



Assessment of Nocturnal Enuresis Management in Children in the Advanced Diagnostic Center in Khartoum State

**Mhdia Elhadi Osman¹, Aaza Ahmed Bashar², Nasrin E. Khalifa^{3,4}
and Halima Mustafa Elagib^{5,6*}**

¹Department of Clinical Pharmacy, Faculty of Pharmacy, University of Ha'il, Saudi Arabia.

²Faculty of pharmacy, Omdurman Islamic University, Sudan.

³Department of Pharmaceutics, Faculty of Pharmacy, University of Ha'il, Saudi Arabia.

⁴Department of Pharmaceutics, Faculty of Pharmacy, University of Khartoum, Sudan.

⁵Department of Pharmacology, Faculty of Medicine, University of Ha'il, Saudi Arabia.

⁶Department of Pharmacology, Faculty of Pharmacy, Omdurman Islamic University, Sudan.

Authors' contributions

This work was carried out in collaboration among all authors. Author MEO designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AAB and NEK managed the analyses of the study. Author HME managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2020/v32i4331071

Editor(s):

(1) Dr. Giuseppe Murdaca, University of Genoa, Italy.

Reviewers:

(1) Dhondiram Tukaram Sakhare, Shivaji Arts, Comm. & Science College, India.

(2) Mohd Izrul Izwan Ramli, Universiti Malaysia Perlis, Malaysia.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/64751>

Original Research Article

Received 10 November 2020

Accepted 14 January 2021

Published 27 January 2021

ABSTRACT

Nocturnal enuresis is defined as nighttime bedwetting in children five years of age or older in the absence of neurological or structural problems affecting the bladder. A wide variety of interventions are used to treat nocturnal enuresis include simple behavioral intervention, enuresis alarm, and pharmacological treatment—the aim of the study to assess the management of nocturnal enuresis in children. A prospective cross-sectional study included 150 children attend the advanced diagnostic center. Data collected by direct interview questionnaire was tested –coded and analyzed by SPSS version 20 in tables and graph & excel. The result of this study showed that the highest treatment adopted was simple-cognitive behavioral therapy (87%), with the highest (94.7%) of

*Corresponding author: E-mail: halimaelagibwork@gmail.com;

patient surveyed adopted lifting and awaking technique,(38%) of patient surveyed have taken imipramine, (26%) of patient surveyed have taken 75mg dose of imipramine, (37%)of patients surveyed had a full response from imipramine therapy. The study showed that the first-line treatment that is needed is simple-cognitive behavioral therapy with instruction regarding diet and fluids, and it is very useful. The main drug was used in the treatment of nocturnal enuresis is imipramine with a dose of 75mg.

Keywords: Assessment; nocturnal; enuresis; management; children.

1. INTRODUCTION

A common concern in children is nocturnal enuresis or bedwetting. For them, as well as for their friends, it is a cause of tension, who may also face substantial financial expenses. The Avon Longitudinal Study of Parents and Children found that the prevalence of bedwetting.

< 2night per week is 30 percent at 4.5 years and 8 percent for 9.5 years and the prevalence of bedwetting ≥ 2 nights per week is 8 percent at 4.5 years and 1.5 percent at 9.5 years [1].

Continuous incontinence refers to constant leakage of urine and can occur even in infants and young children. Intermittent incontinence defined as any urine leakage in discrete amounts in a child at least 5 years old. When a child has never been dry of urine, they have primary incontinence. However, if a child becomes incontinent after a previous good urinary control period, they have secondary incontinence. When intermittent incontinence occurs while the child is awake, it is called daytime incontinence. Conversely, when occurring while asleep, it described as enuresis or nocturnal enuresis.

Mono symptomatic nocturnal enuresis is bedwetting without daytime symptoms; this is the most common form of enuresis. Non-mono symptomatic nocturnal enuresis is bedwetting with daytime voiding symptoms [2].

