Self-reported morbidity and its conditioning factors in children aged 5 to 9 in the city of Sobral, Brazil

Morbidade referida e seus condicionantes em crianças de 5 a 9 anos em Sobral-CE

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Supported by: Universidade Federal do Ceará, Children's Institute – USP
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Abstract

Objective: To assess self-reported morbidity among children aged 5 to 9 years and to analyze its conditioning factors. **Methods:** Population-based cross-sectional study including a representative random sample of children aged 5 to 9 years living in the urban area of the city of Sobral, state of Ceará, northeastern Brazil. Home interviews were carried out with 3,276 children and a subsample of 2,594 children underwent a clinical examination. Health problems reported by the mothers were classified according to the International Classification of Diseases – 10th Revision (ICD-10). The outcomes analyzed were self-reported morbidity in the 15 days prior to the interview. The analyses were performed using Stata 7.0. **Results:** Self-reported morbidity was seen in 43.9% of children. The highest prevalent morbidities were diseases of the respiratory system (DRS) (28.7%); diseases of the skin and subcutaneous tissue (3.4%); and infectious and parasitic diseases (2.2%). Of those with self-reported morbidity, 41.5% sought care, of which 77.4% at the Family Health Strategy units. The independent variables that had a statistically significant association with the prevalence of DRS were living in the main urban center; history of malnutrition; and school attendance with odds ratio (OR) of 1.48 (95% CI 1.10–1.99), 1.30 (95% CI 1.05–1.60), and 1.54 (95% CI 1.02–2.32), respectively. **Discussion:** A high prevalence of DRS was found among children living in the main urban center. DRS prevalence was about two times higher than that reported in other studies with similar methodology. This finding is suggestive either of over reporting or environmental pollution. Most children had minor health problems and facilitated access to health services, especially to the FHS. **CONCLUSIONS:** Further studies are needed to identify potential causes of high prevalence of DRS in children living in the main urban center of the city. Opportunities in which children require FHS care due to minor diseases should be used for prevention and health promotion.

Key words: morbidity, child health, respiratory disease.

RESUMO

OBJETIVO: Descrever a morbidade referida em crianças de 5 a 9 anos e analisar seus possíveis condicionantes. **METODOLOGIA:** Corte de base populacional com amostra aleatória e representativa em crianças de 5 a 9 anos da zona urbana de Sobral – CE - Brasil. Entrevistas domiciliares com 3276 crianças e exame clínico em 2594. A morbidade referida foi classificada segundo a CID10. O desfecho analisado foi morbidade referida nos últimos 15 dias, utilizando Stata 7.0. **RESULTADOS:** 43,9% das crianças apresentaram morbidade referida: Doenças do Aparelho Respiratório (DAR), 28,7%; doenças da pele, 3,4%; doenças infecciosas, 2,2%. Das que adoeceram 41,5% procuraram atendimento. Dessas, 77,4% em Unidades de Saúde Familiar. Apresentaram maiores chances de DAR as crianças com as seguintes características, a saber, residir no núcleo urbano principal do município; ter antecedente de desnutrição e frequentar escola, com um valor de ODDS Ratio, respectivamente de: 1,48 (IC95%1,10-1,99), 1,30 (IC95%1,05-1,60) e 1,54 (IC95%1,02-2,32). **DISCUSSÃO:** Chamou atenção a elevada prevalência de DAR em crianças no núcleo urbano principal, cerca de duas vezes maior que a observada em outros estudos de metodologia similar, levantando hipóteses de sobre relato ou poluição ambiental. A maioria das crianças apresentou problemas de saúde de menor gravidade e teve acesso facilitado aos serviços de saúde, principalmente ao PSF.**CONCLUSÕES:** Serão necessários novos estudos para identificar possíveis causas da elevada prevalência de DAR em crianças no núcleo urbano principal do município. As ocasiões em que as crianças demandam os serviços de saúde da família por doenças de baixa gravidade podem ser aproveitadas para medidas de prevenção e promoção da saúde.

Palavras-chaves: morbidade referida, doenças respiratórias, escolar, saúde da criança.

