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Research Article

Efficacy of alarm intervention in primary monosymptomatic nocturnal enuresis in children

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ABSTRACT

Background: Enuresis affects about 15 to 20% of five year old children, and even up to 2% of young adults. The various treatment modalities used are behavioural therapy, alarm intervention and pharmacological therapy. Current evidences suggest that alarm intervention is preferable to other modalities of treatment. So a study was done to assess the efficacy of alarm interventions in primary monosymptomatic nocturnal enuresis in children.
Methods: A prospective study was done on children aged between 5-18 years with primary monosymptomatic nocturnal enuresis on a total of 62 children. An enuresis diary was maintained by parents. All children received alarm intervention for 12 weeks. A child remaining dry for two consecutive weeks was taken as a success. The subjects were followed up for 12 weeks, two or more wet night in 2 weeks period were taken as relapse. If child failed to become dry after 12 weeks of alarm intervention, intervention was continued for maximum of 6 months or till he became dry.
Results: Out of 62 children, majority were males and in the age group of 5-7 years. Family history of enuresis was present in 30.65% of children. A total of 74.19 % of subjects achieved dryness while failures were 25.8% and relapse was seen in 23.91 % during follow up. Significant improvement was noticed as early as 2 months after alarm intervention (p 0.00499) but maximum improvement was seen after 5 months (20 week). On follow up 23.91 % children had relapsed but the frequency of wet nights among these also was significantly low (mean wet nights 0.08/week). Even among failures there was a significant decrease in mean number of wet nights (from 4.24 wet nights/week to 1.85 wet nights/week).
Conclusions: Alarm treatment was an effective intervention for management of primary monosymptomatic nocturnal enuresis with high success and low relapse rate.

Keywords: Primary nocturnal enuresis, Alarm intervention, Children

INTRODUCTION

Each morning 5-7 millions of children wake up in a wet bed due to night time bedwetting.[1] Although bedwetting in itself is pathologically benign and has a high rate of spontaneous remission, it may bring social and emotional stigma, stress and inconvenience to both the person with enuresis and their families.[2,3] Physicians have been troubled in their search for the ideal treatment. Despite the wide variety of treatments for nocturnal enuresis there is lack of consensus as to which is the best.[4] Current evidences suggest that alarm intervention is preferable to other modalities of treatment. Compared to no treatment, approximately two-thirds of the children become dry with the use of an alarm system. Although medication may have a more immediate effect than an alarm, most children relapse after active drug treatment is stopped Additionally, since there are associated risks of side

effects with medication use, alarms are preferable to pharmacological options.[5] Considering the safety and lack of sufficient Indian literature on the use of alarm intervention for nocturnal enuresis, the present study was conducted.

A prospective study was conducted on children with primary monosymptomatic nocturnal enuresis with the objectives assessing the efficacy of alarm intervention in reducing the number of wet nights and the relapse rate following stopping alarm intervention.

METHODS

A total of 62 children attending the pediatric outpatient were enrolled as a convenience sample. An approval from institutional research ethical committee was obtained. Children above the age of 5 years with primary monosymptomatic nocturnal enuresis and more than 2 wet nights per week for at least 3 consecutive months were included. Children with the following were excluded from the study

1. Developmental delay
2. Any Neurological deficits
3. Seizure disorder
4. Congenital malformation of urinary tract
5. Urinary tract infection
6. On treatment for enuresis

A detailed history was taken and a complete physical examination was performed. A family history of nocturnal enuresis was inquired and noted. Urine routine examination on early morning sample and X-ray lumbo-sacral spine were done. If any abnormality was found those patients were excluded from the study.

Baseline wet nights for 4 weeks were noted in an enuresis diary by the parents. Detailed instructions for alarm intervention were given and advised use for 12 weeks continuously. Those who remained dry for 2 consecutive weeks were considered a success and were taken for further follow up. The alarm intervention was continued for maximum of 24 weeks in those who did not become dry. If the child did not become dry even after 6 months (24 weeks) of alarm intervention they were labelled as failures. During follow up all who achieved dryness were observed for 12 weeks and relapse was noted. Relapse was termed if the child had 2 wet nights in 2 week period any time after becoming dry, during follow up. Throughout the study period no other treatment for enuresis was given. The results were statistically analysed using chi square test, z test and t test.

RESULTS

Majority of the children were in the age group of 5-7 years (41.94%) and 19.35% children were above 10 years. The mean age in the present study was 8.24 years. Majority 39 (62.90%) were males and Male to female ratio in the study was 1.7:1. Positive family history was present in 30.65% of the children.

In the present study 46 (74.19%) children achieved success, 16 (25.71%) failed & 11 (23.91%) children relapsed after stopping the intervention. Prior to intervention 72.58 % of children had wet nights frequency of 8-14 wet nights per month, 24.19% had frequency 15-21 per month and 3.23 % had frequency >21 per month. However at the end of 2 months none had enuresis frequency of 15-21 per month and at end of 3 months none had frequency >21 per month. At the end of 6 moths of intervention, majority of children (93.55 %) had frequency <7 per month which was significantly lower from pre intervention period. On follow up at the end of 3 months, 4.8 % children still had wet nights but the frequency had significantly decreased to <7 wet nights per month and no one had >7 wet nights per month which was also a significant improvement.

About one fourth children (23.91 %) children relapsed but the frequency of wet nights among these was also significantly lower (mean wet nights 0.08/week). Among failures also there was a significant decrease in mean number of wet nights from 4.24 wet nights /week to 1.85 wet nights /week.

