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Systematic Review

Nocturnal Enuresis in Saudi Children: A Review

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Abstract

Background: Regardless of the significance and the disturbing magnitudes of nocturnal enuresis, this disorder is still unacknowledged properly in Saudi Arabia. Broad studies in this field are significantly deficient in KSA.

Aim: To discuss results of reported studies about prevalence and associated risk factors of NE among children in Saudi Arabia.

Methodology: This is a systematic review was carried out, including PubMed, Google Scholar, and EBSCO that examining randomized controlled trials, observational, and experimental studies which study nocturnal enuresis in Saudi children.

Results and Conclusion: The study included 6 studies and concluded that; Prevalence of NE in Saudi Arabia is greatly variable from one region to another. Saudi population should pay more attention to this problem to control this rising prevalence in KSA. Awareness programs on the causes and consequences is advised. Future studies are required to look into associated risk factors and treatment approaches.

Keywords: *Nocturnal Enuresis; NE in KSA; NE in Saudi Children*

Introduction

Nighttime incontinence or nocturnal enuresis is known as nighttime bedwetting in children aged 5 years or older [1]. It is the urological complaint that is most common in pediatric patients. If it happens in a child who is not dry for at least 6 months, the case may be described as nocturnal enuresis, while secondary enuresis develops after a duration of nocturnal dryness of at least 6 months [2,3].

NE is an international problem across all cultures. The incidence of enuresis (≥ 2 nights per week) in one large British study was 8% at 9.5 years [2]. Prevalence rate was reported to be 5% - 20% [4].

It is possible to distinguish Enuresis into primary and secondary classes. Primary enuresis occurs when for six or more months in a row a child > 5 years of age has never achieved a period of full dryness. Although secondary enuresis is a situation that develops at least six months or several years after a child has reached a full dryness period [5].

Enuresis etiology is not fully known. Several major pathophysiological factors, including such bladder dysfunction, low bladder capacity, irregular vasopressin levels, nocturnal polyuria, and irregular sleeping habits, have been proposed [6].

For the child and the parents, nocturnal enuresis has serious consequences. A range of cognitive, social and psychological issues can be triggered by nocturnal enuresis, including embarrassment, blushing, loss of self-esteem and aggression [7]. Behavioral changes such as low self-esteem, isolation, reduced ambition, and increased anxiety in many children who suffer from NI. Within the school system, these children are often low-achievers and become a concern for their family and school. It is therefore important to classify children at risk and to perform therapeutic steps [8].

Regardless of the significance and the disturbing magnitudes of nocturnal enuresis, this disorder is still unacknowledged properly in Saudi Arabia. Comprehensive studies in this regard are considerably lacking in KSA.

Aim of the Study

To discuss results of reported studies about prevalence and associated risk factors of nocturnal enuresis among children in Saudi Arabia.

Methodology

PubMed and EBSCO Data bases were used for the publications used in the study, as they are known to be high-quality sources of information. PubMed is one of the leading online databases established by the National Center for Biotechnology Information (NCBI). Articles regarding NE among Saudi children as well as other articles were used in writing the article. Limitation to the last ten years, and on English due to insufficient translation services have been applied. Papers were screened by names, and the abstracts reviewed 6 articles that were eligible. Criteria for inclusion: papers were chosen on the basis of importance to the topic, including one of the following topics: 'nocturnal enuresis, NE in KSA, NE in Saudi children' Exclusion criteria: all other publications that did not have either of these subjects as their main end, or repetitive research and summary studies were omitted.

Statistical analysis

No technology was used to analyze the results. Information collected was derived on the basis of a particular type (Publication Title, Author's Name, Purpose, Description, Findings and Outcomes). This data were checked by the group members to obtain a uniform results. Double review of the results of each member has been implemented to ensure authenticity and eliminate errors.