INTRODUCTION

Self-reported morbidity is a set of reports of health conditions. These reports are obtained through in-person or telephone interviews, online or mail surveys and refer to the respondent or a family member. Epidemiological surveys can provide comprehensive knowledge on health conditions that are prevalent in a population and its demands for care services. These surveys are intended to assess whether a health problem, perceived and reported by the respondents, created a demand and whether this demand was met.[1, 2,3,4]

In developing countries such as Brazil where there has been a progressive reduction in mortality in children under 5 and a significant change in the epidemiological profile, it has become increasingly important to know the profile of self-reported morbidity in children by age to better prepare health services to meet their new needs or expectations. But scarce information is available, particularly for children older than 5.

Most published studies on children between 5 and 9 years of age have been conducted in schools or school health services. They have major issues: selection bias as only children attending school or health services are studied, and limited generalizability of the results for the general population in the same age range.[2,3]

These arguments support the need for studies on self-reported morbidity in children aged 5 to 9 years in Brazil to establish their epidemiological profile, know their health needs and provide input for analysis of the impact of public policies and major changes in socioeconomic and environmental conditions. The objective of the present study was to assess self-reported morbidity in children 5 to 9 living in the urban area of the city of Sobral, northeast state of Ceará, Brazil, and to identify potential factors associated.

METHODS

This is a population-based cross-sectio-

nal study that was conducted in the city of Sobral in the northwest interior scrubland of the state of Ceará, northeastern Brazil. The city has an area of 1,729 km^2, is 224 km away from the state capital Fortaleza and had an estimated population of 173,000 inhabitants in 2005 (Brazilian Institute of Geography and Statistics – IBGE, 2005). As for its political-administrative organization, Sobral has a major urban central part and eleven urban small communities in other administrative districts of the city. Primary care is provided by family health teams, and each team provides care to 950 families.

There was studied the population of children aged 5 to 9 living in the city of Sobral, including the villages of all districts, an estimated total of 18,668 children for a total population of 143,565 inhabitants, according to IBGE estimates prior to the 2000 Population Census available at the time of sample estimate (IBGE, 1999).[4]

Sample selection

The sample of children for the study was drawn from the database of the project "Study on health conditions, education and quality of life for children aged 5 to 9 living in the city of Sobral – Ceará," conducted from 1999 to 2000.[5]

A amostra foi construída a partir de sorteio aleatório, estratificada por ano de nascimento, com base no cadastro das unidades amostrais (o domicílio) , organizado pelas equipes de saúde da família e técnicos da Secretaria de Saúde de Sobral.

A random sampling, stratified by year of birth, based on the registration of sample units (households) was carried out by family health teams and officers from the Sobral Department of Health.

Only one child per household was included and it was drawn a sample of children born between 1990 and 1994, aged between 5 and 9 years at the time of the drawing.

The sample size was calculated based on the estimated prevalence of events to be studied for a lowest rate of 10%. A total of 2,900 children would be required. There were drawn 4,400 children due to two reasons:

(1) the study design required three contacts with the respondents and a considerable number of losses would be expected;
(2) the operational capacity of the study was 4,000 children. The drawing of 4,400 children provided for a loss of 10%.

Study instruments and fieldwork

A questionnaire for household interviews and two forms for clinical examination were used in the study.

Interviews with the mothers or caregivers of the children were performed between November 1999 and August 2000 by previously trained university students. The rate of self-reported morbidity was assessed through an open-ended question: "Did your child have any health condition in the last 15 days?".

