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COLLEGE OF HEALTH SCIENCES**

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DEPARTMENT OF PEDIATRICS AND CHILD HEALTH

Prevalence of asymptomatic microscopic hematuria in
7-12 years school age children of Medhanealem primary
School in Addis Ababa

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List of abbreviations

AIMP	Asymptomatic isolated microscopic hematuria
AMHP	Asymptomatic microscopic hematuria with proteinuria
CI	Confidence interval
CKD	Chronic kidney disease
DPCH	Department of pediatrics and child health
ESRD	End stage kidney disease
HPF	High power field
IPNA	International pediatric nephrology association
MAPS	Medhanealem primary school
RBCs	Red blood cells
RRT	Renal replacement therapy
US	Ultrasound

A B S T R A C T

Background

Hematuria is one of the most important signs of renal or bladder disease in children and it can represent a process that is simple and benign or complex and life threatening. Asymptomatic microscopic hematuria is common in unselected populations of children, with a prevalence that ranges from 0.4% to 4.1% depending on the criteria used to define hematuria.

Urine analysis, a simple and inexpensive test, is the cornerstone in the evaluation of the kidney function. Proteinuria or hematuria may be the only early signs of renal disease including membranous nephropathy, membranoproliferative glomerulonephritis, post infectious glomerulonephritis, IgA nephropathy and others. The basic dipstick method is the most rapid screening procedure that could be helpful in the early detection of renal or urinary tract diseases among apparently healthy or asymptomatic subjects in the hope of preventing and retarding progression to chronic renal failure. Many countries have used this screening program to prevent and follow children with asymptomatic children. However the prevalence of asymptomatic hematuria is unknown in Ethiopia and there is no recommendation on routine screening urinalysis in Ethiopian school children.

Objective

To determine the prevalence of asymptomatic hematuria in school age children in Addis Ababa

Methods

A cross sectional survey using urinalysis was done over a period of 8 weeks in 382 apparently healthy school age children (7-12 years) at MAPS in Addis Ababa. The children who tested positive in the first screening were re-tested after 2 weeks.

Results

In the first screening 32 children (8.4 %) tested positive for hematuria. Of these children, 16 (4.2 %) cases tested positive in a second screening. The prevalence was both age and sex dependent. Co-existing proteinuria and leucocytes were common findings (19.6 % and 8.4 % respectively) where as pyuria, glycosuria and nitrite were seen in < 1% of children.

Glomerulonephritis was the most commonly detected disorder (43.75%). 75 students (19.6%) were positive for protein, 7 students (1.8%) were positive for both blood and protein, 1 student (0.3%) was positive for glucose, 1 student (0.3%) was positive for nitrite, 32 students (8.4%) were positive for leukocyte- esterase.

Subsequently, 10 children from the secondary screening group were lost to follow up and only 6 students were referred to TAH pediatric renal clinic.

Conclusions

This study helped to assess the prevalence of urinary abnormalities in school-aged children for the first time in Ethiopia. Urine abnormalities are common finding among apparently healthy school aged children with hematuria and proteinuria being the most prevailing abnormalities. Our study demonstrated that hematuria is higher in Ethiopian children than other African children and worldwide. Coexisting urinary abnormalities especially Leukocyturia and proteinuria (most are trace) are common while nitrituria and glucosuria are uncommon.

Introduction

BACKGROUND INFORMATION

Hematuria is defined as a positive dip strip on urinary specimen with microscopic confirmation of the presence of >5 RBCs/HPF (centrifuged) or >6 RBCs/0.9 mm³ (uncentrifuged) (1, 2, 3,). Hematuria may originate from the glomeruli, renal tubules and interstitium, or urinary tract (including collecting systems, ureters, bladder, and urethra). In children, the source of bleeding is more often from glomeruli than from the urinary tract (4).

Likely the most commonly used laboratory test for examining renal function or injury to the kidney or urinary tract, the urinalysis is easy to perform and is used as a screening test, a diagnostic test and, at times, a follow up examination (5). The commonest indicator of an abnormality of the urine is a “positive” or abnormal urine strip test for blood (4). When tested on urine samples in which a predetermined amount of blood has been placed, dipsticks have a sensitivity of 100 and a specificity of 99 in detecting one to five RBCs/hpf(2) However if the dipstick test is positive, the presence of red cells should be confirmed by microscopic examination (6, 7).

Hematuria is a common finding in the unselected population of children and most of the data relative to prevalence of hematuria have come from population-based studies of school children(4). Microscopic hematuria may be transient, intermittent, or persistent. Since the persistent type seems to be uncommon, the results of an epidemiologic study depend on the number of specimens examined from each individual (2).

