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Prevalence of Haematuria and Proteinuria in Children

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Abstract
Screening of kidney diseases by urinalysis in school going children was approved in many parts of the world with inexpensive tools such as urinary dipsticks. There is a long list of causes of microscopic haematuria, most of which are benign especially in children presenting with isolated asymptomatic microscopic haematuria. Studies to support current recommendations regarding the evaluation and management of isolated asymptomatic haematuria are long overdue even though this condition is frequently encountered in clinical practice. Hence the present study was planned to assess the Haematuria and Proteinuria in children in school going children.

The study was planned in Upgraded Department of Paediatrics in Patna medical College and Hospital from November 2012 to October 2013. Urine sample was collected from 100 school going children. The mid-stream urine samples were collected in clean wide mouth jars, examined for the presence of proteinuria by dipsticks (Uristix; Bayer Pharmaceuticals Pvt Ltd) and microscopic examination for haematuria was performed.

The present data gives the information about the prevalence of proteinuria and haematuria in school children in Bihar. From the findings, it can be revealed that it would be probable to screen a large population of children at a moderately low cost providing the framework for further action in persistent cases that may lead to the prevention of any systemic or renal disorder.

Keywords: proteinuria, haematuria, screening, dipsticks, urinalysis

Introduction

Small amounts of protein excreted in the urine (proteinuria) or blood excreted in the urine (haematuria) are sometimes discovered in people without symptoms when urine tests are done for some routine purpose. The presence of clumps of red blood cells (red blood cell casts) or abnormally shaped red blood cells is a clue for doctors that the blood in the urine came from glomeruli. Casts and proteinuria may be present because the person is recovering from a recent undiagnosed episode of kidney inflammation (nephritis). If this situation seems likely, a doctor needs only to recheck the person over the next weeks or months to make sure that the abnormalities resolve.

If red blood cells (particularly casts) and proteinuria persist, the cause is usually one of three disorders:

- **Immunoglobulin A (IgA) nephropathy:** a type of glomerulonephritis caused by deposition of immune complexes (combinations of antibodies and antigens) in the kidneys that can be very mild and non-progressive or become a severe disease leading to kidney failure (loss of most kidney function).
- **Hereditary nephritis (**Alport syndrome), a progressive disorder that can be severe and lead to kidney failure and decreased hearing and vision.
- **Thin basement membrane disease** (benign familial haematuria), a hereditary disorder caused by thinning of a part of the glomerulus called the basement membrane.

Thin basement membrane disease tends to cause red blood cells in the urine, but causes excretion of smaller amounts of protein than IgA nephropathy or hereditary nephritis and may not cause excretion of red blood cell casts. This disorder follows a mild and non-progressive course. The diagnosis can usually be made with a kidney biopsy. However, a kidney biopsy is rarely done because the likelihood of finding a treatable disease is very low.

It is recommended that people with asymptomatic proteinuria and haematuria have a physical examination and undergo urine testing once or twice a year. Additional tests are done if the amount of protein or blood increases much, or if symptoms occur that suggest the development of a specific disease. Most people with asymptomatic proteinuria and haematuria syndrome do not worsen, and the condition may persist indefinitely [1]. Haematuria is the presence of red blood cells in the urine. Visible haematuria, also known as gross haematuria (also frank haematuria or macroscopic haematuria), causes visible red or brown discoloration of the urine. Microscopic haematuria is invisible to the naked eye and is often found by urinalysis or urine dipstick; it is said to be chronic or persistent if 5 or more red blood cells (RBCs) per high-power field can be seen in 3 of 3 consecutive centrifuged specimens obtained at least 1 week apart. Any part of the kidneys or urinary tract (ureters, urinary bladder, prostate, and urethra) can leak blood into the urine. The causes of haematuria are broad, ranging from urinary tract infection

to kidney stones to bladder cancer [2]

Microscopic haematuria is found regularly on routine urinalysis, with a prevalence between 0.18% and 37%. Some studies have shown increased incidence with age and female sex, but others did not show a correlation. In many people, no specific cause is found. Cancer of the kidney, prostate, bladder, or testes is found in 5% of people with microscopic haematuria and up to 40% of those with visible haematuria. Haematuria is common in pediatric population, with a prevalence of 0.5-2% [3].

