Revista de Saúde Pública

Journal of Public Health

Assessing morbidity in the paediatric community

Avaliação da morbidade em comunidade infantil

Maria Mercedes L Escuder, Nilza N da Silva, Júlio CR Pereira, Rosana F Puccini e Anneliese A Herrman

Instituto de Saúde da Secretaria de Estado da Saúde. São Paulo, SP - Brasil (MMLE); Departamento de Epidemiologia e Estatística da Faculdade de Saúde Pública da Universidade de São Paulo. São Paulo, SP - Brasil (NNS); Laboratório de Epidemiologia e Estatística do Instituto Dante Pazzanese de Cardiologia. São Paulo, SP-Brasil (JCRP); Departamento de Pediatria da Universidade Federal de São Paulo. São Paulo, SP-Brasil (RFP, AAH)

Assessing morbidity in the paediatric community*

Avaliação da morbidade em comunidade infantil

Maria Mercedes L Escuder, Nilza N da Silva, Júlio CR Pereira, Rosana F Puccini e Anneliese A Herrman

Instituto de Saúde da Secretaria de Estado da Saúde. São Paulo, SP - Brasil (MMLE); Departamento de Epidemiologia e Estatística da Faculdade de Saúde Pública da Universidade de São Paulo. São Paulo, SP - Brasil (NNS); Laboratório de Epidemiologia e Estatística do Instituto Dante Pazzanese de Cardiologia. São Paulo, SP-Brasil (JCRP); Departamento de Pediatria da Universidade Federal de São Paulo. São Paulo, SP-Brasil (RFP, AAH)

Abstract

Introduction

Morbidity information is easily available from medical records but its scope is limited to the population attended by the health services. Information on the prevalence of diseases requires community surveys, which are not always feasible. These two sources of information represent two alternative assessments of disease occurrence, namely demand morbidity and perceived morbidity. The present study was conceived so as to elicit a potential relationship between them so that the former could be used in the absence of the latter.

Methods

A community of 13,365 families on the outskirts of S. Paulo, Brazil, was studied during the period from 15/Nov/1994 to 15/Jan/1995. Data regarding children less than 5 years old were collected from a household survey and from the 2 basic health units in the area. Prevalence of diseases was ascertained from perceived morbidity and compared to estimates computed from demand morbidity.

Results

Data analysis distinguished 2 age groups, infants less than 1 year old and children 1 to less than 5. The most important groups of diseases were respiratory diseases, diarrhoea, skin problems and infectious & parasitical diseases. Basic health units presented a better coverage for infants. Though disease frequencies were not different within or outside these units, a better coverage was found for diarrhoea and infectious & parasitical diseases in the infant group, and for diarrhoea in the older age group. Equivalence between the two types of morbidity was found to be limited to the infant group and concerned only the best covered diseases. The odds of a disease being seen at the health service should be of at least 4:10 to ensure this equivalence.

Conclusion

It was concluded that, provided that health service coverage is good, demand morbidity can be taken as a reliable estimate of community morbidity.

Correspondence to:
Maria Mercedes L. Escuder
Praça Com. Manoel de Melo Pimenta, 12
05451-110 São Paulo, SP Brasil
E-mail: mescuder@isaude.sp.gov.br

350   Morbidity in the paediatric community
       Escuder MML et al.

Rev. Saúde Pública, 33 (4), 1999
www.fsp.usp.br/rsp

Descritores

Assistência ambulatorial.
Inquéritos de morbidade.
Necessidades e demanda de
serviços de saúde.

Resumo

Introdução

Informações sobre morbidade são de fácil acesso através de registros médicos. Porém seu escopo é limitado à população ou grupo que demanda o serviço. Informações de prevalência de doenças requerem inquéritos domiciliares, os quais nem sempre são possíveis. Estas duas fontes de informação representam duas alternativas para avaliação da ocorrência de doenças na comunidade, chamadas morbidade de demanda e morbidade referida. O objetivo do estudo foi pesquisar uma possível relação entre elas, a fim de validar a primeira na ausência da segunda fonte.

