

KEEP Pakistan Health Initiative: Establishing a Kidney Early Evaluation Program in a Resource-Limited Setting- A Local Expert Survey and Proposed Framework

Shafiq Cheema, Faiza Muzahir, Muhammad Ahmed Abubakar, Nawal Chishti

Department of Nephrology,
Allama Iqbal Medical College/ Jinnah Hospital, Lahore, Pakistan

Abstract

Background: Chronic kidney disease is a major health burden all over the world including Pakistan where most of the cases remain undiagnosed at the community level. Kidney Early Evaluation Program (KEEP) in Pakistan offers a validated framework for target based community screening of kidney disease in resource limit settings.

Materials and methods: A structured questionnaire in the form of google form was sent to 24 medical experts. Respondents were asked to give their opinion and guidance about clinical and operational questions related to the implementation of KEEP initiative for early detection of chronic kidney disease in high risk population of Pakistan.

Results: About 80% of the respondents recommended chronic kidney disease screening using serum creatinine-based eGFR and spot urine albumin-to-creatinine ratio. Addition of urine complete examination for detecting glomerulonephritis was suggested by 70% of the respondents, while 37% supported random blood sugar testing for diabetes screening. Most favored a combined screening strategy targeting high-risk groups, supported through sponsored funding. More than half also recommended screening individuals with recurrent kidney stones. Experts estimated that 40 – 50% of kidney disease cases remain undiagnosed in Pakistan. Most preferred screening in camps and hospital settings and were willing to participate in screening.

Conclusion: This survey provides us robust information about implementation of screening program for KEEP Pakistan. Targeting high risk individuals using a sponsored funded model for CKD screening is both feasible and urgently needed to address the silent epidemic of kidney disease in Pakistan.

Keywords: Chronic Kidney Disease, High Risk population, Kidney disease screening, KEEP Pakistan

Corresponding Author:

Dr Shafiq Cheema, MD FACP FASN (USA)

Department of Nephrology,

Allama Iqbal Medical College/ Jinnah Hospital, Lahore, Pakistan

Email: Shafiqcheema@yahoo.com

DOI: <https://doi.org/10.53778/pjkd103374>

Received 8 Aug 2026 and accepted 26 Sep 2026

PJKD 2026;10(3):15-27

Introduction

Chronic kidney disease (CKD) represents a growing global public health crisis, with current joint estimates by international nephrology organizations (ISN, ERA-EDTA, ASN) and WHO/KDIGO health reports indicating that over 850 million individuals are affected worldwide (Jager et al., 2019; ISN, 2023).¹ 80% of the above said population with CKD reside in low-income countries (LICs) and lower middle-income countries (LMICs), with approximately 1/3 of the above said population living in China and India alone.^{1,2} Between 1990 and 2017, prevalence of CKD has increased by 33%.¹ By 2040, CKD is expected to surpass type 2 diabetes, Alzheimer's disease, and road injuries to become the fifth most common cause of years of life lost.³ In contrast to other non-communicable diseases (NCDs) such as cardiovascular disease, stroke, and respiratory disease,

which are projected to experience a decline in mortality, CKD has increasing mortality⁴. Primary strategy to protect kidney health, prevent chronic kidney disease progression along with its related complications, reduce cardiovascular disease risk and reduce kidney-related and cardiovascular mortality is by initiating timely and appropriate treatment for kidney disease.⁵⁻⁷

International assessment of public about kidney disease shows low awareness about symptoms, screening, diagnosing and treatment of chronic kidney disease⁸. Individuals all over the world universally express the desire of having being diagnosed early in their disease path to allow for more time for education, lifestyle changes and pharmacological interventions⁸. In light of all these, it is highly suggestive that early detection of chronic kidney disease is a public health priority.^{5,7}

CKD burden in Pakistan: A Call for Urgent Action

Pakistan is classified as a lower middle-income country by World Bank with a health care system affected by both communicable and non-communicable diseases. Prevalence of hypertension and diabetes in Pakistan in adult population is around 30 to 40 percent for both diseases and accounts for independent risk factors for chronic kidney disease and contribute to a major burden of kidney disease in Pakistan^{9,10}. Like the rest of the world, Pakistan also shows a high prevalence of chronic kidney disease ranging from 12.5% to 29.9%.^{11,12}

Despite this huge burden of risk factors and chronic kidney disease, Nephrology services in Pakistan remain limited. There is also scarcity of resources for managing patients with chronic kidney disease and facilities for dialysis in rural areas further burdening national exchequer and also adding a constant physical and psychological toll on patients and their families¹³. In view of all this, the KEEP Pakistan initiative is a case finding pilot study designed to screen approximately 10,000 individuals at high risk for CKD. To define the most appropriate high risk criteria and screening modalities in a resource limited settings, an expert survey was conducted.

