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Screening Of Proteinuria and Hematuria in Asymptomatic Children in Basic School-Kosti City-In White Nile (Kosti City)

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ABSTRACT

Mass screening for proteinuria and haematuria enhances the awareness of renal diseases and improves the chances for an early diagnosis and therapy. Early diagnosis is the cornerstone for prevention of kidney failure. Even if progression cannot be slowed, patients who have been diagnosed early have better survival when commencing renal replacement therapy. To determine asymptomatic renal disease in children in particular proteinuria, and hematuria in asymptomatic children. It is a community based study of prevalence of asymptomatic proteinuria and haematuria in basic school children at Kosti City -White Nile State -Sudan. The data was collected from 486 children. Male to female ratio was 1.1:1. Twenty one children (4.3%) had one (+) protein, 9 children (1.9%) had two (+) of protein, and only one children (0.9%) found to have three (+) of protienuria. One (+) RBCS in urine found in 24 children (4.9%), two (+) RBCS found in 14 children (2.9%) and 8 children (1.6%) were found to have three (+) of RBCS in their urine. The prevalence of proteinuria and haematuria was significant. Urinary screening programmes in children must be a routine especially in school age children.

Key words: Asymptomatic Proteinuria, Haemtaturia, Children and Kosti-Sudan.

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INTRODUCTION

A symptomatic proteinuria may be defined as proteinuria detected by routine urinalysis or during investigation for diseases unrelated to the urinary tract. This finding is either transient or persistent and may or may not reflect underlying renal disease (Mclinain et al., 1969). Transient proteinuria may occur with fever, exercise, or changes in posture and is usually considered benign. If the proteinuria is persistent the possibility of a serious renal disease is considered more likely (Mclinain et al., 1969).

Mass screening for proteinuria with self-testing enhances the awareness of renal diseases and improves the chances for an early diagnosis and therapy. Limitations are the frequent over-diagnosis of proteinuria due to minimal colour changes in the dipsticks (Heidland et al., 2009).

In normal individuals, the major constituent of non-plasma proteins is the Tamm-Horsfall protein (Uromodulin). It is a glycoprotein (MW, 95 kDa) actively

Table 1. Age distribution.

Valid	Frequency	Percentage	Valid percentage	Cumulative percentage
Less than 10 years	142	29.2	29.2	29.2
10 years or more	344	70.8	70.8	100.0
Total	486	100.0	100.0	

secreted by the tubular cells in the ascending thick limb. The Tamm-Horsfall protein has no clinical significance. Significant proteinuria can be classified into (a) glomerular proteinuria, (b) tubular proteinuria, and (c) overflow proteinuria (Elsharif and Omer, 2014). Transient proteinuria is usually associated with exercise, stress, fever, and dehydration. It does not reflect renal disease (Rytand and Spreiter, 1981). Persistent proteinuria indicates renal disease. Proteinuria may per se also lead to renal injury and should be thoroughly investigated (Elsharif and Omer, 2014). There are several tests available for the measurement of urinary protein. The most common is the urine dipstick, and other tests such as the sulfosalicylic acid test that detects all proteins (Patrice et al., 2010).

The urinary dipstick measures albumin concentration via a colorimetric reaction between albumin and tetrabromophenol blue producing different shades of green according to the concentration of albumin in the sample. (Elsharif and Omer, 2014).

Negative, Trace -20 mg/dL, 1+-30 mg/dL, 2+-100 mg/Dl, 300 mgdL-3+ and 4+-1000 or more mg/Dl. Dipstick testing will not detect low molecular weight proteins. False-positive results may be obtained in samples that are very alkaline or contaminated by antiseptic agents (such as chlorhexidine or benzalkonium chloride) or iodinated radiocontrast agents. Thus, the urine should not be tested for protein with the dipstick for at least 24 h after (Morcos et al., 1992). In contrast to the urine dipstick, sulfosalicylic acid (SSA) detects all proteins in the urine including the low molecular weight proteins that are not detected by the dipstick. This test is infrequently necessary in children (Hogg et al., 2000). Hematuria is defined by the presence of an increased number of red blood cells (RBCs) in the urine. Hematuria can either be visible to the naked eye (gross) or apparent only upon urinalysis (microscopic). Microscopic hematuria may be discovered as an incidental finding on a urinalysis prompted by urinary or other symptoms (Feld et al., 1997).

