

Original Article

Asian chronic kidney disease best practice recommendations: Positional statements for early detection of chronic kidney disease from Asian Forum for Chronic Kidney Disease Initiatives (AFCKDI)

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SUMMARY AT A GLANCE

These guidelines relate to screening for chronic kidney disease, specifically in an Asian setting. They draw on considerable experience across Asia from a specially convened workshop.

AFCKDI RECOMMENDATIONS FOR EARLY DETECTION OF CHRONIC KIDNEY DISEASE**1. Targets**

Patients with diabetes, hypertension

Those with family history of chronic kidney disease (CKD)

Individuals receiving potentially nephrotoxic drugs, herbs or substances or taking indigenous medicine

Patients with past history of acute kidney injury

Individuals older than 65 years

2. Tools

Spot urine sample for protein with standard urine Dipstick test (need a repeat confirmatory test if positive)

Dipstick for red blood cells (need confirmation by urine microscopy)

An estimate of glomerular filtration rate based on serum creatinine concentration

3. Frequency of screening

Screening frequency for targeted individuals should be yearly if no abnormality is detected on initial evaluation.

4. Who should perform the screening

Doctors, nurses, paramedical staff and other trained healthcare professionals

5. Intervention after screening

Patients detected to have CKD should be referred to primary care physicians with experience in management of kidney disease for follow up. A management protocol should be provided to the primary care physicians. Further referral to nephrologists for management will be based on the protocol together with clinical judgment of the primary care physicians with their assessment of the severity of CKD and the likelihood of progression.

6. Screening for cardiovascular disease risk

It is recommended that cardiovascular disease risk factors should be screened in all patients with CKD.

Patients with chronic kidney disease (CKD) are at increased risk of progression to end stage kidney disease and cardiovascular disease if they are not identified and properly managed. This is true for all patients with CKD. Despite the increasing prevalence of CKD in Asia, there are few guidelines for early detection of CKD in Asian countries.

Although there is broad agreement about targeted screening directed at subgroups of the population who would derive the most benefit from CKD detection, there are differing views regarding the costs and benefits of a population wide surveillance programme. Table 1 summarizes the existing international guidelines on screening for CKD.¹⁻⁵ There are no randomized controlled trials examining outcomes of kidney disease screening programmes (including cardiovascular risk), and little information specifically dealing with the issues of cost-effectiveness and public health policies. Recommendations have been reported by the 2006 Kidney Disease Improving Global Outcomes (KDIGO) Controversies Conference regarding strategies for implementation of screening and surveillance for CKD in developing countries.³ For the purpose of uniformity, we use the same definitions of screening and surveillance.³ Screening is an activity whereby persons in a defined population who are not aware of CKD are tested to detect the disease and, if present, are subsequently treated to reduce the risk of progression of CKD and its complications. Surveillance, on the other hand, refers to an activity to provide key information on CKD, such as time, location, magnitude, and severity, in order to guide implementation of medical and public health measures to control progression of CKD and its complications.³ Screening efforts, unless population-based, cannot provide information about true prevalence of disease in a community.

The objective of the current guidelines is to give advice where possible on the early detection of CKD in Asian countries. We therefore focus largely on screening, which alone does not represent surveillance in all its facets. These guidelines are intended to be reviewed by the work group participants under the Asian Forum of CKD Initiative (AFCKDI). Members of the work group were selected based on the criteria of knowledge/expertise in CKD with a geographical representation of the Asian Pacific countries/region, diversity of views and expertise in the healthcare system.

BACKGROUND

The need for early detection

The global epidemic of CKD has posed a major public health problem, not only in high-income countries but also in Asia. This problem is compounded by the diabetes epidemic and the enormous disease burden of hypertension in Asian populations. Given the population growth and rate of urbanization in Asia, it has been estimated that India and China will be the two countries with the highest numbers of people with diabetes by 2030.⁶ Five other Asian coun-

tries are among the top 10 countries in the number of diabetic patients – Indonesia, Pakistan, Bangladesh, Japan, and the Philippines.

