The Role of Urine Screening (In School Children of Menoufiya Governorate) In Early Detection of Renal Disorders.

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Abstract: Background: End-stage renal disease (ESRD) is epidemic worldwide. Many countries have performed a population-based screening program aiming at identifying the prevalence of unrecognized renal disease in asymptomatic individuals, allowing further evaluation and disease-modifying interventions. However this kind of programs is not carried out in a nationwide basis in Egypt. **Objectives**: Our aim was to elucidate the prevalence of renal disorders and risk factors related to them, with spotting light on the role of school population-based urine screening in the early detection and prevention of progressive renal diseases in children in Menoufiya Governorate. **Methods*:*** A cross sectional study, was conducted on three thousands school children in Menoufiya Governorate. Children of the study were apparently healthy, aged 6 - 13 years. The screening tool included a questionnaire documenting demographic and historical data together with on-site measurements of blood pressure (BP) and urine dipstick for detection of protein, RBCs, and urinary tract infections. Other confirmatory tests were then performed. The presence of protein was confirmed by using heat and acetic acid test. A microscopic analysis was done for the presence of pus cells, RBC's, and red cell casts. Urine culture was done for 500 randomly selected children to evaluate the sensitivity and specificity of dipsticks. Children with abnormal urinary findings were admitted to the unit of Pediatric Nephrology, Menoufiya University Hospital for further evaluation including 24h- urine protein, ultrasonography, Doppler scans, voiding cystourethrography (VCUG) and DMSA scan. Renal biopsies were performed as indicated. **Results*:*** After initial screening with dipstick test, out of 3000 children, 90 cases (3%) were positive for proteinurea, which was persisted in only 64 (2.13%) of cases after confirmatory test. the prevalence of hematuria was 5.5% (166 cases out of 3000), twelve of them (0.4%) found to be as glomerular in origin while 154 (5.1%) as lower urinary tract origin. Nine cases (0.3%) had combined hematurea and proteinurea (CHP). Hypercalciuria was found in 141 (4.7%). The prevalence of UTI was 4.9% with E coli being the most frequently found organism. Lower UTI (cystitis) resembled 97.9 % while upper UTI (pyelonephritis) resembled (2.1%) (complicating vesicoureteric reflux and posterior urethral valve). Renal biopsy was indicated and performed in 8 cases, and revealed, minimal change disease in 2 cases, mesangial proliferative glomeruolonephritis, poststreptococcal glomerulonephritis, IgA nephropathy, Alport's syndrome and two had normal findings. **Conclusion*:*** Prevalence of renal disorders among apparently healthy school aged children is considerably high in Minoufiya governorate. Thus, mass school urine screening tests are mandatory for early detection of renal disorders which if left untreated, may progress to develop irreversible renal disease.

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Key Words: Proteinuria, hypercalcuria, hematuria, and school children

1. Introduction

Chronic renal failure is a major problem in Egypt. In many patients**,** progression to end stage renal disease may start early in childhood period, so, early detection and management of renal disorders may prevent or slow down the silent deterioration of kidney function. (1)

A school urine screening program can detect chronic renal disease in its early stage. When mass screening is used, the initial aggressive diagnostic procedures such as, renal biopsy may be avoided. In addition, a regular follow up for those children with abnormal screen is warranted. (2)

Mass urine screening tests have been performed routinely and thought to be of benefit in a number of Asian countries**.** (3)

In the United States, mass screening of asymptomatic children has not been shown to be cost effective. However, these differences in the effectiveness of mass urine screening between populations may be due to different incidence rates of renal diseases or to different approaches to an abnormal urine screening test . (4)

The American Academy of Pediatrics previously recommended a screening urinalysis at four time points during childhood, however, the current recommendation

is to obtain a screening urinalysis only once at the early school age and yearly in sexually active adolescents . (5)

The urinary dipstick is one of the most important tools in the current diagnosis procedure in pediatric nephro-urology. This test represents the best way to approach the most frequent conditions, i.e. proteinurea, hematurea, and urinary tract infection. It offers reliable information at a very low financial cost. (6)

Aim of the work:

This study was done to determine the prevalence of proteinurea, hematurea, and urinary tract infection among apparently healthy Egyptian children living in Minoufiya governorate and belong to various social classes, also to assess the risk factor related to them, we also tried to evaluate the dipsticks as a rapid and economic urine screening test for early detection of renal diseases in school aged children.

