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Household Storage of Pharmaceuticals, Sources and Dispensing Practices in Drug Stores and Ordinary Retail Shops in Rural Areas of Kibaha District, Tanzania

S.E.D. NSIMBA* AND M.B. JANDE

Department of Clinical Pharmacology, Muhimbili University College of Health Sciences, P.O. Box 65010, Dar es Salaam, Tanzania.

A cross sectional study was conducted in rural areas of Kibaha district within the Coastal region of Tanzania to assess knowledge on dosage, storage, expiry and dispensing practices of antimalarial drugs among households, drug stores and ordinary shops. A standard questionnaire was administered to 253 household members to assess their knowledge as regards storage, sources and use of antimalarial drugs. Drug sellers in 20 drug stores and 39 shopkeepers in ordinary retail shops were also interviewed and their dispensing practices of antimalarials and other over the counter drugs were observed and recorded. The results showed that 35 % of household members interviewed knew the dates and importance of drug expiry, whereas 65 % kept drugs without knowing expiry dates. Only 16 % of household members were informed of the expiry dates of drugs at the facilities they attended. Furthermore, 48 % of these household members could state three or more symptoms of malaria correctly. The majority of drug store (53 %) and ordinary retail shop (75 %) sellers did not dispense correct doses of antimalarials due to low literacy and lack of dosage guidelines or package inserts. In order to reduce incidences of drug poisoning due to over-dosage or drug resistance due to under dosage, there is need to educate both consumers and dispensers on correct dosage regimens through mass media such as radio, health education programs, television, posters, leaflets and newspapers.

Keywords: Households, antimalarials, storage, expiry dates, self-medication, drug stores, ordinary shops.

INTRODUCTION

In Tanzania, malaria is ranked as the leading cause of morbidity and mortality and its effects keep increasing every year [1]. It accounts for 30 to 40 % of all out-patient attendances in all age groups in dispensaries and health centers and is responsible for 15 % of the total mortality among in-patients in healthcare facilities [2]. Most of the malaria related fevers in sub-Saharan Africa are first recognized and attended to in homes by caregivers [3].

Household storage of pharmaceuticals is widely practiced in third World countries. It has been suggested that the increasing accessibility is consequently causing hoarding of medicine in households [4]. A study on the household storage of pharmaceuticals in Costa Rica revealed that the average number of medicines per household was 10 times smaller than in England and Wales [5]. Another survey of household storage of pharmaceuticals by Mlavwasi found a large number of expired analgesics and antimalarials in an urban district in Tanzania [6]. It can therefore be expected that in Kibaha rural areas where patients have to wait long hours before being attended to at formal health facilities coupled with the frequent shortages of pharmaceuticals in public primary health care (PHC) facilities, unused stocks of medicines could encourage self medication. Self-medication could lead to acute accidental poisoning, adverse reactions and delay medical consultation in the presence of a serious disease [7-9].

In Tanzania, drug stores and ordinary shops including groceries are allowed to stock and sell over the counter drugs, usually without a prescription. These outlets are not manned by qualified pharmaceutical personnel and are not supposed to deal in prescription drugs. Despite this regulation, it is known that prescription drugs especially antimalarials and analgesics under

*Author to whom the correspondence may be addressed.

several brand names such as Nivaquin®, Malaraquin®, Dawaquin®, Homaquin®, Aspro® and Hedex® are sold through these outlets with or without prescriptions [10]. However, it is not known whether appropriate instructions are given to clients regarding dosage, storage and expiry of such medicines.

Lack of antimalarial drugs in the public sector and long travel distances to facilities is a serious problem which may hinder utilization of formal health facilities in Tanzania [8,10-13]. Thus drug stores and ordinary retail shops become the main sources of antimalarials and other commonly used drugs. Nevertheless, the dispensing practices of sellers and household self-medication practices need to be improved.

MATERIALS AND METHODS

Study Area

Kibaha is one of the six administrative districts in the coastal mainland of Tanzania with its headquarters at Kibaha town. It is situated 40 km northwest of Dar es Salaam. At the time of the study, there were 9 wards and 41 villages within Kibaha town. Three of the wards were urban while the remaining 6 were rural. The district was chosen because it is a malaria endemic area and is easily accessible from Dar es Salaam.

The administrative structure consists of an Administrative Executive Officer, ward secretaries, village chairmen and the *Balozis* (ten cell or ten house leaders). Kibaha has a total of about 20,000 households with an average household size of 5 persons. In the Tanzanian context, a household can be defined as a person or a group of people living together and sharing a common source of food [14]. According to the National Census of 2002, the district has a total population of 132,045 (66,291 males and 65,754 females) with a National Annual Growth Rate of 3.2 % [15]. The major tribe in the area is the Zaramo. Muslims, Christians and atheists are the three religious groups. The majority of inhabitants are peasants who grow maize, millet, cassava and rice as food crops, while cashew nuts and coconuts are their cash crops. The Ruvu River is the main dependable source of fish and drinking water for the district and Dar es Salaam region at large.

