Cost of access to health services in Zambia

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Equity is an important policy objective in the health care field. The importance of equity in health care provision can be argued from various points of view. As a result governments in all countries attempt to provide health care systems that enable equal access for everyone. Zambia is no exception. In the health care reforms the objective of the national health strategy is to provide Zambians with equity of access to health care. We focus on access defined as the costs (both monetary and time) an individual incurs when visiting a health care facility. Using a survey of 900 households, this article explores equality of access to health care among Zambians. Four areas are compared: urban high cost, urban low cost, townships and rural areas. The results of the analysis indicate that there are inequalities among residential areas, especially between rural and urban areas. In particular these differences exist because of differing distances to the nearest health facility. Large distances make it very costly for rural dwellers to seek medical care, especially during the high season for farming. The analysis suggests that obtaining equality of access to health care poses a challenge for the Zambian Government.

Introduction

In many countries the health care sector plays an important role in the economy by employing large numbers of health care staff and by absorbing considerable amounts of national resources. In both developing and developed countries the public sector is often the largest provider of health care. However, there are enormous differences between developed and developing countries in terms of capacities and health services provided, partly due to the higher disease burden and severe resource constraints in the latter countries. Eighty-four per cent of the world's population live in developing countries; they account for 93% of the global disease burden but only 11% of all health care spending (World Bank 2000). This implies that there is an inadequate provision of health care in many developing countries. Health care has to meet the needs of different population groups and at the same time not pose an impossible financial burden on households and on the national economy. Apart from this, general opinion is that the health care system needs to be equally accessible to the various social groups in the population.

The provision of health care is but one important input for health alongside other factors such as clean water, sanitation and lifestyle, which also affect the health status of the population. Health status does, of course, affect the wellbeing of individuals, but it also has implications for the society's potential for development. The importance of health as an input to economic development is well established. A healthy population is more productive and has an increased capacity for learning. This is particularly interesting in a developing country context, as the marginal productivity of health is likely to be higher there compared with developed countries (Strauss and Thomas 1998). Furthermore, the health status of

the people in a country is a critical element not only for the economy, but also for the overall quality of life. However, the health status of a population is an average measure that ignores distributional aspects. Gaps between different social groups are often wide in both developing and developed countries. One of the objectives of the primary health care principles, defined at the Alma-Ata conference in 1978, is to improve equity in access to health and health care. WHO has stated that access to health is everybody's right and the ethical basis of any country's health policy should be 'Health for all' (WHO 1996).

In the last few years, the Zambian health care sector has undergone several changes based on the health care reforms that started in the late 1980s/early 1990s. One of the changes has been the decentralization of the health care organization. Instead of central management by the Ministry of Health, the task of running the system has now been divested to the Central Board of Health, hospitals and district health boards, while policy-making and monitoring remain with the Ministry of Health. Another major change in the health care system, and certainly the most obvious one to the Zambian population, was the introduction of user fees at all public health facilities. A policy of free health care was introduced shortly after independence in 1964. However, due to tightening economic conditions, a growing demand for health care and a growing population, it became apparent in the late 1980s that additional resources were needed for financing of health services. Zambia is not unique in this respect. Introducing user fees as a way of increasing resources in the health sector has been considered worldwide as a means of strengthening the health system (Yoder 1989).

In the health care reforms, the main objective is to provide Zambians with 'equity of access to cost-effective quality

health care as close to the family as possible' (quoted from National Strategic Health Plan 1995–1999, Ministry of Health 1996). Equality of access to health care for all individuals in all situations is perhaps not what is intended given the limited financial resources. However, it is obvious to anyone working within or with the Zambian health sector that equity matters are very much present in the daily work. The underlying intention of striving towards equity is clearly present in policy discussions.

The main objective of this paper is to study equality of access to Zambian health care services by estimating the average cost of access for a visit to a health facility for individuals belonging to households in different areas and socioeconomic groups.

