CHAPTER IV

RESEARCH METHODOLOGY

4.1 Conceptual Framework

This study will try to analyze the factors that affect people's participation in health insurance at Takmau district, Kandal province, Cambodia. The pilot study on health insurance program introduced in Takmau has not received good response from the people for the last five years. It is felt that there are some underlying factors affecting health insurance participation by people.

Therefore this study will try to identify factors that affect people's participation in health insurance in Takmau. People in Takmau district will be interviewed through a structured questionnaire, and the data collected will be analyzed so as to determine the factors predominantly affecting people's participation in health insurance. The conceptual framework for analysis is shown in Figure 4.1 below

(1) Operational Definitions:

Dependent variable: the probability that an individual will join the health insurance program

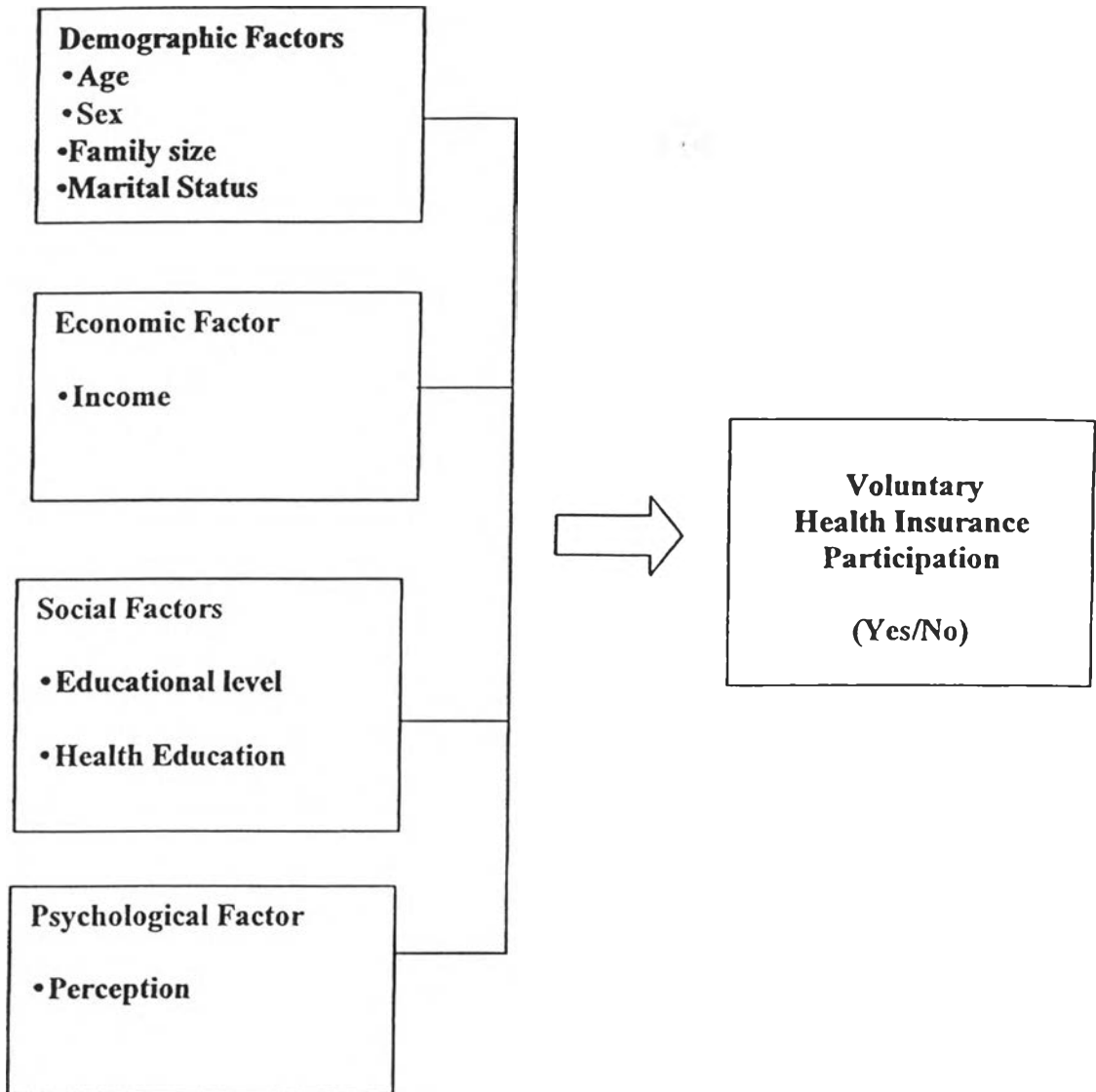**Independent variables:**

Age: Age of person interviewed. (18 to 60 years old)

Individual income: depends on the income of the individual. The income is calculated and summed up based on major items such as: cereal crop, rice, plants, livestock, business, salary and other benefit.

