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Prevalence of Isolated Proteinuria in Students of University of Maiduguria, Borno State Nigeria: An Early Indicator of Renal Insufficiency

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Abstract

Background: In developing country like Nigeria, data on the prevalence of isolated proteinuria (an early predictor of renal insufficiency) is scarce. Renal disease is increasing rapidly worldwide most especially in the developing countries. Scarcity of knowledge will prevent early intervention with consequence of decline to End Stage Renal Disease (ESRD).

Objectives: To detect the prevalence of isolated proteinuria as an early predictor of renal insufficiency in asymptomatic proteinuric persons in Maiduguria, Borno state Nigeria

Methods: A total of 104 apparently healthy subjects (students) of University of Maiduguri participated in the study. They were screened for persistent proteinuria using dipstick analysis. Quantitative urinary protein and Urinary Creatinine estimation were also carried out using Sulphur Salicylic acid (3% SSA) and Jaffe methods respectively. Serum renal biochemical analysis was carried out on the subjects with persistent proteinuria for any renal disease.

Results: Proteinuria was found to be high between the age of 18-24 yrs (55.8%) and between the ages of 25-31yrs (37.5%). The prevalence of isolated proteinuria by dipstick was higher in male students (42.3%) than in females (37.5%). But the prevalence using UPCR ratio was found to be 12.5% for male students and 7.7% for females. Mean serum urea and creatinine were found to be 3.6 ± 1.0 mmol/L, 3.0 ± 0.8 mmol/L; and 120.5 ± 19.2 µmol/L, 97.0 ± 14.8 µmol/L for male and female students respectively.

Conclusion: In conclusion, the findings of this study show that prevalence of isolated proteinuria is high (20.2%), and may be due to risk factors for renal insufficiency which are common in our environment.

Keywords: Prevalence; Isolated proteinuria; Students; University; Early; Indicator; Renal insufficiency

Introduction

Proteinuria as defined by Michael [1] is the excretion of urinary protein of greater than 150mg per day. In healthy person urinary protein excretion varies considerably and may reach proteinuric levels under several conditions. About 20% of the normally excreted proteins is low molecular weight type such as immunoglobulin (M.Wt about 20 KDa), 40% albumin (M.Wt=65 KDa) and 40% is made up of Tamm-Horsfall mucoproteins secreted by the distal tubule [2]. An isolated proteinuria is defined as excretion of urinary protein of less than 2 g per day in an individual with normal renal function test, no evidence of systemic diseases with renal complication, normal urinary sediment, and normal blood pressure. This is usually discovered incidentally in routine dipstick urinalysis [3]. However, current scientific evidence shows that 20%of such individual will develop renal insufficiency after 10 years of follow-up and therefore should be monitored by blood pressure measurement, urinalysis and serum creatinine after every six months [1]. Isolated proteinuria of more than 2 g per day is rare and usually signifies glomerular disease [1]. Due to the asymptomatic nature of renal disease, kidney damage frequently remains undetected until late and at this stage therapeutic interventions are often ineffective [2].Given its long preclinical latency, screening of asymptomatic individuals for CKD has been considered as a potential means for early detection, with a goal of reducing CKD progression and its complications[4].

In developing countries including Nigeria, kidney disease is a growing health problem [5] possibly due to ignorance, poverty, and lack of appropriate government intervention. It is therefore important to identify predictors for early renal impairment which will allow early intervention and therefore halt the decline towards ESRD [6].

The aim of our study was to detect the prevalence of Isolated proteinuria as an early predictor of renal insufficiency in students of University of Maiduguria, Borno state Nigeria. It was also aimed at identification of persons likely to develop CKD in an attempt of reducing the number of patients with ESRD.

Materials and Methods

Study subjects

A total of 104 apparently healthy subjects (students) of University of Maiduguri participated in the study. Sixty nine (66.3%) were Males and thirty five (33.7%) were Females consented to participate in the study. Subjects with any form of renal insufficiency, systemic diseases and

metabolic diseases such as diabetes, high blood pressure and females who are under their monthly period during the time of sampling were excluded.