The prevalence of asymptomatic hematuria has been markedly variable. Generally microscopic hematuria in two or more urine samples is found in 1 to 2% of children 6 to 15 years of age (4) and reaches up to 4 % in a single urine sample (1,2,) where as Gross hematuria is an uncommon finding in an unselected Population of children with a prevalence of 0.13%(8). Variation in the detection rate of urinary abnormalities on screening in these studies may be due to varying ethnic backgrounds and the prevalence of renal diseases in these populations(9). There are also considerable differences in the pattern of renal disease around the world which arise from racial variation in the susceptibility to renal disease compounded with socioeconomic status further contributing to the variation (10).

Worldwide, screening for CKD is controversial, primarily because of the uncertainty whether early detection of renal disorders in childhood will lead to effective interventions and reduction in the number of individuals who develop end-stage renal disease (ESRD). There appears to be a clear consensus among Japanese, Taiwanese, and Korean investigators that the screening programs currently in place in these countries have led to early detection and

effective intervention. This opinion is not shared by investigators from North America and Europe and 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 (5, 7, 10-15).

However the case may be different for developing countries where RRT (dialysis and transplantation) is not readily available and the cost of prevention is by far lower than treatment. Some authors argued that, with some effort, prevention of the progression of renal disease with the combination of pharmacologic and non-pharmacologic approaches can be exported to less-developed countries. In line with this argument screening programs can be implemented with simple, cheap, and reliable tests, such as measurement of body weight, blood pressure, blood glucose, and dipstick urinalysis as has been seen in India and Bolivia (16-18).

The IPNA practical primary care approach to hematuria in children categorize hematuria into 4 clinical categories for the sake of ease of approach; Gross hematuria, Microscopic hematuria with clinical symptoms, asymptomatic microscopic (isolated) hematuria and asymptomatic microscopic hematuria with proteinuria(1). Another goal of the design is to discourage the random and often unnecessary use of laboratory investigations in each child with hematuria (19).

Many studies have shown that most children with isolated microscopic hematuria do not have a treatable or serious cause for hematuria and do not require an extensive evaluation. Because the most common diagnoses in children with persistent microscopic hematuria without proteinuria are benign persistent or familial hematuria (thin basement membrane disease), idiopathic hypercalciuria, IgA nephropathy, and Alport's syndrome, a more extensive evaluation is indicated only when proteinuria or other indicators are present(1, 2, 20-23). Unlike microscopic hematuria macroscopic hematuria requires prompt evaluation to exclude potentially life-threatening causes. Painful gross hematuria usually is caused by infections, calculi, or urologic conditions. Children with macroscopic hematuria require urine culture and renal imaging by ultrasound (1, 8, 23, and 24).

In a study of 342 children with microscopic hematuria, no cause was uncovered in 274 patients and the authors conclude that diagnostic evaluation for potential causes of asymptomatic microscopic hematuria in children may not be necessary (23). A recent study from China also showed similar results to the above studies with adverse renal events (proteinuria, hypertension, or impaired renal function) of 6.0% patients with AIMH and 22.8% patients with AMHP (17).

African studies on the prevalence and long term follow up outcome are scarce with only few studies coming from Egypt and Nigeria (16, 25-28).

To the best knowledge of the author there is no previous study on the prevalence and clinical importance of asymptomatic childhood hematuria in Ethiopia and the national guideline recommendation is based on data from western studies (29). A short survey of the pediatric nephrology clinic log book in our center (the only pediatric renal follow up clinic in Ethiopia) showed only eight children followed for asymptomatic hematuria over a period of 10 years* (from 1996-2006 E.C.). This could be because of failure of detection/referral of such patients who may benefit from follow up by a pediatric nephrologist or because of the rarity of the condition. Thus, this study is meant to fill this gap and primarily expected to show us how common the problem is; may help as the basis for a better large scale study including the common causes of the condition and the need on routine screening of school age children. (*Tikur Anbessa hospital pediatrics department, renal unit, patients follow up log book)

Statement of the problem

Hematuria is one of the most important signs of renal or bladder disease in children and it can represent a process that is simple and benign or complex and life threatening.

Asymptomatic microscopic hematuria is common in unselected populations of children, with a prevalence that ranges from 0.4% to 4.1% depending on the criteria used to define hematuria.

