

Full Length Research Paper

Costs of HIV/AIDS: A case study in Iran

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Advanced HIV (AIDS) is a phenomenon that its social, cultural and economic aspects are very broad and it can be regarded as an important obstacle in human progress. Considering the possibility of the future expansion, especially in developing countries with limited resources, thinking about its economic aspect is inevitable. The aim of this study was to calculate advanced and non-advanced HIV infection costs to patients in the selected referral centers in Iran. This is the kind of descriptive and cross-sectional study that was carried out on 120 out of 400 patients in the selected referral centers in Iran (the largest referral centers providing services to patients with advanced and non-advanced HIV) in four groups including advanced HIV with addiction, advanced HIV without addiction, non-advanced HIV with addiction and non-advanced HIV without addiction in 2010. The study involves collecting data from available resources (including patient files and referral to the relevant centers) and interviews with patients and according to a valid questionnaire. The average annual total cost in groups first to fourth were \$18,583.44, \$16,135.16, \$7,029.48 and \$7,007.44 respectively ($P < 0.01$). Also the average of direct and indirect costs was significant ($P < 0.01$). Considering the high costs of the disease and the low average age and education level in the study, using the evidence based educational intervention in order to increase the level of awareness to prevent further spread of the disease especially among the younger generation can lead to reduce the expenditure.

Key words: Cost, AIDS, Iran.

INTRODUCTION

Since 1988, the first of December has been given every year as world AIDS Day in order to increase budgets and also improve education, awareness and reduce the outbreak of the diseases and is considered the slogan for the day (Walker, 2003).

Advanced HIV (AIDS) is a phenomenon that its social, cultural and economic aspects are very broad. In June 2000 in the United Nation Security Council (UNSC) Resolution it was recognized as a potential threat to global stability and security for the first time (Hogan et al., 2005).

AIDS is now the fourth cause of human mortality and is predicted to be the first by 2020. Remarkably, more than 90% infections are being developed in the developing

countries (Bell et al., 2003). The high point about AIDS is that the disease typically may mostly involve young adult ages who have maximum efficiency. This is considered a serious economic threat (Stringer et al., 2000).

Although the rate of patients with AIDS in Iran is still limited, more than 80 to 100 thousands people had been infected by 2006 and it is dramatically rising (WHO, 2011). Ways to transfer AIDS is limited to the numbers: unsafe sex, use of contaminated syringes to inject and the use of contaminated blood product in the transmission factors.

According to the statistics in Iran the use of drug user from sharing needles and unsafe sex are the major causes of AIDS transmission. Most medical centers believe that 60% of transmission is through the use of shared needles and 35% through sexual intercourses (Mafakheri, 2011).

Conducted study shows that the cost of this disease is 1700\$ in South Africa and \$850 in other countries

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(Rosen and Long, 2010). Few and limited studies were carried out about the calculation of AIDS cost. In a study in Iran by Katibeh et al, in 2006, the average annual indirect cost of AIDS is \$8,440, 000 and total cost estimated \$40,653,000 (Katibeh and Shariati, 2008). Considering that the disease directly and indirectly has effect on various sectors in the society, and since there is no classification in existing studies on the cost calculation based on the disease progress, all findings are very general and lack accuracy to judge and make policy about resources allocation. Since the huge annual budgets are allocated to AIDS by governments around the world including Iran so, to identify the costing group is important. It is expected that the data provided in the study would be helpful for managers and policy makers. The aim of this study was to calculate the costs of patients with AIDS infection in the selected referral centers in Iran.

MATERIALS AND METHODS

This is the kind of descriptive and cross sectional study with a social perspective which carried out on 120 out of 400 patients in the selected referral centers in Iran (the largest referral centers providing services to patients with advanced and non- advanced HIV) in four groups including advanced HIV (AIDS) with addiction, advanced HIV (AIDS) without addiction non- advanced HIV with addiction and non- advanced HIV without addiction. Considering the high rate of AIDS among addicted patients so, we made it as the election criteria. It is worth noting that because of incomplete records and non- cooperation of some patients and to compensate for the loss of patients, 15 samples were added and 120 cases out of 400 cases in the selected centers were calculated with systematic sampling according to the following formula (Lotfi, 2009):

