FACTORS AFFECTING UTILIZATION OF HEALTH CARE SERVICES BY MOTHERS OF CHILDREN ILL WITH DIARRHEA IN RURAL VIETNAM

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Abstract. To examine the use of health services for the treatment of childhood diarrhea in three southern provinces of Vietnam, and identified household, maternal, child and health service characteristics associated with this use, a cross-sectional household survey was conducted between November 1998 and January 1999. Women with a pre-school aged child living at home were the primary respondents for the survey questionnaires. Respondents were asked to recall diarrheal disease events experienced by their child during the two weeks prior to interview, and their responses to these events. Prevalence ratios (PR) were used to identify associations between maternal age, education, occupation, ethnicity, knowledge about diarrhea, feeding practises during diarrhea, household residence and economic status, disease severity, use of oral rehydration solution (ORS), time to nearest health care facility and overall satisfaction with local medical services, and the use of health care services for children ill with diarrhea. The two-week period prevalence of childhood diarrhea was 10% and varied by the province and ethnicity of the child's mother. Forty-three percent of mothers reported using ORS during diarrheal episodes. Seventy percent of mothers sought advice or treatment when their child became ill with diarrhea. After controlling for potential confounders in regression models, maternal ethnicity, maternal high school education (in comparison to no education or incomplete primary education), more severe disease and the use of ORS were factors associated with increased utilization of health care services. There was a low level of the utilization of ORS to treat children with diarrhea, especially by ethnic minority mothers. A high percentage of mothers reported low levels of satisfaction with medical services, especially those from ethnic minorities. Mothers from ethnic minorities and those with lower levels of education were less likely to seek advice or treatment. These findings suggest the need for programs to promote the use of ORS and use of appropriate services for the treatment of childhood diarrheal disease. Interventions are needed to improve the access of ethnic minority children to child health care services for the treatment of diarrhea.

INTRODUCTION

Access to health care services is considered as the link between the health care system and the population it serves (Andersen, 1968; Aday and Andersen, 1974). Utilization is proof of access or is evidence that access has been achieved (Fiedler, 1981). The volume and type of services, whether or not the service can be reached, the cost of the service, the client's perceptions of the relative worth of the service and the acceptability of services provided, all influence access and the utilization of services (Aday and Andersen, 1974; Penchansky and Thomas, 1981).

Andersen's behavioral model of health services utilization (Andersen, 1995) has provided a frequently-used framework for surveys of health care utilization since it was introduced in the late 1960s, although to date it has not been used frequently in studies from developing countries, often because of limitations in the data collected in these surveys. The model proposes

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that people's use of healthcare services is a function of their predisposition to use services, the factors enabling or impeding use, their need for care, and their satisfaction with services. Studies have identified life-style, cultural or attitudinal factors, age and gender, as key factors affecting differences in the use of health services (Knutsen, 1994; Padgett *et al*, 1994; Bellon Saameno *et al*, 1995). In addition, factors influencing how symptoms and illness may be perceived, such as commonality of the disease, familiarity of the symptoms or clinical/physical changes, are partly responsible for health care seeking behavior (Jacobsen *et al*, 1995).

In Vietnam, diarrhea remains one of the most common diseases of children under the age of five (National Committee for Population and Family Planning, 1999). Programs to control diarrheal diseases (CDD) were commenced by the Ministry of Health in 1983, with support from UNICEF and WHO. By the mid-1990s over 90% of all communes in Vietnam had started to implement CDD programs with the target of increasing the use of ORS to 85% of all diarrheal disease episodes by the year 2000. Currently, in Vietnam, there is limited information about the use of ORS and the extent to which guardians seek treatment from health care services for children ill with diarrhea. There is also a lack of knowledge about factors constraining the use of these services for the treatment of childhood diarrhea, especially severe diarrhea. Recently, a population-based survey in Vietnam collected data for planning primary health care services (Dibley *et al*, 1999). The study analyzed these survey data in order to: 1) describe the use of health care services for the treatment of childhood diarrhea in three rural provinces of southern Vietnam, and 2) determine the relationships between maternal and socio-economic factors and the utilization of health care services by the mothers of children ill with diarrhea.