Certain substances can mimic haematuria either by discoloring the urine or by causing a false positive on urine dipstick. Causes of a false positive urine dipstick include hemoglobin (in absence of red blood cells), semen, myoglobin, porphyrins, betanin (after eating beets), and drugs (such as rifampicin, phenazopyridine, and sulphonamides. Substances that mimic haematuria by causing red or brown discoloration of the urine include drugs (such as sulfonamides, quinine, rifampin, phenytoin), betanin, and menstrual bleed [4].

More than 50% of visible haematuria in children have an identifiable cause. Common causes of visible haematuria in children are: urinary tract infection, perineal or urethral irritation, congenital abnormalities, trauma, acute nephritis, coagulopathy, kidney stones, IgA nephropathy, Post-streptococcal glomerulonephritis [5].

Proteinuria is the presence of excess proteins in the urine. In healthy persons, urine contains very little protein; an excess is suggestive of illness. Excess protein in the urine often causes the urine to become foamy, although foamy urine may also be caused by bilirubin in the urine (bilirubinuria) [1], retrograde ejaculation, pneumaturia (air bubbles in the urine) due to a fistula, [2] or drugs such as pyridium [6].

There are three main mechanisms to cause proteinuria:

- Due to disease in the glomerulus
- Because of increased quantity of proteins in serum (overflow proteinuria)
- Due to low reabsorption at proximal tubule (Fanconi syndrome)

Proteinuria can also be caused by certain biological agents, such as bevacizumab (Avastin) used in cancer treatment. Excessive fluid intake (drinking in excess of 4 litres of water per day) is another cause. Also leptin administration to normotensive Sprague Dawley rats during pregnancy significantly increases urinary protein excretion. Proteinuria may be a sign of renal (kidney) damage. Since serum proteins are readily reabsorbed from urine, the presence of excess protein indicates either an insufficiency of absorption or impaired filtration. People with diabetes may have damaged nephrons and develop proteinuria. The most common cause of proteinuria is diabetes, and in any person with proteinuria and diabetes, the cause of the underlying proteinuria should be separated into two categories: diabetic proteinuria versus the field [7]. With severe proteinuria, general hypoproteinemia can develop which results in diminished oncotic pressure. Symptoms of diminished oncotic pressure may include ascites, edema and hydrothorax.

Screening of kidney diseases by urinalysis in preschool children was approved in many parts of the world with inexpensive tools such as urinary dipsticks. There is a long list of causes of microscopic haematuria, most of which are benign especially in children presenting with isolated asymptomatic microscopic haematuria. Studies to support current recommendations regarding the evaluation and management of isolated asymptomatic haematuria are long overdue even though this condition is frequently encountered in clinical practice. Hence the present study was planned to assess haematuria and proteinuria in children in school going children of urban area of Bihar.

Methodology

The study was planned in Upgraded Department of Paediatrics in Patna Medical College and Hospital From November 2012 to October 2013. The urine sample was collected from 100 school going children from a school. The midstream urine samples were collected in clean wide mouth jars, examined for the presence of proteinuria by dipsticks (Uristix; Bayer Pharmaceuticals Pvt Ltd) and microscopic examination for haematuria was performed.

The approval of the institutional ethics committee was taken before starting the study. All the patients and their parents were informed and consent was taken. The aim and the objective of the present study were conveyed to them.

The information included demographic details such as name, age, sex & education.

Results & Discussion

The data from 100participants were collected and is presented as below. The present study was planned to assess the Screening of kidney diseases by urinalysis in preschool children found useful in many parts of the world using inexpensive tests such as urinary dipsticks and microscopy. In the present study in the first dipstick samples the prevalence has been observed in 15 cases for proteinuria and in 5 cases for haematuria.

Table 1: Age & Sex of Patients

Age	Number of Cases
5 –8 years	32
8 –12 years	37
12 -16 years	31
Total	100
Sex	
Girl	40
Boys	60
Total	100

Table 2: No. of Cases of Proteinuria &Haematuria

Age	Total Cases	Number of Cases positive for Proteinuria	Number of Cases positive for Haematuria
5 –8 years	32	4	**0**
8 –12 years	37	6	**2**
12 -16 years	31	5	**3**
Total	100	15	5

Table 3: Sex wise Distribution

	Number of Cases positive for Proteinuria			Number of Cases positive for Haematuria		
Age	**Total**	**Males**	**Females**	**Total**	**Males**	**Females**
5 −8 years	4	1	3	0	0	0
8 −12 years	6	2	4	2	2	0
12 -16 years	5	2	2	3	2	1
Age	15	5	9	5	4	5

Dodge has studied a three consecutive urinalysis in 6 to 12 year old children at intervals of 3to 6 weeks and it has been found that prevalence of proteinuria in all the three tests has been 0.942% in females and 0.33% in males and haematuria in 0.34% and 0.12% respectively [8].