High blood pressure has also been estimated to account for more than a third of deaths and almost a fifth of disability-adjusted life years in central Asia. Nevertheless, the proportion of awareness, treatment and control of high blood pressure is exceedingly low, partly related to low level of literacy and education, but also attributable to a low level of access to medical care in some Asian countries. Previous data from national surveys,⁷⁻¹¹ for instance, suggested a disappointingly low level of disease awareness and adequate treatment (Fig. 1). In a survey involving 141 892 Chinese adults, only 24% of affected adults were aware of their hypertension.⁷ In fact, the percentage of hypertension awareness has been less than 50% in most Asian countries (Fig. 1), quite low when compared to that in the United States population. 80.7% of United States patients with hypertension in the National Health and Nutrition Examination Survey (NHANES), answered affirmative to the question, 'Have you ever been told by a doctor or other healthcare professional that you had hypertension, also called high blood pressure?'¹² This discrepancy in hypertension awareness percentage (Fig. 1) indicates a substantial knowledge gap between Asians and the Western population.

The priority of disease detection

Given the aforementioned problems of undiagnosed diabetes mellitus and hypertension in many areas of Asia with extreme poverty and limited healthcare resources, CKD screening should therefore form a second or third layer of healthcare. Screening for CKD should be given the same priority and in fact integrated with screening for hypertension and diabetes, and, depending on the circumstances and environment, must be balanced against the need in the developing countries for screening and managing malnutrition, acute and chronic infections (such as gastroenteritis, human immunodeficiency virus, tuberculosis and malaria). Prevalence of glomerular disease, particularly immunoglobulin A (IgA) nephropathy, is high in Asian countries. Glomerulonephritis is the second leading cause of ESRD following diabetes. The early detection of glomerulonephritis is also important and meaningful because it is a treatable disease.

SCREENING AND EARLY DETECTION OF CHRONIC KIDNEY DISEASE

Whom to screen

Universal screening of the general population would be time-consuming, and expensive and has been shown to be not cost-effective. Unless selectively directed towards high-

Table 1 Summary of international guidelines on screening of chronic kidney diseases (CKD)

Recommendation on screening		Target populations suggested	Screening tools
National Kidney Foundation, NKF ¹	Published in 2007	<ul style="list-style-type: none"> • Patients with diabetes • Patients with hypertension and cardiovascular disease • A family history of CKD • Age greater than 60 years 	Urine test for proteinuria and a blood test to estimate GFR
Caring for Australasians with Renal Impairment, CAR ²	Published in 2007	<ul style="list-style-type: none"> • Patients with vascular disease or hypertension • Immediate relatives of patients with kidney disease • Aboriginal Australians and Torres Strait Islanders • Patients complaining of prostatic symptoms 	Proteinuria and renal function (serum creatinine and eGFR)
Kidney Disease Improving Global Outcomes, KDIGO ³	Published in 2007	<ul style="list-style-type: none"> • Patients with hypertension • Patients with diabetes • Patients with cardiovascular disease • Families of patients with CKD • Patients with hyperlipidaemia • Patients with obesity • Patients with metabolic syndrome • Smokers • Patients treated with potentially nephrotoxic drugs • Age greater than 60 years 	Urine test for proteinuria and a blood test for creatinine to estimate GFR
UK Renal Association and National Institute for Health and Clinical Excellence, NICE ⁴	Published in 2008	<ul style="list-style-type: none"> • Patients with hypertension • Patients with diabetes mellitus • Patients with cardiovascular disease (ischaemic heart disease, chronic heart failure, peripheral vascular disease, cerebrovascular disease) • Patients with structural renal tract disease, renal calculi, or prostatic hypertrophy • Patient with multisystem diseases with potential kidney involvement • Family history of stage 5 CKD or hereditary kidney disease • Opportunistic haematuria or proteinuria 	Urine albumin: creatinine ratio, serum creatinine (isotope dilution mass spectrometry traceable simplified MDRD equation) to estimate GFR
Japanese Society of Nephrology Guideline for treatment of CKD ⁵	Published in 2009	<ul style="list-style-type: none"> • Hypertension • Impaired glucose tolerance, diabetes mellitus • Obesity, dyslipidaemia, metabolic syndrome • Collagen disease, systemic infection • Urinary tract stone, urinary tract infection, prostate hypertrophy • Family history of CKD, low birth weight • Past history of screening (urine tests, kidney function, kidney size and shape) • Habitual drugs (NSAIDs), supplements • Past history of acute kidney failure • Smoking • Elderly • Single kidney, kidney atrophy (small kidney) 	Urine test for proteinuria and a blood test to estimate GFR
U.S. Preventive Services Task Force, USPSTF	No recommendation	No recommendation	No recommendation
Kidney Disease Outcomes Quality Initiative KDOQI	No recommendation	No recommendation	No recommendation
European Best Practice Guidelines EBPG	No recommendation	No recommendation	No recommendation