The outcome variable was self-reported morbidity. Independent variables were grouped and only those with a significant relationship with the outcomes were analyzed, namely:

(i) Demographic and socio-economic variables: gender (1 = male, 2 = female [exposure]); age (continuous variable); school attendance (1 = yes, 0 = no); skin color; religion; family income; per capita family income; mother's schooling; father's schooling; mother's occupation.
(ii) Environmental variables: type of dwelling (1 = house, 2 = other types of dwelling [exposure]); type of construction; persons per room; home location (1 = urban small communities of districts; 2 = urban central part [exposure]); type of district; water supply, sewage system; waste disposal; house with yard or garden (1 = yes, 2 = no); street lighting.
(iii) Variables of access and utilization of health services: enrollment in the Family Health Strategy (FHS); health insurance; complete immunization schedule (1 = yes, 0 = no); last weight and height measure of the child (1 = <1 year, 2 = ≥1 year [exposure]).
(iv) Information from the clinical exami-

nation: past history of malnutrition (1 = yes, 0 = no); supplementary feeding program; physical disability; mental retardation; asthma; seizures or epilepsy (1 = yes, 0 = no); weight-for-age, weight-for-height, height-for-age deficits (1 = yes, 0 = no).

Ethical issues

Given that it was a large community-based study it was opted for asking only verbal consent to participate in the study. Some authors claim that in this case a written consent is not required.[5] The study was approved by the Research Ethics Committee of Universidade Estadual Vale do Acaraú (UVA). Children with any abnormalities found in the clinical examination or laboratory tests were sent for evaluation at the family health clinics or by experts who supported the study.

Coding, data entry and data analysis

Health conditions were classified according to the chapters of the International Classification of Diseases – 10th Revision (ICD-10). The collected data were entered into Epi Info 6.04 and analyzed using Stata 7.0.

The univariate analysis included the calculation of simple frequencies for all variables and prevalences of causes of self-reported morbidity. For the bivariate and multivariate analysis the five top causes of self-reported morbidity were selected. A comparison of proportions was performed using the chi-square and Fisher's exact test. If more than two independent variables had a $p \leq 0.250$ for the same outcome in the bivariate analysis, they were included in a multivariate logistic regression model,[6,7,8] as was the case for the outcomes diseases of the respiratory system (DRS) and infectious and parasitic diseases (IPD).

RESULTS

Seven hundred children (16%) were excluded from the study sample for different reasons: address not found; error in age recorded in the community health worker record; relocation; travel; family refusal; or child death.

A total of 3,700 home interviews were carried out. During the home visit an appointment at the Family Health unit of the area would be scheduled and children should attend it with their parents or caregivers. In this consultation, medical and nursing staff would perform a clinical examination and record all information in a standard medical form of the study. A total of 2,594 children underwent a clinical examination.

There were excluded from data analysis an additional 424 (9.6%) children who were interviewed for the following reasons: sibling of a child already included in the study; duplicated questionnaire; child out of the study age range; and incomplete questionnaire.

The final sample for analysis of self-reported morbidity comprised 3,276 children, representing 17.54% of the population aged 5 to 9 years living in the city of Sobral. The analysis of the relationship between self-reported morbidity and socioeconomic, environmental, access and utilization of health services variables was performed.

The subsample including 2,594 children was analyzed for prior health conditions, collected at the time of medical examinations, and nutritional status was assessed by weight and height measures. Children with low height-for-age were those who had a z-score <–2, calculated using the Epi Nut module of Epi Info.

Univariate analysis

The sample was demographically characterized by an even distribution of gender (50% females and 50% males) and age, confirming the soundness of the methods used in the sample selection. There was predominance of self-referred black, brown or mixed skin color (72.7%), which is quite consistent with that reported in the 1991 Census in the State of Ceará. As for religion,

most families were Catholic (88.4%).

The distribution by family income revealed a low-income population; almost 30% reported an income of less than one monthly minimum wage (MMW) and 77% of less than three MMWs. With regard to the mother's and father's schooling, 12.6% and 16.6% were illiterate, respectively.

Of the children participating in the study, self-reported morbidity was seen in 42.9%. The most common causes of health conditions according to ICD-10 were in a descending order of prevalence: DRS; signs and symptoms, not elsewhere classified; diseases of the skin; IPD; diseases of the ear, and diseases of the digestive system. DRS were five times more prevalent than signs and symptoms, not elsewhere classified (Table 1).

More than one health condition was included when the additional reported complaint was not a general symptom (such as fever or vomiting) and involved a different system, e.g. flu and skin wounds. More than one condition was reported in only 0.9% of children and therefore only the first self-reported morbidity was considered in this analysis.

