

CHAPTER 3

RESEARCH METHODOLOGY



3.1 Study Design

The research design of this thesis was a descriptive case study made by analyzing the information about cost items related to the management of the diabetes mellitus disease for outpatients at Sena Hospital, a general hospital which located in Sena District in Ayutthaya Province.

3.2 Data/ Information Collection

Data was collected from 1st October 1996 - 30th September 1998 in the fiscal year 1998 through hospital records survey, observation and including interviews with the hospital authorities.

To analyze the unit cost at OPD in Sena Hospital from a provider perspective, information and data were collected through field visits from:

- a. information of organization and infrastructures of Sena Hospital, which was divided by department/ unit for providing outpatients care services;
- b. information of buildings, total area of the hospital and the area of each department/ unit in square meters, for allocating the cost. The proportion of the utilities area in each department/ unit, relating to diabetics treatment, was used to calculate the average cost of the building for diabetics in 1998;
- c. number and type of staff working in the organizations with their monthly salaries structure including fringe benefits and also other personnel related to the

patient services of diabetes mellitus diseases in 1998 in order to calculate the recurrent cost for patient services;

d. total time spent by related staff, such as physicians and nurses, on diabetics care to calculate the proportion of their salary to be allocated to the costs share for diabetic outpatients services in 1998;

e. total number of OPD patient's visits and total number of diabetic outpatients, classified in the 3 kinds of diabetics (without complications, complication with hypertension and complication with heart disease) including the frequency of services in 1998, were collected for proportional allocation of the annual costs of diabetic outpatients;

f. according to e., the information on diabetic outpatients was collected by examining the payment mechanisms in the 2 main groups (health card holders and non-health card holders), Health Card holder and out of pocket in the age group 40-60 and over 60 for the elderly. None of this patients had access to other health privileges such as private insurance. Data was checked and selected from diabetic profiles in 1997-1998 at the DM clinic;

g. total material costs including drugs and laboratory tests for diabetic outpatients in 1998 to calculate the average cost of drug cost/ visit and laboratory cost/ visit for those 3 kinds of diabetics;

h. electricity, water and telephone bills and maintenance costs of equipment in 1998 in order to allocate the costs share for diabetic outpatients services; and

i. information on the cost of buying or making capital inputs, the lifetime of the capital inputs and the interest rate in 1998 are used for estimation of the annual cost of the capital cost items related to diabetic outpatients services.

3.3 Conceptual Framework

The conceptual framework of this study was to estimate the unit cost (cost/ visit) for the management of diabetics at OPD in Sena Hospital, in which the majority of 3 kinds of diabetic outpatients were: (1) diabetics without complications; (2) diabetics with hypertension; (3) diabetics with heart disease.

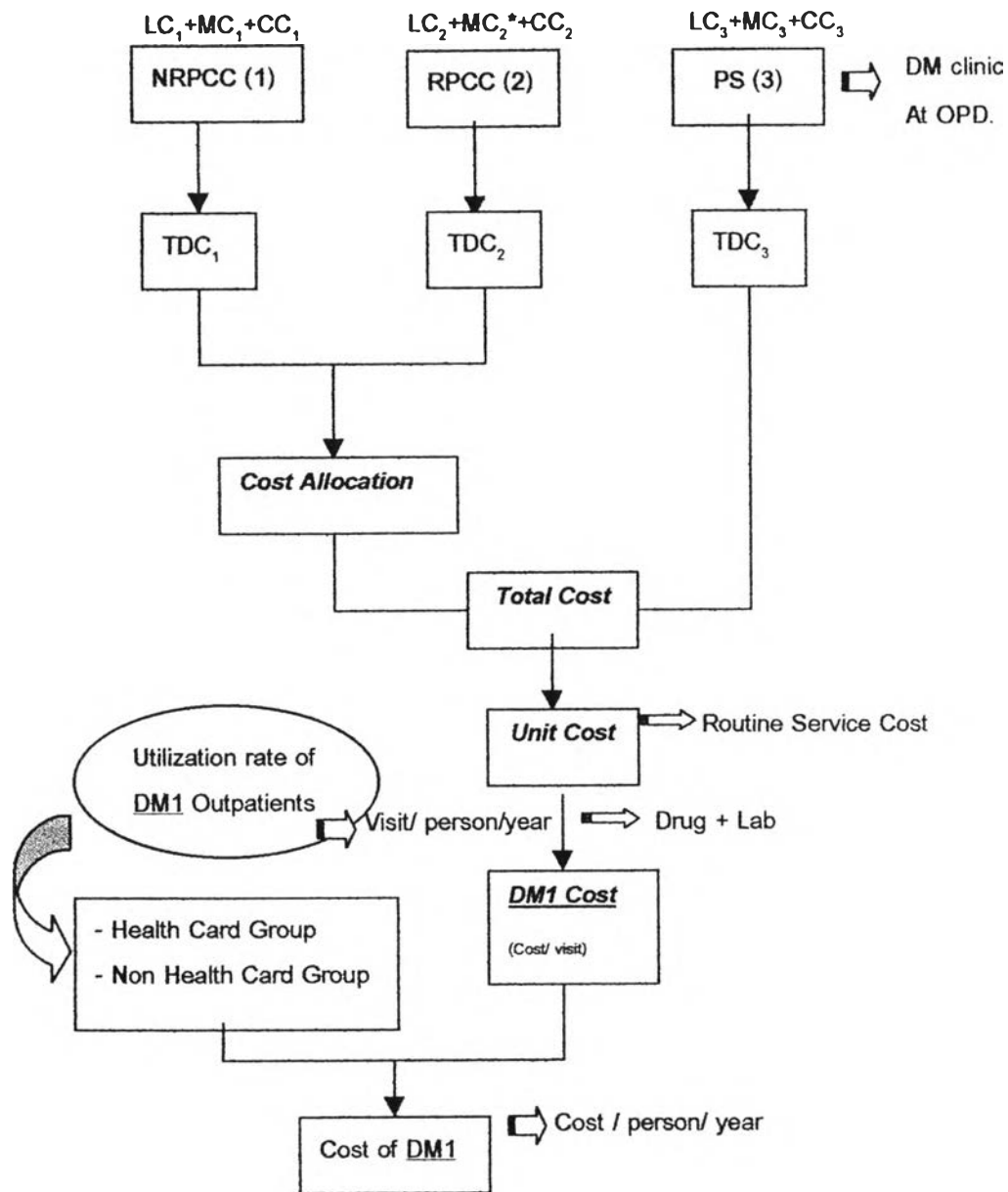
The control variables were the 3 kinds of diabetics as mention above and their distribution between Health Card holders, Non-Health Card holders (The out of pocket group and the elderly group). *The characteristics of diabetics outpatients were:*

