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## Original Research Article

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## Prevalence of Hematuria among Iranian school children: A systematic review and meta analysis

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### Abstract

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**Introduction:**

Screening of kidney diseases by urinalysis in preschool children was approved in many parts of the world with inexpensive tools such as urinary dipsticks. In this study the researchers investigate the prevalence of hematuria among Iranian school children.

**Methods :**

The methods used for this systematic review were based on the "Cochrane Systematic Study Booklet" and "Appropriate Items for Systematic and Meta-Analysis Study (PRISMA)" tool. The review of references and resources was done using the Medical Subject Headings (MeSH) and keywords related to the source of information on Prevalence of Hematuria among Iranian school children. To find references, the international Databases (MEDLINE PubMed interface), Google Scholar, and Web of Science) and domestic databases (SIDs and Magiran) and journals were searched; unlimited searching, in terms of both setting and language, was done until June 30, 2018.

**Results:**

The final research was conducted on 15591 participants; with an age range of 1 to 14years old; the Prevalence of Hematuria among Iranian school children in 15591 patients was %009 (95% confidence interval [CI]: 0.008, 0.011,  $I^2 = 98.6\%$ ).

**Conclusion :**

It is necessary to provide adequate education and information on the principles of personal hygiene in the school curriculum and even the mass media. Ultimately, urine analysis is suggested at the time of entering the school in order to search for a case or abnormalities; in such cases, the subject's sample will be referred to the relevant specialist for further examination and testing.

**Keywords:** children, school, Hematuria

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### Introduction

Kidney disease usually develops without clear signs and symptoms and may lead to kidney failure (1). Early diagnosis of kidney diseases in children is useful in preventing the disease, delaying progression, reducing the number of patients with progressive kidney failure and reducing mortality and disability(2). There are long-term plans for urinary screening for early detection of renal diseases in some countries and several studies have so far been carried out to confirm the usefulness of this program (3).

Children refrain from expressing their problems when they are suffering physical pain for a variety of reasons, including embarrassment, inability to express or ignorance of the importance of the subject(4). Fortunately, as a dynamic product of the day-to-day operation of the urinary system (the most important organ after the brain and heart), urine undergoes specific changes in all kidney problems and some systemic diseases, causing simple urine analysis, which is practically a fluid biopsy, to function as a screening test has long been considered by researchers in pediatric medicine(5). The ultimate objective of

implementing urine analysis test is early detection of symptoms and finding people at risk for developing kidney disease and controlling those who, if not timely diagnosed, may return to the irreversible stage(6). Some researchers even recommend annual implementation of urine analysis test as a screening one(7). Some kidney problems developing during adolescence and puberty are rooted in childhood, and the first symptoms can only be identified early in urine analysis(8). Variables, including the presence of blood in the urine, hemoglobinuria, proteinuria, granulocyte membranes, urinary parasites and bacteriuria can be searched for during a laboratory examination of urine specimens(9).

Considering the importance of this issue and the prevalence of kidney disease in Iran and the lack of timely referral of patients, it was decided to determine the frequency of hematuria in Iranian asymptomatic children.

## Methods

### Eligibility criteria

The methods used for this systematic review were based on the "Cochrane Systematic Study Booklet" and "Appropriate Items for Systematic and Meta-Analysis Study (PRISMA)" tool. Observational studies conducted on general population have been added and studies conducted on specific population have been removed. Results are summarized as reported in the research. The minimum sample size was 25 patients in each study. The target population covers the total population of Iranian school children who entered the study. Prevalence of Hematuria among Iranian school children was calculated in this study.

### Searching strategies and databases :

The review of references and resources was done using the Medical Subject Headings (MeSH) and keywords related to the source of information on Prevalence of Hematuria among Iranian school children. To find references, the international Databases (MEDLINE PubMed interface), Google Scholar, and Web of Science) and domestic databases (SIDs and Magiran) and journals were searched; unlimited searching, in terms of both setting and language, was done until June 30, 2018. PRESS standard and the Health Sciences Librarian were used for designing the strategy. MEDLINE application was

used to search other databases. In addition, PROSPERO was used to provide a systematic search that was completed recently. To search for headlines and abstracts, boolean (AND, OR, NOT), mesh, coordinate {truncation} \* and related words were used; following keywords were used to provide a comprehensive context: children, Hematuria, prevalence .

### Research selection and data extraction

According to the research protocol, two researchers observed the titles and abstracts separately according to the eligibility criteria; in the next step, after the removal of repeated studies, the full text of the paper was studied based on the eligibility criteria and the required information was extracted. Consensus method was used to solve the disagreements between two researchers. The extracted data included the general information (corresponding author, year and place), characteristics of the research (research design, sample size, location, study period, and risk of bias), and characteristics of participants.

