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The costs of HIV/AIDS care at government hospitals in Zimbabwe

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According to official figures, HIV infection in Zimbabwe stood at 700 000–1 000 000 in 1995, representing 7–10% of the population, with even higher expected numbers in 2000. Such high numbers will have far reaching effects on the economy and the health care sector. Information on costs of treatment and care of HIV/AIDS patients in health facilities is necessary in order to have an idea of the likely costs of the increasing number of HIV/AIDS patients. Therefore, the present study estimated the costs per in-patient day as well as per in-patient stay for patients in government health facilities in Zimbabwe with special emphasis on HIV/AIDS patients.

Data collection and costing was done in seven hospitals representing various levels of the referral system. The costs per in-patient day and per in-patient stay were estimated through a combination of two methods: bottom-up costing methodology (through an in-patient note review) to identify the direct treatment and diagnostic costs such as medication, laboratory tests and X-rays, and the standard step-down costing methodology to capture all the remaining resources used such as hospital administration, meals, housekeeping, laundry, etc.

The findings of the study indicate that hospital care for HIV/AIDS patients was considerably higher than for non-HIV/AIDS patients. In five of the seven hospitals visited, the average costs of an in-patient stay for an HIV/AIDS patient were found to be as much as twice as high as a non-HIV/AIDS patient. This difference could be attributed to higher direct costs per in-patient day (medication, laboratory tests and X-rays) as well as longer average lengths of stay in hospital for HIV/AIDS patients compared with non-infected patients. Therefore, the impact on hospital services of increasing number of HIV/AIDS patients will be enormous.

Introduction

The spread of HIV and AIDS in Zimbabwe started in the early 1980s but was only significantly noticed in 1986. In mid-1995 the Ministry of Health estimated that the figure of HIV infection stood at 700 000–1 000 000, representing 7–10% of the population (NACP 1995). In addition to this, a cumulative total of 52 000 AIDS cases had been reported by the end of 1995. More recently, it has been projected that in the year 2000 there would be 1.8 million HIV-infected individuals in the country and the number of deaths due to AIDS would be 124 000 (NACP 1999). A study on the demographic impact of HIV using various mathematical modelling techniques projected that by the end of the 1990s the HIV prevalence among males in the 15–49 age group would reach 25%, with prevalence in women a little lower (Gregson et al. 1996). Further, due to increased mortality, life expectancy at birth was projected to decrease from 55.3 and 58.6 years in 1986 to 30.4 and 31.7 years by year 2006 for males and females respectively.

The impact of the HIV epidemic on the health care sector will be severe since it will be faced with steeply increasing demand for care. Adding to the pressure on the public health services are the diminishing resources allocated to health care. It has been estimated that the real per capita recurrent spending has fallen by almost 40% from financial years 1990/91 to 1994/95 (Chisvo and Munro 1994). Further, there may also be a loss of skilled staff in the health care sector itself due to increased HIV/AIDS related morbidity and mortality. In this situation of dwindling resources and increasing demand, information on costs of the treatment and care of AIDS patients in health facilities is necessary in order to have an idea of the likely costs of the increasing

number of AIDS patients. Furthermore, information on hospital costs can be compared with other possible alternatives such as home-based care for HIV/AIDS patients.

Recognition of the need for costing information for planning purposes is reflected in the growing number of published studies on hospital costs in developing countries, including those in Africa. In most cases, the published studies have estimated the average costs per in-patient day or per in-patient stay in hospital regardless of the diagnosis of the patients. For instance, Mills et al. (1993) estimated the average costs per in-patient day and per in-patient stay in a number of district hospitals in Malawi and found that these costs varied between the district hospitals. Further, Barnum and Kutzin (1993) reviewed a number of hospital cost studies in developing countries of which four were done in African countries. Average cost estimates varied considerably from country to country, which was largely attributed to differences in the per capita gross national product (Barnum and Kutzin 1993).

