

Research reports

Performance of village pharmacies and patient compliance after implementation of an essential drug programme in rural Burkina Faso

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After implementation of a nation-wide essential drug programme in Burkina Faso a prospective study was undertaken consisting of non-participant observation in the health centre and in the village pharmacy, and of household interviews with the patients. The study covered all general consultations in nine health centres in three districts over a two-week period as well as all client-vendor contacts in the corresponding village pharmacies; comprising 313 patients in consultations and 498 clients in eight village pharmacies with 12 vendors involved in dispensing 908 drugs. Additionally patients were interviewed in their households.

Performance and utilization of the village pharmacy: 82.0% of the drugs prescribed in the health centres were actually dispensed at the village pharmacy; 5.9% of the drugs were not available at the village pharmacy. Wrong drugs were dispensed in 2.1% of cases. 41.3% of the drugs dispensed in the village pharmacy were bought without a prescription. Differences are seen between the districts and are put in relation to different onset of the essential drug programme.

Patient compliance: Patients could recall the correct dosage for 68.3% of the drugs. Drug taking compliance was 63.1%, derived from the pills remaining in the households. 11.5% of the drugs had obviously been taken incorrectly to such an extent that the occurrence of undesired drug effects was likely.

The study demonstrates the success of the essential drug programme not only in performance but also in acceptability and utilization by the population.

Introduction

Burkina Faso has approximately 10.5 million inhabitants and is divided into 30 provinces. This study took place in the districts (Tougan, Nouna, Solenzo) of the provinces Sourou and Kossi in north-west Burkina Faso. More than ten different ethnic groups live in the studied area, most of them having their own language.

There is one medical centre in every district capital and 6 to 14 health centres in the surrounding villages. Here each health centre covers a population of 10 to 15 thousand. The staff of a health centre is paid by the state, and generally consists of one nurse, a nurse aid and a midwife. Until 1993 the services in the health centres were free of charge, but patients had to buy the prescribed drug in private pharmacies

which were mostly located in the district capital, not in the village where the consultation took place. Often drugs were not available in the pharmacies or patients could not afford to buy them. Traditional and non-formal suppliers of health care play an important role in this area. In fact utilization of the rural health services was found to be low: within the population of a 10 km catchment area, approximately 30% of consultations in a year were curative.

Partly for these reasons the Government decided to start a reform of rural health services by implementing strategies of the Bamako Initiative in 1993. The core of this reform was the introduction of the essential drug programme. With financial and technical support from the World Health Organization and the GTZ (German Society for Technical Co-operation), village pharmacies have been inaugurated in all villages with health centres, an essential drug list and treatment guidelines have been published, nurses have received refresher courses on essential drugs, and drug vendors have been trained on four-week courses to sell the drugs in the new village pharmacies. A village committee is now in charge of its village pharmacy and decides how the income of the village pharmacy may be directed to local health services (e.g. by constructing new housing for health personnel).

The essential drugs are purchased on the world market by a national distributor. They are then distributed to district drug depots from where village pharmacies can buy the drugs at standardized prices much lower than on the private market.

By March 1994, drug depots and village pharmacies had been installed, and nurses and vendors had participated in additional workshops on rational use of essential drugs, in two of the studied districts. In the third district the programme was fully implemented by May 1995.

The question arose of how successful the implementation of the programme was and how patients use the essential drugs (Guimier 1995). Various studies have investigated performance of village pharmacies by assessing availability of drugs and other performance parameters (McPake et al. 1993; Litvack and Bodart 1991), but utilization of village pharmacies is not considered in relation to utilization of private drug sellers.

The objective of this study was therefore to assess (1) the performance of the village health pharmacies,

(2) the utilization of different drug selling places by the clients, and (3) their drug taking compliance in a prospective study starting at the general out-patient consultation. This work is part of a survey investigating the quality and the effectiveness of health care services from consultation in the health centre, through the dispensing of drugs in the village pharmacy to the drug taking behaviour of the patient. This survey took place within the PRAPASS project which has been gathering health related demographic data through household interviews in two of the studied districts since 1992. We believe this to be the first published study to investigate drug taking compliance in the rural setting of a West African country.

Methods

Study design and study population

Guided, non-participant observation was undertaken simultaneously in the health centre and in the village pharmacy, and was combined with household interviews with the corresponding patients. The field study lasted from June 25 to July 26, 1995 and took place in nine health centres and their corresponding catchment areas in three districts. The study covered all general consultations (except wound treatment) and all client-vendor contacts during a two-week observation period. This included 313 patients in consultations, 498 clients in eight village pharmacies, and 12 vendors involved in dispensing 908 drugs. In one village in the district of Tougan the pharmacy was not functioning; analysis on performance of village pharmacies therefore excludes this village. In two districts, 170 household interviews were carried out.