This knowledge helps the practitioner know the different treatment approaches available for their enuretic patient. Notably, experts recognize that a significant portion of monosymptomatic enuresis patients likely has under-reported or under-diagnosed daytime symptoms, thus explaining the over-lapping therapeutic efficacy in many patients. As the therapy for non-monosymptomatic enuresis incorporates strategies used for daytime incontinence and monosymptomatic enuresis. After excluding underlying medical conditions and undertaking an appropriate evaluation to exclude relevant

comorbid conditions, the ICCS recommends a stepwise approach to treating monosymptomatic enuresis [3].

Several factors, such as reduced bladder capacity, delays in development, nocturnal polyuria, sleep disorders, snoring at night, psychological issues, etc., may cause this problem [4].

Most children with primary nocturnal enuresis have significant signs of stress and mental problems, and most of the symptoms are anxiety disorders [5]. 60% of patients with enuresis disorder had at least one mental factor [6]. Anxiety disorders are prevalent and are involved in about 5% - 10% of children and adolescents [7].

With symptoms of urgency, frequency, multiple series demonstrate that 6-30% of children suffer from urinary incontinence [8]. Urinary incontinence affects both the child and the family socially, emotionally, and behaviorally [9].

Mood disorders such as attention deficit hyperactivity disorder and anxiety and conduct disorders are frequent comorbidities encountered in children with UI [10], as is constipation [11].

Important risk factors include that enuresis is a pediatric public health problem associated with young age children, family history of enuresis and history of urinary tract infections, and a lot of maternal & child demographic data.[12].

Bladder dysfunction may be caused by detrusor overactivity, with involuntary detrusor contraction during bladder filling resulting in symptoms of urgency and/or the frequency with or without urge incontinence, often associated with a small functional bladder capacity [13].

Management of primary nocturnal enuresis should begin with educating and reassuring the child and parents about the condition. The first treatment line is behavioral therapies, and

pharmacotherapy is only recommended for children who are affected by enuresis. [14].

Medication should not be started in children unless non-pharmacological interventions fail [15]. Three frequently used drugs for the treatment of enuresis are imipramine, desmopressin, and oxybutynin [16].

In one study, the majority of the sample had bed wetting previously; most of them start bedwetting at age 5 years old. All children were questioned with a standard form that discussed the statistically significant disparity in constipation between the two groups in their micturition and defecation behaviors ($z = -9,251$; $P = 0,000$) [17].

Children in the oxybutynin group showed a slightly higher response rate (71.0% success) and a lower relapse rate (31.8%), while in the desmopressin group, the response and relapse rates were 63.3% and 57.9%, respectively, and in the imipramine group 61.3% and 63.2%, respectively. However, the difference between the 3 groups in terms of response ($P = 0.701$) and relapse rates ($P = 0.095$) was not statistically significant [18].

1.1 Objectives

1.1.1 General objective

To evaluate nocturnal enuresis management in children in the advanced diagnostic center.

1.1.2 Specific objective

To determine the type & symptom of nocturnal enuresis in children & daytime wetting, family history.

To assess frequency per night, week, a patient who get wake up, trigger factor, and cause of nocturnal enuresis in children.

To identify different types of treatment of nocturnal enuresis in children, side effects of drug & response of different types of treatment.

2. MATERIALS AND METHODS

Observational - cross sectional-hospital based study, conducting during the period starting from November (2017) to February (2018) and performed at the advanced diagnostic center.

The child with nocturnal enuresis attending the health facility at the time of the study. The questionnaire was filled with the child and mother and father or relative in the rest time without any interruption.

All pediatric –both gender –age (1day to 16 years) between November to February will be included.

2.1 Statistical Analysis

Data collected by direct interview questionnaire tested –coded and analysis of result by SPSS version 20 in tables and graph & excel.

3. RESULTS AND DISCUSSION

3.1 Study Population Characteristics

Demographic data results indicated that 62% were males and 38% females. Their ages range from (5-18). The expected age range was (9-12) represented 41% .55% had a first degree, 41% second degree, and 4% others of family history. In terms of the complaint, nocturnal enuresis were 64%, 36% daytime wetting with nocturnal enuresis as shown in table 1. Regarding the patient age group, the results of this current study revealed that (62%) were males and (38%) were females between (9-12) years, which is supported by [12], who found that 62% of the study sample were females, the age of total sample 76% were range between (13-18) years old.

