User fees & the cost of irrational prescribing

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Abstract

Lack of funds, insufficient drug availability and irrational prescribing undermine primary health care in Nepal. This study measured the cost of irrational prescribing and the impact of different kinds of user fee on the cost of irrational prescribing. The study took place within cost-sharing drug re-supply schemes (CSDS) in rural hilly E. Nepal, where the drug supply is supplemented and a nominal user fee charged. A before-after non-randomized controlled trial was conducted. The cost per prescription, the cost of irrational prescribing (wastage) per prescription and % drug cost recovery were measured. It was found that more than one-third the value of all drugs dispensed to patients had been irrationally prescribed and that item fees were associated with 20% financial savings due to reduced irrational prescribing as compared to flat fees. If all irrational prescribing were eliminated it maybe that an amount of drugs equivalent to value of the annual HMG drug indent would last the year round in many health facilities.

Keywords: Drug; prescribing; primary health care; cost; cost-sharing; Nepal.

Introduction

An inability to spend the minimum US $12 per capita on primary health care in the public sector, as recommended by World Bank (World Bank 1993), undermines primary health care in Nepal and many other developing countries. As a result of inadequate funding in Nepal there is a lack of essential drugs and manpower contributing to poor quality of care, irrational use of drugs and low utilization in public primary health care facilities (Tamang & Dixit 1992). The problem of lack of finances resulting in poor quality of care can be approached from 2 angles – raising extra funds and improving efficiency.

Since the "Bamako Initiative" was launched by the UNICEF in 1987, many countries have introduced user fees in order to raise funds to buy more essential drugs and improve the quality of care. Most of these schemes have been evaluated from the point of view of financial and management efficiency and utilization only, and not from the point of view of quality of care. The amount of money raised from user fees in many drug revolving funds has been relatively low (Cross *et al* 1986, Foster 1991, Foster & Drager 1988, Holloway 1998). Often the funds raised are not used to purchase drugs and drug availability remains poor (HMG 1995). A review of the economic literature (McPake 1993) has shown that user fees will usually raise revenue but only in small amounts and usually at the expense of equity, and also that people are not willing to pay for poor quality of care.

The irrational use of drugs is one major source of inefficiency and non cost-effectiveness within the health sector world-wide. Both providers, including prescribers, dispensers and retailers, and consumers use drugs irrationally (Laing 1990, Hogerzeil *et al* 1993, Gilson *et al* 1993, Greenhalgh 1987, Hardon 1987). Much of the irrational use is potentially very harmful and inappropriate drug use by prescribers may encourage inappropriate self-medication by consumers (Greenhalgh 1987). Apart from being potentially harmful, irrational drug use wastes scarce resources, both drugs and money, so undermining the raising of funds through user fees. There have been few studies quantifying the costs of irrational drug use.

There is some evidence that the user fees themselves may affect the rational use of drugs. Many countries charge a single fee per prescription for ease of administration. However, such charging may actually promote irrational use due to consumer demand (Chalker 1992, Fryatt *et al* 1995). In Nepal, a recent study by the authors showed that charging per item of drug decreases the problem of over-prescribing so resulting in improved rational drug use (Holloway & Gautam 1997). This study is a follow up to that one. The study described in this article was undertaken at the same time and within the same areas as the study previously published. However, whereas the previous article described prescribing habits, this article describes the financial costs of irrational prescribing. For ease of understanding, some points mentioned in the previous article are repeated in this article and others are referred to.

The objectives of this study were to:

1. quantify the costs of irrational prescribing;

2. compare the costs of irrational prescribing between areas charging a flat prescription fee and those charging a fee per drug item;

Obviously poor drug availability will affect prescribing, and hence, prescribing costs. However, it was the aim of this study to describe prescribing costs in the context of adequate drug availability only.

The government of Nepal (HMGN) supplies essential drugs to health facilities once per year and these drugs, which are dispensed free, often run out after 3-5 months (MOH & MLD 1995). Thereafter patients must buy drugs at high prices from shops or do without drugs. HMGN is now planning to introduce user fees in a nation-wide revolving drug scheme programme, the Community Drug Programme (CDP), with the aims of providing year-round drug availability and promoting rational drug use (MOH & MLD 1995). In order to address these problems, the Britain Nepal Medical Trust (BNMT), an INGO, has run, in cooperation with HMGN's Ministry of Health (MOH), cost sharing drug schemes (CSDS), in public health facilities in 4 hill districts of Eastern Nepal for the past 7-17 years. In the CSDS, BNMT supplies essential drugs to the Ilaka health posts and district hospital once the annual indent has finished. Patients are charged a small user fee (whether the drugs are supplied by HMG or BNMT) and the money is collected and used by BNMT to buy more drugs. About half the drugs used by health facilities are supplied by BNMT which recovers half of its drug costs ie., HMG pays one-half, BNMT one-quarter and patients one-quarter of the drug costs.

