CHAPTER 3

LITERATURE REVIEW

This chapter reviews the prior works on Leprosy Control Program(LCP) for other countries and LCP for Myanmar, literature dealing with economic evaluation about leprosy and other communicable diseases and costs and costs benefit analysis.

3.1 Review of Previous works on Leprosy Control Program for Other Countries and Myanmar

Sukumaran (1988) reviewed the status of leprosy control in Malaysia. The author commented that there are two main forms of case detection, with 80 % of cases being detected by the passive method. Active case detection is limited to contact tracing, examination and surveillance. He found that contact surveillance reduced the pool of infectious carriers and the application of suitable effective early rapid diagnostic tools for field application will contribute for the effective control of disease. The author explained that only 20% of the cases were being detected by ACD but it reduced the pool of infectious carrier which is very important for program as well as patients because in this way the program can trace these pool of infection and two possible outcome can occur: cases are detected in early phase before disability sets in and it will not need to rehabilitate them and other one is reduction in the transmission of disease to other people. These facts are acting as benefit for the program by doing case finding activity. The author tried to find out only the facts of the program by doing case finding activities and he did not mention about the costs of doing these activities. If we know the better method in each endemic area, the program can give priority for that activity. Therefore the program should be evaluated and case finding activity with higher benefit cost ratio should be determined.

Max and Shepard (1989) in studying the productivity loss due to deformity from leprosy in India, explained that the policy makers must allocate scarce resources between control and treatment of leprosy and other conditions. They stressed that estimates of economic loss provide a valuable guide in allocation of resources. They mentioned that among leprosy cases

in India, approximately 20% of cases have some degree of deformity and disability as a result of nerve damage. In addition to suffering physical impairments, patients are stigmatized particularly when they are deformed or disfigured. Both social stigma and physical deformity may limit or preclude a patient's ability to engage in productive economic activity. As a result, earnings may be reduced or entirely eliminated. They tried to find out the productivity loss due to deformity from leprosy by studying 550 leprosy patients with some degree of deformity and 550 adult family members of these patients as a control subjects. They calculate the economic loss from deformity. It was necessary to compare the average earnings of groups of leprosy patients under two alternative condition (a) with their present levels of deformity and (b) if all deformities could have been completely eliminated. Expected annual earnings under each condition was estimated as the product of the proportion of the group gainfully employed times the average annual earnings of those gainfully employed. The dependent variable, the presence of earnings was coded as '1' if the patient reported positive earnings and '0' otherwise. The independent variables of greatest interest was the deformity grades. They used the logistic regression and other major determinants of earnings were considered in the equation for example – sex, location, presence of schooling and presence of technical skills.

The result of the logistic regression for gainful employment showed that 42.2% of the sample leprosy patients were gainful employed. Earnings of control were 1.7 times those for leprosy patients for males, 4.0 times for females and 1.8 times for both sexes. To extrapolate the regression results to a national level for India, it was noted that the country reported 3,225,302 registered leprosy cases in 1995. The number of leprosy patients with some deformity is estimated at 20% of this number. Thus, the income gain from eliminating deformity in leprosy patients would be Rs 2.43 billion. Finally they found that an indication of the magnitude of the $ 130 million gain to the Indian economy from eliminating deformity, this amount is one–eleventh of India's entire official development assistance for all purposes from all resources in 1985($ 1,470 million). The study concluded that failure to control deformity may be even more costly. Therefore productivity loss due to disability

from leprosy should also considered in Myanmar because Myanmar
is one of the leprosy endemic countries in the world.

