Healthcare Use for Diarrhoea and Dysentery in Actual and Hypothetical Cases, Nha Trang, Viet Nam

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ABSTRACT

To better understand healthcare use for diarrhoea and dysentery in Nha Trang, Viet Nam, qualitative interviews with community residents and dysentery case studies were conducted. Findings were supplemented by a quantitative survey which asked respondents which healthcare provider their household members would use for diarrhoea or dysentery. A clear pattern of healthcare-seeking behaviours among 433 respondents emerged. More than half of the respondents self-treated initially. Medication for initial treatment was purchased from a pharmacy or with medication stored at home. Traditional home treatments were also widely used. If no improvement occurred or the symptoms were perceived to be severe, individuals would visit a healthcare facility. Private medical practitioners are playing a steadily increasing role in the Vietnamese healthcare system. Less than a quarter of diarrhoea patients initially used government healthcare providers at commune health centres, polyclinics, and hospitals, which are the only sources of data for routine public-health statistics. Given these healthcare-use patterns, reported rates could significantly underestimate the real disease burden of dysentery and diarrhoea.

Key words: Diarrhoea; Dysentery, Bacillary; Healthcare; Healthcare-seeking behaviour; Viet Nam

INTRODUCTION

Seeking care for diarrhoeal diseases is directly related to survival and mortality (1-3). Several studies have evaluated healthcare-seeking behaviours and healthcare use among mothers and families in developing countries in relation to diarrhoeal diseases. Across cultures several patterns have been recognized which determine the use of healthcare services for diarrhoeal diseases. These include: (i) Perceptions of the severity of the illness affecting caregivers' decisions to seek treatment and influencing the type of treatment used (1,4-10); (ii) The patient's or care-provider's beliefs about causative factors of the disease which play a role in the decision to seek healthcare in the first place and types of treatment ultimately chosen (8,10); (iii) The use of self-treatment with biomedical or traditional remedies, private or public healthcare facilities, consultation with a traditional healer, and the use of local stores or pharmacies appear not to be mutually exclusive, and often a combination of several

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types of treatment is common (3,7,10,11); and (iv) The choice of treatment is related to the socioeconomic status of the patient.

One study on healthcare-seeking behaviour patterns in Chiapas, Mexico, observed that households with lower incomes are more likely to use a local store and less likely to travel distance for healthcare options (11). The variables that affect individuals' healthcare-seeking behaviours are not static, but dynamic and dependent on past experiences, immediate access to resources, perceived efficacy of resources available, and beliefs about causes and treatments.

An understanding of healthcare use is essential for the rational planning of healthcare services. Passive surveillance systems are commonly used in epidemiological studies of disease incidence and in trials. It is essential to estimate the fraction of disease episodes missed in a passive surveillance system when patients seek treatment outside the network of participating healthcare providers.

The DOMI (Diseases of the Most Impoverished) Programme includes the assessment of the impact of shigellosis in six Asian countries using passive surveillance. Sociobehavioral and healthcare-use studies contribute to understanding the extent to which the surveillance might underestimate burden. To estimate the burden and cost of shigellosis in Nha Trang, Viet Nam, one of the participating sites, the current study explored healthcare use and healthcare-seeking practices relating to treatment of dysentery and diarrhoea.

Both quantitative and qualitative methods were used for obtaining data on healthcare use in actual and in hypothetical circumstances. A qualitative approach may be best suited to understanding which providers are used for a particular disease and why one provider is chosen over another. Anthropologists and other social scientists have made significant contributions to understand the perceived desirability, availability, and accessibility of sectors of healthcare systems and have identified critical influences in the acceptability and delivery of various public-health programmes (12-15). To further clarify findings from the qualitative study regarding healthcare, we designed a population-based household survey to estimate the fraction of cases making use of one or another healthcare facility.

MATERIALS AND METHODS

The paper is based on data from two studies in Nha Trang city, Viet Nam, conducted during June 2001–December 2002. Both the studies were part of a larger surveillance project in Khanh Hoa province to study enteric diseases, including cholera and shigellosis (16,17).