GFR, glomerular filtration rate; MDRD, Modification of Diet in Renal Disease.

risk groups, according to a cost-effectiveness analysis using a Markov decision analytic model, population-based dipstick screening for proteinuria has an unfavourable cost-effectiveness ratio.¹³ The scale of screening programmes, therefore, should be individualized for each region. Before

high-risk group screening can be recommended, surveillance needs to be performed to allow correct identification of target groups (for screening). This approach has been endorsed by the International Society of Nephrology 2004 Consensus Workshop statements on prevention of kidney diseases.¹⁴

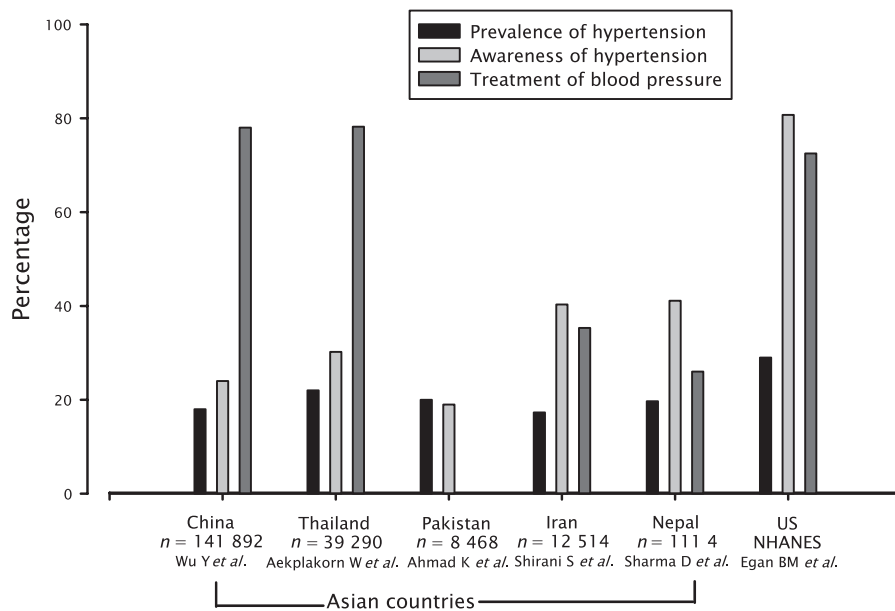


Fig. 1 Disease prevalence, awareness and treatment of hypertension from national survey studies within Asia: comparison with US National Health and Nutrition Examination Survey (NHANES) data. Disease prevalence refers to the percentage of overall population, awareness percentage is of disease prevalence and treatment percentage is of awareness population.