Materials and Methods

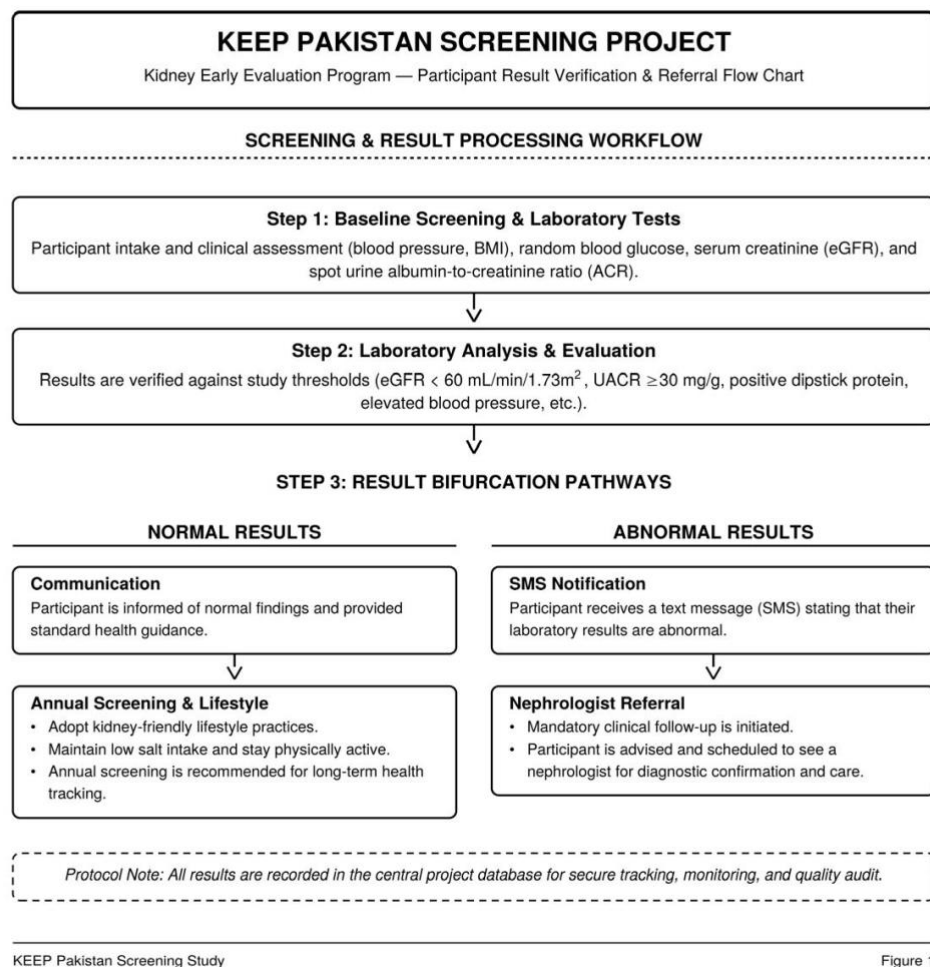
Study design and settings

This study was designed as an expert-based cross-sectional survey to inform the development of the KEEP Pakistan (Kidney Early Evaluation Program Pakistan) initiative, a national program aimed at early detection of chronic kidney disease (CKD) in high risk population in a resource-limited setting. Survey was conducted to identify agreement on screening strategies, target populations and implementation models suitable for local healthcare infrastructure, Figure 1 details the workflow of the KEEP Pakistan initiative. Ethical approval was obtained from hospital IRB Ref # IRB-25/1-IMC-December 4, 2025.

Study participants

Survey was done amongst 24 practicing nephrologists and physicians involved in kidney care across Pakistan and USA. Participants represented a range of institutions including teaching hospitals, private clinics and academic centers across Pakistan, reflecting a broad spectrum of clinical experience. Invitations were extended through professional networks, institutional affiliations, and nephrology forums. Data was collected electronically via online platform (Google form). Participation was voluntary and responses were collected anonymously. Duplicate entries were noted and excluded.

Figure 1: Workflow for the KEEP Pakistan study.



Survey development

A structured questionnaire was developed which focused on screening strategies, target population and implementation models, Figure 2. It was based on current CKD guidelines, screening models previously used and local clinical considerations. The survey was designed to assess expert opinion on

- * Appropriate screening tests for CKD
- * Identification of high-risk populations
- * Role of urine analysis vs UACR
- * Inclusion of random blood glucose testing
- * Use of SCORED risk tool for screening of CKD
- * Addition of recurrent kidney stones as CKD risk factor
- * Screening models (community vs facility-based)
- * Perceived burden of undiagnosed CKD in community
- * Follow up protocol if reports come abnormal
- * Feasibility in a resource-limited setting
- * Willingness to participate in screening program

CKD & KEEP Pakistan Initiative

Figure 2: KEEP Pakistan Healthy Initiative survey questionnaire.

KEEP Pakistan Healthy Initiative
Expert Advisory Poll on CKD Screening Strategy
Pakistan Kidney Foundation & Dr. Shafiq Cheema

The Kidney Early Evaluation Program (KEEP) implemented by the National Kidney Foundation demonstrated that targeted screening of high-risk populations can detect chronic kidney disease early in a cost-effective manner.

As we develop the KEEP Pakistan Healthy Initiative, we would greatly value your expert opinion to help design a practical CKD screening strategy for Pakistan.

Your input will help guide the development of an effective CKD screening program in Pakistan.

Respondent Details

Name: _____

Institution: _____

Date: _____

Instructions: Please tick (✓) one option for each question.