Métodos

Uma comunidade de 13.365 famílias de dois bairros do Município do Embu, Grande São Paulo, Brasil, foi estudada durante o período de 15/11/94 a 15/01/95. Foram coletados dados referentes à morbidade de crianças menores de 5 anos por meio de inquérito domiciliar e de registros de consultas médicas de duas unidades básicas de saúde (UBS). A prevalência de doenças foi calculada a partir dos dados de morbidade referida e comparada com a estimativa de prevalência extraída dos dados de demanda.

Resultados

O estudo trabalhou com dois grupos etários separadamente: crianças menores de um ano e de 1 a 4 anos completos. Os grupos de doenças mais importantes foram doenças respiratórias, diarréia, problemas de pele e outras doenças infecciosas ou parasitárias. As UBS apresentaram melhor cobertura para os menores de um ano. A ocorrência de doenças não mostrou diferença dentro ou fora das unidades, as quais cobrem apenas diarréia e outras doenças infecciosas ou parasitárias para menores de um ano, e diarréia no grupo etário mais velho. Foi encontrada equivalência entre as duas fontes de morbidade no grupo etário de menores de um ano, referindo-se aos grupos de doença que apresentam maior cobertura. Um odds de procura de serviço por grupo de doenças igual ou superior a 4:10 parece assegurar a equivalência de prevalência.

Conclusão

Provida uma boa cobertura dos serviços de saúde, os dados de morbidade de demanda podem ser usados como indicadores da morbidade da comunidade.

INTRODUCTION

Paediatricians at the primary level of the medical care system often wonder whether their actions meet community needs or are distorted by the sort of resources they have available. The query is: are services responding to community needs or imposing their standards on the community?

The recognition of users' medical problems by health services is portrayed by medical diagnoses, and community's discernment of these problems is represented by people's perception of symptoms and signs of illness. Thus, put in other words, the question is the relationship between two forms of morbidity assessment, namely medical diagnoses and people's opinions on their health status. Each of these assessments represents a distinctive approach to the ill-health process and accordingly is liable to equally distinctively represent this process.

Morbidity has been compared to an iceberg (Verbrugge[9], 1987), in which the visible part changes according to the measurement applied. Thus, there might not be any unique morbidity, but different types of morbidity. Morbidity figures drawn from service-outcome data are best representatives of demand and self-perceived morbidity should best represent needs. While the former is easily available from medical records, the latter require population surveys, which are not always feasible.

According to McKeown and Lowe[4] (1981), the differences between demand morbidity and perceived morbidity lie in the fact that a few problems do not have proper nosological classification and, further, many symptoms do not require medical attention. Wadsworth et al[10]. (1971) arrived at the same conclusion through empirical data. In a study in the sixties, they found that though 95% of people interviewed reported some sort of symptom for the pre-

ceding two weeks, only 20% of them had sought medical help. Despite these differences, Neuwelt[5] (1992) endorses the use of demand morbidity in cases where survey data is not available.

The present study was conceived as to evaluating the relationship between demand morbidity and perceived morbidity, thus endeavouring to elicit how reliable indicators of community needs may medical records be.

METHODS

Two districts of Embu, a town on the outskirts of the metropolitan region of Greater S. Paulo, S. Paulo State, Brazil, were selected for this study in view of the existence of a university programme in the area providing primary care to the community and field training for students. This community consists of 13,365 families accounting for 1,223 infants less than 1 year of age and 4,443 children between 1 and less than 5 years old. Primary medical care is available from 2 basic health units (BHU) named after the districts in which they are situated as "Santo Eduardo" (SED) and "Santa Emília" (SEM). Medical assistance is provided by university staff. One casualty department covers emergencies.

During the period from 15/Nov/1994 to 15/Jan/1995, all children less than 5 years of age calling at either BHU (BHU-SED or BHU-SEM) had their diagnoses retrieved from the visit-register form regularly used by doctors. These forms allow transcription of up to 4 diagnoses coded according to the International Classification of Disease (ICD-10) Morbidity Table (OMS[6], 1990), and all were considered.