Figure 1 shows the seasonal pattern of DRS by month of the year, from November 1999 to August 2000. The highest rates of DRS were seen in April, May and June that are the rainy months in Ceará and are historically characterized by outbreaks of respiratory diseases and diarrhea, especially in children.[9]

Table 2 describes morbidity as reported by the mothers (verbatim) classified according to ICD-10. The most common complaint in the chapter of DRS was flu (10 times more prevalent), followed by "throat problems" and "asthma." The prevalence of asthma in Sobral was 1.9% (Table 2).

The signs and symptoms, not elsewhere classified included isolated complaints that are not indicative of a syndrome or a particular disease such as stomachache, fever, headache, and vomiting.

There were classified as diseases of the skin: wounds (term used by local population in Ceará to describe superficial skin infections), and less frequently "allergy," "tumor," "abscess," and "itch".

The infectious and parasitic diseases included "diarrhea," "worm infections," "hepatitis," and "chicken pox" (term used by local people to describe varicella). The most common problem included in the diseases of the ear was "earache". The most common condition among the diseases of the digestive system was "toothache" (Table 2).

The seventh most prevalent group of self-reported morbidity (prevalence of 0.5%) was external causes of morbidity (ICD-10

Table 1 – Prevalence of self-reported morbidity classified according to the International Classification of Diseases – 10th Revision (ICD-10) among 3,276 children aged 5 to 9 years, city of Sobral, state of Ceará, Brazil, 1999–2000

Self-reported morbidity (ICD-10)	Prevalence of self-reported morbidity		
	N	%	95% CI
No disease reported	1,837	56.1	-
Diseases of the respiratory system	942	28.7	27.2–30.3
Signs and symptoms, not elsewhere classified	177	5.5	4.6–6.1
Diseases of the skin	112	3.4	2.8–4.0
Infectious and parasitic diseases	73	2.2	1.7– 2.7
Diseases of the ear	58	1.8	1.3–2.2
Diseases of the digestive system	39	1.2	0.8–1.6
External causes of morbidity and mortality	15	0.5	-
Other chapters	23	0.6	-
Total	3,276	100	-

