

THE SCHOOL CONTEXT AND LOWER URINARY TRACT SYMPTOMS: AN INTEGRATIVE LITERATURE REVIEW

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ABSTRACT: This is an integrative review undertaken with the objective of identifying factors associated with the occurrence of lower urinary tract symptoms among children in the school context. The search was undertaken in November 2013, in the following databases: Medical Literature Analysis and Retrieval System Online, Cumulative Index to Nursing and Allied Health, and the Latin American and Caribbean Center on Health Sciences Information, without the use of a time limit. The sample was made up of 12 articles. The majority of the studies addressed measures of prevalence according to sex, age range and symptom investigated. Three thematic categories were also identified: factors associated with urinary symptoms, conditions for using toilets in school, and the perception of teachers and school nurses regarding patterns of child elimination. The literature indicates the influence of the school context on children's micturition behavior, the school nurse being mentioned as a strategic agent in the promotion of healthy micturition habits in childhood.

DESCRIPTORS: Pediatric nursing; School health; Micturition.

CONTEXTO ESCOLAR E SINTOMAS DE TRATO URINÁRIO INFERIOR: REVISÃO INTEGRATIVA DA LITERATURA

RESUMO: Trata-se de uma revisão integrativa com o objetivo de identificar fatores associados à ocorrência de sintomas de trato urinário inferior em crianças no contexto escolar. A busca foi realizada em novembro de 2013, nas bases de dados: Medical Literature Analysis and Retrieval System Online, Cumulative Index to Nursing and Allied Health Literature e Literatura Latino-Americana e do Caribe em Ciências da Saúde, sem emprego de limite temporal. A amostra foi composta por 12 artigos. A maioria dos estudos abordou medidas de prevalência segundo sexo, faixa etária e sintoma investigado. Também foram identificadas três categorias temáticas: fatores associados aos sintomas urinários, condições para uso do toaleta na escola, e percepção de professores e enfermeiros escolares quanto a padrões de eliminação infantil. A literatura aponta a influência do contexto escolar no comportamento miccional da criança, sendo o enfermeiro escolar citado como um agente estratégico na promoção de hábitos miccionais saudáveis na infância.

DESCRIPTORIOS: Enfermagem pediátrica; Saúde escolar; Micção.

CONTEXTO ESCOLAR Y SÍNTOMAS DE TRACTO URINARIO INFERIOR: REVISIÓN INTEGRATIVA DE LA LITERATURA

RESUMEN: Es una revisión integrativa cuyo objetivo fue identificar factores asociados a la ocurrencia de síntomas de tracto urinario inferior en niños en el contexto escolar. La búsqueda fue realizada en noviembre de 2013, en las bases de datos: *Medical Literature Analysis and Retrieval System Online*, *Cumulative Index to Nursing and Allied Health Literature* y Literatura Latinoamericana y de Caribe en Ciencias de la Salud, sin empleo de límite temporal. La muestra fue compuesta por 12 artículos. La mayoría de los estudios abordó medidas de prevalencia de acuerdo al sexo, a la franja etaria y síntoma investigado. También fueron identificadas tres categorías temáticas: factores asociados a los síntomas urinarios, condiciones para uso del baño en la escuela, y percepción de profesores y enfermeros escolares acerca de comportamientos de eliminación infantil. La literatura apunta la influencia del contexto escolar en el comportamiento de micción del niño, siendo el enfermero escolar citado como un agente estratégico en la promoción de hábitos de micción saludables en la infancia.

DESCRIPTORIOS: Enfermería pediátrica; Salud escolar; Micción.

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Received: 14/08/2014

Finalized: 16/12/2014

INTRODUCTION

According to data from the Unified Health System Informatics Department (DATASUS), the diseases of the genitourinary system are among the five main causes of child morbidity, revealing that health problems related to the urinary system contribute significantly to cases of pediatric inpatient treatment⁽¹⁾. The Lower Urinary Tract Symptoms (LUTS) correspond to a significant proportion of these episodes of inpatient treatment. Such symptoms refer to changes in the functioning of micturition, whether in storage or in voiding⁽¹⁻²⁾, without the presence of neurological compromise.