Education: education variable classified as the number of years of schooling of the person interviewed

Sex: 1 is male

           0 otherwise

Figure 4.1 Conceptual Framework

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┌─────────────────────────┐
│ Demographic Factors     │
│ • Age                   │
│ • Sex                   │
│ •Family size            │
│ •Marital Status         │
└─────────────────────────┘

┌─────────────────────────┐
│ Economic Factor         │
│                         │
│ • Income                │
│                         │
└─────────────────────────┘                    ┌──────────────────────┐
                                     ⟹          │    Voluntary         │
┌─────────────────────────┐                     │  Health Insurance    │
│ Social Factors          │                     │   Participation      │
│                         │                     │                      │
│ • Educational level     │                     │     (Yes/No)         │
│                         │                     └──────────────────────┘
│ • Health Education      │
└─────────────────────────┘

┌─────────────────────────┐
│ Psychological Factor    │
│                         │
│ • Perception            │
└─────────────────────────┘
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Health Education: number of times that people got health education

Perception   : 1 is willing to buy health insurance

0 otherwise

Occupation   : 1 is the farmer

0 other

Family Size   : number of the family of the person who interviewed

Marital Status: 1 is single

0 is otherwise

(2) Reasons for Choosing the above Factors as Independent Variables:

Income: A number of studies have examined the relationship between family income and expenditure on medical care and also the effect of income on the use of medical care. When the studies are based on survey data, it is often found that families with higher incomes spend more on medical care, although the percentage of income spent on medical care declines as the income increases.

Other studies also found that, when family income increases, patients prefer using better quality of health services to lower quality of these. In theory, a good is normal good if people consuming it increase with increasing income and inferior good if the number of people using it decreases with decreasing income.

Sex: There are sex disparities in coverage, reflecting the different experiences of adult men and women in the workplace and with public policies. Although men are more likely than women to be uninsured, women have a lower rate of employment-based coverage. Since women are more likely to obtain coverage through individual policies and public programs, their insurance status tends to be less stable, with more opportunities for gaps in coverage.

Age: It was also noted that youngsters and adults did not participate just because they

think that they do not fall sick frequently. Another study of (Hongvivatana and Suphchit, 1999) also showed that the economic status of the population affects the decision to participate in the health insurance.

Education Level: Higher levels of education may lead to an increased efficiency in a family's purchase and use of medical services. A higher level of education in the household may enable a family to recognize the early symptoms of illness, resulting in a greater willingness to seek treatment. Such families are likely to spend more for preventive services and less for more acute illness later. Years of education in a household may serve as an approximate measure of a greater awareness of the need for medical care, of different attitudes toward seeking care, and of greater efficiency in its purchase and production. Differences in education between families are expected to result in different use and spending on medical services.

Health Education: Health is directly related to the level of health education. This would mean that if people have a higher level of health education they would know and understand what risks they are exposed to. They will take more care and resort to more preventive measures than other people with a low health education.

4.2 Research Design

This study is a cross – sectional descriptive study.

The aims of the study are to identify the relationship between the determinants and health insurance participation.

Target population: The people Takmau district, Kendal province, Cambodia.

Study area: Takmau district, Kandal province, Cambodia.

Time study: In February, 2005

Data will be collected during February 2005.

Sample size is estimated basing on the formula shown below.

(1) Sample size estimation

$$N = \frac{Z_{1-\alpha/2}^2 \, PQ}{d^2}$$

Of which: N   is the estimated sample size

$Z_{1-\alpha/2}$: is the standard normal deviation set at 1.96 corresponding confidence intervals (α equal to 0.05).

P   : is proportion of health insurance participation, which is estimated equal to 0.25.

Q $= 1 - P = 1 - 0.25 = 0.75$

d   = degree of accuracy set at 5%

$$N = \frac{(1.96)^2 (0.25)(0.75)}{(0.05)^2} = 289$$

So the sample size in this study is about 300 individuals.

(2) Sampling procedure

In the first step, we divide the number of the people into two groups - one taking part in health insurance, and another group who did not..