Urine analysis, a simple and inexpensive test, is the cornerstone in the evaluation of the kidney function. Serious renal diseases may be present without any symptoms. Proteinuria or hematuria may be the only early signs of renal disease including membranous nephropathy, membranoproliferative glomerulonephritis, post infectious glomerulonephritis, IgA nephropathy and others. The basic dipstick method is the most rapid screening procedure that could be helpful in the early detection of renal or urinary tract diseases among apparently healthy or asymptomatic subjects in the hope of preventing and retarding progression to chronic renal failure. Many countries have used this screening program to prevent and follow children with asymptomatic children. However the prevalence of asymptomatic hematuria is unknown in Ethiopia and there is no recommendation on routine screening urinalysis in Ethiopian school children. This study will help to fill the knowledge gap and helps as the basis for a future organized large scale study.

OBJECTIVE

General

To determine prevalence of asymptomatic microscopic hematuria in school age children in Addis Ababa

Specific

-Determine category of asymptomatic hematuria

-Assess the coexisting urinary abnormalities in those children with persistent hematuria

Subjects and methods

Study Setting -the study was conducted in school age children from MAPS in Addis Ababa city which is the capital city of Ethiopia. MAPS is one of the government primary schools under Gullele sub city education office and currently having 3238 students, the second by the number of students in the city preceded only by Dejazmach wondirad primary school. The school was selected based on its number of students and its geographic location for ease of the study.

Source population –All students of the MAPS primary school

Study population- asymptomatic children from MAPS primary school who are in the age range of 7-12 years.

Sample size- using the formula $n = z^2 p (1-p) / d^2$ taking 95% CI and precision of 2.5%*, p as 7.8%+ and a 10 % non respondent rate, sample size (n) =488.

*(*for rare diseases with < 10% prevalence precision <5 % gives better result; + prevalence of hematuria from a recent Egyptian study (reference25))*

Study Design

The study was performed from Miazia 2006 to Ginbot 2006 E.C. A total of 382 children aged 7–12 years from 1 primary school in Addis Ababa city (MAPS), Ethiopia, were included in the study. Assuming that the prevalence of asymptomatic hematuria in school age children is 7.8 % (from reference 25), the necessary sample size was determined to be 443. Anticipating 10% of the subjects would be inaccessible or would fail to report to followup, 488 was the calculated sample size.

All six grades (grades 1-6) and both sexes were equally represented. Two sections from each class were randomly selected by lottery method each having an average of 50 students, total of 600, but only 490 students fulfill the inclusion criteria and included in the study population. From the 490 students only 382 gave consent to participate in the study. . A cross-sectional study carried out on 382 (173 boys & 209 girls).(See fig.1)

A consent form with the research information written in Amharic was sent to the parents /guardian before the study.

A day before the screening urinalysis a labeled urine collection cup was given for each student with written instruction to the parents to take midstream early morning fresh urine to the level of the mark** and send the cup to the child after proper sealing. The urine samples were received by the data collector and dipstick urinalysis was done within 1 hour of collection. A dipstick test (Multistix, Bayer Diagnostics, Miles Inc., USA) was performed on the unspun urine specimen by trained laboratory technician, with reagent strip designed to react progressively producing color changes in given intervals. The results were decided by visual comparison of the test strip with a color chart provided on the bottle. In this screening program, the dipstick adopted consists of 10 reagents: pH, specific gravity, protein, blood, glucose, leucocytes, nitrites, urobilinogen, bilirubin and ketone label.

All positive results were screened for the second time after 2 weeks to check for persistence of hematuria and this time the positive dipstick results were confirmed by microscopy after centrifugation of 10ml urine and 5 or more RBC/HPF confirms hematuria.

Those children with persistent hematuria for the second time underwent focused history and physical examination including blood pressure measurement, hearing and throat exam, evaluation for edema.

After the examination these children were referred to a pediatric nephrologist for follow up and further work up according to the national guideline(4).

*(** The urine cup was marked at level of 15.)*

Eligibility criteria

Inclusion criteria – all asymptomatic children in MAPS between 6 and 12 years

Exclusion criteria

Symptomatic children on history or examination

Known renal patients

Female students seeing menses during the study

Data quality control

During the supervision, quality and completeness of gathered information by the data collector was checked periodically by the principal investigator. The collected data was cleaned manually.

Statistical Analysis

The statistical analysis was performed using statistical package of social science SPSS version 16.0. Chi-squared and Fisher's exact test were applied to compare proportions and mean differences, respectively. A P value of less than 0.05 was considered significant.

Ethical Clearance

The protocol of the study was approved by the department research Committee and informed written consent was obtained from parents and the school administration.

Those children with asymptomatic persistent hematuria in the second urinalysis were sent to the Department of Pediatrics, renal unit, TAH for further work up and follow up evaluation by a pediatric nephrologist.

