

# Socio-demographic and psychopathologic correlates of enuresis in urban Ethiopian children

Menelik Desta (menelikdesta@hotmail.com)<sup>1</sup>, Bruno Hägglöf<sup>2</sup>, Derege Kebede<sup>3</sup>, Atalay Alem<sup>4</sup>

1.Amanuel Hospital, Addis Ababa, Ethiopia

2.Division of Child and Adolescent Psychiatry: Department of Clinical Sciences, Umeå University, Umeå, Sweden

3.World Health Organization, Regional Office for Africa, Brazzaville, Congo

4.Department of Psychiatry Addis Ababa University, Ethiopia

## Keywords

Children, Developing country, Enuresis, Psychopathology

## Correspondence

Menelik Desta, P.O. Box 10389, Addis Ababa, Ethiopia.

Tel: ++251 11768776 | Fax: ++25115511079 |

Email: menelikdesta@hotmail.com

## Received

22 September 2006; revised 24 November 2006; accepted 3 January 2006.

DOI:10.1111/j.1651-2227.2007.00229.x

## Abstract

**Aim:** To examine the association between enuresis and psychopathology in urban Ethiopian children. **Methods:** A two-stage mental health survey of 5000 urban children found enuresis to be by far the most common disorder. Logistic regression modelling was carried out to determine the independent associations of a number of socio-demographic and psychopathological characteristics with enuresis. **Results:** Male sex, younger age and lower achieved educational grade of the child were all independently associated with childhood enuresis. The odds of having enuresis were significantly higher for children in families with significant financial worries and in children from homes where parents were separated. Children with DSM-III-R anxiety disorders, especially simple phobia, or disruptive behaviour disorders were found to have significantly higher odds of having enuresis.

**Conclusion:** Psychopathology, both anxiety and behavioural disorders, as well as family stressors in urban Ethiopian children were found to be risk factors for enuresis. Although a cause-effect relationship could not be ascertained, the findings of higher association of psychopathology with enuresis in this and other studies indicate that there is a need for evaluating children with enuresis for the presence of concurrent psychopathology, especially in traditional societies where undetected psychopathology may be more common.

## INTRODUCTION

Enuresis is a common childhood problem. The prevalence varies according to age, with highest levels in the preschool period, decreasing as the child reaches adolescence (1). Enuresis is known to cause considerable distress to children and their parents (2,3), with affected children frequently developing low self esteem (4).

In Ethiopia, conflicting estimates for the prevalence of enuresis in children have been reported by different studies: 5% in a small town (5), 0.8% in a predominantly rural sample (6) and 9% in a group of urban child labourers and their controls (7). None of these studies examined the association between enuresis and other demographic, social or psychopathologic factors.

During 2002–2003, a cross-sectional survey of psychiatric disorders was carried out on children aged 6–15 years in Addis Ababa, Ethiopia, with diagnostic assessment according to the revised third edition of the Diagnostic Statistical Manual (DSM-III-R) criteria. The results of that survey showed that enuresis had by far the highest prevalence of all conditions. While the weighted prevalence for any DSM-III-R diagnosis was 16.9%, the weighted prevalence of enuresis alone amounted to 12.3%. Except for simple phobia, present in 5.5% of the children, the weighted prevalence of all other identified conditions were below 1% (8).

Recent studies have supported the notion that enuresis is a genetic/developmental disorder rather than a manifestation of childhood behavioural or mental disorder, although

few have been carried out in developing countries. In view of the relatively high prevalence of enuresis in our setting, the objective of this study was therefore to describe the relationship between enuresis and other psychiatric diagnoses as well as identify associated socio-demographic factors.

## PATIENTS AND METHODS

We used two-phase sampling.

First-phase sample includes 5000 children randomly selected from the total population of Addis Ababa. Of these, 864 children turned to be screen positive while the rest (4136) were screen negative.

Second-phase sample includes 2401 children (involving all of the 864 screen positive and 1537 'controls' from the screen-negative children).

The source of study subjects was the total population of Addis Ababa. From the total of 306 subdistricts (Kebeles) of the city, 50 were selected by the probability-proportionate-to-size sampling method. For the first-phase sample, 100 children aged 6–15 years residing in systematically selected households in each of the 50 subdistricts, were assessed. For the second-phase sampling, we took all the 864 children who were screened positive in the first phase. In addition, 1537 screen-negative children were included in the second-phase sample.

Interviews of parents or caretakers were carried out by trained high school graduates at the home of selected subjects. For the first phase of the study, interviews started

randomly from one of selected houses in each *kebele*. For the selected cases and non-cases, the second-phase interview was performed on the same date as the first-phase interview. The same informant was interviewed for both phases.

