

A Household Survey on Morbidity and Treatment of Acute Respiratory Infections in Communities in Vietnam

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Abstract

Objective: To ascertain the extent of under-utilization and insufficiency or inappropriateness in provision of health services as one of the possible causes of high mortality from pediatric pneumonia in pilot areas in Vietnam.

Method: The household survey on morbidity and treatment of acute respiratory infections, simple cough, and cold and pneumonia, was conducted in two communities with 10% sampling of the child population.

Results: Both under-treatment of “fast breathing”, a proxy for pneumonia, and over-treatment of simple cough and cold with antimicrobials by health workers, mothers, and private practitioners were common.

Conclusions: A household survey on morbidity and treatment was found to be useful to clarify actual practices in the treatment of acute respiratory infections in the community, which cannot be obtained by mere interview with health workers or mothers. Since a change of knowledge did not automatically lead to change of practice, the training of health workers, health education of mothers and provision of antimicrobials at village health stations would not guarantee improved practice of health workers and mothers. Therefore, constant supervision for health workers, continued health education of mothers and involvement of private practitioners are needed to improve the situation.

Key words: household survey, health services, pediatric pneumonia, community, developing countries, Vietnam

Introduction

At the global level, acute respiratory infections (ARI), particularly pneumonia account for one third of deaths in children under 5 years of age (1). Reports from developing countries in the WHO Western Pacific Region showed that pediatric pneumonia accounted for more than one fourth of child deaths in countries where the infant mortality rate was greater than 30 per 1,000 live births (2). The infant mortality rate is 36.6 per 1,000 livebirths in Vietnam in 1989 (3). Therefore, pediatric pneumonia is a public health problem in the country. Recognized risk factors for the high incidence and fatality of pediatric pneumonia include malnutrition (4), low birth weight (5), breast feeding (6), indoor air pollution (7), parental passive smoking of children, crowding (8), lack of vitamin A (9), and nasopharyngeal carriage of *Haemophilus influenzae*

and *Streptococcus pneumoniae* (10, 11) in descending order of importance. These are factors to consider in the primary prevention of pediatric pneumonia. However, it appears to be rather difficult to correct these factors by various programs of primary prevention to reduce their impact. The main pathogens of pediatric pneumonia in developing countries are *Streptococcus pneumoniae* and *Haemophilus influenzae* and antimicrobial therapy was confirmed to be effective (12), early diagnosis and early treatment is still the mainstay of control efforts as secondary prevention.

The three-year health systems research on intervention of pediatric pneumonia control was conducted between 1988 and 1990 in two districts. During the period health workers were trained, mothers were given health education about the signs and symptoms of cough and cold and pneumonia, and antimicrobials (cotrimoxazole) were provided at district hospitals and village health stations. According to WHO guidelines (13), ARI are those with less than 30 days' duration, that includes any area of the respiratory tract including the nose, ears, pharynx, epiglottis, larynx, trachea, bronchi or bronchioles, or lungs. If a child has a cough, the respiratory rate is counted by a health worker with a timer or a watch. When a child has fast breathing, he/she is diag-

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Table 1 Demographic characteristics of study sites in Vietnam in 1990

District Location Province	Quang Xuang, rural, Thanh Hoa	Phu Xuyen, suburban, Ha Tay	Total
Number of communes	40	25	65
Total population	218,877	145,082	363,959
Child population under 5 years of age	26,023	14,855	40,878
Surveyed child population (10%)	2,381	1,352	3,733

Table 2 Results of morbidity survey in two districts in Vietnam in 1990

District Location Province	Quang Xuang, rural, Thanh Hoa		Phu Xuyen, suburban, Ha Tay		Total	
Prevalence rate in the previous 2 weeks	number	% per pop.	number	% per pop.	number	% per pop.
all acute respiratory infections	942	39.6	647	49.8	1589	42.6
cough and cold	847	35.5	597	44.2	1444	38.7
fast breathing	95	4.1	77	5.7	172	4.6
Annualized incidence rate	episode per person		episode per person		episode per person	
all acute respiratory infections	10.2		12.9		11.1	
cough and cold	9.1		11.4		10.1	
fast breathing	1.1		1.5		1.2	

nosed as pneumonia and antimicrobials are to be administered. If a child does not have fast breathing or any other severe signs such as chest-inrawing or cyanosis, antimicrobials are not to be administered. The cut-off point to define as fast breathing is 50 per minute for children less than 5 years. However, even after the program started, one third of all child deaths from ARI still occurred without utilization of health care before death in these pilot communities (14).