Equality of access

Equity in health care has several definitions, of which 'equality of access' is one (Culyer and Wagstaff 1993). The literature on equality of access is complex and not all researchers seem to agree on the subject. Several writers in the health care field assume that equal access leads to more appropriate utilization. This belief is based on the assumption that a strong relationship between access and utilization exists. Utilization and access are used synonymously by, for example, Collins and Klein (1980), Puffer (1986) and Aday and Anderson (1975). However, Mooney (1983) argues that the two terms should be separated from one another since studies based on the utilization interpretation of access fall short when it comes to analyzing equality of access to health care. Access is a question of supply only, while utilization depends both on supply and demand. In this paper we also choose to keep the two concepts separate. Following this, we choose to focus on access, with access referring to the opportunity to use a health care facility instead of the actual outcome of the use of a health care facility.

Equality in access to health care could be interpreted as the cost incurred when receiving health care. Following this definition, equal access to health care would mean that persons facing the same costs when consuming health care would also have equal access. Access cost is a combination of several factors, such as distance to health facilities, waiting time at the facility, out-of-pocket payments etc., i.e. monetary costs as well as time costs (Le Grand 1982). Time costs include time for reaching the facility, waiting time and time for consultation. Monetary costs include fees for services and travelling costs. It is completely irrelevant if the health care facility is being used or not since it is only the opportunity to use it that is of interest. If one chooses to define access in this way, then equality of access is really the same thing as equality of opportunity and can be viewed as a supply-side criterion (Mooney 1983). This is different from the concepts of 'treatment' and 'entry' since they depend not only on supply, but also on demand. These two concepts depend both on the costs facing the individual and on the individual's personal perception of the benefits of health care.

In a health system with low fees or no fees, for example before the health care reform in Zambia in 1993, costs other than directly financial ones are very important. Travel to the health facility can be measured either as time or distance and can be used to analyze accessibility to health care. In Zambia, where a large number of households live in rural areas, distance to health care facilities must be expected to be a decisive factor in health-care seeking decisions. Costs of access are usually an important explanatory factor of differences in health care utilization between different social groups in developing countries (Gertler and van der Gaag 1990; Timyan et al. 1993).

Methods

The analysis is based on data from a household health expenditure survey carried out in Zambia in December 1996. This survey covered four provinces – Luapula, Copperbelt, Eastern and Western provinces – and interviewed approximately 900 randomly selected households containing a total of 5600 individuals. The interviews were conducted with the household at their place of residence. In order to receive a high response rate the enumerators went back to the household several times before randomly choosing another household in the same area if no response could be obtained. Of the

Table 1. Distance to the nearest health centre and average travel time to health centre

Area	Household, distribution (%)	Distance to health centre (km)	Travel time[a] to health centre (minutes)	Distance to hospital (km)	Travel time[a] to hospital (minutes)
Urban high-cost	14.2	3.18　(3.76)	23.8　(28.3)	2.65　(2.58)	19.9
Urban low-cost	44.6	2.56　(3.94)	19.2　(29.5)	11.40　(20.18)	85.5
Township	11.1	1.46　(1.05)	10.9　(7.8)	2.86　(3.85)	21.5
Rural	30.1	7.95　(6.95)	119.3　(104.2)	25.02　(37.24)	375.5
Significance		p = 0.000	p = 0.000	p = 0.000	p = 0.000

Standard deviation is given in parenthesis.
[a] Travel time is estimated by assuming the speed per km to 7.5 minutes for urban areas and 15 minutes for rural areas (waiting time for transportation is included). Note however that these figures are assumptions and must be interpreted with care. The differences in speed between rural and urban areas are because of differences in infrastructure and transportation. Other studies have found similar differences (CSO 1998a).
Source: IHE and UNZA 1997.

889 households interviewed, 691 could be used for this analysis; 198 lacked sufficient information to carry out the analysis.

The main purpose of the survey was to study health care expenditures among Zambian households and to obtain information on health care utilization. Apart from questions concerning socioeconomic background of the household, detailed questions were asked about enrolment in pre-payment schemes, satisfaction with health care services and perceived problems of access to services. Other questions included details concerning illness episodes, health-care seeking behaviour and expenditure for health care services and preventive care. Questions on ability to pay for health care were also asked. Detailed questions were asked about the household's expenses, income and assets. Questions regarding the household's income were related to a period of 1 month previous to the survey. Income was measured in terms of both cash income and income in-kind.