For the first phase of the study, the World Health Organization's Reporting Questionnaire for Children (RQC) (9) was used. In Ethiopia, RQC has been used in a couple of previous studies and was found to be of acceptable validity (10). The RQC is a 10-item simple questionnaire with one of the items enquiring about the presence of wetting or soiling in the child. The revised parent version of the Diagnostic Interview for Children and Adolescents (DICA) (11) was the instrument used for the second phase of the study. The revised DICA (DICA-R) was a modified, less structured version (12), of the initial DICA. DICA-R would classify the psychiatric disorders in children according to the revised third edition of the Diagnostic and Statistical Manual or DSM-III-R of the American Psychiatric association (1). Reliability and validity studies of the DICA have been satisfactory (11,13).

In Ethiopia, The DICA-R is the only semistructured child instrument based on an accepted diagnostic algorithm that has been translated into the national working language—Amharic. Its reliability and content validity have also been found to be satisfactory (14).

Following data entry, DICA-R automatically generates DSM diagnoses based on a preloaded electronic algorithm, thus giving a summary for each individual child regarding the presence or absence of a specific diagnosis.

For efficient statistical analyses, the diagnoses were regrouped into three major clusters. Accordingly, attention-deficit hyperactivity disorder, conduct disorder and oppositional defiant disorder were grouped together under '*Disruptive behaviour disorders*' (DBD). Simple phobia, separation anxiety, obsessive-compulsive disorder and posttraumatic stress disorder were categorized under '*Anxiety Disorders*'. The third group was '*Elimination Disorder*', which consisted of enuresis and encopresis. Other conditions were excluded from the analysis.

Statistical analysis was done using the Statistical Package for Social Sciences (SPSS) software, (SPSS Inc, Chicago, IL, USA) version 11. Logistic regression modelling was performed in order to test the significance of the relationship between enuresis and DBD and anxiety disorders as well as between enuresis and various socio-demographic variables. Enuresis was entered as the dependent variable whereas sex, age, educational grade, ethnicity, family size, poverty, parental separation, financial worries (defined as having problems covering costs of basics such as food and clothing for the family), anxiety disorder group and DBD group were entered as independent variables in the logistic regression model.

### Ethical matters

Ethical clearance was obtained from the National Ethical Review Committee of the Ethiopian Science and Technology Commission. Verbal consent was obtained from par-

ents/caretakers. Parents whose children were found positive for DSM-III-R disorders were advised to take their children for medical assessment.

### RESULTS

A total of 2401 children (51.2% females) were assessed during the second phase of the study. With the number of screen-negative children included in the second-phase sample being 1537, the RQC positive to RQC negative ratio in the second-phase sample was slightly less than the planned—1:2.

Regarding demographic characteristics, children below the age of 8 years made 18.5% of the sample whereas 41.45% and 40.1% were in the age group of 8–11 years and 12–15 years of age, respectively. Most of the subjects were in elementary grades (74.8%). A total of 20.2% had achieved high school level and 5% had never been to school. The majority of the children came from Amhara (45.6%), Oromo (24.2%) and Gurage (17.7%) ethnic groups and the rest belonged to various other ethnic origins. Half of the subjects lived in homes with 7–10 members, 37.5% in homes with less than 7 members and the rest lived in homes with more than 10 members. Seventy-seven percent of children lived with both parents while the remaining lived with either parent. Over 35% of subjects lived in families with substantial financial worries, defined as 'shortage of money to the extent of being unable to afford basic necessities such as food and clothing'.

Of the 2401 study subjects, 511 had elimination disorders (crude prevalence of 21.3%). Of these 511, 500 had enuresis only, 2 had encopresis only and 9 had both conditions. In the analysis for this report, we included only the 509 children with enuresis.

Table S1 shows the demographic and Table S2 the social and psychopathologic correlates of enuresis. The adjusted odds of having enuresis were 25% lower in females compared to males [adjusted odds ratio (adj. OR) (95% confidence interval (CI)) = 0.76 (0.62, 0.93)]. The odds of having enuresis decreased with increasing age. This trend was statistically significant ( $p$  for trend < 0.001). The chances of having enuresis dropped significantly in high school children compared to children who had not been to school [adj. OR (95% CI) = 0.55 (0.32, 0.95)]. There was a significant trend in which the higher the grade level of the child, the lesser were the chances of having enuresis ( $p$  for trend = 0.006). Enuresis was not significantly associated with ethnic group or household size.

