CHAPTER 3
RESEARCH METHODOLOGY

This chapter is divided into three sections: the first section is the operational definitions, the second is the conceptual framework, and the third is the study methods.

3.1 Operational Definitions

3.1.1 Health Expenditure on the Elderly under the Public Assistance Scheme, MOPH

The health expenditures on the elderly under the Public Assistance Scheme in this study is defined as the charge on the public provider for direct medical care for the elderly, whether the purpose was curative, preventive or rehabilitative. The elderly in this Public Assistance Scheme are defined as people aged 60 years or over.

3.1.2 Health Utilization

Utilization made by the elderly can be categorized into 3 types: 1) utilization with need but no demand for health care, 2) utilization with demand but no need, and 3) utilization with both need and demand.

3.1.3 Equity

The review in the previous chapter has indicated that the concept of equity is a broad one which depends on the notion of fairness and social justice. In this study, equity is defined as a fair distribution of health expenditure and utilization by the elderly. In Thailand, the Public Assistance Scheme provides free medical care for all of the elderly; therefore, if demand and need for health care are equal, then health care expenditure and utilization should be the same (assuming that other things are remain unchanged). On the other hand, many studies have indicated that poverty is associated

with poor health. Also, Hurley et al has pointed out that vertical equity refers to the imperative to distribute unequal amounts among differently situated people. Therefore, the elderly poor may need a greater share of health expenditure and utilization from the Public Assistance Scheme than the rich. However, the principles that health analysts use to ensure and assess equity derive from a variety of fields; philosophy, ethics, law, and political science as well as economics. These issues are discussed in Chapter 5.

3.1.4 Poverty Line

The poverty line is defined as the minimum basic needs of the people. It is the threshold income below which one is considered to be poor. It can be used to formulate the projects and a program, to direct resources to the poor. The NESDB (1998) has defined people as being poor if they do not have sufficient income to satisfy their basic needs. A household is classified as poor if its per capita income is less than the household specific poverty line, in which case all persons living in that household are classified as poor.

3.1.5 Poverty Incidence

The poverty incidence is the proportion or percentage of the total population which has an income below the poverty line.

3.2 Conceptual Framework

The conceptual framework of this study is presented in Figure 3.1. The study looks into health welfare for the elderly. The health welfare of the elderly in Thailand is partly provided through public assistance, so a budget is allocated as part of the Public Assistance Scheme, MOPH. The study explores both a situation analysis of health expenditure and the utilization made by the elderly of help within this Public Assistance

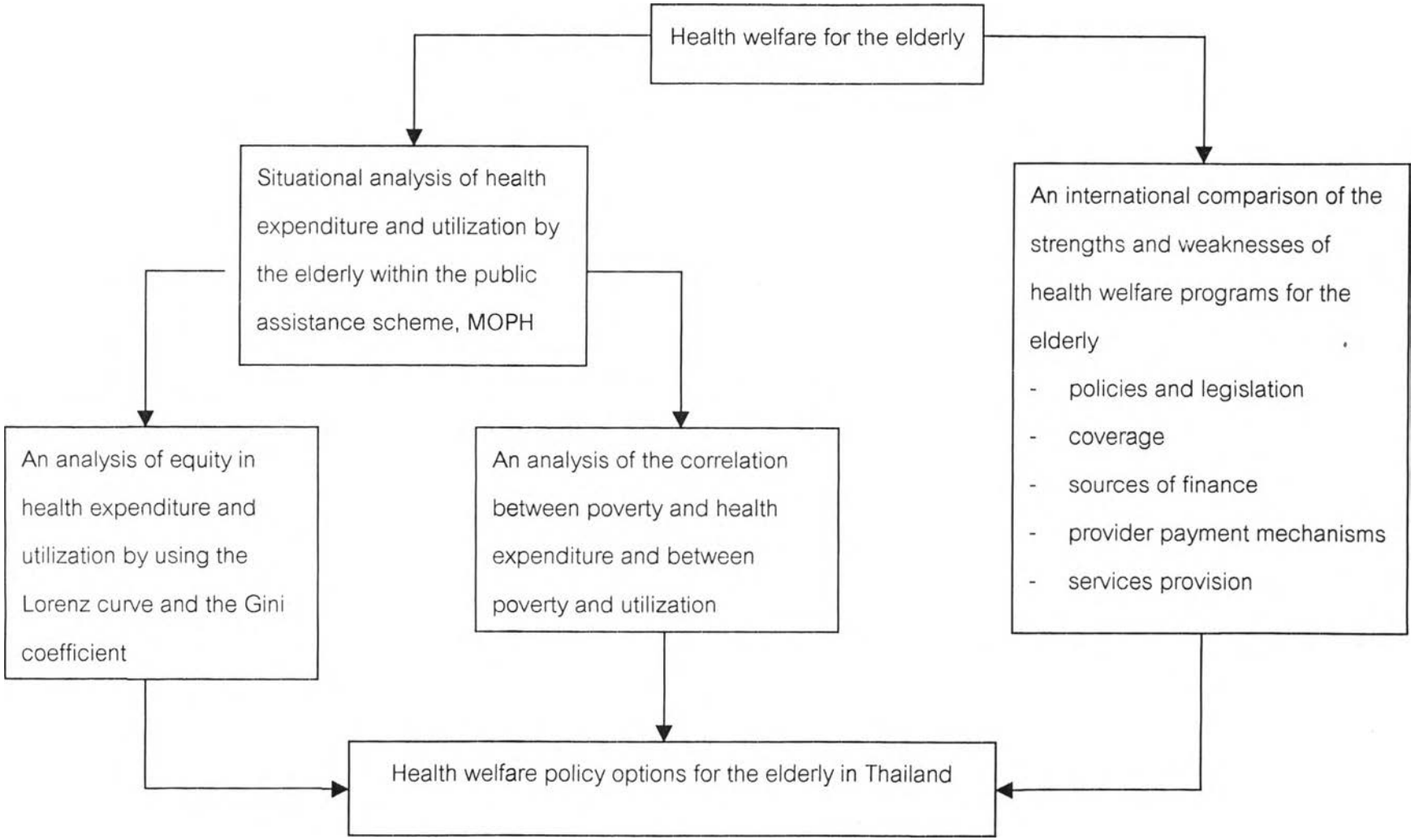
Scheme, and compares the strengths and weaknesses of elderly health welfare program among different countries.