Among the LUTS described by the International Children's Continence Society⁽³⁾ are: diurnal and nocturnal urinary incontinence, micturition urgency, low or high urinary frequency, hesitation, effort, weak urinary jet, withholding manoeuvres and genital pain. Most of these symptoms reflect the child's micturition behavior, learnt in her sphincter training, or even altered during her development, in accordance with the environment or system in which she is inserted⁽²⁻³⁾.

Among the micro-systems which most influence the child's developmental trajectory, one finds the school and the family. It is fundamental, therefore, to investigate the micturition behavior and the conditions of the school environment. The concept of micturition behavior is complex and is not limited merely to the biological sphere; environmental, social, psychological and emotional factors are equally determinant for healthy micturition habits in the child⁽⁴⁻⁵⁾.

Another rationale for directing attention to the school microsystem lies in the number of hours that the child spends in this environment. Sometimes it is at school that the LUTS are first noted, in particular those related to urgency and to increased urinary frequency, as a result of schools having predetermined times for using the toilet, and the child needing the teacher's permission to leave the classroom.

Besides this microsystem's possible impacts on the child's health and micturition habits, the school can also be seen as an environment which is propitious for the promotion of healthy living habits, such as "develop knowledge, skills and abilities for self-care of health and the prevention of risky behaviors at all educational opportunities"^(7:390).

The nurse in the school context⁽⁷⁾, in conjunction with the school community (parents, students and education professionals) should act holistically, in the multiple dimensions of health care. Considering her possible role in the promotion of healthy living habits, the nurse's actions may be directed towards the environment (physical structure of the toilets in the school) and towards the promotion of healthy micturition habits.

The area of Urological Nursing, however, remains little explored by Brazilian nurses⁽⁸⁾. One integrative review published in 2012 investigated the issue of school nursing in the period 1983 – 2010; of the 38 Brazilian publications included in the review, none addressed issues relating to schoolchildren's micturition patterns⁽⁹⁾.

In order to better understand the scale and the influence of the school environment on the occurrence of LUTS among school-age children, this integrative review aimed to respond to the following question: What factors are related to the occurrence of LUTS among children in the school environment?

METHOD

This is an integrative review of the literature, a research method which allows the searching for, critical evaluation of, and summarizing of the evidence available regarding the theme investigated, in a systematic and ordered way⁽¹⁰⁾.

The search was undertaken in November 2013, using the following databases as a source: Medical Literature Analysis and Retrieval System Online (MEDLINE/PubMed), Cumulative Index to Nursing and Allied Health Literature (CINAHL), and the Latin American and Caribbean Center on Health Sciences Information (LILACS), and without the use of a time limit or other filters. Combinations were made of the following controlled and non-controlled descriptors, specific to each database: Schoolchildren from 6 to 12 years old: Child, children, school age, school; Living habits: Lifestyle, health behavior, food habit, dietary modification, dietary habits, elimination habits, toilet habits, micturition habits; Lower urinary tract symptoms: Lower urinary tract symptoms, elimination disorders, dysfunctional voiding, non-neurogenic disorders.

After obtaining the study's results in each one

of the databases, the articles were pre-selected through their titles and abstracts, ascertaining their suitability in relation to the inclusion and exclusion criteria defined. The inclusion criteria were: studies with children in the age range from 0 to 12 years old; studies addressing living habits or risk factors for the occurrence of LUTS; studies which analyzed these habits or risk factors in the school environment; articles published in the Portuguese, English and Spanish languages.

In order to evaluate the methodological quality of the studies included, the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) scale was used, which aims "to offer a recommendation regarding how to report observational studies most appropriately"^(11:561). This instrument was chosen because observational studies have been shown to be the most efficient for evidencing effects of association between risk factors and measurements of outcome, as well as having

samples which are more representative of the target population⁽¹¹⁾.