$$n = \frac{z^2 \delta^2}{d^2} = \frac{(1.96)^2 \times 8^2}{(1.2)^2} = 177$$

$$n^* = \frac{n}{1 + \frac{n}{N}} = \frac{177}{1 + \frac{177}{400}} = 125$$

The study involves collecting data from available resources (including patient files and referral to the relevant centers) and interviews with patients and according to a valid questionnaire to determine costs of cardiovascular disease that based on costs associated with AIDS and ultimately was designed by a team of experts that validity was confirmed. The questionnaire contained demographic information such as age, gender, marital status, health insurance status of patient, disease status, residency and employment status; the list of all tests at different stages of treatment, all presented medications in the selected center, vaccines (hepatitis, combined adult pneumococcal and influenza) general practitioner and the special list consultation and infectious psychiatrist (with the patient's family), methadone, other services such as condoms to reduce injuries, syringes, milk powder for infants born of mothers with HIV- positive, TB treatment, TB prevention services, the prevention of other opportunistic infections, hepatitis treatment inpatient services (admission, counseling and drug testing), cost of complications related to treatment process (all of which include indirect medical expenses) and other indirect cost

such as transportation costs, accommodation costs (if the city were referred to), the costs associated with absenteeism from work, and if the patient has fellow, the costs associated with fellows during treatment (which is considered the component of non- medical and indirect costs). Inclusion criteria in the study were all patients who have file in selected referral centers. It is important to note that because almost all services provided to patients are free and cost of some services is not directly available to estimate the cost of some imported, foreign and no priced drug items and also costs related to the tests, Tehran Blood Transfusion Organization and AIDS Department of Health Ministry were assisted. Indirect costs such as travel costs was estimated approximately with interviews with several patients referred and was extended to the statistical community. Since most people have false job and do not certainly earn the much, Costs related to the absenteeism from work are calculated based on the level of minimum wage (\$1.578) per hour in Iran determined by Ministry of Labour and Social Affairs (" , 2011). We used the estimated interval and SPSS.17 software; and T test and ANOVA to estimate the average cost to compare the average costs in the group.

FINDINGS

In this study, the average age was 33 years (SD = 0.26) and 109 men (0.9%) and 11 women (0.09%) were participated. 113 persons lived in Tehran (94%) and seven people lived in the suburbs (0.05%), the number of people employed 65 (0.54%) and 55 cases (0.45%) were unemployed. There were 116(96.3%) high school or lower education and 4 (3.3%) university education, 87 cases (72.5%) have insurance, six cases (5%) uninsured and 27 people were unknown (22.5%). Single and married persons were 60 (50%) and 41 (34.2%) respectively and the marital status of 19 (15.8%) was unknown (Table 1).

Total direct spending in all groups is \$26663.99 (SD = 163.2). Also there is significant relationship between the different groups of disease and total direct costs (P<0.01) (Table 2).

Total indirect cost in all groups is \$22091.53 (SD = 193.2). Also there is significant relationship between the different groups of disease and total indirect costs (P<0.01) (Table 3).

Total annual spending in all groups is \$48755.52 (SD = 795.6). Also there is significant relationship between the different groups of disease and total costs (P<0.001) (Table 4). It should be noted that the mean time period of the disease in the study is 24 months. Also, indirect costs have formed 46% of total costs.

DISCUSSION

In this study as Katibeh et al. (2008), the social perspective is considered, (Katibeh and Shariati, 2008). In another social perspective study, the cost rate for people are without the syndrome, with syndrome but without AIDS and AIDS patients are \$6515, \$13140 and \$34825 respectively while in this study, the average total cost in groups with advanced addictive HIV, advanced

Table 1. Frequency and percentage of referred patients to the selected referral centers in Iran.

Item		Frequency	Percent
Age	< 25	3	2.5
	26-40	69	57.5
	> 41	48	40
Sex	Male	109	90.8
	Female	11	9.2
Location	Tehran	113	94.2
	Suburbs	7	5.8
Employment	Employed	65	54.2
	Unemployed	55	45.8
Education	Diploma	4	3.3
	Under diploma	116	96.7
Insurance	Insurance	87	72.5
	No Insurance	6	5
	Unknown	27	22.5
Marital	Single	60	50
	Married	41	34.2
	Unknown	19	15.8
Disease	Advanced HIV with Addiction	30	25
	Advanced HIV without Addiction	30	25
	Non-Advanced HIV with Addiction	30	25
	Non-Advanced HIV without Addiction	30	25

Table 2. Direct cost according disease status of referred patients to the selected referral centers in Iran (in dollar).