MATERIALS AND METHODS

Study design

Cross-sectional household cluster surveys were conducted in three provinces between November 1998 and January 1999. The primary respondents for the child health information were women who had a preschool aged child living at home.

Setting and study population

The surveys were designed to collect planning information as part of a primary health care development assistance project in three southern provinces of Vietnam. Two of these provinces, Long An and Ben Tre, are located in the Mekong River Delta and the majority of the population is from the Kinh ethnic group. In contrast, the third province, Quang Ngai, is located on the Central Coast and has an ethnically diverse population, of which the H're group is the largest ethnic minority. The majority of the populations in all three provinces live in rural areas.

Sampling design

The reference population for the survey was all households in each province. In the absence of provincial household sampling frames, a multi-stage cluster sample was constructed by selecting, with probability proportionate to population size (PPS) (Levy and Lemeshow, 1999) 60 commune clusters in Long An and Quang Ngai provinces but only 35 commune clusters in Ben Tre Province. In each commune, two hamlets were randomly selected and then, in each selected hamlet, 12 households were chosen by simple random sampling. The sample sizes were calculated using a standard sample size formula for proportions in cluster surveys (Lemeshow *et al*, 1990) with the assumption that there was an average of five persons per household and 0.7 children under five years of age per household. Based on these calculations, a total sample size of 678 household interviews per group of districts was required to examine all but one of the program indicators. This sample size was expended to 720 to allow for survey data losses of about 6%. Thus the total sample size for Long An and Quang Ngai was 1,440 per province, but for Ben Tre it was 840, because only 35 clusters were selected in that province.

Questionnaire

The draft questionnaire was adapted from the Vietnam Reproductive Health Survey 1995 (NCPFP and GTZ, 1996) and was pilot tested through two focus group discussions, and by 30 interviews with mothers in communes in Long An. The final questionnaire was structured, pre-coded and interviewer-administered. Information collected with this instrument consisted of household demographics and socio-economic data, the health of women aged 15 to 49 years, and the health of children under five years of age.

In the child health section, information was gathered from the child's mother or guardian about symptoms of diarrhea, acute respiratory infections and febrile illnesses experienced during the two weeks prior to interview, and the use of health services in response to these illnesses. For each illness, the type and duration of symptoms, whether or not health care was sought, the type of provider, the type of health care facility used, the cost of the service, the time to reach the provider, the type of services provided and the level of satisfaction with these services, were recorded.

Maternal knowledge and practices in caring for children ill with diarrhea were assessed by questions about food and fluids for these children, and the recognition of symptoms of severe diarrhea that indicated a need for treatment. Overall satisfaction of the mothers with local medical services for all types of health care was recorded using a scale to rate the respondent's level of satisfaction. The travelling time from the respondent's household to the nearest medical service was also recorded.

Data management and analysis

A Vietnamese version of Epi-Info 6.04 with check-files was used for data entry (Dean *et al*, 1994). Data entry and data cleaning procedures were standardized through flow charts. To adjust for sampling weights, the cluster sampling design, and stratification of the sample, the data were analyzed using the "survey commands" in STATA version 6.0 (Stata Corporation, 1999). Using two-tailed significance tests, categorical data were tested with Pearson chi-square, normally distributed continuous data with Student's *t*-test or the Mann-Whitney test when differences between medians were tested. Factors associated with health care seeking for children ill with diarrhea, were assessed using PR and 95% confidence intervals. Multi-variable models using the Cox proportional hazard model were used to adjust for confounding and to identify effect modification (Lee, 1994). Stepwise backward elimination was applied using the strategy described by Greenberg and Kleinbaun (1985).

