

## Original Paper

# Screening Program for Proteinuria in Rural Adult Population: Kirsehir, Turkey

Mehmet ÖZDEMİR\*, Gülay AKGÜL\*

\*Ahi Evran University Training and Research Hospital, Kirsehir, Turkey

**Background & objectives:** The burden of kidney disease is disproportionately high in central Anatolia, and the conditions often remain undiagnosed until late-stage disease. In order to reduce this burden, strategies must be implemented to improve the detection of kidney disease, and preventative measures must be targeted at those at greatest risk of disease. Important risk factors among include hypertension, diabetes, and obesity. As the exact prevalence of proteinuria is not known in the general population, we undertook this study to estimate the same in a rural adult population in Kirsehir district.

**Methods:** A survey of health and health related issues was conducted on 2524 volunteers, average age 52.19 years, selected randomly from the Kirsehir District, Turkey. A dipstick urinalysis and test for Proteinuria was performed on a clean void, untimed urine sample as a part of a 4-hour interview/examination. Ultrasound of the abdomen was done in patients with renal failure and renal biopsy was performed in selected patients.

**Results:** Of the total 2524 individuals screened, 61.3 per cent were females. Mean age of the study population was  $51.19 \pm 11.2$  yr. First dipstick test identified 289 individuals positive for albuminuria. Repeat dipstick could be done in only 263, of whom 117 showed persistent albuminuria. Significant proteinuria was detected in 14 individuals of the 208 who had 24 h urine protein measured. Of these 14 patients, 3 were found to have chronic renal failure, 6 were presumed to have diabetic nephropathy clinically, one each had focal segmental glomerulosclerosis and biopsy proven diabetic nephropathy, and 4 patients had proteinuria of unknown aetiology.

**Interpretation & conclusion:** The prevalence of proteinuria in this adult rural population was 0.47 per cent (0.30-0.67%) and Males were more affected than females. The detection and treatment of chronic kidney disease in 14 individuals is bound to reduce the rate of decline of renal functions.

**Key words** Albuminuria - dipstick - endstage renal disease - proteinuria

## 1. Introduction

Proteinuria is defined as urinary protein excretion of greater than 150 mg per day. Urinary protein excretion in healthy persons

varies considerably and may reach proteinuric levels under several circumstances. Most dipstick tests (e.g., Albustin, Multistix) that are

positive for protein are a result of benign proteinuria, which has no associated morbidity or mortality[5]. Among the various predictors of progression of chronic kidney disease to end stage renal disease (ESRD), proteinuria is the most potent predictor[6]. Angiotensin converting enzyme (ACE) inhibitors (ACEi) and angiotensin II receptor blockers (ARB) have been given to persons with proteinuria and chronic kidney disease to decrease the progression to end stage renal disease[4,7-11], treatment of proteinuric patients with ACEi and ARB has been shown to decrease the rate of progression of chronic kidney disease.

Since the exact prevalence and cause of proteinuria as a marker of kidney disease is not known in our population, we undertook this study to estimate the same in a rural population in *Kirsehir*.

## 2. Material & Methods

A convenient sample of 2524 adults (aged 40 yr and above) from rural area of *Kirsehir*, Turkey was included in the study. The study was carried out for a period of 24 months between April 2011 and April 2013. Individuals were selected under an ongoing community health programme by the Department of Urology, Ahi

Evran University Training and Research Hospital, *Kirsehir*, Turkey.

After explaining about the objective of the study, individuals were tested for albuminuria by dipstick examination (Multistix SG, Bayer Diagnostics) in an untimed urine sample. Individuals who had acute illness, non ambulatory persons and menstruating women were excluded. Individuals tested positive for albuminuria underwent a second dipstick examination after a gap of one week. Repeat dipstick was performed to rule out transient proteinuria.

Individuals with persistent albuminuria on the second dipstick examination underwent further evaluation at the which included medical history, physical examination, 24 h urine protein estimation, total serum protein and albumin estimation. Those who had proteinuria (protein excretion >150 mg/day on 24 h urine protein estimation) underwent urine microscopic examination, blood urea and serum creatinine, fasting and postprandial blood sugar level estimations. Ultrasound of the abdomen was done in patients with renal failure (serum creatinine >1.4 mg/dl). Renal biopsy was performed in patients with proteinuria >1 g/day or

proteinuria with an active urinary sediment or with renal failure. To facilitate the participation, dipstick examination for albuminuria was performed at the individual's residence.

### 3. Results & Discussion

Of a total of 2524 individuals screened, 1548 (61.3%) were women. The age ranged from 40 to 90 yr with a mean age of  $51.19 \pm 11.2$  yr. First dipstick test identified 59 individuals with positive for albuminuria. Of these, repeat dipstick could be done in 57

diabetic nephropathy clinically (diabetics with proteinuria, diabetic retinopathy and inactive urinary sediment). Seven patients who had proteinuria of unknown aetiology, were not subjected to renal biopsy as criteria for biopsy were not met (proteinuria of less than 1 g/day, normal renal function and bland urinary sediment). Two patients underwent renal biopsy and it showed focal segmental glomerulosclerosis in one and diabetic nephropathy in the other. The following thresholds have been considered, as summarised here:

**Table 1**

ACR (mg/mmol)	PCR (mg/mmol)	Implication
>2.5/3.5	>15	Abnormal (ACR values are for male, female): adequate to define CKD 1 or 2. Commence ACEI/ARB if diabetic(**).
30	50	Favour ACE inhibitor/ ARB if hypertensive Suffix 'p' on CKD stage
70	100	Referral threshold in non-diabetics
>250	>300	Approximately 'nephrotic range' proteinuria

individuals of whom 21 showed persistent albuminuria. Significant proteinuria was detected in 14 (8 males, 6 females) of the 20 individuals with persistent albuminuria who had 24 h urine protein measured. Further evaluation of these 20 subjects revealed chronic renal failure in three by biochemical and ultrasound examinations. Twelve patients were presumed to have

The prevalence of proteinuria in the study population was 0.47 per cent (0.30-0.67%) using albumin dipstick as a screening test. Prevalence in males and females was 0.75 per cent (0.35-1.14%) and 0.31 per cent (0.11-0.50%) respectively (Table 2).