The situation analysis of health expenditure and utilization by the elderly comprises two parts. The first part is to analyze equity in health expenditure and utilization. The Lorenz curve and Gini coefficient measurement were used for this approach. The second part is to analyze the correlation between poverty and health expenditure and poverty and utilization.

The international comparison of the strengths and weaknesses of health welfare programs for the elderly is a comprehensive review of experience in Singapore, Japan, the United States, and Thailand, which was discussed in the previous chapter. The comparison focuses on various components, such as policies and legislation, coverage, sources of finance, provider payment mechanisms and services provision.

Finally, the design of possible health welfare policy options for the elderly is based on three parts as follows: 1) an analysis of equity in health expenditure and utilization, 2) an analysis of the correlation between poverty and health expenditure and the correlation between poverty and utilization, and 3) an international comparison of the strengths and weaknesses of different health welfare programs for the elderly. The flow of the conceptual framework is shown in Figure 3.1.

Figure 3.1 Conceptual Framework



3.3 Methods Used

This section is based on the conceptual framework. The descriptions of the methods for outcome measurement are detailed as follows:

3.3.1 Equity in Health Expenditure and Utilization by the Elderly under the Public Assistance Scheme

In comparing different provinces, Initially the following variables were computed;

1) Elderly health expenditures per capita in province i $= \frac{E_i}{P_i}$

Where E_i is

1) Total health expenditure (OPD cases) of the elderly in province i

2) Total health expenditures (IPD cases) of the elderly in province i

P_i is the elderly population (provincial population projections) in province i

2) Elderly utilization per capita in province i $= \frac{U_i}{P_i}$

Where U_i is

1) Total visits (OPD cases) of the elderly in province i

2) Total length of stay in hospital (IPD cases) of the elderly in province i

P_i is the elderly population (provincial population projections) in province i

To compare the equity of distribution in health expenditure and utilization over several years, data on utilization and health expenditure of the elderly can be presented on a graph, using a Lorenz curve.

The Lorenz Curve

A Lorenz curve (named after the American statistician C.Lorenz who invented it in 1905) is a graphical representation of a distribution and its inequality. It is an accumulative frequency curve which compares two sets of ordinal, interval or ratio data. (Ghatak, 1995; Kooreman and Wunderink, 1997). In this study, a Lorenz curve relates the cumulated elderly population across groups (provinces) to the cumulated health expenditure or utilization measure studied, ranking the groups from the lowest to the highest values of health expenditure or utilization per capita. In Figure 3.2, the vertical axis shows the cumulative percentages of expenditure or utilization, whereas the horizontal axis measures cumulative percentage of the elderly population.

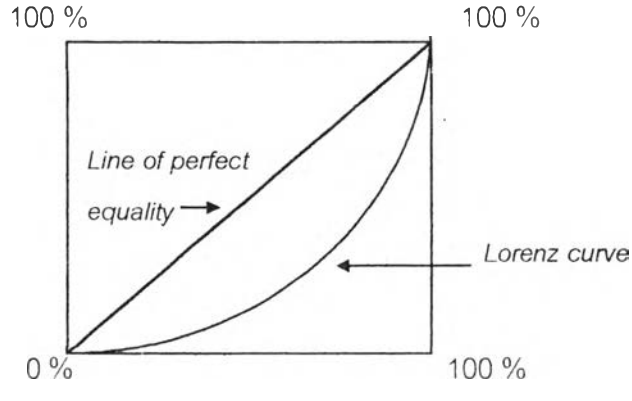


Figure 3.2 The Lorenz Curve

Each Lorenz curve appears on a graph that includes a 45 degree line. That line is the line of perfect equality, indicating what the Lorenz curve would be if every one had exactly the same share. The data need to be ordered from "lowest concentration" to "highest concentration". The variables plotted are always cumulative percentages, so the scale is always 0 to 100. The Lorenz curve runs from one corner of the unit square to

the diametrically opposite corner, the curve must lie below the diagonal (except the one of perfect equality which would be the diagonal) and its slope will rise at an increasing rate. The further the Lorenz curve that lies away from the line of perfect equality, the greater is the concentration of the variable or the greater is the inequality (Ghatak, 1995; Jacobson and Callanghan, 1996).