No.	Question	Response Options (tick one)
1	In a resource-limited country like Pakistan, what should be the core laboratory test strategy for CKD screening?	☐ Serum Creatinine (to estimate eGFR) only ☐ UACR (Urine Albumin–Creatinine Ratio) only ☐ Both Serum Creatinine (eGFR) and UACR
2	Should we add urine dipstick testing along with UACR to detect glomerulonephritis cases presenting primarily with hematuria and to allow comparison of dipstick performance with UACR in the Pakistani population?	☐ Yes ☐ No ☐ UACR alone is sufficient
3	Should diabetes screening be included as part of KEEP Pakistan?	☐ Random Blood Glucose ☐ HbA1c ☐ Both Random Blood Glucose and HbA1c ☐ None
4	What screening strategy should KEEP Pakistan adopt?	☐ Screen all patients with hypertension and diabetes ☐ Screen only high-risk individuals identified using the SCORED questionnaire (score ≥4 indicates ~25% CKD risk) ☐ Combination approach (initial risk assessment followed by targeted laboratory screening)
5	Since kidney stone disease is common in Pakistan, should individuals with a history of kidney stones also be included in the CKD screening program?	☐ Yes ☐ No ☐ Only if recurrent stones or additional risk factors exist
6	Should other high-risk groups also be included in screening?	☐ Include individuals with any additional high-risk factor such as family history of CKD, cardiovascular disease (heart attack or stroke), or age ≥60 years ☐ Initially screen only diabetics and hypertensives ☐ Include all high-risk groups from the start
7	What should be the financial model for the KEEP Pakistan screening program?	☐ Completely free screening ☐ Paid screening at discounted price ☐ Hybrid model (basic screening free, advanced tests paid)
8	In your opinion, what percentage of CKD cases in Pakistan remain undiagnosed in the community?	☐ Less than 25% ☐ 25–50% ☐ 50–75% ☐ More than 75%
9	What should be the preferred setting for CKD screening under KEEP Pakistan?	☐ Primary care clinics / hospitals ☐ Community screening camps ☐ Both community camps and healthcare facilities ☐ Mobile screening units for rural areas
10	If abnormal results are detected during screening (reduced eGFR or albuminuria), what should be the recommended next step?	☐ Referral to nephrologist ☐ Referral to primary care physician first ☐ Repeat testing after 3 months before referral ☐ Combination approach depending on severity
11	Would you be willing to serve on the Advisory Board of the KEEP Pakistan Healthy Initiative?	☐ Yes ☐ No ☐ Maybe / Need more information
12	Would you and your center be willing to participate in the KEEP Pakistan Healthy screening program?	☐ Yes ☐ No

Thank you for your valuable input.

Statistical Analysis: Data was analyzed using descriptive statistics and categorical variables expressed in percentages (%). Results were summarized to identify areas of agreement and variability among respondents. No inferential statistical testing was performed, as the primary objective was to guide program development through expert agreement.

Ethical considerations: Participation in the survey was voluntary. No identifiable personal data were collected. The study was conducted in accordance with ethical principles for survey-based research.

Results

Out of total 327 members of the whats App group 24 (7.4%) responded from all across Pakistan, Figure 3-5 and Table 1.

Testing strategy for CKD screening

The majority of participants (79.2%) supported the use of both serum creatinine (for estimation of eGFR) and urine albumin-creatinine ratio (UACR) as the core laboratory tests for CKD screening.

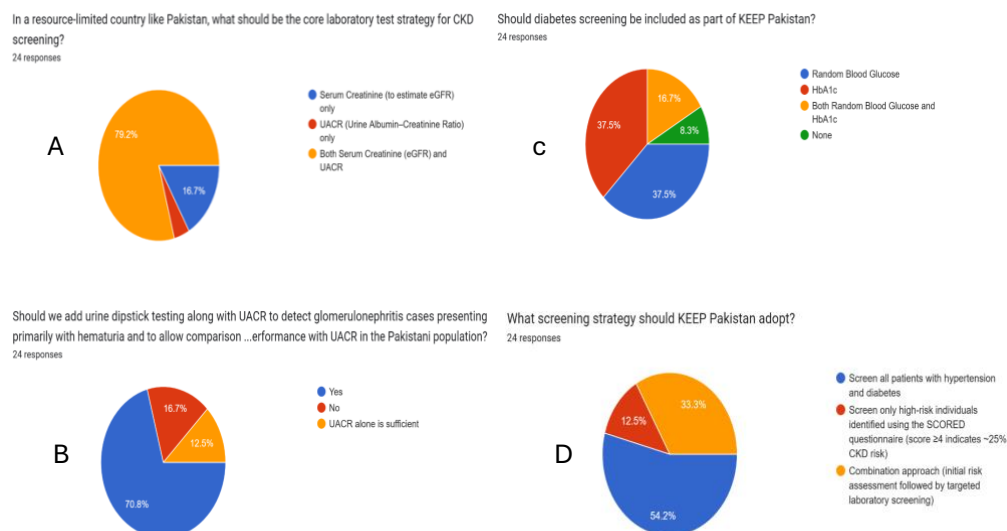


Figure 3: Response to the Keep Pakistan healthy initiative regarding laboratory measures to be included and the clinical states.

In addition, 70.8% of respondents favored inclusion of urine analysis alongside UACR. This reflects strong support for detecting hematuria and identifying glomerular diseases that may not present with albuminuria alone.

Diabetes screening

Given the high prevalence of diabetes in Pakistan and its role in causing kidney disease, more than 90% of respondents suggested adding screening of diabetes in KEEP initiative. Out of HbA1c and random blood sugar, each modality was chosen by 37.5% to screen for diabetes.

Screening strategy

About screening strategy, about 54.2% respondents suggested using diabetes and hypertension as risk factor for screening program while 33.3% suggested combination approach (initial risk assessment followed by targeted laboratory screening). Only 12.5% suggested using SCORED criteria for CKD screening.

Inclusion of Kidney Stones as risk factor for CKD

As incidence of kidney stones is high, it was asked whether it should be added as risk factor for kidney disease. 54.2% agreed with this and more than 41.7% suggested to add this only if there are additional risk factors or history of recurrent stones.