Data regarding perceived morbidity for the same period was collected through a community survey. Cluster sampling (Kalton[2],1983) was used to randomly select 61 blocks out of the total of 210 blocks covering the area. Within the selected blocks, all families were visited and mothers or proper surrogates were interviewed to collect data on the health status of children under five. All children less than 1 year old were included. As to children aged 1 to less than 5, more numerous, a random sample of 1:3 was taken.

A standardised questionnaire was applied by university medical staff inquiring about symptoms and signs regarding the preceding 15 days. Apart from spontaneous answers, a checklist was also used including diarrhoea, fever, cough, running nose, breathlessness, ear pain, sore throat. If any problem was reported, the mother was asked about help seeking (none, health services, pharmacist, relatives/ friends/ neighbours, lay healers). If a doctor had been seen, his diagnosis was asked for and again a checklist also stimulated spontaneous answers (diarrhoea, pneumonia, common cold, tonsillitis, otitis, bronchitis, and asthma). The ICD-10 Morbidity Table was again used to code data, each problem corresponding to a diagnosis unless they could be brought together in a single diagnosis, e.g. running nose and fever corresponded to the single diagnosis of upper airway infection. For children seen by a doctor, medical opinion had no precedence over mothers' opinion, so that they could be likewise brought together into one single diagnosis or kept as two distinct problems. This double strategy approach, namely open questions and checklists, was adopted as to improving reliability, even though Kooiker[3] (1995), in a recent study, concluded that either alone is reliable and that conclusions are bound to be similar.

Analysis of survey data separated by the two age groups included descriptive statistics regarding becoming ill and seeking help, BHU's coverage of care needed, and prevalence of disease groups as perceived by the community. Differences of disease occurrence between children attending BHU and other sources of care were examined as well as chances of children of a given age and disease group been seen at the BHU were calculated.

BHU's demand data were processed through descriptive statistics, as were the survey data, to determine the frequencies of groups of diseases. To ascertain prevalence rates for the community from demand data, frequency data needed correction to allow for children seeking different sources of care. This was achieved through parameters drawn from the survey and the establishment of a premise that the relative frequency of problems should not vary from BHU to other sources of care.

To compare the two types of morbidity, a 95% confidence interval of the prevalence rates for perceived morbidity was calculated to check whether estimates of prevalence rates from demand morbidity were included, in which case equivalence between the two measurements could be supported.

RESULTS

Perceived Morbidity: Survey Data

According to the sample frame, the survey collected data on 346 infants (mean age = 5.8 months) and 338 children aged from 1 to less than 5 years (mean age = 2.8 years). There were 7 instances of unsuccessful interviews with mothers alleging unawareness of their children health status for the preceding 15 days. These cases accounted for 2 infants less than 1 year old and 5 children of 1 to less than 5 years, whose data were allotted to missing values. Among infants, 109 (31.7%) had at least one health problem reported for the period considered. In regard to children of 1 to less than 5 years of age, this frequency was 97 (29.1%).

Among the children reported as presenting problems, health services were the major source of help in both age groups. Nonetheless, not all children sought help and among those who did, different patterns were observed in each age group. BHU's coverage was better among infants less than 1 year old, while children aged 1 to less than 5 years were mainly taken to the casualty department. Patterns of help seeking and choice of health services are presented in Figures 1 and 2.

To analyse perceived morbidity, complaints were coded and grouped and groups with a prevalence equal to or greater than ≥2% were considered. Exception was made to skin problems as to providing comparison with demand morbidity, which reported high occurrence rates for such diseases. Table 1 shows the selected groups, which accounted for 90.83% and 95.88% of total morbidity in infants less than 1 year old and children from 1 to less than 5 years, respectively.

Figures 3 and 4 outline the sequence of events reported above in a Bayesian frame where disease occurrence is broken down according to the destination of children perceived as ill. To focus on BHU, alternatives to this source of help were merged where applicable. From this, parameters representing probability of events at each level were drawn.