### Quality control:

To assess the quality of the methodology and bias risk, each observation study was evaluated using a tool developed by Hoy et al; this 10-item scale evaluated the quality of the study in two dimensions, including external credentials (items 1 to 4 target populations, sampling frame, sampling method, and minimum indirect neglect) and internal validity (items 5 up to 9 covering methods for data collection, case definition, study tools, and data collection mode and item 10 covering assessing relevant assumptions or analyzes). The risk of abuse was assessed by two researchers separately and possible disparity of ideas was resolved by consensus.

### Aggregation of data:

All eligible studies were included within the systematic review. The data was combined using forest plot graph; random effects model was used to evaluate Prevalence of Hematuria among Iranian school children. The heterogeneity of primary studies was assessed by performing  $I^2$  tests. Meta-analysis was performed using the STATA 14 statistical software.

## Results

### 1. Selecting eligible papers and researches

In the initial search on various databases, a total of 430 articles were reviewed, 403 of which turned out to be repetitive during screening process of title and

abstract. 15 articles were removed due to unrelated title; out of the remaining 12 articles, 6 articles met the inclusion criteria. Of the 6 articles that were removed, 2 were reviews, 1 were letters to editors, 2 had no complete text, and 1 had low quality and could not be considered in the research. (Figure 1)



PRISMA 2009 Flow Diagram

