

Analysis of Cost Impact of HIV/AIDS on Health Service Provision in Nine Regions, Tanzania: Methodological Challenges and Lessons for Policy

Godfrey M. Mubyazi^{1*}, Aziza J. Mwisongo¹, Emmanuel A. Makundi¹, Kisali Pallangyo², Hamisi M. Malebo¹, Jonathan M. Mshana¹, Kesheni P. Senkoro¹, William N. Kisinza¹, Yahya Ipuge³, Phillip Hiza⁴, Stephen M Magesa¹, Andrew Y. Kitua¹ & Mwele N. Malecela¹

¹Department of Health Systems and Policy Research, National Institute for Medical Research, Dar es Salaam, Tanzania,

²Muhimbili University College of Health and Allied Sciences (MUHAS),

³Department of Hospital Services, Ministry of Health Headquarters, Dar es Salaam, Tanzania,

⁴Independent Consultant and retired Chief Medical Officer (CMO), Ministry of Health, Dar es Salaam, Tanzania

Abstract

Background: Tanzania is one of African countries that have since 1983 been facing the human immuno-deficiency virus-acquired immune-deficiency syndrome (HIV/AIDS) pandemic, thereby, drawing attention to the general public, the governmental and non-governmental organizations and government's partner development agencies. Due to few socio-economic studies done so far to evaluate the impact this pandemic, a study was designed and undertaken in 2001 to analyse how this disease had impacted on health service provision in Tanzania from a cost perspective.

Methods: The study involved a review of health service management information documents at selected health facilities in nine regions within mainland Tanzania, interviews with health service workers (HWs) at selected health facilities and health managers at district and regional levels as well as focus group discussions with people living with HIV/AIDS (PLWA).

Findings: We noted that on average, HIV/AIDS caused 72% of all the deaths recorded at the study hospitals. The health management information system (HMIS) missed some data in relation to HIV/AIDS services, including the costs of such services which limited the investigators' ability to determine the actual costs impact. Using their experience, health managers and HWs reported substantial amounts of funds, labour time, supplies and other resources to have been spent on HIV/AIDS preventive and curative services. The frontline HWs reported to face a problem of identifying the PLWA among those who presented multiple illness conditions at HF levels which means sometimes the services given to such people could not be separated for easy costing from services delivered to other categories of the patients. Such respondents and their superiors (i.e. Health managers) testified that PLWA were being screened and receiving treatment. HWs were concerned with spending much time on counselling PLWA, attending home-based care, sick-leaves and funeral ceremonies either after their relatives or co-staff have died of AIDS, lowering time for delivering services to other patients. HWs together with their superiors at district and regional levels reported increasing shortages of essential supplies, office-working space and other facilities at HF levels, although actual costs of such items were not documented.

Conclusion: The cost impact of HIV/AIDS to the health sector is undoubtedly high even though it is not easy to establish the cost of each service delivered to PLWA in Tanzania. As adopted in the present study, designers of methods for analysing impacts of diseases like this should consider a mixture of both quantitative and qualitative techniques. Meanwhile concerted measures are needed to improve health service record keeping so as enhancing data usability for research and rational management decision-making purposes.

Key words: *HIV/AIDS, poverty, burden-of-disease, cost-analysis, Tanzania*

Background

Human Immuno-deficiency Virus causing Acquired Immune Deficiency Syndrome (HIV/AIDS) is one of the major public health problems with adverse effects on the socio-economic development of many countries, especially the least developing ones mainly found in sub-Saharan Africa (SSA) and south-eastern Asia countries. [1] It is estimated that 15 million people in middle and low income countries live with HIV.

In SSA alone, AIDS related deaths by 2009 were estimated at 1.1 – 1.5 (on average 1.3) million among adults and children. [2] According to the World Health Organization (WHO) over 90% of HIV infections occur through heterosexual intercourse and the full blown AIDS is fatal. [3] The long incubation period of 2-10 years or more between HIV infection and the onset of AIDS have many implicit effects that are yet,

albeit difficult, to be fully analysed so as to determine their large scale cost implications. The resource requirements for controlling HIV/AIDS affect various sectors^[4], however, several country-specific studies have found inadequate crucial data on the costs of HIV/AIDS interventions at macro-level, therefore, limiting chances for rational policy and planning decisions.^[6]

HIV/AIDS can contribute to impoverishment through household asset depletion and income loss that cause consumption levels to fall below minimum needs.^[7-9] Household interactions with health services and the costs people and service providers do incur due to HIV/AIDS illness are also central to the performance of health care interventions, particularly their coverage and equity implications.^[10-11] Existing cost barriers and quality weaknesses can deter use of health services, particularly by the poor, so services can often be ineffective in reaching the poor and generate less benefit for the poor than the rich. Health services related to HIV/AIDS can also impose regressive cost burdens, with poor households spending a higher proportion of their income on health care than better-off households.^[11]

