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Royal Government of Cambodia

National Institute of Statistics
Ministry of Planning

Directorate General for Health
Ministry of Health

**Factors Associated with Utilization of Health Services for
Childhood Diarrhea and Fever in Cambodia**

**Further Analysis of the
Cambodia Demographic and Health Survey**

PHNOM PENH
April, 2013



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Factors Associated with Utilization of Health Services for Childhood Diarrhea and Fever in Cambodia

Further Analysis of the Cambodia Demographic and Health Survey

National Institute of Statistics
Ministry of Planning

Directorate General for Health
Ministry of Health

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April 2013

This report presents findings from a secondary analysis study undertaken as part of the follow-up to the 2010 Cambodia Demographic and Health Survey (CDHS). Additional information about the survey can be obtained from the National Institute of Statistics, Ministry of Planning; 386 Monivong Boulevard, Sangkat Beong Keng Kang 1, Chamkar Mon, Phnom Penh, Cambodia; Telephone: (855) 12-723107, (855) 16-644454; E-mail: linahang2002@gmail.com; Internet: www.nis.gov.kh and the Directorate General for Health, Ministry of Health 151-153 Kampuchea Krom Boulevard, Phnom Penh, Cambodia; Telephone: (855) 12-222773; E-mail: rathavy@online.com.kh; Internet: www.moh.gov.kh.

Suggested citation:

Bunsoth Mao, Lundy Saint, and Sarun Nit. 2013. *Factors Associated with Utilization of Health Services in Childhood Diarrhea and Fever in Cambodia: Further Analysis of the Cambodia Demographic and Health Survey*. Phnom Penh, Cambodia: National Institute of Statistics, Ministry of Planning and Directorate General for Health, Ministry of Health.

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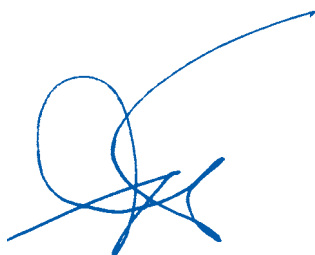
Preface

The Cambodia Demographic and Health Surveys (DHSs) collect high quality data on the demographic and health characteristics of populations in Cambodia. These available data allow researchers to perform more in-depth analyses to examine issues related to the population and health conditions in Cambodia, which inform policy makers with evidence-based results useful for national programs and initiatives.

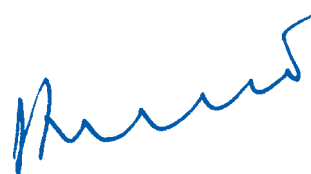
This follow-on study and analysis focuses on factors associated with the utilization of health services for childhood diarrhea and fever in Cambodia. It examines the characteristics of several determinants for health-seeking behavior that explains service-utilization by mothers when seeking treatment for diarrhea and fever for their children. This study uses data from the 2010 Cambodia DHS.

This topic was selected by the officers of the Cambodian Ministry of Health in consultation with the officers of the Cambodian National Institute of Statistics, as well as the United Nations Population Fund (UNFPA).

It is anticipated that the findings from this analysis will enhance the understanding of important factors associated with the utilization of health services in childhood diarrhea and fever in Cambodia by health analysts and policymakers.



H.E. Prof. Eng Huot
Secretary of State
For Minister of Health



H.E. Ouk Chay
Secretary of State
For Senior Minister
Minister of Planning


Acknowledgements

The further analysis of the 2010 Cambodia Demographic and Health Survey (2010 CDHS) was conducted by researchers of the Directorate General for Health of the Ministry of Health and the National Institute of Statistics of the Ministry of Planning. This analysis represents the continuing commitment and efforts in Cambodia to build the capacity of the Cambodian researchers. It reflects interest in obtaining additional information and data needed to develop policies and programs for the country.

We would like to thank Dr. Rathavuth Hong for assistance with data analysis, and the reviewers for their comments on the draft. Special thanks are given to the National Institute of Statistics of the Ministry of Planning and the Directorate General for Health of the Ministry of Health, which provided guidance on this work, and the United Nations Population Fund (UNFPA), which provided funding for this project.

This analysis could not have been completed without the active support and the efforts of the Excellencies Secretaries of State; H.E. Prof. Eng Huot, Ministry of Health, and H.E. Ouk Chay, Ministry of Planning. We also gratefully acknowledge H.E. San Sy Than and H.E. Hor Darith, Undersecretaries of State of the Ministry of Planning for their supports and valuable comments throughout the analysis activities.

We would like to express our appreciation for the researchers, whose dedicated efforts ensured the quality and timeliness of the analysis,



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Director
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Executive Summary

This analysis seeks to explore the problems concerning to utilization of child health services and associated factors in Cambodia. Information from this analysis helps health analysts and policymakers to better understand the important characteristics related to utilization of health services in childhood diarrhea and fever. Data from the 2010 Cambodia Demographic and Health was used. Mothers of 7,811 children aged 0–59 months were asked about child’s illnesses and type of health facilities where treatment was sought during two weeks prior to the interview. The treatment sought was classified as no treatment, from informal health sector, public health sector and private provider. Factors associated with utilization of health services for diarrhea and fever was assessed using an adapted Andersen’s health behavior model. Multinomial logistic regression analyses were carried out with sampling weights to restore the representativeness of sample. Overall 15 percent and 28 percent of children had diarrhea and fever respectively. About two in five children with diarrhea and fever did not receive any treatment (41 percent for diarrhea and 37 percent for fever). One-third of children received treatment from private health sector. Utilization of child health services in Cambodia was associated with the presence of danger sign and symptom. Mother’s age, level of education, exposure to mass media and prior experience in treatment and utilization of health services, particularly in public health sectors. This information will have important implication on program intervention on childhood illnesses in Cambodia. There is socioeconomic inequality in receiving care, but the relationship is not conclusive. The results show the important role of the private health sector in delivering healthcare services for children. This finding confirms that the private health sector must be seriously considered in the health system reforms so it can follow the standard quality of care, and be part of program planning. Health equity fund needs to expand its coverage to protect more economically destitute and vulnerable population of women and children.