The differences between sample individual for population characteristic was statistically significant ($P \leq 0.05$). except age ($P = 0.249$) > 0.05 .

3.2 Patients Complains and Symptoms

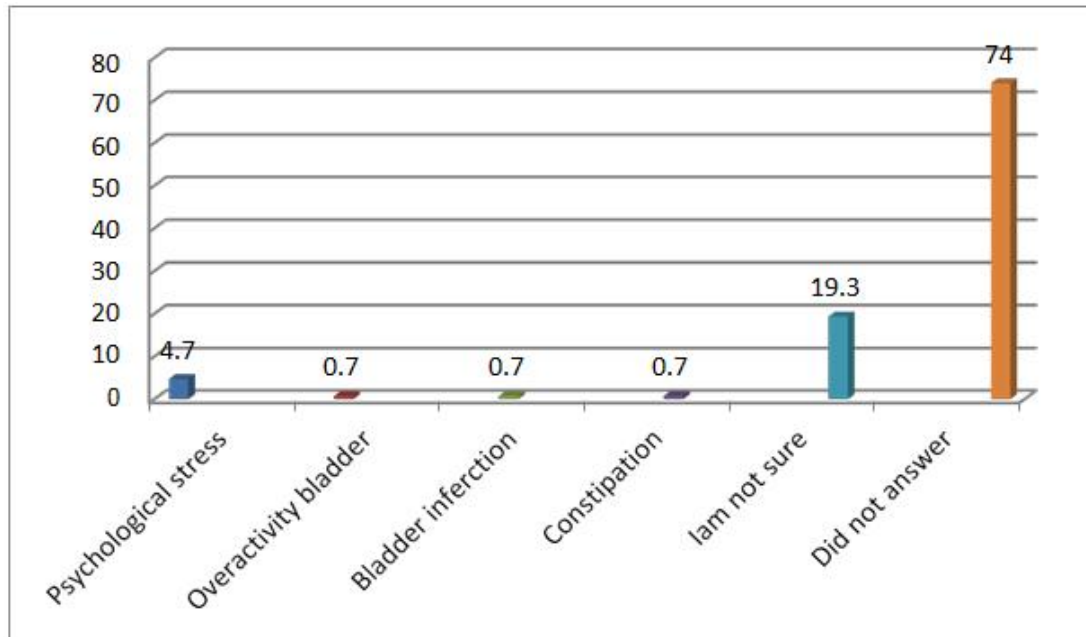
74% of the children had primary complain while 26% was secondary. 91% of the children had monosymptomatic and 7% polysymptomatic.

3.3 Patients Surveyed

Regarding psychological stress, the measured result indicated that (4.7%) of patients had secondary nocturnal enuresis, as shown in Fig. 1.

Table1. Population characteristics based on the study design (N=150)

Patterns	Frequency (%)	P value
Gender		0.016*
Male	62(62%)	
Female	38 (38%)	
Age		0.249
5-8 years	31 (31%)	
9-12 years	41 (41%)	
13-18 years	28 (28%)	
Family History		0.000***
First degree	55 (55%)	
Second degree	41 (41%)	
Others	4 (4%)	
Complaint		0.005**
Nocturnal enuresis	64 (64%)	
Nocturnal enuresis with daytime wetting	36(36%)	

* $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$ **Fig.1. Frequency percentage of distribution of trigger factor to secondary nocturnal enuresis N=150**

The results obtained from this study were in harmony with [19] found that a clear significant difference between the control and patient groups. All subgroups of anxiety disorders such as generalized anxiety disorder (GAD), and their relationship with primary nocturnal enuresis. In the case of GAD, 46 of the participants scored 9, and higher, so the prevalence of the mentioned disease in the patient group was 12.8%.

Regarding family history in this study, we found that (42%) of patients surveyed had a family history of nocturnal enuresis, and this confirmed with the previous study of [12] showed the highest frequency (74 %) risk factors of enuresis were by genetic factors.

3.4 Time and Night Bedwetting

74% of the participant mentioned that the time of night bedwetting occurs at few hours after

sleeping further 26% after many hours after sleeping. Bed-wetting occurs at nights, in 34% of children happen on once night while in 66% occurs more than once a night and this similar finding of [12] found that 20%Once, 26% at night and 40% day and night.