Htoon and Win(1994) studied the disabilities among rural
leprosy patients in Myanmar. They mentioned that
chemotherapeutic measures will never restore the function of the
peripheral nerves once they have been damaged by the disease.
Therefore, some discharged cases though cured of leprosy, may
still need medical care because of disabilities. Apart from
medical needs, some leprosy patients will, for the rest of their
lives, suffer from physical, psychological and social problems
as consequences of having contracted leprosy. The objective of
their study is 'to find out the magnitude of the disability
problem among both leprosy patients currently under treatment
and also among those who had been discharged. They stated that
this study would facilitate the planning and implementation of
appropriate measures aimed at helping disabled leprosy patients
lead a productive life. A cross-sectional survey was conducted
in Hmawbi Township. At the time of survey 180 cases were
registered for treatment and total of 615 cases had been
discharged. Out of a total of 96 villages, 17 villages were
chosen by the investigator with priority given to villages with
the highest number of known leprosy cases. A total of 145 cases
were reviewed out of 101 registered cases and 133 discharged
cases residing in these 17 villages.

Overall results of the 145 leprosy cases reviewed, 48 had
disabilities , 29 of them (20% of total) with grade 2
disability. Grade 1 disability was found in 19 cases. Sixty
seven cases were under treatment and 78 were discharged from
treatment. Among the patients under treatment 44.8% had
disabilities, in which 26.9% had grade 2 disability. Out of 78
discharged cases 23.1% had disability, in which 14.1% had grade
2 disability. They also studied the distribution of disability
among these two groups with regards to age, gender, occupation,
and site of disability and disabilities after registration.
They concluded that the overall proportion of disability among
cases currently under treatment and those who had completed
treatment was 33.1% and 20% of all cases had grade 2 disability.
This shows that the number of leprosy patients in the community
having problems associated with disability is quite high.
Therefore the program should be evaluated which method of case

finding activities is better in the sense that more early cases
are detected. If we can find out the cases in early stage, the
disability problem become reduced.

Lwin and Zuiderhock(1974) studied the case detection rate
for Central Burma(1962-1972). They stated that, the general
features of LCP based on health education, case finding by means
of annual examination of household contacts and regular school
surveys, regular treatment starting as early as possible and
regular follow up of cases. They selected the Central Burma
because it was the most important area for evaluation purposes
of which it represents more than 60% of total number of
registered cases in the whole country. The rate of cases
registered yearly(case detection rate) had been chosen in this
study. With an annual increase of case finding activities, the
trend of case detection rates for lepromatous and non
lepromatous cases, especially among the childhood population
seems to be of the keen interest. They used the continuous
assessment of the program by means of monthly and annual reports
prepared by medical officers of project areas. From those
reports case detection rate for the years 1962 to 1972 were
calculated. The results of the study showed as the graph of the
case detection rate for all newly detected cases which was
declined from 1962 to 1972. They also explained the trend of
case detection rate according to age group and type of leprosy.
They concluded that the trend showed a definite decrease in case
detection rates for Central Burma. For their opinion, active
case finding by means of annual examination of household
contacts and annual school survey, regular treatment beginning
at an early stage combined with health education is found to be
an effective method of leprosy control in Central Burma. They
found out for effective methods of LCP and but they did not
mention about the costs of each method of case finding
activities. It still need to find out which method is more cost
benefit.

Myint and Htoon(1996) studied leprosy in Myanmar. The
study was conducted to evaluate the epidemiologic outcome of
operational changes that occurred in the leprosy control program
of Myanmar during the period 1958-92. They used a retrospective
analysis of data on the occurrence of leprosy from various data
sources. They found that the registered caseload and prevalence

leprosy have declined in Myanmar from a peak of 86.2 per 10,000 population in Myanmar in 1973-77 to 26.82 in 1988-92. The new case detection rates had also declined from 7.41 per 10,000 in 1968-72 to 1.96 in 1988-92. The proportion of passively detected cases had increased significantly from 1973 to 1987. Comparison of the two periods, 1973-77 and 1988-92, showed that the proportion of new cases detected through passive method had not changed significantly. Considering that the increase in the MB proportion of new cases and the declined in proportion of new cases under 14 years old could not have been due sorely to increases in the proportion of new case detected through passive means, and the additional finding of declining detection rates among school children and mass surveys could mean that the overall incidence of leprosy is declining in the country.