The immediate effect with long-term consequences of HIV/AIDS on human resources for health (HRH) is felt when such resources fall sick and eventually die, leaving little time for the health system to employ new/replacement personnel. Increased staff absenteeism due to sick leave or attendance of events related to HIV/AIDS such as funerals or escorting sick patients at home intensifies the workload to the staff remaining at the HF levels to provide services.^[12]

The United Republic of Tanzania is one of the SSA countries greatly affected by HIV/AIDS infections and its morbidity and mortality consequences even though the trend shows a remarkable decrease of the infections.^[2] In Tanzania, the first AIDS case was recognized in 1983 in Kagera Region where it has caused high mortality rates,^[3, 13-14] but by 1986, all regions of mainland Tanzania had reported HIV/AIDS cases. Moreover, recent simulated estimates by the National AIDS Control Program (NACP) indicate that until 2000, at least one out of five clinical cases were due to HIV/AIDS.^[15]

Since there is no free lunch in this world, the provision of healthcare services to HIV/AIDS patients in Tanzania, as elsewhere in the world, is undoubtedly resource consuming and costly. This is because of enormous amounts of time lost, human resource

workload and their remuneration when working on HIV/AIDS control programs, funds used to purchase fuel, pay for the maintenance of program vehicles and other physical materials e.g. procurement of medicines including antiretroviral (ARV) therapy and drugs for treating opportunistic infections, laboratory diagnostic supplies, condoms and their distribution, building new wards and offices to accommodate patients and staff, information education communication materials such as posters, billboards and leaflets, as well as expenditures on radio and TV programs as part of awareness and change behaviour campaigns, leave alone payment for utilities such as water and electricity bills consumed at health facilities. While the budget allocated for HIV/AIDS control programs pose a challenge as it displaces the amount of resources available for controlling other public health problems and for financing other development programs in other sectors of the economy, it has remained difficult to estimate the extra burden of the existing health services due to increased demand for treatment and care. This has, therefore, also made it difficult to establish how much of the resources the governments should prioritize and allocate in order to enable the over-stretched health services to continue to provide quality care.^[16]

So far, the contemporary published literature shows shortage of evidence on the cost impact of HIV/AIDS pandemic on health service provision in Tanzania and the evidence available seem to vary depending on the purpose of the evaluation/analysis conducted, characteristics of the population groups studied, disease conditions and types of health services and health provider accounted for, and period and areas in which the study was carried out. Previous estimates in Tanzania indicated that at micro-level, the cost of medical care for one case of HIV/AIDS to be regrettably high. Early analysis done in the 1980s indicate that the total cost to care for an HIV-infected adult in 1987-88 in Tanzania when both direct and indirect costs are included for low-cost sources was estimated at US\$2462, while the cost for using private sources was US\$5316. The indirect costs include appropriately discounted years of healthy life lost, based on wage rates available at the time.^[17] Meanwhile, provision of triple combination ARV therapy to HIV-positive adults in Tanzania would cost 51% of the GDP, according to one recent estimate.^[18] Other studies in Tanzania came up with estimated treatment cost per one AIDS patient amounting to US\$ 290 per adult case and US\$ 195 per paediatric case,^[19] and these are estimates for the patients admitted once. There are a few other evaluations indicating the types of costs of prevention

and treatment services with notable variations between patient cases and other conditions as highlighted above,^[20] but all of them reveal HIV/AIDS to have burdened the country's health sector and economic development at large.

Therefore, to add on and widen the evidence base regarding the economic impact of HIV/AIDS with particular focus on the health sector, the present study was undertaken in 2001 to assess the direct and indirect costs which the health workers (HWs) and public and private authorities running health facilities (HFs) had been facing in the provision of health services to people living with or at risk of HIV/AIDS in the mainland of Tanzania.

Study Methods

Study design, population and areas covered

This was a cross-sectional descriptive study undertaken in nine regions selected purposefully from different zones in the mainland of Tanzania. The regions include Arusha, Kilimanjaro and Tanga (Northern Zone), Dodoma (Central Zone), Kagera and Mwanza (Lake Zone), Kigoma (Western Zone), Mtwara (Southern Zone), and Iringa, (Southern Highland Zone). In each region, health facilities were identified using a multistage sampling approach so as to allow representation of different localities e.g. districts, divisions and wards (Table 1). The respondents targeted were the people living with HIV/AIDS (PLWA), HWs who were in the frontline of service provision at health facility (HF) levels among whom were those involved in home-based care. We also approached the members of health facility management teams, council health management teams (CHMTs) and health administrators who were engaged in HIV/AIDS control programs.