In term of bedwetting that occur weekly, 19% of the children infrequent (1-2 wetting per week), 68% moderately severe (3-5 wetting per week) and 13% Severe (6-7 wetting per week) as shown in Fig. 2(P≤0.001).

3.5 Wake Up of Children and Amount of Urine

Equally, 50% for the children waking up before and after bedwetting. 53% of the children had a large amount of urine, while 47% had not (P =0.549).

3.6 Child Comorbidities

Regarding comorbidities, the results found that 4% constipation, 6% soiling, 11% developmental problems, 15% attention deficit hyperactivity disorder, 10% learning difficulties, 6% diabetes mellitus. In addition to that 18% behavioral or emotional problems, 22% family problem, 3% a vulnerable child, 13% child abuse, 32% fear and 15% attention deficit hyperactivity disorder and, this was similar finding with [20] found that 12.52% attention deficit hyperactivity disorder.

No one had sleep apnea and 1% upper airway obstructive.

The differences between sample individual for the simple behavioral technique was statistically significant (P ≤0.05).except alarm (P =0.908).Stop-start training (P=0.511).

3.7 Type of Treatment

87.3% of patients surveyed were treated with simple behavioral therapy as -line treatment before considering drugs, which was the same approach done in a previous study by [21]. In this study, none of the patients have used an alarming device for treating nocturnal enuresis. This in contrast with the previous study of [22] found that treatment of nocturnal enuresis with an alarm technique was satisfactory in the Brazilian sample.

The result for the distribution of the type of treatment in this study, were 97% fluid restriction, 53% psychotherapy, 91% dry bed training, 45% decompression. In addition to 2% oxybutynin, 33% imipramine hydrochloride, 6% behavioral intervention, and 31% others as shown in Fig. 3. (Fluid restriction P≤0.000, Psychotherapy P≤0.031.Dry bed training (P≤0 .000), Desmopressin (P≤0.000), Oxybutynin 9P ≤0.000), Imipramine (P ≤0.036).

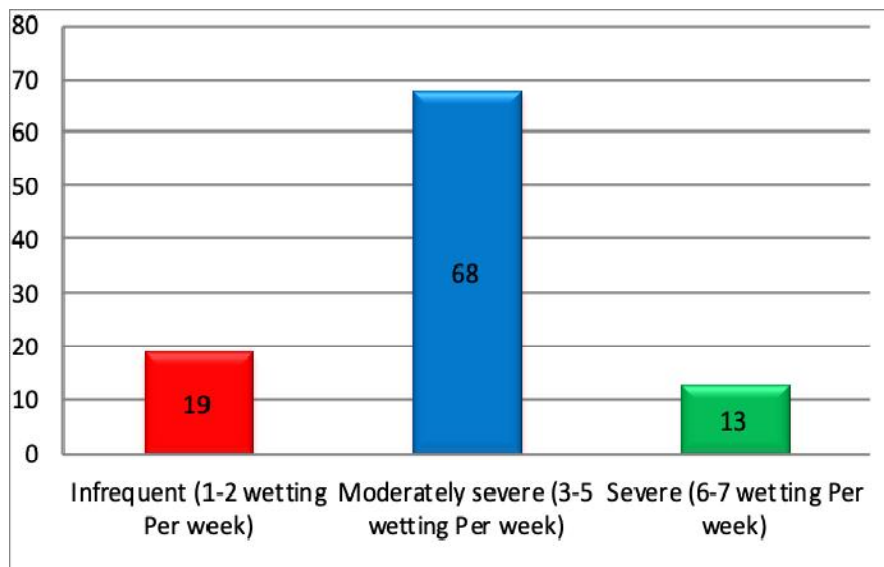


Fig. 2. Frequency percentage of distribution of bedwetting occurs weekly N=150

Table 2. A simple behavioral technique for treating Nocturnal enuresis (94.7%) of patient surveyed adopted lifting and awaking technique