Guided, non-participant observation

Observers in the health centre documented all the prescriptions made by the prescribers, while other observers in the village pharmacy observed all purchases during the two weeks, both those with and those without prescription. The observers did not intervene in the activities of the nurses or the vendors, neither by helping nor by giving any comments. Additionally the identity of the patient and the location of his household was documented by the nurse, in order to prevent the patient suspecting the prospect of a visit by the research team when asked about his address.

Nurses were invited several weeks before and informed about the intended study. The presence of

observers was explained by the fact that patient compliance was to be investigated, but the nurses and vendors were not told that the performance of the pharmacy would also be investigated. During the two-week observation period the observers lived in the village close to the village pharmacy, thus allowing them to observe drug selling activities even outside normal opening hours. Observation forms were designed in a highly structured manner following the INRUD recommendations (Arhinful et al. 1994). These observation forms included the documentation of communication problems between client and vendor, duration of purchase, content of possible negotiations, reasons for incomplete purchases and other accompanying aspects of the drug purchase. The observation forms were tested and revised in two pre-tests in a village not included in the study.

Household interviews

The prescribers in the health centre were asked to fill out a special identification form for each patient asking detailed information on location of household, ethnic group, names of family heads and household heads. The household interviews were realised only in the districts of Nouna and Tougan. Since Solenzo does not belong to the PRAPASS surveillance zone, locally experienced interviewers were not available in this district. 170 out of 190 patients (89%) were located and interviewed in their household. The visit at the household was not announced and took place at the middle of the expected treatment duration in order to assure that a defined number of drugs would still be left for counting. Drugs were identified by label of the package and through comparison with a sample board containing all different pills available from drug vendors in the district. The number of remaining pills were counted and for each drug the patient was asked how he/she was supposed to take it.

Other formulations played only a negligible role among the prescriptions. Injectable drugs were given directly by the nurse. Together with ointments, they were excluded from analysis of drug taking compliance as compliance could not objectively be measured for those applications.

Additionally, a semi-structured interview was held following recommendations by Maier and colleagues (Maier et al. 1994), thus allowing additional information to be gathered on drug buying behaviour outside the village pharmacy.

Study personnel

Observers in the health centre were national medical students and nurses; observers in the village pharmacy were graduates from secondary school and experienced in field work. Both groups knew at least two of the predominantly used languages in the area. The household interviewers were part of the constant field team of the PRAPASS Project. They had experience in household interviews and good knowledge of the villages and their populations, which made it possible to identify and locate the patients. Observers as well as interviewers participated in three-day training workshops and in an additional refresher session shortly before implementation of the study.

During the observation study, supervisors for each district and the principal researcher constantly revised the observation sheets that were filled out, cross-checked patient identity and determined the date for the household interview. The first two household interviews of each village were accompanied by the researcher and the supervisor. Additionally, in each village the supervisor repeated two randomly selected household interviews one or two days after the first one in order to ensure the validity of the interviews.

Statistical analysis

For statistical analysis Epi Info 6.02 software was used and a significance level of $p < 0.05$ was chosen.

Ethical considerations

The district medical officers (DMO) responsible in the study area approved the study design and agreed to the hidden character of the observation. The aim of the study was not to identify efficient or less efficient vendors but to assess the overall quality of performance in the village pharmacies and their utilization by patients. The results of the household interviews were analyzed confidentially and no personal information was given to the nurses or vendors, nor to anyone else. The observers had strict instructions not to intervene in nurses' or vendors' action, since this might have undermined the authority of the health personnel towards their clients.

Results

General observations

The village pharmacies were generally installed in the same or in the neighbouring building of the health

Table 1. Indicators on performance of village pharmacies; comparison of three districts (in parenthesis = number of drugs)

	Nouna	Tougan	Solenzo	significance
drugs purchased at village pharmacy, among prescribed drugs	87.4% (237/271)	62.6% (67/107)	86.1% (348/404)	chi ² = 136.99 p < 0.0001
drugs not available when patient intended to buy a prescribed drug, among prescribed drugs	5.9% (16/271)	19.0% (20/105)	2.0% (8/403)	chi ² = 45.56 p < 0.0001
dispensing errors, among dispensed drugs	1.3% (3/227)	7.4% (5/67)	0.8% (3/351)	chi ² = 15.05 p < 0.001
dispensing without prescription, among dispensed drugs	35.7% (126/353)	54.7% (81/148)	9.3% (36/387)	chi ² = 131.6 p < 0.0001

centre. The usual procedure is that the patient takes the prescription to the vendor in the pharmacy and returns with the drugs he or she has bought in order to then receive the prescriber's (nurse) recommendation on how to take the drugs. For only 32.9% of the prescribed drugs did the prescriber specify to the patient how long the drug had to be taken. Drug dispensing without prescription is allowed for chloroquine, acetyl salicylic acid and paracetamol. In the three villages of Solenzo drug dispensing without prior consultation is not allowed following a decision by the village committee supervising the local pharmacy.