There was an almost 30% higher chance of having enuresis in those children with parental worry about substantial financial difficulties [adj. OR (95% CI) = 1.29 (1.04, 1.60)]. Children not living with both parents because of parental separation also had a higher risk of enuresis compared to those children living with both parents [adj. OR (95% CI) = 1.41 (1.11, 1.80)].

Compared to those without anxiety disorders, children with anxiety disorders had an almost 60% higher risk of having enuresis [adj. OR (95% CI) = 1.59 (1.14, 2.21)]. Likewise, children with DBD had more than twice the risk of having

enuresis compared to children who did not have that condition [adj. OR (95% CI) = 2.20 (1.10, 4.50)].

## DISCUSSION

The findings in this study are with regard to the presence or absence of enuresis. This is because the questionnaire was not able to differentiate primary from secondary enuresis, and because there was inadequate information from the field data on the majority of the subjects regarding the presence or absence of daytime wetting. This was an important limitation of this study in that it made it impossible to compare the co-occurrence of psychopathology with night time wetting with the co-occurrence with day time wetting. The other limitation of the report is that the frequency of wetting was not included in the analysis.

Enuresis in our study was the most prevalent DSM-III-R condition in children between the ages of 6–15 years. This finding is similar to the study that looked at the association between child labour and psychopathology in Ethiopia (7). Enuresis was also the commonest finding in studies from India (15,16). Interestingly, the prevalence of enuresis in a predominantly rural population in Ethiopia was 0.8% (6). A possible explanation for the low prevalence in this rural community could be the difficulties rural parents may face in detecting nocturnal enuresis in children, for example, due to the lack of bedding for children in most rural homes and the common practice of sleeping on a pile of hay in children beyond toddler age. The problem of detection of enuresis could also have been aggravated by the fact that, in many rural homes in Ethiopia, due to the prevailing poverty, domestic animals and humans spend the night in the same room for security and also for thermo-regulatory purposes. In such situations, the more pungent smell of the more profuse animal excreta could have disguised the child's enuresis from detection by parents.

In our study, the prevalence of enuresis was higher in boys compared to girls, in agreement with the majority of reports from around the world. However, while some papers report higher prevalence of enuresis in girls than in boys (17) some find no difference between the two sexes (18).

The prevalence of enuresis showed a decreasing trend with increasing age of children. This trend is also similar to most reports in the literature. However, no significant decrease in the rate of enuresis was found with increasing age in a sample of 6–16 year olds in China (19) and 8–12 year olds in India (18).

We did not find any association between ethnicity and enuresis in our population of children. Previous studies in different countries have reported ethnic differences in the prevalence of enuresis (20–22).

Although not significant, the adjusted odds ratio for enuresis showed a 30% decline in children who came from households with size greater than 10. Household size had been reported as not associated with enuresis by some studies previously (23) whereas others have found enuresis to be more frequent in children from large families (24,25). One study from Sudan found that the presence of fewer children in the family was associated with increased prevalence of noctur-

nal enuresis (26). There was no possible explanation for this finding in Sudan.

Our findings show that urban children coming from families with large financial worries had a significantly higher risk of having enuresis. This finding concurs with reports of studies in other countries (3,22). The present study's finding of parental separation as a risk for enuresis in children is also similar to most previous reports. Child distress can follow parental separation especially if growing up without both parents is perceived as being inferior to those peers who live with both parents, as is the case in Ethiopia. An article from Saudi Arabia, which also reported enuresis to be more frequent in children of separated parents (27), claimed that it is the absence of the father after parental separation that exposes the child to stress. The prevailing attitude in Ethiopia is such that, if a contest arises between divorced parents over the care of a child under 15 years of age, both the traditional and the public legal system favour the mother as the best guardian.

Our results indicate a significantly higher association between psychopathology and enuresis than has been found in previous studies. There was one similar finding in a previous study in Ethiopia, where, during a validation study of the RQC, it was found that, of the 10 screening items, the presence of wetting or soiling in the child had the highest discriminating power in differentiating cases from non-cases (10). In spite of the ongoing argument about the relationship of enuresis and psychopathology, unambiguous evidence supporting either position is not yet available. Redsell and Collier reviewed 15 empirical studies on nocturnal enuresis spanning a number of years. They concluded that although there were increased behavioural problems in children with bedwetting, determination of causation in any direction was difficult (28).