The first study was a sociobehavioural study, including qualitative semi-structured interviews and case studies. Research questions included healthcare-seeking practices of respondents in relation to diarrhoeal diseases, with a particular emphasis on dysentery, perceptions of causes, severity, prevalence, and vulnerability to diarrhoea and dysentery. The second study was a health utilization survey. The survey was designed to address whether the use of healthcare would differ with the perceived severity of disease and vulnerability of the patient. The respondents were asked which healthcare they would choose for diarrhoea compared to dysentery with the implicit assumption that dysentery, bloody diarrhoea, is considered more severe than diarrhoea. Furthermore, the use of healthcare for children was compared with healthcare for adults, assuming that children are perceived more vulnerable than adults. This study concurred with prospective surveillance for diarrhoea and dysentery in all government hospitals, polyclinics, and commune health centres (CHCs) serving the residents of Nha Trang city. The data provide a perspective on the extent to which disease-incidence estimates from the passive surveillance might be underestimated.

Research site

The study was conducted in Nha Trang, which is the largest city and the provincial capital of Khanh Hoa province. Nha Trang city has 26 communes and a population of approximately 327,500. In the past, the local economy depended on manufacturing and processing, fishing, and agriculture, but in recent years, tourism has played a major role. The health utilization survey was conducted in 16 study communes with an approximate population of 226,000. The socio-behavioural qualitative study was conducted in 6 of the 26 communes, including 2 urban, 2 rural and 2 seaside communes.

The healthcare system in Nha Trang is similar to that throughout Viet Nam and includes both public and private facilities. There is a 500-bed general hospital in Nha Trang city and 4 specialized hospitals. Each

commune has a government-funded CHC. The CHC staff are practitioners with 2-3 years of training in biomedical sciences. Four government-funded 'polyclinics', staffed by medical school graduates and larger than CHCs, provide overnight admissions and obstetrical services. There are private physicians and pharmacists. At pharmacies and CHCs, individuals pay for medications only. Pharmacists prescribe a range of medications, including oral rehydration solution (ORS), ciprofloxazin, tetracycline, and co-trimoxazole, which are available in a tablet form and are often purchased, for diarrhoea and dysentery. The cost per tablet of tetracycline is approximately 300 vnd (0.02 US$), ciprofloxazin 1,300 vnd (0.08 US$), and co-trimoxazole 1,200 vnd (0.08 US$). The cost of a sachet of ORS is approximately 1,000 vnd (0.06 US$). In addition to biomedical practitioners, there are traditional doctors engaged in 'thuoc dong y', a form of Chinese medicine.

Generally, for individuals seeking treatment for mild-to-moderate symptoms, including diarrhoea, the first contact is usually a visit to a CHC. Cases which require more sophisticated care are transferred to polyclinics. For more complex interventions, such as surgery, the patient is transferred to the hospital. However, residents do not have to go through this sequence and can go directly to the healthcare provider of their choice. The least expensive alternative is usually the pharmacy, and the most expensive is the hospital. Some government employees who have health insurance are required to pay 20% of the actual expense. For very poor individuals, healthcare can be provided free of charge if the necessary documentation can be provided. For all others, health expenses are their personal responsibility.

Sociobehavioural study

The sociobehavioural study included case studies and open-ended semi-structured interviews with commune residents, commune leaders, and healthcare providers. The open-ended interviews included the use of an interview guide and vignettes. The interview questions were developed from the key research objectives as described above. The vignettes were developed to elicit from respondents hypothetical healthcare-seeking behaviours based on symptoms of dysentery. Case studies were a series of interviews with individuals or family members of individuals who had

confirmed or suspected dysentery diagnosed by CHCs and private practitioners. The interviews were conducted as soon after the onset of illness as was feasible and at 3, 6, and 12 months.

A targeted convenience sampling strategy was used for ensuring that we interviewed approximate equal numbers of men and women and that we covered a range of income and age groups within each commune. Community recruiters, who included CHC staff and commune leaders, were hired to assist in identifying resident respondents. These recruiters were informed of the required gender, age, and socioeconomic status of respondents. The interviewed healthcare providers included CHC staff, private physicians, pharmacists, and traditional doctors. Interviews with community leaders included the chairs of the local Commune People's Committee and the chairwomen of the Women's Unions. An interview-training manual was developed in a collaborative effort and translated into Vietnamese. Six interviewers were trained for one week. The pilot study was conducted to provide field experience for the interviewers and to obtain feedback regarding the accuracy of the translation of the instruments and guides.