To check whether disease occurrence between children attending BHU and other sources of help differed significantly, frequencies within each age group

Figure 1 - Pattern of help seeking and BHU's coverage for infants less than 1 year old
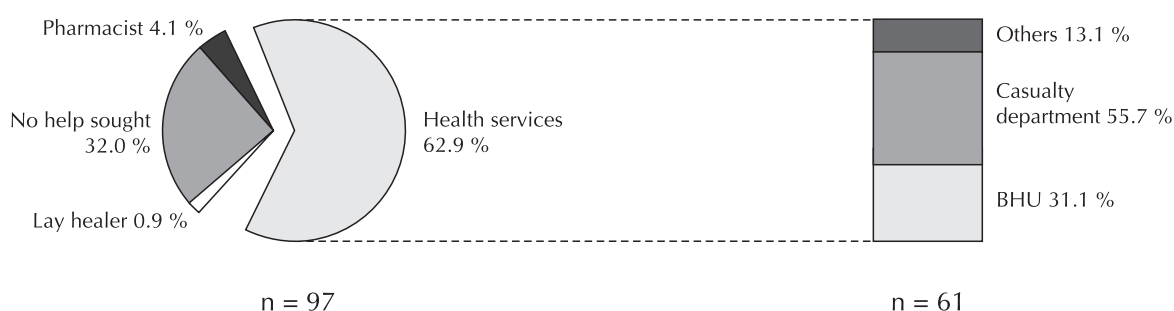

Figure 2 - Pattern of help seeking and BHU's coverage for children 1 to less than 5 years old.

Table 1 - Prevalence of disease groups according to age group: survey data.

Disease group	< 1 year		1 to < 5 years	
	Prevalence rates	95% CI	Prevalence rates	95% CI
Respiratory diseases	0.201	0.156 - 0.245	0.159	0.116 - 0.202
Diarrhoea	0.064	0.034 - 0.094	0.093	0.063 - 0.124
Skin problems	0.003	0 - 0.009	0.003	0 - 0.009
Infectious & parasitical diseases	0.020	0.004 - 0.037	0.024	0.008 - 0.040

Rev. Saúde Pública, 33 (4), 1999
www.fsp.usp.br/rsp

Morbidity in the paediatric community 353
Escuder MML et al.

Table 2 - Comparison of disease group frequencies at BHU and elsewhere: survey data.

| Disease group	BHU (n=35)		Others (n=74)		X²	p
	n	%	n	%		
Infants less than 1 year old						
Respiratory diseases	17	48.6%	52	70.3%	**4.82**	**0.0280**
Diarrhoea	10	28.6%	12	16.2%	2.25	0.1334
Skin problems	1	2.8%	-	-		
Infectious & parasitical dis.	2	5.7%	5	6.7%	0.04*	0.8329
Children 1 to less than 5 years old						
Respiratory diseases	11	57.9%	42	53.8%	0.10	0.7505
Diarrhoea	10	52.6%	21	26.9%	**4.64**	**0.0311**
Skin problems	-	-	1	1.3%		
Infectious & parasitical dis.	1	5.3%	7	9.0%	0.08*	0.7831

* Fischer's ex1act test

were compared through χ^2 test, or Fischer's exact test if applicable. Results are shown in Table 2, and suggest that only respiratory diseases for infants less than 1 year old and diarrhoea for children 1 to less than 5 years old had different ($p < 0.05$) occurrence patterns between BHU and other sources of help.

Allowing room for exceptions related to these two instances, one can rely on the premise that disease frequencies registered by BHU do not differ from those observed elsewhere. Thus BHU does not seem to be selective as far as diagnoses are concerned but, taking into account that BHU coverage is distinct for each age group (Figures 1 and 2), it seems relevant to examine whether chances of being seen at BHU are homogeneous for the different disease groups. Table 3 presents this analysis computing the odds for BHU in each disease and age group.