As our study was a cross-sectional one, a cause-effect relationship between enuresis and psychopathology could not be inferred. All the same, our data raise the concern that in traditional societies such as Ethiopia, neglecting the mental health component in the medical management of enuresis may lead practitioners to overlook possible underlying psychological distress. The societies in Ethiopia are still predominantly traditional. Many years of clinical experience of the first, third and fourth authors, indicate that somatoform disorders including conversion disorders are still common manifestations of distress in Ethiopia. We speculate, therefore, that it is possible that enuresis, like other somato-sensory manifestations of psychopathology, can be used as an outlet of stress in a traditional society. The finding of enuresis as the commonest disorder in Indian children was also associated with lower prevalence of other psychiatric problems in Indian children compared to Western populations (16).

Such similar findings in studies of psychopathology amongst traditional societies probably strengthens the hypothesis that enuresis, as a bodily dysfunction, may play a role in the manifestation of distress. On the other hand, we acknowledge the possibility that the higher rate of psychopathology in children with enuresis may be secondary to the stress of living with enuresis and the environmental

reactions to the problem. Either way, given the repeated findings of concurrent existence of enuresis and psychopathology, it will be necessary to manage emotional and behavioural disturbance while treating the enuresis. Simultaneous management of the emotional/behavioural problems of the child with enuresis will likely enhance compliance and a quick response to interventions such as the pad-and-bell or desmopressin. Recommendations to abandon the mental health aspect of the management of enuresis (29) may be unhelpful especially to children with enuresis in developing countries where higher association has been found between enuresis and psychopathology. Even though global findings indicate that the aetiology of particularly primary enuresis is genetic or developmental, many studies have also found that psychopathology is more in children with enuresis than those without this condition (30). Therefore, it becomes logical to investigate for the presence of and manage any concurrent psychopathology while managing cases of enuresis.

In conclusion, we demonstrated a clear correlation between enuresis and disruptive behaviour and anxiety disorders in children. There is a need for prospective studies with modified questionnaires to delineate a cause-effect association in traditional societies. Prospective controlled trials of psychosocial interventions for children with enuresis and co-morbid with psychiatric disorder may give a clearer picture. In the meantime, although it may not be necessary to refer every case of enuresis for specialist psychiatric management, the inclusion of psychiatric history and mental state examination in the management of cases of enuresis can have beneficial results in light of the above points. We therefore recommend that a psychiatric history and mental state examination should continue to be part of the medical management of children with enuresis, especially in traditional societies.