Data were collected during 21 May–20 July 2001. Each interview was audio-taped. The respondents were paid a small stipend at the completion of the interview. In total, 109 residents, 36 healthcare providers, and 23 community leaders were interviewed. Fourteen case-study participants were identified through private and public healthcare providers. In addition to the open-ended interviews, each resident respondent was asked to respond to one of six vignettes. The vignettes varied by gender and age of the hypothetical 'patient'. The respondent was given a series of questions about how they would respond to increasingly serious symptoms possibly indicative of dysentery.

For the interviews and case studies, the Vietnamese transcripts were translated into English by two translators and entered into Ethnograph, a text-organizing software (Scoleri, Sage Publication Software, Thousand Oaks, CA). The transcribed and translated data were organized using code words, which reflected the key research objectives, e.g. severity, vulnerability, healthcare access. Analyzing the coded transcripts, the research team identified common themes, patterns, and issues.

The interview and case-study data were analyzed at an 'ideational' level, including what was said in the context of the interview, how different parts of the interview fit into single or multiple discourse(s), and relationships between the texts of interviews between groups of individuals. In reference to the intra-interview analysis, we were primarily concerned with 'themal coherence', or how portions of the text express the respondent's recurrent assumptions, beliefs, and goals, or their 'cognitive world' (18). We were interested in how portions of the text and/or responses to specific questions were related to other responses. Analysis was conducted by 'searches' using the coded text in conjunction with sorting by such variables as gender and commune. The portions of text were then read, and memorandums were written on themes, which emerged during these readings.

In addition to being analyzed qualitatively, the vignette data were quantified to look at relationships between healthcare use and perceived cause of disease, gender of respondent, respondent residency, and age of hypothetical 'patient' in the vignette (child, young adult, older adult). The responses were coded and entered into SPSS.

Survey of healthcare use

The survey questionnaire, described in detail previously (19), was designed to address several hypotheses. First, we hypothesized that the use of the healthcare system would differ between adults and children. Second, we hypothesized that the use of the healthcare system would differ between individuals with diarrhoea and individuals with dysentery. To test our hypotheses, the same questions regarding the use of healthcare were asked for a child aged less than five years with diarrhoea, an adult aged over 15 years with diarrhoea, a child with dysentery, and an adult with dysentery. A very large number of respondents would have to be interviewed to identify an adequate number of recent cases. Therefore, in the absence of an actual diarrhoea case in the household in the previous four weeks, the respondent was asked about their potential behaviour for a child with diarrhoea or dysentery and an adult with diarrhoea or dysentery. The respondent was asked to rank their preferred healthcare providers and to suggest the reason for their preferred treatment option.

Households were randomly selected from the 2001 census database (20). The sample size was calculated so that a treatment chosen by 30% of respondents could be estimated within a 95% confidence interval from 25% to 35%.

Ethics

The national ethics review boards of the Government of Viet Nam and the World Health Organization (Switzerland) approved the studies. The interviewers were trained in ethical research and obtaining consent. Written consent was obtained from each participant.

RESULTS

Interviews and case studies

Demographics

Of 109 respondents interviewed, 45 (41%) lived in rural communes, 33 (30%) in urban communes, and 31 (28%) in seaside communes. Forty-six respondents (42%) were male and 63 (58%) were female. Their mean age was 44 years, and the mean household size was 6 (range 2-13). The mean length of residency at the respondent's current location was 27 years for rural respondents, 18 years for urban respondents, and 28 years for seaside respondents. The mean year of schooling across sites was 7.8 years. Seventy-two percent were employed full or part time. Of those employed, 25% had a second job. The mean number of hours worked per week across sites was 50.6 hours. There was some variability across types of sites in mean monthly household income with the lowest income in rural areas (1,114,000 vnd/74 US$), intermediate in seaside areas (1,477,000 vnd/98 US$) and the highest in the urban areas (1,553,000 vnd/104 US$). All the respondents had electricity in their homes. The majority of the respondents used tap/running water (50%) or open well (44%).

For 14 case studies, 12 (85%) of 14 respondents were female. Five were mothers of children diagnosed with shigellosis, and one of the two men interviewed was the father of a child patient. Their age range was 19 to 75 years.

