

# **ASYMPTOMATIC PROTEINURIA IN CHILDREN IN CALABAR**

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## **ABSTRACT**

The urine samples of pupils from 4 Primary schools in Calabar were studied for asymptomatic proteinuria. The aim was to determine the prevalence of asymptomatic proteinuria in children in Calabar. For each pupil, two urine samples were tested for proteinuria using the dipstick. The first urine sample was collected at school and the second was an early morning urine sample brought from home. A total of one thousand two hundred and seventy five children (1,275) were screened. Two hundred and thirty eight (18.6%) children had varying degrees of proteinuria ranging from trace to 500mg/dl in the daytime. Of these, only twenty (1.6%) had significant proteinuria of 30mg/dl to 500mg/dl. A repeat testing with early morning urine still showed significant proteinuria in 1.6% of these children. The prevalence of asymptomatic proteinuria was more in girls (65%) than in boys (35%), giving a male to female ratio of 1:1.9. The study identifies the need to always screen all children for proteinuria before admission into schools, as this will facilitate early detection of nephropathies in them and permit early investigation, treatment and follow-up.

**KEYWORDS:** Asymptomatic proteinuria, children, Calabar.

## **INTRODUCTION**

Proteins do not normally appear in urine in detectable quantities. When they appear, they represent the ultrafiltrate of plasma proteins (Edren 2003). They may be indicative of kidney damage as in glomerulonephritis, and nephrotic syndrome. The later may be caused by quartan malaria, schistosomiasis, IgA nephropathy and Bergers disease (Ikimalo et al 2003).

In clinical practice, proteinuria is however a common laboratory finding in children. It is sometimes a transient or a persistent finding which may represent a benign or serious renal disease. (Mahmond and Adhan 1998). Benign proteinuria is not associated with signs and symptoms of any renal disease (Edren 2003, Mahmond and Adhan 1998). Association with febrile

illness, physical and emotional stress, dehydration, seizure and cold weather has been documented. In these conditions the protein excretion is most often transient (Mahmond, Adhan 1998). Long hours of standing can be responsible for abnormally elevated protein excretion, which however returns to normal in recumbent position.

Several studies however have shown that there is a high incidence of renal diseases and a correspondingly high morbidity and mortality from chronic renal failure in Nigerian children (Eke and Eke 1994).

Since proteinuria occurs in modest quantities in some insidious renal diseases and transiently in some non-renal conditions; children with proteinuria should be investigated and followed up (Hendrickse 1980). This study was therefore undertaken to establish the

prevalence of asymptomatic proteinuria in children in Calabar. This will facilitate early diagnosis and treatment of subtle renal diseases in children. The morbidity and mortality arising from chronic renal disease can be reduced in our resource poor environment.

## SUBJECTS AND METHODS

The study was carried out in four Primary schools in Calabar metropolis. Permission for the study was obtained from the State Primary Education Board and informed consent was obtained from Parents/Guardian of the children. The study was also explained to the head teacher and class teachers in the school. Children between the ages of 5-14 years were randomly selected from each class in the schools using the class register and enlisted for the study. The name and age of each child were obtained. A brief history of any urinary symptom and fever was obtained from each child. Children with any urinary symptom or fever were excluded from the study. A physical examination was carried out on each child. Findings sought on each child included the weight, height and blood pressure. Each child was asked to urinate into a labeled universal tube container. Using the dipstick, the urine specimens were tested for proteinuria within 1-2 hours of collection at school. The same universal containers were washed, dried and given back to the children to bring their first morning voided urine next day. The parents/guardians were given written instructions on the urine collection. On return of samples the following morning, the children were asked to narrate how the samples were collected. Those who were able to give the method of collection accurately were accepted. Otherwise they were retrained and containers given back for re-collection. The early morning urine samples were tested with dipstick for proteinuria within 2-3 hours of collection. Those who could not report in school with the morning urine sample were excluded from the study. The

proteinuric subjects were referred to the nephrology unit for further investigation and follow-up.