In comparison to the Dodge study, we have found that proteinuria and haematuria has been more prevalent in females compared to males. The finding of isolated haematuria or proteinuria on random urine screening can be distressing to paediatric patients and their families. However, available information continues to support the fact that most patients have a benign and transient condition. Isolated findings of proteinuria or microscopic haematuria in an otherwise healthy and asymptomatic child should be confirmed by a primary care physician prior to referral. Persistence of findings would lead to consultation with a paediatric kidney disease specialist, although this need varies by situation. With the increased performance by screening by urine dips and urinalysis in the pediatrician's office the discovery of asymptomatic blood or protein in the urine has become more common [9].

Although Kaplan and colleagues stated that multiple screening dipstick urinalysis in asymptomatic paediatric patients are costly and should be discontinued but they proposed a single screening dipstick urinalysis be obtained at school entry age, between 5 and 6years, in all asymptomatic children [10]. The study of Young-Hon Pak and colleagues showed that the use of a mass school urine screening program may detect chronic renal disease in its early stage and recommend that more attention should be paid to identify those children with combined proteinuria and haematuria and massive proteinuria [9]. Kawasaki *et al.* found that early identification by yearly school urinary screening may enable early management and improve prognosis for MPGN type 1 in children [10].

Conclusion

The present data gives the information about the prevalence of proteinuria and haematuria in school going children in Bihar. From the above findings it can be revealed that it would be probable to screen a large population of children at a moderately low cost providing the framework for further action in persistent cases that may lead to the prevention of any systemic or renal disorder.

References

1. https://www.msdmanuals.com/home/kidney-and-urinary-tract-disorders/kidney-filtering-disorders/asymptomatic-proteinuria-and-hematuria-syndrome.
2. Cohen, Robert A. Brown, Robert S. Clinical practice. Microscopic hematuria". The New England Journal of Medicine. 2003; 348(23):2330–2338. doi:10.1056/NEJMcp012694. ISSN 1533-4406. PMID 12788998.
3. Shah, Samir. Step-up to Pediatrics. Ronan, Jeanine C. Alverson, Brian, (First ed.). Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins, 2014 175–176. ISBN 9781451145809. OCLC 855779297.
4. Hematuria Causes Archived. 2011-05-13 at the Way back Machine. Original Date of Publication 1998. Reviewed by: Stacy J. Childs, MD Stanley J. Swierzewski, III, M.D. Last Reviewed, 2008.
5. Work-up of Hematuria. Primary Care: Clinics in Office Practice. 2014; 41(4):737–748. doi:10.1016/j.pop.2014.08.007. ISSN 0095-4543.
6. Urinalysis Archived at the Way back Machine. Ed Friedlander, M.D., Pathologist, 2006. – Retrieved 2007-01-20.
7. Hisham S. Ibrahim, Gabriele Ruth Anisah Froemming, Effat Omar, and Harbindar Jeet Singh "Leptin increases blood pressure and markers of endothelial activation during pregnancy in rats". BioMed Research International Journal. 2013; 298401:6.
8. Dodge WF. Cost effectiveness of renal disease screening. Am J Dis Child 1977; 131(11):1274-80.
9. Park YH, Choi JY, Chung HS, Koo JW, Kim SY, Namgoong MK, *et al*. Hematuria and Proteinuria in a mass school urine screening test. Pediatric Nephrol 2005; 20:1126-1130.
10. Kaplan R, Springate J, Felp L. Screening dipstick urinalysis; A time to change. Pediatrics. 1997; 100(6):919-21.
11. Kwasaki Y, Suzuki J, Nozawa R, *et al*. Efficacy of school urinary screening for Memberanopro life rative Glomeru lonerpheritis Type 1; Arch Dis Childh. 2002; 86(1):21 - 5.