Table 1: Names of Study Regions and Health Facilities

Region	Level and Type of HFs	
	Hospitals	Government Health Centres
Arusha	Mt. Meru (regional), Arumeru (district), Selian (mission)	Mbuguni
Dodoma	Dodoma (regional), Mvumi (mission), Mpwapwa (district)	Hanadali
Iringa	Iringa (regional); Mafinga (district), Tosamaganga (mission)	Ipogolo
Kagera	Kagera (regional), Nyakahanga (district) Mugana (mission)	Bunazi

Table 1 continued

Kigoma	Mawenzi (regional), Kasulu (district), Kabanga (mission)	Kiganamo
Kilimanjaro	Mawenzi (regional), Same (district), Kibosho (mission)	Makanya
Mtwara	Mtwara (regional), Mkomaindo (district), Ndanda (mission)	Kitere
Mwanza	Sekou Toure (regional), Bukumbi (mission), Nansio (district)	Nyanguge
Tanga	Tanga (regional), Korogwe (district), Kwamkono (mission)	Maramba

Note: all regional and district hospitals are run by the government.

Data collection methods

A multidisciplinary team was involved in the investigation process and these include economists, sociologist, physicians, epidemiologists and health systems experts. Using both quantitative and qualitative assessment approaches, the team decided to focus on: how the increase in the number HIV/AIDS patient admissions increased bed occupancy rates and other consequential costs such as need to increase building space at HFs for accommodating HIV/AIDS services or office space; user fee exemptions offered to AIDS patients attending HFs; costs associated with the support given to HWs undergoing on-job training such as attending seminars or workshops; counselling and treatment services for PLWA and public/community sensitisation on HIV control.

Although the investigation team desired to collect data on the actual monetary value of the costs of the resources used by the health sector on HIV/AIDS related services, practically it was noted that measuring some of the costs in monetary terms was difficult due to the complex manifestations of HIV/AIDS. The complex manifestation of HIV/AIDS made the diagnosis of this disease difficult at lower health service levels such as dispensaries and health centres (HCs) where equipment and other facilities were poorly equipped or absent. Therefore, even keeping patients records at health facility level was reportedly problematic or less reliable. Therefore, based on the terms of references (ToR) for the present study given by the Ministry of Health (MoH), the team decided to put focus on the data that illustrated the direct and indirect resources actually used on HIV/AIDS related services rather than making simulations or projections since simulated data might not reveal the real world situation.

Four data collection tools were used involving focus group discussions (FGDs) with PLWA identified with assistance of management staff found at district and regional hospital levels. Quantitative financial related data as well as number of cases of the PLWA who were attended by the HWs were collected with the aid of a data collection catalogue comprising a mixture of closed-ended and open-ended questions prepared by the investigation team. The elements included in the cost assessment were related to materials such as medicines and supplies involved directly in the service provision, amount of money spent on service delivery including purchase of essential materials and the indirect costs including alternative productive time spent on HIV/AIDS services/program commitments, among others, and these were based on several assumptions (Table 2). In-depth interviews were also conducted and involved HWs involved in direct service provision at HF and community levels and administrators at HF levels, health managers and planners at district and regional levels.

Expenditures on building construction or maintenance, furniture and medical equipment were categorised as the capital costs as distinct from expenditures on other items that were categorised as recurrent costs. Cost of the variables assessed qualitatively are those that were difficult to quantify due to data shortages. In designing the costing protocol for this study, reference was made to the methodologies that were used in cost analysis previously done in Tanzania. ^[21]

Table 2: Summary of variables included in the analysis of costs of HIV/AIDS services

<i>Cost category</i>	<i>Types of study variables</i>	<i>Purposes of the analysis</i>
Direct Costs	Monetary values related to capital and recurrent expenditures on: medicines, office supplies, food, utilities such as water and electricity, transport costs for home-based care, mourning and funeral expenses, out-of-pocket money offered to PLWA, user-fee exemptions to PLWA, construction of buildings to accommodating sick PLWA, medical equipment for diagnostic and surgical procedures, chemical reagents. These medicines and kinds of treatments given to the patients presenting AIDS related illness complexes (ARC) as recorded in most patient registers and sometimes on patient cards even without confirmatory screening tests were included in the cost estimations.	To identify particular resource items contributing much to the HIV/AIDS related services

Table 2 continued

	Time lost by the service providers/ HWs and HF management in general for the activities related to care provision to PLWA. The resource requirement for services other than those target the PLWA or for other developmental affairs that end up being consumed/allocated for the needs of PLWA	The assumption was that the time spent on HIV services is an opportunity cost to other services that are not provided within the same range of time; the consequential effect on the service providers' time lost for productive and leisure time, and the alternative areas where the resources lost would have been allocated
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Data analysis

Quantitative data were analyzed using MS-Excel program for large data sets and scientific calculators for simple data computations. Qualitative data were analyzed manually and this was made possible by first of all undertaking formative transcription followed by coding procedures immediately after data collection to allow for expanded translation later for the final report. However, several statements were quoted verbatim as they were given by the respondents/discussants. The official exchange rate used in the cost estimation/computation of the cost was US\$1 = 900 Tanzanian shillings (TSH.) at market prices by year 2001 and US\$1 = TSH. 757.58 in 2000.