They stated that, the information on the proportion with disability grade two among new cases can be used to study how well new case detection reflects incidence. However this information was not available at the national level because it was not collected routinely. They concluded that the epidemiological pattern of leprosy in Myanmar had changed over time. With the expansion of MDT coverage, the trend of decline observed in the registered prevalence is expected to continue. Increasing the coverage of MDT is expected to facilitate interrupting the chain of transmission and contribute greatly to progress in eliminating the leprosy.

To get the increasing coverage of MDT, case finding activity is very important and so need to find out which method of case finding activity is cost benefit because of limited resources.

3.2 Review of Previous Works dealing with Economic Evaluation on Leprosy and Other Communicable Diseases

Kaewsonthi and others(1995) reported on the economics of early leprosy case detection, using the data from Thailand. The study stated that there are three potential impacts of early case detection namely; effect of early detection on transmission, effect of early detection on the number of

disabled cases and effect of early case detection on relapse.
The authors also identified the six possible actions which could
affect earlier case detection; strengthen health education,
rapid village survey, contact survey, school survey, improved
referral practice through training of staff and paying the
travel expenses of referral patients to attend specialized
diagnostic services. In this study, they analyzed comparison of
costs of actions for one year and cost saving through disabled
life time by using cost models and cost saving(benefit) models.
They found that, rapid village survey and contact survey are
viable actions, economically, to improve early case detection.
That is the benefit cost ratio(for the supplier) which was
greater than one over a five year program with a larger benefit
cost ratio when considering benefits through the disabled life
time. They found that the economic viability of contact survey
depends on the probability of contacts developing leprosy being
greater than 0.01.

They also studied the aggregate annual costs incurred due
to the disease in Thailand in 1992 was US$ 14.8 million, with
59% incurred in activities which contribute to control (case
detection, management, treatment and surveillance after
completion of drug therapy) and 41% in support and maintenance
of the leprosy disabled. They found that of this US$ 14.8
million costs, US$ 4.8 million(32%) was incurred by consumers
and US$ 10 million by supply organizations by using micro and
macro models.

Htoon and others(1993) studied the Cost Effectiveness
analysis of a Leprosy Control Program. The objective of this
study is to compare the costs of alternative strategies to
achieve certain health outcomes or to compare the expected
effect of each dollar spent across different disease control
program. They found out the outcome of the program as total days
of healthy life loss(DHLL). By using data from Myanmar and a
series of assumptions estimated the cost effectiveness of Multi
Drug Therapy, cost in the treatment of complications, cost
issues in screening and total cost of leprosy control.

Based upon a hypothetical population of 100,000 and a
leprosy prevalence of 10 per 1,000 population the total cost per
case was estimated to be US$ 67.10, with annualized capital cost

US$ 11.2 per case screening US$ 1.96 per case, chemotherapy (drugs and delivery) US$ 30.92 per case and for the treatment of complications US$ 22.5 per case. They studied the effectiveness as total days of healthy life loss(DHLL) but this is not the final outcome of the control program. Therefore, we try to explore the outcome as productivity loss which can be measured by monetary unit.

Consuelo (1986) studied an economic issues related to the stigmatization of Hansen's disease. He stated that it was proposed to arrive at information which would contribute towards innovative strategies for the effective control of Hansen's disease. Knowledge of stigmatization and stigma management would therefore be crucial to the early detection, case holding and prevention of the disease. Another practical economic issue would be the effect of stigmatization and self-stigma on different income levels. This refers to the manifestations of stigma and its economic effect at a high income level in comparison to the effect at a low income level.