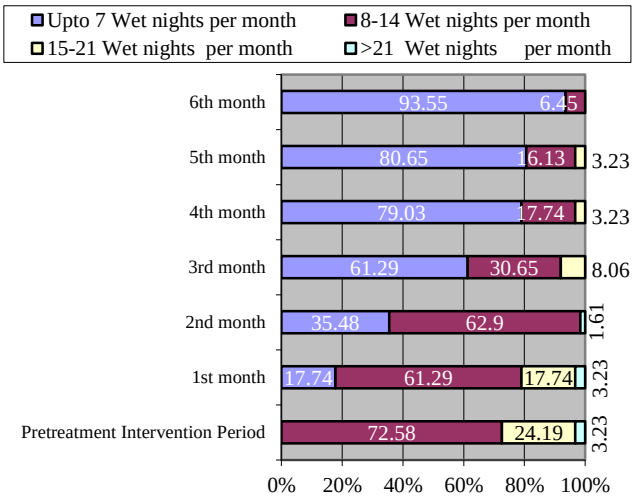

Figure 1: Frequency of wet nights during the different treatment period.

Table 1: Results of alarm intervention according to age.

Age distribution (in years)	Total number (62)	Success	Failure	Relapse
5-7	26	17 (65.38%)	9 (34.62%)	5 (29.41%)
7-10	24	18 (75%)	6 (25%)	4 (22.22%)
>10	12	11 (91.67%)	1 (8.33%)	2 (23.91%)

Significant change was noticed as early as 2 months after alarm intervention (p=0.00499) but maximum improvement was seen after 5 months (20 week) of treatment. It can be concluded that for best results alarm intervention should be used for 20 weeks. Better response was seen among higher age group but there was no correlation found between gender, frequency or positive family history with response to alarm intervention. Occurrence of relapse was not associated with any age, gender or positive family history.

DISCUSSION

The present study was done on 62 children with primary monosymptomatic nocturnal enuresis. The mean age was 8.24 years which is comparable to the report of 8.1 years by Ozgur et al.[6] It has been noted in various studies that enuresis is more common among males.[2,3] The exact cause of male predominance is not known but it could be a genetic predisposition or could be a social factor as in some communities' males are given more preference and they have more access to medical facilities. In the present study also boys were more (62.9%) and male to female ratio was 1.7:1 which was comparable to other studies in literature. Goel et al noted male female ratio to be 1.6:1.[5]

It has been observed that enuresis runs in families.[8,9] In the present study positive family history was present in 30.65 % of children which is comparable to other studies in literature. A previous study conducted at our institution has shown that family history of enuresis was present in 40% of enuretic children in Punjab.[10]

Success rate in the present study was 74.19% which is comparable to various other studies in literature. Success rates for alarm therapy ranged from 45% to 86%. In a study Pereira, et al used alarm treatment among 84 enuretics for 32 weeks and reported a success rate of 71%.[11]

A better outcome was noted among higher age group. Children who were >10 years showed a higher success rate of 91.67% in comparison to 65.38% in age group of 5-7 years. When this was compared with other studies in literature, McKendry et al also noted better response among older age group when enuresis alarm intervention was used.[12] There was no significant statistical correlation when success was correlated with gender and positive family history of enuresis. In a study Devlin used alarm intervention for nocturnal enuresis and found that variables that were not associated with outcome were age and gender.[13]

Failure rate of 25.8 % was noted in the present study. This is comparable to other studies in the literature. Monda et al compared imipramine, desmopressin acetate and bed-wetting alarm systems and found that enuresis alarm had a failure rate of 25%.[14] In another study Bollard noted a failure rate of 20% when alarm intervention was used.[15] Houts also had 20% failure rate.[16]

It was seen that after using alarm intervention significant improvement is noticed even among failures. Even though they did not reach success criteria but the mean numbers of wet nights were significantly reduced (from 4.24 to 1.85 wet nights/wk p 0.00943) after alarm intervention. Similarly Werry also observed significant improvement among those who did not achieve dryness.[17]

Among children with relapse the mean number of wet nights were significantly low (0.08 wet nights/wk) which was a significant improvement. There was no correlation ($p > 0.05$) found between age, positive family history and gender of child with relapse rate. Jensen, et al also found that age and gender play no role in outcome of alarm intervention.[7] Goel et al used alarms among 100 enuretic children and noted relapse rate to be 20% during 6 months follow up.[5] In another study Mckendry et al used alarm intervention among 122 children with nocturnal enuresis and found that there was no statistical significant correlation was found between family history and relapse or success rate.[12]

In majority of studies the intervention was given for 12 weeks.[18,19] The accepted treatment period for nocturnal enuresis was reported by Forsythe to be 12-16 weeks.[20] In the present study it was found that reduction in mean number of wet night started from 8 weeks of intervention and best results were seen after 20 weeks. However in some studies alarm intervention was given for a longer duration. Pereira et al used alarm intervention for 32 weeks and found success rate to be 71% which can be comparable to the present study where success rate was 74.19 % after 20 weeks of alarm intervention.[11]

CONCLUSION

In the present study Enuresis alarm significantly decreased bed wetting episodes in children with primary nocturnal enuresis. Best results were seen after 5 months of alarm intervention. Significant improvement was seen even among those children who did not reach success criteria. It has better cost benefit ratio as compared to desmopressin. FDA has withdrawn approval for desmopressin intranasal as an indicated medication in primary nocturnal enuresis. It can be recommended that alarm intervention be considered treatment of choice for primary nocturnal enuresis.

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