Health service utilization was based on the first place the child's parents or guardians sought advice and treatment for the diarrhea event. The primary survey outcome was whether or not treatment was sought for the diarrhea event. Severe diarrhea was defined as an episode with either blood in the stools, fever, or more than six stools per day. The score for maternal knowledge about diarrhea was calculated from responses to questions about giving food and fluids during diarrhea, and recognition of the symptoms of severe diarrhea indicating the need for treatment. The score for maternal feeding practises was based on responses to questions about giving drinks, food or breast-feeding when the child was ill with diarrhea. Mothers who provided additional fluids and placed no restrictions on food or continued breastfeeding were regarded as having appropriate feeding practices. Use of ORS during the episode of diarrhea was considered separately.

The poverty-line was based on the total household expenditure per capita and used poverty-line indicators identified for each region in the Vietnam Living Standards Survey 1992-1993 (World Bank, 1995), which were adjusted for the price increments for each province as at December 1998 (General Statistical Office, 2000). The overall satisfaction levels of the mothers with local medical services for all types of health care were collected in the survey. The score for satisfaction with these services was divided into low satisfaction (0 to 9), intermediate satisfaction (10 to 19) and high satisfaction (20 to 30).

Households were asked about the time it took them to reach the nearest medical service, including commune health center, district or provincial hospital, or private medical clinic. In the analyses, this variable was categorized as < 30 minutes or ≥ (missing value) minutes. The time to the nearest pharmacy was not assessed.

Factors examined in the multi-variate analysis included maternal age, education, occupation, ethnicity, knowledge about diarrhea, feeding practises during diarrhea, household residence and economic status, disease severity, use of ORS, time to nearest health care facility and overall satisfaction with local medical services.

RESULTS

There were 1,632 women with 1,935 children under five years of age identified living in 1,618 of the 1,991 households enrolled in the survey. Survey information was collected for more than 99% of these children. The mean number of household members in the families with children under the age of five was 5.4. Approximately 90% of the households in each province were from rural areas. The economic statuses of households differed between the three provinces, with Quang Ngai having a significantly lower mean level of household expenditure and a higher percentage of households below the national poverty line (Table 1). The median time from the household to the nearest heath care facility was slightly longer in Long An Province (Table 1).

The mean age of the children surveyed in the three provinces was 31.7 months, while the mean age of their mothers was 29.7 years. Both ages were similar in each province (Table 1). The proportions of girls and boys surveyed in the provinces were approximately equal. The mean number of years of schooling among the mothers was approximately six years, although it was slightly longer in Quang Ngai Province. In all provinces, most of the mothers worked as farmers although the percentage was highest in Quang Ngai Province. In Long An and Ben Tre provinces, 5% or less of the mothers were from the ethnic minorities. In contrast, 23% of the mothers in Quang Ngai were from ethnic minorities (Table 1), of whom 32% were from the CoHo ethnic minority group and 68% were from the H're ethnic minority group.

There were marked differences in key household and maternal characteristics likely to influence the use of health services between the ethnic groups in Quang Ngai Province. Seventy-two percent of ethnic minority households in Quang Ngai were classified below the poverty line, in contrast to 26% for Kinh households. The median time to the nearest health care facility was 30 minutes for ethnic minority families, in contrast to 15 minutes for the Kinh families. Only 11% of the ethnic minority mothers completed primary school studies or higher in contrast to 79% of the Kinh mothers.

The two-week period prevalence of diarrhea in children, in all provinces combined, was 10% with a median duration of three days during the recall period. Quang Ngai had the highest prevalence of diarrhea, which was more than twice that of Long An (Table 2). Across all the provinces, 25% of the children reported to have had diarrhea still had symptoms at the time of interview. There was no difference in the prevalence of diarrhea between the sexes, but it varied by age from 13.7% (25/168) in children six to 12 months of age, to 5.9% (26/431) in children 48 to 59 months of age. Among the children reported to have had diarrhea, 50% had fever, 15% had bloody stools, and 14% passed more than six stools per day.