A total of 423 articles was identified in the databases researched. Following analysis of titles and abstracts, 390 articles were excluded. The 33 articles remaining were captured and read in full, and, of these, 21 were excluded: six did not address the school environment and/or the child population, 14 had methodological frameworks which were not observational, and one was not available in the languages defined. The final sample, therefore, was made up of 12 articles.

RESULTS

This integrative review had a final sample of 12 articles (Table 1). Of these, 10 were from the MEDLINE/PubMed database, two from CINAHL and none from LILACS. All were published in the English language.

Table 1 - Bibliometric data of the articles selected for integrative review. Brasília-DF, 2014

n	Article title	Year	Database
1	Micturition habits and incontinence in 7-year-old Swedish school entrants	1990	MEDLINE/PubMed
2	Urinary tract infection, day wetting and other voiding symptoms in seven- to eight-year-old Danish children	1997	MEDLINE/PubMed
3	Voiding habits and wetting in a population of 4,332 Belgian schoolchildren aged between 10 and 14 years	2002	MEDLINE/PubMed
4	Do public schools teach voiding dysfunction? Results of an elementary school teacher survey	2003	MEDLINE/PubMed
5	The micturition habits and prevalence of daytime urinary incontinence in Japanese primary school children	2004	MEDLINE/PubMed
6	Perceptions of School Toilets as a Cause for Irregular Toilet Habits Among Schoolchildren Aged 6 to 16 Years	2005	CINAHL
7	Nocturnal enuresis and its treatment among primary-school children in Oromieh, Islamic Republic of Iran	2008	MEDLINE/PubMed
8	Children's experiences of attitudes and rules for going to the toilet in school	2009	CINAHL
9	Prevalence and associated factors of overactive bladder in Korean children 5-13 years old: a nationwide multicenter study.	2009	MEDLINE/PubMed
10	An epidemiologic study of voiding and bowel habits in Korean children: a nationwide multicenter study.	2010	MEDLINE/PubMed
11	Daytime urinary incontinence among kindergarten children in Aden Governorate, 2003	2010	MEDLINE/PubMed
12	School nurse perceptions and knowledge of pediatric toileting	2012	MEDLINE/PubMed

The observational studies captured by this integrative review show a multiplicity of factors associated with LUTS in childhood, it being the case that the epidemiological estimates varied according to country, age ranges, and symptoms investigated. Among the most-investigated LUTS were those related to the phase of storage: diurnal and nocturnal urinary incontinence, increase or reduction of urinary frequency, urgency, nocturia, and withholding manoeuvres. Among the symptoms related to the phase of urinary elimination were: interrupted urinary flow and micturition effort. In relation to the urological conditions, nocturnal enuresis and hyperactive bladder were the only ones reported by the studies included in this integrative review.

The issue involving LUTS in childhood and the school environment has become a target for studies within the universe of Pediatric Urology. This fact may be observed in this review, given that the number of articles published in indexed

journals went from two (16.6%) in the period 1990 – 2000, to six (50%) between 2007 and 2012; that is, in the first 10 years, the issue was covered in only two works published, progressing in the following 12 years to six works published (Table 1).

The majority of the studies in this review (8/12 = 66.6%) calculated the prevalence of some LUTS or urological condition. None of the publications, however, evaluated the LUTS in the Brazilian context, a fact which demonstrates the shortage of studies directed towards the Brazilian pediatric population.

In this integrative review, qualitative data from the studies included were incorporated, making it possible to identify three categories of analysis (Table 2): factors associated with the occurrence or worsening of LUTS among schoolchildren; conditions for the use of the toilet in the school context; and the perception of teachers and school nurses.