1. the Card holders and the out of pocket group were selected on the basis of, patient age, this being between 41-60 years old;
2. the elderly group, age over 60 year;
3. the diabetics in each group of this study do not use other privileges for medical care in Sena Hosital. The out of pocket group have no any private insurance; and
4. all diabetics were requiring only oral medication.

After calculating each unit cost of those 3 groups of diabetic outpatients, then analyzing the utilization rate (visit/ person/ year), it was possible to estimate the total care costs provided to one diabetic in a year (cost/ person/ year).

The study applied the direct distribution method as a method of the cost allocation. It concentrated on the provider cost when the patients were treated at OPD in the hospital. It sought to know the unit cost to the provider for management ofthe diabetic outpatients, as well as annual costs were incurred at the general hospital level. A plan of the conceptual framework of costing (provider) is as follows:

Figure 3.1 Conceptual Framework of Diabetes Cost from Providers



- PS = Patient Service (3)
 RPCC = Revenue Producing Cost Center (2)
 NRPCC = Non Revenue Producing Cost Center (1)
 LC = Labor cost , MC = Material cost, CC = Capital cost
 MC₂* = material cost excluding Drug and Lab
 DM = Diabetes Mellitus Disease
DM1 = 3 kinds of DM were: DM w/o complication, DM with hypertension and DM with heart disease

3.4 Data Analysis

3.4.1 Cost Classification

Cost by input was classified here into two groups:

- a. Capital costs (CC); and
- b. Recurrent costs { Labor cost (LC) and Material cost (MC) }

Capital costs are those cost items that last longer than one year, such as building, major equipment, vehicles, etc.

The capital costs and recurrent costs in the hospital are also concerned with:

- Patient service costs: these cost centers are providing for direct patient services which separate into two departments-outpatient department (OPD) and inpatient department (IPD). This study concentrates only in OPD for outpatient services; and
- Intermediate costs: these costs are providing for auxiliary services to patient services, such as laboratory, pharmacy and radiology.

The capital cost items related to the diabetic outpatients service costs were building with furniture and fixtures at OPD, the patient examination, the room for staff/ administration, vehicles, major equipment such as examination beds, tables, computers, air conditioning and medical equipment, like stethoscopes, dressings and trolleys.

Recurrent costs are usually material costs incurred over the course of a year. They include salary, minor instruments and supply, utility and maintenance costs.

The recurrent cost is the salary costs of personnel directly related to diabetic outpatient services such as doctors, nurses and other staff supporting patient services, it also includes drug, laboratory (including material costs) and utility costs. These are allocated for cost shares.

3.4.2 Calculation of Capital Costs

All the costs were calculated at 1998 prices and then the average annual costs of all capital cost items were calculated. To calculate the average annual costs of all capital cost inputs, the following information was needed:

- a. bought/ made year, and the value of the items/ assets.
- b. life time of assets.

The average annual cost of the capital cost items was then calculated by: linear depreciation assumption and no scrap value.

$$AC_k = \{C_{t_0}(1+r)^{1998-t_0}\} / n$$

- Where,
- AC_k = average annual cost of the capital cost items at 1998 price
 - C_{t_0} = the purchase value of making/ buying costs of the capital cost assets in the year bought or made
 - r = interest rate during the period of study
 - t_0 = the year that the capital assets was bought or made
 - n = life time of capital assets

By using the formula above, the annual capital cost assets were calculated.