## RESULTS

One thousand, two hundred and seventy-five children aged 5-14 years were enlisted in the study out of the total school population of 4,576 pupils. The study group consisted of 691 males and 584 females with a male to female ratio of 1:2.1. Of the 1,275-urine specimen collected at school, 238 (18.6%) tested positive for proteinuria while 1,037-tested negative. The proteinuria ranged from trace to 30mg/dl, 100gm/dl and 500mg/dl. See table 1. In the early morning specimen 230 (18.0%) tested positive. Two hundred and ten (210) had trace proteinuria while 20 still had significant proteinuria. The trace proteinuria was discountenanced. The age distribution of the 20 subjects who had significant proteinuria is as shown in table II and age group 8-10 years had the highest number of subjects with proteinuria; 4males and 8 females. Significant proteinuria was more prevalent in girls (65%) than in boys (35%), with a male to female ratio of 1:1.9. The numbers were too few for any statistical analysis. The degrees of proteinuria are as indicated in table III. The parents of these pupils were invited, counseled and referred to the nephrology unit of the teaching hospital for follow-up.

## DISCUSSION

The prevalence of asymptomatic proteinuria of 18.6% obtained in this study from the daytime urine specimen is higher than observations from previous studies in Nigeria. (*Akinkugbe 1973, Ikimalo et al 2003, Ajasin 1986, Abdurrahman et al 1978*). In these studies the prevalence values were between 3-10%. The high value noted in the present study may be due to the fact that the test was done as children arrived school. Orthostatic

proteinuria may be responsible. In addition, the population surveyed in this study is larger than most of the quoted studies. The 1.6% subjects with significant proteinuria were referred to the nephrology clinic of the Teaching hospital for further investigation and follow-up. *Onifade et al (1997)* observed that only 1.5% of the subjects she studied still had significant proteinuria after repeated urine testing. This seems to agree with the present study.

Significant proteinuria was noted to be more prevalent in girls (65%) than boys 35%. Most studies have observed this also (*Abdurrahman et al 1978, Ajasin 1986*). Others noted the reverse (*Onifade 1997, Ekunwe et al 1989*). Females are more prone to urinary tract infection than males in view of the female short urethra and proximity to the anal region. This could possibly explain the high prevalence of proteinuria in females. It is postulated that the age at which proteinuria is detected might represent the age of onset of renal disease (*Ajasin 1986*). Proteinuria can also persist despite treatment of some common renal condition (*Onifade et al 1987*). *Mclaine et al (1970)* have documented that though persistent asymptomatic proteinuria occurs during the course of various renal disease in children, majority may still be

benign particularly where proteinuria is the sole presenting feature. This may be applicable to some of the subjects in the present study. *Edren (2003)* has found this in 2-5% of adolescents.

Nevertheless, since renal disease are often associated with proteinuria, it is important to perform urinalysis on all children at early ages. Routine urinalysis should form part of the pre-school medical examination on all children. Any child found with proteinuria should be monitored over-time. Urea, electrolyte and creatinine, 24-hour protein excretion and blood pressure should be performed over prolonged periods. Early treatment can hence be instituted to forestall the development of chronic renal disease, whose treatment is not attainable by majority in this resource poor environment.

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**Table 1:** Prevalence of proteinuria on 1<sup>st</sup> screening test is 1,275 children

PROTEINURIA	MALES	FEMALES	TOTAL
Negative	541	496	1,037
Trace	93	125	218
30mg/dl	3	5	8
100mg/dl	2	5	7
500mg/dl	2	3	5
TOTAL	641	634	1275

**Table II :** Age/sex distribution of the 20 subjects that re-tested positive for proteinuria (2<sup>nd</sup> testing)

AGE IN YEARS	MALE	FEMALE	% OF TOTAL
5-7	2	3	25
8-10	4	8	60
11-14	1	2	15
	7(35%)	13(65%)	100

**TABLE III: Degrees of Proteinuria at 2<sup>nd</sup> Testing In 20 subjects**

<b>PROTEINURIA (mg/dL)</b>	<b>NO.</b>	<b>% OF TOTAL</b>
30mg/dL	8	40
100mg/dL	5	25
<b>500mg/dL</b>	<b>7</b>	<b>35</b>

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