However, the above-mentioned studies did not pay special attention to the hospital costs of HIV/AIDS patients. In general relatively little related to the costs of hospital care of HIV/AIDS patients in Africa can be found in the existing literature (Scitovsky and Over 1988). Further, Boerma and Bennett (1997) described HIV prevention and AIDS care in districts in Tanzania, but no hospital treatment costs were included. As an exception to this, a study in Malawi focused on the hospital treatment costs (including drug, investigation and staff costs) of children assigned with a diagnosis of 'probably/possibly AIDS' as compared with children not believed to have AIDS (Nelson et al. 1995). The group of children with clinical AIDS had on average 48% higher treatment costs than all other children.

While research on the costs per in-patient day and per in-patient stay has been carried out for a small number of hospitals in Zimbabwe (Hongoro 1995), no study in the country has put special emphasis on estimating the hospital costs of HIV/AIDS versus non-HIV/AIDS patients.

Objectives

The purpose of this study was therefore to determine the costs of hospital care for HIV/AIDS patients and non-HIV/AIDS patients at hospitals at every level of the referral system in order to be able to compare these two patient groups. It was decided to determine for each of the two groups the costs per in-patient day, the average length of stay and the total costs of an in-patient stay.

Methodology

Study type

The study was exploratory and analytical, estimating the average costs per in-patient day of in-patients, with special emphasis on HIV/AIDS patients in hospitals at the secondary, tertiary and quaternary level of the referral system for the financial year 1994/95, but updated to the beginning of 2000.

Sampling

Of the more than 200 hospitals in Zimbabwe, seven were purposively selected for the costing analysis. These included two central hospitals (quaternary level), two provincial hospitals (tertiary level) and three district hospitals (secondary level), of which one was a mission hospital but had been designated as a district hospital. At each hospital, 2–3 male and female medical wards were visited to collect costing information; a total of 16 medical wards were included in the study. Only medical wards were included since HIV/AIDS would mainly be treated in this type of department. From the admissions register at each study site, 25 sets of patient notes were randomly selected for each study ward in order to obtain further costing information. In other words, a sample consisting of 400 in-patient notes was aimed at.

Data sources and collection

Data collection at each hospital took, on average, three days. Cost data as well as statistics on activity (admissions, in-patient days, outpatient visits) were gathered. Information on the recurrent costs could be found in the financial statement of the hospital which specified by vote how much had been used for medical and surgical supplies, bedding and linen, provisions, printing and stationary, vehicle hire, etc. An estimate of the percentage of each vote used for strictly hospital activities was obtained through discussions with the hospital administrator. Salaries for the personnel working in the individual hospitals did not appear in the financial statements since salaries for all personnel are paid and administered centrally in the capital Harare. Therefore, at each hospital, type and grade of all staff members were recorded, and using the government salary scale, the total salary bill could be calculated. Some of the hospitals in the sample also had university doctors and mission staff on their establishment. It was then assumed that their salaries corresponded to a government employee of the same type and grade. Hospitals were supervised from the Ministry of Health, Head Office, and in the cases of provincial and district hospitals, also from the Office of the Provincial Medical Director. Attempts to measure the costs of supervision were not made.

In addition to these recurrent costs, the capital costs of this study comprised buildings, equipment and furniture. Details of the size, structure and type of individual hospital departments were listed during the visit and a quantity surveyor was hired to estimate how much it would cost to build a department or a building of this specific type today (replacement costs). Information on the model and type of equipment and furniture by department was retrieved from the Master Assets Register while the prices of these items were found through various suppliers (for instance the Central Purchasing Authority within central government). Since the usefulness of these capital inputs extended over several years, the replacement costs were allocated over their expected life span. These cost items were annualized using a 5% real discount rate and a 20-year life span for buildings (as recommended in cost manuals such as Creese and Parker 1994), 7 years for equipment and 10 years for furniture. The 5% real discount rate corresponded to the average real interest rate in

the money market on assets such as treasury bills and bank deposits in the past 4 years in Zimbabwe (Central Statistical Office 1997). All vehicles, including ambulances, did not belong to individual hospitals but were owned by another government department, which charged hospitals according to total mileage. The rate per kilometre charged to hospitals incorporated all running and capital costs of a vehicle.