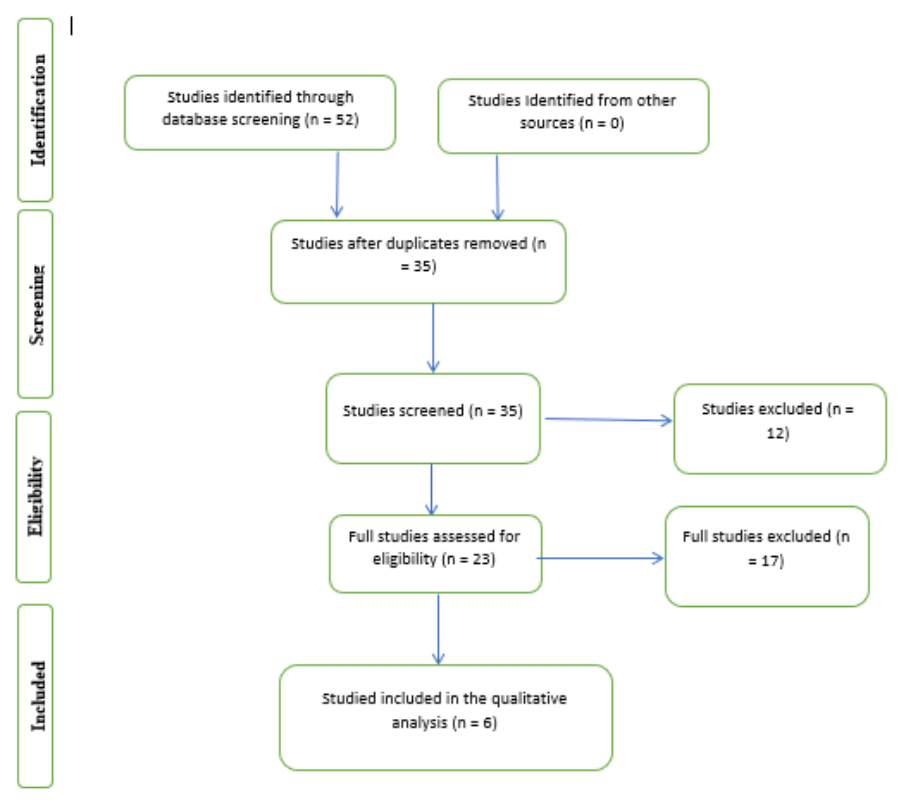
Results

A total of 52 research used for the title screening contributed to the search. 35 of them had been used for abstract screening, which contributed to the omission of 12 papers. The remaining 23 full-text articles have been examined. The full-text revision helped lead to exclusion of 17 studies and 6 were able to enroll for final extracting data (Table 1).

Author	Study Region	Year of publication	Study type	Sample size	Outcome	Ref
Alhifthy, Elham H., *et al*.	Saudi Arabia	2020	A cross-sectional descriptive study	2148 Child	31.2% of children have nocturnal enuresis. There were no significant correlations between nocturnal enuresis and child gender while it significantly correlated with child's age and having a family history of NE.	9
Alshahrani Abdullah *et al*.	Riyadh, Saudi Arabia	2018	A cross-sectional survey	352 families that had children with NE	The prevalence of NE was 18.5% among families with a higher prevalence in boys. Prevalence of NE decreased with increasing age with many children found of having stressful events in their life other than parents' divorce.	10
Sherah KM., *et al*.	Jazan, Saudi Arabia	2019	A cross-sectional study	505 child	76.4% of the children had NE. The prevalence of NE in the boys (79.5%) was non-significantly higher than girls (73.3%). There were statistically significant relationships between NE and history of pinworms infestation, no breastfeeding, low school performance, and lower father education	11
Shahin M M., *et al*.	Hail, Saudi Arabia	2017	A cross sectional study	652	The overall prevalence of nocturnal enuresis was 22.7%. Female gender, young age, history of enuresis among parents or siblings, deep sleep and history of urinary tract infections and other social and psychological problems were associated factors with enuresis.	12
Al-Zahrani SS.	Taif, Saudi Arabia	2014	A cross sectional study	2701 child	The frequency of nocturnal enuresis was 7.81 %. There were no significant between boys (7.33%) and girls (8.42%).	13
Kalo BB and Bella H	Saudi Arabia	1996	A cross-sectional population-based study	640	Enuresis prevalence was 16.3% among boys and 13.8% among girls. The overall prevalence was 15%. Stressful life events before the age of 6 years, deep sleep, acute family psycho-social problems, recurrent urinary tract infection, constipation and congenital defects were found to be strongly associated with enuresis.	14