Method

The study occurred in all 9-11 "Ilaka" health posts (HPs) and the district hospital in 3 CSDS districts. Since the project relied on the services provided by BNMT, random choice of facility was not possible. The 3 different districts were rural and similar in terms of population and socio-economic status according to government statistics (CBS 1992 & 1995). It was assumed that the study population did not change significantly during the study period. Case-mix patterns between districts were similar (MOH 1995).

Study Design

The study was a before-after non-randomized controlled trial. The 3 CSDS districts operated the same kind of cost sharing drug supply scheme, with the same 'flat' nominal fee per prescription from 1990 to 1992. In 1993-4, the charging system was changed such that there were 3 kinds of fee as shown in table I below. Fee details are given in table II and were set so that the average fee per prescription (containing 2 drug items, 1 cheap & 1 expensive) was the same in all districts (whichever fee system was used) this being less than one-third of the average day's cash income of village households (Kafle & Gartoulla 1993).

Table I: Time-table of User Fee Implementation.

Stage	*Time Period*	*Control Areas*		*Intervention Areas*	
		District	*Fee*	*District*	*Fee*
1	1991-2	PDS, TDS, BDS	Flat	-	-
2	1993-4	PDS, TDS	Flat	BDS	2-band item fee
3	1994-6	PDS	Flat	BDS TDS	2-band item fee 1-band item fee

BDS: Bhojpur TDS: Taplejung PDS: Panchthar

Implementation of the different fee-types required the same manpower and 87-96% of expected monies was actually collected from each district with a different fee-type (Holloway 1998).

Table II: User Fees in CSDS Districts.

Fee Type	*Fee Details (£1=Rs. 70-75/- in 1993 & Rs. 80/- in 1995)*

Flat Fee	Rs. 5/- (HP) & Rs. 6/- (hospital) per prescription, covering all drugs for a full course of treatment. The fee in PDS during the period 1994-5 was increased to Rs. 7/- (HP & Rs. 8/- (hospital) per prescription due to inflation and in order to better match the other fees in overall amount charged per prescription.
2-Band Item Fee	Rs. 5/- per expensive item (antibiotics & injections) and Rs. 2/- per cheap item, (HP & hospital) covering a full course of treatment.
1-Band Item Fee	Rs. 3/- per item (HP) & Rs. 5/- per item (hospital), whether cheap or expensive and covering a full course of treatment.

Data Collection

Baseline data was collected in 1992 and the same kind of data was collected in 1995. The 'flat' fee was regarded as the 'control' fee against which other types of fee were compared. The basic sampling unit was the health facility. There were 10-12 facilities for each kind of fee system. The main outcome measures included.

1. the actual average cost per prescription (Px);

2. the average irrational prescribing cost per prescription ie., wastage per prescription due to irrational prescribing.

Other outcome measures including WHO indicators (WHO 1992) were collected but these are described in the previously published article (Holloway & Gautam 1997) and not here. % cost recovery for drugs dispensed was also calculated from health facility and BNMT records.

Actual costs per prescription were calculated from the monetary value of total quantities of drugs dispensed (according to health facility records) divided by the number of prescriptions occurring over the year ie:

Actual Cost per Px =

In all the CSDS facilities a drug consumption or dispensing register was kept. In it were recorded the date, prescription number and number of units (tablets) of each drug dispensed. Running totals of all the units of all drug items were kept. In this way a total amount of drugs dispensed (whether HMGN or BNMT supplied) was calculated and the amount valued using the wholesale prices BNMT paid. 1992 drug prices were used for 1992 data and 1995 prices for 1995 data. In fact there was virtually no change in prices during this time due to improved procurement efficiency and the expansion of the therapeutics industry (Holloway 1998). Dispensed drugs as opposed to prescribed drugs were used since some prescribed drugs may not be dispensed. Prescribed drugs that are not dispensed do not contribute to the actual costs per prescription. In fact 81- 88% of prescribed drugs were dispensed during 1995 (Holloway & Gautam 1998).

