Proteinuria in newly-diagnosed HIV patients in Southeast Nigeria: a hospital based study

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Abstract

Background: The aim of this study is to determine the prevalence of proteinuria in newly diagnosed HIV subjects in southeast Nigeria using 24-hour urine protein.
Methods: This was a prospective study on the prevalence of proteinuria in newly-diagnosed HIV subjects in Owerri, southeast Nigeria. Three hundred and seventy five newly diagnosed HIV subjects and 136 non-HIV controls. Subjects were recruited from the HIV clinic and Medical Outpatient Department (MOPD) of Federal Medical Centre, Owerri. An interviewer structured questionnaire was administered and relevant data collected. Investigations performed included HIV screening, and confirmatory test, 24-Hour Urine Protein (24HUP), Creatinine Clearance. Significant 24HUP was taken as ≥0.150g.
Results: Three hundred and seventy five HIV subjects and 136 control subjects took part in the study. The mean age of the subjects was 39±11 years. Significant Proteinuria (≥ 150mg/day) was present in 122 (32.5%) of the HIV subjects and 20 (14.7%) of the controls (p=0.019). In addition, 68 (18.1%) of HIV and 8 (5.9%) of non-HIV control subjects had proteinuria in the range of 0.150g - 0.300g/day. While 54 (14.4%) of HIV subjects and (11) 8.1% of non-HIV controls, had proteinuria in the range of 0.300g - 3.499g/day, p<0.001.
Conclusion: Prevalence of significant proteinuria is high in newly diagnosed HIV-seropositive and assessment of proteinuria is recommended in newly diagnosed HIV subjects. This will help in identifying chronic kidney disease subjects, and also encourage early initiation of treatment.

Keywords: Human Immunodeficiency Virus (HIV), Proteinuria, 24-Hour Urine Protein (24HUP), Creatinine Clearance (Ccr).

Highland Med Res J 2016;16(1):33-36

Introduction

HIV infection is a global healthcare problem. An estimated 24.7 million people living with HIV, comprising 71% of global total, are in Sub-Saharan African countries.[1]

Proteinuria is one of the markers of chronic kidney disease. In HIV seropositive subjects; proteinuria is more commonly associated with HIV-associated nephropathy (HIVAN), noted as the most common cause of established renal disease, among HIV seropositive subjects.[2-4] In USA, the prevalence of proteinuria in HIV subjects ranges from about 14.1% to 32.0%.[5-8] In Africa, studies carried out in Tanzania, and Malawi, reported proteinuria prevalence of 6.4%, 3.3%, respectively.[9,10] However, the prevalence of proteinuria ranges from about 20% to 33% in HIV-infected subjects from surveys conducted from other geopolitical zones of Nigeria.[11-14]

Nephrotic range proteinuria, in HIV seropositive subjects is commonly associated with Focal Segmental Glomerulo-Sclerosis (FSGS).[2, 3] FSGS is the typical biopsy finding in HIV associated Nephropathy (HIVAN). Although nephrotic range proteinuria is commonly seen in HIVAN, some subjects however, present with non nephrotic range proteinuria.[5,15] In addition, about 40% of HIV subjects with proteinuria, do not have HIVAN.[16,17] Zaidan et al[18] reported that tubulointerstitial nephropathies commonly caused by drugs like Tenofovir, and non-steroidal anti-inflammatory drugs (NSAIDS) also cause proteinuria in HIV subjects.

Proteinuria is recognized as an independent risk factor for cardiovascular and renal disease and as a predictor of end organ damage.[19] There are limited studies on proteinuria from Sub-Saharan African countries in HIV infected paersons. In Nigeria the previously published prospective studies on prevalence of proteinuria reported variable conclusions thus necessitating more studies.[11-14] In addition these previous prospective studies were carried out in other geopolitical

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zones of Nigeria. There is currently no published prospective study from eastern Nigeria from literature search, prompting us to undertake this study.