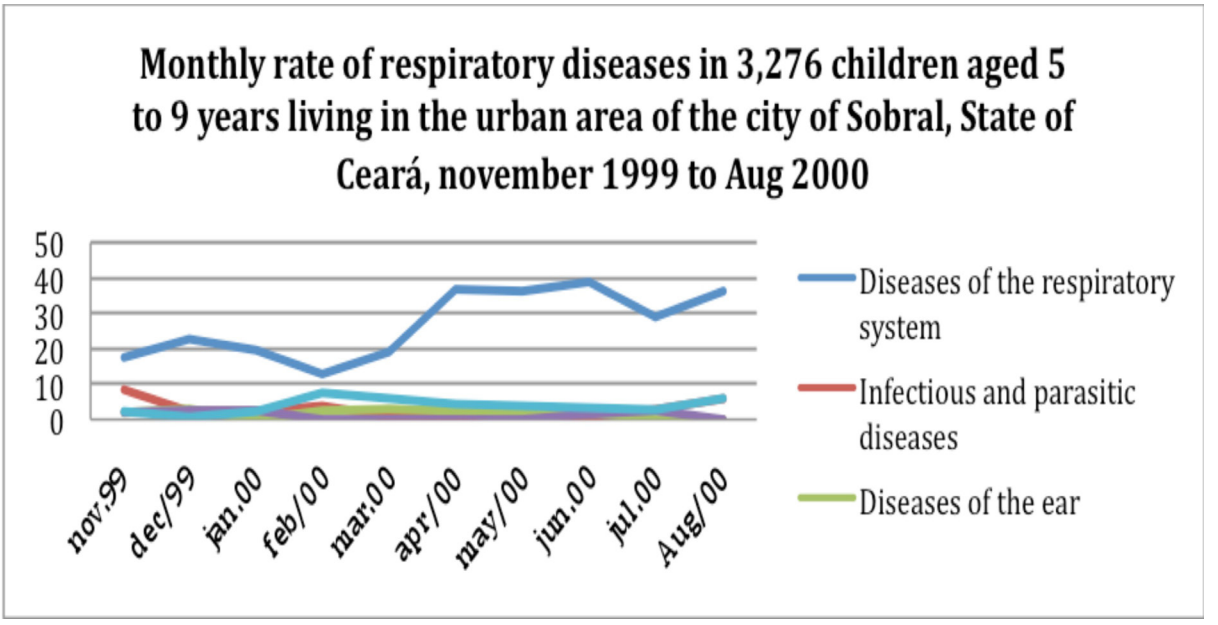

Figure 1 – Monthly prevalence of self-reported morbidity in 3,276 children aged 5 to 9 years in the city of Sobral, state of Ceará, Brazil. November 1999 to August 2000.

chapters XIX and XX). It is noteworthy due to its high potential of causing injury and death.

Of 1,439 children with reported health conditions in the 15 days prior to the interview, 41.5% sought care. Of 597 children who required treatment, 77.4% (32% of the children with reported health conditions) sought care at the FHS units, and 22.6% (6% of the children with reported health conditions) sought care at hospitals affiliated with the Brazilian National Health System (SUS). Only 2.6% of the children with reported health conditions sought care at private services.

Care was sought more than once for 15.4% of children. After a first consultation, 1.3% of the children with reported health conditions were referred to major care centers, of which 0.4% to hospital emergency and 0.6% to medical specialty departments.

Among the children with reported health conditions, 40.2% were recovered at the time of the interview and 25.4% were still ailing. However, 34.3% of mothers or caregivers who were interviewed did not report whether the child was or was not recovered at the time of the interview.

Multivariate analysis

Factors that showed statistically significant association with DRS were school attendance, living in the urban central part of the city, incomplete immunization schedule, weight measures less than 1 year and prior history of malnutrition. The rate of DRS significantly decreased as age increased (Table 3).

With respect to the conditioning factors of infectious diseases, male children were 1.84 times more likely to have infectious conditions (OR 95% CI 1.08–3.11), and children with low height-for-age were 2.24 times more likely to have infectious diseases than normal height-for-age (OR 95% CI 1.23–4.06) (Table 4).

The prevalence of diseases of the skin was 4.3% in children living in households with no garden or yard (households in the poorest districts of the city) compared to a prevalence of 2.4% in children living in households with garden or yard (p=0.026). No multivariate analysis was performed for this outcome.

The prevalence of diseases of the ear was 2.1% and 1.0% in children living in urbani-

Tabela 2 - Distribution of health problems by the five top ICD-10 chapters of self-reported morbidity in 3,276 children aged 5 to 9 years in the city of Sobral, state of Ceará, Brazil, 1999–2000

Self-reported morbidity (ICD-10)	Prevalence of self-reported morbidity	
	N	%
Diseases of the respiratory system	942	28.7
Flu	747	22.8
Throat problems	94	2.9
Asthma/bronchitis	64	1.9
Pneumonia	15	0.5
Signs and symptoms, not elsewhere classified	177	5.4
Stomachache	56	1.7
Fever	45	1.4
Headache	31	0.9
Vomiting	12	0.4
Diseases of the skin	112	3.4
Wound	35	1.1
Allergy	18	0.5
Tumor or abscess	16	0.5
Itching	15	0.6
Infectious and parasitic diseases	73	2.2
Diarrhea	34	1.0
Chickenpox	27	0.8
Worm infections	6	0.2
Hepatitis	1	0.0
Other	5	0.2
Diseases of the ear	58	1.8
Earache	35	1.1
Ear discharge	5	0.2
Ear problem/inflammation	18	0.5
Diseases of the digestive system	39	1.2
Toothache	18	0.6
Gastrointestinal problem, stomachache and nausea	10	0.3
Mouth sores or disease	8	0.2
Hernia	2	0.1
Appendicitis	1	0.0

zed and undeveloped districts, respectively (p=0.040). Children with a complete immunization schedule were 70% less likely to have diseases of the ear than those with incomplete immunization.