Average cost estimation

In most instances, the cost information described above was available only on an aggregate basis for the hospital as a whole and not by department. Since the objective of the study was to calculate the costs of an in-patient day for an HIV/AIDS patient in medical wards, it was necessary to identify from these aggregate data all resources used by individual medical wards to provide their services. The methodology used to estimate the average costs per in-patient day was a combination of two different approaches: (1) standard step-down costing methodology, and (2) the bottom-up costing method. The latter was used to estimate the direct treatment and diagnostic costs such as drugs, laboratory tests and X-rays while the former captured the costs of the remaining resources used. These two methods are described below.

Step-down costing methodology

As described in Drummond et al. (1987), the ultimate purpose of applying the standard step-down costing methodology was to allocate all the costs of running a hospital to departments providing the final output of the hospital: direct patient care in wards and outpatient departments. Departments like hospital administration, kitchen, pharmacy and laboratory were not directly involved in patient care but provided necessary services to the patient care departments. The costs of running these departments were therefore allocated to the patient care departments in a stepwise fashion as follows. Hospital departments were divided into three categories. Overhead departments, including for instance administration and kitchen, provided services which were not of direct medical benefit to patients but were nevertheless necessary to allow the hospital to function. These departments served all hospital departments and were therefore placed first in the step-down procedure. Support departments enabled the medical care process to take place, by, for example, supplying drugs (pharmacy) and providing diagnostic services (laboratory, X-ray department). This category of departments did not provide any services to overhead departments and were therefore placed at the second stage in the step-down procedure. The third type, final service departments, provided treatment services directly to patients. In contrast to support and overhead departments, these patient care departments did not serve other departments and were consequently placed at the last step in the step-down procedure.

The standard step-down costing methodology was applied in the conventional way (Drummond et al. 1987). Described briefly, the first step involved allocating hospital level recurrent and capital costs to individual departments using allocation criteria reflecting actual resource use. The second step allocated the costs of running overhead departments to support and final service departments. In the third step, the costs of running support departments were allocated to individual final service departments.[1]

It was noted that the overhead departments received services from each other in a simultaneous manner. Therefore, before commencing to step two in the methodology, this problem was dealt with by applying a simultaneous cost allocation method for the overhead departments (Drummond et al. 1987). This involved solving a set of inter-related equations using a computer spreadsheet.

At the end of this procedure the full costs of providing individual patient care in the selected medical wards were arrived at (except the treatment and diagnostic costs which were added after estimation using the bottom-up costing). By virtue of the step-down costing methodology, these costs included a portion of the costs of all overhead and support departments reflecting usage as well as costs of resources related directly to an individual ward, such as the attached personnel. The full costs per in-patient day in a medical ward could then be calculated by dividing the costs by the number of in-patient days in a year for that ward.

Bottom-up costing

The aim of the bottom-up costing methodology was to capture the direct treatment costs such as drugs, laboratory tests and X-rays. For each study department, a random sample of 25 patient notes was retrieved from the medical records department. In some cases sets of patient notes could not be found so the total sample ended at 308 sets for all hospitals. Each individual set of patient notes was examined and information on the consumption of drugs, number and type of laboratory tests and X-rays were recorded as well as the length of stay. The direct treatment could then be costed using price lists from the Government Medical Stores and *The Relative Value Schedule* (published by the National Association of Medical Aid Societies of Zimbabwe and used by the private sector to charge patients for various laboratory tests and X-rays). It should perhaps be mentioned that antiretro-viral drugs were not available in the public sector.

