Feasibility of screening for urinary abnormalities as a part of school health appraisal

Sir,

Urinary abnormalities can be asymptomatic in children and identified only by screening tests.[1] Several South East Asian countries perform urine screening as a part of regular health evaluation for school children. This is an effective method for prevention and early detection of chronic kidney disease.[2-4] No study has been conducted in India on urine screening in school children. The objectives were to study the prevalence of asymptomatic proteinuria and hematuria in school children and assess the feasibility of screening urine as a part of annual school health appraisal. We conducted a cross-sectional study from October 2008 to June 2009 among school children aged 5-16 years from schools in the urban slums of Bangalore. After obtaining informed consent from parents and teachers, a mid-stream sample of urine was freshly collected in a sterile container and tested within 30 minutes for proteinuria and hematuria using URS-9 (Teco diagnostics) dipsticks. Proteinuria 1+ to 4+ (30->2000 mg/dl) and hematuria 1+ to 4+ (10-200 RBC/μl) were considered abnormal. Hematuria was confirmed by microscopic examination. The reevaluation of isolated microscopic hematuria is recommended weekly for 2 weeks to look for persistence of hematuria.[5,6] However, we were able to reevaluate only after 3 months.

A total of 1597 children were included in this study. The male to female ratio was 1:1. A total of 752 (47.27%)

children were between 5 and 10 years of age and 845 (52.72%) were between 11 and 16 years.

The prevalence of urinary abnormalities on initial evaluation was 7.82% (95% CI 3.2, 9.4). Proteinuria and hematuria on the first evaluation were seen in 1.9% and 5.8%, respectively. There was a significantly higher prevalence of urinary abnormalities in older children (9.8%), compared to younger children (5.18%) ($P<0.01$). Only 54.5% of the children with urinary abnormalities were available for re-evaluation. The prevalence of urinary abnormalities reduced from 7.8% to 1.9%. Those children who had persistent urinary abnormalities were advised to come to the Pediatric Nephrology OPD for further evaluation.

The prevalence of proteinuria and hematuria in our study population is comparable with other studies where the prevalence of hematuria varies from 0.5-7.2%.[2-4,7-9] The prevalence of urinary abnormalities was significantly higher in the older age group and this was in concordance with other studies.[4,8,9] Persistent urinary abnormalities were found in 1.98% of children. This may be falsely low as only 55% were reassessed. The reduction in the prevalence may be due to transient abnormalities.

The feasibility of screening was assessed. Urine samples were obtained in all children. However, repeat evaluation could be done only in 55%. Younger children needed assistance with urine collection. The dipsticks could be split vertically into two parts to reduce the cost. The cost of urine screening was Rs. 10 per child and the time taken for screening was 5 to 7 minutes per child. Hence, urine screening is a simple, noninvasive, inexpensive, and feasible test which can be incorporated into the school health appraisal process.

We concluded that urine screening is a simple and feasible method for diagnosis of urinary abnormalities in asymptomatic children which requires periodic re-evaluation.

The limitations of our study were that an early morning urine sample was not collected. Repeat evaluation was done only after a gap of 3 months. Only 55% of children with urinary abnormalities were available for repeat evaluation. Further evaluation for the etiology of proteinuria and hematuria could add significance to the screening of urinary abnormalities in these children.

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References

1. Hogg RJ. Screening for CKD in Children: A Global Controversy. Clin J Am Soc Nephrol 2009;4:509-15.
2. Murakami M, Yamamoto H, Ueda Y, Murakami K, Yamauchi K. Urinary screening of elementary and junior high-school children over a 13-year period in Tokyo. Pediatr Nephrol 1991; 5:50-3.
3. Cho BS, Kim SD. School urinalysis screening in Korea. Nephrology (Carlton) 2007;12 Suppl 3:S3-7.
4. Zhai YH, Xu H, Zhu GH, Wei MJ, Hua BC, Shen Q, *et al.* Efficacy of urine screening at school: Experience in Shanghai, China. Pediatr Nephrol 2007;22:2073-9.
5. Meyers KE. Evaluation of hematuria in children. Urol Clin North Am 2004; 31:559-73, x. Review.
6. Phadke KD, Vijayakumar M, Sharma J, Iyengar A; Indian Pediatric Nephrology Group. Consensus statement on evaluation of hematuria. Indian Pediatr 2006;43:965-73.
7. Yap HK, Quek CM, Shen Q, Joshi V, Chia KS. Role of urinary screening in children in the prevention of chronic kidney disease. Ann Acad Med Singapore 2005;34:3-7.
8. Rao J, Zhou L, Shen Q, Sun L, Fang X, Liu H, *et al.* School urinalysis screening in Shanghai. World J Pediatr 2006;2:195-8.
9. Jafar TH, Chaturvedi N, Hatcher J, Khan I, Rabbani A, Khan AQ, *et al.* Proteinuria in South Asian children: Prevalence and determinants. Pediatr Nephrol 2005;20:1458-65.

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