Operational definitions

School age children-children in the age range of 7- 12 years

Hematuria- a dipstick of trace and above for blood or 5 and above RBCs/HPF

Proteinuria - a dipstick of trace and above for protein

Significant Proteinuria- a dipstick of +1 and above for protein

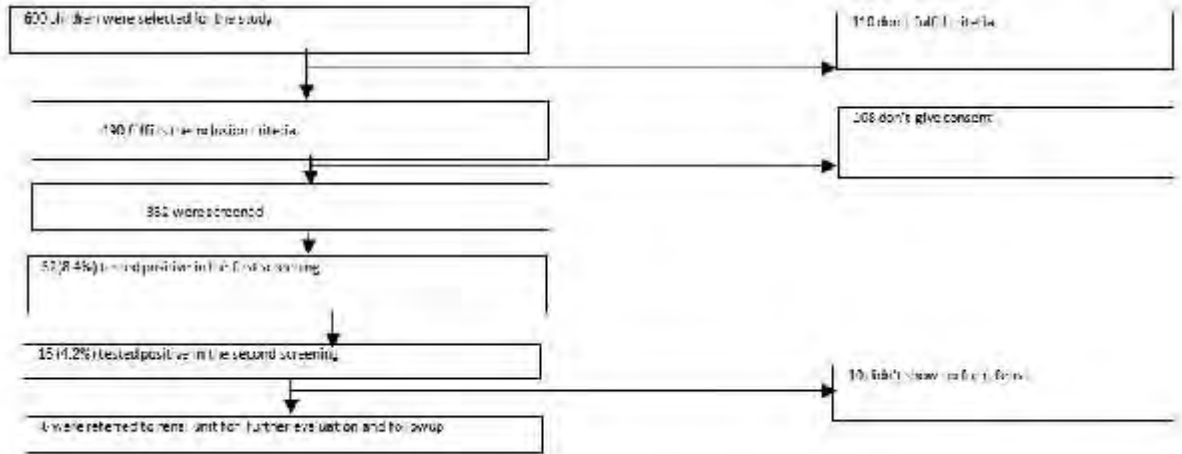
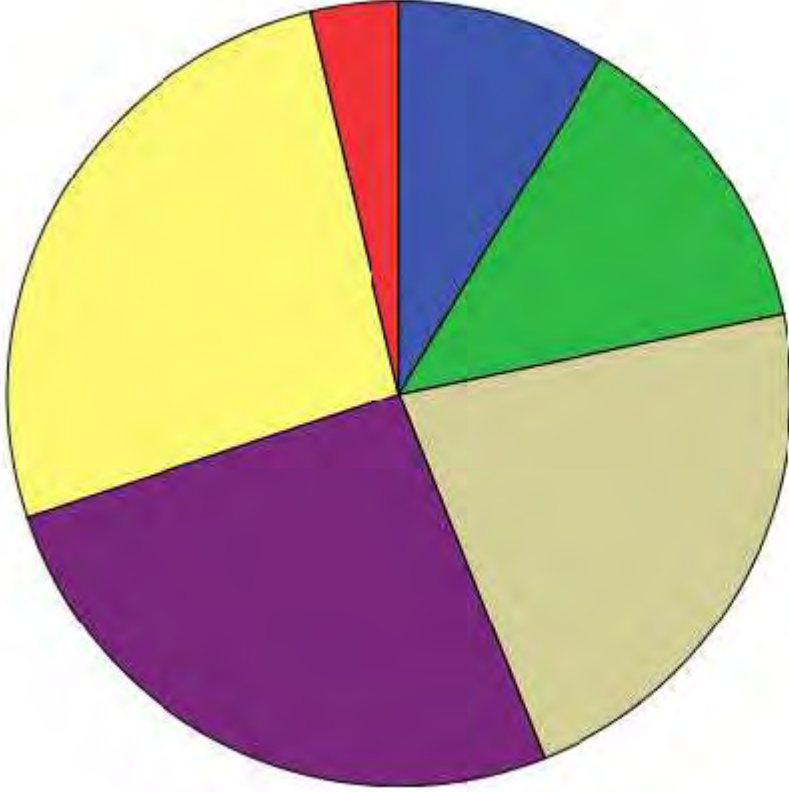