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The value of land can be estimated from the information of the market price in real-estate for housing at 1998 actual price in the neighborhood of the Sena Hospital. Then, these amounts have to be added with the chosen interest rate of 10% of permanent deposit saving from the bank in 1998.

The opportunity cost of land allocates to the cost center or department/ unit depending on the proportion of space used for each department/ unit.

3.4.3 To Calculate the Material Cost for Diabetic Outpatients Services

Those cost items that used up in the course of a year and usually purchased regularly were utility costs; water, electricity and phone bill and maintenance including the miscellaneous.

The total utility costs are basically calculated as the sum of all the inputs used. Cost of each input were calculated as unit cost of that inputs in 1998 and then multiplied by the total number of unit used.

3.4.4 To Calculate the Labor Cost or Personnel Cost for Diabetes Outpatients Services

Salary costs of personnel for diabetic outpatients services at OPD was calculated in the following way:

First of all, year by salary cost of the personnel related to diabetic outpatients services in 1998 collected from hospital records was calculated based on total working hour/ year /person (365 days in a year multiplied by 8 hours work/

person/ day). To get per hour, salary cost of each personnel was obtained by dividing each personnel's total salary cost/ year by working hour/ year.

Finally, total amount of time spent by each person for diabetic outpatients services was calculated by multiplying the time spent by each person/ visit in OPD by the total number of diabetes outpatients in 1998. Then the total cost of time for each person was calculated by multiplying the total time spent for each person by his or her hourly salary cost for diabetes outpatients and then all personnel costs were added together to get total cost for diabetic outpatients at OPD.

However, Sena Hospital provides care services for diabetic outpatients at OPD one day a week on every Wednesday.

Routine Service Costs (RSC) of DM clinic at OPD was obtained from the direct total cost in DM clinic, added together with the indirect cost from Non-Revenue Producing Cost Center (NRPCC) and Revenue Producing Cost Center (RPCC)

The distribution of indirect cost that relates to diabetic outpatients services were obtained from:

- Non-Revenue Producing Cost Center (NRPCC) that related to diabetic outpatients services were:
 - Administrative
 - Medical record
 - Health education
- Revenue Producing Cost Center (RPCC) that relates to diabetic outpatients services were:
 - Pharmacy
 - laboratory

3.4.5 To calculate Medical Care Cost of Treatment for Diabetic Outpatients

In OPD

Drug and laboratory costs were calculated for all 3 kinds of diabetes outpatients with both Health Card holders and non-Health Card holders.

To Calculate Drug / Visit

Total drug cost was calculated by the item of drug and was multiplied by the unit of drug and then was multiplied by the original price of the unit of drugs for the year provided to the patients.

The above explanation in terms of calculating drug cost at Sena Hospital was done in this way by a computer program in order to charge the patients. The charge rate was standard and set according to the financial regulation and the hospital guiding of Ministry of Public Health. Vice versa, the total charges can be taken to calculate the drug cost by using cost to charge ratio. Those charges were computed and based on the original price of each item of drugs including doctor fee, for example:

- In the case of Health Card holders that were charged at 10% of the original price (real cost) or drug investment, it means the real cost equals 90 baht, if the drugs price was charged at 100 baht.
- In the case of social insurance card holders that were charged at 30% of the original price (real cost) or drug investment, it means the real cost equals 70 baht, if the drug price was charged at 100 baht.

To Calculate the Drug Cost/ Visit

The data of diabetic outpatients was collected and then before calculating the drug cost per visit, the sampling frame was prepared in order to be used as the representation of population. This study used the probability sampling technique by using stratified random sampling, which classified diabetic outpatients into 3 stratum or 3 kinds of diabetes. Then, sampling the sample size of population from each stratum;

The population size (N) = All 3 kinds of diabetic outpatients

The sample size (n) = the total of sampling unit (DM case) that was the representation of the population

So, the equal opportunity of the random sampling was $n/ N = 10\%$ of 3 kinds of diabetics, which were used for calculating the average drug cost/ visit in this study.

Sampling 10% of each the 3 kinds of diabetic outpatients both in Health Card holders and non-Health Card holders as table as following:

Table 3.1 A Sample of the Three Groups of Diabetics Outpatients.

DM outpatients	Health card holders		Out of pocket		Elderly	
	Total Case	10% DM	Total Case	10%DM	Total Case	10%DM
Without complication	95	10	14	1	87	9
With hypertension	176	18	29	3	218	22
With heart disease	30	3	7	1	32	3
Total	301	31	50	5	337	34

Analyzing the average utilization rate of diabetic outpatients among 3 groups of diabetic outpatients both in Health Card holders and non-Health Card holders from the data collected by adding up the total number of visits in a year and dividing by the total number of cases (in Chapter 4).

After analyzing the average utilization rate (visit/person/year) of the 3 kinds of diabetic outpatients both Health Card holders and non-Health Card holders, the total health care cost of diabetes services that the hospital provides for one person in a year, can be estimated by the average utilization rate, multiplied by cost per visit (cost/ person/ year).