As a corollary of the former results, namely higher coverage for the age group less than one year old and equivalence of disease frequency within and
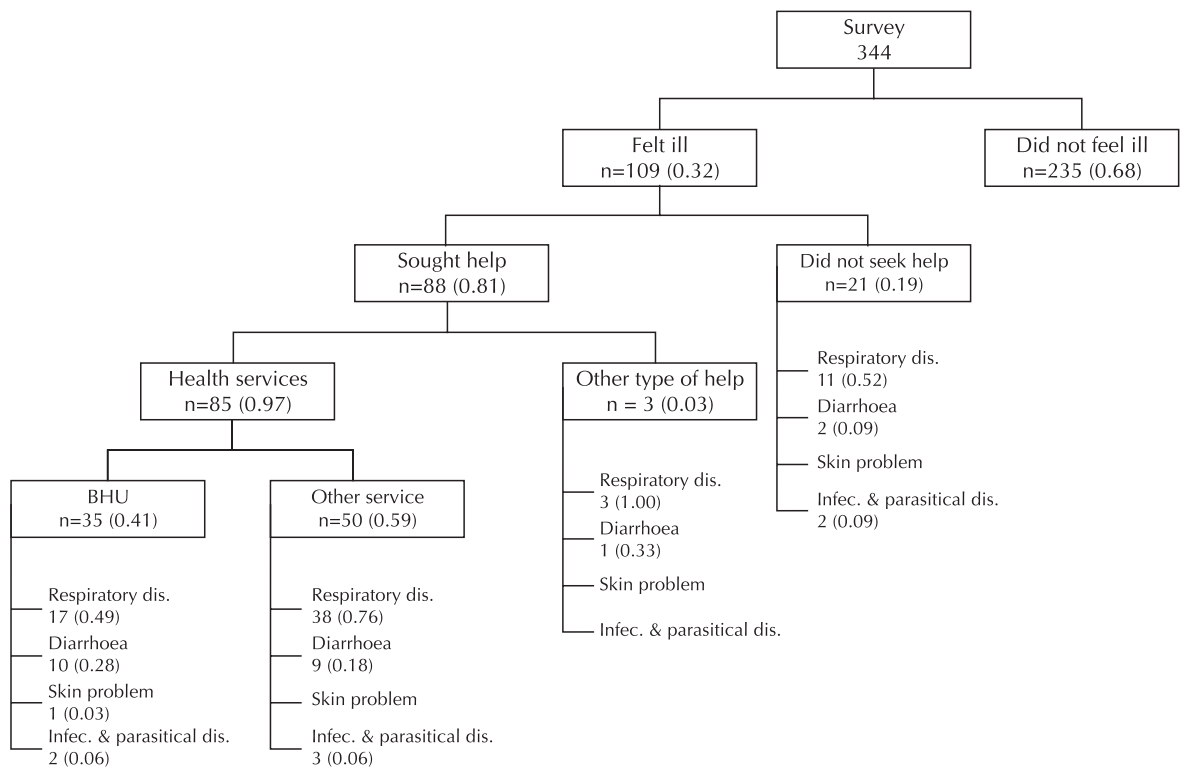
Figure 3 - Sequence of events ensuing the perception of health problems, and disease group frequencies for infants less than 1 year old: survey data.

354 Morbidity in the paediatric community
Escuder MML et al.

Rev. Saúde Pública, 33 (4), 1999
www.fsp.usp.br/rsp

outside BHU, Table 3 shows that the highest odds for BHU are in the age group of less than one year old. If a cut-off point for odds were established at 0.40, for the age group of less than one year, BHU's coverage would be unsatisfactory only for respiratory diseases. Conversely, in the age group one to less than 5, BHU's coverage would be satisfactory only for diarrhoea.

## Demand Morbidity: BHU Attendance Data

During the study period, 407 visits for first attendance for a given problem were recorded at BHU-SED and BHU-SEM. Routine and recall visits were disregarded. Infants less than 1 year old accounted

for 153 of these visits and children of 1 to less than 5 constituted the remaining 254. The first age group accrued 292 diagnoses (mean number/ visit = 1.9), while the latter registered 287 diagnoses in the 254 visits (mean number/ visit = 1.1). Diagnoses were coded in the same fashion as for the survey data.

Applying the parameters furnished by the Bayesian frames built for each age group from survey data (Figures 3 and 4), and assuming that relative frequencies of disease occurrence did not vary as between BHU and other sources of help (Table 2), estimates of prevalence rates could be computed from BHU demand data. Table 4 presents both disease group frequencies and prevalence estimates.

Table 3 - Chances of disease problems being seen at BHU according to age group: survey data.