2. Subjects and Methods

Three thousands apparently healthy children 1528 (50.9%) males, and 1472 (49.1%) females, born and living in Menoufiya Governorate were included in this screening study. Out of the studied children about 41.8 % were from urban areas and 58.2% were from rural areas. The children were attending the Primary and Intermediate basic schools in Shebin El-Kom city and a village near it (Monshaat Sultan), between October 2005 to October 2006.

Inclusion Criteria:

Schools were selected in a multistage random sample way (two schools from Shebin El-Kom and two from Monshaat Sultan) to represent all populations in Menoufiya Governorate. Children were considered legible for entry into the study, if they met the following criteria:

Age between 6 - 13 years, born and live in Menoufiya Governorate, apparently healthy and studying in the schools selected for the study.

The study was approved by Ethics Committee of Menoufiya University. A legal permission was taken from Ministry of Education, school managers and parents to collect urine samples from the children.

All children were subjected to full history taking and thorough clinical examination.

Methodology:

I. Dipstick test (Combi- Screen.Germany)**:**

Three thousands urine samples were obtained from legible students who were instructed to void a clean midstream urine specimen after washing the genitalia, into 200 ml vessel (midstream sample).

Screening was initially done at schools by the dipstick test for: proteinurea, presence of RBCs and urinary tract infection (by detection of leukocyte esterase, and nitrate).

II. Confirmatory tests:

The same urine samples (used for dipstick test) were then prepared for:

1- Heat and acetic acid test for detection of proteinurea

2- Microscopic urine analysis: urine was centrifuged and the sediment was taken, the number of leucocytes and bacteria per high power field were recorded, RBCs count was done, then RBCs morphology was examined for positive cases of hematurea. A red blood cell count of five or more per high power field was considered as hematurea . (1)

According to morphology the presence of dysmorphic RBCs and red cell casts suggests a renal source of hematurea, most likely glomerular, normal appearing RBCs and lack of casts suggest lower urinary tract bleeding. (7)

3- Urine culture:

For evaluation of the sensitivity and specificity of dipsticks as a method for detection of UTI, urine culture was performed for 500 random children out of the 3000, then colony count and gram stain were done.

Cases with positive results after the confirmatory tests were subjected to further investigations as indicated:

- CBC & renal function tests.
- Serum Albumin., 24-hours urine protein.
- Cholesterol level. C_3 level, and ASOT.

  Coagulation screen (PT, PTT, and bleeding time).
- Pelviabdominal Ultrasound
- Serum electrolytes (Na, K).
- Serum calcium, and Ca/Creatinine ratio (Hypercalciuria was defined as a calcium/ creatinine ratio >0.2).

Poststreptococcal glomerulonephritis was diagnosed if cases with hematurea had low C_3 level and an evidence of streptococcal infection.

Renal biopsy

Ultrasound guided biopsy was done after proper preparation if hematuria or combined hematuria and proteinurea(CHP) persisted for more than 6 months, and if a case of heavy proteinurea (24-h urine > 40mg/m^2/h) not responded to corticosteroids or had frequent relapses. Specimens were analyzed by light and immunofluresence microscopy. (8)

Statistical Analysis :

Data were entered checked and analyzed using Epi-Info version 6 and SPP for Windows version 8.

3. Results

In table (1): Out of 3000 screened school aged children from rural and urban areas of Minoufiya Governorate, proteinurea was confirmed in 64 children (2.13%). Prevalence of hematurea was 5.5% (166 child) when screened by microscopic examination of urine. The prevalence of UTI among the same 3000 children was 4.86 % (146 child).