The irrational prescribing cost per prescription (or wastage per prescription due to irrational prescribing) was calculated by subtracting expected costs from actual costs ie:

Wastage = Actual costs – Expected costs

Expected costs pre prescription were calculated from a random sample of at least 150 carbon copy prescriptions per health facility per year collected for 1992 and 1995. The details of these prescriptions were entered into a computer data-base using Epi Info 6.03 software. Diagnosis frequency lists according to health facility and different age groups were derived from this database and later imported into a microsoft excel spread sheet. A list of expected cost for each different diagnosis and age group was separately compiled using HMGN MOH's Standard Drug Treatment Schedule (HMG 1993) and BNMT wholesale drug prices and entered into an excel spreadsheet. The two files, one of the frequency of diagnoses and the other of expected costs of diagnoses were then "merged & matched" in the same spreadsheet file and the average expected cost per prescription per health facility calculated.

Explanatory, possibly confounding, data such as drug availability and health staff attendance were collected from health facility observation and records respectively during supervisory visits done throughout 1992-6. Drug availability was assessed by doing a stock check at each supervisory visit and recording the number of therapeutic groups missing and also whether antibiotics or procaine benzyl penicillin (the most commonly used injection) were absent or not. Staff availability was measured by examining the staff attendance register at each health facility for the months of Jesth, Asar, Mangsir and Pous in both 1992 and 1995. Patient attendance was measured by examining the serial numbers on the carbon copy prescriptions. This excluded "non out-patient clients" who did not need a prescription and were attending for conditions dealt with under the vertical programmes for which no charge is made and which are run by the MOH eg., patients needing family planning, ante-natal visits, TB and leprosy patients. It was felt that the carbon copy prescriptions were more reliable than patient registers which are often poorly filled in. Nevertheless a very small number of patients not requiring drugs or a prescription may have been excluded.

Data Analysis

Analysis was done at the facility level, using Wilcoxon rank sum test to compare districts pre-intervention and post intervention. Explanatory variables were also examined, their confidence intervals calculated and compared.

Results

The main results are shown in table III. Prescribing costs will be affected by the number and type of drug items and the number of units of each drug item prescribed and dispensed. Therefore these are shown in table III so as to make comparisons with the cost changes. The number of items per prescription was also described in the previous article published by the authors (Holloway & Gautam 1997) together with other details concerning prescribing habit (eg., antibiotic & injection usage), which are not repeated here. The main finding shown in table III is the large differences between expected and actual prescription costs ie., wastage due to irrational prescribing in all districts.

Table III shows that the item fees were associated with a reduced number of items being prescribed and either a reduction or lesser increase in actual costs per prescription. Expected prescription costs changed little during 1992-5 and were much lower than actual prescription costs in all districts. However, in the case of the flat fee district the discrepancy between the actual and expected costs ie., the cost of irrational prescribing (wastage), increased greatly during 1992-5 whereas the wastage in the item fee districts remained similar. One might wonder why prescription costs and wastage did not reduce by a greater margin in the item fee districts since the number of items per prescription did reduce greatly. Part of the reason for this is the increase in the number of units of each drug item prescribed during 1992-5. Although there was an increase in all districts the increase was greatest in the 2-band item fee district and least in the flat fee district. It may be that though item fees promoted the use of less items there was some "compensation" for less items in the form of more units.

Table III: Prescribing Indicators During 1992 and 1995.

Outcome Variables	*Change in Indicators*	*Panchthar (11 HPs, 1 Hosp) Flat fee*	*Taplejung (9 HPs, 1 Hosp) 1-band item fee*	*Bhojpur (10 HPs, 1 Hosp) 2-band item fee*
Average number of	1992	2.7	2.6	2.5
items per	1995	2.7	1.8	2.0
prescription	Change	**0.0**	**0.8**	**-0.5**
p<0.001	95% CI	-0.2 to +0.2	-1.0 to -0.6	-0.7 to -0.2
Average number of	1992	11.3	13.5	11.9
units per drug item	1995	13.6	16.3	15.3
	Change	**+2.3**	**+2.8**	**+3.4**
p>0.05	95% CI	+1.0 to +3.6	+1.0 to +4.7	+2.3 to +4.5
Average actual cost	1992	22.1	23.9	22.8
per prescription	1995	31.1	22.6	26.3
(NRs)	Change	**+9.0**	**-1.3**	**+3.5**
p<0.05	95% CI	+5.7 to +12.2	-4.9 to +2.3	+0.4 to +6.5
Average expected	1992	14.9	15.1	16.9
cost per	1995	14.7	15.8	17.6
prescription (NRs)	Change	**-0.2**	**+0.7**	**+0.7**
p>0.05	95% CI	-2.2 to +1.8	-3.1 to +4.5	-0.8 to +2.2
Average wastage	1992	7.2	8.8	6.0
cost per	1995	16.4	6.8	8.7
prescription (NRs)	Change	**+9.2**	**-2.0**	**+2.7**
p<0.05	95% CI	+5.1 to +13.3	-7.5 to + 3.5	-0.5 to +5.9

Analysis done at the level of the health facility.

