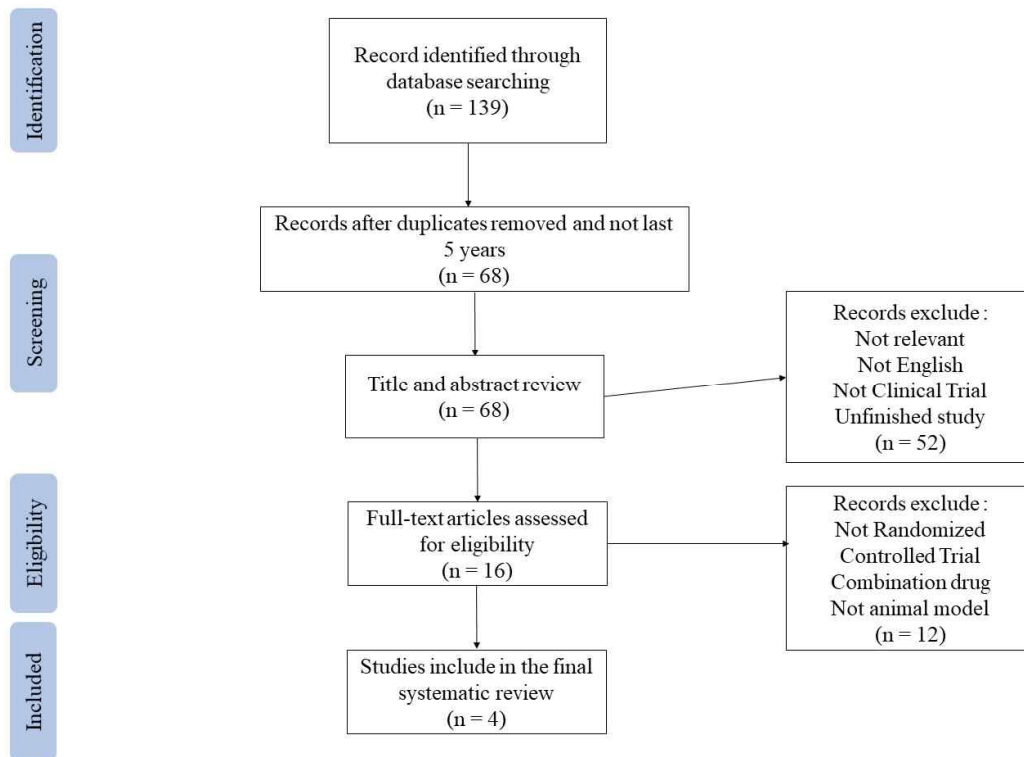


Table 1. Summary of Randomized Controlled Trial in Evaluating Curcumin Effect in Chronic Kidney Disease

No	Author	Country	Study	Number of sample	Dosage	Result					
						Creatinine	BUN	Urine protein/creatinine/albumin	Body weight of kidney	Creatinine clearance	Others
1	Ghelani H et al, 2019	Australia	RCT	29	curcumin at doses of 50, 100 and 150 mg/kg	Decrease*	Decrease*	Increase of creatinine*, decrease of total protein*	Not significant different	Increase*	Decrease of total cholesterol, triglyceride*, LDL*, VLDL* Increase of HDL*
2	Ali BH et al, 2017	Oman	RCT	48	37.5, 75 and 150 mg/kg	-	-	Decrease of urinary albumin/creatinine*	Decrease*	Increase (NS)	Decrease of TNF alpha*, cystatin C*, adiponectin* Increase of sclerotine*
3	He Y et al, 2019	China	RCT	70	curcumin 75 mg/kg	Decrease*	Decrease*	Decrease of urine protein*	Increase*	-	Decrease of p-mTOR*, mTOR*, p-P70S6K1*, P70S6K1*, P-4E-BP1*, 4E-BP1*, HIF-1α* and VEGF*
4	Lau WL et al, 2018	United States	RCT	15	1% Tetrahydrocurcumin	Decrease#	Decrease#	Decrease of urine protein/creatinine*	Decrease#	Increase#	Increase of CuZn*, SOD*, GPX-1* Decrease of caspase-3*, alphaSM-actin*

\* = Significant difference from CKD control (p<0.05)  
 NS = Non significant difference from CKD control  
 # = No data for analysis significance from CKD control