Do free-of-charge public health services impede cost recovery policies in Khartoum state, Sudan?

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هل تعرقل مجّانية خدمات الصحة العموميَّة سياسات استرداد التكاليف في ولاية الخرطوم السودانية؟

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الخلاصة: أجرى الباحثون في عام 2001 مسحاً أُسَرياً في ولاية الخرطوم لتحليل خصائص أولئك الذين يتلقّون خدمات صحية عمومية مجانية، وللتحقُّق من وجود أي عوائق أمام سياسات استرداد التكاليف في إطار الاستفادة من الرعاية الصحية. وقد جُمعت البيانات من خلال المقابلات المستندة إلى استبيان ملائم. وأظهرت الدراسة أن أولئك الذين لديهم مصادر أخرى للدخل، ويعولون غيرهم دائماً أو أحياناً، ممَّن قاموا بزيارة المرافق الصحية مرتَيْن خلال الأشهر الثلاثة السابقة، هم الذين يحصلون على خدمات صحية مجانية على الأرجح، ممَّا ينفي المزاعم القائلة بأن الاستفادة من هذه الخدمات حكرٌ على الأغنياء.

ABSTRACT We carried out a household survey in Khartoum state in 2001 to analyse the characteristics of those who receive free public health services and to ascertain whether there are any impediments to cost recovery policies for health care use. Data were collected through interviews based on an adapted questionnaire. Those who had other income, always or sometimes had dependents and visited the health services twice in the previous 3 months were more likely to receive free public health services. This does not support claims that beneficiaries of these services are the well-off.

La gratuité des services de santé publique menace-t-elle la politique de récupération des coûts dans l'État de Khartoum au Soudan ?

RÉSUMÉ Nous avons mené en 2001 une enquête auprès des ménages résidant dans l'État de Khartoum, visant à analyser les caractéristiques des bénéficiaires des services de santé publique gratuits et à vérifier s'il existe des obstacles à la politique de récupération des coûts. La collecte des données a reposé sur des entretiens individuels s'appuyant sur un questionnaire spécifiquement adapté. Les ménages ayant une autre source de revenus générés par un double travail, ayant dans tous les cas, ou presque, des personnes à charge et ayant eu recours à deux reprises aux services de santé dans les 3 mois précédents étaient davantage susceptibles d'utiliser les services de santé publique gratuits. Cette conclusion est en contradiction avec la théorie qui veut que les bénéficiaires de ces services appartiennent aux classes les plus favorisées.

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Introduction

Background

Both before and during colonial rule, people in sub-Saharan countries paid most of the costs of health services themselves (because of the lack of published literature available about Sudan and the similarity of conditions in sub-Saharan Africa, the authors support this study using background from the experiences of other developing countries). Sudan, like other developing countries, has problems resulting from inappropriate allocation of available resources, an inefficient public health service delivery system, a heavily constrained private sector and poorly developed health insurance schemes [*1*]. The policy tool chosen to reduce the effects of these problems is often the expansion of the cost recovery policies in the public sector. These policies are expected to support the sustainability of the health financing system by increasing the revenues of the public system [*2–4*]. They are expected to help in targeting public sector subsidies for the poor [*5*]. They also allow the government to reallocate tax-financed expenditures from curative services to public health activities that have a broader beneficiary base [*3*]. They are also expected to reduce the private sector's price disadvantage relative to the government sector and to encourage the expansion of the health insurance schemes, especially for the informal sector [*6*].

The political risks of imposing new fees by establishing a cost recovery system or enforcing the existing one are extremely high. They are possibly higher than raising taxes, because they are tied to a valued social service. In Sudan, the issue of the cost recovery policies at public health facilities is politically charged. There is, however, very little information on the effects of user fees, a similar situation to that in Ethiopia [*2*]. There is no information regarding what people are paying for health services or what they might be willing to pay for public health services. In the absence of such information, speculation and ideology tend to monopolize the political debate and make it far too general to be of much use in setting policy [*2,6*].