Materials and Methods

This was a cross-sectional survey on the prevalence of proteinuria in newly-diagnosed HIV patients in southeast geopolitical zone of Nigeria. The survey was conducted from March 2011 to August 2011 in Federal Medical Centre (FMC), Owerri, Imo state, southeast Nigeria. The institution is one of the two tertiary hospitals in the state, and receives referral from other hospitals in the state and from neighboring states as well. The subjects consisted of 393 newly diagnosed HIV seropositive subjects. The control consisted of 136 age- and sex-matched HIV seronegative subjects. The HIV Seropositive subjects and the control subjects were recruited from the HIV clinic and the MOPD of FMC Owerri, respectively. Inclusion criteria for the study included newly diagnosed HIV subjects that are 18 years and above, and those that gave informed consent. Exclusion criteria included pregnancy, menstruation, fever, urinary tract infection, diabetes mellitus, heart failure, bladder tumor, chronic use of nephrotoxic drugs, and those on antiretroviral drugs prior to presentation at the HIV clinic. Subjects who refused to give consent were also excluded from the study.

Ethical approval for the survey was obtained from Ethical and Research Committee of FMC, Owerri. Participation in the survey was voluntary and written consent was obtained from participants prior to enrollment after due explanation of the purpose, objectives, benefits and risks of the survey.

A questionnaire was used to collect relevant information including, sociodemographic data, medical history, nephrotoxic and antihypertensive drugs consumption, and also stage of the infection. Investigations performed by the subjects included HIV screening and confirmatory tests, serum electrolyte urea, and creatinine, 24-Hour Urine Protein (24HUP), Glomerular Filtration Rate (GFR) using creatinine clearance. Significant proteinuria was defined as 24HUP≥ 150mg/day. Clear instructions were given to the subjects on how to collect the 24-hour urine sample according to standard procedures.

Data analysis

The data obtained was entered into a spread sheet and analysed using SPSS version 17.0. Tables and frequencies were computed. The strength of association between proteinuria in the groups was determined by chi square test. P≥0.50 was taken as statistically significant.

Results

The mean age of the subjects was 39 ± 11 years. Three hundred and seventy five HIV Seropositive subjects took part in the survey, 270 (72.0%) were females, while 105 (28.0%) were males. The control consisted of 136 HIV seronegative subjects, 98 (72.1%) were females, while 38 (27.9%) were males.

Table 1: Distribution of proteinuria in HIV subjects

Variable	HIV subjects n=375	Non-HIV control n=136	P value
Age (years)	39±11	39±12	0.814
Sex Female	270(72.0%)	98(72.1%)	0.989
Male	105(28.0%	38(27.9%)	
24HUP(mg)			
<50	72(19.2)	50(36.8%)	0.048
51-149	181(48.3%)	67(49.3%)	<0.001
150-300	68(18.1%)	8(5.9%)	<0.001
301-3499	54(14.4)	11(8.1%)	<0.001
≥150	122(32.5%)	19(14.0%)	<0.001

Table 1 shows that significant proteinuria is more common in HIV subjects when compared with the control. The incidence of proteinuria in the HIV and control subjects was 32.5% and 14.0% respectively. The p value was significant

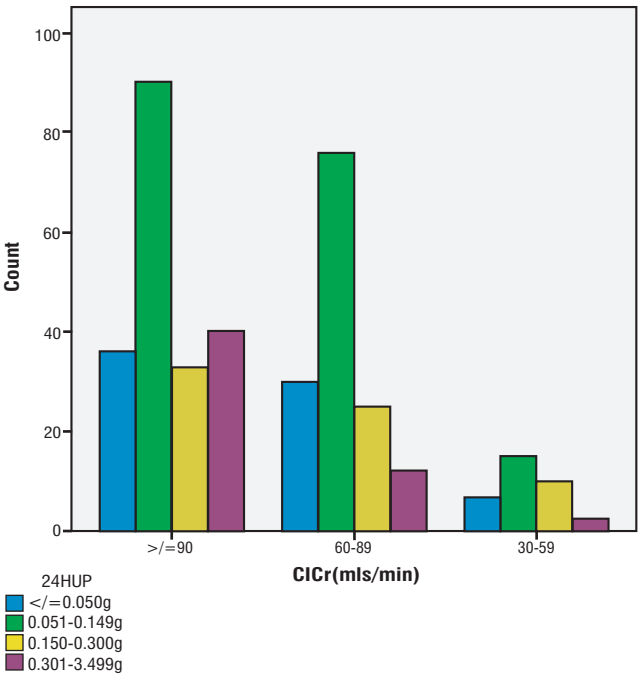

Figure 1: Proteinuria at different levels of renal function in HIV subjects.