The Gini Coefficient

The most favored index to measure inequality is the Gini coefficient, named after Corrado Gini, the Italian statistician who invented it in 1912 (Ghatak, 1995)

This measurement has been widely used to represent the extent of inequality (Sen, 1973). The coefficient is calculated by, first drawing the Lorenz curve, which relates the cumulated population across groups to the cumulated resource or utilization measure studied, and ranking the groups from the lowest to the highest values of resources per capita.

The Gini coefficient is the ratio of the area between the diagonal and the Lorenz curve, to the total area under the diagonal. This measure increases from 0 to 1 as inequality increases. In other words, a value of zero for the Gini coefficient would mean perfect equality (every one has the same share of resources). Whereas a value of one would mean that one individual had all the resources (perfect inequality).

$$Gini\ coefficient = \frac{Area\ between\ the\ curve\ and\ the\ diagonal}{Area\ of\ the\ triangle\ below\ the\ diagonal}$$

$$= 0.5 \sum_{i=1}^{n} |x_i - y_i|$$

Where n is the number of groups , and x_i and y_i are relative (not cumulative) frequencies for the x and y scales respectively.

In this case

x_i is the aging population

y_i is; 1) the health expenditure of the elderly

2) the utilization by the elderly (visits in OPD cases and length of stay in hospital in IPD cases)

Sen (1973) has defined the arithmetic average of the absolute values of differences between all pairs of variable as:

$$G = (1/2n^2\mu)\sum_{i=1}^{n}\sum_{i=1}^{n}|y_i - y_j|$$

$$= 1 - (1/n^2\mu)\sum_{i=1}^{n}\sum_{j=1}^{n} Min(y_i, y_j)$$

$$= 1 + (1/n) - (2/n^2\mu)\ [y_1 + 2y_2 + ...ny_n]$$

$$for \quad y_1 \geq y_2 ..... \geq y_n$$

Where : y is the variable which will be evaluated

n is the number of persons

μ is the mean or average of the variable which will be evaluated

3.3.2 Correlation between the Incidence of Poverty and Elderly Health Expenditure and Utilization by the under the Public Assistance Scheme

The objective of this part is to examine the relation between the distribution of health expenditure for the elderly and utilization under the Public Assistance Scheme and the incidence of poverty among the provinces.

Low income has been found to be highly correlated with poor health in many studies. Robert and House (1994) studied socioeconomic status (SES) differentials in health by age and alternative indicators of SES, and the results showed that financial assets (especially liquid assets), considered both alone and net of education and income, are associated with health throughout adulthood and old age. Furthermore, financial assets remain associated with health until quite late in life and become more important relative to education and income at older ages for some measures of health. In addition, Kennedy et al. (1998) also studied the effect of inequalities in income within a state on self rated health status in the United States .The result found that inequalities in the statewide distribution of income were associated with self rated fair or poor health.

Here, we assume that the elderly who are living in provinces, which have a higher incidence of poverty are more associated with poor health. Thus these people need free health care more than the elderly living in provinces have a lower poverty incidence. In other words, health expenditure for the elderly and utilization of the elderly under the Public Assistance Scheme should be positively correlated with poverty incidence.

To measure this correlation, Pearson' correlation coefficients were. The range of the correlation coefficient is from -1 to $+1$, zero means no linear relationship between x and y.

$$r = \frac{\sum \left(x_i - \bar{x} \right)\left(y_i - \bar{y} \right)}{\sqrt{\sum \left(x_i - \bar{x} \right)^2 \sum \left(y_i - \bar{y} \right)^2}}$$

$$= \frac{n \sum x_i y_i - (\sum x_i)(\sum y_i)}{\sqrt{n \sum x_i^2 - (\sum x_i)^2} \sqrt{n \sum y_i^2 - (\sum y_i)^2}}$$

Where x_i is

1) Elderly health expenditure per capita (OPD and IPD cases) in province *i*

2) Elderly utilization per capita (visits in OPD cases and Length of stay in hospital in IPD cases)

y_i is poverty incidence in province *i*

3.3.3 International Comparison of Strengths and Weaknesses of Health Welfare Programs for the Elderly

This is based on the review of the experiences of health welfare for the elderly of Thailand, Singapore, Japan and the United States in Chapter 2. The overall review considered the themes of; demographic trends, policies and legislation on social and health welfare, and health care financing. In this section, the lessons learned are summarized and analyzed with regard to strengths and weaknesses. The comparison focuses on policies and legislation, coverage, sources of finance, provider payment mechanisms, and services provision.