Treatment

A large number of the respondents talked about the use of various types of herbs, tea, and soup to treat dysentery and other diarrhoeal diseases. Many of these foods and herbs are considered 'cool' and can, therefore, counteract the 'hotness' in the body perceived to cause

diarrhoea and dysentery among other diseases. Within Vietnamese traditional medicines, foods, beverages, herbs, and even western medicines are categorized as either 'hot' or 'cool'. To avoid illnesses, a balance between 'hot' and 'cool' must be maintained in the body through the intake of appropriate foods. Some foods and tea considered to be 'cool' include sweet leek soup (canh he), 'mong toi' soup, artichoke tea (tra a ti so), guava leaf (la oi), plantain leaf (la ma de), 'mo' leaf (la mo), and a number of other herbs and leaves (la chum ngay, la song doi, truong sinh).

A 29-year old woman discussed the use of guava leaves in her household. "My house has a guava tree for the treatment of diarrhoea. When someone gets diarrhoea, we pick some leaves from the top of the guava branch and put them into water with a little salt and cook. Taking this water can treat the diarrhoeal disease." Another common home treatment was a drink made from water and a dried kudzu powder (uong bot san day). A 42-year old woman reported, "when getting diarrhoea, I take guava leaves in water. When I get 'kiet' (dysentery), I take drinks from boiled water with dried kudzu powder."

These various home treatments are used alone, but also in combination with western medicines obtained from the pharmacy or CHCs. The respondents discussed both traditional and biomedical treatments for diarrhoea and dysentery. A woman interviewed for the case studies stated that she used both western and Vietnamese medicines to treat her illness, and she felt that the combination of the two was more beneficial than either used alone. She stated that after receiving medicines from a healthcare provider "… I asked for 'mo' leaves, and I washed them clean and ate with eggs. At the time getting disease not eat fat food and not eat soup…. After doing that, disease was reduced; I thought what I did improved my disease more because I took medicines and traditional treatment at the same time."

The perception of the severity of a disease affects healthcare-use decisions. Some individuals talked about choosing western medicines for more serious illnesses, but using home treatments or traditional medicines (thuoc dong y) for less serious illnesses. In some instances, home treatments were used first, and then if the illness continues the respondent would go to the pharmacy, CHC, or the hospital.

A 47-year old man stated, "When getting a disease, I do not buy medicine but at home I use 'mo' leaves, and eggs, and fry to eat. If the disease does not improve, I go to the hospital." And a young woman said, "For myself and my family, if we have a serious disease, we go to the pharmacy or the clinic to buy medicines to take. If the disease is not serious, we treat it at home and eat pineapples, semi-incubated duck eggs, and drink kudzu powder." Other residents noted that the first recourse would be to use western medicines, because they are perceived to act quickly. These medicines, particularly antibiotics, however, were often only used until the symptoms have subsided. Within the 'hot' and 'cool' explanatory model for illnesses, western medicines (thuoc tay) were also considered to be 'hot'. One woman, whose young son was included among the case studies, mentioned that, for this reason, she was initially reluctant to use western medicines for her son's condition. "Yes, at first I intended to have him drink western medicines but then I took leaves for him to drink…because I thought traditional medicines made him cool, while western medicines made him hot."

Access to healthcare

Nearly, all individuals reported that they could obtain healthcare. However, many of these individuals also noted instances in which they had to borrow money to pay for needed care for them or for a family member. In Viet Nam, per-capita income in 2001 was less than US$ 400. The mean monthly household incomes within the study population ranged from 1,114,000 vnd (US$ 74) in rural sites to 1,553,000 (US$ 104) in urban sites. One resident who made his living as a driver noted, "Once my van was broken down, and I did not have money to buy injection medicines for my son. At that time, I borrowed money from my parents." Among healthcare providers, one traditional doctor described a sliding scale for his patients. "... (it costs) about 30,000 vnd (2 US$) for each time of treatment. To me, there is a difference, because I think I can get more money from the rich to make good for the poor. The poor can pay less, or if they do not have money they can pay later, or get medications without payment." Another healthcare provider suggested that the very poor, and in particular migrant labourers, simply avoid going to healthcare facilities because they do not have money. "Their houses are mainly rented and small, and they have many unhygienic

conditions ... these people do not have enough money to buy medicines, and they only take one or two dose(s). People here when they get a disease do not want to visit doctors, because they have no money."

One woman stated that she had to pay 6,000 vnd (0.40 US$) for medicines at a local pharmacy. A young man paid 140,000 vnd (9.34 US$) for injections at a private physician's office, and another woman reported that she paid 100,000 vnd (6.67 US$) for hospitalization costs. In several vignettes, individuals stated that they might want or need to go to the hospital, however they would not go because of the cost. Among the case studies, a few respondents reported that they did not have to pay any money directly for healthcare either because they went to the free CHCs or had health insurance.