In the second step, we randomly choose group one from 5 communes, i.e. 45x5=225 persons are selected. We randomly choose group two from 5 communes, i.e.15x5=75persons are selected (see Figure 4.2)

4.3 Data Collection:

A team including 10 persons will be established to hold up for collecting data. These persons will attend as interviewers. All of them are health personnel at grass-root level. They know very well about the situation in the area that they have undertaken. Before interviewing they will be trained to become familiar with the purpose of study, questionnaire and how to interview the individuals. The main research instrument used will be the standard questionnaires method for interviewing the people in each village.
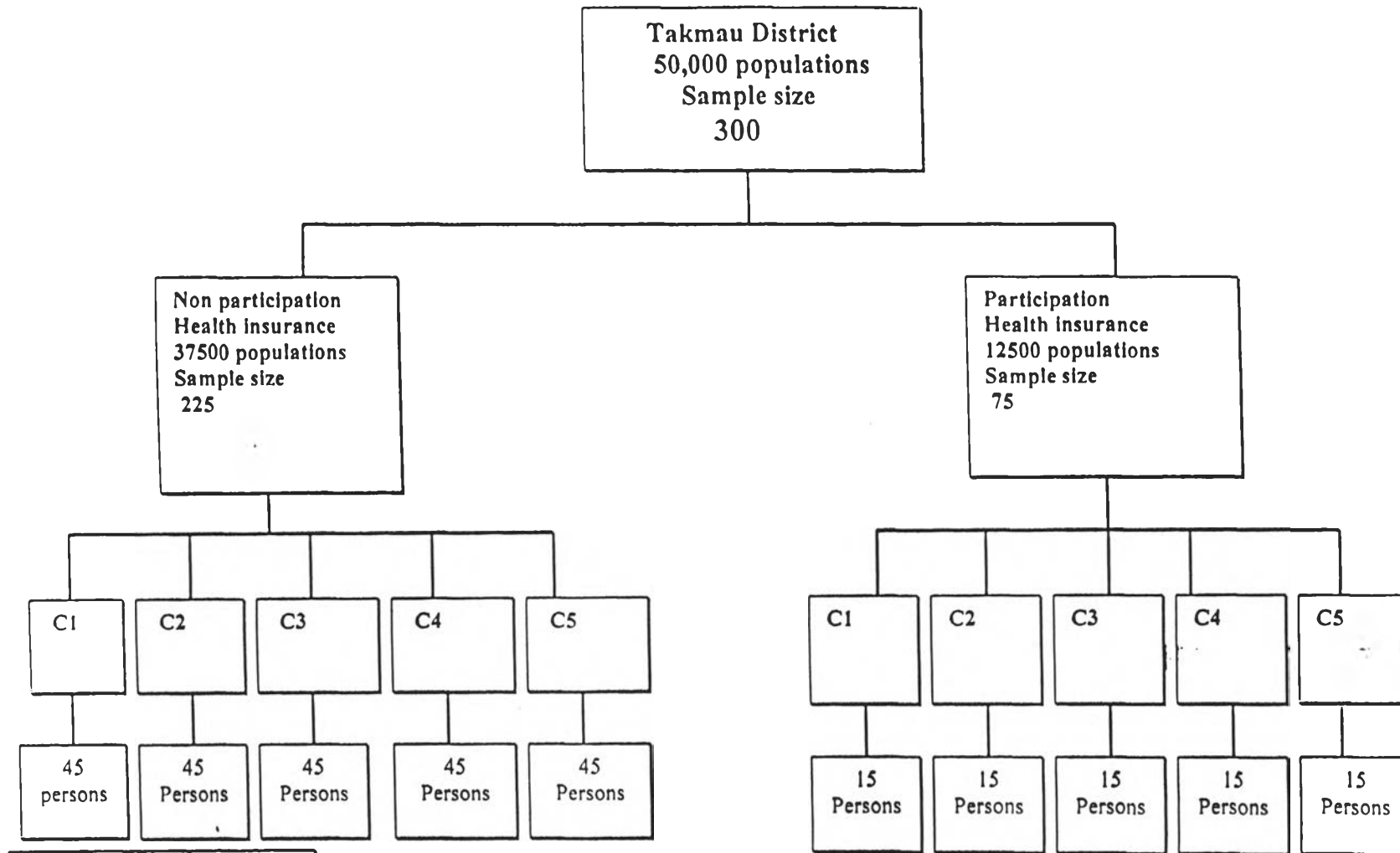
4.4 Data Analysis

(1) The regression model

Using regression analysis to express the relationship between health insurance participation and its determinants

Multiple logit regression analysis was applied to identify the factors that might influence