The diagnosis of HIV/AIDS hardly ever appeared in the patient notes due to the stigma attached to this disease in Zimbabwe. Examining these notes, a clinician of the research team assessed the HIV status of the patients based on clinical indicators (i.e. the presence of Kapozi Sarcoma), hints and euphemisms used by the doctors (such as immunosuppression). Independently, an assessment of the HIV status of the patients in the sample was made by one of the doctors in the particular hospital who had, therefore, in many cases attended to these patients. These two assessments proved to tally in the majority of patients reviewed. In cases where there was no consensus, it was decided to utilize the diagnosis assigned by the former in order to maintain a degree of consistency among the hospitals included in the study. Having divided the patients notes into two groups by HIV status, a comparison between AIDS and non-AIDS patients could be made for the costing analysis. Since these two groups were only distinguished by the HIV/AIDS status, each group contained the same presenting illnesses, for instance, TB or pneumonia.

Total costs per in-patient day

The total costs of an in-patient day were then arrived at by adding the costs found in the standard step-down costing methodology and the bottom-up costing methodology.

Up-dating of costing information

All the information described above was collected in the second half of 1995. Further, the costs per in-patient day and per in-patient stay were calculated for 1995. However, these figures have been updated to 2000. Despite the fact that many types of drugs and hospital equipment were imported, the majority of inputs used in the Zimbabwean health care sector were from internal sources, i.e. salaries. Following the recommendations of Kumaranayake (2000), all 1995 figures were adjusted upwards using the general consumer price index (Central Statistical Office 1999, 2000).[2] From January 1995 to January 2000, the general price level had increased by around a factor of four (Central Statistical Office 1997, 1999).

Findings and discussion

General information on activity and unit costs in the study wards

In Tables 1–4, the unit costs per in-patient day and in-patient stay are shown for all the wards included in the study. The tables also show some key service statistics that can help to explain variation in in-patient unit cost measures. These include average length of stay (ALOS), bed turnover rate (average number of in-patients per bed during a year) and bed occupancy rate (percentage of beds occupied on average).

As displayed in Tables 1–3, the costs per in-patient day were much higher at central hospitals (especially Central Hospital A) than at provincial hospitals, where the costs in turn were higher than for hospitals at district level. This pattern of increasing unit costs per in-patient day at higher level hospitals is, of course, to be expected for several reasons. First, central hospitals, and to a lesser extent provincial hospitals, have a teaching role which may contribute to higher cost (more teaching personnel). Secondly, provincial and central hospitals are intended for treatment of patients with increasingly complex and severe conditions requiring more and/or sophisticated drugs, diagnostic services and clinical expertise. Thirdly, having to care for more complicated conditions requires more sophisticated equipment.

Further, the workload as measured – total number of in-patient days of an individual ward in a specific period – can also influence the average costs per in-patient day. To run a typical medical ward, some costs are fixed (and will have to be incurred) irrespective of the number of in-patients. These fixed costs include for instance salaries for most personnel, expenses for lights and capital costs (buildings and equipment). Therefore, the more in-patient days in a ward, the lower the average fixed costs per in-patient day will be. Wards with many in-patient days and a high bed occupancy rate will therefore tend to have lower average costs per in-patient day. This might be some of the reason why the costs per in-patient day at the male ward were higher than for the female ward at Provincial Hospital A, and why the average costs were considerably lower in wards C7 and C8 at Central Hospital B compared with all wards in Central Hospital A.

Another factor affecting the costs per in-patient day in otherwise similar hospital wards is the average length of stay. During an in-patient stay, most diagnostic, therapeutic and other treatment services provided to the patient are concentrated in the first couple of days, while the last days may be less treatment intensive allowing the patient to rest. In other words, the first few days of an in-patient stay will tend to be more expensive than the remaining days, and a short stay will therefore have a tendency to have higher average costs per day than a longer stay (for patients with similar conditions) because the least resource intensive in-patient days are cut. This might explain the higher costs per in-patient day in the female ward than at the male ward at Provincial Hospital B,