Residents also reported that, during the rainy season, they had difficulty in accessing healthcare because of the conditions of roads and a decreased family income. While each study commune includes a CHC, travel and distance can still be an issue particularly if an individual needs to go to a hospital. One resident stated that concern about diarrhoea is compounded by issues of distance to the hospital. "They care much for diarrhoea because they are far from the hospital, and it can cause to die if it is not treated soon". A case-study young woman stated that she was unable to get to a CHC; however, a staff member came to her house. "I was unable to walk to the healthcare centre so I phoned to invite Thuy (health centre staff) to examine disease, and Thuy gave me medicines to take." In discussion with the healthcare providers and commune leaders, a majority of them felt that healthcare services were generally available for commune residents.

Survey of healthcare use

In total, 310 respondents were interviewed for the healthcare-use survey during 1-6 December 2002. Their median age was 42 years, and 57% were female. The majority of the respondents were household heads (n=230, 74%), followed by adult children of the household head (n=55, 18%). The median number of household members was 4.5 (interquartile range 4-6). Of the 310 respondent households, 97 (31%) had a child aged less than five years living in the household at the time of the interview. Diarrhoea and dysentery episodes in the previous month were infrequently reported. Six (2%) households had a child aged less than five years with a diarrhoea episode in the previous month, and 12 (4%) households had an adult aged 15 years or older with a diarrhoea episode. Two (1%) households reported dysentery episodes in a child, and two households reported a dysentery episode in an adult (1%). Given these small numbers, the analysis on healthcare choices included individuals with actual cases and those responding to hypothetical cases. There were no significant differences between individuals with actual diarrhoeal/dysentery cases and those who responded to hypothetical cases in terms of healthcare choices. The small number of actual cases of diarrhoea/dysentery made statistical meaningful comparisons impossible.

For these hypothetical scenarios, there were no significant differences in the first choice of healthcare facility for children and adults, or between diarrhoea and dysentery. The first choice for the majority of the respondents was to purchase treatment for diarrhoea or dysentery from a pharmacy. As shown in Figure 1, 47% of children and 52% of adults with diarrhoea and 40% of children and 43% of adults with dysentery would receive treatment bought at a pharmacy. The next most common treatment choice was to attend a private practitioner, which was chosen for 19% of children with diarrhoea, 13% of adults with diarrhoea, 22% of children with dysentery, and 17% of adults with dysentery. The other choices were CHCs, followed by hospital, self-treatment with traditional or biomedical remedies, polyclinics, and lastly traditional healers.

The second choice of treatment depended on what the respondents considered to be a first choice. Respondents whose first choice was to visit the pharmacy ranked second a visit to either a private practitioner engaged in general practice (55%) or the hospital (37%). Additionally, 92% of the respondents who ranked a visit to the private practitioner first ranked a visit to the hospital second. Between 93% and 94% of the respondents whose first or second choice had not included the hospital ranked a visit to the hospital third. The flow of patients is illustrated in Figure 2.

The overall pattern of healthcare use did not depend on whether the respondent was the household head or another household member. But heads of the

households reported less frequent (24/230, 10%) use of hospitals compared to the responses from children of the household heads (12/55, 22%; odds ratio [OR]

with children aged less than five years was very similar to the use in households without children in that age group. There were not enough diarrhoea and