Age group ⇒	< 1 year old			1 to < 5 years old		
Disease group ⇓	BHU	Other source of help	Odds to BHU	BHU	Other source of help	Odds to BHU
Respiratory diseases	17	52	0.32	11	42	0.26
Diarrhoea	10	12	0.83	10	21	0.47
Skin problems	1	-	-	-	1	-
Infectious & parasitical dis.	2	5	0.40	1	7	0.14
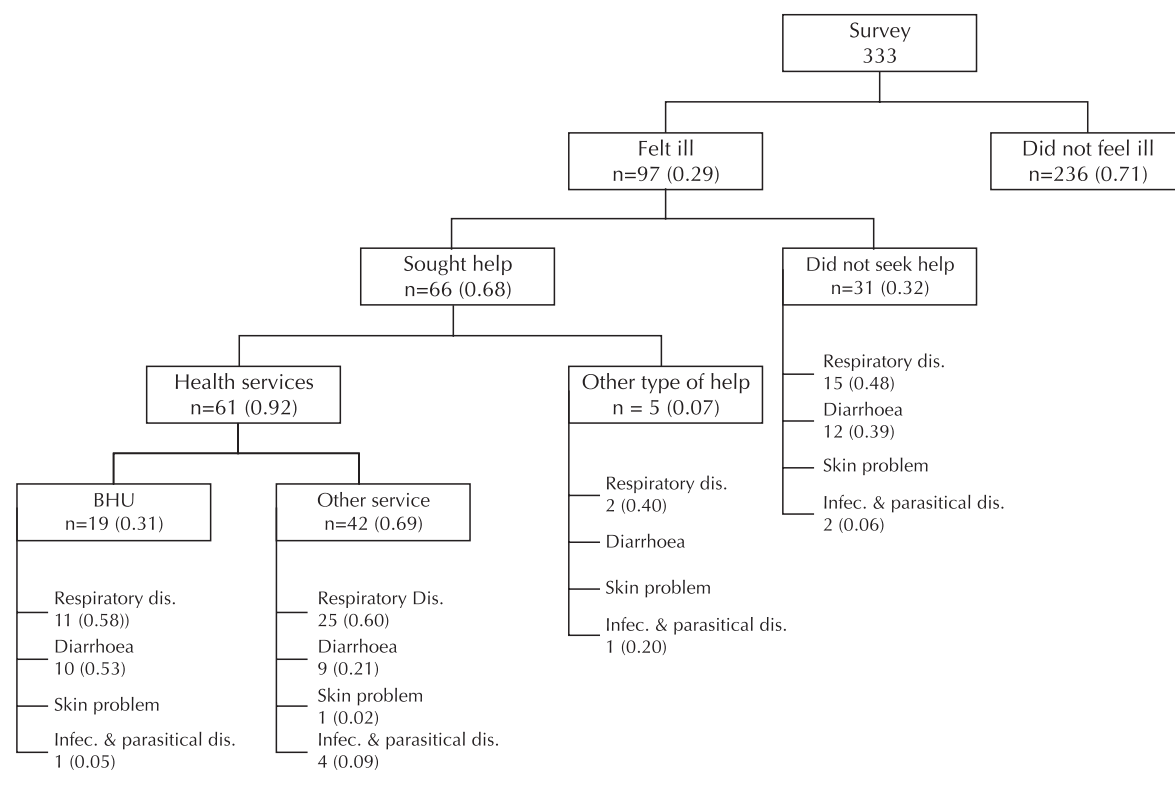
Figure 4 - Sequence of events ensuing the perception of health problems, and disease group frequencies for children 1 to less than 5 years old: survey data.

Table 4 - Frequencies of disease groups recorded at BHU (demand data) and prevalence estimates computed with survey data parameters.

