

CHAPTER 3

LITERATURE REVIEW

A large volume of literature is available on various economic aspects related to HIV/AIDS. However, the literature review of this study is grouped under the following three headings:

3.1 Economic Costs of HIV/AIDS

3.2 Effect of HIV / AIDS on Households

3.3 Impact of HIV/AIDS on Economy

3.1 Economic Costs of HIV/ AIDS

The economic costs of AIDS fall into four main categories. The first category includes the personal medical care costs associated with AIDS, that is, the costs of detecting, treating and caring for people with AIDS. The second category includes the non personal costs, such as the costs of blood screening, the costs of information, education and communication, and the costs of basic research on AIDS. In the third category is the cost of forgone output and lost income because of AIDS morbidity and mortality. The fourth category consists of the psychological costs associated with the epidemic, such as the pain and suffering caused by AIDS, and the cost imposed upon people who must behave differently to avoid contracting or transmitting HIV. Many studies have been conducted in both developed and developing countries to estimate the various cost components of AIDS. These costs have been grouped under direct and indirect costs in many of these studies.

Viravaidya et al (1993), in their study in Thailand estimated both direct and indirect costs of AIDS. Direct costs in the study included various costs of prevention and medical care whereas indirect costs mainly included loss in output to the

economy. The study estimated the health care costs for people with AIDS to be between \$ US 658 and \$ US 1,016 per year; i.e. 30 to 50 percent of annual household income for the average Thai family or more than twenty five times the current annual per capita government health expenditure. Indirect cost to the economy due to the premature death of adults in their prime working years was estimated to an average \$ US 22,000 per death. According to the authors between 1991 and 2000 the 1993 value of the aggregate direct and indirect costs of the projected AIDS cases and AIDS deaths would total between \$ US 7.3 billion and \$ US 8.5 billion.

Similar studies conducted in other developing countries have also shown the huge loss to the economy due to AIDS . For example Over, et al (1988) in Zaire had showed that total costs range from fifteen to fifty-four times the per capita GDP and in Tanzania the costs range from twenty-four to fifty-two times per capita GDP. A study by Shepard (1990) in Puerto Rico showed the total costs of AIDS more in tune with those for Thailand, with the costs equaling nineteen times per capita GDP.

Bong-Min Yang (1993) studied the economic impact of AIDS in the Republic of Korea. The study computed lifetime economic costs for representative AIDS patients. The study estimated the outpatient costs as \$ US 2,215 for an average HIV cost of an AIDS patient (given 41 hospital day) was estimated to \$ US 2,010. The study found that the largest component of the cost of the AIDS epidemic is due to work time lost and future earnings foregone rather than to direct medical care expenditure.

MOPH (1992) Thailand analyzed hospital care costs of AIDS patients including 1) routine service cost: cost/ inpatient day 2) medical care cost and 3) external cost by using retrospective data from the division of provincial hospitals during 1988-1991. The study found that routine service cost was 341.19 baht per

inpatient day (\$ US 13.65), the medical care cost was 4,236.47 baht per case (\$ US 169.49) and external cost was 1,153.91 baht per case (\$ US 46.16).

Another study, Pitayanon et al (1994), analysed economic impact of HIV/AIDS mortality on households in Thailand. The study revealed that the direct medical care cost for each HIV/AIDS patient was approximately \$ US 1,000, which was equivalent to about six months' worth of the average household income. A little difference in cost was found between HIV/AIDS related death and non HIV/AIDS related deaths (10 percent), with the cost of the non-HIV/AIDS-related death being slightly greater than the cost of the HIV/AIDS related death, because the households spent more on funeral rites. The largest part of the economic costs of an HIV/AIDS related death was the foregone income of the deceased. The total cost of AIDS death was estimated at around \$ US 82,000.