Free-of-charge health services in Sudan

In 1996, 2 years after the declaration of the national health insurance policy and before it could harvest the benefits, the government decided to provide free-of-charge health services at emergency departments. This step was taken under the pressure of the expansion of poverty and the political situation after the increase in the price for petroleum. Furthermore, to favour the poor, the president of Sudan decided in 2000 to offer free-of-charge public health services at the third class inpatient wards [*7*] (free treatment in the inpatient wards had not at the time been adopted.). This was a response to the requests made by medical professionals during the Medical Oath ceremony. These 2 steps were taken without any preparation nor were they supported by results from scientific studies or technical opinion. The move was entirely based on the assumption that the beneficiaries of free-of-charge public health services would be the poor.

The health financing planners, however, claimed that the poor would not be the real beneficiaries of the free-of-charge public health services [*2–4,8,9*]. They also claimed that any free-of-charge public health services would impede the cost recovery policies and lead to huge losses of medical supplies.

The exploitation of free-of-charge public health services by high-income earners is well known and is considered by some to be

one of the main disadvantages of these policies. Heller argued that "these mechanisms favour the less sick (who can wait longer) and higher income clients (who have the contacts)" [*10*]. Free service provision does not imply free access or consumption and one should consider time and transport costs that discriminate against the poor and rural residents [*2,4,5,8,9*]. Ofosu-Amaah also writes that "the reality in much of Africa is that attempts at the provision of free health care have resulted in inadequate or non-existent services, especially for the poor and most vulnerable" [*11*].

On the other hand the depletion of the available medical supplies is seen as one of the great disadvantages of the free-of-charge policy. A rapid assessment study conducted in the 3 big hospitals in the capital to evaluate free public health services at the emergency departments showed that > 50% of medical materials, especially intravenous fluids, are lost [*12*]. The huge loss of resources may be aggravated by the ill-defined referral system in Sudan and the misuse of emergency facilities. A similar type of problem was expressed by a health post staff member in Nepal, "In the past, people used to drop into the health post whenever they were passing by to pick up medicines for future use. After the introduction of charges, this custom completely died out and no one demands medicines until he/she is really sick" [*13*].

The misuse and siphoning off of medical supplies has been observed to be practised by health workers as well. Owing to the low salaries and high inflation rates, they sold the free-of-charge supplies [*14*].

Objective

In this survey, we investigated impediments to cost recovery on health care use in Khartoum state, Sudan. A logistic regression model was used for this purpose. We aimed to describe, and provide a broad study of, the effects of free-of-charge public health services on the cost recovery policies. Attention was focused on investigating the characteristics of the people who are likely to receive free-of-charge public health services.

Methods

Survey data

This study was carried out 5 years after the implementation of a free-of-charge public health services policy at the emergency departments and before the adoption of the new policy of free-of-charge health care at the inpatient wards.

Data were collected through interviews based on an adapted questionnaire in Arabic (we used questionnaires from the experiences of a number of developing countries to construct a questionnaire in English and then translated it into Arabic; it was not a direct translation of a specific single questionnaire). The questionnaire was tested in a pilot study. After correction and modification the questionnaire was retested.

The survey was conducted during the 2 months March 2001–April 2001 in Sudan. The team was composed of a supervisor, coordinator, 3 assistants, a statistician, 40 data collectors, 2 data entry workers, a secretary and a driver. They conducted the survey after 3 weeks of training for the data collectors and after some pretests (the data collectors were students and graduates from Elahfad University for Women, Omdurman, Sudan). The team was centred in central Khartoum, and joined the research department at the Ajaweed Society, a nongovernmental organization concerned with counselling. The society has a bilateral collaboration with the Khartoum Centre for Psychiatry and Counselling.

The samples were selected by a multistage sampling procedure. First, a simple random selection of the 3 provinces of Khartoum state (each province has > 30 localities) was made. Each of these provinces was divided into central, peripheral and rural and 15 neighbourhoods in each area were randomly selected. One house in each neighbourhood was randomly selected as a starting point, then every 4th house till the required number was reached. The total number of households contacted was limited to 460 owing to financial restrictions and the capacity of the *SPSS* package in analysis and generalization of results [*15*]. There were no refusals to participate. For the purpose of similarity and to increase the internal consistency of the sample we excluded 10 questionnaires to ensure that there were 150 questionnaires from each province. The overall response rate was 100%, which indicates high reliability.