Similar to the prevalence of all diarrhea, the period prevalence of diarrhea and fever, and bloody diarrhea, was highest in Quang Ngai and was more than twice the level of Long An (Table 2). However, the percentage of children passing more than six stools per day was highest in Ben Tre (Table 2). When these severity indicators were combined, 5.6% of all the surveyed children had a severe attack of diarrhea during the two weeks prior to interview, with the highest prevalence being observed in Quang Ngai (Table 2).

In Quang Ngai, there were differences in

Table 1
Characteristics of households, children and mothers surveyed in three provinces in southern Vietnam, December 1998-January 1999.

Characteristics	Provinces		
	Long An	Ben Tre	Quang Ngai
Number of households (N=1,619)	560	321	738
Mean no of persons/household[a] ± SD	5.5 ± 0.10	5.3 ± 0.11	5.5 ± 0.10
Percent of households in rural areas[a]	91.3%	91.4%	87.7%
[f]Mean / capita expenditure[b] ± SD	336 ± 41	242 ± 22	170 ± 11
[g]Households below poverty line[a]	15.7%	21.0%	36.3%
Median time to health facility (minutes)	20	15	15
Number of children <5 years (N=1,935)	648	371	916
Mean age in months ± SD	31.7 ± 0.63	31.4 ± 0.91	31.7 ± 0.53
Percentage of females	46.8%	45.4%	49.2%
Number of mothers (N=1,632)	566	324	742
Mean age in years ± SD[c]	29.2 ± 0.33	29.1 ± 0.39	30.5 ± 0.28
Mean years at school ± SD[d]	6.0 ± 0.21	6.0 ± 0.24	6.3 ± 0.37
Occupation[e]			
Farmer	60%	52%	79%
Unemployed	5%	3%	1%
House work	15%	22%	6%
Salaried workers	6%	2%	4%
Others	15%	19%	9%
Ethnicity			
Kinh group	95.5%	95.0%	77.1%
Minority groups	4.5%	5.0%	22.9%

[a] 3 households in Long An with missing data.
[b] 8 cases with unknown household expenditure, 6 in Long An and 2 in Quang Ngai.
[c] 79 cases of unknown maternal age, 25 in Long An, 13 in Ben Tre, 41 in Quang Ngai.
[d] 78 cases of unknown mother's age, 22 in Long An, 14 in Ben Tre, 42 in Quang Ngai.
[e] 83 cases with unknown maternal occupation, 24 in Long An, 14 in Ben Tre and 45 in Quang Ngai.
[f] Household expenditure in thousands of Vietnam Dong / month.
[g] Poverty line was based on the total household expenditure per capita, and classified according to the system from the Vietnam General Statistics Office.

the prevalence of diarrhea by ethnic group. There were no reports of diarrhea for CoHo children (0/53), but the period prevalence was 14.8% (107/720) for Kinh children and 21.3% (21/98) for H're children. The proportion of complicated cases was similar for both ethnic groups reporting diarrhea.

Twenty-nine percent (57/135) of surveyed mothers whose children had diarrhea were able to correctly answer questions about diarrhea and its treatment. In contrast, 92% (182/198) of these mothers reported appropriate feeding practises for their child ill with diarrhea. However, ORS was only given by 43% (85/194) of mothers during the diarrhea episode. The use of ORS increased with higher levels of maternal education, starting from 31% (21/64) in mothers with no schooling or incomplete primary school education, to 54% (23/43) in mothers with secondary school education or higher. None of the ethnic minority mothers gave their children ORS, compared with 47% (82/169) of Kinh mothers.

Seventy percent of the mothers took their

Table 2
Prevalence and duration of diarrhea in children under five years of age in three southern provinces of Vietnam, December 1998-January 1999.