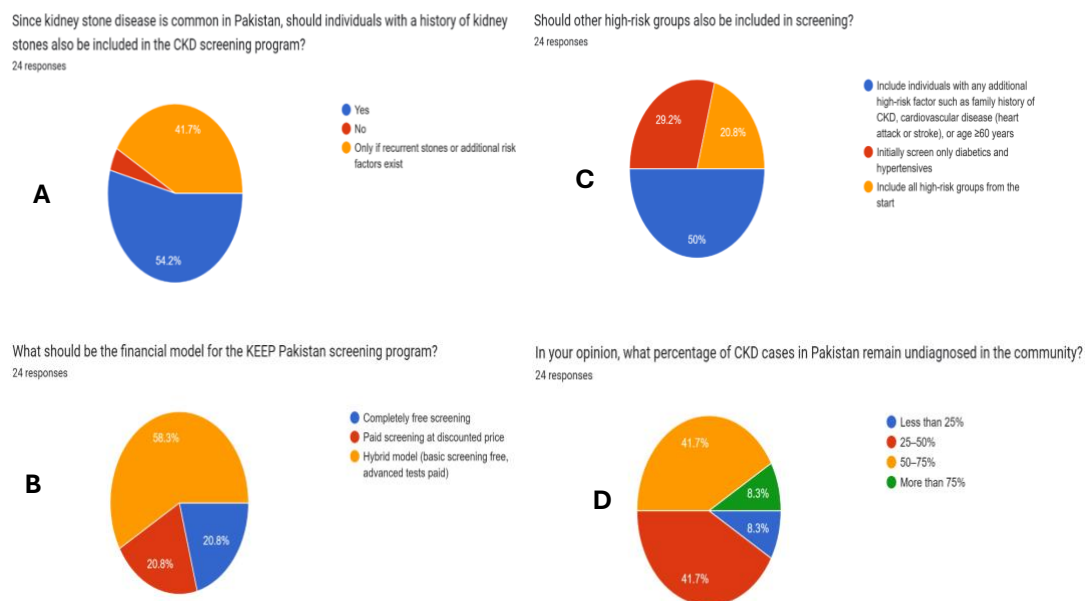


Figure 4: Response to the Keep Pakistan healthy initiative regarding kidney stones, financial model, risk stratification and estimate for CKD.

Additional high risk groups

50% of respondents suggested adding additional risk factors such as cardiovascular disease and other factors while 29.2% suggested to initially start with diabetes and hypertension. 20.8% chose adding all risk groups

Financial model

58.3% suggested Hybrid model in which there will be free basic screening followed by paid advanced tests, if needed. 20.8% suggested totally free screening while 20.8% suggested subsidized screening.

Undiagnosed CKD burden

Participants estimated a significant burden of undiagnosed CKD in which 41.7% believed that 25 – 50% of CKD cases remain undiagnosed and an equal percentage believed percentage to be 50-75%. This highlights a strong perception among clinicians that CKD remains significantly under-recognized in the community.

Screening settings

62.5% suggested both camps and hospitals for screening reflecting strong support for a hybrid delivery model, balancing accessibility with diagnostic accuracy.

Follow-up of abnormal results

54.2% suggested referral to nephrologist while 41.7% suggested stratifying patients on severity and then managing them accordingly. A minor number of respondents suggested repeat labs at 3 months' interval.

Willingness for participation

About the willingness to be on advisory board of KEEP, 62.5% responded in yes while 29.2% wanted more information. About participation in screening work, more than 90% were willing to be included.

CKD & KEEP Pakistan Initiative

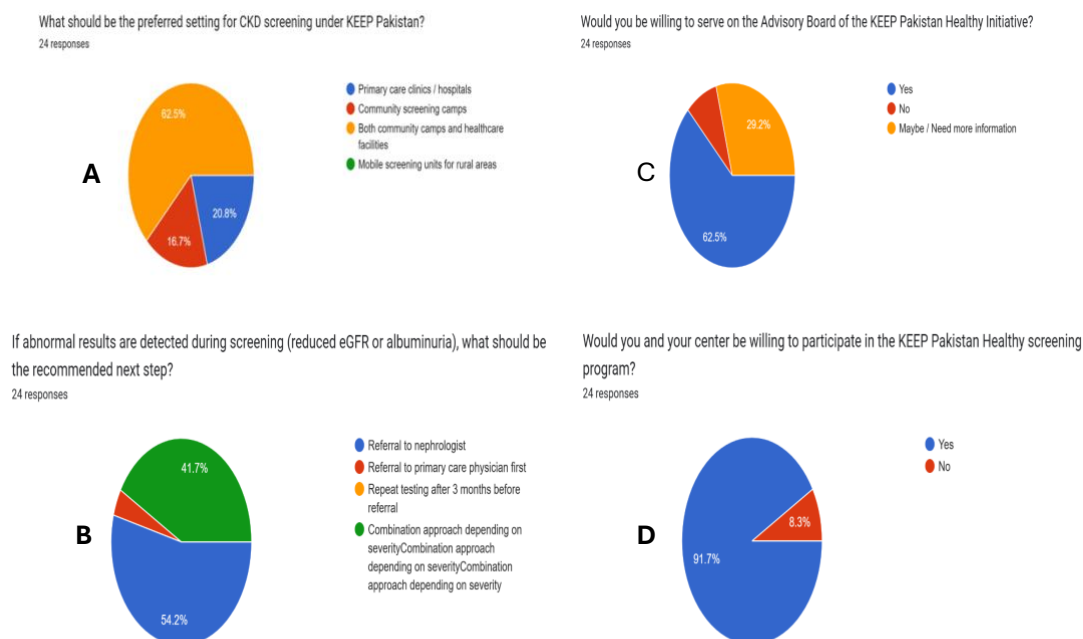


Figure 5: Response to the Keep Pakistan healthy initiative regarding place of screening and followup plan for incident cases diagnosed with CKD.