Data to guide identification of high risk-groups for screening are derived largely from analysis of several surveillance studies in Asia. Efforts have been made to characterize the scale of the problem and to identify candidates for screening CKD in Asian countries. Numerous large-scale surveillance studies have been performed in Asia (Table 2).^{15–25} The prevalence of CKD has been estimated to be 13% in a large sample of 13 295 adults in China.¹⁵ This is congruent with the findings from another cohort of 574 024 adults in Japan, where the same prevalence of CKD was reported.¹⁸ New clinical studies suggest that a strikingly large percentage of patients who have AKI do not fully recover renal function or require permanent renal replacement therapy, and that this population has an important impact on the epidemiology of CKD and end-stage renal disease.^{26,27}

Based on these studies and the opinion from our members, we recommend that patients with diabetes, hypertension, a family history of CKD or a past history of acute kidney injury should have regular screening for detection of kidney disease (Table 3). This recommendation is consistent with guidelines (Table 1) developed by the Kidney Disease Improving Global Outcomes (KDIGO),³ UK Renal Association and National Institute for Health and Clinical Excellence (NICE),⁴ the National Kidney Foundation (NKF),¹ Caring for Australasians with Renal Impairment (CARI)² and the Japanese Society of Nephrology.⁵

In addition, a recurring theme from the published data in Asia is the susceptibility of individuals to develop CKD if they are treated with potentially nephrotoxic medications including herbs. This should be highlighted with special reference

to Asian countries. The need to look into the high-risk group with nephrotoxic medication use in Asian populations is well illustrated by a prospective study from Taiwan, where regular use of herbal medicines was associated with a quarter higher risk for developing CKD than among non-users.¹⁹ These results showed a proportion of herbal medicine usage that rose with severity of disease; the relationship persisted even when those with advanced disease (stage 4 and 5) and those aware of their disease status were excluded. Another cross-sectional study in Taiwan confirmed that herbal therapy was associated independently with CKD and the stage of CKD in subjects not using analgesics.²⁸ A high risk (adjusted odds ratio 2.19) of developing CKD had also been shown among patients who receive nephrotoxic medication (non-steroidal anti-inflammatory drugs and herbs containing aristolochic acid) in a surveillance study in Beijing, China.¹⁵ Similar findings have been replicated in India and Thailand, highlighting the popularity and risk of using traditional medicines.^{21,22} It is our opinion that there is a definite need for screening Asian individuals receiving potentially nephrotoxic drugs, herbs or substances or taking indigenous medicine.

Whether or not screening targeted at elderly individuals has benefit is currently unknown. CKD has increasingly become a ‘geriatric’ disease, with a dramatic rise in incidence in the aging population. Elderly patients have developed into the fastest growing population commencing dialysis. In previous surveillance studies from China, Australia, Thailand, India and Singapore, old age has been associated with an increased risk of CKD,^{15–17,21,22} but there is controversy regarding the current classification schema for applying

Table 2 Population-based epidemiological studies of chronic kidney disease (CKD) in Asia and Oceania