Luijben et al (1991) studied the direct economic impact of HIV infection on the health care system in Netherlands. Data on inpatient utilization of drugs was recorded prospectively at patient-level during five years. The study found between 1987 and 1991 cohort of 234 HIV-infected patients generated 248.57 admissions and 4,397 inpatient days. Yearly total costs of inpatient drug use rose from \$ US 4,792 in 1987 to \$US39,884 in 1991, CDC-IV patients accounting for 95% of these costs. The costs per person per year of inpatient drug use by CDC-IV patients declined from \$ US1,144 in 1987 to \$ US 668 in 1991 analogous to CMV, PCP, Cryptococcus neoformans and Candida infections, and fever of unknown cause; per admission. The drug treatment costs for these infections were \$795, \$451, \$1,632, \$ 324 and US \$ 250 respectively. In descending order, prescriptions of Acyclovir, Zidovudine, Pentamidine, Ganciclovir and Foscarnet generated the highest costs. These drugs accounted for 43.4% of all inpatient drug costs. Fluconazol became the most costly drug during 1991.

Jaegel et al (1992) evaluated the cost of medication in outpatient with HIV disease and AIDS in Germany. The authors evaluated the amount of money actually spent on their medication in a three months period by 96 patients insured by German "Ersatzkassen" in different stages of disease. All drug prescriptions for these patients during out-patient treatment that were paid for by the respective insurers were also analyzed. OTC drugs which played a minor role in this setting as well as unproved therapies that were privately paid for by the patients were not included in the analysis. Cost of medication given during a possible in-patient period of a given patient were excluded from analysis.

The study found more than 50 different drugs prescribed, the most common ones were: Fluconazole, AZT, Clarithromycin, Pentamidin, intravenous immunoglobulins, Acyclovir. Mean cost of medication was DM 1.391,93 per month (100 DM = 0.6172 \$ US).

Flores, et al (1991) projected the economic impact of HIV/AIDS in two largest cities in Honduras. The indirect and sectoral analyzes included reviewing occupational data from HIV-infected individuals and census data for the two cities. The direct cost estimates were based on 1,000 records from patients in the two cities who have been hospitalized with AIDS and accounting records from 11 health facilities (hospitals and hospices). Direct and indirect cost estimates were combined with epidemiological projections to determine the future impact.

Preliminary results of the study indicated that AIDS was most affected in the city of San Pedro Sula, which is within the most heavily industrialized and fastest growing region of Honduras. AIDS was found to affect certain occupations, including industrial workers, personal service workers, traders, and agricultural workers. The

cost of treating Patient with AIDS in Honduran hospitals was calculated to be between \$ US 500 per admission.

Simpson et al (1992) assessed the influence of standard treatment algorithms for diagnostic work-up, treatment and follow-up of Pneumocystis Carinii Pneumonia (PCP), Cytomegalovirus retinitis (CMV), Toxoplasma encephalitis, Cryptococcal meningitis, Mycobacterium Avium Complex(MAC), primary central nervous system non-Hodgkin's lymphoma, and Kaposi's sarcoma were developed by clinical experts in each country. The study was based on costs and/or charges for the resources used for treatment in 1992 in each country.

The study found that treatment costs vary greatly, both between countries for the same condition, and among conditions. For example, the cost of treatment of PCP (in European currency units) is 4.261 ECU in the UK versus 8.361 ECU in Germany. CMV treatment costs ranged from 8.332 ECU (Italy) to 39,160 (Switzerland). MAC costs ranged from 4,861 ECU (France) to 15,239 (Switzerland). These variations were strongly influenced by decisions to hospitalize patients, and to lesser extent by country drug prices and input price factors. The variations further confirmed when medical purchasing power parities were used in the calculations.

Hellinger et al (1993) conducted a study to forecast the medical care costs of HIV in the United States from 1993 to 1996 using data from many sources including the AIDS cost and service utilization survey. The study estimated that the average monthly cost of treating a person with AIDS was \$ US2,900. The "lifetime" (i.e., from AIDS diagnosis until death) cost of treating a person with is calculated to be \$ US 70,180. The national cost of treating all persons with HIV was forecasted to increase 66 % i.e. from (\$ US6.7 billion in 1993 to \$ US 11.1 billion in 1996.