The information obtained in the survey is extensive. In this paper we will focus only on access to health care. To determine inequalities in access, we have interpreted the definition 'equality in access to health care' as equal cost incurred when receiving health care. When calculating cost of access we use both the time cost and the financial cost for consuming health care. The total cost of access to health care is estimated by some simple calculations. The total cost of access for an individual, C_i, is the sum of monetary costs, M_i, plus the time cost, T_i; where $i = 1 \ldots N$, and N is the number of individuals. The time cost, T_i, is the sum of the time required for reaching the health care facility, d_i, and the time required for consultation, v_i, multiplied by the cost per time unit, f_i. The monetary costs, M_i, are the sum of fees, b_i, and travelling costs c_i.

$$C_i = M_i + T_i$$

where $T_i = (d_i + v_i) f_i$

and $M_i = b_i + c_i$.

Time cost is incorporated into the total cost of access by transforming time into monetary equivalents. The opportunity cost is assumed to be lost output, and the income (lost output) of an individual is transformed into income per minute. This makes it possible to calculate the loss of income related to visiting a health facility. It is very likely that the opportunity cost varies during the year, e.g. during harvest season. When no user charges exist, as for example before the health care reforms in Zambia, time measured in minutes can serve as a proxy for cost of access. In our calculations distance to health care is measured as the distance between the home and the health care facility.

Non-parametric tests, Kruskal–Wallis, have been performed to determine differences between the four different areas (Pratt and Gibbons 1983).

Cost of access to primary health care services

When determining the cost of access to health care, an important starting point is the distance from home to the nearest health care facility for the households in the analysis. The household study showed that significant differences exist between urban and rural areas when it comes to distance to the nearest health care provider. In Table 1, the average distances from place of residence to the nearest health centre and hospital are given for four different areas.[1]

When asked whether or not distance to health facilities was perceived as an obstacle for seeking health care, 56% of households in rural areas perceived distance as a big problem, which is significantly higher than households in the other areas where only 7–16% found it a major problem.

A disadvantage for those in rural areas is that travelling often takes longer per kilometre than for those living in urban areas. This is because of the poor infrastructure in rural areas and lack of transport. Too often the only way to attend health care services is to walk, making time spent going to the clinic much longer than for an individual living in urban areas, even if the distance is the same. There is a significant difference between the four areas in travel time to the nearest health centre. Individuals living in rural areas have approximately 7.95 km to the nearest health facility, while individuals living in urban areas only have to travel between 1.46 and 3.18 km to reach a health facility. If distance to the nearest health care facility is used to measure inequality of access between urban and rural areas in Zambia, then clearly access to health care facilities can be said to be unequal.

In order to calculate the cost of access for health care for individuals living in the various areas, the user fee was assumed to be 800 Kwacha[2] in all areas. This was the amount recommended to be charged at public health care facilities for outpatient services in 1996.[3] The monetary costs for travelling are based on the average travelling cost incurred during the latest illness episode within the household reported in the survey. The waiting time and time for seeing a medical doctor have been assumed to be 1 hour and 15 minutes at health care facilities for everybody in the survey, which is in accord with results from other studies (CSO 1998a).

When estimating the time cost for individuals in rural areas, the seasonal nature of their income must be taken into account. The high season is when the farmers are working in their fields, harvesting, etc. and during this season a visit to a health care facility can be very costly in terms of loss of income. African subsistence agriculture is generally labour intensive. In a study among poor women in rural areas of Zambia's Northern province, the women said they could not afford to be ill because of the increased costs of treatment and because of the costs incurred through staying away from productive activities (Evans and Young 1988). The livelihood of rural households depends on the income from the land, and the loss of working time can be directly connected to lower returns from the land. This is why we have calculated two different types of costs of access to health care for those in rural areas, average cost and cost during high season. Average cost is based on the assumption that the income of an individual is the same every month. Cost during high season is calculated with the knowledge that time cost is high for individuals in rural areas during 6 months per year, and we