1. Introduction

1.1 Background:

Acute Diarrheal Diseases (ADD) and Acute Respiratory Infections (ARI) are the most common acute childhood illness, particularly in developing countries (Bhutta ZA 2006; Rudan I, El AS, Bhutta ZA, Black RE, et al 2011). ADD and ARI are the two most important single causes of childhood mortality. Pneumonia and diarrhea are among the leading causes of death among children worldwide and accounted for 29 percent of all causes of death in children under five years of age (UNICEF 2012). The estimated worldwide incidence of ARI in children is approximately 154 million cases per year with an estimated 4-6 episodes of ARI per child per year. Almost one in ten of these ARI episodes require hospitalization, and ARI is responsible for an estimated 1.9 million deaths among children under-five annually (HARP 2013). The World Health Organization (WHO) estimated that globally there are 13,000 million episodes of diarrhea in the developing countries with 3.2 million deaths occurring among children annually (WHO 1993). In these countries, each child on an average suffers from diarrheal diseases for more than three episodes per year (United Nations Children Fund (UNICEF) 1983).

It is estimated that during an episode of diarrhea and ARI, appropriate care could prevent mortality associated with these conditions by nearly 30 percent (WHO 2012). Effective case management of diarrhea and ARI relies on the early detection using simple clinical signs and empirical treatment. The severity of ARI can be detected and assessed by observing such symptoms as difficulty breathing, rapid breathing, and/or chest withdrawal. Diarrhea with severe dehydration can be detected by observing a child with sunken eyes and with the pinching of the skin of the abdomen (if it returns to its original condition slower than two seconds, the child is dehydrated). ARI and diarrhea can safely and effectively be treated at home. However, when the conditions are severe enough (e.g. pneumonia and severe dehydration), the child requires immediate medical attention. One of the reasons that mortality remains high when these conditions exist is the under-utilization of health services (Srivastava N, Awasthi S, Agarwal G 2009). This means that sick children do not come to the attention of qualified healthcare providers until it is too late. Many factors affect health seeking behaviors and determine the utilization of health services. Studies have shown that factors which may affect utilization of health care services include socioeconomic inequality (Deogaonkar M 2004), and a mother's knowledge, attitudes, and beliefs (Uzochukwu BS, Onwujekwe EO, Onoka CA 2008; Zaidi SS, Seidlein LV, Nizami SQ 2006).

Cambodia continues to make steady progress in the improvement of the overall health of children. Nonetheless, childhood mortality in Cambodia remains one of the highest in the region (National Institute of Statistics (NIS), Directorate General for Health (DGH), and ICF International, 2011). Diarrhea and ARI remain among the leading causes of childhood morbidity and mortality in the country.

Cambodia has a mixed public and private service healthcare delivery system. Public healthcare service delivery is organized in a two-tier service system, both provided in all operational districts: a) the Minimum Package of Activity (MPA) which is provided at health centers; and b)

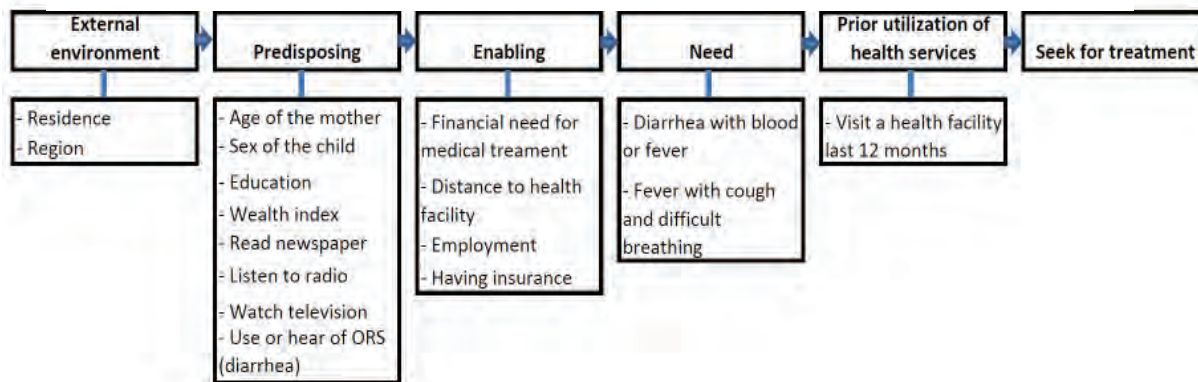
the Complementary Package of Activity (CPA) provided at the referral hospitals. The private sector includes private practitioners, clinics and hospitals, and international NGOs, which deliver a limited range of healthcare services. Tertiary services are provided by National Hospitals which are located in Phnom Penh and are semi-autonomous (MOH 2006). Healthcare in Cambodia is not free, included those were provided by public sector. The “user fee” mechanism was introduced in public health facilities in 1996 (Hardeman W, Van Damme W, Van Pelt M, et al. 2004). Meanwhile health insurance has not yet provided a nationwide coverage, and paying for healthcare service utilization is mainly an out-of-pocket payment. Fee for services to the most destitute and vulnerable population is supported or subsidized by a financial mechanism called the “health equity fund” (Annear PL, Wilkinson D, Chean RM, et al. 2006).

1.2 Objective of the study:

The objective of this analysis is to examine health care seeking behavior and the utilization of child health services for children who had diarrhea and fever two weeks prior to the survey. It aims to provide better understanding of the factors associated with health care seeking behavior and utilization of child health services that may have implications on child health policies and programs in Cambodia. Therefore, this study may contribute important knowledge to the policy makers for developing strategies in order to improve health service delivery in Cambodia.

