

CHAPTER 2

LITERATURE REVIEW AND CONCEPTUAL FRAME WORK

2.1 Literature Review

Many studies have been carried out on the costs in controlling this disease. But most of the studies were concentrated on the provider's aspect and treatment of HIV-infected patients. No attempt has been made to do cost analysis of the patients' perspective except a few studies of local importance. The present review therefore is pertained to those costs studies carried out in Thailand on TB disease control.

Disease and its economic implications

Spinacci (1991) studied the magnitude of the TB problem. At the time of the study, there were 8 million new cases per annum with 2.9 million death and concluded that economic costs of the disease were substantial.

Murray (1991) reviewed the health sector priority on tuberculosis based on the analysis of the programme in Malawi, Mozambique and Tanzania. The cost of treating smear positive tuberculosis was estimated to be US \$20 - 57 per death averted. Interventions in common practice such as measles immunization and rehydration were as cost effective as TB treatment. But this study did not account the costs of treatment failure (and subsequent transmission of drug resistance tuberculosis). If such costs are also included it was concluded that the apparent economic benefit would be smaller.

Control of the disease - method and effect

Jittinandana (1988) studied the problems of TB treatment in Thailand and his study results showed that patients drop out and incomplete treatment were the main problems in the implementation of the programme. It has been further emphasized that incorporation of psycho-social and behavioral sciences is important to solve the problems. He concluded that attitude of health provider and consumer, convenience of the service, distance, economy of provider and consumer, consumer-provider relationship and quality of care are the influential factors. These factors lack adequate attention.

Bangen and Jittinandana (1985) made on the experimental study on health education and economic support in relation to the regularity of treatment in pulmonary TB patients. Study has shown that patients who get health education and economic support collect drugs regularly.

Evaluation of chemotherapy and service delivery strategy

World Development Report (1993) showed that the cost of treatment is less than \$ 10 per DALY in all chemotherapy scenarios. It focuses on the prevention of new cases at the rate of 1 to 4 by treating one infected individual through reduction in transmission. However, this benefit has not been considered for projecting the effectiveness of treatment.

Result of a study on the cost effectiveness of anti-tuberculosis programmes has shown that isoniazid, rifampicin, pyrazinamide for 2 months followed by isoniazid and rifampicin twice a week for 4 months was the most costs-effective regimen both from the perspective of patients and providers (Kamolratanakul 1989).

Economic consequences of disease

Jittinandana (1985) analyzed the socio-economic status of pulmonary tuberculosis patients. About 4/5 of the patients were laborers with low income or without income and as a result a large number of patients had low economic loss before tuberculosis treatment. However this study didn't include all opportunity costs from the symptom(s) to treatment.

Cost of the control programme

Komalratanakul (1989) compared both direct and indirect costs between short course and basic regimens in the treatment of tuberculosis. Focus on patients perspective has shown that indirect costs (time cost) were more or less equal to the direct medical cost in 2SHT/16HT (streptomycin, isoniazid and thiacetazone for 2 months followed by isoniazid and thiacetazone for 16 months) and 2HRZ/4HR (isoniazid, rifampicin, pyrazinamide for 2 months followed by isoniazid and rifampicin for 4 months). But indirect costs were 3 time more than direct medical costs in 2SHRZ/6HT (streptomycin, isoniazid, rifampicin and pyrazinamide for 2 months followed by isoniazid and thiacetazone for 6 months). This study identified not only the cheapest regimens but also showed that other costs were substantially greater than drugs costs.

Modelling

Tjiptoherijanto and Joesoef (1988) have developed an epidemiological model for cost effectiveness analysis of TB treatment programme in Indonesia. The number of prevented cases and prevalence rate were considered as effectiveness measure. These were estimated by using an epidemiological model. But the costing aspect was weak, as it included only drugs costs. Providers' costs on case holding, programme management, training and consumers' costs were not included.

Performance of patients

Through a prospective study in Yala TB Center, Punggrassami (1993) analyzed patient's delay and doctor's delay. The total delay in the first 3 months was found to be 35.8 per cent while that of patient's delay and doctor's delay were 23.1 and 37.9 per cent respectively. But sample size was not adequate and it did not take into account of memory bias and chance of under reporting.