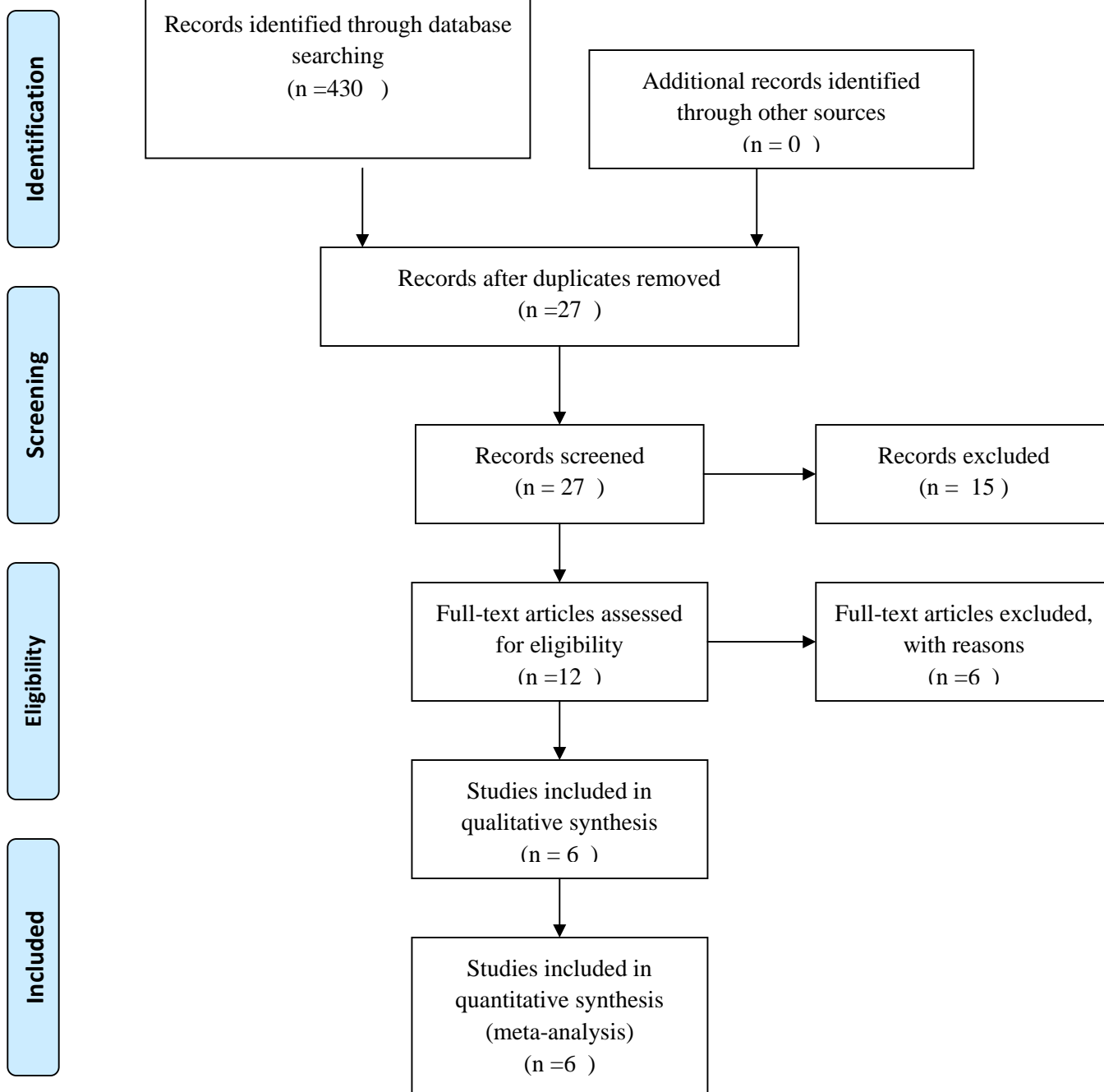


Fig 1: diagram of included studies

## 2. Characteristics of the researches and papers

The final research was conducted on 15591 participants; with an age range of 1 to 14 years old; a cross-sectional design was used in all studies. Research was conducted in only 6 provinces out of 31

provinces of Iran. Of the 6 studies , one was from Rasht, one from Yazd ,one from Boushehr , one from kermanshah, one from Zahedanand One from Hormozgan . Required data was collected through interview (n = 4) and most of the studies had a low bias risk (n = 4) (Table 1).

**Table 1: Characteristics of final included studies about Prevalence of Hematuria among Iranian children**

ID	Author	Year	N	City	Prevalence	Bias
1	Sadeghi[15]	2008	1169	Zahedan	0.11	Low
2	Ghasemi[16]	2004	2047	Boushehr	0.05/91	Moderate
3	Badeli[17]	2008	1520	Rasht	0.01/57	Moderate
4	Vazirian[18]	2004	6831	Kermanshah	0.008	Low
5	Samimagham[19]	2005	1010	Hormozgan	0.13/5	Low
6	Jafari[20]	2015	3014	Yazd	0.005	Low

### Meta-analysis Prevalence of Hematuria among Iranian children:

Based on the results of random effects model, the Prevalence of Hematuria among Iranian children in 15591 patients was %009 (95% confidence interval [CI]: 0.008, 0.011, I<sup>2</sup> = 98.6%) (table 2) .

**Table 2: Prevalence Hematuria among Iranian children**

Study	Year	ES	95% conf. Interval		% weight
			Low	Up	
Sadeghi	2008	0.110	0.092	0.128	0.65
Ghasemi	2004	0.059	0.047	0.071	1.50
Badeli	2008	0.016	0.010	0.022	5.63
Vazirian	2004	0.008	0.006	0.010	54.14
Samimagham	2005	0.135	0.114	0.156	0.47
Jafari	2015	0.005	0.003	0.007	37.60
Pooled ES	-----	0.009	0.008	0.011	100