Discussion

The findings of this expert poll strongly support the development of KEEP Pakistan as a targeted case-finding initiative rather than a general population screening program. This approach is aligned with the experience of the National Kidney Foundation Kidney Early Evaluation Program (KEEP), which was specifically designed as a free community-based screening initiative for individuals at increased risk of CKD, particularly those with diabetes, hypertension, or family history of kidney disease¹⁴. In resource-limited countries such as Pakistan, where healthcare resources remain constrained and a large proportion of CKD cases remain undiagnosed, a focused high-risk screening strategy is likely to provide the greatest clinical and public health benefit.

In our poll, 79% of participants recommended the combined use of serum creatinine-based estimated glomerular filtration rate (eGFR) and urine albumin to creatinine ratio (UACR) for CKD screening while only a small proportion favored either test alone. Chronic kidney disease is diagnosed on the basis of functional abnormality having estimated glomerular filtration rate (eGFR) less than 60ml/min/1.73m² or urine albumin to creatinine ratio more than 30mg/g persisting for more than 3 months or structural abnormality on radiologic investigations⁷. Current

Table 1: KEEP Pakistan Healthy Initiative Expert Advisory Poll on CKD Screening Strategy
Pakistan Kidney Foundation | March – April 2026 | Total Respondents: 24

Question	Most Selected Response	%	Other Key Responses
Q1. Core Laboratory Test Strategy for CKD Screening	Both Serum Creatinine (eGFR) and UACR	79%	eGFR only: 16.7% ; UACR only: 4.1%
Q2. Add Urine Complete Alongside UACR to detect GN?	Yes	71%	No: 17% ; UACR alone sufficient: 12.5%
Q3. Diabetes Screening as part of KEEP?	HbA1c	37.5%	Both: 16.7%
Q4. Preferred Screening Strategy	Random Blood Glucose	for both	None: 8.3%
	Screen all patients with hypertension and diabetes	54%	Combination approach: 33% ; SCORED ≥ 4 only: 12.5%
Q5. Include Individuals with History of Kidney Stones?	Yes	54%	Only if recurrent stones or additional risk factors exist Include all: 41% ; No: 5%
Q6. Other High-Risk Groups to Include	Family history of CKD/CVD or age ≥ 60	50%	Diabetics & hypertensive only: 29% ; All high-risk groups: 21%
Q7. Financial Model	Hybrid model (basic free, advanced paid)	58%	Discounted paid screening: 21% ; Completely free: 21%
Q8. Estimated CKD Cases Undiagnosed	25–50%	42% for	>75%: 8%
Q9. Preferred Screening Setting	50–75%	both	Less than 25%: 8%
	Community camps + healthcare facilities	62.5%	Primary care/hospitals: 20% ; Camps only: 17%
Q10. Recommended Next Step After Abnormal Results	Referral to nephrologist	54%	Combination approach: 42% ; PCP referral first: 4%
Q11. Willing to Serve on Advisory Board?	Yes	62.5%	Maybe/Need more info: 29% ; No: 8%
Q12. Willing to Participate in KEEP Pakistan Screening Program?	Yes	92%	No: 8%

KDIGO guidelines recommend the use of both eGFR and albuminuria for the detection, staging, and risk stratification of CKD⁷. Several previous screening studies have also demonstrated that the combined use of eGFR and arc improves identification of high-risk individuals and enhances early detection of kidney disease^{15,16}. Based on these findings and existing evidence, KEEP Pakistan plans to incorporate both serum creatinine-based eGFR and spot as the core screening investigations.

Approximately 70% of respondents supported the addition of urine complete examination alongside arc for CKD screening, particularly to improve detection of glomerular diseases. This recommendation is highly relevant in Pakistan, where glomerulonephritis remains an important contributor to CKD. Urine complete examination is inexpensive, widely available, and provides valuable information regarding glomerular injury, tubular dysfunction, inflammation, and urinary tract infection¹⁷. As glomerulonephritis can present with hematuria along with proteinuria, urine

complete is needed along with arc to look for RBCs to diagnose glomerulonephritis¹⁸. Recent KDIGO 2024 guidelines also recommend doing urine complete examination in high risk population groups such as diabetics, hypertensive and with family history of kidney disease⁷. Urine complete examination can provide early detection by evaluating hematuria, proteinuria or casts and can predict disease before rise in serum creatinine occurs¹⁹. Importantly, some glomerular diseases, including IgA nephropathy, may initially present with isolated microscopic hematuria without significant albuminuria²⁰. Incorporating urine complete examination into KEEP Pakistan therefore represents a practical and cost-effective strategy to improve the early identification of glomerular disease in the local population.

More than 90% of participants recommended incorporating diabetes screening into the KEEP Pakistan initiative. Among the suggested methods, random blood glucose and HbA1c were selected equally by respondents. Although HbA1c remains an established diagnostic tool for diabetes, its cost may reduce feasibility in large-scale community screening programs within low-resource settings^{21,22}. Several studies from South Asia and other resource-limited regions have demonstrated that random blood glucose testing can serve as a practical alternative for opportunistic diabetes screening²³⁻²⁵. Since diabetes remains the leading cause of CKD worldwide and in Pakistan, inclusion of diabetes screening within the KEEP Pakistan framework is essential. Based on the poll findings and financial considerations, random blood glucose testing appears to be the most feasible option for large-scale screening implementation.