1.3 Conceptual framework:

Figure 1. Conceptual framework for health seeking behavior



In 1995, Andersen developed and proposed a health behavior model that is widely accepted and adapted to study the determinants of health services utilization (Anderson RM 1995). This study adapted the Anderson model and developed its conceptual framework for its analyses. The Andersen model bases its framework on three domains: 1) predisposing factors, 2) enabling factors, and 3) need factors. This study added two more domains: external environmental factors, and prior utilization of health service factors (Figure 1). Health services utilization or the action of seeking healthcare treatment is a conditional, sequential function of five domains. External environment and predisposing factors set the conditions in which mothers are likely to use

healthcare services. Enabling factors are those which either encourage or thwart the use of healthcare services. The first three domains may or may not be sufficient to initiate a visit to a healthcare facility or provider. But the need factors or the severity of the health condition weighs heavily on the decision to utilize the healthcare service. Finally, prior utilization of healthcare services, will guide the mothers to choose the type of treatment according to their prior experiences.

2. Data and Methods

2.1 Study population

This study uses data from the most recent Cambodia Demographic and Health Survey (CDHS), implemented in 2010. The 2010 CDHS collected data from a random representative sample in order that the majority of indicators can be estimated at the national level, urban-rural level, and 19 sampling domains (provinces or groups of provinces). The survey uses the master sampling frame of the total 28,764 enumeration areas (EA) from the 2008 Cambodia General Population Census. The survey uses a two-stage stratified sampling method. In the first stage enumeration areas or clusters are selected from a master sampling frame from the most recent National Population Census. In the second stage, a number of households were selected within each cluster. In total, 611 clusters or EA were selected for the survey in the first stage. In the second stage, twenty-four households were then randomly selected within each urban cluster and 28 households were then randomly selected within each rural cluster, for a total of 16,344 households. The sampling methods for this survey have been reported in detail elsewhere (National Institute of Statistics (NIS), Directorate General for Health (DGH), and ICF International, 2011). This survey interviewed 18,754 women aged 15–49 years from July 2010 to January 2011. The module in the survey questionnaire pertaining to children’s health was addressed to women in the household about all live births occurring to them women within the previous five years. In total there were 8,200 live births to the women who participated in the survey, including 389 live births of children who died before the age of five years (who were not included in this study). This analysis is limited to only 7,811 living children.. Information on women’s demographic and socioeconomic characteristics were collected during the interview. Data on healthcare service utilization, exposure to mass media, perception on issues related to healthcare, and prior experience in utilization of health services, were also collected. This survey was conducted in all 19 survey domains that have been grouped further in the analysis into five regions: **Phnom Penh**, the capital city is assigned as a region; the **Plain** region includes the provinces of Kampong Cham, Kandal, Prey Veng, Svay Rieng and Takeo; the **Great Lake** region includes the provinces of Banteay Mean Chey, Bat Dambang, Kampong Chhnang, Kampong Thom, Pousat and Siem Reap; the **Coastal** region includes the provinces of Kampot, Koh Kong, Kep City and Preah Sihanouk City; and the **Plateau/Mountain** region includes the provinces of Kampong Speu, Kratie, Mondol Kiri, Preah Vihear, Rattanak Kiri, Stung Traeng, Otdor Mean Chey, and Pailin City.

2.2 Dependent variables:

All children under five years of age, (0-59 months old) (n = 7,811), were included in the initial step of the analysis. For each child, the survey asked the mothers the following questions:

- Has (NAME) had diarrhea in the last 2 weeks?
- Has (NAME) been ill with a fever at any time in the last 2 weeks?

Data from these two questions determined the children who had diarrhea (1,161; we disregarded whether they had fever or not) and the children who had fever (2,194; we disregarded whether

they had diarrhea or not) within the last two weeks. In the second step, for children who suffered from these conditions, the survey asked the mothers:

- Did you seek advice or treatment for the illness from any source?

If the answer was ‘yes’, two follow-up questions were asked.

- Where did you seek advice or treatment? Any other?
- Where did you first seek advice or treatment?

In this analysis, response categories available for the question “where did you seek advice or treatment?” were grouped into the following categories:

1. the public sector (national hospital, provincial hospital, district hospital, health center, health post, outreach, military hospital, other public sector),
2. the private sector (private hospital, private clinic, home of trained health worker, visit of trained health worker, other private medical sector),
3. the informal sector (pharmacy, shop, traditional practitioner, other), and
4. no treatment provided.

For this analysis, we combined ‘no treatment provided’ with the ‘informal sector’.

2.3. Independent variables:

Based on the conceptual framework, the independent variables were defined according to their domains.

External environment: residence (urban, rural); region (Phnom Penh, Plain, Coastal, Great Lake, Plateau/mountainous).

Predisposition: age of the mother (15-24, 25-29, 30-34, 35-49); sex of the child (male, female); education (no education, primary, secondary or higher); wealth index (lowest, lower, middle, higher, highest); did the mother read a newspaper or magazine at least once per week (no, yes); did the mother listen to the radio at least once per week (no, yes); did the mother watch television at least once per week (no, yes); did the mother use or know about ORT - for diarrhea analysis (no, yes).

Enabling: financial need for medical treatment (big problem, not a big problem); distance to a healthcare facility (big problem, not a big problem); employment (not currently working, currently working), does the mother have health insurance (no, yes).

Need: diarrhea with blood and/or with fever – for diarrhea analysis (no, yes); fever with cough and difficult breathing of chest origin – for fever analysis (no, yes).

Prior utilization of health service: visit to a healthcare facility in last 12 months (no, yes).

2.4. Analysis

This study uses both descriptive methodology and multivariate methods to show associations between factors and the utilization of healthcare services in different healthcare sectors. Because the dependent variables have three categories (no treatment/informal health sector, public health sector, private health sector), the multivariate method that is appropriate for this analysis is a multinomial logistic regression. The results of the multinomial logistic regression are presented as Relative Risk Ratio (RRR) with its significant level (p-value). An association is considered significant if its p-value is smaller than 0.05.