HOUSEHOLD SURVEY

Selection of Study Population

During the survey, a multistage cluster sampling (three stage cluster sampling) was done in selecting wards, villages and ten *Balozis* using simple random sampling (SRS) procedure and a purposive sampling in the selection of households.

A total of 5 villages were selected. Out of 180 ten cell leaders, 100 were selected from the villages. In each selected village, a research team met with the village chairman, secretary, village health committee and the ten cell leaders. These leaders were informed about the study and its purpose and were requested to accord the researchers the necessary cooperation and assistance.

During the research, only the first ten households were visited before proceeding to the next *Balozi*. This purposive selection of households was done because the ten cell leaders control about 10-20 households. The *Balozis* are appointed by members of the households in their respective areas and perform all their duties on voluntary terms. All drug sellers selling medicines classified as Part 2 Poisons in drug stores and ordinary shops were included in the study.

Data Collection

The household survey was carried out by trained research assistants together with investigators. Visits to households were conducted with a *Balozi* who ensured the interviews went on smoothly. A verbal consent to participate in the study was sought from each household leader. Household members were asked to name the sources of the drugs they used whenever they fell sick including the doses they took in treating themselves for malaria. Further information on the conditions and duration of storage of drugs, knowledge of expiry dates of the drugs stocked as well as of the symptoms of malaria was recorded. The questionnaires included one section specifically targeting any household member who had suffered from malaria within the one month immediately preceding the study and consisted of both open-ended and closed-ended questions. They were translated into the local (Swahili) language and administered during data collection.

Identification (name, ward and village) as well as demographic characteristics were also noted.

Drug Storage and Ordinary Retail Shop Survey

All drugs stores (n = 20) and ordinary shops (n = 39) located within the same geographical area of the 5 villages were selected whereby drug store denotes privately owned medical stores licensed to stock and sell over the counter medicines and that are usually, not manned by qualified pharmacists. ordinary shops are retail shops in the area which are licensed to sell items such as clothes foodstuff, soft drinks, stationery and various brands of chloroquine (Nivaquin®, Malaraquin®, Dawaquin®, Homaquin®, Shelly-quin®), analgesics (in both syrup and tablet forms) and various cough mixtures. Consent to conduct the survey was sought from the owners or dispensers in the outlets selected. Interviews at these places were first conducted by investigators who posed as teachers. In order to assess dispensing practices and advice or instructions given to clients before or after purchase of drugs, the research assistants posed as surrogate clients seeking to purchase antimalarials from the specified drug stores and ordinary shops. The research assistants were escorted by the investigators to the outlets.

The specific information sought included the instructions offered to clients on how to use and store the drugs, indication of the expiry dates of drugs or whether the medicines were dispensed correctly. This type of protocol has been used in a survey of self-prescribing through pharmacies in Sri-Lanka [16].

Ethical Clearance

The study was cleared by the Human Ethics Committee of Muhimbili University College of Health Sciences, Dar es Salaam, Tanzania. Approval to carry out the study was obtained from the Kibaha district and Coast region administrative officials before commencing the study.

Data Analysis

Data entry and processing was carried out using the Data-Base IV programme and analyzed using the SPSS software program. The responses of closed-ended questions were pre-coded while those of open-ended questions were coded after the survey prior to data entry. The Chi-Squared test was used to compare two groups of categorical data while the Student's t-test was used for continuous variables. The level of significance was set at p = 0.05.

RESULTS

Social Demographic Profile

The basic characteristics are shown in Table 1. This survey showed that most household members who reported having fallen sick within the month immediately preceding this survey had primary school education and their ages ranged from 18-80 years. Of the household members interviewed 53 % had at least one child less than five years of age. Regarding the drug sellers, 65 % were males with a mean age of 24.3 years and had received primary school education.

Table 1: Education levels of study participants

Description	Frequency (%)	
	Household Members	Drug sellers
No formal education	31 (12.2)	2 (3.4)
Adult education	11 (4.3)	4 (6.8)
Primary education	192 (75.9)	46 (78.0)
Secondary education	11 (4.3)	5 (8.5)
Post secondary education	8 (3.2)	2 (3.4)
Total	**253 (100.0)**	**59 (100.0)**

Knowledge of symptoms of malaria among household members:

Table 2 shows that 253 households of the 1000 surveyed had members who reported having contracted malaria within the month immediately preceding the study 48 % of whom mentioned 3 or more correct symptoms of malaria whereas 52 % mentioned less than 3 correct symptoms. People with higher education status were found to know more symptoms (p< 0.001) compared to those with low or no formal education. Those who mentioned 3 or more correct symptoms were considered to know the symptoms of malaria

whereas those who mentioned less than 3 were considered ignorant.