Figure 1 shows proteinuria at different levels of renal function. In subjects with creatinine clearance of ≥ 90 mls/min 36.68% had significant proteinuria; while in

those with creatinine clearance of 60-89 mls/min 37 (25.87%) had significant proteinuria. In subjects with creatinine clearance of 30-59 mls/min 12 (36.36%) had significant Proteinuria and also none of the HIV subjects had creatinine clearance of less than 30mls/min. In addition in the three groups' noted above, proteinuria in the range of 150 -149mg was most common and none of the subjects had proteinuria in the range of ≥ 350omg in the three groups.

Discussion

This was a cross-sectional study on the prevalence of proteinuria in newly-diagnosed HIV subjects in Owerri, southeast Nigeria using 24HUP estimation. The study reported that 32.5% of the HIV subjects and 14.0% of the non-HIV controls had significant proteinuria. It also showed that 18.1% of the HIV subjects had proteinuria between 150mg/day and 300mg/day, while 14.4% had proteinuria between 300mg/day - 3.499g/day.

The proteinuria prevalence of 32.5% in HIV-seropositive subjects reported in this study is comparable to those reported from similar studies emanating from Nigeria.[11-14] One of the studies was carried out by Umezudike et al[14] in southwest Nigeria, and they reported proteinuria prevalence of 20.5%, while another by Agaba et al[12] in North-central Nigeria, reported 25.3%. Okafor et al[13] reported 33.3% from south-south Nigeria. The prevalence reported in this study is almost the same with that reported by Okafor et al[13] although he used spot urine protein creatinine ratio in estimating proteinuria in their subjects while we used 24HUP estimation method. The prevalence of proteinuria observe from both studies was not influenced by the method of assessment of proteinuria. The report from this survey contrasts sharply with some studies that reported lower proteinuria prevalence of 8.1% to 8.7%, [20, 21] The reason for this could be due to the fact that these studies had variations in sample collections and included patients that were symptomatic in various clinical stages with longer duration of illness. In addition, the fact that subjects involved in the above studies where on highly active antiretroviral therapy (HAART) may also have influenced the low value observed. Expectedly, HAART has been shown to reduce the prevalence of proteinuria and subsequently, renal disease in HIV patients.[22]

Our study also showed a prevalence of 0.150g-0.300g proteinuria of 18.1% in HIV subjects, and prevalence of 0.301g-3.499g proteinuria of 14.4% in HIV subjects. This finding was different from that reported by Han et al in their study done in South Africa in 2006 in which they found a proteinuria prevalence of 6% in HIV subjects. They evaluated microalbuminuria and quantified microalbuminuria. However, proteinuria was not graded.

This study is limited by the relatively small sample size. A larger sample size preferably involving many centers in the southeast Nigeria is desirable. Subjects that took part in the study, where not on admission during the study, compliance with strict collection of all urine produced during the investigation period would have been better if the study subjects were admitted in hospital and the urine collection supervised by trained nurses.

Conclusions

The prevalence of proteinuria among HIV seropositive subjects in Owerri southeast Nigeria is high. This underscores the need for quantitative estimation of proteinuria in HIV seropositive subjects; bearing in mind that proteinuria is a marker of chronic kidney disease and also a marker of cardiovascular disease. Early detection of significant proteinuria in this group of patients and commencement of appropriate treatment will reduce the rate of progression of chronic kidney disease. This will also reduce sharply the number of HIV seropositive subjects that progress to End Stage Renal Disease.

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