Enuresis in school children from eastern Croatia

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The aim of this study was to establish the prevalence of nocturnal incontinence (NI) in 6-to-7-year- old children from eastern Croatia, to determine the factors associated with NI and to evaluate parental perception of the problem.

From May to September 2004, the parents of 3,011 children were asked to complete an anonymous validated questionnaire.

The overall prevalence of reported NI was 1.2% (35/3011). All of the cases were cases of secondary NI. NI was significantly more frequent in boys than in girls. Family history of enuresis was present in 68.6% (24/35) of enuretic children. Only 17.1% (6/35) of parents expressed some concern about the effect of the researched problem on their child's future development.

The frequency of NI in this study group is much lower than that reported in other European countries. The reason for this is still not known, although parental perception of this problem is certainly a significant factor. Further investigations are needed.

Key words: nocturnal incontinence, enuresis, child, children, Croatia.

Enuresis is a frequent symptom and condition among school children[1-3]. Definitions conform to the standards recommended by the International Children's Continence Society: Enuresis means intermittent incontinence while sleeping. Intermittent incontinence (II) is urine leakage in discrete amounts. It can occur during the day (daytime incontinence-DI) and/or night (nocturnal incontinence or enuresis- NI) and it is applicable to children who are over five years old[4,5].

Although common, NI is still a misunderstood and undertreated childhood condition[6]. Intermittent incontinence is both psychologically and physically distressing, and if left untreated, has considerable psychological ramifications on children as they get older[6-8]. Enuretic children will often avoid peer activities for fear of overnight invitations[6]. Additionally, many children who suffer from NI exhibit behaviors such as low self-esteem, withdrawal, decreased ambition, and increased anxiety. These children are often low achievers within the school system and become a problem for their family and school[9]. The condition may also lead to teasing or bullying. Considering this, during the past few years, it has been emphasized that early screening and treatment can help enuretic children to improve their quality of life[6]. In order to eventually treat somebody, it is necessary to recognize the problem early. In Croatia, there are no studies dealing with this important problem although clinicians in the field (especially pediatricians and school medicine specialists) often recognize the problem in the population of children for which they are responsible. According to Croatian laws, there are several occasions in the pediatric health care system when all children of one particular age are required to undergo physical examinations in order to check their health status. Mandatory

examination of children before elementary school admission is one of those occasions during which health professionals involved in implementing public health measures in the field are able to recognize conditions such as enuresis and begin to solve the problem.

The aims of the present study were to estimate the prevalence of NI in 6-to-7-year-old children from eastern Croatia required to have a medical examination before elementary school admission, to determine the factors associated with NI, to evaluate parental strategies for managing enuresis, and to establish their perception of the problem.

Material and Methods

Subjects

A cross-sectional questionnaire survey was performed from May to September 2004. In Croatia, a preschool examination is mandatory for all children. During 2004, 3,011 school children aged 6 to 7 years old were required to have a medical examination before elementary school admission at the Department of School Medicine in the Institute of Public Health for Osijek-Baranya County. The parents of these children were asked to complete an anonymous questionnaire as a part of their child's examination; thus, the response rate was 100%. Written informed consents were obtained from all parents. The study was approved by the Ethical Committee of the Institute of Public Health for Osijek-Baranya County.

Data Collection

An anonymous questionnaire with 16 questions was developed from the validated questionnaire used by Bakker et al.[10] during the survey in a population of Belgian children. Since we have shortened and slightly modified the questionnaire developed by Bakker et al., our questionnaire was additionally validated by a small group of parents during the previous year's preschool examination (in 2003). The questionnaire included items about the gender and age of the child, symptoms associated with enuresis, frequency of NI and DI, family history of enuresis, the child's history of urinary tract infections, the parental concern about this problem, and any self-help strategies that were used (see Appendix).

Statistical Analysis

Analyses were conducted using Microsoft Excel 2000 (Microsoft Corporation, Redmond, WA, USA). Descriptive statistics were used to describe gender and mean age of the study participants, the overall prevalence of reported NI, symptoms associated with enuresis, frequency of NI and DI among enuretic children, family history of enuresis, the child's history of urinary tract infections, common self-help strategies, and parental perception of this problem. To test the statistical significance of gender differences for enuresis in the study population, we used the χ^2 test. Fisher's exact test was used to test the statistical significance of gender differences for the weekly frequencies of NI. Detected differences at $p<0.05$ were considered to be significant. The power of the statistical analysis is 80%.