Three HCs were found not having proper systematic data for the HIV related TB patient screening services. Like in the case of HIV tests, the total number of TB tests at lab levels and the associated costs were determined by the rate at which the victims presented their cases to the HC for medical check up and treatment. There was a general lack of records/data on the actual monetary budgets set and expenditures made for HIV/AIDS services. The health management information system (HMIS) registers found at HCs did not contain HIV diagnoses. Even at several hospitals, information on patients' HIV sero-status was only confined to counsellors, therefore, making it difficult to establish the actual number of HIV/AIDS cases diagnosed and the associated services. This deficiency in data might be contributed by the high stigma among some of the HWs to disclose the personal information of the PLWA. ^[22]

Ethical considerations

The study was approved by the MoH where it originated and certified by the office of NIMR Director General. NIMR is a Parastatal Organization under the MoH established by the Act of the Parliament Number 23 of 1979 with the mandate of carrying out, monitoring, evaluating and executing health research on behalf of, and advising the MoH and the Government of the United Republic. All the regional, district and health facility level participants were given adequate information about the study before they accepted to participate.

Results

Quantitative findings

Cost of buildings established to accommodate HIV/AIDS services

Since the beginning of 1990, the Bukoba Regional Hospital and district designated hospital (DDH) of Karagwe had constructed new wards for accommodating an increased number of HIV/AIDS patients. Also, four district hospitals had to renovate rooms previously laid idle for accommodating PLWA when they were admitted. Meanwhile, two other district hospitals had reallocated some rooms to accommodate new services for HIV/AIDS patients. The respondents from all the nine regional hospitals confirmed their experience with increased need for laboratory and counselling services for PLWA, therefore, requiring new service delivery spaces. At each of the study hospitals it was reported that special rooms had been prepared/allocated for HIV/AIDS related counselling activities that did not exist before. Unfortunately, lack of proper financial recording system at most of the HFs made it impossible to establish the total monetary expenditures actually made to acquire the new service delivery spaces as the accounts data could not be traced by the research team. It was also impossible to obtain a list of inventory of the materials used based on which the financial costs were estimated using official price catalogues and local market prices.

Costs associated with deaths of the employees

A documentary review indicated that proportionately the HWs dying of HIV/AIDS accounted to an average of 72% of all HWs' deaths having occurred at several hospitals (Table 3). In particular, 100% of all staff deaths recorded at district hospitals of Nyakahanga, Nansio, Same and Arumeru, 74% of similar deaths recorded at Mafinga and Korogwe hospitals and 85% of all staff deaths recorded at Mkomaindo hospital during 1998 were associated with HIV/AIDS.

Costs of patients admissions

In all the districts studied, it was generally testified that there had been an increase in the diagnosis and admissions of the suspected HIV/AIDS infected patients that consequently increased workload to the existing HWs. Between 1996 and 2000, records indicated that the proportion of HIV/AIDS related admissions at all the nine regional hospitals increased from 4.4% in 1996 to 6.8% in 1998 up to 7.2% in 2000. The estimated lengths of stay by HIV/AIDS patients in hospitals varied between hospitals, HCs and regions and the varying lengths of stay and types of the services delivered had cost implications. While the average length of stay (in this case defined as the bed occupancy period) for non-HIV/AIDS patients was 5 days, the average length of stay of HIV/AIDS patients at regional hospital and at faith-based (mission) hospitals was 25 days and 18 days, respectively. Thus, at each of these HFs, the ultimate cost would depend on the nature of the services delivered to the patients concerned. According to reports from several clinicians involved in this study, the length of stay for HIV/AIDS patients ranged between 12 and 60 days in Mwanza and Kigoma Regions, respectively, and this was considered burdening given the need for beds by patients presenting with other serious illness conditions.

Costs of time and money spent on counselling and laboratory services given to PLWA

The number of nurses at all HFs studied was lower than required for optimal delivery of the services. Therefore, the counselling services remained an activity of a few nurses who had received special training on counselling services to PLWA. Only a few respondents could estimate financial amounts they had personally spent on counselling services. The highest monthly average expenditures estimated to have been spent by the district hospital staff out of their pockets to support PLWA was US \$ 11.1 at Mafinga Hospital in Iringa, US\$ 3.3 at Same Hospital in Kilimanjaro, and US\$ 2.2 at Arumeru Hospital in Arusha. Until the end of the data collection process, the actual budget spent by the employers and collaborating/sponsoring agencies to organize seminars or workshops related to HIV counselling services was not obtained as they are centrally kept, but as discussed this depended on the number of workshop/seminar participants and the resources required for meeting writing, foods, drinks, communication, transport, accommodation, tutorials and other expenses.