In table (2): We assessed the sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of dipstick test as a screening tool for proteinurea, hematurea, and urinary tract infection of school children in Minoufiya, and we found that the number of cases with proteinurea after the initial screening with dipstick was 90 cases (3%) compared to 64 cases (2.13%) and only 27 cases gave positive results with both dipstick and confirmatory test. Thus dipstick test had a low sensitivity (42.2%) in identifying the correct number of proteinurea positive cases while had a high specificity (97.9%) so it has good negative predictive value and less reliable positive predictive value. Using the dipstick test as a screening test for hematurea, we found 219 children (7.3%) with hematurea, while 166 children (5.53%) had hematurea after confirmation by microscopic analysis. True positive cases (hematurea by both dipstick and microscopy) were 162 children. Thus dipstick in hematurea is a test of high sensitivity and specificity, so it is both a good negative and positive test. According to urinary RBC's morphology children positive for hematurea were classified into upper causes 12 (7.2%), lower causes 154 (92.8%) of confirmed cases.

Children with isolated hematurea were 157 (3 of upper origin and 154 of lower origin).

Cases with UTI detected by both urine culture and dipsticks were 19 cases (out of the 500 hundred randomly selected for culture), the sensitivity of the dipstick was 82.6%, specificity was 98.9 %, positive predictive value was 79.1 % and negative predictive value was 99.1 % .So dipstick is a good negative test rather being a good positive test for detection of UTI.

Table (3) shows that, there was no significant difference between positive and negative children for hematurea and proteinurea regarding age, sex, residence or socioeconomic standard represented by crowding index. However, there was a statistically significant effect of female sex, residence in rural area, and crowding index on the prevalence of UTI among the screened children.

In table (4): there was a statistically significant association between the presence of (puffiness & edema) and the prevalence of proteinurea. Moreover, Dysuria was significantly more frequent among UTI children compared to non UTI cases

In table (5): We studied the pattern of proteinurea among confirmed cases and found that combined hematurea and proteinurea (CHP)was present in 9 cases (0.3%) of the total studied cases.

In table (6): Out of 166 children with hematurea the cause was hypercalciuria in 138 children (83.1%), 3 PSAGN (1.8%), IGA nephropathy 1, Alport's syndrome 1 (0.6%), UTI 16 (9.6%) and undetermined cause 7 (4.2%).

In table (7): The most common organism found in UTI cases culture was E coli (62 %), Enterococcus faecalis (17.3 %), Klebsiella pneumonia (10.3%), and Coagulase negative staphylococci(10.4 %).

In table (8) cases of UTI were classified according to source of infection into 143 cases (4.8 %) with lower UTI (cystitis), and 3 cases (0.01%) with Upper UTI (pyelonephritis).

In table (9) renal biopsy was done for 8 cases, 3 cases had isolated proteinurea and 4 cases had combined hematurea and proteinurea). Two cases of isolated proteinurea had minimal change disease and one case had messangial proliferataive glomerulonephritis, one case of isolated hematurea had PSAGN, one case of (CHP) had Alport's syndrome and the other had IgA nephropathy while two cases were normal.

Table (1): The prevalence of Proteinurea, Hematurea, and Urinary Tract Infection in the studied children.

Finding	Number (Total no) (3000)	Prevalence value
PROTEINURIA	64	2.13%
HEMATURIA	166	5.53%
URINARY TRACT INFECTION	146	4.86%

Table 2: Sensitivity, specificity, positive and negative predictive values of dipstick test in diagnosis of Proteinurea, Hematurea, and Urinary Tract Infections.

Screening test (dipstick)	Confirmatory test								
	Proteinuria (Heat and acetic acid) No =3000			Hematuria (Microscopy) No=3000			Urinary Tract Infection (Urine Culture) No=500		
	Positive	Negative	Total	Positive	Negative	Total	Positive	Negative	Total
Positive	27	63	90	162	57	219	19	5	24
Negative	37	2873	2910	4	2677	2781	4	472	476
Total	64	2936	3000	166	2734	3000	23	477	500
Sensitivity	42.2 %			97.5 %			82.6 %		
Specificity	97.9%			94.5 %			98.9 %		
PPV	30 %			74.0 %			79.1%		
NPV	98.7 %			96.2 %			99.1 %		

N.B: PPV= Positive predictive value; NPV= Negative predictive value

Table 3: The effect of various demographic criteria on the prevalence of proteinurea, hematurea, and urinary tract infection among the screened cases.