In the first part of the study, the results indicate the prevalence of diarrhea and fever by selected background characteristics of the child, mother, and household. The second part, presents the analysis for the utilization of healthcare services for diarrhea, and the final part presents the analysis for utilization of healthcare services for fever.

In the analysis, sampling weights were used to restore the representative of the sample in the population. The non-response rates could have affected the estimates if the rates differed significantly for certain groups of respondents and for certain specific questions compared to other groups of respondents or questions. However, non-response rates are small and are unlikely to cause any significant bias.

Ethics: This study is based on secondary analysis of existing survey data with all identifying information removed. The survey acquired informed consent from women included in this study before asking any questions.

3. Results

3.1. Diarrhea and fever among children under five years of age

Table 1. Percentage of children under five who had diarrhea and who had fever in the two weeks preceding the survey, by selected background characteristics, Cambodia 2010

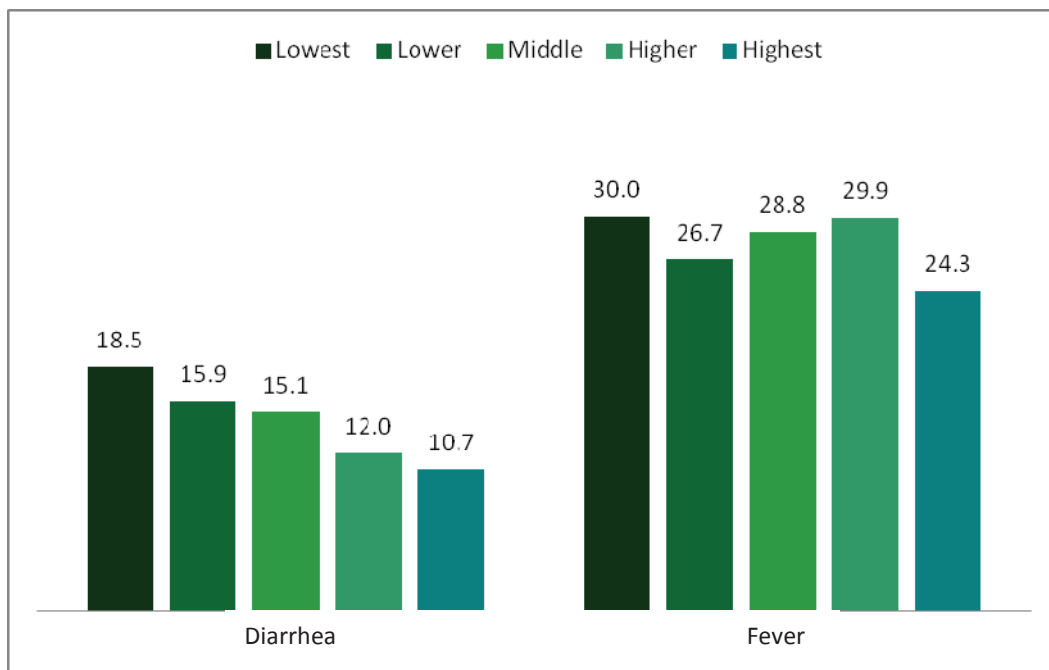
Characteristics	Diarrhea	Fever	Number of Children
<i>Child Characteristics</i>			
Age (month)			
<6	14.2	21.2	711
6-11	26.5	41.8	826
12-23	21.1	34.9	1,614
24-35	13.7	27.9	1,610
36-47	9.6	25.0	1,537
48-59	8.7	20.0	1,514
Sex			
Male	16.0	28.0	4,033
Female	13.7	28.2	3,779
<i>Mother characteristics</i>			
Age of mother			
15-24	19.1	30.2	1,928
25-29	13.7	27.5	2,758
30-34	14.1	26.9	1,560
35-49	12.4	27.7	1,566
Mother's education			
No schooling	17.4	29.1	1,426
Primary	15.7	29.3	4,412
Secondary and higher	11.2	24.6	1,973
<i>Household characteristics</i>			
Wealth index			
Lowest	18.5	30.0	2,039
Lower	15.9	26.7	1,667
Middle	15.1	28.8	1,421
Higher	12.0	29.9	1,369
Highest	10.7	24.3	1,315
Residence			
Urban	10.5	25.3	1,256
Rural	15.7	28.6	6,555
Region			
Phnom Penh	11.6	24.1	641
Plain	15.6	29.1	3,076
Great Lake	16.9	31.2	2,418
Coastal	14.6	27.1	513
Plateau/Mountainous	10.8	21.6	1,163
Total	14.9	28.1	7,811

Table 1 represents the percent of diarrhea and fever in children within two weeks preceding the interview according to selected background characteristics among the children under five.

Overall, 15 percent of the children under five had diarrhea. The percent of diarrhea varies by age of the child. The percent of diarrhea among young children aged 6-11 and 12-23 months are higher (26 percent and 21 percent, respectively) than children younger than 6 months old or 24 months or older. Diarrhea was slightly more common among boys (16 percent) than girls (14 percent). Children of young mothers (15-24 years old) experienced more diarrhea (19 percent) than children (12 percent to 14 percent) of older mothers. The occurrence of diarrhea is lower among children whose mothers had a secondary education or higher (11 percent), lived in the highest households wealth quintile, and who lived in urban areas (11 percent) than other children. Regional variations show that the prevalence of diarrhea was lower in the Plateau/mountainous region (11 percent) and in Phnom Penh (12 percent) than in other regions (15 percent-17 percent).