Region	Screened population	Screening tools	Prevalence	Identified risk factors
Beijing, China ¹⁵	13 925 adults (response rate 90.6%)	Glomerular filtration rate using calibrated serum creatinine level and formula estimation	13%, defined as glomerular filtration rate <60 mL/min per 1.73 m ² or markers of kidney damage	Independent predictors of CKD <ul style="list-style-type: none"> • Older age (odds ratio 1.83) • Nephrotoxic medication (odds ratio 2.19) • Rural area (odds ratio 0.47) • History of cardiovascular disease (odds ratio 2.04) • High-density lipoprotein cholesterol <1.03 mmol/L (odds ratio 3.00) • Hypertension status >10 years (odds ratio 1.85)
Australia ¹⁶	11 247 adults (response rate 55.3%)	Spot urine protein to creatinine ratio Haematuria confirmed by urine microscopy Cockcroft-Gault estimated glomerular filtration rate	16% with one or more indicators of kidney damage	Independent predictors of proteinuria <ul style="list-style-type: none"> • Age ≥65 (odds ratio 2.5) • Diabetes mellitus (odds ratio 2.5) • Hypertension (odds ratio 3.1)
Singapore ¹⁷	189 117 working adults	Dipstick analysis of urine protein and blood	1.1% with proteinuria ≥1 +	Independent predictors of proteinuria <ul style="list-style-type: none"> • Age ≥61 (odds ratio 2.7) • Malay race (odds ratio 1.3) • Diabetes mellitus (odds ratio 2.0) • Hypertension (odds ratio 1.8) • Renal disease (odds ratio 3.5) • Body mass index ≥30 kg/m² (odds ratio 2.5) • Haematuria (odds ratio 2.9) • Family history of kidney disease (odds ratio 2.0)
Japan ¹⁸	574 024 adults	Japanese equation for estimated glomerular filtration rate Dipstick analysis of urine protein	13% with CKD (stage 1–5)	
Taiwan ¹⁹	462 293 adults	MDRD equation for estimated glomerular filtration rate Dipstick analysis of urine protein	12% with CKD	Predictors of CKD <ul style="list-style-type: none"> • Regular use of Chinese herbal medicine (odds ratio 1.2)
Hong Kong ²⁰	1 201 adults	Dipstick analysis of urine protein and blood	3.2% with proteinuria ≥1 +	Predictors of urine abnormalities <ul style="list-style-type: none"> • Family history of diabetes or hypertension
Thailand ²¹	3 459 adults	Serum creatinine standardized with isotope dilution mass spectrometry and MDRD equation for estimated glomerular filtration rate	17.5% with CKD (stage 1–5)	Independent predictors of CKD <ul style="list-style-type: none"> • Age ≥70 (odds ratio 7.34) • Diabetes mellitus (odds ratio 2.72) • History of kidney stone (odds ratio 2.72) • Hypertension (odds ratio 1.96) • Using traditional medicine (odds ratio 1.20) • Uric acid >0.33 mmol/L (odds ratio 2.87) • Female gender (odds ratio 1.70)
Delhi, North India ²²	5 252 adults (response rate 94.4%)	Serum creatinine, Cockcroft-Gault and MDRD equation for estimated glomerular filtration rate Dipstick analysis of urine protein	13.3%, defined as glomerular filtration rate <60 mL/min per 1.73 m ² by Cockcroft-Gault equation 2.25% with proteinuria ≥1 +	Independent predictors of CKD <ul style="list-style-type: none"> • Age >60 (odds ratio 29.49) • Diabetes mellitus (odds ratio 1.51) • Hypertension (odds ratio 1.74) • NSAID intake (odds ratio 1.34) • Female gender (odds ratio 1.53) • Education less than primary (odds ratio 1.31) • Obese by waist circumference (odds ratio 1.34)
South Korea ²³	5 136 adults	MDRD equation for estimated glomerular filtration rate	6.8%, defined as glomerular filtration rate <60 mL/min per 1.73 m ² by MDRD equation	Independent predictors of CKD <ul style="list-style-type: none"> • Female gender (odds ratio 3.53) • Metabolic syndrome (odds ratio 1.77) • Hypertension (odds ratio 1.33)
Indonesia ²⁴	9 412 adults	Dipstick analysis of urine protein Serum creatinine only measured in subjects with hypertension, proteinuria, glycosuria and/or a history of diabetes	2.8% with proteinuria ≥1 + persistently	
Nepal ²⁵	8 398 adult ≥20 years of age	Serum creatinine, fasting blood glucose, dipstick urinalysis with proteinuria confirmed by ACR, e-GFR using Modified MDRD equation	5.04% with proteinuria ≥1 +, CKD 14.4% defined as glomerular filtration rate <60 mL/min/1.73 m ² by MDRD equation	
Mongolia ²⁵	997 adults	Dipstick analysis of spot urine protein Serum creatinine, e-GFR using Modified MDRD equation	13.9% with CKD (stage 1–5) defined as proteinuria+, glomerular filtration rate <60 mL/min/1.73 m ² by MDRD equation	Independent predictors of proteinuria <ul style="list-style-type: none"> • Age ≥61 • Diabetes mellitus • Hypertension • Body mass index ≥25 • Family history of kidney disease

ACR, albumin/creatinine ratio; GFR, glomerular filtration rate; MDRD, Modification of Diet in Renal Disease; NSAID, non-steroidal anti-inflammatory drugs.