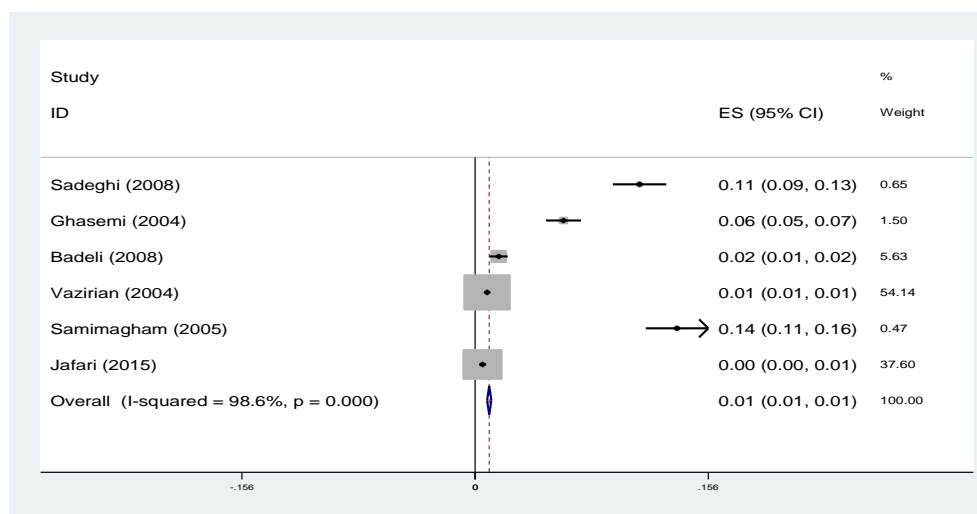
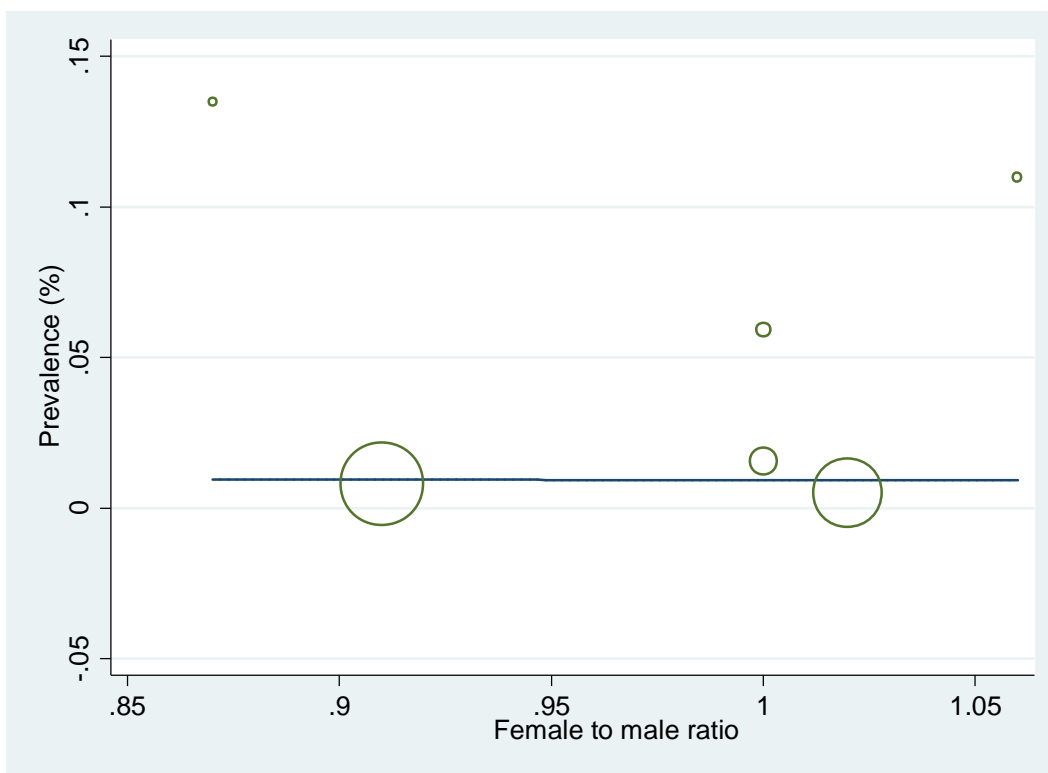


Fig. 2 : The Prevalence of Hematuria among Iranian children and its 95% interval for the studied cases according to the year and the city where the study was conducted based on the model of the random effects model. The midpoint of each section of the line

estimates the % value and the length of the lines showing the 95% confidence interval in each study. The oval sign shows Prevalence of Hematuria among Iranian children for all studies.



**FIG. 4. Meta-regression between the female-to-male ratio and the Prevalence of Hematuria among Iranian children**

**Discussion**

Urinary tract disorders include cases in which the patient has no complaints, but there is evidence of a kidney problem such as protein, white blood cells, etc(10-12). Many urinary tract infections in various diseases and ultimately serious kidney damage begin from an asymptomatic phase; however, they are accompanied with positive laboratory symptoms that can be treated at this stage in many cases(13). Therefore, early diagnosis of renal problems is important and, as a result, urinary screening for children in schools is mandatory in many countries(14). Hematuria turned out to be the most common cause in boys, indicating a higher incidence of glomerular diseases in boys. On the other hand, the majority of congenital anatomical abnormalities of the urinary system are more common in boys, which can all be the cause of hematuria. Meta-analysis

Prevalence of Hematuria among Iranian children Based on the results of random effects model, the Prevalence of Hematuria among Iranian children in 15591 patients was %009 (95% confidence interval [CI]: 0.008, 0.011,  $I^2 = 98.6\%$ ).

**Conclusion**

It is necessary to provide adequate education and information on the principles of personal hygiene in the school curriculum and even the mass media. Ultimately, urine analysis is suggested at the time of entering the school in order to search for a case or abnormalities; in such cases, the subject's sample will be referred to the relevant specialist for further examination and testing.