Hematuria can be transient due to fever, infections, trauma and exercise are common causes and are usually microscopic and benign (Trachtman et al., 1984), persistent hematuria usually indicates renal disease, symptomatic hematuria associated with symptoms such as hypertension, edema and urinary symptoms, asymptomatic or isolated (Trachtman et al., 1984). Hematuria can be diagnosed by urine dipstick. This test is capable of detecting even five RBCs per cu mm, and is positive both in hemoglobinuria and myoglobinuria, it will be negative in discoloration of urine due to food and drugs. Appositive dipstick test should be followed by microscopic examination of the urine to distinguish hematuria from myoglobinuria and hemoglobinuria. The combination of hematuria and proteinuria is significantly less common than either isolated proteinuria or hematuria. Although asymptomatic hematuria with proteinuria has a prevalence rate of less than 0.7% in unselected school-age children, it is associated with a higher risk for significant renal disease (Vehaskari et al., 1979).

MATERIALS AND METHODS

This is a community based study of prevalence of asymptomatic proteinuria and hematuria in school children at Kosti city -White Nile State Sudan. The study was conducted at Kosti city-White Nile State- Sudan. The study was conducted during a period of five days between16th December 2014 till 20th December 2014. During the study period urine sample was taken from all the target students and the sample was depsticked. Data was analyzed using SPSS.

RESULTS AND DISCUSSION

Data was collected from 486 children of both sex from Kosti Primary Schools. The age group between 6 to 14 years divided in to two groups. Three hundred and forty four children (70.8%) were 10 years or more, and 142 children (29.2%) were below 10 years old Table 1. The sex distribution showed 242 children (49.85%) were male where 244 (50.2%) were females Table 2. Four hundred and forty four children (91.4%) had no protein in urine, 11 children (2.3%) had trace proteinuria, 21 children (4.3%) had one (+) protein, 9 children (1.9%) had two (+) of protein, and only one child (0.9%) found to have three (+) of protienuria in their urine Table 3. The result showed that 440 children (90.5%) had no hematuria, one (+) RBCS in urine found in 24 children (4.9%), two (+) RBCS found in 14 children (2.9%) and 8 children (1.6%) were found to have three (+) of RBCS in their urine Table 4. Table 5 showed the detection of protienuria by BSSA test so that 454 children (93.4%) hand no protein in their urine

Table 2. Sex distribution.

Valid	Frequency	Percentage	Valid percentage	Cumulative percentage
Male	242	49.8	49.8	49.8
Female	244	50.2	50.2	100.0
Total	486	100.0	100.0	

Table 3. Proteinuria.

Valid	Frequency	Percentage	Valid percentage	Cumulative percentage
Nil	444	91.4	91.4	91.4
Trace	11	2.3	2.3	93.6
+	21	4.3	4.3	97.9
++	9	1.9	1.9	99.8
+++	1	0.2	0.2	100.0
Total	486	100.0	100.0	

Table 4. RBCS in urine.

Valid	Frequency	Percentage	Valid percentage	Cumulative percentage
Nil	440	90.5	90.5	90.5
+	24	4.9	4.9	95.5
++	14	2.9	2.9	98.4
+++	8	1.6	1.6	100.0
Total	486	100.0	100.0	

Table 5. BSSA.

Valid	Frequency	Percentage	Valid percentage	Cumulative percentage
Nil	454	93.4	93.4	93.4
Trace	13	2.7	2.7	96.1
+	14	2.9	2.9	99.0
++	4	0.8	0.8	99.8
+++	1	0.2	0.2	100.0
Total	486	100.0	100.0	

Table 6. Hematuria and age cross tabulation.