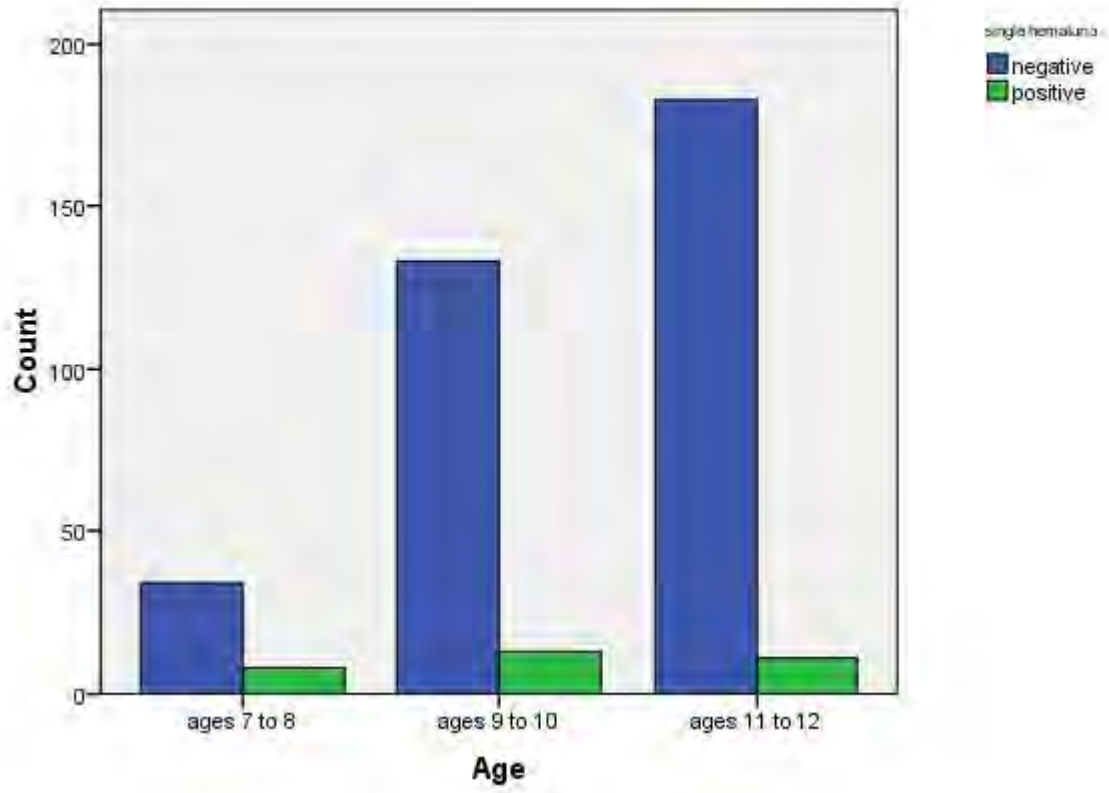
Fig. 1 study flow and screening process

Gender and Age distribution		Age			Total
		ages 7 to 8	ages 9 to 10	ages 11 to 12	
Gender male	Count	12	62	99	173
	% within Gender	6.9%	35.8%	57.2%	100.0%
female	Count	30	84	95	209
	% within Gender	14.4%	40.2%	45.5%	100.0%
Total	Count	42	146	194	382
	% within Gender	11.0%	38.2%	50.8%	100.0%