Quadro 2 - Categorias de análise com base nos dados qualitativos dos estudos incluídos na revisão integrativa. Brasília, DF, 2014

n	Factors associated with the occurrence of LUTS in school-children	Conditions for toilet use in the school context	Perception of teachers and school nurses
1	Male sex and monosymptomatic nocturnal enuresis	Not reported	Not reported
2	Female sex associated with previous history of UTI	Not reported	Not reported
3	Significant correlation with previous history of UTI	Not reported	Not reported
4	Not reported	Few teachers reported concerns regarding safety items: bullying and wet floor in the school toilets 40% of the teachers allow the child to go to the bathroom at any time during the class; 31% require the child to wait for the appropriate time	18% of the teachers reported having received information about abnormal patterns of child voiding
5	Increased urinary frequency, cystitis, and infrequent intestinal movements are strongly associated with diurnal urinary incontinence	Not reported	Not reported
6	Not reported	Causes of reluctance to use toilets in school: emotional reactions relating to unpleasant visual and olfactory sensations; shame and fear; poor installations.	Not reported
7	The occurrence of enuresis is greater in the male sex	Not reported	Not reported

8	Not reported	The rules of permission for going to the toilet were elaborated by the teachers, but little communicated to the students	Not reported
9	Constipation, fecal incontinence, history of UTI, delay in acquiring urinary sphincter control.	Environment of inadequate/poor toilets	Not reported
10	Delay in anal sphincter control, history of UTI have a negative impact on the children's micturition-related and intestinal habits.	Not reported	Not reported
11	Urinary incontinence associated with emotional events, the child's birth order, and type of crèche.	Not reported	Not reported
12	Not reported	Poor physical installations in the schools' toilets	39% of American school nurses knew or had received information about normal patterns of micturition among children

DISCUSSION

Diurnal and nocturnal incontinence were the symptoms investigated most. Eight of the studies calculated their prevalence (understood as the number of cases existing in a specified population and time), varying from 3.2%⁽¹²⁾ to 11.2%⁽¹³⁾. However, it was not possible to calculate a mean prevalence among the studies included, as the age ranges were distinct. It is observed that girls present a greater prevalence of incontinence than boys. In one study undertaken in Denmark⁽¹⁴⁾, for example, it was identified that 13.3% of the girls and 9.9% of the boys reported diurnal urinary losses.

Regarding the symptoms of low frequency (< 3 micturitions/day) and increased urinary frequency (>7 micturitions/day), one study undertaken in the Republic of Korea⁽¹³⁾ identified a prevalence of 4.4% and 2.5% in children of 5 to 13 years old, respectively. It was also noted that the younger children tend to present an increase in urinary frequency, while older children present a reduction in frequency^(12,14). Furthermore, children with diurnal incontinence reported a greater urinary frequency than those who did not complain of incontinence ($p=0.001$)⁽¹⁴⁾.

Urinary urgency (characterized by the imminent desire to urinate) had a prevalence of 16.6% in children of 5 to 13 years old⁽¹³⁾, reducing with age. Considering the difference between the sexes, there was no consensus between the studies, as two studies asserted that the

prevalence of urinary urgency was greater among boys^(12,13), while another study indicated a higher percentage among girls⁽¹⁵⁾.

Regarding the occurrence of nocturia (LUTS relating to the phase of storage and which corresponds to waking up in the night to go to the bathroom), one study undertaken in Belgium with children aged from 10 to 14 years old⁽¹⁶⁾ found a prevalence of 2.6%. The same study identified that children with nocturnal urinary losses went to the bathroom less during sleep (29%) when compared with children who did not present losses (67%), which may be a protective behavior for episodes of nocturnal incontinence.

The undertaking of withholding manoeuvres - which corresponds to the child's behavior of crossing legs or squatting as a mechanism for preventing urinary losses - was evaluated by only one study⁽¹²⁾, which identified a total prevalence of 23.5%, with these manoeuvres being undertaken more by girls, and reducing as the children's ages increase.

Concerning the LUTS which relate to the phase of urinary elimination, the following were evaluated: prolonged micturition, low urinary flow, interrupted flow, micturition effort and a need for manual compression of the abdomen. One study undertaken, with children aged from 7 to 8 years old⁽¹⁴⁾ found that 8.8% of the girls presented some difficulty in urinary elimination, while for boys the percentage was 7.4%. Another study with children of seven years old, conducted in Sweden⁽¹⁷⁾ identified that 1.9% of the girls and

0.9% of the boys mentioned some difficulty in urinary elimination. The divergence between the studies shows that there is still no consensus regarding the estimate of mean prevalence of these symptoms relating to the phase of urinary elimination, given the difficulty in understanding and reporting on the part of the child.