Fig. 1. Choice of first healthcare provider according to age (child aged less than five years) or adult (aged 15 years or older) and disease (diarrhoea/dysentery). Vertical lines represent 95% confidence intervals
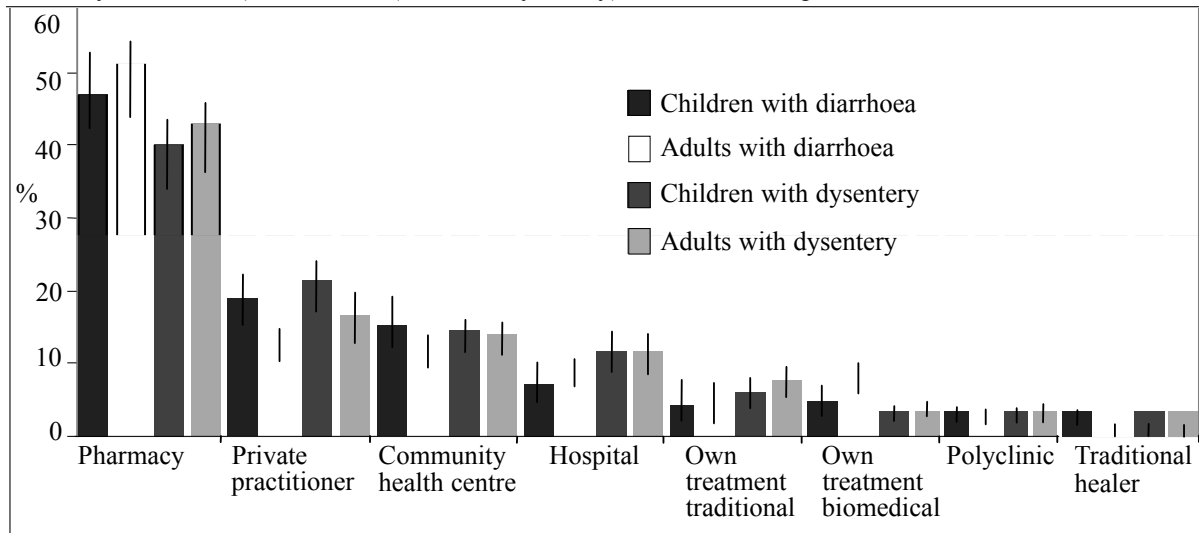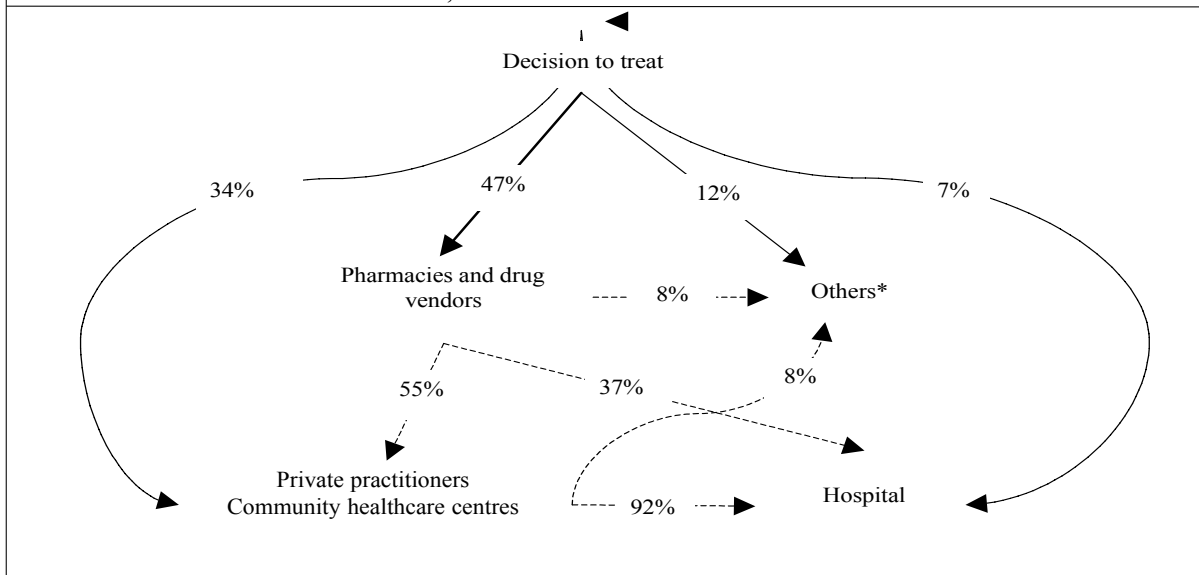

Fig. 2. Overall flow of patients from their first chosen healthcare provider to second to third. First choice of treatment is shown in solid lines, and the next choice is shown in dotted lines

* Others include own treatment, traditional healers, etc.