Kamolratanakul and others (1993) analyzed malaria control for migrant workers in eastern Thailand from an economic point of view. In their study the cost-effectiveness and cost-benefit of permethrin-treated nets were compared with those of untreated nets as a method of malaria control for migrant workers. A randomized, double-blind field trial was carried out to compare the economic impact of treated nets with that of untreated nets. The study was conducted in 261 long-term migrant workers and 138 seasonal migrant workers who used treated nets, while 135 and 79 respectively used untreated nets. They showed that the impregnated-nets program was cost-saving as well as offering improved effectiveness. Benefit for their study was net saving of using a treated net. It was calculated by subtracting costs/worker(treated-net) from costs/worker(untreated-net). These results were expressed from the program's perspective as well as the consumer's perspective.

The net benefit of using a treated net was US$ 1.17 per worker from the program's perspective and US$ 1.61 per worker from the consumer's perspective. The study concluded that, failing the development of safe, effective, long-lasting prophylactic agents, integrating the use of impregnated nets

with large scale primary health care program likely will be the most cost-effective and cost-beneficial method for controlling malaria. From this study we can learn how to analyze the program by means of cost effectiveness as well as cost benefit.

Kaewsonthi (1993) stated that there are a number of questions to be raised concerning the economics of leprosy control. Some questions are relevant to this study:

(1) What are costs per case detected through out-reach services compared to those detected through passive services ?

(2) What would be the most cost effective methods for early case detection where the incidence of leprosy case is low ?

(3) How could costs per detected case be contained and/or minimized ?

(4) How can resource utilization be improved within the leprosy control systems ?

All these questions should be answered for efficient utilization of scarce resources within the program.

3.3 Costs and Cost Benefit Analysis

Economic evaluation is the comparative analysis of alternative courses of action in terms of both their costs and consequences. Therefore the basic tasks of any economic evaluation will be to identify, measure, value and compare the costs and consequences of the alternatives being considered. The effect will be translated into days of disability avoided, years of life gained, medical complications avoided and so on. The effect resulting from a particular service or program is expressed in terms of their dollar benefits to facilitate a comparison with program cost (Reading materials on How to read clinical journals: an economic evaluation(part A), 1984).

Peter and William, 1978 stated that, Cost-benefit analysis (CBA) is a generic term embracing a wide range of evaluative procedures which lead to a statement assessing costs and benefits relevant to project alternatives. The variety of problems addressed and the ingenuity which must be exercised in estimating costs and benefits make it particularly difficult, if not impossible, to design an all-purpose CBA procedure. The CBA is an information-processing machine. The decision maker's input

to the analyst will affect the analyst's output to the decision maker. A technical description and a detailed scenario definition for the projects to be analyzed are obviously important initial steps. The explicit recognition should be given to all resources inputs and final outputs of the projects, and the calendar time in which they will occur. On the input side, these descriptions must include the types and amounts of resources.

On the output side, the time streams of each final good or service of the projects are equally important. Every project has an alternative, even if it is to ''do nothing'', for to ''do nothing'' implies a time stream of costs and benefits to society just as a positive project does. Of course, it is exactly this ''do nothing'' or baseline scenario with which each project is compared. The CBA focuses on how a project will change the baseline time stream of social well-being. Thus, only the difference between the baseline time stream and the with-project time stream are considered in CBA. The good differences are the benefits of the projects; the bad differences are the costs. Since the difference that the project will make is of primal importance, it is essential to have the baseline scenario with which to compare the project scenario.

The analyst selects a parameter in the benefit cost ratio calculation that he feels is both subject to error and capable of significantly affecting the NPV calculation. The analyst selects likely high and low (or best and worst) values for this parameter and computes the B/C ratio estimates for each project - high, medium and low - and for each parameter selected for sensitivity analysis.

Creese and Parker(1994) stated that to estimate a health program's costs, classification of their components is necessary. The program's costs can be classified as many ways namely: classification by inputs, classification by function/activity, classification by level and classification by source. There are three main things for choosing costs classification: it must be relevant to the particular situation, the categories must not overlap and it must cover all the possibilities. Among the different ways of classification

mentioned in the earlier, classification by input is widely applicable and useful.