## References

1. Yufeng LI, Wei M, Weilan WU, Chen H, Dong Y, Jin J, Zhu Y, Gong Y, Shan W. Indications for percutaneous renal biopsy in children with asymptomatic hematuria. *Journal of Clinical Pediatrics*. 2017 Jan 1;35(7):494-7.
2. Wang X, Fu H. Clinical characteristics of asymptomatic hematuria children with minor glomerular abnormalities or IgA nephropathy. *INTERNATIONAL JOURNAL OF CLINICAL AND EXPERIMENTAL MEDICINE*. 2017 Jan 1;10(3):5182-8.
3. Zarza C. What is the prognosis of microscopic hematuria in children?. *Evidence-Based Practice*. 2018 Jun 1;21(6):14.
4. Schwartz R, Distal R, Shapiro A, Waisman Y. Evidence of a link between fever and microscopic hematuria in children. *European journal of pediatrics*. 2017 Jun 1;176(6):787-90.
5. Spivacow FR, Del Valle EE, Rey PG. Metabolic risk factors in children with asymptomatic hematuria. *Pediatric Nephrology*. 2016 Jul 1;31(7):1101-6.
6. Zu'bi F, Assadi A, Hardak B, Zohar Y, Naroditsky I, Abadi S, Livne PM. Pyrogenic Granuloma: Possible Cause for Macroscopic Hematuria in Children. *Urology*. 2017 Jun 1;104:191-3.
7. Thirunagari R, Marrone A, Elsinghorst H, Mastrandrea LD. Hematuria as an adverse outcome following provocative growth hormone stimulation testing in children. *Journal of Pediatric Endocrinology and Metabolism*. 2018 Apr 25;31(5):539-43.
8. Alidadi A, Khazaei HA, Shahraki BN, Andarzi S, Jalili A, Mirzaei A, Shahraki A, Hajinejad S, Hashemi SM. Comparison of IL-13 and IL-27 levels between schizophrenics and healthy subjects before and after antipsychotic administration. *Health Sciences*. 2016 Jan 1;5(9S):654-61.
9. Li Y, Wang Y, He Q, Dang X, Cao Y, Wu X, Mo S, He X, Yi Z. Genetic mutational testing of Chinese children with familial hematuria with biopsy-proven FSGS. *Molecular medicine reports*. 2018 Jan 1;17(1):1513-26.
10. Alidadi A, Fard RG. EFFECT OF PENTOXIFYLLINE ON SERUM CRP LEVELS IN HEMODIALYSIS PATIENTS COMPARED WITH PLACEBO. *INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH*. 2018 Jun 1;9(6):2347-50.
11. Dossche L, Raes A, BESOUW M. Recurrent hematuria due to nutcrackers syndrome: imaging techniques. In *44e Jaarlijks congres van de Belgische Vereniging voor Kindergeneeskunde (BVK 2016) 2016 (Vol. 18, No. 1)*.
12. Saddadi F, Alidadi A, Hakemi M, Bahar B. Nephrotic Syndrome After Hematopoietic Stem Cell Transplant: Outcomes in Iran. *Experimental and clinical transplantation: official journal of the Middle East Society for Organ Transplantation*. 2017 Feb;15(Suppl 1):90-2.
13. Clark M, Aronoff S, Del Vecchio M. Etiologies of asymptomatic microscopic hematuria in children—systematic review of 1092 subjects. *Diagnosis*. 2015 Dec 1;2(4):211-6.
14. Srivastava RN, Bagga A. 10 Asymptomatic Hematuria and Proteinuria. *Pediatric Nephrology*. 2016 May 31:179.
15. Sadeghi bojd S, Hadian M, Rakhshani f. Prevalence of proteinuria and hematuria in urine screening in asymptomatic children in Zahedan schools.
16. Ghasemi Kh, Beygi S, Shojaie M. Prevalence of asymptomatic microscopic hematuria in primary school children of Bushehr and Kharg Island.
17. Badeli H, Heidarzadeh A, Ahmadian M. Prevalence of hematuria and proteinuria in healthy 4 to 6 year old children in daycare Centers of Rasht (Northern Iran). *Iranian Journal of Pediatrics*. 2009;19(2):169-72. The results of urine analysis in asymptomatic children in elementary schools of Kermanshah.
18. Vazirian Sh, Aminzade M, Golpayegani M, Moshiri S, Mohammadnejad M. The results of urine analysis in asymptomatic children in elementary schools of Kermanshah

19. Samimagham H, Hosseini s, Zare Sh. Prevalence of asymptomatic disorders in primary school children in Bandar Abbas.
20. Nodoshan AA, Shajari A, Golzar A, Shakiba M. Urinary screening in primary school children in Yazd, Iran. Shiraz E-Medical Journal. 2015;16(1).

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