Tisane (1991) studied delay in case finding in 6th Zonal TB Center. The delay was by one month in 34% of the patients. Delay by 1-2 months 2-6 and more than 6 months was noticed among 23.2%, 26.8% and 15.9% respectively. While the results are important.

2.2 Conceptual frame work

Microbacterium tuberculosis complex a group of infectious agents can produce disease in man. Infection is established though an interaction between the agent and host. Therefore it is important to understand the mechanism of interaction.

Agent factor:

- Microbacterium tuberculosis complex

Host factor:

- Age
- Sex
- Nutritional status
- Genetic
- Immunity

Environment:

- Physical
- Biological
- Socio-economic

As long as equilibrium between agent, host and environment is maintained, a person remains healthy. When there is disequilibrium and a person has notably poor health or low immunity, the infection can develop. In preclinical stage, patient generally does not perceive symptom(s). When one enters in clinical stage, symptom(s) are noticed. The ways in which given symptoms are perceived, evaluated and acted (or not acted) upon by different kind of persons. Differences in the perception of the disease and consequent action will affect costs. Severe symptoms of Tuberculosis lead to specific action (seek better medical care urgently) where as moderately severe TB infected might have different actions in different individuals. One may carry on his daily activities and seek no medical advice, another may continue to work and seek informal care or formal care and a third may not only seek medical care but take days off from work (Mausner 1985). Therefore time between perceived symptoms and seeking formal care, costs of cares and behavior of patients differ in different individuals. This study

concentrated on aspects such as costs to the patients prior to the formal care, behavior of patients in seeking care and time gap between perceived symptoms and seeking formal care (Figure 2.1).