There were no statistically significant associations between the independent variables studied and diseases of the digestive system.

DISCUSSION

Self-reported morbidity does not mean "disease." As we can learn from medical anthropology, the health-disease process takes up different meanings when seen through the eyes of individuals and their families. A doctor's perspective is mostly based on diagnostic criteria established by life "sciences" while evaluating a patient who seeks care; the doctor usually labels the patient with the diagnosis of a "disease" based on the knowledge generated by these disciplines.[10,11] However, for individuals, their families and communities, the health-disease process carries other meanings associated to a wide variety of factors. The way they understand and deal with "diseases" is strongly influenced by their cultural background, beliefs, history and subjectivity, as well as the mass media.

The set of complaints and health problems comprising a self-reported morbidity reflect the understanding of both individuals and their families and of doctors themselves, which is re-interpreted and reported by the interviewee. It may be quite common in contexts of universal health care such as in Brazil.[2,12]

The study methodology included the classification of self-reported morbidity according to ICD-10 chapters. With this procedure, some reports that were in the "illness" format were adjusted to the ICD-10, i.e., to a medical perspective. While this may have caused a loss, the qualitative aspect of

Table 3 – Final model of logistic regression of potential risk factors for respiratory diseases in 2,670 children aged 5 to 9 years in the city of Sobral, state of Ceará, Brazil, 1999–2000

Variables	Children with respiratory diseases (N)	Children with respiratory diseases (%)	Adjusted odds ratio	95% CI	p-value
Age:					
5 years old	128	33.2	0.88	0.82–0.94	0.000
6 years old	187	32.9			
7 years old	173	30.7			
8 years old	151	26.5			
9 years old	141	24.1			
School attendance:					
No	49	25.0	1	-	
Yes	731	29.6	1.44	1.02–2.04	0.040
Household location:					
Small urban communities and districts	86	22.8	1	-	
Main urban center	694	30.3	1.38	1.06 - 1.79	0.017
Complete immunization:					
No	78	35.0	1	-	
Yes	690	28.9	0.73	0.54–0.97	0.033
Time since child was last weighed:					
Less than 1 year	413	32.6	1	-	
≥ 1 year	367	26.3	0.77	0.65–0.92	0.003
History of malnutrition:					
No	526	28.2	1	-	
Yes	245	32.7	1.23	1.02–1.49	0.029

Table 4 – Adjusted association between potential risk factors and the occurrence of infectious disease in 2,663 children aged 5 to 9 years in the city of Sobral, state of Ceará, Brazil, 1999–2000

Variables	Children with infectious diseases (N)	Children with infectious diseases (%)	Adjusted odds ratio	95% CI	p-value
Gender:					
Female	22	1.6	-	-	
Male	41	3.1	1.84	1.08–3.11	0.024
Age:					
5 years old	11	2.9	0.86	0.71–1.04	0.112
6 years old	18	3.2			
7 years old	15	2.7			
8 years old	10	1.8			
9 years old	9	1.5			
Type of household:					
House	61	2.3	1	-	
Other	2	3.8	1.56	0.37–6.66	0.545
Time since child was last weighed:					
Less than 1 year	41	3.2	1	-	
≥ 1 year	22	1.6	0.50	0.30–0.85	0.011
History of seizures:					
No	61	2.3	1	-	
Yes	2	10.0	2.95	0.65–13.33	0.159
Low height-for-age:					
No	48	2.0	1	-	
Yes	15	4.7	2.24	1.23–4.06	0.008

information was preserved as the influence of the interpretation of mothers and families remained unchanged. These evidence the limitations and, dialectically, the potential of studies on self-reported morbidity for the understanding of the health-disease process in the community.