Ethical approval was obtained from the Research and ethical clearance Committee of the University of Maiduguri /University of Maiduguri Teaching Hospital.

Methods

Urine: Subjects were provided with Universal container and midstream urine was collected after being educated for appropriate sample collection. The samples were collected back from the subjects same day of collection. Aliquot of urine samples were stored at 8°C until analysis.

Blood: Five (5) ml of blood samples was collected from each person and registered appropriately. The blood samples were allowed to clot and spun at 4000 rpm for 10 minute to obtain the clear supernatant (serum). The sera were stored frozen at 8oc until analysis.

Analysis

Qualitative analysis of the fresh urine samples was carried out on the same day of collection using ComboStik reagent strips for urinalysis. The frozen urine samples were thawed and quantitative urinary protein and Urinary Creatinine were estimated using Sulphur Salicylic acid (3% SSA) and Jaffe methods respectively. The serum samples were equally thawed. Serum Urea and Creatinine were estimated using Diacetyl Monoxime method and Jaffe method respectively.

Statistical Analysis

The data obtained were analyzed using the Statistical Package for Social Sciences (SPSS) version 20.0 for windows pc. Descriptive statistics and student-t test was used for the analyses. The level of significance was set at 95% ($p<0.05$) confidence interval.

Result

Data are expressed in frequency and percentage. The t-test was used to determine the level of significance for the urinary protein and urinary creatinine in apparently healthy individuals. The level $p<0.05$ was considered as the cut-off value for significance. Samples were collected from one hundred and four (104) students of both sexes from University of Maiduguri.

Table 1 shows characteristics of subjects evaluated for proteinuria; sixty nine (66.3%) students were male whereas thirty five (33.7%) students were females. Twenty seven (26%) male students had no protein in urine; Forty two (40.3%) male students had positive (1+) protein in urine. Eighteen (17.3%) female students had no protein in urine while seventeen (16.4%) female students had positive (1+) protein in urine. The results showed that sixty nine (66.3%) male students had no leukocyte (WBC) in urine and thirty five (33.7%) female students had no leukocyte in urine; fifty (48.1%) male students had no nitrite in urine while twenty eight (26.9%) female students had no nitrite in urine. Nineteen (18.3%) male students had positive (1+) nitrate in urine, while seven (6.7%) female students had positive (1+) nitrite in urine. Thirty six (34.6%) male students and twenty one (20.2%) female students had pH of five (5), sixteen (15.4%) male students and six (5.8%) female students had pH six (6), seven (6.7%) male students and six (5.8%) female students had pH 7, while ten (9.6%) male students and two (1.9%) female students had pH eight (8). Sixty five (62.5%) male students had no occult blood in urine while three (2.9%) male students had positive (1+) occult blood in urine, and thirty three (31.7%) female students had no occult blood in urine while two (1.9%) female students had positive (1+) occult blood in urine. The male students which are sixty nine accounting for sixty six point three percent (66.3%) of the study population have mean serum urea level of 3.6 ± 1.0mmo/l while that of thirty five (33.7%) female students have mean serum urea level is 3.0 ± 0.8 mmol/l. Also the mean serum creatinine of the sixty nine (66.3%) male student's was120.5 ± 19.2 µmol/L and for the thirty five (33.7%) female students the mean serum creatinine was 97.0 ± 14.8 µmol/L respectively.

Table 2 shows the prevalence of isolated proteinuria by uPCR ratio of the students. It was found that twenty seven (26%) of the female students had Up/Cr ratio of less than two (<2.0), eight female students accounting for (7.7%) had Up/Cr ratio greater than two (>2.0), while fifty six (53.8%) of the male students had Up/Cr ratio less than two (<2.0) and thirteen (12.5%)of the male students had Up/Cr ratio greater than two (>2.0) respectively and twenty one students (20.2%)had isolated proteinuria of Up/Cr ratio greater than two (>2.0) .