Table 1. Summary statistics and unit costs in Zimbabwe dollars (Z$) for the period July 1994–June 1995, medical wards in central hospitals (US$1 = Z$38.5, January 2000 exchange rate)

	Hospital wards					
	Central Hospital A			Central Hospital B		
	C3	C7	C8	B7	C7	C8
In-patient days	8 264	9 039	9 154	9 659	13 024	9 822
Discharges	1 161	972	1 183	1 313	2 026	1 321
Beds	30	30	30	33	38	28
ALOS[a]	7.1	9.3	7.7	7.4	6.4	7.4
Bed turnover rate	38.7	32.4	39.4	39.8	53.3	47.2
Bed occupancy rate	75.5	82.5	83.6	80.2	93.9	96.1
Costs per in-patient day	1 610	1 477	1 558	1 140	1 044	1 040
Costs per discharge	11 465	13 745	12 043	8 398	6 708	7 719

[a] Average length of stay.

Table 2. Summary statistics and unit costs in Zimbabwe dollars (Z$) for the period July 1994–June 1995, medical wards in provincial hospitals (US$1 = Z$38.5, January 2000 exchange rate)

	Hospital wards			
	Provincial Hospital A		Provincial Hospital B	
	Male	Female	Male	Female
In-patient days	7 735	14 738	12 611	11 467
Discharges	1 292	3 318	1 571	1 880
Beds	30	46	42	38
ALOS[a]	6.0	4.4	8.0	6.1
Bed turnover rate	43.1	72.1	37.4	49.5
Bed occupancy rate	70.6	87.8	82.3	82.7
Costs per in-patient day	903	694	711	743
Costs per discharge	5 419	3 083	5 700	4 532

[a] Average length of stay.

Table 3. Summary statistics and unit costs in Zimbabwe dollars (Z$) for the period July 1994–June 1995, medical wards in district hospitals (US$1 = Z$38.5, January 2000 exchange rate)

	Hospital wards					
	Government District Hospital A		Government District Hospital B		Mission Hospital	
	Male	Female	Male	Female	Male	Female
In-patient days	9 561	10 472	7 354	5 797	8 788	8 977
Discharges	1 381	1 513	992	1 106	904	923
Beds	42	40	24	18	30	30
ALOS[a]	6.9	6.9	7.4	5.2	9.7	9.7
Bed turnover rate	32.9	37.8	41.3	61.4	30.1	30.8
Bed occupancy rate	62.4	71.7	83.9	88.2	80.3	82.0
Costs per in-patient day	658	690	454	542	249	265
Costs per discharge	4 552	4 789	3 376	2 846	2 413	2 581

[a] Average length of stay.

and the higher costs in the female ward compared with the male ward in Government District Hospital B.

Finally, the differences in unit costs found in hospitals with similar roles could possibly be explained by other factors than the service statistics listed in Tables 1–3, i.e. differences in quality of care, varying norms of clinical treatment and non-similar case-mix (even for hospitals at the same level).

Comparison of hospital costs of HIV/AIDS patients versus non-HIV/AIDS patients

Certain categories of costs are likely to be similar irrespective of the diagnosis of an individual patient. For instance, what Barnum and Kutzin (1993) term the overhead costs (i.e. administration, electricity, maintenance) and 'hotel' costs (meals, laundry, cleaning) per in-patient day in an individual ward will most probably be the same for both a patient with malaria and a patient with tuberculosis. In this study, therefore, it was assumed that possible differences in cost between AIDS and non-AIDS in-patients would mainly be found in the direct costs and/or the average length of stay. In Table 4, the results of estimating the direct costs are shown. Direct costs were defined as drug consumption, laboratory tests carried out, and X-rays done, as captured in the patient note review. These costs were therefore patient specific, and a separation between HIV/AIDS and non-HIV/AIDS patients could therefore be done (Table 4). In order to maintain a reasonable sample of HIV/AIDS and non-HIV/AIDS patients (thereby achieving more reliable cost estimates), the cost calculations were done by hospital and not broken down by individual ward as in Tables 1–3. 'Other costs per in-patient day' displayed in the table incorporated all costs other than direct costs, i.e. those identified by the step-down methodology.