Results

The response rate was 100%. The mean age of the study group of children was 6.5±0.4 years. In the study, 53.3% (1605/3011) of the participants were boys, and 46.7% (1406/3011) were girls. The overall prevalence of reported NI was 1.2% (35/3011). All of the cases were considered secondary NI. Of the enuretic children, 74.3% (26/35) were boys and 25.7% (9/35) were girls, with gender differences being statistically significant ($p=0.0123$; $\chi^2=6.263$).

When analyzing the presence of symptoms connected with NI, 65.7% (23/35) of parents noticed some symptoms such as turbid urine, frequent urination and an urge to urinate, while 34.3% (12/35) of parents did not notice any of the above-mentioned symptoms.

Of the children with NI, 28.6% (10/35) experienced wetting once a week and 71.4% (25/35) experienced wetting two or more nights a week. Gender differences were not statistically significant in this regard, as 30.8% (8/26) of the boys and 22.2% (2/9) of the girls had experienced wetting once a week, and 69.2% (18/26) of the boys and 77.8% (7/9) of the girls had experienced wetting two or more nights a week ($p=0.6247$; Fisher's exact test=0.239).

In addition to the children with NI in the sample, we also found 0.2% (6/3011) of the

APPENDIX
QUESTIONNAIRE
Please circle your answer(s) or write it on the line provided

1. How old is your child (years)? _____
2. Gender of your child: M F
3. Weight of your child: _____ kg
4. Height of your child: _____ cm
5. Were there enuretics in the family?
   a) yes
   b) no
6. If so, who?
   a) father/mother
   b) brother(s)/sister(s)
   c) uncle(s), aunt(s), cousin(s)
   d) nobody
7. Does your child suffer from nocturnal incontinence? a) yes b) no
8. For how long has your child had nocturnal incontinence (years)? _____
9. How often does you child have nocturnal incontinence?
   a) every night
   b) 5 to 6 times a week
   c) 3 to 4 times a week
   d) 1 to 2 times a week
   e) less than once a week
   f) my child does not have nocturnal incontinence

10. Does your child have any of the following symptoms?
    a) turbid urine
    b) frequent urination
    c) instant and sudden urge to urinate
    d) other symptoms
    e) my child does not have any of the above-mentioned symptoms
11. Has your child ever been diagnosed with urinary tract infection(s)?
    a) yes
    b) no
12. Does your child also have daytime incontinence?
    a) yes
    b) no
13. How often do these incidents occur?
    a) rarely
    b) sometimes
    c) often
    d) every day
    e) my child does not have daytime incontinence
14. What is your current solution for your child's nocturnal incontinence?
    a) restriction of water intake before sleeping
    b) waking the child at night to void
    c) punishing the child if the nocturnal incontinence occurs
    d) rewarding the child if the nocturnal incontinence does not occur

e) others
f) my child does not have nocturnal incontinence

15. In your opinion, does your child's nocturnal incontinence influence your child's social activities and have you noticed any changes in his/her behavior?
    a) yes
    b) no
    c) maybe
    d) my child does not have nocturnal incontinence
16. In your opinion, from your child's point of view, what is the most important reason your child wants to overcome the problem of nocturnal incontinence?
    a) to build self-esteem
    b) to feel safer
    c) to avoid humiliation
    d) to be equal to other children
    e) to be able to go on trips or to sleep over at a friend's house
    f) to be able to share the bed with his/her brother(s) or sister(s)
    g) other
    h) my child does not have nocturnal incontinence

children had DI. Among enuretic children from eastern Croatia, 68.6% (24/35) of them had a positive family history of enuresis, while 31.4% (11/35) had a negative family history concerning the presence of enuresis in their relatives. Regarding the frequency of urinary tract infections in an enuretic child's life, it was discovered that 14.3% (5/35) of enuretic children had suffered from at least one urinary tract infection, while 85.7% (30/35) had never had a urinary tract infection.

After analyzing the self-help strategies that parents of enuretic children applied in an attempt to solve the problem, it was established that 40.0% (14/35) of parents had applied a combination of waking the child at night to void and restriction of water intake, 22.9% (8/35) of parents had used only the restriction of water intake, 17.1% (6/35) of parents had used waking the child at night to void, and 20.0% (7/35) of parents had used some other techniques to deal with the problem.