Group	M	SD	Test result
Advanced HIV with addiction	11068.88	425,4	F = 8.97
Advanced HIV without addiction	10094.892	255,6	
Non-advanced HIV with addiction	2216.68	321,1	
Non-advanced HIV without addiction	3283.54	270,6	
Total	26663.99	163,2	P-value<0.01

Table 3. Indirect cost according disease status of referred patients to the selected referral centers in Iran (in Dollar).

Group	M	SD	Test result
Advanced HIV with addiction	7514.56	205.4	F=9.23
Advanced HIV without addiction	6040.27	155.6	
Non-advanced HIV with addiction	4812.80	121.1	
Non-advanced HIV without addiction	3723.90	180.6	
Total	22091.53	193.2	P-Value<0.01

non addictive HIV, non advanced addictive and non advanced non addictive are \$18,583.44, \$16,135.16, \$7,029.48 and \$7,007.44 respectively (Naik et al., 2009). Average age of patients in the study was 33 years, while in a study conducted in the UK was 40.5 years (Mullins et

al., 2000). As the Joint United Nations Program on HIV/AIDS (UNAIDS) reported in 2006 that national funds paid by the government to direct costs is \$14,000,000 (6). In a study in Italy has been shown that the high indirect cost of HIV/AIDS (the lost income and low wages) at the

Table 4. Total annual cost according disease status of referred patients to the selected referral centers in Iran (In Dollar).

Group	M	SD	Test result
Advanced HIV with addiction	18583.44	403.2	F=7.73
Advanced HIV without addiction	16135.16	332.5	
Non-advanced HIV with addiction	7029.48	137.7	
Non-advanced HIV without addiction	7007.44	109.1	
Total	48755.52	795.6	P<0.001

individual level and a serious impact in terms of loss of income (the loss annual income from \$6150 to \$5271) (Torti et al., 2003).

An economic evaluation study in Canada showed that the present value of future overall productivity loss for all men in the age range 25 to 64 years who died during 1991 to 1987 has been estimated about 39 to 74 billion dollars. The cost of dying from HIV/AIDS disease is estimated about 5.3% of the overall losses or nearly 2.11 billion dollars in 1990 (Hanvelt et al., 1994).

A study in Kenya by fax and et al, estimated the effects of the HIV/AIDS disease on labor productivity during disease progression. Costs items included daily labor productivity, number of days that there have to pay, the number of days that are light (Fox et al., 2004). Results from another study have been shown that the average medical and non medical expenses for the treatment and services was \$122 in a six months period (Freedberg et al., 1998).

As various studies showed the cost of the disease is catastrophic and as the disease progresses it exponentially increases. In a study in 2006 to 2007 carried out in Imam Khomeini hospital in Iran indirect cost resulting from the disease of HIV/AIDS is \$616 per person considering the social perspective. This article stated that indirect costs of the HIV/AIDS disease is almost 60% of direct costs in 2006 to 2007 While in the present study, indirect costs have formed 46% of total costs (Katibeh and Shariati, 2008).

In a study conducted in England in 1997 indirect cost were devoted 45% to 102% of direct treatment costs in the period of one year (Mullins et al., 2000).

Fortunately, international experience shows that the intervention measures to combat HIV/AIDS are cost saving (John et al., 2011). Recent studies indicate the more focus the interventions (through information, services and prevention behaviors) have on reducing the risk in a group of people that likely have increased prevalence of HIV/AIDS, the more cost saving. They are interventions such as the reproductive health, the education of HIV/ AIDS in schools, the education about health care and the prevention for vulnerable groups including dealing with sexually transmitted disease (STD) and risk reduction for injecting addicts are as examples of cost efficient measures (Adam, 2007).

Conclusion

Since indirect costs are to account for a significant percentage of costs, so its calculation of total costs resulting from the disease is necessary. Also, the spending in the different groups varies, and this amount increases with advancing stage of disease. Considering that a high percentage of people are unemployed or employed falsely and have low income it seems that provision of insurance for the individuals and families under their support is crucial. Based on the study findings, we can design cost effective interventions to promote effectiveness of the treatment. Considering that the average age and the education level in the study is low, we can use evidence based educational intervention in order to increase the level of awareness to prevent further spread of the disease especially among younger generation. Many people have still not enough information about much worse stage of the disease and its transmission routes. Finally, strengthening national information systems to monitor and assess the condition and how to respond to HIV/AIDS are important.

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