5.9; 95% confidence interval [CI] 1.1-31.2). After adjusting for age of the respondent, the difference in responses from these two groups of respondents was somewhat lower and no longer statistically significant (OR 5.2; 95% CI 0.9-31.4). The healthcare use in households

dysentery cases in the households of the respondents to allow for a statistically meaningful comparison between response to actual and hypothetical scenarios. There was a considerable variation in the responses between communes. For example, in one commune

(Vinh Tho), only 2 (15%) of 13 respondents would first go to a pharmacy if a child in their household had diarrhoea. In contrast, in another commune (Vinh Hoa), 17 (85%) of 20 respondents would choose a pharmacy first. The same variability was seen for the use of CHCs, polyclinics, and hospitals included in the surveillance study. In the commune, Vinh Truong, none of 25 respondents would make use of any study treatment centre, in contrast to Vinh Thanh where 11 (58%) of 19 respondents would make use of a study treatment centre.

The respondents were asked why they made the first choice. The answer was dependent on the choice of the healthcare provider. Among those who chose CHC and pharmacy, 81% and 69% respectively stated that they chose based on the close distance of the facility. Only 27% of the respondents who selected private practitioners and none of the respondents who chose the hospital mentioned distance as a decisive factor. The most frequently-mentioned reasons to choose the private practitioner were short waiting time (32%) and good reputation (20%). The most frequently-mentioned reason for using the hospital as a first choice was the condition of the treatment facility (68%). The second reasons that respondents gave for their choice were dependent on the choice of provider. Among those who chose pharmacy and CHC, waiting time (39%/28%), distance (14%/11%), and cost (10%/15%) were the second reasons given. Respondents who chose to go to a private physician listed as their second reasons, waiting time (24%), reputation (20%), and staff attitude (10%), while respondents who chose the hospital listed quality of consultation (32%), condition of treatment facility (27%), and knowledge of the disease (18%).

Vignettes

The vignettes, which were a part of the open-ended interviews, were a means of validating some of our findings in regard to healthcare use and obtaining additional information about the sequence of healthcare.

Of the respondents' perceptions of the causes of the described symptoms, 53 (49%) gave a biomedical cause, e.g. 'unhygienic water', 18 (17%) gave a traditional cause, e.g. eating 'hot foods', and 16 (15%) gave a combined explanation using both biomedical and traditional etiologies. Twenty (19%) of the responses were 'unclear' and could not be categorized. No

significant relationships between individuals' perceptions of cause and choice of healthcare could be detected. Likewise, there were no significant relationships between income and chosen healthcare option.

There were, however, differences in choice of healthcare by gender of respondent, age of hypothetical 'patient' in the vignette, and residency (rural, urban, seaside). Women were significantly more likely than men to choose both self-treatment (women 71%, men 59%) and CHCs (women 24%, men 15%), and men were more likely to choose private physician and hospital (men 17.4%, women 3.2%) (p<0.05). There was a significant difference (p<0.05) between use of CHC in the seaside communes (36%) compared to both urban (11%) and rural (14%) communes. Of seaside residents, 46% stated that they would use self-treatment, as opposed to 78% of both urban and rural residents (p<0.05).

DISCUSSION

There was a clear pattern of healthcare use among the respondents based on both sociobehavioural qualitative study and health utilization study. Many individuals self-treated initially, unless the symptoms were perceived to be severe. In this latter instance, individuals went to a healthcare facility. Their choice of facility was influenced by several factors, including economics, logistics, and perceptions of the quality of facilities. The importance of these factors varied by choice of facility, and choice of facility appeared to be influenced by gender and residency of the respondent and age of the patient. The differences between choices of healthcare use also differed across communes. These differences were more reflective of variations in the availability and quality of different facilities, e.g. CHCs, than variations in population characteristics.

The respondents consistently used both traditional methods and allopathic medicine to treat diarrhoea and dysentery. Some respondents used traditional medicine and allopathic medicine sequentially. First 'home treatments' were used for treating symptoms, and in the absence of improvement or worsening symptoms, the patient was switched to an allopathic medicine. In other cases, the traditional medicine and allopathic medicine were used simultaneously. These findings are similar to the findings of previous studies in developing countries, including Viet Nam. It is estimated that

40-60% of individuals in Viet Nam initially depend on self-treatment, including the use of western and traditional medicines. In a study in rural Viet Nam, 138 (27.3%) of 505 households stocked drugs, including 96 different antibiotics, for future use. These medications were primarily used for diarrhoea and coughs (21). Another study in rural Viet Nam also found that mothers of children aged less than five years used self-treatment with antibiotics for acute respiratory infections. Mothers seemed to respond appropriately to the severity of symptoms using antibiotics, but used them inappropriately by stopping too early to treat an infection. This use of antibiotics is similar to their use of traditional medicine to treat symptoms (22).