Therefore, the purposes of the present household survey on ARI in communities were to ascertain the extent of under-utilization and insufficiency and/or inappropriateness in provision of health services, and to evaluate the effects of the training program for health workers at health stations in suburban and rural communities in Vietnam. The authors were involved in the planning and evaluation of the health systems research under the supervision of Vietnamese Government and WHO Regional Office for the Western Pacific.

Subjects and Methods

Study sites were Quang Xuang District in Thanh Hoa Province, a rural area, 100 km south of Hanoi, and Phu Xuyeng District in Ha Tay Province, a suburban area, neighboring the Province of Hanoi. The sites were selected because the pilot project of a control program for ARI had already started in these districts. In the program, 28 health workers in Phu Xuyen District and 42 health workers in Quang Xuong District were trained using the WHO standardized training module and retrained annually. In addition, annually, about 15,000 mothers in Quang Xuang District and about 9,000 mothers in Phu Xuyen District and were provided with health education by health workers using flip charts in a face-to-face basis when they came to health stations with sick children. Ten percent of households with children under 5 years old in each district were sampled (Table 1), and were visited by health workers for interviews using structured questionnaires in May and June, 1990.

Questionnaires were prepared as follows. Questions were on ① cases under 5 years of age with symptoms; if child has or had a cough in the past 2 weeks, he or she is considered to suffer from ARI; Cough without fast breathing is defined as simple cough or "cough and cold"; Cough with fast breathing is defined as ARI

with fast breathing, possibly pediatric pneumonia, ② who treated patients: mothers, health workers at government health stations or private practitioners, ③ whether an antimicrobial was used, and ④ what kind of antimicrobials were used and how long they were administered for cases with fast breathing. Definition for correct treatment is that suitable antimicrobials such as cotrimoxazole and amoxicillin were provided for at least 5 days.

Statistical analysis was performed using the χ^2 -test between two districts on the prevalence and treatment.

Results

1. Prevalence rate of ARI (Table 2)

The prevalence rate for ARI was 39.6% (942/2381) of children under 5 years of age in Quang Xuang and 49.8% (647/1352) in Phu Xuyen. Similarly, the prevalence rate for fast breathing was 4.1% (95/2381) in Quang Xuang and 5.7% (77/1352) in Phu Xuyen. Although it was not significant by difference, prevalence rates of both ARI and fast breathing were higher in Phu Xuyeng than those in Quang Xuang.

3. Treatment of all ARI cases (Table 3)

Slightly more than half (53.7%) of the cases with cough and cold in the two districts, 54.2% in Quang Xuang and 52.9% in Phu Xuyen, respectively, were administered antimicrobials. The majority of these cases were administered by mothers (45.6% in Quang Xuang and 27.6% in Phu Xuyen), fewer by health workers (6.5% in Quang Xuang and 11.1% in Phu Xuyen) and private practitioners (2.1% in Quang Xuang and 14.2% in Phu Xuyen).

4. Treatment of fast breathing cases (Table 3, 4)

Most cases (83.1%) with fast breathing (81.1% in Quang Xuang and 85.7% in Phu Xuyen) were administered antimicrobials. In other words, 16.9% of those with fast breathing were not administered antimicrobials. In Quang Xuang, 52.6% of those with fast breathing were administered antimicrobials by mothers, 25.2% by the government health workers, and only 3.2% by private practitioners. In Phu Xuyen District, only 20.8% of fast breathing cases were administered antimicrobial by mothers, 40.3% by the government health workers, and 24.7% by private practitioners.