- grade 1
- grade 2
- grade 3
- grade 4
- grade 5
- grade 6

Bar Chart



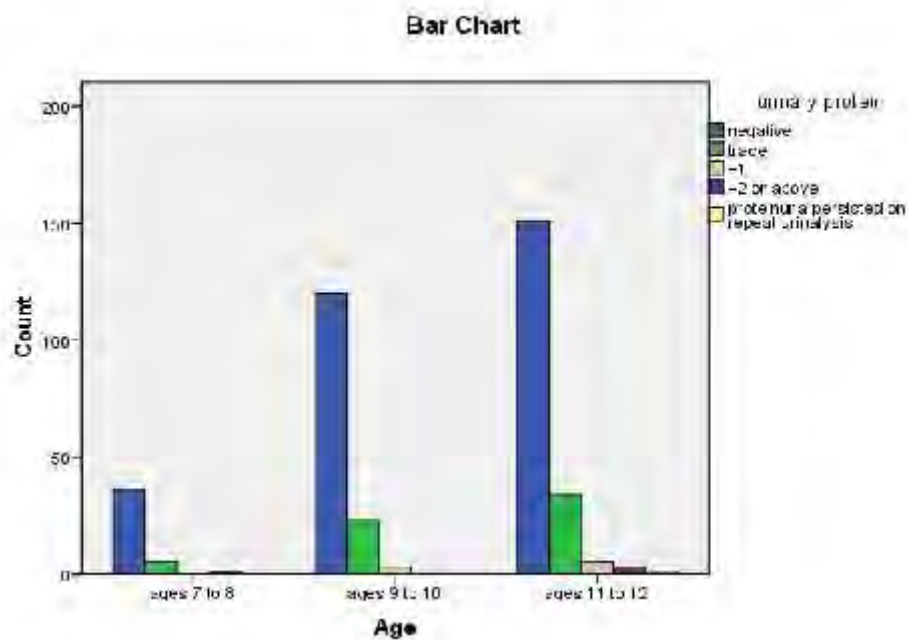


Table 2 relative frequency of abnormal findings in the first urinalysis

Variable	Gender			P value	CI
	Male	Female	Total		
Hematuria	7	25	32(8.4%)	0.009	3.22
Proteinuria	32(18.5%)	43(20.6%)	75(19.6%)	NS*	-
Leukocyte esterase	0	32(15.4%)	32(8.4%)	0.000	-
Nitrituria	1(0.6%)	0	1(0.3%)	NS	-
Glucosuria	0	1(0.5%)	1(0.3%)	NS	-

Presence of proteinuria increases with increasing age with prevalence of 14.3, 17.9 and 32.2% in groups A, B and C respectively. However the difference is not statistically significant. Unlike hematuria proteinuria was not found to be gender dependent being seen in 19.5% males and 20.6 % females ($p=0.218$). 62 students (16.2%) have trace proteinuria whereas significant proteinuria (+1 and above) was found only in 12 students (3.1%).

The overall incidence of isolated hematuria, and combined hematuria and proteinuria were 4.2%, and 0.5%, respectively, among the studied population (table 2). Of the 16 children who tested positive in the second screening, 7(43.8%) shows RBC casts suggesting of glomerulonephritis as the cause for hematuria. this conclusion however is impossible to draw as no further workup was done to ascertain the causes and it is beyond the scope of the study objective.

From the 382 students only 1 child (0.3%) was found to have glycosuria. one child tested positive for nitrite (0.3%) whereas leucocytes were seen in 32 children (8.4%), all of which are females.

Among the 32 children who tested positive for hematuria in the first screening repeat urinalysis revealed pyuria in 4 children(12.5%), and casts in 12 children(37.5%). The casts were RBC in 6(18.8%), granular in 3(9.4%), and WBC in 1(3.1%) and a combination of two of the above in 2(6.2%).

No ketone or bilirubin was detected in the urine of study and all children have normal urine PH and specific gravity.

Age(yrs)	Hematuria positive	Hematuria negative	Total	Prevalence (%)
7-8	8	34	42	19
9-10	13	133	146	8.9
11-12	11	183	194	5.7
Total	32	350	382	8.4

Table 4 category and relative frequency of hematuria and proteinuria in the two steps of the study		
Finding	First sample	Second sample
Isolated hematuria(AIMH)	27(7%)	14(43.7%)
Isolated proteinuria	66(17.3%)	-
Mixed hematuria &proteinuria(AMHP)	7(1.8%)	2(6.3%)
Gross hematuria	0	0
Symptomatic hematuria	0	0
No finding	350(91.6%)	15(46.8%)
Total	382(100%)	32(100%)

Discussion

A cross sectional survey using urinalysis was done in MAPS over 8 weeks in 382 school age asymptomatic children selected by stratified random sampling method to determine the prevalence of hematuria and coexisting abnormal urinary findings.

Our findings of hematuria, proteinuria, leukocyte, nitrituria and glycosuria in school children were compared to other studies.

In our study 32 children(8.4%) have hematuria,75 students (19.6%) were positive for protein,7 students(1.8%) were positive for both blood and protein, 1 student(0.3%) was positive for glucose,1 students (0.3%) was positive for nitrite ,32 students (8.4%) were positive for leukocyte- esterase(tables 1,2,3,4).

In the Galveston County epidemiology study⁽²⁰⁾, approximately 4.0% of school-age children had microscopic hematuria in one of the three samples tested. When the criteria for “persistent” hematuria were the presence of blood in two and three of the three consecutive samples, the prevalence decreased to approximately 1% and <0.5% respectively.

Our study shows a prevalence of 8.4% for hematuria in a single sample and decreases to 4.2% on repeat urinalysis which is higher than the above study. However the result of our study is comparable to a recent Egyptian study with 55 students (7.8%) showing positive results for blood. the other results were also comparable except proteinuria (12 students (1.7%) were positive for protein, 5 students (0.7%) were positive for both blood and protein.) 1 student

(0.1%) was positive for glucose, 11 students (1.6%) were positive for nitrite, 32 students (4.5%) were positive for leukocyte- esterase (25).

Our result is also comparable with a recent Indian study in 100 subjects with proteinuria and hematuria occurring in 16 % and 5% respectively (18).