As displayed in Table 4, the proportion of patients with

Table 4. Costs in Zimbabwe dollars (Z$) per in-patient day and in-patient stay for AIDS and non-AIDS patients for the period July 1994–June 1995, medical wards in hospitals (US$1 = Z$38.5, January 2000 exchange rate)

Hospital	HIV status	No. of patients	Direct costs per in-patient day	Other costs per in-patient day	Ave. length of stay	Total costs per stay
Cent. Hos. A	HIV/AIDS	33	646.7	898.8	7.9	12 176.6
	Non-HIV/AIDS	18	596.1	898.8	5.0	7 475.2
Cent. Hos. B	HIV/AIDS	20	407.0	622.2	7.5	7 666.3
	Non-HIV/AIDS	21	480.5	622.2	9.3	10 237.0
Prov. Hos. A	HIV/AIDS	15	251.7	476.9	4.7	3 398.4
	Non-HIV/AIDS	9	173.0	476.9	2.9	1 876.6
Prov. Hos. B	HIV/AIDS	11	309.9	427.5	4.7	3 485.2
	Non-HIV/AIDS	27	294.6	427.5	4.1	2 969.7
Dist. Hos. A	HIV/AIDS	25	263.3	432.3	9.7	6 761.9
	Non-HIV/AIDS	28	244.5	432.3	5.1	3 432.5
Dist. Hos. B	HIV/AIDS	26	96.7	383.4	9.5	4 540.9
	Non-HIV/AIDS	25	114.8	383.4	5.1	2 550.6
Mission Hos.	HIV/AIDS	22	73.1	190.7	15.8	4 159.1
	Non-HIV/AIDS	24	61.8	190.7	6.2	1 556.7

Note: 'Direct costs' refer to patient related costs (drugs, laboratory tests and X-rays); 'Other costs' refer to all remaining costs; and 'Total costs' are the sum of 'Direct costs' and 'Other costs'.

HIV/AIDS was quite high in this random sample of patients from the medical wards studied. Out of the 304 sets of patient notes examined, 152 (50%) were believed to be HIV-positive. The percentage of HIV/AIDS patients out of the total was similar in most hospitals except Central Hospital A, where the prevalence was higher than 50%, and Provincial Hospital B with a lower percentage. By far the most common presenting condition among the suspected HIV/AIDS cases in the overall sample were various forms of TB (especially pulmonary TB) followed by pneumonia and meningitis. For the non-HIV/AIDS patients the most frequently presented health problems were malaria, dysentery, pneumonia and chronic cardiac failure, in that order.

The direct costs per in-patient day were in general higher for patients thought to be HIV/AIDS infected or to have chronic HIV/AIDS morbidity compared with patients not thought to be infected with the virus. In Central Hospital B and District Hospital B, the pattern was the opposite, with non-HIV/AIDS patients being more costly in terms of direct costs. With regard to average length of stay, HIV/AIDS patients stayed longer than other patients at all hospitals except Central Hospital B. In district hospitals, the average in-patient stays were markedly higher for HIV/AIDS patients compared with other patients, while this difference was not as large at provincial and central hospitals. From the pattern of costs per in-patient day and average length of stay described above, it followed that the total costs (direct and other costs) per in-patient stay were higher for HIV/AIDS patients compared with other patients at all hospitals except Central Hospital B. Apart from two hospitals, the total costs per in-patient stay for an HIV/AIDS patient were close to twice the costs of a non-HIV/AIDS patient. At the Mission Hospital, the difference in total costs was as much as a factor 2.7. Notable were the relatively high costs of an in-patient stay at the district hospitals due to relatively long hospitals stays compared with provincial and central hospitals.