Regarding the clinical conditions, in particular the so-called hyperactive bladder (characterized as a symptom of micturition urgency, which may be associated or not with the occurrence of urinary incontinence), the study undertaken in the Republic of Korea⁽¹³⁾ identified a prevalence of 16.59% of hyperactive bladder in school-children aged from 5 to 13 years old. The authors also observed that the prevalence was inversely proportional to the child's age.

Another clinical condition investigated was nocturnal enuresis (urinary loss during sleep), both as an isolated symptom (monosymptomatic) and associated with other diurnal symptoms (non-monosymptomatic). In a study undertaken in Iran⁽¹⁸⁾, the prevalence among children aged from 7 to 12 years old was 7.7%, while the Belgian study with children from 10 to 14 years old⁽¹⁶⁾ identified diurnal and nocturnal incontinence in 3.5% (89 boys and 62 girls) and 1% for nocturnal incontinence alone (47 boys and 15 girls). The difference of prevalence between the two studies may be explained by the age ranges studied, given that enuresis has a tendency for spontaneous annual cure as the child matures.

Factors associated with the occurrence of LUTS in school-children

In this category of analysis, the authors identified factors which influenced the occurrence of LUTS, these being: a history of UTI; delay in acquiring sphincter control; and constipation.

The literature has indicated a positive association between the child with a history of UTI and the presence of LUTS. One study undertaken with 623 children⁽¹⁹⁾ indicated that 33% of them had a history of UTI. This history was related mainly to clinical conditions which led to urinary stasis, either due to a prolonged time of urine remaining in the bladder, or because of micturition which leaves significant residual volumes of urine.

Among the studies which reported the

prevalence of the LUTS, two publications identified the UTIs as complications resulting from the LUTS^(14,15). In the epidemiological study undertaken with Japanese children⁽¹⁵⁾, those with history of cystitis had a higher – and statistically significant – rate of diurnal urinary incontinence, when compared with children who did not have this history (28.6% versus 5.4%). Equally, in the Danish study⁽¹⁴⁾ it was identified that a report of previous UTI was present in 9.4% of the girls and 2.8% of the boys, there being a statistically significant correlation between current LUTS and previous UTI. According to the Danish authors, the explanation for this correlation may be associated with the presence of urodynamic disorders such as higher intravesical pressures and/or difficulty in elimination. Also found was a statistically significant correlation between two LUTS (withholding manoeuvres and encopresis) and previous UTI, although only in the group of female children⁽¹⁴⁾.

Sphincter control was also identified as an essential developmental landmark for optimal urinary functioning. The literature shows that children with long transitional periods (the phase between social continence and accidental urinary losses during sphincter training) present an increased risk for the appearance of micturition dysfunctions⁽²⁰⁾.

The association between LUTS and constipation has been explained by various theories. One of these believes that the accumulation of feces in the rectal ampoule exercises physical compression on the bladder wall, which reduces its storage capacity. Another explanation would be that the presence of feces entails involuntary patterns of vesical contraction, causing detrusor instability⁽²¹⁾.

Generally speaking, it was possible to observe that the factors associated with LUTS are in a strictly biological dimension, given that the majority of the articles identified urological symptoms and conditions as the main risk factors. As a result, gaps remain regarding the environmental, behavioral, psychological and emotional domains, as well as their influence on the micturition habits and on the child's mechanism of sphincter continence.

Conditions for using toilets in the school context

The behavior for the use of the toilet is a complex concept, influenced by individual, social

and environmental factors⁽⁵⁾. When the individual (child or adult) enters into contact with some situation which is uncomfortable in relation to the social or environmental domain, there is, in general, a tendency to postpone or avoid using the toilet. As a result, inadequate sanitary conditions can lead to retentive behavior, both for micturition and voiding of feces.