When asked if they had noticed if NI had affected their child's social activities or had influenced their behavior, 82.9% (29/35) of parents with enuretic children reported that NI had not affected their child's social activities and behavior, 11.4% (4/35) of parents thought that there might have been some changes, and 5.7% (2/35) of parents clearly stated that NI had affected their child's social activities and behavior.

Discussion

Results of our study revealed that the prevalence of NI in Croatian school children was 1.2%. Previous studies had shown that the prevalence of enuresis varies with geographical area, study population and the criteria used in the studies. It has been reported to be as low as 2.6% in the United Kingdom (UK) to 15.0% in Saudi Arabia[11-29]. The prevalence of NI in Croatian school children is much lower than the prevalence of NI detected in other countries, such as Taiwan (8.0%), Pakistan (9.1%) and Spain (10.18%)[11,13,22]. Frequency of NI, which is common among younger school children, usually decreases with increasing age, but 1-2% of enuretic children continue wetting into adulthood, which presents a serious problem for the affected individuals[11,12,17,26,28,30,31].

Bearing in mind that NI is in fact a serious problem, one of the most surprising findings of this study was the parental perception of their child's enuresis. The majority of parents (29/35 or 82.9%) had not noticed that NI had affected their child's social activities, 11.4% (4/35) thought that there may have been some changes, and only 5.7% (2/35) of them clearly stated that NI had affected their

child's social activities and behavior. These findings are different from the findings of other studies conducted elsewhere. For example, in a large study conducted in Pakistan, parents of 68.5% of children reported concern about the problem[13]. The significance of parental perception in solving the problem of enuresis is very important, although it seems from this study and studies conducted in Hong Kong, France and Turkey that the parental concern level was not high and that parents of enuretic children had a tendency to minimize the impact of enuresis[5,16,32]. Identification of children at risk is an essential first step before choosing individualized management strategies for each enuretic child. Parents are the ones who can first recognize the problem and who must be aware of the importance of this problem for their child's future development[3]. The findings suggest that enuresis is connected with higher rates of poor school performance and poor social adaptation compared with non-enuretic children[33]. In addition, it was established that many enuretic children exhibit behaviors such as low self-esteem, withdrawal, less ambition and increased anxiety[10,34-36].

Nocturnal incontinence established in our study was more frequent in boys than in girls (74.3% enuretic boys versus 25.7% enuretic girls), with gender differences being statistically significant. This finding is consistent with similar studies from other countries[1,15,17,26,30-32,37,38]. In the sample, we also found 0.2% (6/3011) of children with DI. That is lower but still comparable with findings from studies conducted in Finland and the UK, which reported 1.6% and 3.3% of children having both DI and NI, and is much lower than in studies conducted in Sweden and Turkey, which reported 17.0% and 21.0% of children having combined DI and NI[23,29,32,39].

Among enuretic children from eastern Croatia, 68.6% (24/35) of them had a positive family history of enuresis, which is more than in studies conducted elsewhere, with reported percentages of enuretic children with positive family histories of NI ranging from 22.9% to 66.0%[13-15,27,30,32,33,40].

Considering self-help strategies that parents of enuretic children applied in attempt to solve the problem of enuresis, it was established that waking the child at night to void and restriction of water intake before sleeping are two common self-help strategies, and the majority of parents (28/35 or 80.0%) used these two strategies, alone or in combination, to combat the enuresis. These solutions are also the most common solutions reported in other studies, such as studies conducted in Korea and Thailand[12,28].

It is known that there are some variations in the pattern of NI between summer and winter, and it is considered that NI decreases in the summer[41,42]. This study was performed from May to September, covering spring, summer and the beginning of autumn. Although it is possible that the low prevalence of NI among Croatian school children in comparison with the data from other countries can be partially connected with seasonal weather characteristics, we cannot draw any definite conclusions about such a connection; further studies focusing on this aspect of the problem are definitely needed.

In conclusion, we can say that the prevalence of NI in Croatian school children is much lower than that detected in other countries. The significant differences in the prevalence reported by other country studies can be attributed to the criteria selection for ranges of age, definition of enuresis, genetic predisposition, and traditional and cultural background[28]. We believe that the low rate of reported enuresis in our sample could be due to the social stigma of this condition in Croatia, which is similar to the results of a study from Hong Kong[5]. As the first study conducted among Croatian school children, this study reveals some aspects of this problem, emphasizing the fact that Croatian parents are not fully aware of the importance of solving the NI problem for the future well-being of their children. Further investigations are needed to clarify the background of the established prevalence of NI in Croatian school children and social attitudes about the problem.

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