Simple behavioural technique		Frequency	Percent	P value
Lifting /awaking	Yes	142	94.7	0.000***
	No	6	4.0	
	Total	148	98.7	
Chart-reward system	Yes	126	84.0	0.000***
	No	22	14.7	
	Total	148	98.7	
Retention control training	Yes	96	64.0	0.000***
	No	52	34.7	
	Total	148	98.4	
Alarm	Yes	148	98.0	0.908
	No	150	100	
	Total			
Stop start training	Yes	78	52.0	0.511
	No	70	46.7	
	Total	148	98.7	
Diet-fluids	Yes	128	85.3	0.000***
	No	15	10.0	
	Total	150	95.3	
Triple voiding	Yes	39	26.0	0.005**
	No	18	12.0	
	Total	57	38	

** , $P \leq 0.01$, *** , $P \leq 0.001$

3.8 Different Type of Drugs

In this study, 38% of patients surveyed had taken imipramine, and that (24.7%) of patients surveyed had a full response from imipramine therapy and (14%) had a partial response as shown in figure no.4, and this was the same as [15] found that imipramine had been efficacious in 40 - 60% of children. Another systematic review showed that imipramine had been associated with a reduction of about one wet night per week during the treatment [23].

In this study, the rate of desmopressin in treating enuresis was 2.7%, and for oxybutynin 1.3%. There is not enough evidence-based and reliable information indicating oxybutynin as an efficacious treatment for monosymptomatic enuresis [24]. Some studies recommended oxybutynin for desmopressin resistant children or those with primary nocturnal enuresis and daytime wetting [15,25].

Side effect (4.7%) of patients surveyed had insomnia, 0.7% urinary retention, 1.3% nausea,

1.3% constipation, and 2% dry mouth from imipramine therapy. This finding was in agreement with [15] found that dose-related adverse effects of tricyclic antidepressant use. There may be drowsiness, lethargy, anxiety, exhaustion, disrupted sleep, and gastrointestinal upset. In children with nocturnal polyuria and average bladder capacity, desmopressin is perhaps most efficient. Patients respond more rapidly to desmopressin than they respond to alarm systems. For resistant cases, combined treatment is effective [15].

Concerning adverse reactions, a cross-sectional analysis comparing patients with primary and secondary nocturnal enuresis found that both types of enuresis are similar in frequency, urgency, nocturia, constipation, and daytime wetting. Daytime wetting is also associated with constipation, which occurs in more than 50% of children with secondary nocturnal enuresis and almost 75% of children with primary nocturnal enuresis [26].