	Provinces		
	Long An % [95% CI] (n/N)	Ben Tre % [95% CI] (n/N)	Quang Ngai % [95% CI] (n/N)
Prevalence of diarrhea			
Diarrhea during the 2 weeks prior to interview[a]	5.5 [3.9-7.6] (36/647)	9.3 [6.2-13.7] (31/371)	14.3 [11.9-17] (131/914)
Symptoms of diarrhea at interview	19.5 [9.7-35.2] (7/36)	22.6 [9.6-44.4] (7/31)	26.8 [19.7-5.2] (35/131)
Indicators of severity			
Diarrhea and fever	3.2 [2.0-5.0] (21/647)	4.8 [2.6-8.8] (16/371)	6.6 [4.9-8.9] (61/914)
Bloody diarrhea	0.4 [0.1-1.3] (3/647)	1.8 [0.6-5.1] (6/371)	2.2 [1.4-3.4] (17/ 914)
Stools >6 stools / day	0.7 [0.3-1.6] (5/648)	2.4 [1.1-5.2] (8/371)	1.3 [0.7-2.3] (12/916)
Severe diarrhea[b]	3.2 [2.0-5.0] (21/648)	5.7 [3.3-9.7] (19/371)	7.6 [5.8-10.0] (70/916)

[a] For 3 cases diarrhea status was unknown.
[b] Severe diarrhea defined as an episode with either blood in the stools, fever or more than six stools/day.

child with diarrhea to a health care facility or provider for treatment or advice. There was no difference in the proportion of girls (72%) or boys (68%) who were taken to health care services for treatment. Furthermore, there was no clear, age-specific pattern to seeking treatment, although there was a tendency for a higher proportion (83%) of children aged 12 to 23 months to use health care facilities or providers. Maternal education was related to the level of utilization of services, with 55% (35/65) of children with diarrhea whose mother had no schooling or incomplete primary school, being taken for treatment, compared with 95% (41/43) for children whose mothers had completed secondary schooling or higher. In addition, ethnicity was strongly related to the use of services. Thirty-two percent (8/25) of children of ethnic minority mothers were taken for treatment in comparison to 75% (132/173) of children of Kinh mothers.

In Long An, mothers tended to seek advice or treatment for their children ill with diarrhea more frequently from publicly provided health care services, whereas in Ben Tre and Quang Ngai, mothers mostly sought care from the private sector, although the types of service differed between these provinces (Table 3). Across the three provinces, the most common reason for not seeking care was the expectation that the child would recover. Other reasons included expense and lack of time or distance to provider or facility. Only 2% of mothers reported a lack of satisfaction with services as

Table 3
Use of health services, type of facility and type of services provided for children < 5 years with diarrhea in three provinces of Vietnam, December 1998-January 1999.

	Provinces		
	Long An % [95% CI]	Ben Tre % [95% CI]	Quang Ngai % [95% CI]
Use of health services	N=36	N=31	N=131
Percentage of mothers who sought health care	64 [46–79]	65 [43–82]	74 [63–83]
Type of provider or facility used	N=22	N=20	N=97
Percentage seeking first health care from:			
Public health care sector	60 [42–76]	25 [10–50]	33 [23–45]
Private health care sector	40 [24–58]	75 [50–90]	67 [55–72]

the main reason for not seeking treatment.

In contrast, only 17% of mothers reported a high satisfaction score with local medical services and 47% reported low scores. Satisfaction scores were highest in Ben Tre and lowest in Quang Ngai, and there was a tendency for lower satisfaction scores from mothers who did not seek care for their children ill with diarrhea (Table 4). No ethnic minority mothers reported high levels of satisfaction and 85% reported low satisfaction scores with their local medical services (Table 4).

In both uni-variate analyses and after adjustment with a Cox proportional hazard model, maternal ethnicity, maternal education, severity of disease and the use of ORS were all significantly associated with mothers seeking advice or treatment for their children ill with diarrhea (Table 5). The strongest effect was from maternal ethnicity, with mothers from the Kinh ethnic group being more than twice as likely to seek health care for their child than mothers from ethnic minorities. Mothers who had completed junior high school were 37% more likely to seek advice or treatment compared to those who had not. Mothers of children with severe diarrheal disease were 27% more likely to seek advice or treatment compared to mothers of less ill children. Mothers who reported using ORS during the diarrhea episode were 29% more likely to have consulted a health care provider. However, it is not known if these women started to use ORS before or after talking to the health care provider.