## References

1. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. 4th ed. Washington, DC: American Psychiatric Association, 1994.
2. Lee SD, Sohn DW, Lee JZ, Park NC, Chung MK. An epidemiological study of enuresis in Korean children. *BJU Int* 2000; 85: 869–73.
3. Yeung CK, Sreedhar B, Sihoe JDY, Sit FKY, Lau J. Differences in characteristics of nocturnal enuresis between children and adolescents, a critical appraisal from a large epidemiological study. *BJU Int* 2006; 97: 1069–73.
4. Hagglof B, Andren O, Bergstrom E, Marklund L, Wendelius M. Self-esteem in children with nocturnal enuresis and urinary incontinence: improvement of self-esteem after treatment. *Eur Urol* 1998; 33 Suppl 3: 16–9.
5. Giel R, Van Luijk JN. Psychiatric morbidity in a small Ethiopian town. *Br J Psychiatr* 1969; 115: 149–62.
6. Ashenafi Y, Kebede D, Desta M, Alem A. Prevalence of mental and behavioural disorders in Ethiopian children. *East Afr Med J* 2001; 78: 308–11.
7. Fekadu D, Alem A, Hagglof B. The prevalence of mental health problems in Ethiopian child laborers. *J Child Psychol Psychiatr* 2006; 47: 954–9.
8. Desta M, Kebede D, Hagglof B, Alem A. Psychiatric disorders in urban children in Ethiopia: a population-based cross-sectional survey. *Soc Psychiatry Psychiatr Epidemiol* (submitted).
9. Giel R, de Arango MV, Climent CE, Harding TW, Ibrahim HH, Ladrado-Ignacio L, et al. Childhood mental disorders in primary care: results of observations in four developing countries. *Paediatrics* 1981; 68: 677–83.
10. Tadesse B, Kebede D, Tegegne T, Alem A. Childhood behavioural disorders in Ambo district, Western Ethiopia II. Validation of the RQC. *Acta Psychiatr Scand Suppl* 1999; 397: 98–101.
11. Herjanic B., Reich W. Development of a structured psychiatric interview for children: agreement between child and parent on individual symptoms. *J Abnorm Child Psychol* 1982; 10: 307–24.
12. Reich W. Diagnostic Interview for Children and Adolescents (DICA). *J Am Acad Child Adolesc Psychiatry* 2000; 39: 59–66.
13. Welner Z, Reich W, Herjanic V, Keneth G, Jung MA, Amado H. Reliability, validity, and parent-child agreement studies of Diagnostic Interview for Children and Adolescents (DICA). *J Am Acad Child Adolesc Psychiatry* 1987; 26: 649–53.
14. Kebede M, Kebede D, Desta M, Alem A. Evaluation of reliability, acceptability & feasibility of the Amharic version of DICA. *Ethiop J Health Dev* 2000; 14: 3–20.
15. Malhotra S, Kohli A, Arun P. Prevalence of psychiatric disorders in school children in Chandigarh, India. *Indian J Med Res* 2002; 116: 21–8.
16. Srinath S, Girimaji SC, Gururaj G, Seshardri S, Subbakrishna DK, Bhola P, et al. Epidemiological study of child and adolescent psychiatric disorders in urban & rural areas in Bangalore, India. *Indian J Med Res* 2005; 122: 67–79.
17. Bakker E, van Sprundel M, Van der Avera JC, van Gool JD, Wyndaele JJ. Voiding habits and wetting in a population of 4,332 Belgian school children aged between 10 and 14 years. *Scand J Urol Nephrol* 2002; 36: 354–62.
18. Hackett R, Hackett L, Gowers S. Enuresis and encopresis in a south Indian population of children. *Child Care Health Dev* 2001; 27: 35–46.
19. Liu X, Sun Z, Uchiama M, Li Y, Okawa M. Attaining nocturnal urinary control, nocturnal enuresis and behavioral problems in Chinese children. *J Am Acad Child Adolesc Psychiatry* 2000; 39: 1557–64.
20. Kanaheswari Y. Epidemiology of childhood nocturnal enuresis in Malaysia. *J Paediatr Child Health* 2003; 39: 118–23.
21. Spee-van Der Wekke J, Hirasing RA, Meulmester JF, Radder JJ. Childhood nocturnal enuresis in the Netherlands. *Pediatr Urol* 1998; 51: 1022–6.
22. Rona RJ, Li L, Chinn S. Determinants of nocturnal enuresis in England and Scotland in the 90s. *Dev Med Child Neurol* 1997; 39: 677–81.
23. Gur E, Turhan P, Can G, et al. Enuresis: prevalence, risk factors and urinary pathology among school children in Istanbul, Turkey. *Pediatr Int* 2004; 46: 58–63.
24. Eapen V, Mabrouk AM. Prevalence and correlates of nocturnal enuresis in the United Arab Emirates. *Saudi Med J* 2003; 24: 49–51.
25. Cher TW, Lin GJ, Hsu KH. Prevalence of nocturnal enuresis and associated familial factors in primary school children in Taiwan. *J Urol* 2002; 168: 1142–6.
26. Rahim SIA, Cederblad M. Epidemiology of nocturnal enuresis in part of Khartoum, Sudan I. The extensive study. *Acta Paediatr Scand* 1986; 75: 1017–20.
27. Kalo BB, Bella H. Enuresis: prevalence and associated factors among primary school children in Saudi Arabia. *Acta Paediatr* 1996; 85: 1217–22.

28. Redsell SA, Collier J. Bedwetting, behaviour and self-esteem: a review of the literature. *Child Care Health Dev* 2001; 27: 149–62.
29. Friman PC, Handwerk ML, Swearer SM, McGinnis JC, Warzak WJ. Do children with primary nocturnal enuresis have clinically significant behaviour problems? *Arch Pediatr Adolesc Med* 1998; 152: 537–9.
30. Van Hoeke E, De Fruyt F, De Clerq B, Hoebek P, Walle JV. Internalizing and externalizing problem behavior in children with nocturnal and diurnal enuresis: a five-factor model perspective. *J Pediatr Psychol* 2006; 31: 460–8.

#### Supplementary material

The following supplementary material is available for this article:

**Table S1** Demographic correlates of Enuresis in children in Addis Ababa, Ethiopia, 2003

**Table S2** Social and psychopathological correlates of Enuresis in children in Addis Ababa, Ethiopia, 2003

This material is available as part of the online article from: <http://www.blackwell-synergy.com/doi/abs/10.1111/j.1651-2227.2007.00229.x>

(This link will take you to the article abstract).

Please note: Blackwell Publishing is not responsible for the content or functionality of any supplementary materials supplied by the authors. Any queries (other than missing material) should be directed to the corresponding author for the article.