Age	Nil	+	++	+++	Total
Less than 10 years count % of total	130 26.7%	9 1.9%	2 .4%	1.2%	142 29.2%
10 years more count % of total	310 63.8%	15 3.1%	12 2.5%	7 1.4%	344 70.8%
Total count % of total	440 90.5%	24 4.9%	14 2.9%	8 1.6%	486 100.0%

by BSSA test, 13 children (2.7%) had trace protein, 14 children (2.9%) had one(+), 4 children (0.8%) had two (+) and one child (0.2%) had three (+).

Table 6 showed that 46 children (9.5%) had hematuria, most of them were 10 or more than 10 years old, 34 children (7%), and the least account were those less than 10 years old, 12 children (2.5%).(p=0.338). Table 7 shows sex distribution of hematuria which is mainly males, 15 children (3%) from total 486) and 31 females (6.3%) from total 486. p=0.003. Table 8 showed that 13 children (2.6%) were less than 10 year old, while 29 children (5.9%) were more than 10 years old with hematuria. P. value=0.048. Table 9 showed the association between proteinura and sex, in which 20

Table 7. Hematuria and sex cross tabulation.

Sex	RBCS				Total
	Nil	+	++	+++	
Male count % of total	227 46.7%	3.6%	7 1.4%	5 1.0%	242 49.8%
Female count % of total	213 43.8%	21 4.3.8%	7 1.4%	3.6%	244 50.2%
Total count % of total	440 90.5%	24 4.9%	14 2.9%	8 1.6%	486 100.0%

Table 8. Proteinuria and age cross tabulation.

Age	Protein					Total
	Nil	Trace	+	++	+++	
Less than 10 years count % of total	129 26.5%	4.8%	4.8%	4.8%	1.2%	1.42 29.2%
10 years more count % of total	315 64.8%	7 1.4%	17 3.5%	5 1.0%	0.0%	344 70.8%
Total count % of total	444 91.4%	11 2.3%	21 4.3%	9 1.9%	1.2%	486 100.0%

Table 9. Proteinuria and sex cross tabulation.

Sex	Protein					Total
	Nil	Trace	+	++	+++	
Male count % of total	220 45.3%	7 1.4%	8.1.6%	6 1.2%	1.2%	242 49.8%
Female count % of total	224 46.1%	4.8%	13 2.7%	3.6%	0.0%	244 50.2%
Total count % of total	444 91 4%	11 2.3%	21 4.3%	9 1.9%	1.2%	486.100.0

Table 10. Proteinuria and hematuria cross tabulation.

RBCS	Protein					Total
	Nil	Trace	+	++	+++	
Nil count % of total	400 82.3%	11 2.3%	19 3.9%	9.1.9%	1.2%	440 90.5%
+ count % of total	23 4.7%	0.0%	1.2%	0.0%	0.0%	24 4.9%
++ count % of total	14 2.9%	0.0%	0.0%	0.0%	0.0%	14 2.9%
+++ count % of total	7 1.4%	0.0%	1.2%	0.0%	0.0%	8 1.6%
Total count % of total	444 91.4%	11 2.3%	21 4.3%	9 1.9%	1.2%	486 100.0%

Table 11. BSSA and proteinuria cross tabulation.

BSSA	Protein					Total
	Nil	Trace	+	++	+++	
Nil count % of total	442 90.9%	2.4%	7 1.4%	3.6%	0.0%	454 93.4%
Trace count % of total	1.2%	8 1.6%	1.2%	3.6%	0.0%	13 2.7%
+ count % of total	1.2%	1.2%	10 2.1%	2.4%	0.0%	14 2.9%
++ count % of total	0.0%	0.0%	3.6%	0.0%	1.2%	4.8%
+++ count % of total	0.0%	0.0%	0.0%	1.2%	0.0%	1.2%
Total count % of total	444 91.4%	11 2.3%	21 4.3%	9 1.9%	1.2%	100.0%

children (4.1%) with hematuria were females and 22 children (4.4%) were males. P.value=0.045. Table 10 showed the correlation between hematuria and proteinuria in which 42 children (8.7%) had protienuria and hematuria. P.value =0.038. Table 11 showed those with positive urine for proteinuria and BSSA test. It showed 42 children (8.7%) with positive urine for both proteinuria and BSSA test. P.value = 0.000.