The village pharmacies buy the drugs at the district drug depot, generally in jars of 500 pills. The vendor then packs the pills with a hand-written paper label in small plastic bags according to defined units (e.g. 20 for chloroquine). Drugs are dispensed only in those units, regardless of the individual need of the patient.

Performance and utilization of the village pharmacy

Eighty-two per cent of the drugs prescribed in the health centres were dispensed at the village pharmacy. The remaining 18.0% were either bought elsewhere or were not bought at all. For 5.9% of the prescribed drugs the client went to the village pharmacy but the drug was not available. Most of the missing drugs did not belong to the essential drug list (32/44). Significant differences were seen between the different districts (see Table 1).

1.7% of the drugs prescribed and dispensed did not correspond to the prescription. This means the prescribed drug was replaced by another drug of a completely different therapeutic group (e.g. acetyl salicylic acid instead of chloroquine). Drug dispensing errors occurred significantly more often in the district of Tougan than in the other two districts.

41.3 % of the drugs dispensed at village pharmacies were sold without prescription. Most of them were antimalarials and antipyretics (70%), oral antibiotics (7%), topical antibiotics (4%) and anti-helmentical drugs (3%).

Drug buying compliance

Of the prescribed drugs found in the houses, 5.2% were bought at a drug selling place other than the village pharmacy (see Table 2). The following alternative drug selling places were used: in Nouna, the medical centre pharmacy and one private pharmacy in the district capital; and in Tougan, two of the three private pharmacies in the district capital.

According to the observation in the pharmacy and to qualitative analysis of the household interviews, the reason for the client not buying the drug, although it was available at the pharmacy, was nearly always lack of money.

Patients' knowledge of correct dosage

During the household interviews patients - or their parents in the case of children - could recall correctly the prescribed dosage for only 68.3% of the drugs.

Table 2. Drug buying compliance among patients with complete household follow up

	No. drugs purchased	No. drugs prescribed	%
Total	310	378	82.0
Purchased at village pharmacies	294	378	77.8
		Total no. drugs purchased	
Purchased at village pharmacies	294	310	94.8

Table 3. Patient knowledge of dosage and duration of treatment when asked at patient's home in the middle of the expected treatment duration

Patient knowledge	No.	Category	Total No.	%
correct recalling of dosage	162	among all prescribed drugs of all patients	237	68.3
health threatening errors in recalling the correct dosage*	18	among cases where dosage was not recalled correctly	75	24.0
correct recalling of dosage	45	among drugs prescribed for adult male patients > 19 years	58	77.5*
correct recalling of dosage	35	among drugs prescribed for adult female patients > 19 years	52	67.3*
treatment duration given by the nurse	222	among observed drug prescriptions	674	32.9
correct recalling of recommended treatment duration	55	among cases for which detailed instructions on treatment duration were given	198	27.8
statement that drugs had to be taken until finished	288	among cases for which no instructions on treatment duration were given	415	69.4

* Difference is not significant ($\chi^2 = 1.46$, $p = 0.226$)

No significant differences could be found according to patient age, sex and ethnic group; nor could observed communication problems during consultation or language differences be related to knowledge of drug dosage. If instruction was given on duration of treatment, this could be recalled correctly for 27.8% of the drugs. See Table 3 for more details.

Drug taking compliance

Results on drug taking compliance are presented in Table 4. No significant differences in compliance

could be detected between health centres, sex or ethnic group of the patient, nor between different types of medicines. The need for translation between nurse and patient/accompanying person or observed difficulties of communication during the consultation did not decrease compliance. However, significant differences were observed due to patient age: children under 5 years received correct dosage in only 40.3% of the cases, while patients of 5 years or more were compliant for 64.7% of the drugs ($\chi^2 = 11.91$, $p < 0.001$).

Table 4. Drug taking compliance according to pill-count of drugs found in the household at the middle of the expected duration of treatment

Patient compliance	No.	Category	No.	%
probably correct intake of drugs	142	among drugs found in the households	225	63.1
health threatening compliance failure*	26	among drugs found in the households	225	11.5
health threatening compliance failure*	26	among cases with certainly incorrect intake	83	31.3
probably correct intake of drugs	29	among drugs prescribed for children under 5 years of age	72	40.3**
probably correct intake of drugs	99	among drugs prescribed for patients aged 5 years or more	153	64.7**

* Cases with obviously such important errors in dosage or drug taking that the occurrence of important undesired drug effects by over-dosage or of completely inefficient anti-microbial therapy by under-dosage is likely.