In the Finnish study, 16% of the patients with hematuria also had proteinuria in at least one sample with an overall prevalence of 0.7% [2]. Interestingly, during a 1-week follow-up home testing, the protein excretion was intermittent in each patient. In our study 62 students (16.2%) have trace proteinuria where as significant proteinuria (+1 and above) was found only in 12 students (3.1%). The overall incidence of isolated hematuria, and combined hematuria and proteinuria were 4.2%, and 0.5%, respectively, among the studied population (table 2). The difference in the prevalence of proteinuria among different studies might be due to the variation in the sensitivity of the dipstick test.

The similarity in most studies is in the prevalence of persistent hematuria associated with proteinuria (AMPH) which is 0.5 % in our study, still slightly higher than other studies. (0.28% in the previous Egyptian study. (Maha etal, 25).It is the most important indicator of clinically significant hematuria as isolated hematuria usually follows a benign course (28).

In our study reported glucosuria was in one student (0.3%) similar to Maha etal (25) where as nitrite was detected in 0.3%; lower than Maha etal (25). Leukocyturia was detected by 8.4% which is higher than Maha etal (4.5%) (25).

Our finding is significantly higher than a Nigerian study (which reveals 1 % prevalence of proteinuria and 0.6 for hematuria) (26) and Korean researchers(isolated proteinuria was about 0.2%, occult blood was about 0.8%, and glucosuria was about 0.07% from January 1998 to December 2004)(30).

In one Nepalese study 5.5% children tested positive in the first screening for isolated hematuria and proteinuria and for combined hematuria and proteinuria. Of these children only 0.71% cases tested positive in a second screening. Glomerulonephritis was the most commonly detected disorder (50%) in this study (9).In line with this observation in our study of the 16 children who tested positive in the second screening, 7(43.8%) shows RBC casts suggesting of glomerulonephritis as the cause for hematuria. this was also the case in another Egyptian study(27). This conclusion however is impossible to draw in our case as no further workup was done to ascertain the causes.

In a similar Turkish study in 1848 healthy school-age children aged 7 to 14 years Isolated hematuria, isolated proteinuria, and combined hematuria-proteinuria were found in 92 (4.9%), 16 (0.8%) and 10 (0.5%) patients, respectively. In addition, 11.9% (11/92) of cases of isolated hematuria and 40% (4/10) of cases of combined hematuria- proteinuria were observed to have persisted. Persistent hematuria and persistent hematuria-proteinuria were found in 11 (0.5%) and 4 (0.2%) patients, respectively.

No prevalence higher than ours was documented in the studied age group except for the close proximity with the above Egyptian study. However, a prevalence as high as 39% were reported from adolescents and adults (6). There is no ideal method for the screening of hematuria and most of the differences are likely due to variations in methods and definitions (2).

The commonest pattern/category of hematuria identified from this study was isolated asymptomatic microscopic hematuria (14/16=87.5%) followed by a combination of hematuria and proteinuria (2/16=%12.5).Our study found no case of gross and symptomatic hematuria. Isolated microscopic hematuria was seen in 6.6% and 3.7%, hematuria with proteinuria in 1.8 and 0.5 % of cases from the first and second urinalysis. This finding is also demonstrated in the other studies (1, 2, and 19).

Whether the prevalence of asymptomatic hematuria depends on age and gender is not obvious from the previous studies. Silverberg et al showed in general higher percentages for older girls, but there is no consistent trend in their figures, and the total number of boys is too small to draw any conclusions. Dodge et al found the prevalence to increase with age in girls up to 11 years, but at 12 years their oldest group, there was a marked drop. For boys their results do not show any constant pattern. The Finnish study, with a fairly large number of subjects in each age and sex group, show no significant variation with age. Silverberg et al found almost a tenfold higher prevalence in girls than in boys, a much smaller difference was reported by Dodge et al,(20) Finnish study shows no significant difference. There was no ready explanation for the disagreement(2, 20, 32, 33). No differences in prevalence in male and female was found from India (18).

However hematuria is found to be age dependent in our study with significant prevalence in the age group 7-8 yrs (prevalence=19%) despite the small no off samples in this age group. Females are also 3 times more affected (OR 3.2 and p value 0.009) in our study even if results are inconsistent in previous studies.

There is no significant difference by age and sex in children with proteinuria in this study. However Indian study showed female preponderance in the age group b/n 10-13 yrs (18).

Despite the absence of detailed workup as to the cause of the hematuria in our case nearly half of the children with persistent hematuria, 7 /16(43.8%) do have RBC casts suggesting a glomerular origin for the hematuria possibly glomerulonephritis. In line with this observation a recent Nepalese study found that 50 % of the hematuria was from glomerulonephritis (9). Egyptian researchers also found glomerulonephritis as the cause of asymptomatic hematuria in two-third of the cases (27).