Overall, 28 percent of the children under age five had fever 2 weeks before the interview. Similar to diarrhea, fever was more commonly reported among children aged 6-11 months and 12-23 months, and among children of the young mothers. However, the prevalence of fever is less commonly reported among urban children, children who live in households with the highest wealth index quintile, and children whose mothers have a secondary education or higher. The percent of fever among boys and girls is exactly the same (28 percent each). Regional variation of fever is similar to that of diarrhea.

Figure 2. Distribution of prevalence of diarrhea fever among children under five by household wealth index quintile, Cambodia 2010



3.2. Utilization of healthcare services for treatment of diarrhea

Utilization of healthcare services for the treatment of diarrhea are shown in tables 2 and 3. Utilization of healthcare services during the occurrence of diarrhea was presented by independent variables described in the conceptual framework. The differences in the proportion of utilizing public health sector and private health sector according to independent variables were statistically significant (p-value < 0.05) for region, age of mother, listening to the radio, used or

heard of ORS, covered by a health insurance, diarrhea with blood or fever, and visiting healthcare facility within the last 12 months.

Table 2. Type of health services sector sought for treatment of diarrhea among children under age five who had diarrhea in the two weeks preceding the survey by selected factors, Cambodia 2010

Factor	No treatment/ informal health sector	Public health sector	Private health sector	Number of children with diarrhea
<i>External environment</i>				
Residence				(p=0.313)
Urban	41.9	26.9	31.2	131
Rural	41.0	28.0	31.0	1,029
Region				(p=0.000)
Phnom Penh	40.5	29.6	29.9	74
Plain	35.5	24.8	39.7	479
Great Lake	46.2	34.4	19.5	408
Coastal	47.4	15.1	37.5	75
Plateau/Mountainous	42.2	25.4	32.4	125
<i>Predisposing</i>				
Age of the mother				(p=0.006)
15-24	37.6	28.5	33.9	368
25-29	38.1	29.9	32.1	379
30-34	46.4	23.1	30.6	220
35-49	47.6	28.4	24.0	193
Sex of the child				(p=0.669)
Male	42.9	26.1	31.0	643
Female	38.8	30.2	31.0	518
Mother's education				(p=0.063)
No schooling	44.5	25.7	29.8	248
Primary	41.2	29.7	29.1	693
Secondary and higher	37.0	24.8	38.2	220
Wealth index				(p=0.055)
Lowest	46.7	25.6	27.7	376
Lower	40.6	32.2	27.2	264
Middle	32.7	29.2	38.1	215
Higher	40.7	24.2	35.1	164
Highest	40.3	28.2	31.5	141
Reading newspaper at least once per week				(p=0.857)
No	41.2	28.1	30.7	1,083
Yes	39.9	25.0	35.2	77
Listening to radio at least once per week				(p=0.039)
No	43.8	26.2	30.1	835
Yes	34.2	32.3	33.5	326
Watching television at least once per week				(p=0.051)
No	44.0	24.9	31.2	621
Yes	37.8	31.4	30.8	540
Used or heard of ORS				(p=0.001)
No	56.8	16.6	26.6	62
Yes	40.2	28.6	31.3	1,099
<i>Enabling</i>				
Financial need for medical treatment				(p=0.429)
Big problem	40.2	27.7	32.2	812
No problem	43.2	28.5	28.3	348
Distance to the health facility				(p=0.303)
Big problem	44.6	28.6	26.9	480
No problem	38.6	27.5	33.9	681

To be continued...

Table 2 – Continued

Factor	No treatment/ informal health sector	Public health sector	Private health sector	Number of children with diarrhea
Employment				(p=0.531)
Not currently working	41.5	31.4	27.1	410
Currently working	40.8	26.0	33.2	750
Covered by health insurance				(p=0.004)
No	40.7	26.8	32.6	930
Yes	42.7	32.6	24.8	231
<i>Need</i>				
Diarrhea with blood or with fever				(p=0.000)
No	50.4	22.7	26.9	441
Yes	35.4	31.1	33.5	720
<i>Prior utilization of health services</i>				
Visiting health facility last 12 months				(p=0.001)
No	41.4	25.7	32.9	460
Yes	40.8	29.4	29.8	701
Total/Number	41.1	27.9	31.0	1,161

The Coastal, Plain, and Plateau/mountain regions utilized the private health sector more than the public health sector, whereas the Great Lake region preferred the public health sector to private health sector for the treatment of diarrhea. Young mothers were more likely to seek treatment for diarrhea than were older mothers, and more often used the private health sector. Mothers who used or were familiar with ORS were more likely to seek treatment for diarrhea, but preferred to go to the private health sector. If the family was covered by an insurance (the majority of the insurance is the equity fund provide to the poor to use services at the public health facilities), they were more likely to bring their children to the public health sector, but if they had to pay out-of-pocket, private health sector was more likely their choice. Children who had bloody diarrhea or diarrhea with fever were more likely to receive treatment than other children, and were also more likely to utilize the private health sector more than the public health sector. Women who had not visited a healthcare facility within the last 12 months and who sought treatment for diarrhea for their children were more likely to use the private health sector.

In the multivariate model (Table 3), two predisposing factors (watching television and use or heard of ORS), and one need factor (diarrhea with blood or fever) are statistically significant and associated with seeking treatment from the public health sector. Mothers who watched television at least once per week were significantly more likely to take their children to the public healthcare sector than women who did not watch the television or watched it less often than once per week (RRR=1.45, p-value=0.033). Women who used or heard of ORS are also significantly more likely to take their children to the public healthcare sector than women who did not use or hear of ORS (RRR=2.15, p-value=0.043). Moreover, children who had diarrhea with blood or fever were almost two times more likely to be brought to the public healthcare sector for treatment than children who had diarrhea without blood or fever (RRR=1.90, p=0.000).