Table 2. Average monthly income and costs for time lost when seeking health care

Area	No. of households used in the analysis (N)	Average monthly income per adult household member[a] (Kwacha)	Total time lost[b] (minutes)	Total time cost[c] (Kwacha)
Urban high-cost	98	75 925	99.0	782.0
Urban low-cost	308	36 471	94.0	358.0
Township	77	39 431	86.0	353.0
Rural	208	18 557	194.0	375.0 (750.0)[d]
Significance		p = 0.000	p = 0.000	p = 0.000

Total time lost when seeking health care is the sum of travel time plus waiting time and treatment time. We calculate the average cost per minute as the loss of income per minute. The sum of total time costs is simply the loss of income per minute multiplied with the time lost. The exchange rate in December 1996 was 1250 Kwacha = 1 US$.

[a] The income is close to the findings in the Living Conditions Monitoring Survey the same year (CSO, 1998b).

[b] $\sum_{i=1}^{N} (d_i + v_i)/N$

[c] $\sum_{i=1}^{N} (T_i)/N$

[d] Cost during high season.
Source: IHE and UNZA 1997.

Table 3. Cost of access to health care per individual, in Kwacha 1996

Area	Travel cost[a, b]	Fee[c]	Sum of total monetary costs[d]	Total time cost[e]	Total cost of access to health care[f]	% of monthly income
Urban high cost	1537	800	2337	782.0	3119	4%
Urban low cost	2350	800	3150	358.0	3507	9%
Township	2415	800	3215	353.0	3568	9%
Rural	1658	800	2458	375.0 (750.0)[g]	2833 (3209)[g]	15% (17%)
Significance	p = 0.000	–		p = 0.000	p = 0.000	p = 0.000

The exchange rate in December 1996 was 1250 Kwacha = 1 US$.
a reported in the household survey.

[b] $\sum_{i=1}^{N} c_i/N$

[c] $\sum_{i=1}^{N} b_i/N$

[d] $\sum_{i=1}^{N} M_i/N$

[e] $\sum_{i=1}^{N} (T_i)/N$

[f] $C_i = \sum_{i=1}^{N} (M_i + T_i)/N$

[g] during high season.
Source: IHE and UNZA, 1997.

assume that their total income is earned during this period. Figures are presented in Table 2.

The income[4] per adult member of the household varies significantly between the four different areas. This finding is consistent with incomes reported in the 1996 Living Conditions Monitoring Survey (CSO 1998b). Individuals

living in urban high-cost areas have the highest income per adult member of the household and therefore naturally also the highest time cost per minute. This is reflected in the sum of time cost for seeking health care, which is on average 782 Kwacha for households in urban high-cost areas. Households in rural areas, on the other hand, have the lowest income per adult member of the household and thereby also face a lower

time cost for seeking health care, on average 375 Kwacha or 750 Kwacha during high season. There is a significant difference between the four areas for the total time cost.

If we base our calculations on the average income per year, the cost of access is highest for individuals living in urban low-cost areas and townships. The total cost of access to health care facilities in these areas has been estimated to be 3507 Kwacha and 3568 Kwacha, respectively. For individuals in rural areas, the cost of access is the lowest among the four areas at 2833 Kwacha, while the cost of access is 3119 Kwacha for individuals in urban high-cost areas. However, if we take into account that the time cost is very high for farmers during high season, the cost of access increases slightly to 3209 Kwacha for individuals in rural areas. If we relate it to their income, we clearly see that their situation is worse than for individuals in other areas. There is a significant difference between the four areas for the total cost of access for health care.

It is evident that the cost of access to health care as a percentage of monthly income varies between the areas. For Zambians living in rural areas and belonging to a low-income group, the cost of access for one visit to the nearest health facility accounts for 17% of their monthly income during high season, according to our calculations. Individuals in urban low-cost areas and townships also face high costs for accessing health care relative to their size of income (see Table 3). The percentage of income spent on health care services in these two areas is 9%. In the urban high-cost areas, on the other hand, only 4% of monthly income is spent on health care services.