The female preponderance in the study sample was probably a reflection of the fact that the men

were away from home at work during the time of sample collection. Among the various aetiological factors, diabetic nephropathy was found in 7 of 14 patients (50%) with proteinuria.

Seven patients with significant proteinuria not meeting the criteria for a renal biopsy are being followed up. Patients with diabetic nephropathy were advised euglycaemic measures and are on follow up with the health department. One individual with focal segmental glomerulosclerosis was treated

parts of the country may prove to be an effective measure in reducing the burden of chronic kidney disease.

### Acknowledgment

The authors thank trained health care workers at Ahi Evran University Training and Research Hospital, Kirsehir, Turkey for their assistance in performing urine dipstick examination.

**Table 2. Prevalence rate of proteinuria (%) according to age and gender**

Age (yr)	(N)	Males Prevalence	(N)	Females Prevalence
40-59	621	0.60 (0.58 - 0.62)	1050	0.62 (0.61 - 0.64)
60-79	319	0.32 (0.30 - 0.34)	441	0.35 (0.347 - 0.349)
>80	36	0.07 (0.06 - 0.09)	57	0.03 (0.027 - 0.029)
Total	976		1548	

Values in parentheses indicate range

with ACEi and has stable renal function. The risk of renal failure is greater in younger patients.

In conclusion, although the prevalence of proteinuria in this rural population was low, detection and treatment of chronic kidney disease in 14 individuals with proteinuria is likely to reduce the rate of decline of renal function. Similar screening programmes for proteinuria with proper study design in different

### References

1. Nakopoulou L, Stefananki K, Papadakis J, Boletis J, Zeis PM, Kostakis A et al. Expression of bcl-2 oncoprotein in various types of glomerulonephritis and renal allografts. *Nephrol Dial Transplant* 1996; 11: 997-1002
2. Gerstein HC, Mann JF, Yi Q, et al. Albuminuria and risk of cardiovascular events, death, and heart failure in diabetic and nondiabetic individuals. *JAMA* 2001; 286 : 421-6.

3. James PA, Oparil S, Carter BL, et al. 2014 evidence-based guideline for the management of high blood pressure in adults—report from the panel members appointed to the Eighth Joint National Committee (JNC 8). *The Journal of the American Medical Association*. Published online December 18, 2013.
4. Anastasio, P, Spitali, L, Frangiosa, A, Molino, D, Stellato, D, Cirillo, E, Pollastro, RM, Capodicasa, L, Sepe, J, Federico, P, Gaspare De Santo, N (2000) Glomerular filtration rate in severely overweight normotensive humans. *Am J Kidney Dis* 35 (6) 1144-1148.
5. Lindholm LH, Ibsen H, Dahlof B, et al. Cardiovascular morbidity and mortality in patients with diabetes in the Losartan Intervention For Endpoint Reduction in Hypertension Study (LIFE): a randomised trial against atenolol. *Lancet* 2002; 359 : 1004-10.
6. Jafar TH, Schmid CH, Landa M, et al. Angiotensin-converting enzyme inhibitors and progression of nondiabetic renal disease: a meta-analysis of patient-level data. *Ann Intern Med* 2001; 135 : 73-87.
7. Uluhan A, Paydaş S, Sağlıker Y, Demirtaş M, Bozdemir H, Sarıca Y: Low blood pressure and amyloidosis. *Nephron* 1995; 69: 118-119
8. Agodoa LY, Appel L, Bakris GL, et al. Effect of ramipril vs amlodipine on renal outcomes in hypertensive nephrosclerosis: a randomized controlled trial. *JAMA* 2001; 285 : 2719-28.
9. Lewis EJ, Hunsicker LG, Clarke WR, et al. Renoprotective effect of the angiotensin-receptor antagonist irbesartan in patients with nephropathy due to type 2 diabetes. *N Engl J Med* 2001; 345 : 851-60.
10. Brenner BM, Cooper ME, de Zeeuw D, et al. Effects of losartan on renal and cardiovascular outcomes in patients with type 2 diabetes and nephropathy. *N Engl J Med* 2001; 345 : 861-9.
11. Saatçi Ü, Özdemir S, Özen S, Bakkaloğlu A: Serum concentration and urinary excretion of beta 2 microglobulin and microalbuminuria infamilial Mediterranean fever. *Arch Dis Child* 1994; 70: 27-29
12. Aktuğ H, Çetintaş VB, Kosova B, Oltulu F, Demiray ŞB, Çavuşoğlu T et al. Dysregulation of nitric oxide synthase activity and Bcl-2 and caspase-3 gene expressions in renal tissue of streptozotocin-induced diabetic rats. *Turk J Med Sci* 2012; 42: 830-8