Sources of antimalarials and reasons for not obtaining full doses

The commonest source of insufficient doses of antimalarials was public health facilities (39 % of respondents) followed by ordinary retail shops and home stocks. Private health facilities were the least reported outlets where people obtained incomplete doses. Scarcity of drugs in public health facilities was the most frequently reported reason (50 % of respondents) for dispensing incomplete doses of antimalarials.

Storage of medicines in homes and knowledge of their expiry dates

Table 3 shows the places where medicines were frequently stored by members of households. Most members stored their drugs on tables and in cupboards. About 35 % of those who kept medicines at home knew their expiry dates and tended to store them more securely (p<0.001) compared to those who were ignorant of the dates.

Sources of treatment for household members

Interviewees who received treatment or medication from health facilities and drug stores had a higher chance of being informed about the expiry dates of their drugs compared to those who obtained drugs from other sources such as ordinary shops. Only 18 % of them admitted knowing the expiry dates of the drugs they received without being informed by dispensers while 82 % did not. Those who knew the expiry dates mentioned the medicine label as the source of information (90 %) while the remainder of the members did not mention any. However, 8 % claimed that drugs lose potency on the day they finish their dose while 3 % said they only believe the drugs are potent when they recover (Table 4).

About 80 % of those who did not know the expiry dates of their medicines thought it was important to know the dates while 20 % said it was not. In the former group, 42 % thought that expired drugs cannot cure disease, 33 % thought drugs become poisonous on expiry and 24 % thought that expired drugs may be harmful or dangerous without further clarification. Among those who did not consider it important to know the expiry dates of medicines, 41 % responded that they were not informed by the medical personnel of the importance, 23 % stated they were not medical professionals to be concerned while 15 % thought that drug sellers were the people supposed to know about expiry dates.

Table 2: Knowledge of symptoms of malaria among household members who had contracted malaria within the month preceding the study

Education Status	Knowledge of Symptoms of Malaria		
	Knows	Ignorant	Total
No formal education	18	13	31
Adult education	6	5	11
Primary education	86	106	192
Secondary education	7	4	11
Post secondary education	5	3	8
Total	122 (48 %)	131 (52 %)	253 (100 %)

Table 3: Storage of medicines and knowledge about expiry dates by household members

Storage sites	Knowledge about expiry dates of drugs		
	Yes	No	Total
In cupboard	4	7	11
On the table	6	7	13
In table drawers	1	2	3
In a tin with a lid	4	2	6
In a plastic bag	0	4	4
In a wardrobe	1	1	2
Others	1	8	9
Total	**17**	**31**	**48**

Table 4: Sources of knowledge about expiry dates of drugs by household members

Source of drugs	Informed during dispensing about expiry of drugs		
	Yes	No	Total
Public health facilities	23	92	115
Drug stores	17	90	107
Ordinary retail shops	0	20	20
Stored at home	0	3	3
Friends/relatives	0	8	8
Neighbours	0	8	8
Total	**40**	**213**	**253**

DISCUSSION

The survey revealed that 26 % of household members reported having suffered from a bout of malaria within the month preceding the survey. The low incidence could possibly be attributed to the partial acquired immunity in this community as most of the interviewees were adults. Another reason could be under-reporting by the household members due to the long recall period since it has previously been reported that minor complaints can be under-reported within 1 to 2 weeks [17-18]. Furthermore, severe symptoms are remembered longer than mild ones [19]. Thirdly, it could be due to the low season of malaria transmission in the study area, as the study was conducted during the dry season of September-October.

Knowledge of household members about storage, expiry dates of drugs and symptoms of malaria seems to be inadequate and this was partly due to their low education status as the majority of household members had only attained primary school, adult education or no formal education at all. Hence there is need to educate clients on these issues. Proper storage of drugs in homes is important in avoiding loss of potency as a result of moisture absorption or other unfavorable climatic conditions which may affect drug stability in the tropics [20]. In addition, it may prevent accidental drug poisoning especially in children. Use of expired drugs may increase chances of treatment failure and prolongation of treatment and other grave consequences. It has previously been reported that use of expired drugs in some facilities (private or public) in developing countries is common [21].

Drug stores and ordinary shops in Tanzania stock and sell over the counter drugs such as chloroquine and other formulations. These drug sellers generally lack adequate formal training on how to dispense drugs and give appropriate

instructions to clients on the use of antimalarials and other over the counter drugs. In this study, their dispensing practices and the instructions they gave to clients were improper and inadequate. Other researchers have reported similar findings from retail pharmacies in developing countries [22, 23]. It is known that use of sub-optimal doses of chloroquine favours the emergence and development of choloroquine resistant malaria strains [9, 24].

In conclusion, knowledge about proper malaria management among household members as well as drug store and ordinary retail shops sellers is inadequate. There is need to intervene and improve the situation through training, supervision and inspection or monitoring of drug outlets so as to improve dispensing practices and rational drug use by clients. Drug store and ordinary shop sellers must be educated on all these aspects of rational dispensing practices. This is especially important in many developing countries where most people in rural areas depend a lot on these facilities for their over the counter drug supplies [22, 23, 25].

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