Seeking treatment for diarrhea in the private healthcare sector is significantly associated with the age of the mother, the wealth index quintile, financial need for the treatment, distance to the healthcare facility, and diarrhea with blood or fever. Older mothers (35-49 years old) were less likely to take their children to the private healthcare sector for diarrhea treatment than were younger mothers (RRR=0.61, p-value=0.037). Women belonging to the second or higher wealth

index quintiles utilized the private healthcare sector for the treatment of diarrhea for their children more often than women belonging to the first (lowest) wealth index quintile, but the association is statistically significant for only for women in the middle quintile (RRR=1.76, p-value=0.013). This contrasts with the expectation that women who said that money is not a big problem for obtaining medical treatment were less likely to go to the private healthcare sector for the treatment for their children (RRR=0.53, p-value=0.001). However, as expected, women who said that the distance to a healthcare facility is not a big problem in getting medical treatment, is significantly more likely to bring their children to the private healthcare sector (RRR=1.57, p-values=0.008). Diarrhea with blood or fever was more likely to be treated by the private healthcare sector than a child with diarrhea without blood or fever (RRR=2.05, p=0.000).

Table 3. Factors associated with health services sector sought for children under age five who had diarrhea in the two weeks preceding the survey, Cambodia 2010

Factor	Sought treatment from a public sector compared to no treatment/informal sector		Sought treatment from private sector compared to no treatment/informal sector	
	RRR	p-value	RRR	p-value
<i>External environment</i>				
Residence				
Urban	1.00		1.00	
Rural	1.22	0.550	1.04	0.911
Region				
Phnom Penh	1.00		1.00	
Plain	0.84	0.677	1.70	0.194
Great Lake	0.84	0.677	0.62	0.240
Coastal	0.40	0.077	1.16	0.743
Plateau/Mountainous	0.75	0.540	1.17	0.725
<i>Predisposing</i>				
Age of the mother				
15-24	1.00		1.00	
25-29	1.07	0.721	1.03	0.879
30-34	0.70	0.113	0.85	0.442
35-49	0.87	0.546	0.61	0.037
Sex of the child				
Male	1.00		1.00	
Female	1.30	0.080	1.15	0.361
Mother's education				
No schooling	1.00		1.00	
Primary	1.07	0.743	0.96	0.815
Secondary and higher	1.05	0.852	1.34	0.265
Wealth index				
Lowest	1.00		1.00	
Lower	1.48	0.052	1.22	0.336
Middle	1.43	0.123	1.76	0.013
Higher	0.90	0.710	1.36	0.230
Highest	1.03	0.929	1.47	0.290
Reading newspaper at least once per week				
No	1.00		1.00	
Yes	0.80	0.499	1.00	0.991
Listening to radio at least once per week				
No	1.00		1.00	
Yes	1.39	0.063	1.32	0.117
Watching television at least once per week				
No	1.00		1.00	
Yes	1.45	0.033	0.88	0.474

To be continued...

Table 3 – Continued

Factor	Sought treatment from a public sector compared to no treatment/informal sector		Sought treatment from a private sector compared to no treatment/informal sector	
	RRR	p-value	RRR	p-value
Used or heard of ORS				
No	1.00		1.00	
Yes	2.15	0.043	1.60	0.155
<i>Enabling</i>				
Financial need for medical treatment				
Big problem	1.00		1.00	
No problem	0.76	0.147	0.53	0.001
Distance to the health facility				
Big problem	1.00		1.00	
No problem	1.16	0.407	1.57	0.008
Employment				
Not currently working	1.00		1.00	
Currently working	0.82	0.206	1.27	0.142
Covered by health insurance				
No	1.00		1.00	
Yes	1.28	0.194	0.80	0.279
<i>Need</i>				
Diarrhea with blood or with fever				
No	1.00		1.00	
Yes	1.90	0.000	2.05	0.000
<i>Prior utilization of health services</i>				
Visiting health facility last 12 months				
No	1.00		1.00	
Yes	1.09	0.584	0.93	0.657

3.3. Utilization of healthcare services for the treatment of fever

Table 4 represents the utilization of healthcare services for the treatment of fever. Utilization of healthcare services during the episode of fever was presented by independent variables described in the conceptual framework. The differences in proportion of utilizing the public health sector and private health sector according to the independent variables were statistically significant (p -value < 0.05) for all indicators except for the age of mother, the sex of the child, the financial need for medical treatment, and employment (Table 4).

Rural mothers sought treatment for their children more often than did urban mothers. Nevertheless, the utilization of the private health sector was more prominent than that of the public health sector by both rural and urban mothers. All regions, except for the Great Lake region, utilized the private health sector more than the public health sector. Mothers with a secondary education or higher were more likely to seek treatment for fever, and did so more often at private health sectors than the public health sector. Mothers belonging to the two lowest wealth quintiles were more likely to go to the public health sectors for their children's treatment, whereas mothers belonging to the three highest wealth quintiles preferred to go to the private health sector. Mothers who were exposed to the mass media at least once per week sought treatment for their children more than mothers who did not. For those who sought treatment for their children did so more often at the private health sector regardless of whether they were exposed to the mass media or not.

Women who said that distance to a health facility is not a big problem sought treatment for their children more often than other women. Those women were more likely to go to the private health sector. The difference of seeking treatment between those that were insured and those that were uninsured is small. However, the insured were more likely to bring their children to the public health sector. Children who had fever accompanied by the symptoms of ARI were more likely to receive treatment than children who only had symptoms of one, and went to the private health sector more than public health sector. Women, who had not visited a healthcare facility within the last 12 months and sought treatment for fever for their children, were more likely to go to the private health sector (table 4).