While the general pattern was that HIV/AIDS patients were much more expensive than other patients, two hospitals deviated somewhat from this picture. This may be partially explained by the profound effect that attitudes towards HIV/AIDS patients and knowledge of care alternatives such as home-based care could have on costs per day and per stay in hospitals. Some doctors might feel helpless when faced with an HIV/AIDS patient and react by discharging early, thus saving costs to the hospital while feeling more confident in spending resources on non-HIV/AIDS cases. In addition, the organizational cultures of the institutions vary, especially at quaternary level. For instance, Central Hospital B has always coped with a high level of acute illnesses and injuries by having short lengths of stay. They therefore tend to discharge early.

Comparison between the costs of hospital and home-based care of HIV/AIDS patients

The expected huge impact on the demand for hospital services from the HIV epidemic has spurred interest in identifying possible alternatives to in-patient care in order to relieve the hospital sector. One of the most prominent suggestions has been home-based care for HIV/AIDS patients. In this model the patients stay as much as possible at home and care is carried out by family members supplemented by home visits by a nurse from the nearest health facility. Home-based care has often been termed a cheaper and better solution than hospital care for HIV/AIDS patients, and in addition it will reduce the number of in-patient days in hospitals. However, according to a recent study on costs and quality of home-based care for HIV/AIDS patients (Woelk et al. 1997; Hansen et al. 1998), it appears that this model of care may not be so cheap.[3] It was found that the costs per home visit in facility-based outreach programmes were Z$518–735 in the two urban home-based care schemes and Z$1256–1377 in the two rural programmes included in the study. Thus the costs of a

home visit in a rural area (Z$1317 – the midpoint of the range) equal the cost of 2.7 in-patient days for an HIV/AIDS patient in, for instance, the rural District Hospital B (Table 4). In urban areas, the transport expenses were much less and the costs of a home visit corresponded to the costs of 0.9 in-patient days for an HIV/AIDS patient at the urban District Hospital A. In addition, the above-mentioned study calculated the total costs of home-based care defined as the costs of home visiting activities and an estimate of the household costs of caring for a bedridden HIV/AIDS patient. Assuming a frequency of two home visits per week, the total costs of home-based care amounted to Z$38 500 over a 3-month period (Hansen et al. 1998). In other words, this corresponded approximately to the costs of an in-patient stay for an HIV/AIDS patient of 80 days in District Hospital B (Table 4). It seems, therefore, that there may not be a strong case on cost-saving grounds to recommend home-based care.

Limitations

Finally, a few limitations of the study should be mentioned. First, the cost figures calculated are based on actual resources spent as found in the expenditure book of the hospitals as well as staff in post and equipment in place. In some hospitals, however, the resources available might be insufficient, for instance due to under-staffing and frequent stock-outs of drugs. A low cost per in-patient day in a hospital may therefore indicate insufficient resources rather than high performance or efficient resource use. Secondly, it became clear after analyzing the data from patient notes that direct patient-related costs (medication, laboratory tests, X-rays, etc.) varied substantially among patients. A review of a larger number of patient notes would therefore have been in order to make the figures on 'direct cost per in-patient day' and 'average length of stay' in Table 4 more reliable. For instance, the average length of stay for Provincial Hospital A, calculated using information from the patient note review (Table 4), was lower than the figure reported by the Health Information Officer (Table 2).

Conclusions

The HIV epidemic will result in more and more people having health problems which will increase the burden and pressure on the health care sector. At the time of the study (1995), 50% of all in-patients in the study wards were assessed to be infected with HIV. More recent figures are not available, but the percentages of HIV-infected in-patients in medical wards countrywide are likely to have increased due to the higher number of AIDS cases (NACP 1999). In itself this is worrying, but adding to this is the high probability that HIV/AIDS patients are on average more costly per in-patient day and stay longer in hospital than the average non-HIV/AIDS patient, as found in this study. Costs per in-patient stay were twice as high for HIV/AIDS patients compared with other patients at most of the hospitals included in this study. In short, the likely impact on the hospital services will be enormous.