As experienced by the respondents at HF levels, the counselling services consumed a considerable time for attending other patients and other official duties at HF levels and compromised provision of quality of health services in general. The extra time lost on counselling services cost the frontline HWs who were not compensated for, it was lamented. At seven district hospitals where the HWs recalled, the average time for counselling one client was estimated to range between 30 minutes and 2.25 hours. However, it proved difficult to realistically measure average opportunity cost of time spent on counselling services as the counsellors failed to recall the exact number of the clients they had attended. But if the counsellors were known for the health sector as a whole, this average time could be used to compute the estimated amount of the total time lost on counselling services and given records on the salary scales of the staff concerned, then it would have been possible to come up with a realistic figure indicating how much of the counselling time lost costed the health facility runners and overall health sector.

Official records on workdays lost by staff attending other HIV/AIDS related events

A review of district hospital records indicated that HWs spent a larger proportion of their official working hours or days attending HIV/AIDS related occasions such as taking care of PLWA who were sick or attending funeral and mourning events in case of death of their co-workers or close relatives. While activities such as staff attending HIV/AIDS related workshops consumed 4% of the officially absent days, the remaining 96% of the time was scored by their attendances to burial or funeral occasions. On the other hand, the officially recorded days of absenteeism at work at faith-based hospitals within the years 1990 – 2000 were proportionately more for their participation in funeral events than on HIV/AIDS workshops or seminars. Specifically, the average annual staff absent days on other usual duties due to their devotion on HIV/AIDS related services in 1990, 1996, 1998 and 2000 were estimated to be 69.3, 80.6, 105.9 and 112 in days, respectively. Given the fact that still the duty absent staff were being paid their monthly salaries in full amount, the loss the government and other employers were incurring for paying the staff for the unproductive hours was regrettably enormous and this could be justified by taking the total number of official hours lost over the total number of official working hours required per day for the specified period of time e.g. a day, week, or month, etc., times each employee's

monthly salary (data not shown as this was not computed in this study).

Cost of screening voluntary blood donors for HIV Status

In all nine regional hospitals visited, cost of screening for HIV among the blood donors increased within 10 years period between 1990 and 2000 (Table 4). However, the reported cost per person varied at different hospital levels. Data combined for all regions indicated the average cost of screening one person to be US\$ 2.8 in 2000 while the overall hospital cost increased almost two-fold from US\$ 2,222.22 in 1990 to US\$ 4,222.22. It is noteworthy that records keeping varied significantly among hospitals. Total cost of screening blood donors for HIV depended on the total number of blood donors screened at each study hospital and the respective year's market prices. No specific trend in screening costs was observed because the number of people who volunteered blood donation varied within a year and between years.

Cost of screening patients for TB associated with HIV infection

It was noted that between 1984 and 2000, TB cases diagnoses increased from 12,000 to 55,000, of which 60% were associated with the increasing trend of HIV/AIDS, especially at regional hospital levels. Costs of screening TB patients since 1990 have been rising whereby the annual average total cost of per TB case detected at one hospital's laboratory and x-ray departments was US\$ 23.3 and US\$ 62.2 in 2000 .

At all the district and faith-based hospitals, the cost per one TB laboratory test if the standard government guidelines were strictly adhered to at all the government HFs was estimated at US\$ 0.56. Of course, the annual total cost incurred by such hospitals for this type of service depended on the number of people presenting their cases at the hospital for treatment. Some district hospitals had screened more patients than others.

Costs of drugs prescribed to HIV/AIDS patients at district hospitals

Data on this study component were obtained from 5 hospitals only (Table 5). The average direct cost of drugs prescribed to staff infected with HIV/AIDS also varied between hospitals and between the patient wards in the same hospital in 2000. At the medical wards, the average cost ranged between US\$3.3 at Mkomaindo Hospital to US\$33.3 at Nyakahanga Hospital. In the surgical wards, the average drug cost per staff ranged

between US\$3.3 at Mkomaindo Hospital and US\$72.2 at Nyakahanga Hospital. In the paediatric wards, the average drug cost per staff ranged between US\$5.3 at the Same Hospital and US\$18.7 at Nansio Hospital. The average drug cost prescribed to patients who were not members of staff at the study district hospitals was determined based on the types of the hospital wards in

which the patients were being admitted. The costs were US\$ 17, US\$ 35 and US\$ 11.7 for medical, surgical and paediatric wards, respectively, in 2000. Based on the few data obtained, the average cost of drugs prescribed per staff living with HIV/AIDS and costs associated with their transport and burial expenses (all in TSH) are also indicated (Table 5).

