

## CHAPTER III

### RESEARCH METHODOLOGY

#### 3.1 Research Design

The research design used is household-based cross sectional analytical study to compare the health of children and their mothers in Habitat and non-Habitat housing.

#### 3.2 Study Site

The study was conducted in the communities of Khmer Kampuchea Khrom, Samaki and Sen Sok, which are all in greater Phnom Penh, Cambodia.

#### 3.3 Target Participants

Children ages 10 years and younger, and their mothers, who are living in Habitat for Humanity-built houses (typically with brick walls, toilet/septic tank, concrete floor, and metal sheet roof), and children and mothers living next door in non-Habitat homes (largely make-shift and inadequately built homes [e.g., thatched, no toilet, leaking roofs, dirt floor]).

### **3.4 Sample Size**

This was estimated at 150 (of a total of 159) households living in Habitat for Humanity-built houses and 150 Households adjacent to them (largely in makeshift and inadequately-built houses) in Khmer Kampuchea Khrom, Samaki and Sen Sok.

### **3.5 Sampling Technique**

The target population consisted of all Habitat households in the 3 study villages. One non-Habitat household was selected for each Habitat household. Non-Habitat houses were located within 100 meters of Habitat houses. The first choice of non-Habitat house was that adjacent and to the right of the Habitat household (facing from the front).

### **3.6 Inclusion Criteria**

All Habitat households in the 3 selected communities and one adjacent non-Habitat household.

### **3.7 Exclusion Criteria**

Those excluded were households not on the Habitat for Humanity list of pre-qualified families for the housing improvement program, which was prepared prior to this study. The list tended to exclude households at the upper end of the socioeconomic scale, and thereby reduced socioeconomic-related bias in the study results.

### 3.8 Data Collection Methodology

A structured, standardized, pre-tested questionnaire was administered by trained interviewers. Questionnaire responses were used to assess the health of children and mothers among selected households. The respondent reported on illness and symptoms during the last 4 weeks, and during the last 2 weeks ("illness recall method"). The questionnaire respondent was the mother whenever possible, and was otherwise another adult caregiver (a female in all cases but one). Also, permission was obtained for collecting drinking water, to measure and compare *coliform* and *E. coli* levels in Habitat and non-Habitat houses.

### 3.9 Research Instruments

1. The structured questionnaire, consisting of the following 5 parts:
  - a. Study description and signed consent form
  - b. Basic family Information
  - c. Health Information about the mother or female care giver
  - d. Health Information about the children given by the mother or female caregiver
  - e. General questions about the housing conditions of the respondents
2. Laboratory measurements of levels of coliforms and *E. coli* sampled from the drinking water in all study homes.

### 3.10 Data Collection Process

1. A questionnaire in English and Khmer languages was developed.

2. The questionnaire was validated by pre-testing it with 30 households (15 non-Habitat and 15 Habitat) in another community where Habitat has an on-going project but outside the study area, with similar socio-demographic characteristics to the study group.
3. Adjustments were made to the questionnaire as a result of the pre-testing exercise, such as changes to the content to include other symptoms, changes in the terminologies used and rephrasing of some questions to insure clarity.
4. Orientation and training were conducted for 10 interviewers who are Khmer and Basic English speakers. Topics were the Habitat for Humanity program and the covered communities, content of the questionnaire, interviewing techniques and the purpose of the study.
5. Data was then gathered from respondents in the 3 selected communities.
6. Samples from drinking water source were directly collected from each household and placed in containers with controlled temperature (as instructed by the laboratory) and taken to the Resource Development International laboratory for testing.

### **3.11 Ethical Considerations**

The participants were asked to participate voluntarily, and they informed about the purpose of the study and study procedures. This study involved no invasive procedures (e.g., blood drawing). They were asked to sign the consent form if they were willing to participate. All prospective subjects were free to refuse to participate.

### 3.12 Data Analysis

All variables in the questionnaire were classified into nominal, ordinal or continuous levels of measurement. Some variables were treated as more than one type of data. The variables were coded, and entered into a PC computer. Data entry and analysis were done using SPSS software. Comparisons were made between non-Habitat and Habitat households and SPSS was used for the analysis of the results. Independent T test statistics were applied to analyze continuous variables (e.g., income, age) and chi-square for the categorical variables (e.g., gender, educational level). Logistic regression was used to analyze the combined continuous and categorical variables. Pearson's chi-square was used for the analysis of the relationship of the independent and dependent variables.

A Comparison and analysis on the following health measurements were made using chi-square test:

1. Health status of Habitat for Humanity and non-Habitat houses, where specific symptoms of respiratory infections, gastrointestinal infections and skin infection were analyzed to see prevalence rate of those illnesses.
2. Health status of children and mothers by looking at housing related environmental characteristics (e.g., indoor fuel, use of mosquito coils, floor type, walls type, garbage disposal, building materials, water source).
3. Comparison of *coliform* levels in Habitat and non-Habitat houses was made using the non-parametric Mann-Whitney U test for continuous data in 2 independent groups. This test was done because *coliform* and *E. coli* levels were not normally distributed in Habitat and non-Habitat homes.

4. Comparison of gastrointestinal illness rate in children and their mothers from *coliform* levels was made using chi-square test to find strengths of association.

### 3.13 Variables

1. Dependent Variables: Children's and mother's health status.
2. Primary Independent Variable: Habitat vs. non-Habitat housing
3. Other Independent Variables (potential confounders)
  - Housing Condition and related environmental characteristics
  - Demographic: (e.g., name, age, sex)
  - Socio-economic: (e.g., income, education)
  - Non-housing-related environmental (e.g., smoking)

### 3.14 Sample Size Considerations

The following table shows the illness rates by housing type, as reported in two previous studies. Wolff et al. addresses children's respiratory and GI illness rates in Habitat and non-Habitat homes in Malawi, and Shrestha and Shrestha addresses women's illness rates in houses made with concrete vs. other building materials in Nepal. Shaded information in the table below was used in sample size calculations.

Table 3.1: Rates of illnesses and symptoms, by house type, in two studies

<u>Study, location, population, and recall period</u>	<u>Health condition</u>	<u>House type and Rate [n of subjects, (%)]</u>	
		<u>Habitat (total 143)</u>	<u>Traditional (total 175)</u>
Wolff et al., Malawi, children 5 years and younger, 2 or 4 weeks	Respiratory illness	30 (20.9)	51 (29.1)
	Gastrointestinal illness	12 (9.8)	24 (13.7)
Shrestha and Shrestha, Nepal, women, 12 months		<u>Concrete (total 42)</u>	<u>Mud, brick, and mixed (total 126)</u>
	ALRI	6 (14.3)	18 (14.3)
	Cough	8 (19.0)	45 (35.7)
	Phlegm	3 (7.1)	31 (24.6)
	Cough and phlegm	2 (4.8)	24 (19.0)
	Breathlessness	6 (14.3)	40 (31.7)
	Wheezing	1 (2.4)	38 (30.2)
	Breathlessness and wheezing	1 (2.4)	33 (26.2)
At least one respiratory symptom	8 (19.0)	52 (41.3)	

Based on these previous studies the researcher expected to find at least 1 child under 10 years old per house and the average of at least 2 children per household, expecting to find at least 150 children in Habitat houses and 150 children in non-Habitat houses. This provided at least 90% confidence and 70% power in test of expected rates of respiratory illness in children in Habitat vs. non-Habitat housing. For women the researcher calculated that 152 mothers (76 in each group) would be needed to detect differences between Habitat and non-Habitat households in mothers' symptom rates. This number would yield 95% confidence and 80% power.