Information as collected in this study is necessary for planning purposes. For instance, the total costs and bed requirements for HIV/AIDS patients in the future can be estimated using the projected number of HIV/AIDS patients as found in studies like Gregson et al. (1996). In general, innovative strategies are needed to cater for the increasing health burden from the HIV/AIDS epidemic. Tables 1–4 do, however, suggest a few strategies that may enable the health care system to cope with a larger burden. These are listed below.

(1) The costs per in-patient day were increasingly expensive at provincial and central level hospitals compared with district hospitals, mainly due to high overhead costs. In addition direct costs are sometimes higher because of the availability of more expensive drugs and diagnostic tests in higher level hospitals. More specialized doctors may also intervene with more expensive procedures. The implication of this is that HIV/AIDS and other patients must, as much as possible, be treated at hospitals at the district level. Only complicated cases should be sent to provincial and central hospitals. Analysis of the patient notes reviewed for this study revealed that a number of cases treated at provincial and central hospitals could have been managed in a district hospital. In short, the referral system should be enforced to a larger degree.
(2) While costs per in-patient day were progressively higher at provincial and central hospitals compared with district hospitals, the total costs per in-patient stay were relatively high in the latter due to long hospital stays, especially for HIV/AIDS patients (Table 4). At district level, it might be possible to shorten the average length of stay for HIV/AIDS patients. First, it seems unwarranted that the average length of stay is longer at district hospitals than provincial and central hospitals since more complicated cases are presented in the latter health facilities. Secondly, long in-patient stays are not necessarily much more beneficial to an individual patient than a shorter stay. During a hospital stay, most medical examinations, treatments, and diagnostic services will be concentrated in the beginning of the stay. For some patients, therefore, the last one or two days may contribute little to the improvement of the patient's condition. Hence he/she may as well be discharged. However, shorter average lengths of stay may increase the average costs per in-patient day since only the less intensive in-patient days in terms of treatment and diagnostic services will be avoided.
(3) Further, Tables 1–4 indicate a possibility for improving the efficiency of resource use, thereby allowing more patients to be treated in the hospital sector. The pattern of medical problems (case-mix) presented at hospitals at the same level of the referral system should be relatively similar when considering only the group of HIV/AIDS patients. In spite of this, there was a substantial variation in average length of stay, bed turnover rate and bed occupancy rate in hospitals at the same level. For instance, the length of stay was shorter and the bed occupancy rate higher at medical wards in Central Hospital B compared with Central Hospital A. Likewise, among the district hospitals in this study, the Mission Hospital had long in-patient stays and District Hospital A operated well below capacity (low bed occupancy rates). In other words, the

tables indicate the possibility that some hospitals can improve performance and aim at shorter average in-patient stays, higher bed turnover rate and higher bed occupancy rates (the latter only if necessary of course). This will give room for more HIV/AIDS (and other) patients.

(4) Finally, in spite of the fact that home-based care may not necessarily be much cheaper than models relying more intensively on hospital care (especially if frequent home visits are considered a necessity), it may continue to be considered an alternative to hospital-based care. However, there is not sufficient information to conclusively compare home-based and hospital-based care for HIV/AIDS patients in Zimbabwe since the clinical outcomes and quality of life of patients in the two models remain unclear. This must be the subject of future research. Most likely, however, both models should be considered as complements to rather than substitutes for each other.

Endnotes

[1] Some of the costs of running support departments were excluded from the step-down costing method to avoid double counting. One example was the total costs of drugs since this cost category was dealt with through the bottom-up costing method.

[2] As a component of the general consumer price index, a 'medical care' index was available. However, this sub-index was constructed mainly to capture the development of the prices of drugs and fees in the private sector so it was thought more appropriate to use the overall consumer price index.

[3] The cost figures mentioned in Woelk et al. (1997) and Hansen et al. (1998) were stated in 1995 prices. For the present paper, however, these figures have been updated to the 2000 price level.

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