It involves a manageable number of categories and these categories are general enough that they can be applied to any health program. It distinguishes two important categories of resources — those that are used up in the course of a year and are usually purchased regularly(i.e., recurrent costs) and those that last longer than one year, such as buildings, vehicles and equipment(i.e., capital costs). And they also mentioned that, cost effective analysis will be comparing at least two alternatives — for instance, two ways to organize the program(or activity) or two different packages of inputs to conduct it.

The benefit of this study is in terms of cost save for early case detection in other words 'saving to supplier and/or consumer due to reduction in the number of disabled'.

In the past, the benefit of the health output of a project is based on the economic returns to society obtained from better health of the population involved. The identification is known as the 'human capital' approach. This approach is strongly criticized for discriminating against the elderly who no longer offer production gain. The 'value of life' approach to identify the health outcome was developed in order to rectify this problem. Expanding length of life and improving quality of life become the latest operational definition in the economic evaluation. This gives rise to two key concepts: Disability Adjusted Life Years (DALY) and Quality Adjusted Life Years (QALY) (Lecture notes on evaluation of health benefits).

Disease costing studies provide broad estimates of the total potential benefits to be derived from the prevention or cure of particular diseases. Economic analysis is also required, at a more detailed level, to determine the most economical and effective means of obtaining these benefits. Evidence on the distribution of costs and benefits is therefore required if the health ministry is to bargain effectively for scarce resources within the public sector(Report on a WHO working group, 1982).

Guy Carrin(1984) stated that CBA as an approach to measure benefits and costs to society of a project and in which both

benefits and costs are maesured in terms of money. The most refined and correct way to find out what the maximum amount is that society is villing to pay for that porject. But they found that there are several reasons for the lack of application of the Willingness To Pay (WTP) approach. A major alternative to the WTP approach is to consider the benefits of a project as consisting of *production gained* and the *cost savings* as a result of that project. It is usually estimated by using earnings data for the individuals whose health is improved. The cost savings can also be regarded as a benefit because the funds freed by a project can be used in other benefit entailing health projects.

Barnum(1986) studied the evaluating healthy days of life gained from health projects. He tried to measure the health status effects - changes in morbidity, case fatality and disability - of key health interventions, not only for single intervention but also for packages of interventions using alternative delivery mechanisms. The author modified the Ghana model in his study. The Ghana Team procedure is essentially an accounting approach that uses estimates of incidence, case fatality and duration and extent of disability to calculate the number of healthy days loss from disease. While this method does not account for qualitative differences among different morbidity states, does not directly consider interaction among diseases.

The author also explained that the Ghana team methodology cannot be applied to determine the most cost effective alternative in all situations. Cost-effectiveness analysis can only be applied to make choices among alternatives with comparable outcomes. In general the broader the scope of the policy choices the more difficult to measure the effect of project outcomes in comparable units. Although healthy days may provide a reasonable first approximation for the health output of the projects it does not provide for other kinds of useful outcome measures. In this study the outcome expressed as healthy days of life loss by productivity.

He mentioned the two main point in this study. These are--- - near events are given greater weight or value than distant events and so discounting healthy days of life loss is very important for the decision maker.

- Productivity does not ignore the welfare of the children. Adult productivity is important to qualify and sustenance of life for all age groups. Therefore in this study the outcome found out from productivity weight.

The author determined the outcome as healthy days of lie loss by productivity. This outcome can be applied only on cost-effectiveness study. For the cost benefit study the outcome should be monetary term and so by multiplying this outcome into discounted average annual income.

From reviewing the prior works, it is found that early case detection can prevent disability which has undesirable consequences on economy but there is no study about economic evaluation of case finding activity of the Leprosy Control Program in Myanmar. The program should be evaluated, so as to identify which method of case finding activity has the highest benefit in terms of cost savings for early case detection when compared with cost incurred.