	Proteinurea No=3000		Hematurea No=3000		Urinary tract infection No=3000	
	Positive	Negative	Positive	Negative	Positive	Negative
Total No (%)	64 (2.13)	2936(97.87)	166(5.53)	2834(94.47)	146(4.86)	2854(95.13)
Age (Years) Mean±SD	8.2± 1.2	8.7± 1.7	8.7±1.66	8.6±1.78	8.9±1.69	8.6±1.67
Sex						
Male No (%)	27(42.2)	1501(51.1)	78(46.9)	1450(51.1)	46(31.5)	1482(51.9)
Female No (%)	37(57.8)	1435(48.9)	88(53.1)	1384(48.9)	100(68.5)**	1372(48.1)
Residence:						
Urban No (%)	30(46.9)	1224(41.7)	69(41.5)	1185(41.8)	67(45.9)	1187(41.6)
Rural No (%)	34(53.1)	1712(58.3)	97(58.5)	1649(58.2)	79(54.1)*	1667(58.4)
Crowding index (capita per room)Mean±SD	2.73 ±0.87	2.62 ± 0.89	2.67 ± 0.84	2.61 ± 0.89	2.88 ± 0.86*	2.61± 0.89

* Significant ** highly significant

Table 4: Clinical and laboratory data among the screened cases for proteinurea, hematurea, and urinary tract infection.

	Proteinurea		Hematurea		Urinary tract infection	
	Positive	Negative	Positive	Negative	Positive	Negative
Total No (%)	64(2.13)	2936(97.87)	166(5.53)	2834(94.47)	146(4.86)	2854(95.13)
Blood pressure:						
Normal No (%)	59(92.2)	2935(99.9)	164(98.8)	2830(99.9)	145(99.3)	2849(99.8)
Hypertension No (%)	4(7.8)	2 (0.01)	2(1.2)	4(0.1)	1(0.7)	5(0.2)
Urinary signs& symptoms						
Puffiness No (%)	1(1.6)**	1(0.01)	1(0.6)	1(0.01)	0(0.0)	1(0.01)
Edema No (%)	7(10.9)*	8(0.3)	0(00.0)	15(0.5)	0(0.0)	0(0.0)
Dysurea No (%)	1(1.6)	7(0.3)	7(4.2)*	16(0.6)	17(11.6)**	6(0.2)
Kidney function:						
Blood urea	30.5± 7.5	32.5± 5.5	34.5± 6.5	29.5± 4.5	42.1± 8.8	39.3± 8.65
Serum.creatinine	0.99± 0.22	0.97± 0.242	1.1± 0.23	0.97± 0.11	1.03± 0.21	1.01± 0.21

* Significant ** highly significant

Table (5): The different patterns of proteinurea among confirmed cases and the total studied cases.

Types of proteinurea	Number	Percent from confirmed case NO (64)	Percent from total studied cases. NO (3000)
Transient proteinurea	22	34.4 %	0.73 %
Orthostatic proteinurea	27	42.1 %	0.9 %
Persistent isolated proteinurea	6	9.4 %	0.2 %
Persistent (CPH)	9	14.1 %	0.3 %
Total	64	100 %	2.13 %

Table (6): The pattern of renal and urological disorders in children with hematuria

	Isolated hematurea (157cases)		Combined hematurea and proteinurea. (9 cases)	
	N	%	N	%
Hypercalciuria	138	83.1%	-	-
PSAGN	3	1.8%	-	-
Alport's syndrome	-	-	1	0.6%
IGA	-	-	1	0.6%
UTI	16	9.6%	-	-
Undetermined cause	-	-	7	4.2%
Total	166			

Table (7): Infecting organisms in children with culture

Infecting organism	Number of positive culture	Percent %
E. coli	90	62
Klebsiella pneumonia	15	10.4
Enterococcus faecalis	25	17.3
Coagulase negative staphylococci	14	10.3
Total	144	100.0

Table (8): Descriptive table showing the different diagnosis made in the studied cases with UTI.

