

Determinants in Home Storage of Drugs by University Staff and Traders in Lagos: Physicians, Adverts, Journals, Formulation types are key

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ABSTRACT

Background: Drugs stored at home which are intended for use during future periods of illnesses ultimately are indicative and determinants of self-medication practices, hence, studies of drug storage patterns are important. This study was carried out to ascertain the drug storage practices of selected staff of the University of Lagos, a group of people who have access to the staff health centres and are presumed to be sufficiently educated to handle drugs in such ways that would prevent deleterious outcomes and selected traders in Ojota market who did not have formal education.

Methods: A cross sectional descriptive study on personal drug storage was carried out among 250 selected academic and administrative staff of the University of Lagos with the use of self-administered questionnaires, also, 50 traders in Ojota market, Lagos state who did not have formal education were interviewed.

Results: The choice of drugs stored was most commonly guided by doctor's prescriptions, this occurred in 121(85.8%) and 72(72%) cases respectively among the lecturers and administrative staff, while the pattern of determinants of drug choice was different among the subjects without formal education who were guided

mostly, 50(71.4%) cases by other determinants such as television adverts, friends, parents and costs. The values got for the influence of doctor's prescription on choice of drug stored varied significantly between the lecturers and administrative staff, $p < 0.05$. Analgesics were the most common class of medication stored by the respondents followed by antibacterials and antimalarials, this was observed in 31.1%, 16.8% and 11.9% of cases respectively. There was no significant difference between the number of respondents who stored antibacterials and antimalarials, $p \geq 0.05$.

Conclusion: The drug storage practices of the University of Lagos staff were determined mostly by physicians' prescription while those of the traders in Ojota market were influenced by other factors such as television adverts, friends and parents. Intervention programmes may be beneficial among the staff of University of Lagos if done by the physicians and pharmacists whom these staff patronize while for those without formal education use of television programmes and other media of communication may be more effective. Programmes aimed at preventing the storage of antibiotics at home will be beneficial to these subjects.

Key words: Determinants, home drug storage, Lagos

INTRODUCTION

Drugs are normally stored in health facilities for patients' use. However, individuals who are healthy sometimes store drugs at home¹. Such practice of storing drugs at home provides a reservoir from which medications may be administered whenever a member of the household is ill². There is the possibility that the drugs stored at home may determine which drug is administered for an illness at a future time³, especially if there is difficulty in accessing a health care facility during such a period; the patient may rationalize that a particular drug available at home should suffice for cure. It may be permissible to store non-prescription drugs at home in limited quantities⁴. However, prescription drugs should not be stored at home, but must be obtained when needed in exact quantities only by a doctor's prescription. Interestingly, studies show that prescription drugs have been stored at home over the years^{5,6}. Storage and eventual administration of prescription only drugs at home without appropriate medical consultation may be deleterious depending on the class of drugs. For instance, use of antimicrobials not

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prescribed by a physician may result in increased resistance of pathogens⁷ as well as adverse drugs reactions^{8,9}, masking of a potentially fatal disease or infection in cases where there is misdiagnosis. In such cases, the condition may not necessarily be a potentially fatal one but the misdiagnosis and delay in obtaining appropriate treatment may result in prolonged suffering^{6,7}. Insufficient or incorrect dosages may be administered when prescription only drugs are used without appropriate medical consultation, this may lead to resistance formation¹⁰. Another disadvantage when a prescription only drug is stored and subsequently recommended for use by an unqualified person is that such drug administration may be unnecessary^{6,11}. In addition to the foregoing, storage of over-the-counter drugs as well as prescription only drugs at home may be injurious to patient's health if storage is not properly done¹². Degradation factors which include moisture, light, heat, microbial agents may alter the potency of such drugs or render the drugs dangerous resulting in adverse reactions. Some factors which promote drug storage at home have been identified by previous workers; these include socio-economic factors, cultural attitudes and drug advertising¹³. Places with high availability of drugs other than licensed outlets where over-the-counter dispensing is practiced have emerged as contributing factors in promoting drug storage at home⁷. Other causes of home storage of drugs are excessive prescribing, imperfect therapeutic adherence, treatment modifications, over-sized drug packages which result in leftovers^{6,14}. Such scenario may also be

found with chronically ill elderly patients, those receiving treatment for multiple diseases or patients being treated by several physicians¹⁵. Ultimately, storage of drugs at home may promote self-medication^{7,16}. While self-medication may be beneficial when done properly, irrational drug use as a consequence of self-medication is of utmost concern¹⁷. We carried out this study to ascertain the drug storage practices of two groups of people: selected staff of the University of Lagos, a group of people who have access to the staff health centres and are presumed to be sufficiently educated to handle drugs in such ways that would prevent deleterious outcomes and selected traders in Ojota market who did not have formal education. The outcome of this study may be useful in determining steps to be taken in promoting appropriate storage of drugs at home among the study groups.