DISCUSSION

In the three provinces of Vietnam surveyed, the two-week period prevalence of diarrhea, and severe diarrhea, for children less than 5 years of age was 10.0% and 5.6%, respectively (Table 2). The prevalence of diarrhea varied by ethnicity, with H're children having a significantly higher prevalence of diarrhea than Kinh children, but with CoHo children reporting no diarrhea. Most mothers reported appropriate feeding practises for their children ill with diarrhea, although only 43% reported using ORS. A high percentage of mothers reported seeking advice or treatment for their children from health care services. The type of health service used varied across the provinces, with greater use of public health care services in Long An than in the other two provinces. Maternal ethnicity and education, severity of the child's disease and the use of ORS were all significantly associated with seeking health care for childhood diarrhea (Table 5). Mothers from ethnic minorities, those with lower levels of education, and mothers whose children had mild diarrhea, were all less likely to seek health care.

Table 4
Level of satisfaction with local medical services[a] of households with children < 5 years of age ill with diarrhea in three southern provinces of Vietnam, December 1998 - January 1999.

	Level of Satisfaction		
	Low % [95% CI] (n)	Intermediate % [95% CI] (n)	High % [95% CI] (n)
Provinces			
Long An	30 [16-48] (10)	57 [40-73] (19)	13 [4-35] (4)
Ben Tre	24 [9-51] (6)	28 [13-49] (7)	48 [27-70] (12)
Quang Ngai	59 [49-69] (76)	32 [24-42] (42)	9 [4-16] (11)
By use of health care services			
Services used for child with diarrhea	42 [32-52] (59)	39 [31-48] (52)	19 [12-29] (22)
Services not used for child with diarrhea	59 [45-72] (33)	28 [18-42] (16)	13 [5-28] (5)
By ethnicity of mother			
Ethnic minorities	85 [63-95] (21)	15 [5-37] (4)	0 (0)
Kinh ethnic group	41 [32-51] (71)	39 [31-47] (64)	20 [13-29] (27)

[a]Composite score based on scores for overall satisfaction with services at commune health center, district hospital and private doctor's clinic. Composite satisfaction score range is 0 - 30, and low is defined as 0 - 9, intermediate as 10 - 19, and high as ≥ 20.

The limitations of the survey included the lack of adjustment of the questionnaires for each of the ethnic communities involved. The questionnaires were written in Vietnamese and pilot-tested with mothers from the Kinh ethnic group. In the ethnic minority communities, local interviewers translated the questions at the time of interview. It is possible that the failure to detect diarrhea in the CoHo children is related to the use of culturally inappropriate terms to describe diarrhea in children. The interviewers, although all tertiary-level educated, were from different educational backgrounds. These differences may have resulted in systematically different responses from the surveyed mothers in each province. By the time the survey started in Quang Ngai the rainy season had commenced and this might in part account for the higher prevalence of diarrhea in this province. Finally, factors related to the health care system, such as the volume and distribution of health services, and the characteristics of the providers were not taken into account in this study.

The prevalence of diarrhea observed in this study (10.0%) was almost the same as the two-week period prevalence (10.1%) reported in the Vietnam Health and Demographic Survey (VH&DS) 1997 (National Committee for Population and Family Planning, 1999). The prevalence of bloody diarrhea in the three provinces surveyed was higher than the national level reported in the VH&DS 1997 (0.9%). The higher prevalence of diarrhea and severe diarrhea observed in Quang Ngai may be partly explained by differences in socio-economic statuses between the provinces. Furthermore, Quang Ngai had a higher population of ethnic

Table 5
Factors associated with utilization of health care services for children ill with diarrhea, in three southern provinces of Vietnam, December 1998 - January 1999.