Disease group	Occurrence at BHU	Estimated occurrence at			Prevalence estimate
		Other services	Other source of help	No help sought	
Infants < 1 year old (n = 153 / .41 / .97 / .81/ .32 = 1532.1)					
Respiratory disease	55 (35.9%)	79	4	32.4	0.111
Diarrhoea	28 (18.4%)	40.3	2	16.5	0.057
Skin problems	17 (11.1%)	24.4	1.3	10	0.034
Infec.&parasit. dis.	9 (5.9%)	13	0.7	5.3	0.018
Children 1 to < 5 years old (n = 254 / .31 / .92 / .68 / .29 = 4516.2)					
Respiratory disease	83 (32.7%)	184.9	23.3	137	0.095
Diarrhoea	34 (13.4%)	75.8	9.5	56.2	0.039
Skin problems	44 (17.3%)	97.8	12.3	72.5	0.050
Infec. & parasit. dis.	47 (18.5%)	104.6	13.2	77.5	0.054

Comparison of Perceived and Demand Morbidity

As planned, prevalence estimates drawn from demand data were compared to confidence intervals of prevalence rates computed from survey data. Figure 5 provides this information giving graphical representation of the contents of Tables 1 and 4. Results suggest that equivalence between the two types of morbidity is detectable only for diarrhoea and infectious & parasitical diseases in the younger age group.

DISCUSSION

The results of the survey suggest that the morbidity level in the community studied is lower than national levels. Indeed, in contrast with the present findings that some 30% of the children less than 5 years old had a health problem (31.7% for infants and 29.1% for 1 to less than 5 years of age), a countrywide household survey conducted in 1992 concluded that the frequency relative to this would be 46.8% (Benício et al.[1], 1992). A recent study conducted in the same community (Silva et al.[7], 1997) reported this frequency as about 28%, thus confirming the results herein presented.

Access to health services seems higher than elsewhere in the country. The above mentioned nationwide study reported that 40.5% of the children under 5 bearing a health problem are taken to health services, while the present survey found this proportion to be over 60% (Figures 1 and 2). This particular scenario of better health conditions and superior availability of services might be attributable to the University programme that has been in operation in that area already for more than 20 years.

Different patterns of health services utilisation were found for the two age groups studied, as infants less than 1 year old seek health services more often and are taken by preference to BHU, in contrast with older children who are taken by preference to the casualty department (Figures 1 and 2). Since there is no significant difference in disease occurrence between the two age groups (compare confidence intervals in Table 1), neither is there a marked selectivity for type of help sought by diagnosis (Table 2), it seems sound to conclude that these different patterns are due to factors external to the ill-health process. One reason not to be overlooked, is that infant mothers are usually on maternity leave from work, and thus more ready to take their children for care. Conversely, mothers of older children have returned to work, and thus might be obliged to take their children less often to care and further, to resort to 24-hour services, as offered by casualty departments.

The methodology devised for inference of disease prevalence from demand data, namely correction of disease frequencies through parameters drawn from a
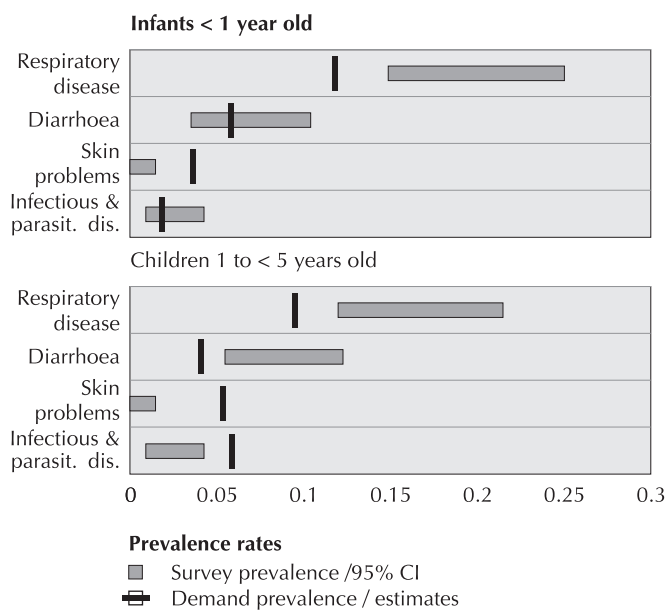
356   Morbidity in the paediatric community
       Escuder MML et al.

Rev. Saúde Pública, 33 (4), 1999
www.fsp.usp.br/rsp

Infants < 1 year old

Children 1 to < 5 years old

Prevalence rates

- Survey prevalence /95% CI
- Demand prevalence / estimates

Figure 5 - Comparison of prevalence figures ascertained from perceived and demand morbidity.