Estimating lifetime healthcare cost per AIDS case is of obvious programmatic and policy importance, but is a more complex task. Since utilization takes place over time, it is inherently a problem in longitudinal data analysis, though often not treated as such. Applying simple descriptive statistical methods to available data can and often does produce substantial biases in estimates. Cost of care estimates vary widely, due partly to differences in the populations studied and partly to differences in analytic approaches.

Crystal et al (1989) illustrates the impact of alternative analytic approaches with data from a longitudinal study of persons with AIDS in New Jersey (n=1149; 583 followed until death and 566 censored). Mean observed cost across all program participants was estimated to be \$ 32,564 and median \$ 19,840. In an alternative approach, data were analyzed only on those who died during the period of observation. In this case mean cost was estimated at \$ US37,664, and median \$ US23,96. The authors also described an approach based on hazard techniques which dealt more appropriately with the structure of longitudinal, censored data. This produced estimates of \$ US64,994 for mean cost to death and \$ US44,303 for median cost respectively. The study demonstrated the substantial difference in estimates that can be produced by alternative analytic methods.

Lim, et al (1994) propose a model of costing based on Singapore experience. The authors estimated direct and indirect costs of AIDS in Singapore. The indirect costs were estimated to be S\$32 million and the direct costs about S\$10 million. The ratio of indirect to direct costs was about three times, which is in contrast to studies from the West which quoted a ratio of as much as five times. This is probably because the studies might have taken into consideration almost all components of the direct costs. The average life-time medical cost per AIDS patient while they were living in Singapore was estimated to be S\$ 12,000. The average length of hospital stay of 42.1

days was similar to that in the UK and some studies in the USA. It is however, not meaningful to compare medical costs in view of the differences in these countries.

3.2 Effect of HIV/AIDS on Households

In a context of economic crisis and absence of true social security systems, household economics in developing countries is particularly fragile when faced with the risk of disease. AIDS worsens the economic situation of stricken families. Kaddar et al(1990) measured the impact of AIDS on household of developing countries (cited in Lujben et al.1991). The authors conducted a multicentric survey in Coted'Ivoire, Burundi and Haiti, to measure the impact of the disease and its evolution as it spreads. The study group made up of 200 families, in each country. The economic consequences were tackled both in terms of direct costs - medical charges and social provision of care - and indirect costs-consequences of disease on familial production. The results showed that nearly half of ill people had no professional activity, because of AIDS on familial income, its consequences on familial budgeting and activities and the importance of informal economy. Pitayanon et al (1994) in their study employed regression analysis to investigate whether an HIV/AIDS-related death actually makes a difference to the economic condition of the affected household two key economic variables explored were household income and household consumption change. The socio-economic factors included in the regression model the determining factors of household income and household consumption change after death were household size, sex of the deceased, age of the deceased at death, household status of the deceased, cause of death, occupation of the deceased before death, and educational attainment of the deceased. Logarithmic values of household income and household consumption change were then regressed with these determining variables, the regression tests showed that an adult HIV/AIDS-related death caused a greater

negative impact on household income and larger consumption change to the household than an adult non HIV/AIDS related death did.

The study by Basu et al (1997) on the household impact of adult morbidity and mortality in India examined the implications of the potential epidemic of AIDS in India. The authors found important differences in the economic impact on households which depend on the household's economic status. The study found that the status of woman also determined the impact on households of disease and death

3.3 Impact of HIV/AIDS on the Economy

Many researchers believe that the AIDS epidemic will have a substantial negative impact on national economic well-being. These experts fall into two groups. The first groups comprises of those who infer this result from the combination of large projected numbers of prime-age seropositive individuals and the relatively high estimated cost of medical care for persons with AIDS. For example, Philipson and Posner (1993) assert that because of the epidemic's size, its distinctive economic character in parts of Africa and, in the near future, in Asia as well will be its substantial implication for such key indicators of macro economic performance as economic growth, GNP and GNP per capita. The various United Nations agencies working on the economic and development implications of the AIDS epidemic expressed similar views. For example, the World Bank (1993) asserts that AIDS, affecting as it does mainly people in the economically productive adult years, had powerful negative economic effects on countries. Similarly, the UNDP (1992) claims that the extent of illness and death force, and adversely affect every sector of the economy. It also argues that the AIDS epidemic imposes large costs on individuals and their families that will be translated into aggregate costs that could become large enough to create national economic crises.