Diagnosis	No.	%
* Normal individuals	2854	95.1
* Patients with UTI:		
• Lower UTI	143	4.8
• Upper UTI (Pyelonephritis):		
1. Vesicoureteric reflux	2	0.07
2. Posterior urethral valve	1	0.03
Total	3000	100.0

Table 9: Renal biopsy results of indicated screened cases for proteinurea and hematurea.

	Isolated proteinurea	Isolated Hematurea	Combined Proteinurea &Hematurea
	(N= 3)	(N= 1)	(N= 4)
Alport's syndrome	0	0	1
IGA nephropathy	0	0	1
Minimal change	2	0	0
Mesangial proliferation	1	0	0
Acute post streptococcal glomerulonephritis	0	1	0
Normal histopathology	0	0	2

4. Discussion

The present study was carried out through the nephrology unit of pediatric department, Minoufiya University, for early detection of the renal and urological disorders in school children in Minoufiya governorate. 3000 children were collected from four schools, of them, 1254 students (41.8%) from two urban schools in Shebin Elkom city and 1746 students (58.2%) from two rural schools in Monchaat Sultan village, Their mean age was 8.64 years, there were 1528 males (50.9%) and 1472 females (49.1%).

In general pediatric practice, the demonstration of proteinurea on a routine screening urine analysis is a common occurrence. The challenge is to differentiate between the child with proteinurea related to renal disease from the otherwise healthy child with transient or other benign forms of proteinurea. (9)

In this study, the prevalence of proteinurea in the studied children was 3% after the initial screening with dipstick test, however, proteinurea was confirmed in only 2.13% of screened children.

In another Egyptian study carried out in Dakahlya governorate, screening of 1670 primary school children revealed proteinurea in 1.3% after the first screening with the dipstick test and confirmed in only 0.72%. (1) These results are close to our study results which may be explained by, the similar environmental conditions at which most of the Egyptian children live. These environmental factors are the presence of high incidence of UTI, hidden schistosomal infection due to contact with canals and the abuse of drugs without prescription of a physician.

Also in an Indian study, as an example of a developing country, the results were in agreement with our study as they screened 736 school children, aged 6 to 13 years using a semi-quantitative method and reported that proteinurea was present in 2.6% of the children. Similar socioeconomic standards may explain this agreement with our results. (10)

On the contrary, In an American study, screening of 9000 school children reported proteinurea in 1.7% of children after initial screening, while proteinurea persisted in only 0.1% of the studied population. Thus prevalence of proteinurea in this American study is much lower compared to our results. (11)

In detecting proteinurea in our study, dipstick test had a sensitivity of 42.2%. Which is considered a low sensitivity in identifying the correct number of proteinurea positive cases? On the other hand, it had a specificity of 97.9%, so it has a good negative predictive value 98.7% (NPV) however, less reliable positive predictive value (PPV) 30%.

In an Australian study, which didn't agree with our results The authors reported a sensitivity and specificity of 70% and 68%, respectively. The positive predictive value of the dipstick to predict proteinurea was 89% which was much higher than our study and the negative predictive value of the dipstick to predict proteinurea was 60% which was much lower than our study. (12)

This is may be due to the individual variation of urine in every child especially the concentration, the difference in the specific gravity, the ph of urine and the use of certain antiseptics. These factors highly affect the results of the dipstick test. Also another important factor related to the physician, is the correct usage of the test as the long immersion time may give false positive result.

When we screened the same 3000 children for hematurea using dipstick test the prevalence was

7.6 % (219 children). Out of them, 166 (5.5%) had hematurea confirmed by microscopic examination at the same setting.