Table 3: Health workers who died of HIV/AIDS related causes at district hospitals

(a) At district hospitals (N = 9)				
Item/Year	1990	1991	1998	2000
Number of districts with records	5	7	8	7
Deaths due to causes other than AIDS	2	17	22	20
Deaths due to HIV/AIDS	1	10	18	15
(b) At regional hospitals (N = 9)				
Sick leave	-	5	8	11
Deaths due to all causes	6	24	34	27
HIV/AIDS deaths only	4	15	18	19

Table 4: Direct cost of screening voluntary blood donors for HIV/AIDS in US\$ (Exchange Rate: US 1 = TSHS. 900 in 2001) at selected District Hospitals

Name of District	1990		1996		1998		2000	
	Tests	Cost	Tests	Cost	Tests	Cost	Tests	Cost
Nyakahanga	782	2,172.222	659	1830.556	2311	6,419.444	938	2,605.556
Nansio	-	-	580	1,611.11	618	1,716.67	765	212.5
Arumeru	-	-	-	-	-	-	-	-
Kasulu	364	202.22	215	119.44	1024	568.89	1339	743.89
Same	148	411.11	210	583.33	1060	2,944.44	746	2,072.22
Mpwapwa	-	-	-	-	344	191.11	1339	743.89
Mafinga	227	630.55	223	619.44	469	13028.33	914	2538.889
Korogwe	-	-	-	-	1199	3,3330.56	946	
Mkomaindo	-	-	477	1,325	1043	2,897.22	1113	2,627.78

User fee exemptions at hospital levels for HIV/AIDS patients

At Mugana Hospital, the total value of the exemptions granted to PLWA ranged between half a million in 1996 and about a million in 2000. At the Bukumbi Hospital, the exemptions amounted between US\$38.3 in year 1990 and US\$1,071 in 2000. The highest amounts of exemptions were noted at Kibosho Hospital and ranged between US\$1380 in 1990 and US\$24,722 in 2000.

Other costs faced by HWs dealing with increasing HIV/AIDS patient attendances

As for services related to counselling in 1996, Nansio Hospital recorded US\$ 425 while Same Hospital recorded US\$ 1,323. Also in 1996, annual expenditure on condom distribution ranged between US\$ 72 at Nansio Hospital to (US\$ 1,667) at Nyakahanga Hospital, while IEC materials cost between US\$ 145 at Nansio Hospital and US\$ 1,667 at Nyakahanga Hospital. Meanwhile, the expenditure on workshops and seminars in 2000 ranged between US\$ 1,011 at the Mafinga Hospital and US\$ 3,821 at Mkomaindo Hospital (Table 6).

Table 5: Average drug cost in US\$ per HW treated for HIV related illnesses in year 2001 (Exchange Rate: US\$1 = TSHS. 900) at selected district and regional hospitals

Name of District Hospital	Medical Ward	Surgical Ward	Paediatric Ward
Nyakahanga	33.33	72.22	11.11
Nansio	24.27	25.89	18.67
Kasulu	11.11	36.67	-
Same	11.03	-	5.34
Mkomaindo	3.33	3.33	-

Table 6: Other direct costs borne by district hospitals in US\$ on staff with HIV/AIDS (Exchange Rate: US\$1 = TSHS. 900 in 2001)

Details/Year	1990	1996	1998	2000
Average cost of medical care	35.78	46.06	190.5	67.68
Average cost of transport of the deceased for-burial	4.17	32.98	148	270.83
Average cost of funeral/mourning, exemption from user charges, etc.	10.82	93.78	172.63	194.09
Average Total Cost (in general)	16.92	57.60	173.83	177.53

The cost of increasing drug prescriptions due to increased HIV/AIDS related opportunistic infections increased at faith-based hospitals. Between 1990 and 2000, the cost of drug at the mentioned hospitals indicated the following ranges: US\$ 709 – US\$ 2163 at Bukumbi Hospital; US\$ 1,513 – US\$ 22,831 at Kabanga Hospital; US\$ 13,075 – US\$ 22,402 at Kibosho Hospital; and US\$ 3,601 – US\$ 54,444 at Selian Lutheran Hospital. Nurses and clinical staff working routinely at health facilities reported acute shortage of gloves, disinfectants and other protective gears both in the laboratory and in the patients wards.

Qualitative Findings

Perceived direct recurrent costs associated with HIV/AIDS problems

Participants in FGDs and interviews expressed their concern about the cost burdens to the MoH and other employers running health facilities and donors partnering with the government in HIV/AIDS control programs considering the relief given to the deceased's families to meet some expenses related to mourning, transport of the deceased bodies and other burial related expenses. The other issue raised was

about the individual patients who presented unknown disease conditions or the individuals who volunteered to donate blood or expected married couples having to undergo screening to confirm their sero-positive or sero-negative statuses. Also, reports were given regarding new wards having been constructed or new buildings having been established to create additional spaces for accommodating patients and counselling services in relation to HIV/AIDS services.

Opportunity cost of time lost on HIV/AIDS services

Also, concerns were expressed regarding length of days AIDS patients spent in the wards as this limited the space for accommodating other kind of patients, leave alone the burden to service providers due to food and utilities used to keep the patients. Participation of HWs in AIDS control activities was interrupting their participation in other health services, making the delivery of such services sub-optimal and increasing staff workload. The frontline HWs considered themselves being at risk in their work when dealing with HIV/AIDS patients and such a feeling had definitely immeasurable psychological cost to the staff concerned and probably their close relatives.