Table 3 Results of treatment survey in two districts in Vietnam in 1990

District Location Province	Quang Xuang rural Thanh Hoa		Phu Xuyen suburban Ha Son Binh		Total	
	number	% per patients	number	% per patients	number	% per patients
for cough and cold (total)	847	100	597	100	1444	100
antimicrobials administered	459	54.2	316	52.9	775	53.7
by mothers	386	45.6	165	27.6	551	38.2
by health workers	55	6.5	66	11.1	121	8.4
by private practitioners	18	2.1	85	14.2	103	7.1
for fast breathing (total)	95	100	77	100	172	100
antimicrobials administered	77	81.1	66	85.7	143	83.1
by mothers	50	52.6	16	20.8	66	38.4
correctly	16	16.8	6	7.8	22	12.8
incorrectly	34	35.8	10	13	44	25.6
by health workers	24	25.2	31	40.3	55	32
correctly	16	16.8	15	19.5	31	18
incorrectly	8	8.4	16	20.8	24	14
by private practitioners	3	3.2	19	24.7	22	12.8
correctly	0	0	6	7.8	6	3.5
incorrectly	3	3.2	13	16.9	16	9.3
Total for correct treatment	35	36.8	27	35.1	62	36

Table 4 Proportion of correct treatment with antimicrobials for fast breathing in two districts

	Number of patients antimicrobials administered	Correctly	Incorrectly	Percentage correctly administered
Total	143	62	81	43.4%
by mothers	66	22	44	33.3%
by health workers	55	31	24	56.4%
by private practitioners	22	6	16	27.3%

Among all fast breathing cases in the two districts together, only 36% (62/172) were correctly treated in terms of the antimicrobials administered. Of all "fast breathing" cases that were administered antimicrobials in the two districts, 43.4% (62/143) were correctly treated (Table 3). If it was broken down by service providers, the percentage of correct treatment was 33.3% (22/66) by mothers, 56.4% (31/55) by health workers and 27.3% (6/22) by private practitioners (Table 4). The majority of incorrectly treated cases were either administered wrong antimicrobial such as streptomycin or tetracycline, which were not suitable for pediatric pneumonia, and/or, although the correct antimicrobials were administered, they were for less than 5 days.

Discussion

Between the two districts the prevalences of both all ARI and fast breathing were higher in Phu Xuyen, suburban areas, than in Quang Xuang, rural areas. A WHO document (13) suggested that incidence rate of ARI among children under 5 years in developing countries was 5–8 episodes per child per year in urban areas and 3–5 episodes per child per year in rural areas. It is obvious that viral transmission as the cause of most ARI is more common in densely populated areas than in sparsely populated areas. The prevalence of ARI for the duration of 2 weeks appears to be higher than the findings from other surveys. For example, the prevalence of ARI for one month was 25.4% in the rainy season and 35.0% in the dry season in Burkina-Faso (14). This might be partly because the season when the survey was conducted was May and June rainy season. These months are known to be the peak season of

ARI by other surveys in Vietnam (reports in Vietnamese). In addition, recall of diseases of the previous 2 weeks by mothers may include episodes which occurred longer than for the 2-week period, for example one month, if mothers remember them clearly. For the proportion of acute lower respiratory infections (ALRI), defined as cough with chest auscultation abnormalities by physicians, of all ARI was 50% during the rainy season and 36.4% during the dry season in Burkina-Faso (14). In other studies, the proportion of ALRI including fast breathing, crepitation, cyanosis and chest indrawing, etc., of all ARI differs in different studies such as 8.2% in the Philippines (8), 14% in Fiji (15) and 25.8% in Colombia (16) based on calculations from the incidence rate. The general health condition using life span and the infant mortality rate in Vietnam is poorer than that of Fiji but similar to that of Colombia and the Philippines. The definition of ALRI as a proxy of pneumonia and the diagnostic skills may differ between studies. In addition, seasonality in the incidence of ARI and ALRI was evident in most study sites. However, it was not always consistent from year to year, and peaks of ARI and ALRI did not necessarily correspond (17). Therefore, it is natural that the proportion of ALRI of all ARI diversified. Since 1988, health education on ARI has been given to mothers. However, villagers usually do not have time pieces to count the respiratory rate. Thus, "fast breathing" is described only by the impression of the care-takers, most by the mothers of the sick children. Nevertheless, the proportion of "fast breathing" among all ARI was 10.9% (172/1589), which was within the range of the above-mentioned prospective studies (8, 15, 16). Therefore, discussions on the treatment of fast breathing cases as a proxy of pneumonia should be meaningful.