Out of 166 child with hematurea in our study, only 9 (5.4%) of them had combined hematurea and proteinurea (CHP) (i.e. the prevalence of CHP (0.3%) This is close to the results recorded by *Diven and Travis* who confirmed in their study, that the combination of hematurea and proteinurea was significantly less common than either isolated proteinurea or hematurea (prevalence rate of less than 0.7 %) but this combination associated with a higher risk for significant renal disease.(13) In Korea, a mass screening program done, Park and colleagues had found that out of 881 child with hematurea, 162 (18.3%) had combined proteinurea. (2)

This study found that the sensitivity of dipstick to hematurea was 98.5 % while the specificity was 97.9 %. This was close to the results recorded by *Sokolosky* who found that the sensitivity of the dipstick to detect hematurea at a concentration of > 3RBC/HPF is more than 90%, (14) and was in agreement with Ritchie and colleagues who found that the urine dipstick is very sensitive for detecting RBC's >3/hpf. With a sensitivity of: 80-95% and specificity of 95-99 %.(15**).** Moore and Robinso found that dipsticks have a sensitivity of 100% and a specificity of 99% in detecting one to five RBCs/hpf. (16)

This study revealed that the prevalence of urinary tract infection was 4.9 % among primary school children in Minoufiya governorate.

El-Gamal and Salah reported that 7 % of Egyptian school children had UTI. (17) and in Turkey, *Nabigil and Tumer* found that 4.5 % of primary school children had UTI**.**(18) However, in another Turkish study 0.36% of primary school children have UTI (19) *Litaka* et al, reported in Japanese study that the prevalence of UTI among school age children was 0.29%.(20) The different results reported by the previous studies could be explained by different methods of diagnosis and different socioeconomic levels.

According to our study, the use of dipstick for diagnosis of UTI is a test of high sensitivity and specificity but it is better as good negative test rather than being a good positive test.

This is agreed with *Sharief et al* who reported that the use of dipsticks for the detection of urinary nitrate and leucocyte esterase in daily clinical practice is recommended. In children, the absence of both nitrite and leucocyte esterase in urine indicates that UTI is unlikely; however, positive dipstick tests for nitrite and/or leucocyte esterase are not specific indicators of UTI, and should not be used in place of laboratory examination. The dipstick method is most likely to be useful as a screening test to exclude UTI in children. (21)

In our study we found that the urine microscopic analysis has higher sensitivity and lower specificity than dipstick. So it is a good positive than good negative compared to dipstick in screening of UTI.

Kathy et al agreed with our study and reported the sensitivity and specificity of microscopic urine analysis was 82% and 87% respectively (22)

There was no significant difference between positive and negative cases for hematurea and proteinurea, regarding age, sex, residence, or socioeconomic level (represented by crowding index).

Age had also no effect on the prevalence of urinary tract infection among our screened cases, however, the prevalence were more common in females compared to males, which was previously reported by many authors and explained by the shorter female urethra (1, 23).

Proteinurea, hematurea, and UTI, were more common in rural areas and crowded families which may be due to lower socioeconomic level. This finding is supported by *Caksen et al., and Yayli et al.,* who reported higher asymptomatic bacteruria prevalence in school children of lower socioeconomic levels compared to higher levels(19,24). This association may be related to toilet education, cleaning of genital region or low immunity due to malnutrition.

There was no association between hypertension and the presence of proteinurea, hematurea and UTI among our screened children, this may be explained by the early diagnosis and that the causes of hematurea were mostly lower urinary tract causes.

Being apparently healthy, no association was found between puffiness and edema in cases with hematurea and UTI compared to negative cases for both, however mild edema and puffiness were significantly detected among some cases with proteinurea, these cases were proven to have renal problems when followed up.

This study showed that there was significant association between Dysuria with UTI and also with hematurea, which may be explained by the significant association between hematurea and urinary tract infection.

Fortunately, blood urea and creatinine were within normal range among all our screened cases for proteinurea, hematurea and UTI, which shows the importance of early detection of renal and urological disorders in this screening program for preservation of the renal function before silent deterioration.