Regarding screening strategy, more than half of the respondents favored targeting individuals with diabetes and hypertension, while approximately one-third recommended a combined risk-based approach involving preliminary risk assessment followed by targeted laboratory testing. Only a minority recommended using the SCORED questionnaire alone. Diabetes mellitus and hypertension are recognized globally to be the two leading drivers of CKD, reported to contribute 50.62% and 23.26% to CKD worldwide, respectively²⁶. SCORED is a screening tool used for screening of CKD in asymptomatic people and value of ≥ 4 is associated with sensitivity and specificity of more than 70% in diagnosing CKD in asymptomatic individuals²⁷. However, relying exclusively on questionnaire-based screening may overlook high-risk individuals in the local population. Both KDIGO 2024 guidelines and the original KEEP program framework endorse a risk-factor based targeted screening model as the most cost-effective strategy in resource-limited settings^{7,14,28}. Accordingly, KEEP Pakistan plans to adopt a comprehensive high-risk screening approach targeting individuals with diabetes, hypertension, recurrent kidney stones, family history of CKD, and those with a SCORED score ≥ 4 .

A particularly important finding from this poll was the strong support for including recurrent kidney stone disease as a risk factor for CKD screening. More than half of the respondents agreed with its inclusion, while many others recommended its inclusion in the presence of recurrent disease or additional risk factors. Kidney stone disease has increasingly been recognized as an important contributor to CKD progression, especially in patients with recurrent nephrolithiasis, obstructive episodes, infections, or underlying metabolic abnormalities²⁹⁻³¹. This issue carries special relevance in Pakistan, where climatic conditions, inadequate hydration, dietary factors, and recurrent urinary tract infections contribute to a high burden of stone disease^{32,33}. Recurrent stones are defined as any of the following: two or more stone episodes within 5 years or 3 or more episodes in lifetime or multiple stones on imaging or history of 2 or more stone related interventions. Inclusion of recurrent

nephrolithiasis as a high-risk category represents a distinctive and clinically meaningful feature of the KEEP Pakistan initiative. This strategy may help identify patients with structural kidney abnormalities or chronic inflammatory injury who might otherwise remain undiagnosed through conventional diabetes- and hypertension-based screening alone.

The poll also highlighted support for expanding CKD screening beyond traditional risk groups. Half of the respondents favored including additional factors such as cardiovascular disease, family history of CKD, and older age. Previous studies and international guidelines have consistently demonstrated that broader risk-based approaches improve early case detection and reduce the likelihood of missed diagnoses^{7,14,19,28}. Since CKD frequently remains asymptomatic until advanced stages, limiting screening only to diabetics and hypertensive individuals may underestimate the true disease burden in Pakistan. Consequently, KEEP Pakistan intends to use an inclusive high-risk strategy while maintaining feasibility within available resources.

Financial sustainability remains a major challenge for any large-scale screening program in low- and middle-income countries. In this poll, the majority of experts preferred a hybrid financial model involving free basic screening with optional paid advanced testing when required. Existing evidence suggests that financial barriers substantially reduce participation in preventive health programs and that sponsored or partially subsidized models improve access and sustainability^{5,13,19}. Considering the socioeconomic realities of Pakistan, the KEEP Pakistan initiative plans to provide core screening investigations free of cost for eligible participants while exploring partnerships, grants, and collaborative sponsorship models to support long-term sustainability.

Respondents also emphasized the large burden of undiagnosed CKD within the community. Most experts estimated that between 25% and 75% of CKD cases remain unrecognized in Pakistan. This perception is supported by published local data showing a high prevalence of CKD and delayed presentation of patients to nephrology services^{11,12}. Delayed diagnosis often results in patients presenting at advanced stages when opportunities for prevention and disease modification have already been lost. By focusing on early detection in high-risk groups, KEEP Pakistan aims to identify CKD at earlier and potentially reversible stages, allowing timely intervention and reducing progression to kidney failure.

The preferred screening settings identified by participants included both community camps and hospital-based screening centers, reflecting support for a hybrid delivery model. Community-based camps can improve outreach, especially in underserved populations that may not routinely access healthcare facilities, while hospital-based screening provides access to confirmatory investigations and specialist referrals^{5,14,19}. Combining both approaches may therefore maximize accessibility while maintaining diagnostic reliability and continuity of care.

The poll further demonstrated strong support for a structured follow-up strategy. Most participants recommended either direct nephrology referral or a severity-based referral system for individuals with abnormal screening results. Early nephrology referral has consistently been associated with improved outcomes, delayed progression of kidney disease, and better preparation for renal replacement therapy when needed³⁴⁻³⁶. Accordingly, KEEP Pakistan plans to implement a stratified follow-up system in which patients will be categorized according to the severity of abnormalities in eGFR, albuminuria, and urine findings. Patients with mild abnormalities may continue follow-up

through primary care services with counseling and repeat monitoring, while those with moderate to severe abnormalities will be referred promptly to nephrology services.

Another encouraging finding was the high level of professional engagement and willingness to participate in the initiative. More than 90% of respondents expressed willingness to participate in screening activities, and a majority showed interest in serving on the advisory board. The success of previous KEEP programs has relied heavily on volunteerism, multidisciplinary collaboration, and continuous quality improvement³⁷⁻³⁹. The strong professional support identified in this poll suggests that the KEEP Pakistan initiative has the potential to evolve into a sustainable national collaborative network for CKD prevention and early detection.