Table 3 Recommendations from Asian Forum for Chronic Kidney Disease Initiatives (AFCKDI) on screening

1. Targets:	Patients with diabetes, hypertension Those with family history of chronic kidney disease (CKD) Individuals receiving potentially nephrotoxic drugs, herbs or substances or taking indigenous medicine. Patients with past history of acute kidney injury Individuals older than 65 years
2. Tools:	Spot urine sample for protein with standard urine dipstick test (need a repeat confirmatory test if positive) Dipstick for red blood cells (need confirmation by urine microscopy) An estimate of glomerular filtration rate based on serum creatinine concentration
3. Frequency of screening	Screening frequency for targeted individuals should be yearly if no abnormality is detected on initial evaluation.
4. Who should perform the screening:	Doctors, nurses, paramedical staff and other trained healthcare professionals
5. Intervention after screening	Patients detected to have CKD should be referred to primary care physicians with experience in management of kidney disease for follow up. A management protocol should be provided to the primary care physicians. The need for referral to nephrologists for management will be based on the protocol together with clinical judgment of the primary care physicians with their assessment of the severity of CKD and the likelihood of progression.
6. Screening for cardiovascular disease risk	It is recommended that cardiovascular disease risk factors should be screened in all patients with CKD.

estimated glomerular filtration rate in the elderly.²⁹ Some concern has been expressed about the applicability of the same diagnostic glomerular filtration rate threshold for aged as for younger populations. A recent study looked into 8705 community-dwelling individuals aged ≥ 65 years and studied the relation of estimated glomerular filtration rate (eGFR) with 6-year mortality. It was found that moderately decreased eGFR < 45 mL/min per 1.73 m² was related to poor outcomes and that the CKD-EPI (Chronic Kidney Disease Epidemiology Collaboration) and the MDRD equations provided very similar prevalence and long-term risk estimates.³⁰ **We suggest that elderly individuals over 65 years should be screened.** Elderly patients have more co-morbid diseases and greater functional limitations that affect mortality and quality of life. Therefore, screening the elderly for CKD may be cost-effective in detecting a target population in need for CKD care. A cost-effectiveness analysis reported that early detection of urine protein with the aim of slowing progression of CKD and decreasing mortality is not cost-effective unless selectively directed toward high-risk groups (older persons and persons with hypertension) or conducted at an infrequent interval of 10 years.¹³ It is important to note that cost-effectiveness is also dependent on the life expectancy of the population to which it is applied.

How to screen

To date no consensus exists as to the best screening tool(s) to use for early detection of CKD among the various options available.³¹ Measurement of albuminuria by a spot urine sample, using either albumin-specific dipstick or albumin-to-creatinine ratio is now accepted. Other options include serum creatinine and equation estimated glomerular filtration rates.

Clearly, in resource-limited countries in Asia, in order to have a population impact, a practical or affordable means of screening CKD should be chosen. No cost-effectiveness studies of various screening tools have been performed in Asia. One simple tool would be anthropometric measurements (body mass index and blood pressure) and standard urine dipstick testing. Screening by spot morning urine albumin concentration and albumin-to-creatinine ratio, on the other hand, has been validated in an Indo-Asian population.³² While this report from Pakistan confirmed that the conventionally recommended cut-off value of albumin-to-creatinine ratio of 30 mg/g was associated with over 95% specificity, its sensitivity remained suboptimal in women. Furthermore, the study reported a comparable diagnostic performance of urine albumin and urine albumin-to-creatinine ratio.³² This observation seems to favour urine albumin concentration test alone, without the need to measure urine creatinine, which might incur substantial cost in a large-scale screening programme.

From an economic perspective, with or without the facilities for urine quantification of albumin-to-creatinine ratio, the simpler alternative tool of **standard urine dipstick testing** is currently considered acceptable, with urine quantification of albumin-to-creatinine ratio reserved for the population with diabetes mellitus. Regardless of the method used, a repeat test should be performed to confirm the presence of proteinuria.