Figure: 4.2 Sample Distribution

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                    ┌─────────────────────┐
                    │   Takmau District   │
                    │  50,000 populations │
                    │     Sample size     │
                    │        300          │
                    └─────────┬───────────┘
              ┌───────────────┴─────────────────┐
    ┌──────────────────┐              ┌──────────────────┐
    │ Non participation│              │  Participation   │
    │ Health insurance │              │ Health insurance │
    │ 37500 populations│              │ 12500 populations│
    │ Sample size      │              │ Sample size      │
    │  225             │              │  75              │
    └────────┬─────────┘              └────────┬─────────┘
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C1	C2	C3	C4	C5
45 persons	45 Persons	45 Persons	45 Persons	45 Persons

C1	C2	C3	C4	C5
15 Persons	15 Persons	15 Persons	15 Persons	15 Persons

Note:

C: Commune

the participation in health insurance of people. The dependent variable is health insurance participation, whereas explanatory variables are: income, education, sex, age, and health education.

The logit regression is shown below.

$$Ln\frac{P_i}{1-P_i} = \beta_0 + \beta_1 SEX_i + \beta_2 AGE_i + \beta_3 EDUC_i + \beta_4 INC_i + \beta_5 OCCU_i + \beta_6 PERC_i + \beta_7 HED_i$$
$$+ \beta_8 MARITAL_i + \beta_9 FAMISIZE_i$$

where	P_i	= Probability of health insurance participation of individual
	SEX_i	= 1 if sex is male
		= 0 otherwise
	AGE_i	= age of person interviewed
	$EDUC_i$	= number of years that people got education
	INC_i	= income of individual person interviewed
	$OCCU_i$	= 1 is farmer
		0 other
	$PERC_i$	= 1 if willing to buy health insurance
		= 0 otherwise
	HED_i	= number of times that people got health education
	$MARITAL_i$	= 1 is single
		0 is otherwise
	$FAMISIZE_i$	= number of the family of the person who interviewed

Purpose of this equation is to identify the factors affecting the probability of individual health insurance participation.

From the table 4.1 it showed the sign of coefficient of logit regression for health insurance participation following the reason as:

Sex: It is considered that the sex variable is related to health insurance programs and the utilization of health services. In this group females are considered to make more use of health care facilities. It was reported that pregnant women in the villages where the health

insurance project was implemented, had antenatal care; tetanus toxic were also delivered by health personnel in the health facility (Kusol Lerjariya S, 1987).But we expected that the male or female will join more or less ,so the sign of sex would be positive or negative.

Age: It was also noted that youngsters and adults did not participate just because they think that they do not fall sick frequently, and the economic status of population affects the decision to join the health insurance (Hongvivatana and Suphachit , 1999).So we expected that the sign of age would be positive.

Education: The decision to participate in health insurance depends on people's education level. Practically people need to have an optimal knowledge about any program and it is easier to make educated people understand about a health insurance program and its benefits, thus making them participate in the program. Educational attainment and employment sector are factors that are related to the length of uninsured periods (Swartz, 1993). So we expected that education sign would be positive.

Income: The utilization of health services under a health insurance program tend to show that those people with higher income participated more in health insurance than poor people (Hongvivatana and Suphachit , 1999). On the other hand, most rich people like to make use of private health facilities to get better treatment (Tin, 1993). We expect that the higher income of the people will join health insurance than low income, so the sign will be positive.

Occupation: The health insurance that implemented in that area is rural. The majority is the farmers and they are not rich. If the price of the premium of health insurance is moderate as it is suit their income and the services of health insurance and health services is good .The farmers will join the health insurance program. Besides that most of the farmers in rural area they can earn the moderate income. So they can not effort the full cost of health care expenditure and the government have a policy to support the farmers that is why they will join in health insurance project.

Perception: The decision to utilize health services and health insurance depends on people's psychological behaviors. Practically people need to know the benefits when taking part in any program (Ayanian, 2000). Most of the people taking part in health insurance in rural areas were persuaded to accept the health insurance project by the health insurance staffs and health personnel who advertise and provide the health insurance policy. Most of people liked to see a medical doctor in the health care services. They will compare between the health insurance and non health insurance program which one will be more benefit for them. The reason for participating the health insurance was satisfactory quality of health insurance and health services ,whereas people who were dissatisfied with the services , they will not join.

According to the reason we expected that the sign of perception would be positive or negative depend on the behavior of the people.

Health Education: The program of health education that educate the people in the rural area how to live with hygiene and take care their health in order to get the better health .The people who join health education they will know the risk to get the diseases than other .They will to prevent the diseases and share the risk when they get sick. More over, they will change their behavior to take care for their health .For example; health education about smoking, the cause of smoking will create a lot of diseases such as bronchitis, lung cancer etc. When they know that they will reduce to smoke or they will stop smoking because they the risk .For that reason concern with health insurance, we expected that the sign of health education would be positive.