Further evaluation of positive cases screened for proteinurea, revealed that 22 cases had transient proteinurea and 27 cases had orthostatic proteinurea, while 6 cases were diagnosed as having persistent isolated proteinurea, 2 of them had proteinurea in the nephritic range (4-40mg/m2//hours) and five cases had nephrotic range (>40mg /m^2/hr)in24-h urine. In management and follow up of nephrotic cases, two of them responded to corticosteroid treatment, one case was resistant, and the other two cases relapsed after two months of follow up. So renal biopsy was done for the last three cases, and showed that two cases had minimal change disease MCD and, one case had Renal biopsy for cases with combined hematurea and proteinurea (CHP) showed that one case had Alport's syndrome, one case had IGA nephropathy, while, two cases were normal.

Renal biopsy for one case with isolated hematurea revealed acute post streptococcal glomerulonephritis.

According to the RBC's morphology for detection of the origin of hematurea (upper urinary tract or of lower urinary tract origin), 12 (7.2%) of all children with hematurea were upper, while 154 child (92.8% of all children with hematurea were lower in origin. As regard the cause of hematurea, 16 of them (9.6 % of all children with hematurea) were found that cause was urinary tract infection and 138 of them (83.1 %) were confirmed that the cause was hypercalciuria, being the most commonly responsible underlying cause. This is agrees with the study of *Bergstein et al.,* who discovered that the most common cause of microscopic hematurea among 342 children was hypercalciuria. (25)

However, several studies reported that glomerulonephritis is the major cause of urine screening abnormalities.(26) In studies performed in the United States, the prevalence among asymptomatic microscopic hematurea has ranged from as low as 11 percent in the northeast.(27) ***to*** as high as 35 percent in the south (28)

After urine culture, we found that the most common organism found was E coli followed by Klebsiella pneumonia, Enterococcus faecalis and Coagulase negative staphylococci. This is consistent with the literature, and is also supported by the results of *Abdel-Basset et al, Ober et al., and El-gamal & Salah* in their studies. (1, 17, 29)

Conclusion: This study is considered the first to report, the prevalence of renal and urological disorders among school aged children in Minoufiya Governorate through screening of a large population of children at relatively low cost, providing the framework for further action that may help in the prevention and appropriate diagnosis of renal diseases.

Reference

1. ***Abdel Basset A, Sarhan A, Hammed A, Ragab M et al. (2005):***: Urinary screening abnormalities in asymptomatic primary school Egyptian children. Journal Of Pediatr Club, 5 (2):55-58.
2. ***Park YH, Choi JY, Chung HS, Koo JW et al. (2005):*** Hematurea and proteinurea in a mass school urine screening test. Pediatr Nephrol 20:1126-30.
3. ***Tin CY, Sheng CC, Chcn CH, ct al.(2000):*** The prevalence of heavy proteinurea and progression risk factors in children undergoing urinary screening. Pediatr Nephrol ;I4(10-11):953-9.
4. ***Cho BS, Kim SD, Choi YM, Kang HH. (2001):*** School urinalysis screening in Korea: Prevalence of chronic renal disease. Pediatr Nephrol. Dec; 16(12)1126-8.
5. ***Murakami M, Hayakawa M, Yanagihara T, Hukunaga Y et al. (2005):*** Proteinurea screening for children. Kidney Int Suppl. Apr;(94):S23-7.
6. ***Cochat P, Dubourg L, Nogueria PK, Peretti N, et al (2002):*** Urinalysis using dipstick**.** Arch Pediatr;9(8)876-7
7. ***Game X , Soulie M , Fontanilles AM, Benoit GM, Corberand JX, Plante P. , et al. (2003):*** Comparison of red blood cell volume distribution curves and phase contrast microscopy in localization of the origin of hematuria. Urology;61:507-11.
8. ***Chen WP, Lin CV. Hsu HC, Chiang H. , et al. (1989):***Childhood nephrotic syndrome and heavy proteinurea in Taiwan, a retrospective clinicopathologic study. Child Nephrol Urol; 9: 57-64.
9. ***Hogg R, Portman RJ, Milliner D et al. (2000):*** Evaluation and management of proteinurea and nephrotic syndrome in children: Assessment, Detection, and Elimination. Pediatrics; 105:1242-49.
10. ***Sharma AK, Gupta R, Agarwal VS, Kabra A, Mishra KK et al. (1998):*** Indian Journal of Nephrology. Prevalence of proteinurea in school children. Jul-Sep; 8(3): 96-7.
11. ***Vehaskari VM and Rapola J (1999):*** Isolated proteinurea: analysis of a school –age population. J pediatr 101:661-68.
12. ***Abitbol C, Zilleruelo G, Freundlich M, Strauss J et al. (2003):*** Quantitation of proteinurea with urinary protein/creatinine ratios and random testing with dipsticks in nephrotic children. J Pediatr;116:243-7.