Factors		Total	No. of children using services	No. of children not using services	Unadjusted pre-valence ratio	Adjusted pre-valence ratio	95% confidence interval	p-value
Maternal age in years[a]	< 20	7	4	3	1.00			
	20-34	155	111	44	1.16	-	-	-
	35+	33	22	11	1.12	-	-	-
Maternal ethnicity[b]								
Ethnic minorities		21	5	17	1.00	1.00		
Kinh ethnic group		173	132	41	2.39	2.32	1.08-5.00	0.032
Maternal education[c]								
None / incomplete primary school		65	35	30	1.00	1.00		
Completed primary school		83	58	25	1.25	1.02	0.78-1.33	0.882
Completed high school or higher		43	41	2	1.75	1.37	1.07-1.74	0.011
Residence								
Rural		181	126	55	1.00			
Urban		17	14	3	0.89	-	-	-
Economic status								
Poor		32	21	11	1.00	1.00		
Not poor		166	119	47	1.12	0.87	0.68-1.11	0.258
Disease severity[d]								
Mild		83	53	30	1.00	1.00		
Severe		110	85	25	1.26	1.27	1.04-1.56	0.017
Maternal knowledge on diarrhea[e]								
Incorrect		57	36	21	1.00			
Correct		132	99	33	1.12	-	-	-
Maternal child feeding practises								
Inappropriate		182	128	54	1.00			
Appropriate		16	12	4	0.99	-	-	-
Use oral rehydration fluids[f]								
No		109	65	44	1.00	1.00		
Yes		85	73	12	1.45	1.29	1.06-1.56	0.010
Province								
Long An		36	23	13	1.00			
Ben Tre		31	20	11	1.01	-	-	-
Quang Ngai		131	97	34	1.15	-	-	-
Satisfaction with medical services[g]								
Low		92	59	33	1.00			
Intermediate		68	52	16	1.22	0.97	0.81-1.17	0.761
High		27	22	5	1.25	1.17	0.93-1.48	0.190
Time to nearest medical service [h]								
< 30 minutes		129	101	28	1.00	1.00		
≥ 30 minutes		66	39	27	0.79	0.99	0.80-1.22	0.913

[a]3 cases missing maternal age; [b]4 cases missing maternal ethnicity; [c]7 cases missing maternal education; [d]5 cases missing disease severity; [e]1 case missing maternal knowledge about diarrhea; [f] 4 cases missing use of ORS data; [g]10 cases missing level of satisfaction data; [h]3 cases missing time to nearest facility; [i]18 children with one or more variables missing.

minorities (23%) compared to the other provinces (<1%). Education levels were much lower for ethnic minority women than for Kinh women. In other studies, higher levels of education have been associated with lower prevalences of diarrhea and bloody diarrhea (National Committee for Population and Family Planning, 1999).

The findings of a high level of use of health care services for the treatment of childhood diarrhea were similar to other reports from Vietnam. The VH&DS 1997 using a national level sample, reported that 50% of children under 5 years of age who had diarrhea two weeks prior to interview, were taken to a health facility or provider for treatment (National Committee for Population and Family Planning, 1999). The Vietnam Living Standards Survey 1992-93 showed that in a national sample, 82% of children under 15 years of age, reported to be ill one month prior to interview, received medical care from a clinic, hospital or health care provider (Dominique *et al*, 1999). This study did not identify the cause of illness; however, it is reasonable to expect that a large proportion of the illnesses were due to diarrhea.

The percentage of mothers seeking treatment for children ill with diarrhea, and the type of health care facility they used, varied between the provinces (Table 3). In Long An, most mothers sought care from public health care services. In Ben Tre and Quang Ngai, most sought care from private sector services, mainly private doctors, clinics and pharmacies. The reasons for these different patterns are not clear, but may be related to health care system factors, such as the number and distribution of services and the quality of services provided. These different patterns of utilization highlight the need to develop appropriate interventions in each province reflecting the different type of health care services used.