Findings on the treatment practice are useful to identify current problems on the usage of antimicrobials. For coughs and colds without fast breathing, antimicrobials are not recommended according to the ARI program, because it may lead to increase in drug resistance and the waste of a valuable resource. However, more than half (53.7%) of cases with cough and cold were administered antimicrobials mainly by mothers (38.2%) who usually buy them from pharmacies or in the market, by health workers (8.4%), and by private practitioners (7.1%). It is an unnecessary and avoidable burden to the patients' families.

Among all cases with fast breathing, only 36% were correctly treated, 47.1% were incorrectly treated and 16.9% were not administered antimicrobials. These figures match well those that 31% of all child deaths from ARI still occurred without utilization of health care before death (18).

In Quang Xuang, the majority of with "fast breathing" cases were administered antimicrobials by mothers, and very few by private practitioners, because there are few private practitioners. In Phu Xuyen, on the other hand, the majority of "fast breathing" cases were treated by health workers, followed by private practitioners, and then by mothers, because there are reportedly even more private practitioners than government health workers. Thus, the private practitioners' role is larger in Phu Xuyen than in Quang Xuang. Mothers play the most important role in providing antimicrobials either for cases with cough and cold or "fast breathing" cases in Quang Xuang. Mothers did not markedly depend on public health facilities because village health stations were relatively far from their residences than in Phu Xuyen.

As generally observed, mothers often buy antimicrobials for one day or only a few days because they do not have enough money or they are not advised properly by store keepers. If symptoms improve, they stop administering drugs. Mothers and private practitioners treated one third of "fast breathing" cases. Furthermore, a concern is that even health workers at public health facilities who were trained treated correctly only slightly more than half of the cases. According to the findings collected through interview in February and November, 1990, 93% (56/60) of health workers in Quang Xuang replied correctly regarding the diagnosis and 92% (55/60) replied correctly regarding the treatment (19). Therefore, even though health workers have correct knowledge, they might not practice correctly or appropriately. This suggests that to test knowledge, information based on actual cases provides more accurate information than that obtained by questionnaire.

Thus, overuse or incorrect use of antimicrobials for simple cough was evident. According to the survey from pediatricians from 14 provinces, cotrimoxazole was widely available in the community from pharmacies or at markets at a low price; (US\$0.02–US\$0.03) per tablet as of 1990 (19). In Vietnam there is no regulation to prohibit over-the-counter sale of antimicrobials, which is the same condition in many other developing countries. Therefore, constant supervision of health workers of government

health facilities and health education of mothers on proper care of ARI and the involvement of private practitioners is needed to minimize unnecessary use of antimicrobials to prevent an increase in the drug resistant rate.

In conclusion, the household survey in Vietnam showed that both under-treatment of "fast breathing", a proxy for pneumonia, and over-treatment of simple cough with antimicrobials were common where regulation of medical practice and that of prescription of antimicrobials is loose. Training of health workers and provision of antimicrobials at village health stations would not automatically change the practice of health workers and mothers because the old practice has been conducted for a long time. Therefore, these findings suggest that further health education and constant supervision of health workers and the involvement of private practitioners are needed to improve the situation. Routine records and reports from government health stations would provide information on treatment only at these health facilities, but would not provide any information on practices in the entire community. In fact, two thirds of "fast breathing" cases appeared to be treated by private practitioners or mothers in the community outside of government health facilities. Therefore, the behavior and practice of mothers and private practitioners should also be monitored to understand the entire picture of treatment of ARI in the community in Vietnam. However, considering its cost, it cannot be repeated often as a regular program. Therefore, some alternative method, which is qualitative rather than quantitative, such as case history interview, focus group discussion and focused ethnographic study should be sought. In a study on ARI in Bangladesh (20), to obtain similar information, 20 case history interviews were conducted with mothers of children under 5 years of age currently suffering from pneumonia. In addition, group discussions were held with different groups such as young mothers, older mothers, grandmothers, traditional birth attendants and village doctors. One group usually has 8–12 persons. Questions were on perceptions of specific signs and symptoms of ARI, and decisions to seek outside care. Group discussion would give rather unbiased opinions in contrast to individual interviews. It can suggest how ARI was perceived and treated although it cannot be evaluated quantitatively. For the same purpose, a focused ethnographic study has a series of activities such as interviews with a sample of 25–30 mothers who usually bring children with ARI to a health facility, trained health workers at the health facility and community-based practitioners. It has a more systematic approach but is more costly (21).

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