The results concerning expected costs per prescription may have been influenced by the recording of the diagnoses on the prescriptions. Poor recording would result in fewer diagnoses being counted and hence lower expected costs. However, the differences in expected costs per prescription between districts were small and also the differences between 1992 and 1995 in the number of diagnoses recorded per prescription were very low. The differences in the number of diagnoses recorded per prescription were -0.04 (95% CI -0.24 to +0.16) in Panchthar, +0.15 (95% CI -0.22 to +0.52) in Taplejung and +0.07 (95% CI -0.08 to +0.22) in Bhojpur.

Table IV shows the total costs per district of irrational prescribing and the wastage due to irrational prescribing as a % of total drug use. % cost recovery for drugs dispensed is included for comparison. The amounts of money wasted are considerable and approximately one-third of all drugs were wasted in all districts in 1992 and the item fee districts in 1995. Wastage in the flat

fee district increased to half of all drugs
used in 1995. The user fee charged in the CSDS facilities were low and so, as expected, drug cost recovery is also low. However, if irrational prescribing were reduced, there would be considerable increases in drug cost recovery.

Table IV: Total Cost of Irrational Prescribing.

Financial Indicators	*Change in Indicators*	*Panchthar Flat fee*	*Taplejung 1-band item fee*	*Bhojpur 2-band item fee*
% Drug cost	1992	20.4%	20.4%	21.0%
recovery	1995	28.7%	28.5%	24.9%
	Change	**+8.3%**	**+8.1%**	**+3.9%**
Total cost of	1992	217,285	187,603	491,686
irrational	1995	443,915	184,201	481,228
prescribing (NRs)	Change	**+226,630**	**-3,402**	**-10,458**
Irrational	1992	28.6%	31.8%	36.3%
prescribing costs	1995	51.4%	33.6%	34.7%
as a % of drug use	Change	**+22.8%**	**+1.8%**	**-1.6%**

Analysis done at the level of the district.

Drug availability, shown in table V, showed no significant difference either between districts or between 1992 and 1995. There was, on average during any one supervisory visit, less than 2 of 13 main therapeutic groups absent. The risk of all antibiotics being absent was only 0-3% and of procaine benzyl penicillin injection only 2-10%.

Staff availability is shown in table VI. Although staffing patterns were different between districts there was deterioration in numbers of prescribing staff in post in all districts between 1992 and 1995. Staff availability was much poorer in Taplejung as compared to the other 2 districts (which had very similar staffing patterns) but the difference was not statistically significant. Improvements in prescribing and prescription costs occurred despite deterioration in staffing patterns and were similar in both item fee districts.

Table V: Drug Availability.

Drugs out of stock, on average, during one supervisory visit (95% CI incl.)	*Time Period*	*Panchthar visits/facility: 9 during 1992-5 3 during 1995*	*Taplejung visits/facility: 9 during 1992-5 3 during 1995*	*Bhojpur visits/facility: 12 during 1992-5 4 during 1995*
Number of Therapeutic	1992-52	**1.3 (+0.8 to +1.8)**	**1.8 (+1.1 to +2.5)**	**1.4 (+1.0 to +1.8)**
groups1	1995	**1.3 (+0.9 to +1.7)**	**1.3 (+0.7 to +1.9)**	**1.3 (+0.9 to +1.7)**
Antibiotics	1992-52	**0.0**	**0.03 (-0.03 to +0.09)**	**0.0**
	1995	**0.0**	**0.03 (-0.03 to +0.10)**	**0.0**
Procaine Benzyl Penicillin (PPF)	1992-52	**0.1 (+0.05 to +0.20)**	**0.07 (-0.03 to +0.12)**	**0.03 (+0.17 to +0.37)**
injection	1995	**0.1 (+0.04 to +0.26)**	**0.09 (-0.04 to +0.23)**	**0.02 (-0.02 to +0.07)**

1 Drugs were divided into 13 therapeutic groups as follows:

antibiotics, procaine benzyl penicillin, cotrimoxazole, eye ointment/drops, benzyl benzoate, whitfield ointment, Oral Rehydration Salt, Intravenous fluids, analgesics, anti-helminthics, metronidazole, iron/folic acid, antacid.