In the survey, households were asked about expenditures connected to their latest illness episode. These expenditures include fees in primary and hospital care, medicines, hospitalization costs, travelling costs, as well as fees paid at traditional healers both in cash and in kind. Consequently they cannot be used for calculating cost of access, but nevertheless they provide interesting information and when compared with the estimated cost of access we find similar differences between the areas. Expenditures were highest in urban high-cost areas at 13 500 Kwacha, followed by urban low-cost and township areas at 7000 Kwacha, and rural areas at 6800 Kwacha.

To further illustrate the variation in the cost of access, concentration curves were used. Figure 1 shows two concentration curves,[5] one for cost of access during high season and the other for total income. The concentration curve for cost of access measures how equally the cost of access is spread among socioeconomic groups. When the curve coincides with the diagonal (the 45 degree line), cost of access is equally distributed among the population, i.e. the share paid by various income groups equals their proportion of the population. We notice in the figure that the concentration curve for cost of access almost coincides with the diagonal, implying that the cost of access to health care services in Zambia is almost equally distributed among the population. The concentration index[6] for the cost of access is 0.01.

The concentration curve for income, on the other hand, shows how unevenly income is distributed in Zambia. The concentration index for income is 0.66, which gives a clear indication of the income distribution in Zambia. From the curve we see that about 80% of the population have an income share of only 25%, while the remaining 20% of the population have an income share of 75%. This finding is in line with CSO (1993) and Mwikisa (1998). According to the Central Statistics Office (CSO), about 20% of Zambian households have an income share of only 2%, while the top 6% of Zambian households have an income share of about 46%.

A comparison of the two curves provides an indication of the extent of inequity. If costs of access to health care were allocated across income groups in proportion to their share of total income, the two concentration curves would coincide. If the two curves coincided at the level of the present income distribution, it would mean that the relationship between cost of access and income would be constant across groups. The extent of inequity can, therefore, be assessed by looking at the gap between the two curves. The fact that the access curve lies above the income curve shows that the poor pay a higher proportion of their income on access costs. As shown in the Figure, individuals in the bottom 20% of the income distribution account for 2% of the total income but pay more than 20% of the total costs of access.

Discussion and conclusions

Cost of access creates an especially problematic barrier to poor people who need to seek care. In developing countries where distances to health facilities can be large, the infrastructure lacking and a large share of the population live below the poverty line, cost of access is a critical determinant of whether care is sought or not. The poorest tend to suffer from ill health to a greater extent and yet use health services
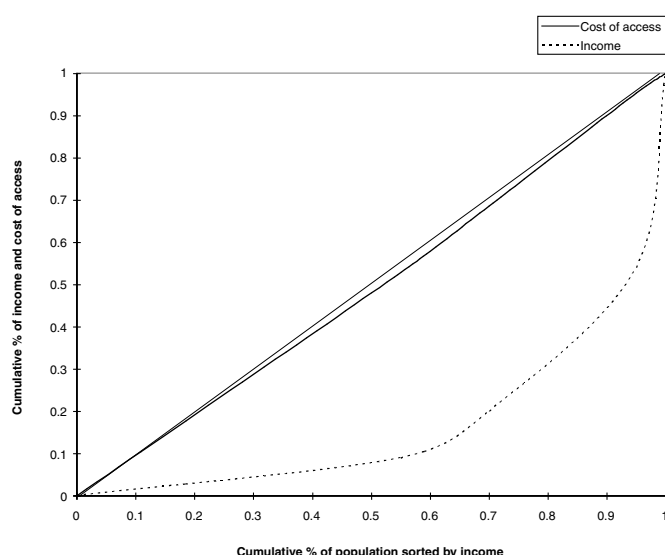
Figure 1. Concentration curve of the estimated cost of access during high season, and Lorenz curve, when the population is ranked by income

to a lesser extent than wealthier individuals. Moreover, public sector health resources in developing countries are often concentrated on hospitals in urban areas, so access becomes easier for urban households, who face lower access costs, than for rural households. At the same time, urban households also tend to have higher incomes than rural households. This type of inequitable resource allocation leads to skewed utilization patterns in the sense that richer individuals enjoy easier access to health care than poorer individuals.