Table 1: *Author, year of publication, study type, and study outcome.*

The included studies had different study designs.



Discussion

Prevalence of NE in KSA was variable as a study in Taif region [13] reported 7.81% as prevalence and other study in Jazan region [11] reported surprisingly higher prevalence (76.4%) than all reported studied in Saudi Arabia. Other studies in KSA reported numbers ranged between these figures. A study in Egypt showed an incidence of 18% among children 9 ± 2 years old [15]. In Turkey, a study reported overall prevalence of nocturnal enuresis was 17.5% [16]. Other previous Turkish studies reported lower prevalence of enuresis as 11.5 - 13.7% [17-19]. In France, the prevalence of enuresis was found to be 12.95% in children aged 5 - 16 years [20]. Lower prevalence rater were reported in Iran (6.8%), [21] India (8.6%), [22] Slovenia (12.4%), [23] Saudi Arabia (15%), [14] Australia (18.9%) [24], Yemen (17.2%) [25], Western Europe [26], Taiwan [27], Thailand [28], and China (4.3%) [29].

Al-Zahrani SS., *et al*. [13] reported no significant variance between males and females in prevalence of NE. This agreed with Sherah KM., *et al*. [11] reported that prevalence of NE was higher in males than females (79.5% vs. 73.3%, respectively). In accordance withes findings, Liu., *et al*. [29] and Piyasil., *et al*. [30] have reported non-significant differences. Higher prevalence among males was recorded in several studies [31,32]. This is in accordance with other studies in Turkey, India and Iran [16,33,34]. In contrast; Aljefri HM., *et al*. [35] reported higher prevalence in girls (35.1%) compared with that in boys (21.2%) ($P < 0.001$), which was in accordance with Shahin MM., *et al*. [12] and other study reported a higher prevalence of NE among girls than in boys [36].

A number of previous studies have shown that the prevalence of enuresis is likely to decrease with advancing age, as the study reported that 30.8% of kids had enuresis at age 6, while none of them had it at age 12 [16]. Lee., *et al*. reported the prevalence of enuresis

at age 7 as 20.4% and decreased to 5.6% by age 12 [37]. Alhifthy Elham H., *et al*. [9] reported that; prevalence of NE significantly declined from 63% in kids aged 5-7 years to 9.6% in kids 7 - 10 years and 4.5% in children older than 10 years of age (P = 0.05). This is compatible with the conclusions of some other previous studies (33 per cent, 18 per cent, 7 per cent, and 0.7 per cent of 5-, 8-, 11-, and 17-year-olds, respectively) that show that the prevalence of NE decreases with increasing age [38,39].

Regarding factors associated with enuresis; a study reported male sex, decreased age, history of enuresis in family members, low parental education, heavy sleep, increased number of children sleeping in the kids bedroom, poor academic performance and a history of recurrent urinary tract infections (UTI) were positively correlated with enuresis [16]. Shahin MM., *et al*. [12] reported female gender, young age, history of enuresis among parents or siblings, deep sleep and history of urinary tract infections and other social and psychological problems were associated factors with enuresis. Kalo BB [14] reported stressful life events before the age of 6 years, deep sleep, acute family psycho-social problems, recurrent urinary tract infection, constipation and congenital defects are the factors associated with enuresis. Alhifthy Elham H., *et al*. [9] reported child's age and family history of NE are associated factors with NE.