Although this poll provides valuable expert insight, several limitations should be acknowledged. The study involved a relatively small number of participants and primarily reflected expert opinion rather than direct patient-level outcomes, this was a voluntary participation via the PSN WhatsApp group may have introduced a self-selection bias, potentially skewing the results toward a higher percentage of positive or supportive recommendations among interested respondents. Additionally, most respondents were nephrologists and physicians with a special interest in kidney disease, which may introduce selection bias. Nevertheless, the poll successfully provides practical guidance for designing a locally relevant CKD screening framework tailored to the realities of Pakistan's healthcare system.

Conclusion

This expert poll provides an important foundation for the development of KEEP Pakistan, a national kidney disease screening initiative designed specifically for a resource-limited setting. The findings strongly support a targeted, high-risk screening strategy focused on individuals with diabetes, hypertension, recurrent kidney stones, family history of CKD, and elevated SCORED risk assessment. The survey highlights a clear agreement that CKD screening in Pakistan should combine serum creatinine-based eGFR, urine albumin-to-creatinine ratio, urine complete examination, and diabetes screening in order to improve early detection of both diabetic and non-diabetic kidney disease. The inclusion of recurrent nephrolithiasis as a high-risk category represents a particularly important and locally relevant contribution of the KEEP Pakistan framework.

Beyond identifying screening modalities, this survey also emphasizes the urgent need for organized, accessible, and financially feasible CKD screening programs in Pakistan, where a substantial proportion of kidney disease remains undiagnosed until advanced stages. The strong willingness of healthcare professionals to participate in screening activities and advisory roles further demonstrates that a collaborative national CKD prevention model is both feasible and achievable.

This pilot initiative also aims to generate local epidemiologic data and practical experience that may help policymakers allocate healthcare resources more effectively, support future large-scale CKD screening campaigns, and strengthen national kidney disease prevention strategies in Pakistan.

KEEP Pakistan has the potential to become an important public health initiative capable of improving awareness, promoting earlier diagnosis, facilitating timely referral, and ultimately reducing the growing burden of advanced kidney disease and kidney failure in Pakistan. In a country where dialysis and transplantation remain financially and logistically challenging for many patients, early detection and

prevention may offer the most practical and sustainable strategy to improve kidney health outcomes at the population level.

Acknowledgment

The authors deeply appreciate the enthusiasm and commitment shown by all poll participants who shared their expert opinions for the KEEP Pakistan initiative. Their collective vision and dedication toward improving kidney health awareness and early CKD detection in Pakistan provided the foundation for this pilot project and future large-scale screening efforts.

The authors also acknowledge the support and guidance of the Pak kidney Foundation & Pakistan Society of Nephrology especially its past president Dr Zahid Nabi and current President Prof Dr Amer Azhar.

Conflict of Interest: None

Funding Source: None

References

1. Jager KJ, Kovesdy C, Langham R, Rosenberg M, Jha V, Zoccali C. A single number for advocacy and communication-worldwide more than 850 million individuals have kidney diseases. *Kidney Int.* 2019 Nov;96(5):1048-1050. doi: 10.1016/j.kint.2019.07.012.
2. Cojuc-Konigsberg G, Guijosa A, Moscona-Nissan A, et al. Representation of low-and middle-income countries in CKD drug trials: a systematic review. *American Journal of Kidney Diseases* 2025; 85: 55-66. e1.
3. Foreman KJ, Marquez N, Dolgert A, et al. Forecasting life expectancy, years of life lost, and all-cause and cause-specific mortality for 250 causes of death: reference and alternative scenarios for 2016 – 40 for 195 countries and territories. *The Lancet* 2018; 392: 2052 – 2090.
4. Francis A, Harhay MN, Ong AC, et al. Chronic kidney disease and the global public health agenda: an international agreement. *Nature Reviews Nephrology* 2024; 20: 473 – 485.
5. Luyckx VA, Tuttle KR, Abdellatif D, et al. Mind the gap in kidney care: translating what we know into what we do. *American Journal of Hypertension* 2024; 37: 640 – 649.
6. Ndumele CE, Neeland IJ, Tuttle KR, et al. A synopsis of the evidence for the science and clinical management of cardiovascular-kidney-metabolic (CKM) syndrome: a scientific statement from the American Heart Association. *Circulation* 2023; 148: 1636 – 1664.
7. Stevens PE, Ahmed SB, Carrero JJ, et al. KDIGO 2024 clinical practice guideline for the evaluation and management of chronic kidney disease. *Kidney international* 2024; 105: S117 – S314.
8. Guha C, Lopez-Vargas P, Ju A, et al. Patient needs and priorities for patient navigator programmes in chronic kidney disease: a workshop report. *BMJ open* 2020; 10: e040617.
9. Basit A, Fawwad A, Qureshi H, et al. Prevalence of diabetes, pre-diabetes and associated risk factors: second National Diabetes Survey of Pakistan (NDSP), 2016 – 2017. *BMJ open* 2018; 8: e020961.
10. Kearney PM, Whelton M, Reynolds K, et al. Global burden of hypertension: analysis of worldwide data. *The lancet* 2005; 365: 217 – 223.
11. Imtiaz S, Alam A. Epidemiology and demography of Chronic Kidney Disease in Pakistan-A review of Pakistani literature. *Pakistan Journal of Kidney Diseases* 2023; 7: 2 – 7.
12. Jessani S, Bux R, Jafar TH. Prevalence, determinants, and management of chronic kidney disease in Karachi, Pakistan-a community based cross-sectional study. *BMC nephrology* 2014; 15: 90.
13. Bello AK, Okpechi IG, Levin A, et al. An update on the global disparities in kidney disease burden and care across world countries and regions. *The Lancet Global Health* 2024; 12: e382 – e395.
14. Whaley-Connell AT, Vassalotti JA, Collins AJ, et al. National Kidney Foundation’s Kidney Early Evaluation Program (KEEP) annual data report 2011: executive summary. *American Journal of Kidney Diseases* 2012; 59: S1 – S4.
15. Levey AS, Becker C, Inker LA. Glomerular filtration rate and albuminuria for detection and staging of acute and chronic kidney disease in adults: a systematic review. *Jama* 2015; 313: 837 – 846.
16. Mahadevappa K, Nayak SB, Maharaj RG, et al. Using eGFR and Albumin Creatinine Ratio as an Initial Screening Tool in Trinidadian Primary Care to Identify High-risk Population for CKD: A Cross-Sectional Study. *Indian Journal of Nephrology* 2024; 34: 332.