Overall prevalence of self-reported morbidity

About 44% of children had self-reported morbidity in the 15 days preceding the interview. Compared with Brazilian studies that also used open questions, the prevalence of self-reported morbidity in the city of Sobral was considerably higher. ESCUDER, MM et al.[13] (1999) in the late 1990s in tie city of Embu, state of São Paulo, found a prevalence of 29.1% of self-reported morbidity in children aged 1 to 5 years. They investigated younger children than that of Sobral, and in this case, one would expect a higher prevalence of self-reported morbidity since children under 5 usually have higher rates of acute conditions.[14,15] Another population-based study conducted by GOLDBAUM et al.[16] (2005) in São Paulo in 2001, using open questions and a 15-day recall, found a prevalence of 13.8% of self-reported morbidity in children under 10.

In the Netherlands, BRUIJNZEELS et al.[17] carried out a study between 1987 and 1988 using the methodology of daily notes on a checklist, asking parents to check off in a list conditions seen in their children every day over a period of 15 days. They reported a prevalence of self-reported morbidity of 65% in children aged 5 to 9 years. Comparing the prevalence obtained by BRUIJNZEELS et al. (1988) with that of the present study, the latter was much lower. However, the metho-

dology used in the Netherlands study tends to increase the prevalence of self-reported morbidity.

Prevalence of respiratory diseases

The prevalence of DRS in Sobral was almost similar to that reported by Monteiro et al.[18] (1980) in a study conducted in the city of São Paulo with prompt physical examination in children under 5. But the prevalence of DRS in the present study was higher than that reported by ESCUDER, MM et al.[13] in the city of Embu, obtained through open-ended questions about the occurrence of health conditions in children aged 1 to 5 years during a 15-day period. The authors found 15.9% prevalence of respiratory diseases. Several other studies reported that children under 5 usually have higher prevalence of DRS compared to older children because of their immature immune systems.[14] The prevalence of DRS in Sobral was also higher than that reported by BRUIJNZEELS in children of the same age, despite the checklist methodology used.[17] These arguments support the fact that the prevalence of DRS found in children aged 5 to 9 years in Sobral was high.

Some factors may have played a role making people report health issues such as strong social involvement regarding health issues and significant expansion of the FHS. People tend to overestimate changes in their health if they are under the impact of some event, or to underreport them if they are used to the event investigated. This bias that occurs in self-reported morbidity surveys can produce over- and underestimated prevalences,[19] and it is inherent to the methodology, particularly when open questions are used. The use of open questions, on the other hand, prevents other issues such as the exclusion of conditions that are not included in ready-to-use check lists.[12]

The above mentioned facts may explain in part the study findings, but they do not exclude the possibility of an actually high prevalence of DRS in Sobral as the result of other variables such as environmental factors.

Heinrich[20] in a 1992 study in East Germany including children of similar age reported a prevalence of DRS (bronchitis) as high as 54.2% associated to air pollution. However, in the 1990s, there was a sharp reduction in the levels of sulfur dioxide (SO_2) and **total suspended particulate** (TPS) in the air. Three consecutive cross-sectional studies carried out in children aged 5 to 14 years evidenced significant declines in the prevalence of DRS: from 54.2% to 38% and from 36.7% to 28.5%, respectively.

The prevalence of asthma in the present study was 1.9%. It lies within the prevalence variation of active asthma between 1.6% and 36.8% described in the International Study for Asthma and Allergies in Childhood (ISAAC) conducted in 56 countries. The prevalence of pneumonia was 0.5%, similar to that reported in the ISAAC.[21]

The observation that children who were weighed less than a year prior to the interview were 23% more likely to develop a DRS than those who did so more than a year prior to the interview could be explained by a reverse relationship, i.e., these children were taken to health facilities due to a DRS and were weighed as it is part of the routine medical care provided in the FHS. It is not uncommon in cross-sectional studies that the causality of a certain association, regarding what factor occurred first, remains doubtful and is a limitation of this design.[22]

Signs and symptoms not elsewhere specified were the second most prevalent condition in the present study. They are commonly seen in surveys investigating morbidities during a short recall period as they mostly characterize the early onset of acute illnesses, isolated symptoms, or more serious diseases not yet diagnosed (ROSS & VAUGHAN, 1986[23]; LEBRÃO, 1991[24]).