Another strategy proposed by the National Kidney Foundation (NKF)¹ and Kidney Disease Improving Global Outcomes (KDIGO)³ is that individuals be screened for CKD using a **spot urine sample for protein and an estimate of glomerular filtration rate based on serum creatinine concentration**. Although coefficients have been applied for different ethnic groups, the most accepted equations among

Asian countries are being debated. It is beyond the scope of our guidelines to discuss the standardized equations in Asia. This controversy per se should not be an obstacle to the use of serum creatinine for screening purposes. Over 66% of our group members are in favour of using serum creatinine or an estimation equation for screening and the consensus from the group is to use a locally agreed formula until one unified Asia formula can be validated.

In Asia, IgA nephropathy is the commonest primary glomerulonephritis. Microscopic hematuria is one common presentation of the disease.³³ It is recommended in Asia that **dipstick testing for red blood cells (RBC)** should be used as a screening tool. A positive result should be confirmed by microscopic examination of the urinary sediment. About 64% of the group agrees to this.

Frequency of screening

Since there is a continuing risk of acquiring CKD with increasing age and the development of hypertension, diabetes and obesity, there seems little reason to doubt that screening should be a continuing process rather than a 'once and for all' strategy. There are, nevertheless, few data on frequency of screening CKD. Accordingly, the proposed time interval of screening is largely based on expert opinion and cost-effectiveness analysis from simulated models.

To address the issue of optimal screening frequency, in principle, the considerations include both the clinical benefits patients may derive and the added cost. For example, lower frequency of screening, such as every 10 years, has been shown to yield better cost-effectiveness ratios for 50-year-old persons with neither hypertension nor diabetes.¹³ It needs to be emphasized that improved cost-effectiveness thus calculated might be associated with decreased quality-adjusted life-years gained as a result of fewer persons benefiting from prevention of CKD progression and death by angiotensin system blockade therapy.

The marginal cost-effectiveness ratio for different screening frequencies is sensitive to factors such as underlying risk (diabetic versus non-diabetic population) and the effects of currently available treatments. According to guidelines from the United Kingdom,⁴ kidney function should be screened at least annually in the targeted groups with a high risk of silent development of CKD, including hypertension, diabetes mellitus and atherosclerotic coronary, cerebral or peripheral vascular disease. The Kidney Disease Improving Global Outcomes (KDIGO) resolved that frequency of testing should be according to the target group to be tested.³ In the absence of specific recommendations, it was stated that testing needs not be more frequent than once per year. Before optimal timing intervals for screening and surveillance are clearly identified by further studies, we concur with the KDIGO recommendations of annual screening. **Screening frequency for targeted individuals should be yearly if no abnormality is detected on initial evaluation.**

SPECIAL ISSUES IN SCREENING FOR CHRONIC KIDNEY DISEASE IN ASIA

Who should perform the screening

A key ingredient of any screening programme is the availability of personnel at a reasonable cost. Opportunistic screening in general practice, when the individuals are seeing their general practitioner at least once a year, has been proposed in countries like Australia.³⁴ We are not certain if this model can be applied to other impoverished rural areas in Asia, where the access to doctors, nurses and allied health professionals is markedly limited. For example, a regular screening programme has been implemented on a shoestring in South India,³⁵ where trained volunteers conduct domiciliary screening, instead of asking the local people to travel 10 to 15 kilometres to reach the primary health centre (and losing a day's wage each time they go). Similarly trained volunteers along with medical students, nurses and doctors screened people in Eastern Nepal through a door-to-door approach.²⁵ We recommend that the screening as organized and directed by nephrologists can be performed by doctors, nurses, paramedical staff and other trained healthcare professionals.

Intervention after screening

Success of a screening programme depends on the ability to recognize the disease in its early phase so that intervention can occur. In other words, a logical strategy is required to ensure appropriate implementation of subsequent intervention. Cost-effectiveness would be reduced if the screened people (including those from Asian regions with social disadvantage) are unlikely or unable to take prescribed medication. In many patients, medication use is restricted by financial issues; accordingly, the need to have lifestyle modification should be emphasized in all patients. It is our opinion that patient education (in particular, for areas with low levels of literacy) about low salt intake and smoking cessation (notably in China, India and countries with high consumption of cigarettes) should be an important component of the intervention.