Regarding counselling, it was expressed by the respondents that during counselling sessions, some clients had no money for transport (fare) back home or for buying drugs and/or other basic needs, as validated by at least two of the statements given:

Some patients complain to have no money to afford a kilo of sugar at the current price of TSH 700 (US\$ 0.8). Others complain to have no money to afford coming to the hospital for basic treatment. Imagine, how many people of this type do we meet every month? (A counsellor at Kagera Regional Hospital 'Bukoba').

“On several occasions you can be working and suddenly you get a message that one of the clients you have been counselling and attending in home based care has died and you are asked to attend his funeral as eventually you have already been regarded as a relative of the deceased and his family. What follows is to ask for permission at work and if approved you attend at least the burial event, but the cost of transport and burial or funeral contributions is up to you” (A FGD participant, Kagera Regional Hospital, Bukoba. Similar experience was shared by the study participants found in the rest of the districts/regions).

On average each counsellor at several hospitals reported to have been spending US\$ 8.6 per month

out of their pockets as help to PLWA during their counselling duties.

As revealed by all the stakeholders at hospital, district and regional levels, transporting either the seriously sick patients back home or the deceased bodies for burial purpose consumed much time of the accompanying employees and this was a loss to the employers. Home-based care for PLWA consumed many hours. Frontline HWs confirmed sick leaves or exemption from duty having been offered to either the HIV/AIDS staff who fell sick or staff who attended their relatives who were HIV/AIDS patient, or when the staff had to attend funeral and mourning events when their fellow staff or close relatives died of AIDS (Figure 1).



Figure 1: HF-based HWs' experiences with the indirect costs incurred on participating in HIV/AIDS services or other events in 9 regions, Mainland Tanzania

Discussion

Impact on counselling services, staff workload and quality of care

Cost analysis is an important step towards determining the economic feasibility of any development program and this is a fact whether the cost is: directly or indirectly measured, real or just perceived, because each of these has a consequence on the successful implementation of the program in question. The concerns expressed by the HWs regarding the time and financial costs faced during the counselling services to PLWA are an alert to their employers, and Ministry of Health to compensate the HWs accordingly. Similarly, a recent study of knowledge, attitude and practice of frontline HWs in Tanzania found that 72% of the respondents

perceived of their jobs to be at great risk of HIV/AIDS infections. [22] With low working morale due to uncompensated overtime working hours, a feeling of demoralisation among the workers is likely to remain. This has negative consequences since it undermines the quality of the services given to PLWA and other patients visiting HF's. Experts have warned that increasing HIV/AIDS patients at health facilities may decrease access for patients with other chronic conditions and already anecdotal evidence indicates that HIV+ patients in some SSA countries are being turned away from health services due to high demand for services and a sense of 'not being able to do anything'. [16] However, any attempt to motivate such workers should be coupled with a strict monitoring system to avoid the dishonesty workers use HIV counselling services as an opportunity for forging for the compensational benefits they do not deserve. How and where to raise additional resources to support the improvement in the delivery of HIV/AIDS related services under the contemporary under-funded budget situations is, of course, another challenge.

Burden of user-fee exemptions

The government policy recommends health service user-fee exemptions for PLWA among other vulnerable groups. [24] It is interesting that in conformity to the latter policy, several HF's showed records on the amount lost as user-fee exemptions for PLWA. However, relying on mere advocacy for exemptions is not enough given the current and possibly future trend in the number of PLWA since it may reach a time when the granting of the exemptions to all the patients presenting at HF's gets next to, if at all not, impossible. This could be possible if there were effective mechanisms in place to ensure that the service providing agencies are fully compensated for the service delivered for free to PLWA, both at public and private clinics. However, the government has insisted that this should be made possible through proper arrangements within local government councils between health service providers and council executive directors in consultation with community leaders in the local settings. [25]

Impact on essential supply requirements and equipment

Leave alone the issue of supply of the anti-retroviral (ARV) drugs including the highly active antiretroviral therapy (HAART) that was not explored in details because the program on ARV had not yet been common throughout the country as well as the transport costs for ambulatory services and major surgical procedures

that were also not adequately explored, the present study reveals concerns by the service givers with shortage of protective-materials such as gloves and disinfectants when dealing with PLWA at HF levels. This is a challenge to the health system and policy making bodies that have always been emphasising the need for ensuring that service providers are adequately equipped with the working facilities in order to deliver quality care. Moreover, the HIV trend seems to have increased the need for more building spaces for services at all the HF studied. This implies that the health system was more likely to tune itself to relocate the resources previously allocated for other development needs. This observation is validated by observations from other studies indicating that there has been an increasing demand for health services (such as drugs, gloves, protective clothing and medical equipment) as a result of increasing trends of HIV infections, hence this having had increased pressure on resources in the already under-funded health systems. ^[12, 16, 26-27]