Marital Status (single): The people who are single or married, they always consider their health .If they are single, they have close relative. When they will get sick they would not take care by themselves. That is why they should take part in health insurance program.

The married person, they have to share risk with the member of their family. So they should join health insurance to share risky with health insurer. So the sign of marital status would be positive or negative. It depends on the individual person.

Family Size: The families who have a lot of members especially in the rural areas. They just think only the food for feeding their member. Sometimes they face the income for living.

That means the first priority for them is food. So they can not buy the premium of health insurance. We expected that the sign of family size would be negative.

Table 4.1 Expected Sign of Coefficients of Logit Regression for Health Insurance Participation:

Variables	Expected Signs
Income	+
Education	+
Age	+
Sex (Male)	+/-
Occupation	+
Perception	+/-
Health Education	+
Marital Status (single)	+/-
Family Size	-

(2) Describe the Situation of Health Insurance Participation in the District

Describe the proportion of health insurance participation with characteristics of people: Income, education level, age, sex, occupation, perception, marital status, family size and so on.

(3) Identify the Relationship between Determinants Affecting Health Insurance

   Participation.

Logit model analysis presents a unique complement to multiple regressions in its ability to utilize a binary dependent variable. Logit analysis does not predict whether an event occurred or not, but instead predicts the probability of an event. In this manner, the

dependent variable can be any value between one and zero.

The logit model is based on the cumulative logistic probability function:

$$P_i = f(Y) = f(\beta_0 + \beta_i * X_i) = \frac{1}{1+e^{-y}} = \frac{1}{1+e^{-(\beta_0+\beta_1 X_i)}} \qquad (1)$$

where

P_i = the probability that an individual will make a certain choice, given knowledge if X_i with i = 1, 2, n

F = a cumulative probability function.

Xi = the individual's attributes which give information to interpret the dependent variables into the logit model.

β_0 = constant and β_i is coefficient of X_i.

e = exponential, e = 2.7182

From equation (1), another equation can be written:

$(1+e^{-y}) P_i = 1$

Then, $\qquad e^{-y} = \dfrac{1-P_i}{P_i}$

and $\qquad e^{y} = \dfrac{P_i}{1-P_i}$

Taking logarithm of both sides of above equation,

$$Y = \ln \frac{P_i}{1-P_i}$$

Thus, final equation is:

$$\ln \frac{P_i}{1-P_i} = \beta_0 + \beta_i * X_i$$

Test for significant of each factor.

For the model analysis, the hypothesis that a coefficient was different from zero by using Wald test and p value to access the significant of each coefficient. The hypothesis was:

H_0: $\beta_i = 0$

H_1: $\beta_i \neq 0$ i = 1, 2, 3, …

The meaning of this test is if the null hypothesis H_0 is true, the corresponding independent variable is not related with dependent variable, and its value is useless. On the other hand, if alternative H_1 is true, it implies that there is a relationship between that variable and dependent variable.

To determine significantly, following process was used: Conduct a test with confident significant 95% and calculate the Wald test.

$$Z = \frac{\beta_i}{Se(\beta_i)} \quad \text{SE is standard error}$$

Reject H_0 if the computed z value is less than critical z value or $p < 0.05$

Accept H_0 if otherwise

Predict a change of probability of independent variable when dependent variable is changing

Suppose, a logit regression is

$$\ln \frac{P}{1-P} = \beta_0 + \beta_1 X$$

When X increases to X+a means X change is ΔX a change of right equation is:

$$\Delta \ln \frac{P}{1-P} = \beta_i \Delta X$$

To simplify, we utilize the fact that for any continuous variable X, $\Delta \log X \approx \Delta X / X$, and the fact that log (x/y) = log x - log y.

then

$$\Delta \ln \frac{P}{1-P} = \left(\frac{1}{P} + \frac{1}{1-P} \right) \Delta P = \frac{1}{P(1-P)} \Delta P$$

So we get

$$\frac{1}{P(1-P)}\Delta P = \beta_1\Delta X \quad \text{and}$$

$$\Delta p \approx \beta_1[p(1-p)]\ \Delta X$$

When X changes, we will calculate a change of p and predict the probability of independent variable.

Applying this theory to this research, for example, we predict the probability of health insurance participation when income increases.

We get a formula

$$\Delta p \approx \beta_1[p(1-p)]\ \Delta INCOME$$

When INCOME increases 100, 00 riel, a change of probability is

$$\Delta p \approx \beta_1[p(1-p)]* 100$$