Figure 2.1 Conceptual Frame work

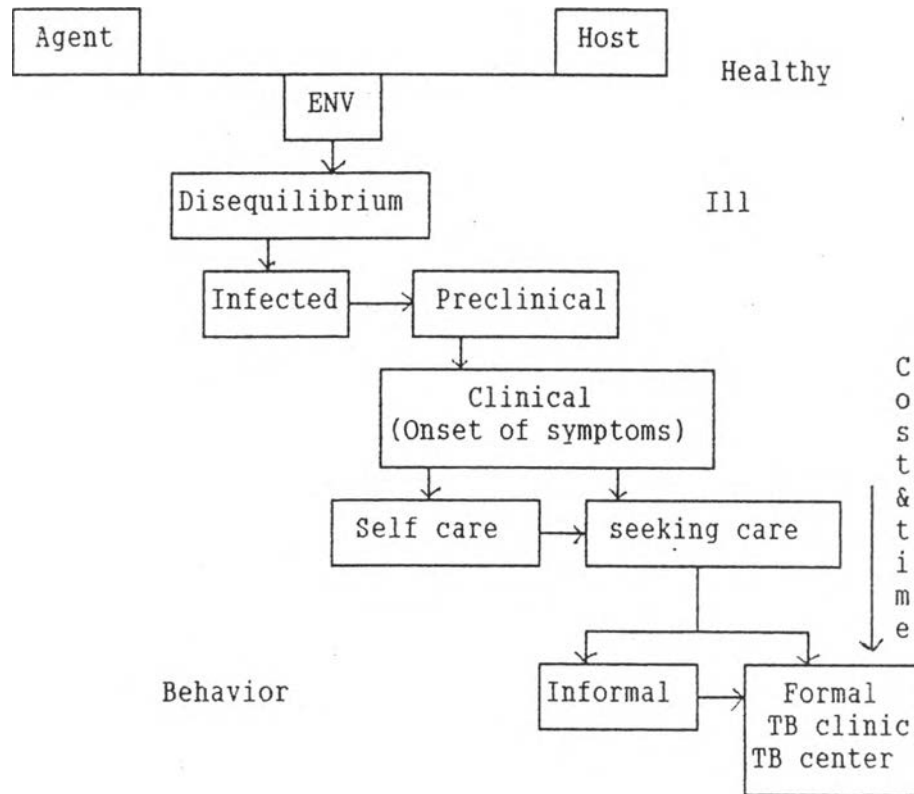
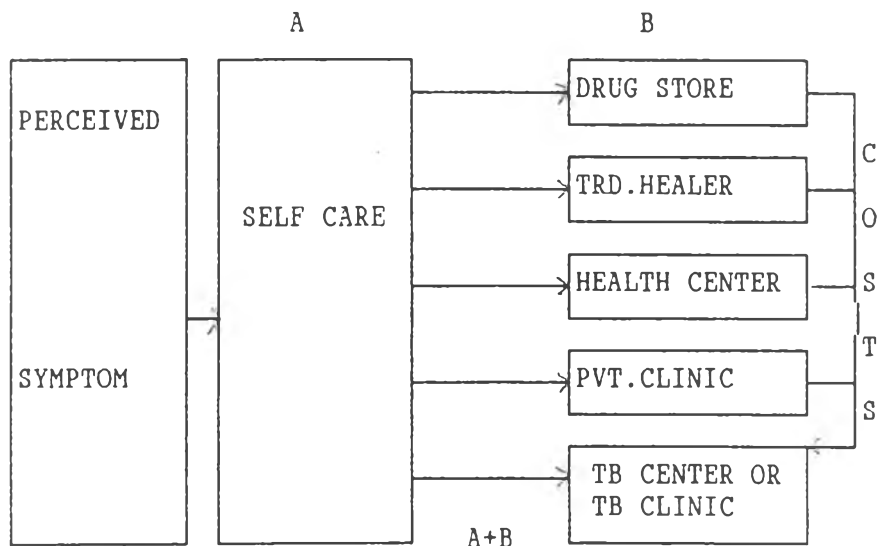
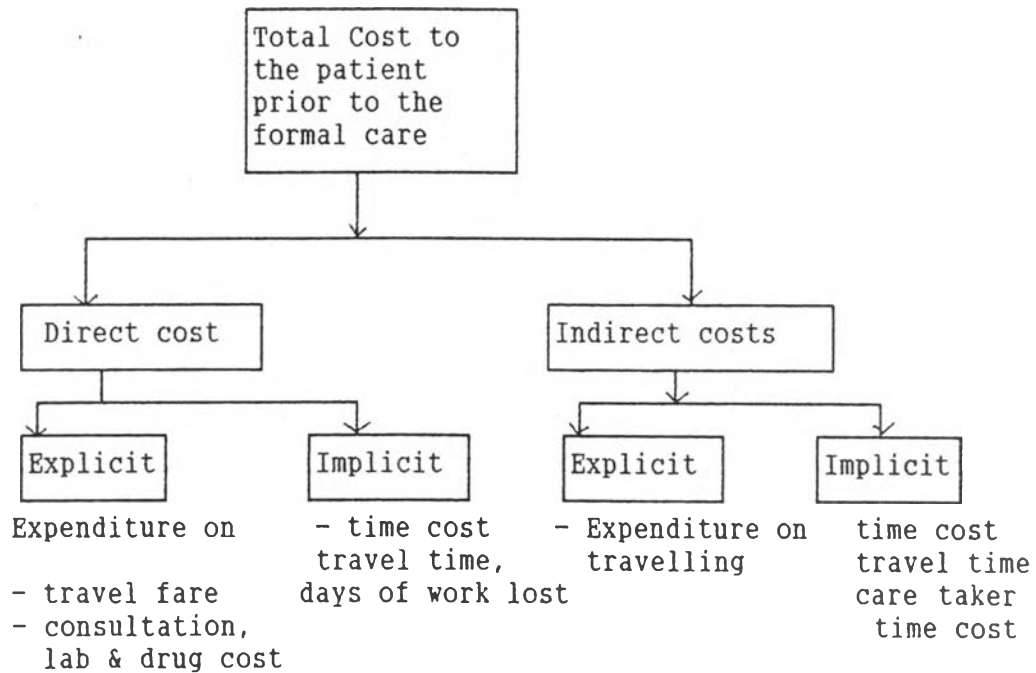


Figure 2.2 The process of health care seeking



Note: PVT.= Private, TRD = Traditional

Figure 2.3 Frame work of patients' cost prior to the formal care.