At a private physician's clinic, individuals paid for consultation and medications, and at the hospital costs included medicines, consultations, tests, and if the patient was admitted, a room. Distance and waiting time were additional indirect costs in terms of lost work hours and salary. Economic factors were primary considerations among those individuals who used self-treatment, pharmacies, and CHCs. Alternatively, among individuals who chose private physicians and the hospital, the expected quality of care seemed to be more important.

Since the legalization of private medical practice in Viet Nam in 1989, there has been a significant shift from use of public to private facilities (23). This shift has created a tiered system, with decreasing funds for public-health facilities, e.g. CHCs. Decreased funding has resulted in less resources for these centres, a perceived decline in the quality of services, and, in turn, decreased use of government health facilities in many areas. The services rendered by government healthcare providers can vary considerably across communes, and there were significant differences in the use of these facilities between communes. This variation in use did not appear to be simply economic, e.g. low-cost care, but availability of choices and a more complex weighing of other options based on the indirect costs, perceptions of the quality of care, and the perceived vulnerability and/or severity of the disease for a particular individual, e.g. child or adult.

These findings have several implications for the treatment of diarrhoeal diseases, estimation of disease burden, and trials relating to their prevention. First,

choices of self-medication and use of pharmacies increase the risk of using an inappropriate antibiotic for an inappropriate duration, which has probably contributed to the emergence of resistance of enteric organisms in the region. For example, *Shigella* strains isolated in Viet Nam are increasingly resistant to the most affordable and widely-used antibiotics, such as trimethoprim-sulphamethoxazole and ampicillin (24,25). Second, the use of self-medication, particularly self-medication with traditional remedies, may delay the use of other medical therapies. In the absence of adequate antimicrobial therapy, shigellosis carries an appreciable risk of severe sequelae, including death (26). Even if the disease ultimately resolves, delays in treatment potentially extend the duration of the illness, thus increasing direct and indirect costs for patients, their family, and society, particularly if the patients are poor and cannot pay for their medical expenses.

The estimation of enteric disease burden frequently has to rely on passive surveillance, the detection of cases through healthcare providers. While there are means to assure that public healthcare providers report the target diseases, reporting from private practitioners is notoriously spotty, and disease reporting from pharmacies is non-existent. Our finding that less than a quarter of diarrhoea patients initially used government healthcare providers at CHCs, polyclinics, and hospitals, which are the only sources of data for routine public-health statistics in Viet Nam, suggest that the reported rates could significantly underestimate the real disease burden of diarrhoeal diseases, including dysentery. The surveillance system is likely to eventually capture a larger fraction of cases as patients turn to the public-health sector when an initial treatment fails. It remains unclear which fraction of patients seek care from a second provider. Furthermore, since antibiotic use is widespread, a large proportion of cases will be pre-medicated. If case detection depends on the isolation of microbes, pre-medication with antimicrobials may well interfere with case detection. The very high variability in healthcare use between communes could present additional problems. In the case of a trial to evaluate an intervention against enteric diseases that assigns the intervention by geographical cluster, this variability will increase the inter-cluster variation, resulting in an increased design effect and ultimately in the requirement for a larger sample size.

A limitation of the study is the reliance on a majority of responses from hypothetical scenarios. The case studies were so few in number that they could not validate the responses to the hypothetical scenarios in a statistically-meaningful fashion. However, the qualitative findings of the case studies were consistent with the qualitative and quantitative data from the semi-structured interviews and the health-use survey. In contrast to interviews inquiring about closely-guarded or intimate circumstances, interviews regarding diarrhoea and dysentery are unlikely to trigger biased responses, although such a behaviour cannot be excluded.

In conclusion, results of this study suggest that more than half of the respondents self-treat initially. Medication for initial treatment is purchased from a pharmacy or with medication stored at home. Traditional treatments are widely used in the study area, although traditional healers are not necessarily consulted. Only if no improvement occurs or the symptoms are perceived to be severe, individuals go to a healthcare facility. Less than a quarter of diarrhoea patients initially use government healthcare providers at CHCs, polyclinics, and hospitals, which are the only sources of data for routine public-health statistics. Disease rates entirely derived from such statistics could significantly underestimate the real disease burden of diarrhoeal diseases. More realistic estimates of disease burden have to be corrected for this under-reporting.

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