Conclusion

Prevalence of NE in Saudi Arabia is greatly variable from one region to another. Saudi population should pay more attention to this problem to control this rising prevalence in KSA. Awareness programs on the causes and consequences is advised. Future studies are required to look into associated risk factors and treatment approaches.

Bibliography

1. Kiddoo DA. "Nocturnal enuresis". *Canadian Medical Association Journal* 184.8 (2012): 908-911.

2. Thurber S. "Childhood Enuresis: Current Diagnostic Formulations, Salient Findings, and Effective Treatment Modalities". *Archives of Psychiatric Nursing* 31.3 (2017): 319-323.

3. Graham KM and Levy JB. "Enuresis". *Pediatrics in Review* 30.5 (2009): 165-172.

4. Butler RJ and Heron J. "The prevalence of infrequent bedwetting and nocturnal enuresis in childhood. A large British cohort". *Scandinavian Journal of Urology and Nephrology* 42 (2008): 257-264.

5. Ghotbi N and GH Kheirabadi. "Prevalence of nocturia and its associated factors in primary school children in Sanandaj in 2002". *Journal of Kurdistan University of Medical Sciences* 5.20 (2001): 30-33.

6. Hjälmås K. "Nocturnal enuresis: basic facts and new horizons". *European Urology* 33.3 (1998): 53-57.

7. Heap J M. "Enuresis in children and young people: a public health nurse approach in New Zealand". *Journal of child health care: for professionals working with children in the hospital and community* 8 (2004): 92-101.

8. N Ghotbi and GH Kheirabadi. "Prevalence of nocturia and its associated factors in primary school children in Sanandaj in 2002". *Journal of Kurdistan University of Medical Sciences* 5.20 (2001): 30-33.

9. Alhifthy EH., *et al*. "Prevalence of Nocturnal Enuresis among Saudi Children Population". *Cureus* 12.1 (2020): e6662.

10. Alshahrani A., *et al*. "Prevalence of nocturnal enuresis among children in Primary Health Care Centers of Family and Community Medicine, PSMMC, Riyadh City, KSA". *Journal of Family Medicine and Primary Care* 7.5 (2018): 937-941.

11. Sherah KM., *et al*. "Prevalence of Nocturnal Enuresis in school-age children in Saudi Arabia". *International Journal of Medicine in Developing Countries* 3.8 (2019): 669-675.

12. Mona Madbouly Shahin., *et al*. "The Epidemiology And Factors Associated With nocturnal Enuresis Among School and Preschool Children In Hail City, Saudi Arabia: A Cross-Sectional Study". *International Journal of Advanced Research* 5 (2017): 2048-2058.

13. Al-Zahrani SS. "Nocturnal enuresis and its treatment among primary-school children in Taif, KSA". *International Journal of Research in Medical Sciences* 2.1 (2014): 91-94.

14. Kalo BB and Bella H. "Enuresis: prevalence and associated factors among primary school children in Saudi Arabia". *Acta Paediatrica* 85.10 (1996): 1217-1222.

15. Hamed A., *et al*. "Prevalence of nocturnal enuresis and related risk factors in school-age children in Egypt: an epidemiological study". *World Journal of Urology* 35 (2017): 459-465.

16. Ozden Cuneyt., *et al*. "Prevalence and associated factors of enuresis in turkish children". *International Brazilian Journal of Urology* 33.2 (2007): 216-222.

17. Oge O., *et al*. "Enuresis: point prevalence and associated factors among Turkish children". *The Turkish Journal of Pediatrics* 43 (2001): 38-43.

18. Gumus B., *et al*. "Prevalence of nocturnal enuresis and accompanying factors in children aged 7-11 years in Turkey". *Acta Paediatrica* 88 (1999): 1369-1372.