Table 4. Type of health services sector sought for treatment of diarrhea among children under age five who had diarrhea in the two weeks preceding the survey by selected factors, Cambodia 2010

Factor	No treatment or informal health sector	Public health sector	Private health sector	Number of children with fever
<i>External environment</i>				
Residence				(p=0.003)
Urban	42.6	25.2	32.2	318
Rural	36.3	30.6	33.2	1,877
Region				(p=0.000)
Phnom Penh	46.8	21.5	31.8	155
Plain	32.2	30.2	37.6	896
Great Lake	39.8	36.4	23.9	753
Coastal	41.0	16.0	43.0	139
Plateau/Mountainous	39.3	21.2	39.5	251
<i>Predisposing</i>				
Age of the mother				(p=0.225)
15-24	33.0	31.3	35.7	582
25-29	36.3	28.8	35.0	759
30-34	37.5	32.6	29.9	420
35-49	44.1	26.9	29.0	434
Sex of the child				(p=0.724)
Male	38.0	27.5	34.6	1,130
Female	36.4	32.2	31.4	1,064
Mother's education				(p=0.000)
No schooling	45.7	26.6	27.7	416
Primary	36.1	31.8	32.1	1,294
Secondary and higher	32.9	27.1	40.0	485
Wealth index				(p=0.000)
Lowest	42.3	30.2	27.5	612
Lower	35.7	37.4	26.9	445
Middle	28.5	30.7	40.8	409
Higher	35.1	25.9	39.0	409
Highest	43.5	22.2	34.3	319
Reading newspaper at least once per week				(p=0.004)
No	37.8	29.7	32.5	2,038
Yes	29.0	30.9	40.1	156
Listening to radio at least once per week				(p=0.016)
No	38.3	29.0	32.8	1,556
Yes	34.7	31.7	33.7	638

To be continued...

Table 4 -- Continued

Factor	No treatment or informal health sector	Public health sector	Private health sector	Number of children with fever
Watching television at least once per week				(p=0.004)
No	39.6	29.1	31.3	1,113
Yes	34.8	30.5	34.8	1,082
<i>Enabling</i>				
Financial need for medical treatment				(p=0.249)
Big problem	37.0	30.0	33.1	1,454
No problem	37.7	29.4	32.9	741
Distance to the health facility				(p=0.010)
Big problem	41.3	30.0	28.7	814
No problem	34.8	29.6	35.6	1,380
Employment				(p=0.102)
Not currently working	38.6	30.7	30.7	810
Currently working	36.4	29.2	34.4	1,384
Covered by health insurance				(p=0.000)
No	37.4	27.9	34.7	1,835
Yes	36.0	39.5	24.5	360
<i>Need</i>				
Fever with cough and difficult breathing				(p=0.013)
No	37.9	30.0	32.0	1,781
Yes	34.1	28.6	37.3	413
<i>Prior utilization of health services</i>				
Visiting health facility last 12 months				(p=0.000)
No	38.8	23.9	37.2	858
Yes	36.2	33.5	30.3	1,337
Total	37.2	29.8	33.0	2,194

Table 5 shows the multivariate model of health seeking behavior. Seeking treatment for fever at a public health sector facility was significantly associated with age and level of education of the mother, wealth index, having health insurance, and prior visit to a healthcare facility within the preceding 12 months. Relationship between the age of the mother and mothers who sought treatment for fever for their child, is very similar to that for the diarrhea. Mothers with a secondary or higher level of education is associated for higher odds of seeking treatment in both public health sector (RRR=1.66, p=0.011) and private sector (RRR=1.71, p=0.005). Association between wealth index and seeking treatment for fever fluctuated and had no clear pattern. Being insured and prior experience visiting a healthcare facility significantly increased the chance of going to the public health sector for treatment (RRR=1.53, p=0.004; RRR=1.46, p=0.001 respectively).

Seeking treatment for fever in the private health sector is significantly associated also with the age and education of the mother in the same direction as to seeking treatment for fever in the public health sector. Nonetheless, there is no significant relationship with being insured or visiting a healthcare facility within the last 12 months. Contrary to the expectation, these results show that when financial need is not a big problem, the children were less likely to be brought for treatment (RRR=0.72, p=0.010). However, when distance to healthcare facility is not a big problem, the children are more likely to be treated in the private health sector (RRR=1.46, p=0.002). Moreover, children who had fever with symptoms of ARI were more likely to be

brought to the private health sector for treatment than children who had no symptoms of ARI (RRR=1.34, p=0.032).

Table 5. Factors associated with health services sector sought for children under age five who had fever in the two weeks preceding the survey, Cambodia 2010

Factors	Sought treatment from a public sector compared to no treatment/informal sector		Sought treatment from private sector compared to no treatment/informal sector	
	RRR	p-value	RRR	p-value
<i>External environment</i>				
Residence				
Urban	1.00		1.00	
Rural	0.94	0.773	1.04	0.843
Region				
Phnom Penh	1.00		1.00	
Plain	1.36	0.329	1.60	0.101
Great Lake	1.27	0.437	0.88	0.654
Coastal	0.54	0.111	1.51	0.206
Plateau/Mountainous	0.76	0.422	1.47	0.211
<i>Predisposing</i>				
Age of the mother				
15-24	1.00		1.00	
25-29	0.85	0.263	0.97	0.800
30-34	0.98	0.878	0.85	0.322
35-49	0.68	0.017	0.68	0.015
Sex of the child				
Male	1.00		1.00	
Female	1.22	0.065	0.96	0.727
Mother's education				
No schooling	1.00		1.00	
Primary	1.39	0.024	1.32	0.058
Secondary and higher	1.66	0.011	1.71	0.005
Wealth index				
Lowest	1.00		1.00	
Lower	1.42	0.022	1.08	0.631
Middle	1.40	0.049	1.87	0.000
Higher	0.83	0.299	1.40	0.050
Highest	0.59	0.044	1.05	0.833
Reading newspaper at least once per week				
No	1.00		1.00	
Yes	1.34	0.211	1.38	0.145
Listening to radio at least once per week				
No	1.00		1.00	
Yes	1.08	0.539	0.96	0.736
Watching television at least once per week				
No	1.00		1.00	
Yes	1.27	0.053	1.08	0.509
<i>Enabling</i>				
Financial need for medical treatment				
Big problem	1.00		1.00	
No problem	0.88	0.333	0.72	0.010

To be continued...