17. Hamadah AM, Gharaibeh K, Mara KC, et al. Urinalysis for the diagnosis of glomerulonephritis: role of dysmorphic red blood cells. *Nephrology Dialysis Transplantation* 2018; 33: 1397 – 1403.
18. Delanghe J, Speeckaert M. Preanalytical requirements of urinalysis. *Biochemia Medica* 2014; 24: 89 – 104.
19. Vassalotti JA, Li S, McCullough PA, et al. Kidney early evaluation program: a community-based screening approach to address disparities in chronic kidney disease. In: *Seminars in nephrology*. Elsevier, 2010, pp. 66 – 73.
20. Ali M, Ahmed S, Ejaz A, et al. Prevalence of IgA Nephropathy: A 10 Years' Experience from Jinnah Postgraduate Medical Centre, Karachi, Pakistan. *Pakistan Journal of Medicine and Dentistry* 2020; 9: 9 – 13.
21. Thomas MC, Brownlee M, Susztak K, et al. Diabetic kidney disease. *Nature reviews Disease primers* 2015; 1: 15018.
22. Association AD. Standards of medical care in diabetes—2022 abridged for primary care providers. *Clinical Diabetes* 2022; 40: 10 – 38.
23. Somannavar S, Ganesan A, Deepa M, et al. Random capillary blood glucose cut points for diabetes and pre-diabetes derived from community-based opportunistic screening in India. *Diabetes care* 2009; 32: 641 – 643.
24. Puavilai G, Kheesukapan P, Chanprasertyotin S, et al. Random capillary plasma glucose measurement in the screening of diabetes mellitus in high-risk subjects in Thailand. *Diabetes research and clinical practice* 2001; 51: 125 – 131.
25. Bhowmik B, Siddiquee T, Munir SB, et al. Random capillary blood glucose in the diagnosis of diabetes: a cross-sectional study in Bangladesh. *BMJ open* 2025; 15: e093938.
26. Xie Y, Bowe B, Mokdad AH, et al. Analysis of the Global Burden of Disease study highlights the global, regional, and national trends of chronic kidney disease epidemiology from 1990 to 2016. *Kidney international* 2018; 94: 567 – 581.
27. Harward DH, Bang H, Hu Y, et al. Evaluation of the SCORED questionnaire to identify individuals with chronic kidney disease in a community-based screening program in rural North Carolina. *Journal of community medicine & health education* 2014; 4: 007.
28. Francis A, Harhay MN, Ong AC, et al. Chronic kidney disease and the global public health agenda: an international agreement. *Nature Reviews Nephrology* 2024; 20: 473 – 485.
29. Chuang T-F, Hung H-C, Li S-F, et al. Risk of chronic kidney disease in patients with kidney stones—a nationwide cohort study. *BMC nephrology* 2020; 21: 292.
30. Rule AD, Bergstralh EJ, Melton III LJ, et al. Kidney stones and the risk for chronic kidney disease. *Clinical Journal of the American Society of Nephrology* 2009; 4: 804 – 811.
31. Shastri S, Patel J, Sambandam KK, et al. Kidney stone pathophysiology, evaluation and management: core curriculum 2023. *American journal of kidney diseases* 2023; 82: 617 – 634.
32. Hussain M, Somro AS, Abidi SS, et al. Stepping Stones In Prevention of Kidney Stone Disease In Pakistan. *Pakistan Journal of Kidney Diseases* 2024; 8: 2 – 10.
33. Imtiaz S. Strategies for preventing end stage kidney disease: The impact of kidney stone disease on Chronic Kidney Disease in Pakistan. *JPMA The Journal of the Pakistan Medical Association*.
34. Dhanorkar M, Prasad N, Kushwaha R, et al. Impact of early versus late referral to nephrologists on outcomes of chronic kidney disease patients in Northern India. *International Journal of Nephrology* 2022; 2022: 4768540.
35. Grill AK, Brimble S. Approach to the detection and management of chronic kidney disease: what primary care providers need to know. *Canadian family physician* 2018; 64: 728 – 735.
36. Chogtu B, Magazine R. Early referral in chronic kidney disease—seizing the opportunity. *Clinical Epidemiology and Global Health* 2024; 28: 101711.
37. Ramakrishnan C, Tan NC, Yoon S, et al. Healthcare professionals' perspectives on facilitators of and barriers to CKD management in primary care: a qualitative study in Singapore clinics. *BMC health services research* 2022; 22: 560.
38. Brown WW, Peters RM, Ohmit SE, et al. Early detection of kidney disease in community settings: the Kidney Early Evaluation Program (KEEP). *American Journal of Kidney Diseases* 2003; 42: 22 – 35.
39. McCullough PA, Brown WW, Gannon MR, et al. Sustainable community-based CKD screening methods employed by the National Kidney Foundation's Kidney Early Evaluation Program (KEEP). *American Journal of Kidney Diseases* 2011; 57: S4 – S8.