19. Serel TA., *et al*. "Epidemiology of enuresis in Turkish children". *Scandinavian Journal of Urology and Nephrology* 31 (1997): 537-539.

20. Ouedraogo A., *et al*. "Epidemiology of enuresis in children and adolescents aged 5-16 years in Ouagadougou (Burkina Faso)" (Article in French) 4 (1997): 947-951.

21. Yeung CK., *et al*. "Characteristics of primary nocturnal enuresis in adults: An epidemiological study". *BJU International* 93 (2004): 341-345.

22. Mithani S and Zaidi Z. "Bed wetting in school children of Karachi". *Journal of Pakistan Medical Association* 55 (2005): 2-5.

23. Karnicnik K., *et al*. "Prevalence and quality of life of slovenian children with primary nocturnal enuresis". *International Journal of Nephrology* (2012): 509012.

24. Bower WF., *et al*. "The epidemiology of childhood enuresis in Australia". *British Journal of Urology* 78 (1996): 602-606.

25. Yousef KA., *et al*. "Epidemiology of nocturnal enuresis in basic schoolchildren in Aden Governorate, Yemen". *The Saudi Journal of Kidney Diseases and Transplantation* 22 (2011): 167-173.

26. Butler R., *et al*. "Nocturnal enuresis: a survey of parental coping strategies at 7½ years". *Child: Care, Health and Development* 31.6 (2005): 659-667.

27. Tai HL., *et al*. "The epidemiology and factors associated with nocturnal enuresis and its severity in primary school children in Taiwan". *Acta Paediatrica* 96.2 (2007): 242-245.

28. Hansakunachai T., *et al*. "Epidemiology of enuresis among school-age children in Thailand". *Journal of Developmental and Behavioral Pediatrics* 26.5 (2005): 356-360.

29. Liu X., *et al*. "Attaining nocturnal urinary control, nocturnal enuresis, and behavioral problems in Chinese children aged 6 through 16 years". *Journal of the American Academy of Child and Adolescent Psychiatry* 39.12 (2000): 1557-1564.

30. Piyasil V and Udomsup J. "Enuresis in children 5-15 years at Queen Sirikit National Institute of Child Health". *Journal of the Medical Association of Thailand* 85.1 (2002): 11-16.

31. Bakhtiar K., *et al*. "Prevalence of nocturnal enuresis and its associated factors in primary school and preschool children of Khorramabad in 2013". *International Journal of Pediatric* (2014): 120686.

32. Ramirez-Backhaus M., *et al*. "Prevalence of nocturnal enuresis in the Valencian Community. Pediatric section of the National Incontinence Survey. the EPICC Study". *Actas Urológicas Españolas* 33.9 (2009): 1011-1018.

33. Mithani S and Zaidi Z. "Bed wetting in school children of Karachi". *Journal of Pakistan Medical Association* 55 (2005): 2-5.

34. Pashapour N., *et al*. "Nocturnal enuresis and its treatment among primary-school children in Oromieh, Islamic Republic of Iran". *Eastern Mediterranean Health Journal* 14 (2008): 376-380.

35. Aljefri HM., *et al*. "Nocturnal enuresis among primary school children". *The Saudi Journal of Kidney Diseases and Transplantation* 24 (2013): 1233-1241.

36. Hotbi N and Kheirabadi G. "Prevalence of nocturia and its associated factors in primary school children in Sanandaj in 2002". *Journal of Kurdistan University of Medical Sciences* 5.20 (2001): 30-33.

37. Lee SD., *et al*. "An epidemiological study of enuresis in Korean children". *BJU International* 85 (2000): 869-873.

38. Byrd RS., *et al*. "Bed-wetting in US children: Epidemiology and related behavior problems". *Pediatrics* 98.3-1 (1996): 414-419.

39. Yeung CK., *et al*. "Characteristics of primary nocturnal enuresis in adults: an epidemiological study". *BJU International* 93 (2004): 341-345.

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