On the other hand, analysis based on proprietary drug costs in the market previously¹³ may underestimate the cost-effectiveness of screening because many angiotensin-converting enzyme inhibitors are now off patent and presumably can be obtained at a substantially cheaper price. We recommend that patients detected to have CKD should be referred to primary care physicians with experience in management of kidney disease for follow up. A management protocol should be provided to the primary care physicians. The need for referral to nephrologists for further management will be based on the protocol together with clinical judgment of the primary care physicians with their assessment of the severity of CKD and the likelihood of progression.

Validity of cost-effectiveness analysis derived from other ethnic groups

Furthermore, the cost-effectiveness analysis of screening CKD cannot be extrapolated from other racial groups when the prevalence and/or severity of the disease vary among the groups.

For example, in the United Kingdom Asian Diabetes Study,³⁶ researchers showed that among diabetes mellitus type 2 patients with normal, untreated blood pressure, the proportion who had microalbuminuria was three times higher among South Asian patients than among white Europeans. Most data from observational studies as well as clinical trials show that Asian patients with diabetes are more likely to develop end-stage renal disease than their white counterparts. Disparities or excess risk of end-stage renal disease among Asians, with non-diabetic kidney disease included, have also been suggested from registry-level data. For example, the United States Renal Data System (USRDS) showed that US Asians have a higher age-adjusted and gender-adjusted risk of end-stage renal disease than do US whites. To further adjust for the presence of baseline kidney disease, a study compared the incidence of end-stage renal disease in a prospective multiethnic cohort of 299 168 adults who underwent a screening health checkup in northern California between 1964 and 1985. The age-adjusted rate of end-stage renal disease for Asians was more than twofold higher than for whites.³⁷ If there is indeed a faster rate of glomerular filtration rate decline among Asians, the value of screening for CKD may differ from that of other ethnic groups. Presumably these factors would affect the cost-effectiveness of screening CKD in Asia.

Considerations for screening for CVD risk

Cardiovascular disease commonly occurs in CKD patients.^{38–40} 81% of the group agree to consider CVD risk in CKD patients. Increased incidence of central obesity, metabolic syndrome and CVD risk has been shown in certain Asian ethnic groups, most notably South Asians. It is not cost effective to screen for CVD risk in the general population. It is recommended that cardiovascular disease risk factors should be screened and followed in all patients with CKD. These include documentation of smoking history, measurement of blood pressure, body weight, body mass index, abdominal obesity, fasting plasma glucose, fasting lipid profile, serum uric acid level, and 12-lead electrocardiogram (ECG).¹⁴

CONCLUSION

In conclusion, the current guidelines are based on the mounting evidence that a population-based screening programme is beneficial if implemented in certain high-risk groups. The success of this strategy would depend on the

socioeconomic status of the region, and most important of all, the premise that therapeutic interventions can be provided or afforded after detection of the CKD at early stages. We also emphasize that the choice of screening programme for many Asian countries will depend on available health resources and competing health care priorities. Before final recommendations can be made, judgment of the effectiveness of early detection of CKD among adults, including from Asia, has to wait for randomized controlled trials. Each country should study the feasibility of applying the guidelines in their own setting, document the obstacles encountered and evaluate the cost effectiveness of applying these guidelines.

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APPENDIX

The following participants also hold an official capacity:

Philip Kam-cao LI, Past Chairman, Hong Kong Society of Nephrology

Gavin BECKER, Past President, Asian Pacific Society of Nephrology

Nan CHEN, Vice President, Chinese Society of Nephrology

Anutra CHITTINANDANA, Vice president, The Nephrology Society of Thailand

David CH HARRIS, President Elect, Asian Pacific Society of Nephrology

Lai Seong HOOL, Past President, Malaysian Society of Nephrology

Suhnggwon KIM, Past Present, Korean Society of Nephrology

Robyn LANGHAM, Past President, Australian New Zealand Society of Nephrology

Rowan G WALKER, President Elect, Australian New Zealand Society of Nephrology

Hai Yan WANG, Past President, Chinese Society of Nephrology

Yusuke TSUKAMOTO, Chair, International Advisory Council of the AFCKDI