One child (6.3%) from those having persistent hematuria was found to have associated pyuria, leukocytes and WBC casts which is suggestive of urinary tract infection but urine culture was not done.

Table 5 Final results of screening of hematuria and proteinuria in different studies			
Study	Hematuria	Proteinuria	Mixed hematuria proteinuria
Dodge et al[20]	1.27%	0.942%	-
Cho BS, Kim SD[30]	0.8%	0.2%	-
Hamidreza etal(31)	0.85%	1.57%	0.06 %
Maha etal(25)	3.1%	0.14 %	0.28%
Present(our) study	4.2%	-	0.5%

After the repeat urinalysis 16 students (4.2%) are found to have persistent hematuria. the parents of these children were communicated for referral to the pediatric renal unit of TAH. however only 6(37.5%) showed up for referral and the other 10(62.5%) don't come for a referral despite repeated communication. we don't know the reason for it but the fact that the children are asymptomatic and low health seeking behavior of our society may have contributed for their absence.

LIMITATION OF THE STUDY

-Our study has clear limitations in the sample population. First it is done in a single governmental school with poor representation of the different sociodemography despite the fact that previous studies don't show difference of prevalence in those sociodemography or environmental factors. Age distribution was also the limitation as most children (89%) are more than or equal to 9 years with only 11% being 7-8 yrs. (This happened while taking 2 sections from each grade considering similar age distribution. The other reason was most no responders were in the 7-8 yrs age group which could be because of failure to remember the consent form to give to the parents or to the data collector.)

-Clinical data and sociodemography data were not taken for all study population because of resource limitation.

-The other limitation is inability to determine the causes of hematuria for children with persistent hematuria and pyuria

Conclusion

Urine abnormalities are a common finding among apparently healthy school aged children with hematuria and proteinuria being the most prevailing abnormalities.

This study helped to assess the prevalence of urinary abnormalities in school-aged children for the first time in Ethiopia

Our study demonstrated that hematuria is higher in Ethiopian children than other African children and even worldwide.

The pattern/category of hematuria isolated from this study was isolated asymptomatic microscopic hematuria (14/16=87.5%) followed by a combination of hematuria and proteinuria (2/16=12.5%). No case of gross or symptomatic hematuria was documented.

Coexisting urinary abnormalities especially Leukocyturia and proteinuria (most are trace) are common while nitrituria and glucosuria are uncommon.

A number of recommendations regarding urinary screening as part of well child care have been published by the American Academy of Pediatrics (AAP) over the past 20 year. In 1977 and 1992, the AAP recommended a screening urinalysis at 4 periods during a child's life. In 2000, the pediatric health care guidelines were revised to recommend a screening urinalysis at 5 years of age and during adolescence. In 2007, the screening urinalysis was removed altogether (11, 12,25).

It is particularly important that the prevalence data for CKD in children worldwide should be updated and additional evidence should be obtained on whether effective interventions will reduce the number of children with ESRD(25).

Ethiopia is one of the developing countries of Africa with poor socioeconomic status and poor education in its periphery where routine visits to pediatricians are infrequent. This may reinforces the necessity of screening children at school entry by dipstick urine analysis.

Hematuria was found to be the most prevalent abnormality. The controversies over the value of urine screening in young children raise the question of whether renal diseases are more prevalent in Ethiopian children and therefore it is of great importance to be identified early in the course of disease, and whether the last AAP guideline would be modified in the near future such as screening will be limited to a selected number of children.

To answer these questions, we need a better study with different representation and larger sample size including the common causes of persistent hematuria.

That study will give clue whether routine urinalysis should be part of screening of children at the school age children in Ethiopia and to determine whether early detection of renal disorders in childhood will lead to effective interventions and reduction in the number of individuals who develop end-stage renal disease.

Recommendation

As this study shows high prevalence of hematuria in Ethiopian children compared to equivalent studies a larger study representative of the majority of school children should be done to see the reproducibility of the result, determine the common causes of hematuria and if routine screening helps to prevent ESRD decreasing the cost of unavailable costly therapeutic interventions. It might take a while before we got answer to this question but we need to establish the evidence based on a better designed study.

The issue of health awareness and preventive medicine and the community's knowledge about asymptomatic renal disease and its prevention may need to be assessed altogether before recommending a routine urinalysis for all school children.

The available interventions for a diagnosed child should also be sorted out before such activities are incorporated in to the routine health activity.

All this might mean that it may take a while to have these questions answered but doesn't mean that it is a question not to be answered.

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