The survey targeted heads of households, or someone representing them (the nearest relative). The survey collected data on the respondents' socioeconomic status and on their use of health services. The sociodemographic data included age, sex, tribe, religion, place of birth, education, occupation, and place of work of the head of the household, and number of people in the household. We used 2 categories with regard to wealth: income (monthly income, occupation and other income) and expenditure. In developing countries, the reliability of using monthly income as an indicator for estimation of the wealth is dubious. Monthly expenditure is sometimes used instead of monthly income for reasons of reliability [*16*]. The inconsistency between income and expenditure in lower income countries induced some researchers to ask questions about durable consumer goods such as refrigerators, cars, other income and house/property [*17,18*]. This study also adopted this approach.

To get an impression about health status, respondents were asked to indicate the number of episodes of sickness and visits to health facilities during the previous 3 months for the head of the household and for any member of the family (in the pre-test phase the time period used was 3 weeks, but as we suspected there was some exaggeration, we changed it to 3 months and we received the same answers). To examine payments for health care, respondents were asked whether they had paid anything for health and whether they had bought drugs for themselves or for any members of their household during the previous 3 months.

Regression analysis

Cultural bias in the sample

Because of transportation and security constraints, the survey was conducted during daylight and thus most of the respondents were women (62.9%). Even when a Sudanese woman is the actual head of the household, she always introduces her husband as the head. So, the sex variable is culturally biased. Also family size has a measurement error due to a cultural bias: many Sudanese families believe in the evil eye, and are reluctant to give the true number for family size. After the evaluation of the pretest, some modifications were made to the question on family size in order to improve the response quality. Where the number of cases was small, a process of merging categories was done for the variables age, family size, education, occupation and disease type [*19*].

Model building strategy

To avoid bias, some variables were eliminated as a first step in the model-building strategy, e.g. tribe and religion. The selection of variables in the model was done by univariate analysis of each variable using cross-tabulation, chi squared, *t*-test, corre-

lation and the ordinary least squares (OLS) method. Table 1 presents the results of the OLS models as the last step of the univariate selection analysis. After completion of the univariate analysis, selection for the multivariate model was done: any variable with test significance < 0.05 was a candidate. Following the fit of the multivariate model, the importance of each variable included in the model was verified by a Wald statistic and a comparison of each estimated coefficient from the model containing only that variable [*20*]. Only the variables "family size 7–10", "occupation merchant" (small traders and owners of small businesses), "other income", "always or sometimes have dependents", "own a house", "sometimes pay school fees", "got sick twice in the last 3 months", "always paid for treatment" and "always paid for drugs during the last 3 months" were eligible to enter the logistic regression model (Table 1).

A model with only the significant variables of the OLS estimations proved to be a poor model without variables such as "merchant" and "has other income". To obtain a model with more explanatory power, direct and the stepwise procedures were used. Compared to the OLS results in Table 1, the full model of the direct procedure method included some significant variables such as "merchant", "other income", "disease type", and "bought drugs during the last 3 months". The full model fit better than the OLS model.

In the stepwise procedure method, backward logistic regression was done and the last step showed that the variables "merchant", "own a house" and "paid for treatment during the previous 3 months" were candidates for the final model. A series of additions and removals together with interactions and combination of variables resulted in 8 partial models. The models of the stepwise procedure have the advantage over the OLS results model in that some of the important variables are retained in the analysis.

Goodness of fit

For all models, the proportion predicted correctly was > 85%. The omnibus test and the significance of the chi squared distribution showed the improvement in the explanatory power of the models. McFadden's R^2 for all models ranged between 0.2 and 0.4. This is considered satisfactory [*20*]. The Hosmer and Lemeshow tests for all models showed a distribution of 8 degrees of freedom for chi squared for the different steps, with significance > 0.05. This indicates that the models are an adequate fit to the data. The likelihood ratios for all partial models except partial model-7 gave chi squared less than the critical value, indicating that the full model was an improvement. The exception, partial model-7, included the important variables; chi-squared for the likelihood ratio was greater than the critical value. This model included 2 interaction variables: "other income/have a car" and "family size 6–10/sometimes paid for treatment during the last 3 months". The first interaction variable helped differentiate between the well-off and the poor regarding the variable "other income", and the second was important for the significance of the model.

Based on this and the other goodness of fit criteria, partial model-7 was the preferred model. The dependent variable in the model was "receives free-of-charge public health services"; the independent variables were the sociodemographic variables in Table 2.