Factors influencing the choice of service points

Socio - Economic status of patients

- Household income
- Education of the patients and family- head
- Employment of family member
- Behavior of patients
- Patient's knowledge about tuberculosis
- Cultural practice

Disease factor

- Effect of tuberculosis

Provider's behavior

- Perceived quality of service
- Past experience of service
- Expenses for the care

Geographical Factor

- Distance to the service points
- Transport facility

Demographic Factor

- Age of patients
- Sex of patients
- Family size

Costs may be divided in many ways. Hospital costs studies may divide cost into medical and non medical costs, capital and recurrent costs. When examining patients' costs, cost are best divided into direct to the patients and indirect to the patients. Costing frame work is shown in Figure 2.3.

Determination of cost components (Patient perspective)

Patients (Direct Costs):

- Expenditure on Travelling to the service point (Explicit)
- Expenditure on consultation and drug costs prior to the formal care (Explicit)
- Time cost (time away from work) incurred when seeking care (Implicit)
- Time cost due to days of work lost before seeking informal care (Implicit)
- Waiting and treatment time cost prior to the formal the formal care Implicit)

Accompanying relative (Indirect cost)

- Expenditure on travelling to and with patient (Explicit)
- Time cost (away from work) when travelling and attending to the patients (Implicit)

Care taker (Indirect Cost)

- Time cost (time away from work) when taking care at home

2.3 Methodology of costing

It is imperative to develop a methodology for costing before determining the costs that are costs to the patients prior to the formal care include both accounting (financial) and opportunity costs of time. This study considered these two aspects adequately.

Accounting cost is the actual expenditure on material and labor. Travelling fare of patients and accompanying persons, drugs and consultation costs are accounting costs. The actual expenditure on drugs and consultation, traveling fare of patients and attendants were determined in this study for analysis.

Travel fare

Travelling costs were determined with following assumptions:

- Traveller were rational,
- They were informed about mode of services and price.
- Transportation services were not taxed and subsidized.
- Accompanying persons used the same mode of travel with patients.
- Travelling time and costs of accompanying person were the same.
- Travelling fare of outward and return journey were the same.

The actual expenditure on travelling fare for one way was calculated and multiplied by two for two ways. If some persons used their own vehicle, cost was calculated and used on the basis of market travelling fare of similar mode of travel (e.g. taxi fare for car).

Drugs and consultation costs

Actual expenditure on drugs and consultation was accounted with the assumption that patients were rational. Drugs and consultation services were not deteriorated by subsidization and taxes.

Time costs (opportunity cost)

Opportunity cost means income or benefit foregone through using resources for one purpose rather than other purposes (Kaewsonthi 1989). In this study time costs (opportunity costs) of patient and accompanying persons and care taker were taken into account.

While determining income or benefit foregone, it was necessary to follow the criteria given below:

1. For formal sector worker, the income was equal to:

Monthly salary + fringe benefits (allowances)(i)

2. For Self-employed or farmer's monthly income

valuation of annual production
----- X (1/12) (ii)
No. of active participants
in production process

3. For street vender's monthly income was:

average daily income X 26(iii)
(6 working days in a week)

2.3.1 Costing model

The model followed was a static one for the given financial year assuming that there was no change in costs of different components during the period of study. The current prices were not distorted by taxes and subsidies. Market were free of monopolistic elements. This model covered the costs prior to the formal care.

Variables and parameters:

C_{di}	= average expenditure on consultation, laboratory and drugs at service point 'i' in Baht.
C_{tc}	= Total care taker cost in Baht.
i	= i represents 5 service points:- drug store, health center, traditional healer, private clinic, BMA or other,
N_{vi}	= average number of visits to the service points i.
$N_{a, i}$	= number of accompanying persons at the service point 'i'.
$N_{p, i}$	= number of patients attended at service point 'i'.
T_c	= average care taker time at home in days.
T_{cd}	= Total consultation and drug costs in Baht.
T_{cp}	= total cost to the patients prior to the formal care. in Baht.
T_{1fa1}	= average travelling fare one way for accompanying persons to the service point 'i' Baht.
T_{1fp1}	= average travelling fare one way for patients to the service point 'i' in Baht.
T_{1p1}	= average travel time one way for patients to the service points 'i' in hour.
T_{1a1}	= average travel time one way for accompanying persons to the service point 'i' in hour.
T_{1a}	= total travel time cost for the accompanying persons to the service point 'i' in Baht
T_{1p}	= total travel time cost for the patients to the service point 'i' in Baht.