2 Only one supervisory visit per HP was available for 1992 as opposed to 3-4 visits per HP per year from 1993 onwards. Therefore 1992 drug availability is judged according to averages of 1993, 1994 and 1995 data.

Table VI: Staff Availability.

No. of days per 100 without staff	*Year*	*PDS* *Flat fee*	*TDS* *1-band item fee*	*BDS* *2-band item fee*
HA & SAHW	1992	75	82	62
Senior Prescriber	1995	76	99	79
AHW & ANM1	1992	12	27	9
Junior Prescriber	1995	21	40	35
HA & SAHW, AHW & ANM1	1992	**11** **(+2 to +20)**	**22** **(+9 to +35)**	**4** **(-1 to +10)**
All Prescribers (95% CI incl.)	1995	**20** **(+6 to +33)**	**40** **(+25 to +55)**	**24** **(+16 to +32)**

HA: Health Assistant; (S)AHW: (Senior)Auxiliary Health Worker; ANM: Auxiliary Nurse Midwife.

1 Figures exclude the district hospitals where there was never any total absence of junior prescribers.

Total out-patient attendance in each district did not change significantly between 1992 and 1995. In Panchthar attendance was 38,150 in 1992 and 32,657 in 1995. In Taplejung attendance was 26,359 in 1992 and 26,618 in 1995. In Bhojpur, attendance was 53,049 in 1992 and 55,681 in 1995. The top 4 morbidity categories in all 3 districts were respiratory disease, skin disease, diarrhoeal disease and worms. These categories were followed by indigestion and peptic ulcer disease, injuries, eye problems, genito-urinal problems and anaemia.

Conclusion

The results show that one-third or more of all drugs dispensed to patients were prescribed irrationally and therefore, in effect, wasted. These costs are real since they all relate to drugs dispensed as opposed to prescribed. Even in CSDS facilities with good drug availability 12-19% of prescribed drugs are not dispensed (Holloway & Gautam 1998). A flat fee was associated with the prescribing of more items and also, as shown in the previous study, with the use of more antibiotics and injections (Holloway & Gautam 1997). This greater use of drugs was, in turn, associated with greater prescriptions costs and greater wastage due to irrational prescribing. However, prescription costs and wastage were not as low in the item fee districts as expected, considering the improvements in prescribing. This was because more units per drug item were prescribed in item fee areas as opposed to the flat fee area. The reason for the prescription of more units is unknown but possibly may have been a "compensation" for the patient receiving less items. Whether this "compensation" was demanded by the patient or felt necessary by the prescriber is unknown.

The % drug cost recovery was low. This was as expected since the user fees were very nominal. The slight increase in cost recovery between 1992 and 1995 was related to the changes in user fees, there being a total average fee increase of NRs. 2/- per patient. If there were no "wastage" due to irrational prescribing, drug cost recovery could increase to 60% in the item fee districts and 80% in the flat fee district (cost recovery + wastage). While it may not be possible to eliminate completely all irrational prescribing, this study does show that the use of item fees (covering a full course of each item) can reduce the amount of drugs wasted through irrational prescribing by about 20%. Such a saving is surely very worthwhile in the context of scarce resources and where the MOH HMG annual drug indent lasts only 3-5 months (MOH & MLD 1995). Indeed were there no irrational prescribing at all it maybe that an amount equivalent in value to the HMGN annual drug indent would last the year-round in many health facilities.

The project area was rural, remote and mountainous, with no easy alternative drug supply in nearby shops except in the case of the district hospitals. The relative monopoly of the government health facilities and paucity of alternative sources of allopathic drugs in such areas may have facilitated the success of item fees for containing patient drug costs through improved rational prescribing. However, the health facilities involved in this study are representative of those available to at least half the population of Nepal, and the "item" fee strategy was just as easy to administer, requiring no more manpower for implementation, monitoring or supervision than the "flat" fees. Therefore, the study findings should be directly applicable to other hill and mountain districts in Nepal and may generalize to rural settings in other developing countries. Since most health posts in Nepal charge "flat" fees (albeit for registration not drugs) and "flat" fees are associated with wastage due to irrational over-prescription, there is an urgent need to

review national policy concerning guidelines on the types of user fee to be charged.

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