This study is the first report from Vietnam to clearly identify ethnicity as an important factor influencing the use of health services for children ill with diarrhea. Mothers from the Kinh ethnic group were more than twice as likely to seek health care for their children than mothers from ethnic minorities. Previous studies from Vietnam have identified higher rates of childhood illness (Dominique *et al*, 1999) or childhood diarrhea (National Committee for Population and Family Planning, 1999) in regions of Vietnam that have a higher proportion of ethnic minorities in the population. Furthermore, different patterns of health care seeking for childhood illness by region were reported from the Vietnam Living Standards Survey 1992 (Dominique *et al*, 1999). Women from regions with high proportions of ethnic minorities in the population were less likely to seek care for their ill children from health care providers or health care facilities than in regions with low proportions of ethnic minorities in the population. However, neither of these studies, nor the more recent Vietnam Living Standards Survey 1997-98 (General Statistical Office, 2000), have analyzed the effect of ethnicity on levels of childhood diarrhea or health care seeking behavior of women with ill children.

It is well established that life-style and culture influence health-seeking behaviors (Knutsen, 1994; Mechanic, 1980). It is possible that cultural perceptions about illness account for the differences in seeking health care for children between the Kinh and ethnic minorities. Language barriers may also contribute to making health care services and health information less accessible to women from ethnic minorities, especially if they have lower levels of education.

The lower level of satisfaction with local medical services reported by mothers from ethnic minorities, compared to Kinh mothers (Table 4), suggests dysfunctional interactions between health care providers and ethnic minorities may have contributed to the lower levels of utilization of health cares for children from these minority communities. There may also have been an interaction between ethnicity and the time to reach the medical service. Twenty-nine percent (5/17) of ethnic minority mothers living 30 minutes or more from a health facility sought care for their child, in comparison to 60% (3/5) for those living less than 30 minutes from

a health facility. In contrast, there was little difference in the utilization of health care services by Kinh mothers related to the time to the nearest health care facility (70% for ≥30 minutes to service versus 77% for <30 minutes to service). This potential interaction of ethnicity and time to health facility could not be evaluated in the model because of the limited sample size.

Maternal education was identified as an important factor affecting the utilization of health care services. Mothers who completed junior high school or higher were 1.40 times more likely to obtain treatment for their child than those who had not. These findings were consistent with another study investigating child health in Vietnam (Dominique *et al*, 1999), which indicated that ill children whose mothers were better educated were more likely to receive outside medical care. Higher educational levels have been associated with an increased self-perception of health status (Fernandez de la Hoz and Leon, 1996), and influence child survival and the use of both curative and preventative health care services (Cleland, 1989).

In the provinces surveyed, the mothers of children more severely ill with diarrhea were more likely to seek advice or treatment from health care services. Similar findings have been reported in other studies of health seeking behavior of mothers with children ill with diarrhea (Perez-Cuevas *et al*, 1996). Although 43% of mothers surveyed reported using ORS when their children were ill with diarrhea, it is not known if this was before or after interaction with health care providers. The level of use of ORS, especially for ethnic minority communities, was low. Since the severity of disease is a significant factor affecting mothers' use of health care services, interventions are needed to teach child caretakers how to use ORS to prevent dehydration, and how to identify signs of dehydration and symptoms of severe diarrheal disease.

The survey findings point to several areas where public health policy changes could improve access to health care services for children ill with diarrhea, and improve maternal and family responses to this illness. The low level of use of ORS needs to be raised, especially with ethnic minority communities, through community-based promotion programs. The high proportion of mothers who expressed low levels of satisfaction with local medical services suggests the need to respond through appropriate training of service providers. In provinces with large ethnic minority populations, increased understanding of the barriers to accessing child health services by ethnic minority communities should be the starting point for designing future interventions to improve access. Qualitative studies (Bentley *et al*, 1988) are needed to identify the best way to respond to the needs of these communities. More information is required about the providers of child health services in areas with high numbers of ethnic minorities and their ability to effectively communicate with these communities. Future studies should focus on developing and evaluating interventions to improve access to child health care services and to increase the level of use of ORS, especially for ethnic minority communities.

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