Despite external causes had a low prevalence, accounting for less than 1% of self-reported morbidity, they should be careful considered because, when they do occur, they involve more serious conditions. Injury, poisoning and other consequences of external causes were among the five top

causes of hospital admissions in children 5 to 9 years in Sobral from 1998 to 2005. The rate of external causes has grown in recent years, and was the most common cause of SUS-affiliated hospital admission in Sobral in 2005 (BRAZIL/DATASUS, 2006).[25]

Demand for health services due to self-reported morbidity

Less than half of the children with self-reported morbidity were taken to health services for consultation. This is an indirect indicator of low severity of the reported health problems, which probably consisted of mild acute illnesses or isolated complaints.

Since more than three quarters of the families who sought health services took their children to the FHS units, the results highlight the importance of primary health care (PHC) provided by the SUS and strengthen the arguments in favor of the organization of health systems based on PHC.[26]

The fact that more than one third of the children had recovered at the time of the interview strengthens the hypothesis of low disease severity. For 25.4% of those who reported no resolution of the problem by the interview, one can assume that the onset of the disease occurred less than 15 days.

Conditioning factors of self-reported morbidity

The authors' attention was first directed to the finding that family income, schooling and mother's employment were not predictors of self-reported morbidity. This lack of association could be explained by the fact that there is no significant variation in income and mother's schooling in the sample of families studied. The results on income and schooling of the families have been published elsewhere.[5,27] This relative homogeneity might in part explain this finding.

Children living in the central urban area of Sobral were 1.38 times more likely to have DRS. This association reinforces the possibility that there may be a predisposing factor for respiratory diseases in the main urban center but not in other small urban communities in the city. It might be an environmental factor, such as pollution, since there are a major cement plant, other industries and a greater number of motor vehicles in the urban center.

Complete immunization schedule was associated with a lower prevalence of both DRS and diseases of the ear. In general children with complete immunization receive better care, which may partly explain this finding. The approximately 11% of children with incomplete immunization indicates a need for FHS teams to focus their attention on the immunization of schoolchildren.

Diseases of the skin were associated to living in household without a yard or garden. This type of household is more common in the suburbs of Sobral, which are characterized by poor urbanization and population of lower per capita income.[5] Household crowding is also common in these neighborhoods; however, no association was found between the number of people per household and diseases of the skin.

As for conditioning factors for infectious diseases, a statistically significant association was found with male children and low height-for-age. The association between male gender and self-reported infectious diseases has been described in other studies but the underlying factors have yet to be clarified.[28] With respect to the association between low height-for-age and infectious diseases, studies have shown that repeated infections early in life can cause a decrease in linear growth, resulting in stunting. Infectious diseases in the first years of life most likely led to low height-for-age in these children, not the other way around.[29]

CONCLUSION

There was a high prevalence of self-reported morbidity in general among schoolchildren, especially DRS in the main urban center of the city, which suggests the role of an environmental factor in this area. Another possibility is that increased

self-reported morbidity may be due to the massive dissemination of health knowledge as well as of information on the present study, prompting people to report diseases in the city. Most children had minor health problems and had facilitated access to health services, especially to the FHS. From an epidemiological perspective, there is a need to further explore environmental factors such as air pollution, which may account for the increased prevalence of DRS in the main urban center of Sobral. It is further recommended training of multidisciplinary FHS teams to focus on respiratory diseases due to its high prevalence as well as providing comprehensive care to schoolchildren, taking advantage of opportunities in which they are taken to health units by the mothers for immunization, eye screening and postural assessment.

ACKNOWLEDGMENTS

To Dr José Wellington Lima for his collaboration in the statistical analysis, Dr Ana Cecilia Sucupira, general coordinator of the "Study on health conditions, education and quality of life for children aged 5 to 9 years living in the city of Sobral – Ceará," Dr Luiz Odorico Monteiro de Andrade, the local secretary of health, and Cid Ferreira Gomes, mayor of the city of Sobral for funding the study. We wish to thank the entire team of supervisors and interviewers who help conducting the fieldwork.

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