Table 5 -- Continued

Factors	Sought treatment from a public sector compared to no treatment/informal sector		Sought treatment from a private sector compared to no treatment/informal sector	
	RRR	p-value	RRR	p-value
Distance to the health facility				
Big problem	1.00		1.00	
No problem	1.10	0.458	1.46	0.002
Employment				
Not currently working	1.00		1.00	
Currently working	1.03	0.810	1.16	0.195
Covered by health insurance				
No	1.00		1.00	
Yes	1.53	0.004	0.86	0.332
<i>Need</i>				
Fever with cough and difficult breathing				
No	1.00		1.00	
Yes	0.97	0.824	1.34	0.032
<i>Prior utilization of health services</i>				
Visiting health facility last 12 months				
No	1.00		1.00	
Yes	1.46	0.001	0.89	0.299

4. Discussion and Conclusion

Our analysis reveals some crucial issues related to health seeking behavior for two important childhood morbidities. One of the more important results is that about two in five children who suffered from diarrhea and fever did not seek any treatment. This is particularly serious in that only 70 percent of children with bloody diarrhea or diarrhea with fever, and 66 percent of children with fever and acute respiratory infection sought any medical treatment at all. Treating diarrhea and fever at home is not unusual since simple diarrhea without severe dehydration or any other danger sign can be treated at home with increased fluid intake and oral rehydration solution. But the children must be examined by a qualified healthcare provider when there are any danger signs.

Children having severe symptoms (diarrhea with blood or fever, and fever with signs of ARI) were likely to be taken to both the public health sector and the private health sector for medical treatment for diarrhea, however only to the private health sector for fever. Previous knowledge or use of oral rehydration salt for the treatment of diarrhea was associated with choosing the public health sector for the treatment of diarrhea. This was most likely due to ORS and ORT education being provided more extensively in the public health sector.

Mothers aged 35 years old or older were less likely to seek healthcare from a provider for their children. Children from wealthier households were less likely to go to the public health sector but more likely to go to the private health sector for treatment. When distance to a healthcare facility was not perceived as a big problem, the children were more likely to be taken to the private health sector for treatment and not necessarily to the public sector. However when women said that money was not a big problem, sick children were less likely to be taken to a healthcare facility for medical treatment. Prior experience visiting a healthcare facility was associated with seeking treatment for fever at a public sector healthcare facility.

All the interpretations of this analysis should be read with caution because of some limitations using the DHS data. Data collected by DHS are retrospective in nature as they are gathered during a face-to-face interview and subject to recall bias. For example, a mother's recollection about her child's illnesses and treatment may not be completely accurate. This analysis is a secondary analysis and the availability of information is limited to only those collected during the survey. The total sample of children who had diarrhea and fever included in the final analyses are relatively small. Taking into consideration the sample variations and recall bias discussed above, this relatively small subject sample may not have enough statistical power to detect significant differences in certain associations.

Income and expenditure is an importance determinant for health service utilization and was not collected in the DHS survey. This analysis used wealth index as a proxy for income which is proven to be a good representative of household socioeconomic status in developing countries (Rutstein SO, Johnson K 2005). The inconsistent relationship between household wealth index quintile and utilization of healthcare services for childhood illnesses cannot be explained and may reflect the quality of the household wealth index, or possibly impacted by the relatively small sample size in this analysis.

Moreover, data about the availability and accessibility of healthcare services were not collected in the DHS survey. Additionally, information about the quality of care and health beliefs was not available. The availability of this information could have made the difference between public and private health sector utilization, and healthcare-seeking behaviors in the utilization of services, more apparent.

Regarding the large number of children who did not seek any medical treatment in either the public healthcare sector or the private healthcare sector, we did not find this problematic at all. Diarrhea without any danger signs can be treated with ORS or home-made rehydration fluids, both of which are easily available. For mothers whose child had a fever, they may have used medicines available at home or used home remedies. It is possible that lower rates of health services utilization was a result of self-treatment (Tinuade O, Iyabo RA, Durotoye O 2010). This is reinforced by the results showing a larger proportion of children being taken to seek medical treatment in the public or private healthcare sector if they had severe symptoms (blood in stools and fever for diarrhea, and ARI symptoms for fever) (Yoder PS, Hornik RC (1994).

A mother's previous experience of using public healthcare services affects the utilization of the public health sector for fever (but not diarrhea). This goes hand in hand with the fact that more mothers gave birth at a public healthcare facility than in a private health facility (National Institute of Statistics (NIS), Directorate General for Health (DGH), and ICF International, 2011). A mother's education also affected whether she sought treatment for a sick child; this is consistent with the findings of previous literature (Fosu GB 1994). However, in contrast with previous studies conducted elsewhere, sex bias does not exist for seeking healthcare for childhood illnesses in Cambodia (Thind A, Cruz AM 2003). It is obvious that health insurance (equity fund) better enables the utilization of the public health sector for childhood illnesses. Media exposure has little influence on health seeking behavior, and only watching television encourages the utilization of public health sector.

The utilization of health services was associated with the presence of danger signs and symptoms of illness in children. Mother's age, level of education, exposure to mass media and prior experience in treatment significantly affect utilization of health services, particularly in public health sectors. This information will have important implications on program intervention of childhood illnesses in Cambodia. Socioeconomic inequality does exist, but no clear conclusion could be drawn from the results of this analysis. It is evidence that the private healthcare sector continues to play an important role in delivering healthcare services to children in Cambodia. Therefore, there must be an inclusion of this sector in health system reforms so it can be regulated, ensure that it follows the standard protocol of care, and be part of program planning. National health insurance schemes of equity fund must improve its coverage to protect economically destitute and vulnerable segments of the population, specifically women and children,

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Developed with Financial and Technical Assistance from
United Nations Population Fund