Figures 1 and 2 shows distribution and percentage of Urinary Protein by Dipstick according to Age Group respectively. Fifty eight (58) students (55.8%) were between the ages of 18-24 years; out of which twenty eight (26.9%) students have positive (1+) for proteinuria. Thirty nine (37.5%) students were between the ages of 25-31 years, of which twenty eight (26.9%) students have positive (1+) for proteinuria. Three (2.9%) students were between the ages of 32-38 years; out of which one (1.0%) student had positive (1+) for proteinuria. Four (3.8%) students were between the ages of 39-45 years out of which one (2.9%) student had positive for proteinuria. Finally two (1.9%) students were between the ages of 46-52years out of which one (1.0%) student had positive (1+) for proteinuria.

Parameter	**Male n=69 (66.3%)**	**Female n=35 (33.7%)**
Proteinuria - Neg	27 (26%)	18 (17.3%)
- 1+	42 (40.3%)	17 (16.4%)
LEUKOCYTE- Neg	69 (66.3%)	35 (33.7%)
Nitrite - Neg	50 (48.1%)	28 (26.9%)
- 1+	19 (18.3%)	7 (6.7%)
PH 5	36 (34.6%)	21 (20.2%)
6	16 (15.4%)	6 (5.8%)
7	7 (6.7%)	6 (5.8%)
8	10 (9.6%)	2 (1.9%)
Occult Blood - Neg	65 (62.5%)	33 (31.7%)
-1+	3 (2.9%)	2 (1.9%)
Serum Urea *(2.5-5.8) mmol/L	3.6 ± 1.0	3.0 ± 0.8

Serum Creatinine**(44-132) µmol/L	120.5 ± 19.2	± 14.8

Table 1: Characteristics of subjects evaluated for Proteinuria.

UPCR RATIO	Females n=35 (%)	Males n=69 (%)	Total N=104 (%)
<2.0	27 (26%)	56 (53.8%)	83 (79.8%)
>2.0	8 (7.7%)	13 (12.5%)	21 (20.2%)*

*Prevalence of Isolated Proteinuria in this Study.

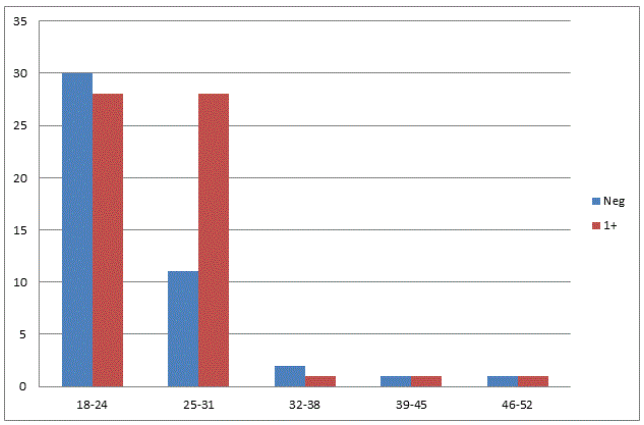

Figure 1: Distribution of Urinary Protein by Degree of Dipstick according to Age Group.

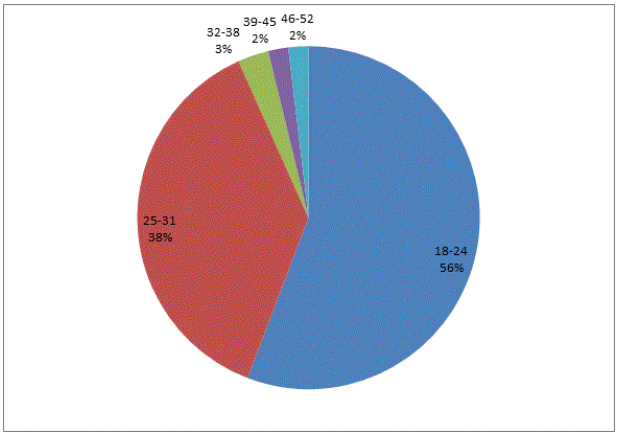

Figure 2: Percentage of Urinary Protein by degree of Dipstick according to Age group.

