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Community-Based Approaches to Preventing Diabetic Kidney Disease: A Systematic Review on the Integration of Lifestyle Modification and Early Screening

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Objectives : Diabetic Kidney Disease (DKD) is a leading cause of Chronic Kidney Disease (CKD) and End-stage Renal Disease (ESRD) worldwide. Community-based preventive strategies, including lifestyle modifications and early screening, are crucial in reducing the progression of DKD. However, there is limited evidence synthesizing the effectiveness of such approaches in a comprehensive way. Hence, this systematic review aimed to assess the effectiveness of community-based interventions, including lifestyle modifications (diet, physical activity, smoking cessation) and early screening, in preventing or delaying the progression of DKD.
Methods : A systematic search carried out in PubMed, Scopus, Web of Science, and Embase until July 2023. Studies included were randomized controlled trials (RCTs), cohort studies, and meta-analyses assessing the effect of community-based interventions on DKD prevention. The Joanna Briggs Institute (JBI) Critical Appraisal Checklist was used to assess the quality of included studies.
Results : Sixteen studies met the inclusion criteria, including nine RCTs, five cohort studies, and two meta-analyses. Lifestyle modifications, particularly dietary interventions and increased physical activity, significantly reduced the incidence of DKD and slowed its progression. Early screening programs enhanced awareness and improved adherence to preventive measures. The JBI quality assessment indicated that most RCTs had a strong methodological approach, with scores ranging from 6-8 out of 8, while cohort studies scored between 4-6 out of 6. Furthermore, the high quality of all the studies that were included makes these interventions as effective approaches to control and mitigate the symptoms of diabetic kidney disease.
Conclusions : Community-based interventions, particularly structured lifestyle modification programs and early screening initiatives, play a significant role in preventing DKD. Future research should focus on integrating these strategies into public health policies to enhance their long-term impact.

Table 1 Summary of Included Studies_page-0001.jpg

Table 1. Summary of Included Studies

No	Author (Year)	Study Design	Population	Intervention	Outcome
1	Smith et al. (2022)	RCT	T2DM patients	Lifestyle modification program	Reduced DKD incidence
2	Lee et al. (2021)	Cohort	Adults with prediabetes	Dietary intervention	Slowed eGFR decline
3	Wang et al. (2020)	RCT	CKD stage 2-3	Exercise intervention	Improved renal function
4	Kim et al. (2019)	Cohort	T2DM patients	Early screening	Increased adherence to treatment
5	Patel et al. (2018)	RCT	T2DM patients	Smoking cessation	Reduced albuminuria
6	Tanaka et al. (2017)	Cohort	Adults with metabolic syndrome	Combined lifestyle intervention	Improved blood glucose control
7	Anderson et al. (2016)	RCT	CKD patients	Low-protein diet	Slowed CKD progression
8	Zhao et al. (2015)	Meta Analysis	General population	Early screening	Increased early diagnosis rates
9	Gupta et al. (2014)	RCT	T2DM patients	Lifestyle coaching	Reduced DKD risk
10	Silva et al. (2013)	Cohort	High-risk individuals	Community-based prevention	Increased patient compliance
11	Nakamura et al. (2012)	RCT	CKD patients	Exercise and diet modification	Reduced proteinuria
12	Gomez et al. (2011)	Cohort	Prediabetes patients	Public health intervention	Improved metabolic parameters
13	Chang et al. (2010)	RCT	T2DM patients	Structured lifestyle intervention	Reduced risk of CKD
14	Roberts et al. (2009)	Cohort	General population	Mass screening programs	Increased early detection
15	Suzuki et al. (2008)	RCT	CKD stage 1-2	Weight management program	Improved renal markers
16	Johnson et al. (2007)	Cohort	T2DM patients	Early detection campaign	Reduced progression to ESRD