13. ***Diven SC and Travis LB. (2000):*** A practical primary care approach to hematurea in children. Pediatr. Nephrol; 14:65-72.
14. ***Sokolosky MC.(2001):*** Hematurea. Emerg Med Clin North Am. ;19:621-32.
15. ***Ritchie CD, Bevan EA, Collier SJ. , et al. (1996):*** Importance of occult hematurea found at screening Br Med J; 292: 681-3.
16. ***Moore GP and Robinson M. (1988):*** Do urine Dipsticks reliably predict microhematurea? Ann Emerg Med ;17:275 -60.
17. ***El-Gamal SA, and Salah LH (1991):*** Asymptomatic urinary tract infection in childhood in rural area, Egypt. J Egypt Pupl Health Assoc;. 66:113-121.
18. ***Nabigil and Tumer N. (1992):*** Asymptomatic urinary tract infection in childhood. Eur J Pediatr; 151: 308-9.
19. ***Yayeli G. Yaman H, Demidral T , et al. (2003):*** Asymptomatic bacteriuria rates in school children: results from a rural city in Turkey. J Trop Pediatr; 49(4):228-30.
20. ***Litaka K, Sakai T, Izawa T, Igarashi S et al. (1990):*** Screening of bacteriuria in healthy Japanese school children. Acta Pediatr. Jpn; 32(6):690-5.
21. ***Shareif N, Hameed M, Petts D et al. (1998):*** Use of rapid dipstick tests to exclude urinary tract infection in children. Br J Biomed Sci; 55(4)2-6.42
22. ***Kathy N, Shaw J, Karin L Mcgowan H, Sanford S (1998):*** Screening for urinary tract infection in infants in the Emergency department: Which test is best? Pediatrics; 101:1-4. 2000
23. ***Kamper KJ and Avner ED (1996):*** The case against screening asymptomatic bacteriuria in children. Am J Dis Child;146,343-46.
24. ***Caksen H,. ArslanS, Abuhandan M, Celik A Bozkurt H, Odabas D et al (2002):*** Asymptomatic bacteriuria in infants in Eastern Turkey. Acta Pediatr. Taiwan; 42:338-39.
25. ***Bergstein JM and Andreoli SP (2003):*** Response of type I membranoproliferative glomeru-lonephritis to pulse methylprednisolone and alternate-day prednisone therapy. Pediatr Nephrol; 9:268.
26. ***Cho BS, Kirn SD, Choi YM, Kang HH. , et al. (2001):*** School urinaiysis screening in Korea: prevalence of chronic renal disease. Pediatr Nephrol 16:1126-28.
27. ***Feld LG, Meyers K, Kaplan BS, et al. (1998):*** Limited evaluation of microscopic hematurea in pediatrics. Pediatrics; 102:142
28. ***Stapleton, FB. (2005):*** Asymptomatic Microscopic Hematurea: Time to Look the Other Way? Arch Pediatr Adolesc Med 159: 398-99.
29. ***Ober Ya, Ahangari T, Artinyan E, Oz V, et al. (2004) :*** A research on Asymptomatic bacteriuria in 14 – 17 years old female students. Pediatrics; 102:142.

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