** Significant difference ($\chi^2 = 11.91$, $p < 0.001$)

Discussion

Methodology discussion

Non-participant observation of health services may always bear the risk of bias, but in the observation of out-patient consultations we experienced very little influence on the behaviour of the health personnel, noted by comparing prescriptions before, during and after observation (Krause et al. 1996). There is unlikely to be much difference for the observation of the vendors. Within these constraints this study design made it possible to give detailed information on everyday reality in the pharmacy and to link this information to patients' drug taking compliance.

Acceptance of essential drugs by the patients

The high rate of purchases in the village pharmacies as opposed to very few in the private market proves that patients accepted the programme extremely well. The reason is simple: village pharmacies are near and cheap, compared to private pharmacies in the district capital. The use of private pharmacies is limited mainly to drugs not included in the essential drug list and therefore not expected to be dispensed at the village pharmacy. The performance in the district of Tougan is not as good as in the other two districts. This may be because the essential drug programme has only just started in Tougan, and in the other districts the health personnel as well as the community had time to get used to the new system.

Performance of village pharmacies

Errors of drug dispensing and non-availability are very rare and prove that the village pharmacies are functioning well. The habit of the nurses of explaining the drug dosage to the patient after he or she has received the drug in the village allows the nurse to check whether the right drug has been dispensed and to decide on alternatives if a certain drug is not available. This procedure may seem complicated and time consuming, but in the given rural setting, where nurses have only few consultations per day, the health personnel should certainly be encouraged to maintain this habit in order to guarantee correct drug delivery.

Drug buying compliance

Another important but often neglected pillar of effective and efficient health care is patient compliance. As far as buying drugs is concerned compliance is good, but this may be due mostly to the fact that those patients who do not have the money to pay for the drugs do not even bother to go to the general consultation, well knowing that a more or less expensive prescription will be the consequence. The predominant reason for not buying a drug in the study population was lack of money.

Drug taking compliance

Little is known about drug taking compliance in developing countries. In industrialized countries

non-compliance was found to have major economic consequences for the health system (Herrmann 1991; Friebel et al. 1988). Comparison with other studies proves that our results are not very different to industrialized countries (Sclar and Pharm 1991; Greenberg 1984; Kritzinger 1980). Of concern is the increased non-compliance among children under 5 years old (De Wet and Hollingshead 1980; Baird-Lambert and Buchanan 1985; Rapoff and Christophersen 1982). Reasons for this are not clear and need further research, especially since various health initiatives in the area are focused on children under 5 years.

Compliance in general seems to be independent from common socio-cultural factors (Gul and Mackenzie 1993; Griffith 1990). Within the limits of observation, communication problems between nurse and patient could not be identified as a reason for increased non-compliance. One reason for non-compliance may be illiteracy of the patient on one hand and inappropriate drug labels on the other hand. Pills often look alike and the labels as they are used presently are of little help. They are small pieces of paper with the hand-written, often unreadable name of the drug. Often labels are missing completely. Larger labels of different colours, bearing commonly understood symbols may reduce the risk of confusing or forgetting treatment schedules (Pinto Pereira and Granger-Pierre 1995).

An additional problem is that patients are rarely informed about treatment duration. The few who are told cannot recall the recommendation. Those who do not receive any instructions on treatment duration tend to think that drugs have to be taken until finished. This may become dangerous as drugs are distributed in standardized quantities, e.g. 20 tablets of chloroquine in one bag, irrespective of whether they are for a child or an adult.

General interpretation

Comparison of the data with reports from other countries leads to the conclusion that the implementation of the essential drug programme was successful as far as performance of the pharmacies and drug buying compliance of users are concerned (Guyon et al. 1994; Adikwu and Osondu 1991; McPake et al. 1990). However, the programme has not managed to increase the low utilization of the health services, as expected. According to preliminary data the utilization remains at about 30%. One reason for this may be that the currency devaluation of 1993 has 'eaten

up' the effect of the lower prices of the generics offered by the new village pharmacies (Brudon 1990; Litvack and Bodart 1991; Anonymous 1994, Raditapole 1990).

Much more investigation is needed on this neglected issue and on how to overcome this important determinant of health care effectiveness. As Káldor (1991) put it 'if the rather inflated slogan of the World Health Organisation 'Health for All by the Year of 2000' is realised, drug research will not be needed anymore, clinical pharmacology will disappear, only the problem of compliance and non-compliance will survive'.

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