Method of analysis

Because of the dichotomous nature of the dependent variable, a logistic regression model was used for the statistical analysis. The dependent variable, whether the

Table 1 **Ordinary least squares estimate of the separate effects of individual characteristics of head of household on free-of-charge health services**

Variable	B	SE	Wald statistic	*P*	95% CI for exp (B)
Family size					
1–6	–0.457	0.421	1.182	0.277	0.277–1.444
7–10	–0.893	0.448	3.966	0.046	0.170–0.986
Education					
Secondary	–0.407	0.340	1.429	0.232	0.342–1.297
University	0.045	0.341	0.017	0.895	0.536–2.043
Occupation					
Employee	–0.241	0.378	0.406	0.524	0.374–1.650
Labourer	–0.437	0.453	0.930	0.335	0.266–1.569
Merchant	–0.987	0.416	5.631	0.018	0.165–0.842
Jobless	0.018	0.711	0.001	0.980	0.253–4.102
Monthly income (Sudanese dinars)[a]					
10 000–15 000	0.239	0.431	0.308	0.579	0.546–2.958
> 15 000–30 000	–0.124	0.433	0.083	0.774	0.378–2.062
> 30 000–50 000	0.292	0.446	0.429	0.513	0.558–3.212
> 50 000	–0.144	0.518	0.078	0.780	0.313–2.389
Financial					
Has other income	0.583	0.275	4.488	0.034	1.04–3.072
Has a car	0.059	0.302	0.038	0.845	0.58–1.916
Has dependents (always)	1.088	0.346	9.871	0.002	1.506–5.853
Has dependents (sometimes)	1.670	0.403	17.138	< 0.001	2.410–11.720
House ownership					
Owned	–0.763	0.362	4.442	0.035	0.229–0.948
Other	0.679	0.412	2.709	0.100	0.879–4.424
Pays school fees					
Always	0.871	0.453	3.701	0.054	0.984–5.797
Sometimes	1.564	0.571	7.491	0.006	1.559–14.635
Episodes of sickness past 3 months					
1	0.577	0.697	0.085	0.408	0.454–6.987
2	1.369	0.658	4.333	0.037	1.083–14.262
> 2	0.686	0.644	1.133	0.287	0.562–7.012
Disease type					
Obstetric & paediatric	–0.434	0.746	0.339	0.560	0.150–2.794
Internal medicine	–0.856	0.570	2.253	0.133	0.139–1.299
Other	–0.186	0.564	0.109	0.741	0.275–2.508
No. of visits to health service unit past 3 months					
1	0.470	0.554	0.719	0.396	0.540–4.741
2	0.825	0.559	2.176	0.140	0.763–6.826
> 2	0.214	0.532	0.162	0.687	0.437–3.512

Table 1 **Ordinary least squares estimate of the separate effects of individual characteristics of head of household on free-of-charge health services** *(concluded)*

Variable	B	SE	Wald statistic	*P*	95% CI for exp (B)
Paid for treatment past 3 months					
Always	–1.473	0.365	16.280	< 0.001	0.112–0.469
Sometimes	0.044	0.376	0.014	0.906	0.501–2.183
Bought drugs past 3 months					
Always	–1.032	0.381	7.352	0.007	0.169–0.751
Sometimes	–0.693	0.445	2.426	0.119	0.209–1.196

[a]*Sudanese dinars (US$ 1 = 267 Sudanese dinars, 2001).*
B = estimated logit coefficient.
SE = standard error of the coefficient.
CI = confidence interval.

respondent received free-of-charge public health services, was given the value 1 if the response was "yes" and 0 otherwise. However, since the linear probability model was heteroscedastic and may predict probabilities beyond the 0, 1 range [*21*], a logistic regression model was used to determine the factors which influenced the dependent variable.

Results

General characteristics of the respondents

The description of the sociodemographic variables in the sample is presented in Table 2. Almost 80% of the respondents were in the age group 31–40 years, the productive age. The family size range indicates that Sudanese society is composed of extended families.

The relatively high level for university education is only true for Khartoum and other big cities. In Sudan as a whole, the literacy rate is 40% for males and 15% for females [*22*].

Monthly income for 86.0% of respondents was ≤ 50 000 Sudanese dinars (DS) (US$ 1 = DS 267, April 2001) (Table 2).