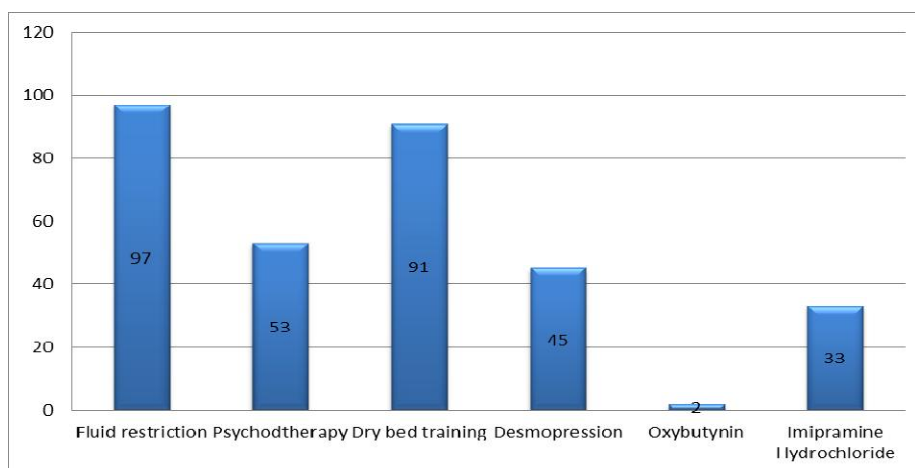


Fig. 3. Frequency percentage of the type of treatment N=150

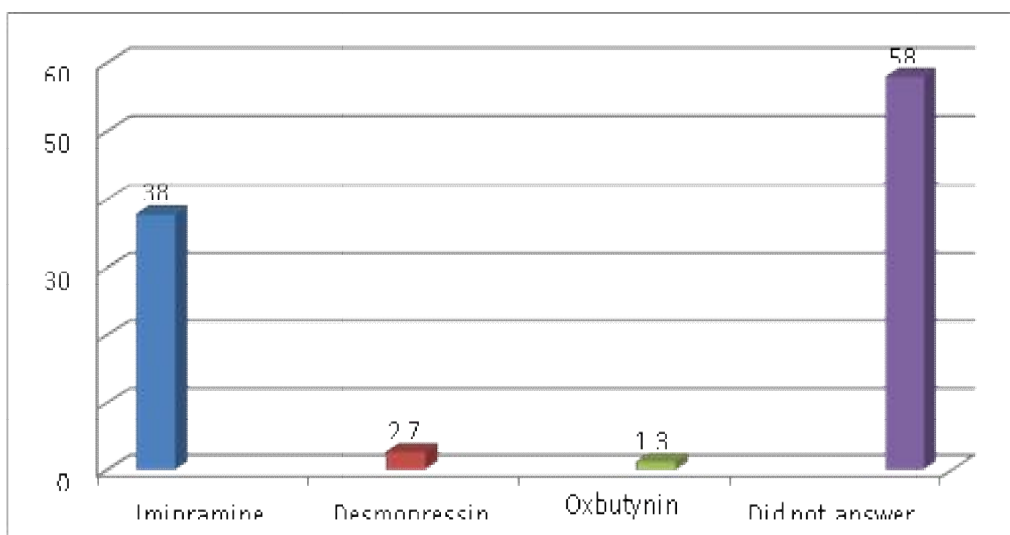


Fig. 4. Frequency percentage of different types of drugs used on nocturnal enuresis N=150

4. CONCLUSION

Firstly, nocturnal enuresis is a medical condition when exceeding a certain age and pattern it can be related to various comorbidity.

This study concludes that large numbers of patients with nocturnal enuresis, but there is no patient with daytime wetting (diurnal) within the number surveyed. The height prevalence of nocturnal enuresis is between (9-12) and males are mostly affected. The family history is fundamental to determine the case of patient .trigger factor and cause of nocturnal enuresis in children. If to identify different type of nocturnal enuresis is necessary

to put the plan of treatment & the side effect of the drug.

The most common cause was genetic. Comply treatment instruction and drug regimen can extensively reduce nocturnal enuresis.

The first-line treatment of nocturnal enuresis is cognitive- simple behavioral therapy with instruction regarding diet and fluids, and it is very useful.

CONSENT

As per international standard, parental written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

This study approved by the Omdurman Islamic University Institutional Ethics Committee, and from Khartoum state Ministry of the health research department and hospitals (Institute).

ACKNOWLEDGEMENTS

The authors would like to thank all department of clinical pharmacy, Omdurman Islamic University, and members of the advanced diagnostic Centre. Many thanks to all participants and their families.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