- T_{fa} = total travelling fare for the patients to the service points 'i' and Baht.
 T_{fp} = total travelling fare in Baht.
 W_{dl} = total monetary value of days of work lost in Baht.
 W_l = average days of work lost in days.
 Y_{da} = average income or benefit on a day of accompanying persons in Baht.
 Y_{dc} = average income or benefit of care taker person.
 Y_{dp} = average income or benefit of patients on a day in Baht.

Total travel time cost to the patients prior to the formal care:

$$T_{tp} = \sum_{i=1}^5 [N_{pi} \{ (T_{tpi} * N_{vi} * 2) / 8 \} * Y_{dp}] \dots \dots \dots (iv)$$

Total travel time cost of accompanying persons:

$$T_{ta} = \sum_{i=1}^5 [N_{api} \{ (T_{tai} * N_{vi} * 2) / 8 \} * Y_{da}] \dots \dots \dots (v)$$

Total travel fare to the patients:

$$T_{fp} = \sum_{i=1}^5 [N_{pi} \{ T_{tpi} * N_{vi} \} * 2] \dots \dots \dots (vi)$$

Total travel fare to the accompanying persons:

$$T_{fa} = \sum_{i=1}^5 [N_{api} \{ T_{tai} * N_{vi} \} * 2] \dots \dots \dots (vii)$$

Monetary value of days of work lost before seeking care:

$$W_{dl} = \sum_{i=1}^5 [N_{pi} \{ (W_l * Y_{dp}) \}] \dots \dots \dots (viii)$$

Total cost to the care taker person:

$$C_{tc} = \sum_{i=1}^5 [N_{pi} \{ T_c * Y_{dc} \}] \dots \dots \dots (ix)$$

Total drug costs prior to the formal care:

$$T_{cd} = \sum_{i=1}^5 [N_{p,i} * C_{d,i}] \dots\dots\dots(x)$$

Total cost to the patients prior to the formal care:

$$T_{cp} = T_{1p} + T_{1a} + T_{fp} + T_{fa} + W_{dl} + C_{lc} + T_{cd} \dots\dots\dots(.xi)$$

2.3.2 Approaches of valuation

Many approaches are in practice in valuation of goods and service which are used in health care. The following approaches are widely used at present.

1. Market price valuation

- Adjusted market price valuation
- Unadjusted market price valuation
- Imputed market price valuation

2. Clients values

3. Policy makers' view

4. Practitioners' view

Market (unadjusted) based valuation is a pragmatic approach to costing, which takes existing market prices unless there is some particular reason to do otherwise (Drummond 1989). Market prices reflect the "true" value of commodities. As minimum wage rate artificially increases the prices of lower labor (Creese & Park 1994), a simple approach of multiplying the days of work lost by the local wage rate or minimum wage rate is in practice. In the situation of underemployed the labor costs would be small and in the situation of unemployed the economic costs of labor might be close to zero. If we measure real income or benefit forgone by interviewing the patients there is the chance of under reporting. It under estimates the time cost also. The minimum wage rate approach has however some disadvantages that it calculates the costs irrespective of their employment (employed / unemployed). Therefore to overcome this time cost (opportunity costs) of patients and accompanying persons, has been valued by using the existing market prices.

Expenditure on transportation, drugs and consultation were also valued by using current market prices.

Goods and services which are non marketable can be measured in imputed market valuation (Drummond 1989). Household costs, which are

non marketable, analogy or similar services, substitution costs can be followed. This approach is justified from the fact that the patients' average income was found to be lower than the level of minimum wage rate. Time costs of care taker was valued using the patients' average income because their income assumed same as patients' income.

As it was a cross sectional study covering a period of only 10 weeks, no adjustment and discounting the costs over time was not applicable.