Questions about car ownership and house ownership were asked to differentiate socioeconomic status, assuming that people who had a car and owned a house were of higher socioeconomic status. The high percentage (70.4%) of house ownership indicated that house ownership was not a strong indicator of wealth. The payment for dependents (for 55.6% of respondents) and of school fees (78.9% of respondents) indicated additional expenditure for some families. Family size was also an indicator of family expenses.

The vast majority of heads of households had paid for treatment (86.2%) or paid for drugs (90.0%) in the 3 months previous to the study.

Logistic regression estimation

The selected model provided the best fit for the data. The proportion correctly predicted was 87.9%. McFadden's R^2 was 0.291, which is satisfactory. The likelihood ratio showed the selected model to be an improvement over the full model given that chi squared was lower than the critical value. The Hosmer and Lemeshow test chisquared was 4.11, distributed with 8 degrees of freedom ($P = 0.847$).

Table 2 **Description of the dependent variable and the sociodemographic variables in the sample**

Variable	Value	Frequency (%)	No.
Receives free-of-charge health care			450
Yes	1	13.8	
No	0	86.2	
Age (years)			450
31–40	1	79.1	
41–50	2	20.9	
Family size			450
1–6	1	50.0	
7–10	2	40.9	
11–15	3	9.1	
Education[a]			450
Primary	1	27.1	
Secondary	2	42.7	
University	3	30.2	
Occupation[a]			450
Employee	1	30.2	
Labourer	2	16.3	
Merchant	3	34.4	
Jobless	4	3.3	
Military and police	5	15.8	
Monthly income[a] *(Sudanese dinars)*			409
≤ 10 000	1	19.3	
> 10 000–15 000	2	21.5	
> 15 000–30 000	3	27.4	
> 30 000–50 000	4	17.8	
> 50 000	5	14.0	
Other source of income			450
Yes	1	37.8	
No	2	62.2	
Have a car			450
Yes	1	28.0	
No	2	72.0	
Dependents			450
Always	1	41.6	
Sometimes	2	14.0	
None	3	44.4	
House ownership			450
Owned	1	70.4	
Other	2	13.8	
Rented	3	15.8	
Pays school fees & pays for others[b]			436
Always	1	70.6	
Sometimes	2	8.3	
Never	3	21.1	
Episodes of sickness past 3 months			304
1	1	21.2	
2	2	22.0	
> 2	3	44.9	
None	4	11.9	
Disease type			307
Surgery & orthopaedics	1	7.2	
Obstetrics & paediatrics	2	8.1	
Internal diseases	3	49.8	
Other	4	34.9	
No. of visits to health service unit past 3 months			362
1	1	25.1	
2	2	18.8	
> 2	3	42.5	
None	4	13.5	
Paid for treatment past 3 months			450
Always	1	66.2	
Sometimes	2	20.0	
No	3	13.8	
Bought drugs past 3 months			450
Always	1	69.8	
Sometimes	2	20.2	
No	3	10.0	

[a]*Sudanese dinars (US$ 1 = 267 Sudanese dinars, 2001).*
[b]*Head of household pays for children who are not his/her own children.*
Primary education includes illiterate, khalwa *(preschool education where Quran, Arabic language and mathematics are taught) and primary school education; secondary education includes secondary and high-secondary schools; university education includes graduates and postgraduates.*

The variables "merchant", "other income", "always have dependents", "sometimes have dependents", "own a house", and "2 visits to health service unit during the last 3 months" were statistically significant (Table 3). In addition, 2 interaction variables were relevant, i.e. "other income/have a car" and "family size 1–6/sometimes

Table 3 **Logistic regression analysis (dependent variable = received free-of-charge public health services)**