- Butler RJ, Heron J. The prevalence of infrequent bedwetting and nocturnal enuresis in childhood. A large British cohort. *Scand J Urol Nephrol*; 2008;42(3):257–264.
- Robson LM, Leung AKC. An approach to daytime wetting in children. *Adv.Pediatr*; 2006;53(1):323-6.
- Neveus T, Eggert P, Evans J, et al. Evaluation of and treatment for monosymptomatic enuresis: A standardization document from the International Children's Continence Society. *J Urol*; 2010;183:441–7.
- Phung P, Kelsberg G, Safranek S, et al. Clinical inquiry: Does primary nocturnal enuresis affect childrens' self-esteem? *J Fam Pract*. 2015;64(4):250–9. [PubMed: 25973452]
- Kuffel A, Kapitza KP, Lowe B, et al. Chronic pollakiuria: Cystectomy or psychotherapy. *Urologe A*. 2014;53(10):1495–9. DOI: 10.1007/s00120-014-3618-x [PubMed: 25214314]
- Logan BA, Correia K, McCarthy J, et al. Voiding dysfunction related to adverse childhood experiences and neuropsychiatric disorders. *J Pediatr Urol*. 2014;10(4):634. DOI: 10.1016/j.jpuro.2014.06.012 [PubMed: 25082714]
- Courtney P. Anxiety disorder. USA: Wolters Kluwer Health. 2012;3688–9.
- Joinson C, Heron J, Von Gontard A, et al. The ALSPAC study team. Psychological problems in children with daytime wetting. *Pediatrics*. 2006;118(5):1985-93.
- Landgraf JM, Abidari J, Cilento BG, et al. Coping, commitment, and attitude: Quantifying the everyday burden of enuresis on children and their families. *Pediatrics*. 2004;113(2):334-44.
- Burgu B, Aydogdu O, Gurkan K, et al. Lower urinary tract conditions in children with attention deficit hyperactivity disorder: Correlation of symptoms based on validated scoring systems. *J Urol*. 2011;185:663–8.
- Burgers R, de Jong TP, Visser M, et al. Functional defecation disorders in children with lower urinary tract symptoms. *J Urol*. 2013;189:1886–91.
- Kareema Ahmad Hussein. Assessment of enuresis in children in Erbil city. *J. of Kufa for nursing science*. 2014;4(1):1-7.
- Raes A, Dehoorne J, Hoebeke P, et al. Abnormal circadian rhythm of diuresis or nocturnal polyuria in a subgroup of children with enuresis and hypercalciuria is related to increased sodium retention during the daytime. *Journal of Urology*. 2006;176:1147.
- Feldman M. Management of primary nocturnal enuresis. *Paediatr Child Health*. 2005;10(10):611–4.
- Ramakrishnan K. Evaluation and treatment of enuresis. *Am Fam Physician*. 2008;78(4):489–96.
- Makari J, Rushton HG. Nocturnal enuresis. *Am Fam Physician*. 2006;73(9):1611–3.
- De la Gastine B, de la Gastineau G, Mosquet B, et al. Water intoxication with desmopressin in children: Report of three cases. *Therapie*. 2007;62:65.
- Maryam Seyfhashemi, Raheb Ghorbani, Abbas Zolfaghari, et al. Desmopressin, imipramine, and oxybutynin in the treatment of primary nocturnal enuresis: A Randomized clinical trial. *Iran Red Crescent Med J*. 2015;17(7):16174.
- Bahman Salehi, Parsa Yousefichaijan, Mohammad Rafeei, et al. The relationship between child anxiety-related disorders and primary nocturnal enuresis. *Iran J Psychiatry Behav Sci*. 2016;10(2):4462.
- Srirangam shreeram, Jian-ping he, Amanda Kalaydjian, et al. Prevalence of enuresis and its association with attention-deficit/hyperactivity disorder among U.S.children: Results from a nationally representative study *J Am Acad Child Adolesc Psychiatry*. 2009;48(1):35–41.

21. Patrino HY, Caldwell, Gail Nankivell, Premala Sureshkumar, et al. Simple behavioral interventions for nocturnal enuresis in children. 2013;(Review:(7):Art.No.CD003637. DOI:10.1002/14651858.CD003637.pub3.1-59
22. Rodrigo F. Pereira, Edwiges F, et al. Behavioral alarm treatment for nocturnal enuresis. Int. Braz j Urol. Rio de Janeiro. International Braz J Urol. 2010;36(3):332-338.
23. Glazener CMA, Evans JHC, Peto RE, et al. Tricyclic and related drugs for nocturnal enuresis in children. Cochrane Database Syst Rev. 2003;3:CD002117.
24. Deshpande AV, Caldwell PH, Sureshkumar P. Drugs for nocturnal enuresis in children (other than desmopressin and tricyclics). Cochrane Database Syst Rev. 2012;12:CD002238.
25. Montaldo P, Tafuro L, Rea M, et al. Desmopressin and oxybutynin in monosymptomatic nocturnal enuresis: A randomized, double-blind, placebo-controlled trial and an assessment of predictive factors. BJU Int. 2012;110(8 Pt B):381–6.
26. Robson WL, Leung AK, Van Howe R. Primary and secondary nocturnal enuresis: Similarities in presentation. Pediatrics. 2005;115(4):956–959

© 2020 Osman et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

*The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/64751>*