Un-quantified direct and indirect costs

It is shown by the present study findings that a number of cost related issues or concerns has been discussed by the respondents more in qualitative manner than in quantitative terms, therefore, limiting the ability of the evaluation team to establish evidence on the actual cost burden of HIV/AIDS services to the service providers and the health sector at large. The study also reveals the inherent critical problem of data shortages in the HMIS based on the documents reviewed at health facility level in which routine service records are supposed to be documented. ^[28-30] It seems that not all the information on HIV/AIDS patients and intervention programs had been documented. This is a fact as observation from other African countries has confirmed: for instance, according to Guthrie ^[16] the challenges of costing the impact of HIV/AIDS services arises from the fact that, "HIV infection is not a notifiable disease in many African countries; many countries do not conduct routine voluntary HIV testing on patients; HIV infection presents a syndrome of many infections and illnesses requiring confirmatory tests which unfortunately are not always carried out at most healthcare facilities; costs in the later stages are obviously greater than in the earlier stages although this is almost never analyzed separately; and costs of HIV/AIDS services per se are difficult to separate from general health service costs due to little information available.

Methodological limitations of the present study

Although the deficiencies in the data collected due to limited health service information recording system at HF levels do not imply that the present study findings are irrelevant, they lower the chance for generalizing the data on a national level. Since on average only 4 days study spent for collecting the data at each HF limited the chances for mobilise all the documents from various departments. In the background section of this paper references was made to a number of estimates made by different agencies indicating different average cost per treatment of a single AIDS case. In fact, the actual costs of providing health services to PLWA are likely to differ from one service provider or place/locality to another. The costs may also vary across a range of services given to patients who are at different stages of disease progression, ^[10] leave alone the different methods or variables sometimes used in different evaluations to estimate the costs. ^[16, 31-34]

Also, the present study has not covered the issue of cost of recruiting new staff to replace the lost ones and training the existing staff to offer the desired services in a better manner while this can be counted as an essential component of the ongoing HIV/AIDS service intervention programs. As pointed out by other authors, ^[12, 35] replacing staff or recruiting new ones to add to the existing AIDS control program has been one of the critical areas where the HIV/AIDS pandemic has impacted, although data from different countries is still needed. Furthermore, the present study did not capture information related to the cost to the health sector as a result of indirect expenditure caused by increased demand for social security grants, higher hospital bed occupancy, medicines for opportunistic infections, TB and sexual transmitted diseases associated with HIV/AIDS, etc. which as suggested by other authors, are very important to know. ^[16] Research is an essential strategy towards making a wider evidence-base possible, hence funding agencies should prioritise research in this area as part of HIV/AIDS control programs.

Methodological strengths of the present study

Something is better than nothing since despite the noted data deficiencies, our study applied the methods designed purposely to determine the actual cost data documented by the frontline HWs or program officers or as recalled by the respondents based on their experiences.

This is great since simulated cost models usually use a few data sets available to estimate or project the 'expected or likely-to-be' events and their possible costs. The quantitative methods used in this study are simple to use and interpret and can be replicated by other evaluators in the future without necessary need for an economist. The use of qualitative and quantitative methods and a multi-disciplinary team of researchers is key in relation to triangulating the findings from different sources in addressing the challenges of collecting data in developing countries like Tanzania for the possibility of their use in rational planning. [36-39]

Conclusions and recommendations

This study provides additional evidence confirming that HIV/AIDS has costed the health sector both in micro and macro terms. As reported, HIV/AIDS has posed costs to individual patients (PLWA) and their families/caretakers and to service providers. It has reduced HWs' ability to work effectively in the provision of health services to other categories of the patients attending HFs, therefore, increasing the health risks to the patients who miss the desired services or who receive sub-optimal services, increasing expenditures on preventive and curative services which cost the government, development partners (including donor community) regrettably. Since identification of the problem is an important step towards solving such a problem, it can be commented that the scantiness of the HF based data calls for the need for improved documentation of the service and costs data in the national HMI system (HMIS) in relation to HIV/AIDS. However, the information recorded should be transparently shared across agents and sectors or departments either involved in the control of HIV/AIDS or program evaluation. Applying community-based demographic and disease surveillance systems at district levels and compiling the reports at national level would help increase the database on the burden of HIV/AIDS pandemic. At national level, there is still a lot of cost information needed so as to contribute guiding the government health budget policy decisions, particularly the information relating to such activities as social marketing, training of trainers and peer and risky groups, support to micro-projects led by non-governmental organizations in fighting HIV/AIDS, creation and strengthening of disease surveillance units and the like, as has been done in Chad. [5]

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Authors Contributions

All the listed authors participated in the design and implementation of the study. GMM (PhD) executed the economic analysis component of the study, made the first draft of this MS, and worked on comments from the rest of the co-authors. AJM (MD, PhD) coordinated the study under assistance by EAM (PhD Cand.) who executed the sociological components of the study. MNM (PhD) and Prof. KP (MD, PhD) were the principal investigators who oversaw the overall study to ensure its successful implementation.