Variable	B	Standard error	*P*-value	Exp (B)	95% CI
Employment					
Employee	–0.545	0.504	0.279	0.580	0.216–1.556
Labourer	–0.901	0.621	0.147	0.406	0.120–1.372
Merchant	–1.639	0.600	0.006	0.194	0.060–0.629
Jobless	0.676	0.882	0.444	1.966	0.349–11.048
Socioeconomic indicator					
Other income	1.059	0.434	0.015	2.884	1.231–6.756
Have a car	0.771	0.541	0.154	2.163	0.749–6.246
Other income/have a car	–2.421	1.034	0.019	0.089	0.012–0.675
Always have dependents	1.048	0.469	0.026	2.853	1.137–7.161
Sometimes have dependents	1.736	0.553	0.002	5.677	1.919–16.791
Own a house	–1.377	0.493	0.005	0.252	0.096–0.663
Other	–0.004	0.541	0.995	0.996	0.345–2.877
Pays school fees					
Always	0.442	0.535	0.409	1.555	0.545–4.437
Sometimes	–0.040	0.732	0.956	0.961	0.229–4.030
No. of visits to health service unit past 3 months					
1	1.237	0.680	0.069	3.446	0.909–13.065
2	1.542	0.705	0.029	4.673	1.173–18.620
> 2	0.741	0.676	0.274	2.097	0.557–7.897
Family size					
1–6	0.992	1.190	0.404	2.697	0.262–27.763
7–10	–0.449	1.290	0.728	0.638	0.051–7.998
Paid for treatment past 3 months					
Always	–1.371	1.347	0.309	0.254	0.018–3.557
Sometimes	2.159	1.401	0.123	8.660	0.556–134.860
Always/family size 1–6	–0.819	1.535	0.594	0.441	0.022–8.934
Sometimes/family size 1–6	–3.376	1.620	0.037	0.034	0.001–0.817
Always/family size 7–10	0.186	1.633	0.909	1.204	0.049–29.544
Sometimes/family size 7–10	–1.337	1.643	0.416	0.263	0.010–6.578
Constant	–2.249	1.374	0.102	0.106	

Correct prediction is 87.9%, χ^2 for the whole model = 85.111 distributed with 24 degrees of freedom, significant at $P < 0.001$ *and McFadden's* $R^2 = 0.2912$.
CI = confidence interval.

paid for treatment last 3 months". Although the variable "pays for school fees" was not significant, it was important for the significance of the model (goodness of fit).

The odds ratio for the head of household having other income indicates that this group was almost 3 times more likely to receive free-of-charge public health services than those who did not have other income. The relatively small confidence intervals indicate that the sample mean must be close to the true mean. Both the intervals are > 1, which indicates that the relationship between "has other income" and "receives free-of-charge public health services" found in this sample is true for the whole population.

The odds ratio for receiving free-of-charge public health services for heads of households who visited a health service unit twice during the previous 3 months was 4.67. Both confidence intervals were > 1, indicating that the relationship is true for the whole population. Although the upper limit of the confidence intervals was a little high (18.62), the odds ratio (exp B) was relatively small (4.67) so the sample mean must be close to the true mean, and a good representation of the whole population.

Although the variables "merchant", "other income/have a car", "own a house" and "family size 1–6/sometimes paid for treatment in the last 3 months" were statistically significant, the odds ratios were < 1, indicating that these respondents were less likely to receive free-of-charge public health services.

Discussion

Overall, 13.8% of the participants used public health services free of charge. Together with the positive results for logistic regression analysis, this indicates that both the rich and the poor benefit from the free-of-charge health services. The negative odds ratios in the logistic regression analysis findings show that the merchant who owns a house, has other income and has a car is less likely to receive free-of-charge public health services. This indicates that there is no direct impediment to the cost recovery policies nor is there exploitation by the well-off.

The relatively high percentage of merchants and the free work category (34.4%) indicate the migration to the business sector. These wages cover a small proportion of family expenses (about one quarter) [*23*]. Having other income and ownership of a car also give an indication of the socioeconomic status of the family. The raising of other income in particular is an example of the family's way of coping with the income–expenditure gap.

Other income is generally considered in studies in developing countries as a coping approach or an adjustment method that people pursue to engineer possible available alternatives to balance the income–expenditure gap and handle possible difficult situations. Strategies to generate other income include: group solidarity strategies, which include increasing the number of income earners (e.g. work of women and children); external support mechanisms (e.g. transfers and remittance of migrants); income diversification strategies (e.g. involvement in secondary activities besides the main occupation such as doctors working in the public and private sectors at the same time); and new forms of asset utilization (e.g. turning private cars into taxis) [*23*].

To differentiate between poor and rich people, a new variable "has other income/has a car" was used on the assumption that "has a car" is an indicator of wealth. The single variable "has other income" had a positive odds ratio, which indicates that both the poor and the well-off use the free-

of-charge public health services. The odds ratio for "has other income/has a car" was negative, indicating that the well-off were less likely to receive free-of-charge public health services.