The second group of experts attempts in various ways to fit the AIDS epidemic as it is projected to evolve. For example, Kambou, et al (1992) simulated the impact of the AIDS epidemic using an eleven-sector computable general equilibrium model of Cameroon. They assumed that the AIDS epidemic claimed the lives of 30,000 workers (or 0.8 per cent of the labour force) each year from 1987 to 1990, with deaths occurring disproportionately among the more skilled segment of the work-force. For instance, they assumed that 6 per cent of the skilled urban work-force died of AIDS each year, compared to 0.4 per cent of the unskilled rural labour force. In this simulation, the AIDS epidemic lowers the rate of growth of GDP by nearly 2 percentage points per year.

Cuddington (1993) used a standard neo-classical growth model to explore the effect of AIDS on economic growth. In this model AIDS-related morbidity and mortality decrease the size of the labour force. In addition, AIDS-related medical expenditures lower public and private savings leading in turn to reduced investment in physical capital and lower productivity. The study also indicated that AIDS will depress the annual growth rate of real GDP per capita by an average of 0.25 per cent (the mid-point of their low and high scenarios) through the year 2010, assuming that World Bank projections of the number of AIDS cases are realized. Over (1992) assumed that AIDS cases will be disproportionately concentrated among the more educated classes and also that 50 per cent of AIDS medical care costs will be financed by reduced savings. He concluded that the epidemic would depress growth rates of GDP per capita by roughly 0.15 percentage points per year (0.33 percentage points under a worst-case scenario), a sizeable amount in the context of sub-Saharan Africa's recent growth experience (that is, a 1.2 per cent average annual decline in income per capita from 1980 to 1991).

Many authors have studied the aggregate impacts of AIDS particularly its effects on the growth of real income per capita and other measures of development. For instance, Bloom and Mahal (1996) used socio-economic and AIDS data from fifty-one countries to examine empirically the question of whether the AIDS epidemic has had a significant effect on economic growth during the past decade. According to their results, the AIDS epidemic has a negative but statistically insignificant effect on the rate of growth of real income per capita. Specifically, they found that an annual average increase in cumulative AIDS prevalence of 1 per 1,000 adults will reduce the annual rate of growth of real income per capita by a statistically insignificant 0.04 percentage points. The above result was used to evaluate the impact of the AIDS epidemic on economic growth in Sri Lanka. According to their forecasts, the cumulative AIDS prevalence was expected to increase from its 1994 level of 0.016 per 1,000 adults to about 1.064 per 1,000 adults by 2005, which amounts to an average annual increase in cumulative AIDS prevalence of about 0.095 per 1,000 adults. Based on these estimates, from 1994 to 2005, the AIDS epidemic would reduce the rate of growth of real income per capita by 0.0038 percentage points below its trend rate. This confirms that the epidemic's macro economic impact in Sri Lanka was very little.

In a recent study, Bloom et al (1996) examined the impact of the AIDS epidemic on the UNDP's Human Development Index (HDI), another measure of economic well-being. They demonstrate that even though the AIDS epidemic will not affect per capita income significantly, it may nonetheless adversely affect the HDI, primarily through its negative effects on life expectancy. In particular, they found that the HDI is reduced by nearly 0.002 for every increase in cumulative AIDS epidemic will reduce Sri Lanka's HDI in 2005 to 0.0019 below its projected level of 0.765 in the year 2005.

The forgoing review shows that the HIV/AIDS epidemic is a dark cloud on the nation's horizon. The relatively high costs involved in HIV/AIDS such by government and personal costs, and the fact that the disease is concentrated among individuals in their prime productive years all suggest that the epidemic has the potential to affect economy's rapid and sustained economic growth. The HIV/AIDS epidemic may also extend beyond economic growth to a wider scale by affecting life expectancy, poverty, household security, family composition, educational attainment etc. However, economic researches focussing more on individuals or families directly affected by HIV/AIDS: change in income of affected families, their consumption reallocation and related issues have not been fully explored.