The studies included in this category evaluated issues such as privacy, safety, hygiene and the presence of bad smells (environmental factors) in the school bathrooms^(17,22-24). The absence of doors on the toilets was identified as a risk factor which directly influenced the child's privacy. The occurrence of bullying in the bathrooms and the presence of wet floors, were also indicated as factors influencing the child's safety. Poor hygiene and the lack of basic supplies such as toilet paper and soap were also identified by the authors. Bad smells resulting from dirty toilets were also indicated as factors leading to students' reluctance to use school toilets.

Besides the points already discussed, the permission necessary for using the toilet (a social and behavioral factor) was another issue raised⁽²²⁾. In the schools studied, there are rules dictating the appropriate time for going to the toilet; these rules were elaborated by the teachers without the students' participation. This fact demonstrates centralization in the needs of the teacher rather than those of the student (child/adolescent).

The fear of permission being denied, or the need to wait to go to the toilet⁽⁶⁾ at the appropriate time lead to retentive behavior for micturition and voiding feces. Postponement in both systems of physiological elimination gives rise to a broader clinical condition termed Bladder Bowel Dysfunction (BBD), as well as complications such as Urinary Tract Infections (UTI), Vesicoureteral Refluxes (VUR) and progressive renal scarring⁽²⁵⁾.

Perception of the professionals (teachers and school nurses)

The school is an institution which relies on the participation of different social actors. The school nurse, in particular, acts through educational practices, disseminating information about healthy habits and health promotion, involving the entire school community^(8,26). With a focus on Pediatric

Urology, the School Nurse can work both in the early detection of LUTS and serve as a link between teachers, students, and family members.

In spite of the potential and evident role of school nursing, one American study⁽²⁷⁾ points to the need for professional training, bearing in mind that only 39% of school nurses received training or information on normal micturition patterns in children. In relation to the teachers, this number is even lower: only 18% reported having received information on abnormal patterns of child elimination.

One possible strategy for minimizing this gap is the creation of campaigns in the school community with the aim of clarifying doubts and providing information on healthy micturition habits. The United Kingdom's 'Education and Resources for Improving Childhood Continence' (ERIC)⁽²⁸⁾ has undertaken actions with a campaign titled "The Right to Go", in which the right to go to the school's toilet whenever necessary is highly acclaimed, along with the right to appropriate sanitary installations.

In Brazil, works such as that of the ERIC have not yet been undertaken; nevertheless, the Brazilian School Health Program can be seen as an important governmental step towards the effective insertion of the nurse in the school environment. In this way, one can perceive the relevance of the work of the school nurse through the incorporation of issues relating to child continence, aggregating it to other issues which are already widely worked upon in the school context, such as visual acuity and nutrition⁽⁹⁾.

CONCLUSION

The prevalence of LUTS was investigated in eight studies, which showed a distribution varying in accordance with the symptom, the age range, and the sex studied. In spite of the variation in the epidemiological calculations, it was possible to observe that the symptoms of storage are more prevalent than those of elimination. There was also a tendency for the prevalence of LUTS to reduce with the child's growth and development. Analyzing the data obtained qualitatively, other factors associated with the occurrence of LUTS in childhood were summarized in three thematic categories: biological factors associated with

the occurrence of LUTS; environmental factors associated with the conditions for using the toilet in the school context; and social factors related to the perception of the professionals (teachers and school nurses).

Generally speaking, this review showed that the school context can negatively influence the micturition behavior, when it offers environmental and social factors which lead the child to postpone her physiological eliminations; and also positively, when, in conjunction with the school community, it undertakes educational actions and actions for raising public awareness regarding healthy micturition habits. The school nurse is an essential professional for bringing together the two fields – health and education – so as to strengthen the positive factors of this school microsystem, and to minimize the negative ones.

FINANCIAL SUPPORT

The 2013-2014 Bid for Proposals of the University of Brasília's Scientific Initiation Program (Scientific Initiation Grant).

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