Discussion

Routine urine screening programs are basic fundamental step in identification of early renal diseases. This has proved to be extremely important in reducing the growing burden of kidney disease in both developed and developing countries. To our knowledge, this is the first report on screening for isolated proteinuria among students in University of Maiduguri. Despite the fact that the study population had normal renal parameters (normal urea and creatinine), the prevalence of isolated proteinuria among the students by dipstick urinalysis was high 58.7%.However, the prevalence was higher 42.3% in the Male students than in female students which is 16.4%. However, when urinary protein/creatinine ratio (UPr/Cr) was estimated, the prevalence was found to be 12.5% for male students and 7.7% for female students. Lower prevalence has been reported in similar studies on isolated proteinuria conducted across the country with 29.7% reported from Ile-Ife [7] and 29.7% from Rivers state [8]. The prevalence among civil servant in Kano is 19.6% [6]; this is similar to the rates of 19% reported from Abuja [6] and 19.9% from Lagos, [9] but higher than 4.3% reported from Enugu, [10]. Our finding was higher (20.2%) than the one reported from China (12.1%) [11], may be due to risk factors for renal insufficiency which are common in our environment. Proteinuria is not only a marker of kidney disease, but also a progression factor in CKD, heralding a further deterioration in renal function. Its detection is therefore very important as intervention at this stage has been shown to prevent or at least delay further renal damage.

Conclusion

In conclusion, the findings of this study show that prevalence of isolated proteinuria is high (20.2%). This may be due to risk factors for renal insufficiency which are common in our environment.

Recommendation

Therefore, there is need for preventive strategies such as public enlightenment to avert the rising burden of CKD. Since many people from this part of the world do not appreciate the significance of routine medical checkups, population screening for CKD and its risk factors becomes paramount, especially among those at higher risk of the disease.

References

1. Carroll FM, Temte JL (2000) Proteinuria in Adults: A Diagnostic approach. Am Fam Physicians 62: 1333-1340.
2. Roscoe RR (1980) Isolated Proteinuria in asymptomatic Patients. Kidney Int. 18: 395-406
3. Rovin HB, Glassock JR, Curhan GC, Lam AQ (2006) Assessment of urinary protein excretion and evaluation of isolated non-nephrotic proteinuria in adults.
4. Berns JS (2014) Routine screening for CKD should be done in asymptomatic adults selectively. Clin J Am Soc Nephrol 9: 1988-1992
5. Eknoyan G, Lameire N, Barsoum R, Eckardt KU, Levin N, et al. (2004) The burden of kidney disease: improving global outcomes. Kidney Int 66: 1310–1314.
6. El-Tayeb (2010) Screening of proteinuria in young adults: is it worthwhile? Dialysis and Transplant 39: 522-526
7. World Health Organization (1999) Definition, diagnosis and classification of diabetes mellitus and its complications: Report of a WHO Consultation. Diabetic Medicine 15: 539-553
8. Olainoye OF, Arogundade AF, Sanusi AA, Hassan MO, Gbadegesin RA, et al. (2010) Undiagnosed hypertension and proteinuria in a market population. Results of WKD 2009 screening exercise. Tropical J Nephrol 5: 66-67.

9. Amira C, Sonibare A, Sokunbi B, Sokunbi O (2007) Community based screening for chronic kidney disease risk factors. World Congress of Nephrology pp: 408
10. Ulasi I, Arogundade FA, Aderibigbe A, Oviasu E, Akinsola A, et al. (2006) Assessment of risk factor for kidney disease in an unselected population of Nigerians. A report of routine screening conducted during national kidney disease awareness and sensitization programme. Tropical J Nephrol 2: 73-80.
11. Chen W, Chen W, Wang H, Dong X, Liu Q, et al. (2009) Prevalence and risk factors associated with chronic kidney disease in an adult population from southern China. Nephrology Dial Transp 24: 1205-1212.