Many renal and urinary tract disorders may be asymptomatic for a long period of time. To our knowledge, this is the second report on dipstick urine analysis screening among asymptomatic children in Sudan. We studied 486 children. Their age ranged from 6 to 14 years. Male were (49.8%) and female were (50.2%) the ratio was 1:1.1. where study done in White Nile state - El-ferdous Village / Sudan by Elsharif and Omer (2014) who studied 213 children, they get male to female ratio was 1.31:1 in their study and the age ranged in their study from 2 to 18 years (Elsharif and Omer, 2014). In our study we found 42 children (8.7%) with protienuria and 46 children (9.4%) with hematuria where Elsharif and Omer (2014) found (11.7%) had proteinuria and haematuria were found in (11.7%) and their high prevelance could be due to the wide range of age group or to the small sample size.

Proteinuria was found in 22 male (4.4%) and 20 female (4.1%) with proteinuria, also we found 15 male (3.0%) and 31 female (6.3%) with haematuria while 1 male (0.2%) and one female (0.2%) were found to have both proteinuria and haemtauria at the same time.

In study done by Oviasu and Oviasu (1994) in Nigeria prevalence of urinary abnormality (proteinuria or haematuria) for both sexes was 5.25% with proteinuria and haematuria accounting for 4.7 and 0.55%, respectively. Proteinuria and haematuria were more frequent in girls being 4.72 and 0.79%, respectively as against 4.68 and 0.29%, respectively for boys. Significantly, 6 of the girls with proteinuria (0.52%) had nephrotic range proteinuria (Elsharif and Omer, 2014). Bakr et al. (2007) reported urinary abnormalities in 1.3% of Egyptian school children in their first screening and it persisted in 0.72% in their second screening. In a Malaysian study, screening of school children for proteinuria and hematuria showed that 1.9% of those screened had positive results but only 0.12% was found to test positive on further evaluation (Zainal et al., 1995). Shajari and Shajari (2007) found that 4.7% of children tested positive in their first screening and only 1.4% in their second screening.

Our study reported that 13 children (2.6%) were less than 10 year old, while 29 children (5.9%) were more than 10 years old with hematuria and it was significant. Elsharif and Omer (2014) reported that those with proteinuria and were 10 years or more were 17 children (8.4%). Jafar et al. (2005) reported that (3.3%) of 497 children aged 5 to 15 years in Pakistan had proteinuria. The mean prevalence was higher in children of 10 to 15 years of age (3.7%) than in younger children (2.8%) (Jafar et al., 2005) Our study prevalence was high for age related proteinuria because we study only those in school where ELsharif and Omer (2014) study both school and non-school children. In our study female with protienuria were (3.3%), while males with proteinuria were founded to be (3%), and correlation was insignificant, and also we found females with hematuria were (6.3%) and males (3%) the result is similar to study done by Farah et al. (2011) in Beirut who showed females with hematuria are more the males, and was also similar to the results of the Nigerian study (Akor et al., 2009), but contrasted with the results of the Egyptian study which showed that age and sex had no impact in the results of the screening done (Bakr et al., 2007). Hamidreza et al. (2009) in north Iran showed hematuria in (17.8%) Francia and Angela (2009), Jos State, Nigeria, they showed in their study 1.5% prevalence of haematuria lower than the 3.8, 2.6 and 3.9% from previous studies they did. In our study those with both proteinuria and haematuria were two children (4%) and this is lower than the study done by Elsharif and Omer (2004) in which they found fourteen children with both proteinuria and haematuria (6.5%), their high prevalence was due to the high prevelance of bilharzias in the area.

CONCLUSION

This study helped to assess the prevalence of urinary abnormalities in school-aged children of White Nile State-Sudan-Kosti city. Hematuria was found to be the most prevalent abnormality. Those with proteinuria need more renal investigation while those with hematuria inspite of more renal investigations, we needs to look for other causes for hematuria like schistosomiasis. By the time we have complete the screening, we suggest that routine urinalysis should be part of screening of children at the school entry in Sudan, and that further follow-up should be offered to determine the exact etiology of any abnormal finding.

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