The high proportion of respondents who paid for treatment (86.2%) or bought drugs (90.0%) during the previous 3 months is an indicator of the high demand for health services. The unexpected significance of "always paid for treatment" and "always paid for drugs" during the previous 3 months is an indication of the existence of under-the-counter payments for health care services.

The response to questions on the number of episodes of sickness and frequency of visits to health service units for treatment during the previous 3 months along with the frequency of internal diseases (49.8%) confirmed this high demand for health services. The frequency of internal diseases shows that Sudan still suffers from the old communicable diseases such as malaria and that noncommunicable diseases such as diabetes and high blood pressure are on the increase. Results from the same survey show that malaria is on the top of the morbidity list followed by diabetes and hypertension.

The frequency of visits to health service units is an indication of the demand for care of the household during the past 3 months. The debate over the price and income elasticity of the demand for medical care underlies in part government efforts to continue and establish the cost recovery policies. On the other hand, it alerts the government to the negative impact of the cost recovery policies on utilization of health services, especially for the poor. A health demand study has shown that acute medical care is relatively insensitive to its cash price [*24*]. Recently, one study found that fees may adversely affect utilization by low income groups [*25*]. A 2001 Sudanese study demonstrated that if all types of medical care compensation are considered, cash outlays for private medicine (including traditional healers, drugs, etc.) tend to represent a large proportion of total health expenditures by people of low socioeconomic status in developing countries. This insensitivity to price suggests that the government can continue to establish cost recovery policies that favour the poor [*12*].

The variable "has dependents" is one of the strongest indicators of extra household expenditure in developing countries. This puts a burden on the head of household. The high dependency indicator in Sudan (93.5%) is due to poor economic status, which forces the government not to fulfil the basic human rights of housing, health care, education and opportunities for work. The extended family structure of the society together with the well-established kinship institution aggravates this problem. The vast majority of the population lives below the absolute poverty line. Women and children account for 45% of the population [*24*]. Responsibility towards parents and siblings weighs heavily on the head of household. The high dependency rate continues to have a negative impact on the household budget. More study is needed to explore this area and to find scientific guidelines for effective solutions.

Although the poor do benefit from the free-of-charge policy, many points still need to be considered. The absence of a referral system raises the question whether all those using the free-of-charge services are emergency cases. How can we make the well-off pay for their emergency needs? How can we stop the huge losses in medical supplies?

Conclusion and policy implications

The group most likely to receive free-of-charge public health services were those who had other income and had dependents. Given their high demand for health services and given that this group is likely to be the target population for free-of-charge health services, the cost recovery policies in Sudan are not likely to be threatened by exploitation by the well-off. Therefore, the government can continue to offer free-of-charge public health services at emergency departments along with effective measures to prevent misuse.

One of the top priorities facing health planners in Sudan is to establish a health referral system. To do this, the government needs to improve the quality of services at the health centres by keeping the revenues within these institutions. The retention of the revenue at the local level, as a supplement to public health care financing, would facilitate and improve the quality of services at the local level and keep the system viable [*2,5,8,26*].

Implementing free-of-charge public health services in Sudan was a political decision taken without technical studies and support. There is a need for a better understanding of the packages of policies that meet the multiple objectives that politicians and the community pursue. If the government insists on executing the new free-of-charge policy at public health services in the class C wards (3rd class), this may need careful and scientific handling.

The government needs to assess the limits of cost recovery policies under a variety of geographical, socioeconomic and service delivery settings. Research is needed on service costs to facilitate rate settings. The involvement of the community in the management process would enhance the importance of cost recovery policies as an effective community financing tool and would encourage the community to foster these policies [*5,24*].

In Sudan it seems to be very difficult to establish a full cost recovery policy. On the other hand, it is also difficult to provide totally free-of-charge public health services. So, if user fees are a deterrent to utilization by the poor, improving access by approaches such as subsidies, waivers, and a sliding fee system could be potential corrective measures. The administrative feasibility of these systems would, however, need to be considered.

Without proper management, it will be very difficult to effectively implement the cost recovery policies for measures aimed at protecting the poor, payment collection and revenue allocation.

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List of Medical Journals in the Eastern Mediterranean Region

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