When analyzing equality in access to health care in Zambia, we find that cost of access varies between different socio-economic groups, i.e. individuals in rural areas pay a high price relative to their income for accessing primary health care, while individuals in urban high-cost areas pay the lowest price for accessing health care relative to their incomes. What seems to contribute to inequality in the cost of access is not the user fee *per se*, but the travel cost and the cost of the time spent in reaching the health facility. Those who are poorer and more susceptible to illnesses live in areas with inadequate infrastructure and thus bear the higher travel and time costs. Accessibility to health care services seems to vary inversely with the need for health care services. Several studies in Zambia have shown that the poor have a higher prevalence of illness and yet utilize health services to a lower extent than the non-poor (see for example Diop et al. 1998; CSO 2000). One Zambian study found that the poor are much less likely to seek health care when ill than the non-poor (Hjortsberg and Seshamani 2000). The same study found that distance to health facilities has an impact on utilization; nearly 50% of those living less than 5 km from a health provider choose to seek care when ill, compared with 17% of those living more than 40 km from a health provider. These findings support the notion that cost of access is a critical factor in seeking health care.

If cost of access is a barrier to health care service use, one obvious result is that the effectiveness of interventions is reduced, hence the costs of interventions increase.[7] To reduce the cost of access, different options can be used. One way is to strengthen the first contact care, i.e. health resources going to first-level facilities in the Zambian health care districts could increase. A mechanism to ensure this is needed. It would certify that local health centres and health posts could provide high quality care close to the patients, so they would not have to travel far to receive quality care. Also the provision of drugs to health districts should be ensured to avoid health care seeking at facilities further away than necessary. Another way to reduce cost of access is to provide home-based care and mobile health services in areas were individuals have limited mobility. Outreach clinics could provide basic health care and focus on major diseases, such as malaria and tuberculosis. However, a detailed cost-effectiveness analysis is needed before recommending outreach services.

There was no room in this study to take into account the interrelationships that exist between equality of access to health care and the social differences of actual health status. This is something that could further serve as an indication of inequality between various social groups. Individuals who live in poor surroundings are generally poor themselves and their health care needs may be high, although health care facilities may not be as easily accessible. Of particular interest are disaggregated analyses that can provide indicators of how the burden of disease and access to health care are distributed across the population, their impact on the production and income of households, and their impact on health care utilization. These issues are of importance for the improvement of the Zambian health sector. It would be useful if the development of the health sector were paralleled with a constructive-minded review of health care services offered today. The specific activities to be undertaken may include: cost identification, measurement and valuation; estimations of existing health programmes' health effects on the population and, if possible, a valuation of them in utility and/or monetary units. This would further expand the basis for decision-making in the Zambian health sector, and policy decisions would be based on research findings.

Endnotes

[1] The households have been classified by the CSO, based on the area of residence.

[2] The exchange rate in December 1996 was 1250 Kwacha = 1 US$.

[3] It should be stressed that 800 Kwacha is an assumption. User fees did vary substantially around the country.

[4] Income was measured in terms of both cash income and income in-kind.

[5] One concentration curve illustrates the cumulative proportions of the population against the proportions of total cost of access to health care they pay, and the other concentration curve illustrates the cumulative proportions of the population against the proportions of total income they receive. If cost of access or income is distributed equally, the curves would coincide with the diagonal. The curves presented here must be read with care since the data are very crude. Nevertheless this general estimation of the curves relative to the diagonal is probably correct.

[6] The concentration index is the ellipse-shaped area between the concentration curve and the diagonal as a proportion of the total area under the diagonal. Complete equity is when the curve coincides with the diagonal and the concentration index is zero.

[7] Barriers to access reduce the effectiveness of interventions at health care facilities by restricting the number of patients attended. Additional resources need to be provided to reach patients.

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