Bayesian frame of event sequence and assumption of equal proportional distribution of diseases within and outside BHU, proved reliable. On one hand figures computed to estimate population gave results close to the real numbers, and on the other the premise of equivalent disease frequencies within and outside BHU was found to hold at an acceptable level (Table 2). As a result, estimates ascertained for demand prevalence seem appropriate for comparison with the perceived prevalence yielded by the survey.

The comparison of the two types of morbidity presented in Figure 5, if taken alone are not suggestive of any relationship between them. Nevertheless, in the light of the information provided in Figures 1 and 2 and Table 3, it can be perceived that equivalence between them seems to be mediated by service coverage. Indeed, as in Figure 5, the age group of infants less than 1 year old scores two agreements between the two types of morbidity while the older age group scores none. In Figures 1 and 2 this age group has better BHU coverage. For infants under 1 year of age feeling sick, 78% go to health services and 41.2% to BHU, which results in a 32.1% coverage of health problems. For older children in the same situation, 62.9% go to health services and 31.1% go to BHU, which amounts to a 19.6% coverage of health problems.

Table 3, in its turn, shows that the two disease groups for which equivalence was found in Figure

5 are exactly the two with highest chances of being seen at BHU. If the proposed cut-off point of odds = 0.40 is accepted to establish a reasonable chance of coverage, then the conclusion is that in the 8 instances of comparison presented in Figure 5, the rule that equivalence is mediated by coverage is only violated once: all coverage odds lesser than 0.40 correspond to disagreement, and for the three coverage odds greater than 0.40, only one fails to correspond to the rule.

Susser[8] (1987), discussing measurements of frequency, says that *'only when the disorder is severe and the services adequate do demand and need converge'*. The present study suggests that 'adequate services' might be the main item enabling demand to be seen as an indicator of need, given that under good coverage demand morbidity should equal perceived morbidity. In conclusion, paediatricians at the primary level of care should feel comfortable in relying on their morbidity records as indicators of the community's morbidity profile, provided that they care for the good coverage of the services they offer.

ACKNOWLEDGEMENTS

REFERENCES

1. Benicio MHD'A, Cesar CLG, Gouveia NC. Perfil de morbidade e padrão de utilização de serviços de saúde das crianças brasileiras menores de cinco anos - 1989. In: Monteiro MFG, Cervini R, organizador. *Perfil estatístico de crianças e mães no Brasil: aspectos de saúde e nutrição de crianças no Brasil*. Rio de Janeiro: IBGE; 1992. p. 79-96.

2. Kalton G. *Introduction to survey sampling*. Beverly Hills: SAGE Publication; 1983. (Quantitative Applications in the Social Sciences, 35).

3. Kooiker SE. Exploring the iceberg of morbidity: a comparison of different survey methods for assessing the occurrence of everyday illness. *Soc Sci Med* 1995; 41:317-32.

4. Mckeown T, Lowe CR. *Introducción a la medicina social*. México (DF): Siglo Veintiuno Editores; 1981. Evaluación de mejoras en la salud; p.17-35.

5. Neuwelt PM et al. Ethnicity, morbidity and health service utilization in two Labrador communities. *Soc Sci Med* 1992; 34 :151-60.

6. [OMS] Organização Mundial de Saúde. *Classificação estatística internacional de doenças e problemas relacionados à saúde/ CID 10*. 10ª revisão. São Paulo: EDUSP; 1993. p. 1225-35.

7. Silva NN, Puccini RF, Araujo NS, Pedroso GC. *Morbidade e utilização de serviços no Município de Embu: estudo epidemiológico na área de saúde infantil*. São Paulo: Faculdade de Saúde Pública da USP, 1997. [Relatório de Pesquisa].

8. Susser M. *Epidemiology, health, & society*. New York: Oxford University Press; 1987.

9. Verbrugge LM, Ascione FJ. Exploring the iceberg. Common symptoms and how people care for them. *Med Care* 1987; 25:539.

10. Wadsworth MEJ, Butterfield WJH, Blaney R. *Health and sickness, the choice of treatment*. London: Tavistock; 1971.