METHODOLOGY

This cross sectional descriptive study was carried out among the academic and administrative staff of the University of Lagos, Lagos, Nigeria. Also included in the study were some selected traders in Ojota market. The University of Lagos is one of the two universities in Lagos State, South West, Nigeria. It is the premier university in the state and has two main campuses, the main one in Akoka which contains six faculties and service departments such as the health centre for staff and students. The other campus which accommodates medical sciences faculties is in Idiaraba. The medical sciences include the Faculties of Dentistry, Basic Medical Sciences and Clinical Sciences. These medical

sciences faculties in Idiaraba have an adjoining teaching hospital where undergraduate and postgraduate students undergo clinical training. The teaching hospital accommodates the staff and students clinic where these two groups of people receive medical attention whenever the need arises. The Ojota market is situated in Kosofe Local Government Area of Lagos State, this is one of the two gateways to the other parts of the country. Activities expected in the neighbourhood of such a link route abound around Ojota market, these include those in the various bus stops, bus parks, shops and eateries where workers with different levels of education and those without formal education work. Informed consent was obtained from the prospective respondents. Questionnaires were distributed by stratified sampling method to the different faculties such that 100 and 50 academic staff members respectively in the main campus at Akoka and the other campus at Idiaraba were reached. Fifty administrative staff members were also issued with questionnaires in the faculties within the main campus while another 50 questionnaires were also distributed to the administrative staff in the affiliate campus. Also, 50 subjects without formal education were deliberately sampled in the Ojota market, Lagos. Thus, the total questionnaires distributed were 300. Subsequently, 291 staff members responded, 9 of the academic staff in the main campus did not respond. University staff that were trained to work in the hospital were excluded, thus, medical doctors, pharmacists, dentists, physiotherapists, nurses and other staff who by virtue of their occupation work in clinics or hospitals

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whether on full-time or part-time basis were excluded. These staff who work in clinic and hospitals were excluded because they would have been trained to handle drugs and such staff normally have easier access to medications, thus filling responses from them may introduce bias into the study. The questionnaires were used to ascertain demographic details, sources of drug information and purchase. The following specific details about drugs stored were also sought: place of storage, duration of storage, formulation types, classes of drugs and names of drugs. The data were presented in frequency distribution tables with percentages. Chi square was used to test significance at $p \leq 0.05$.

RESULTS

The male to female ratio was approximately 3:1.

Knowledge

Most of the respondents got information about drugs from medical practitioners; this was observed in 34(60.7%) and 37(58.7%) cases respectively among the lecturers and administrative staff. Also, 7(1.3%) and 6(9.5%) lecturers and administrative staff obtained drug information from pharmacists, while other sources of drug information included medical journals, magazines, friends, parents, patent medicine dealers in 15(26.8%) and 20(31.8%) cases respectively. There was no significant difference between the values got for responses about each source of information among the lecturers and the administrative staff, $p \geq 0.05$.

Practice

The choice of drugs stored was most commonly guided by doctor's

prescriptions, this occurred in 121(85.8%) and 72(72%) cases respectively among the lecturers and administrative staff, while other determinants such as television and radio adverts, friends, parents, availability of particular types of drugs or formulation, medical journal/magazine and costs constituted 64(45.4%) and 50(50%) cases among these groups. The values got for the influence of doctor's prescription on the choice of drugs stored were significantly different between the lecturers and administrative staff, while the values for other determinants such as television and radio adverts were not, $p \leq 0.05$ and $p \geq 0.05$ respectively. Prior knowledge was the least determinant of drug choice indicated in 55(39.0%) and 13(13%) cases among the lecturers and administrative staff, this determinant varied significantly, $p \leq 0.05$. Also, doctor's prescription being a determinant of choice of drugs stored at home varied when the numerical values obtained for the lecturers in the main campus and medical college were compared 77(84.6%) and 44(88%) $p \leq 0.05$, however, this determinant was still the most frequent among the lecturers in the medical college. The pattern of determinants of drug choice was different among those without formal education who were guided mostly, 50(71.4%) cases by other determinants such as television adverts, friends, parents and costs. Only in 10(14.3%) cases among those without formal education were drug choices influenced by doctor's prescriptions or prior knowledge.

Most of the respondents stored drugs at home among the various groups with the exception of the lecturers in

the College of Medicine (Table 1). Thus, drugs were stored at home by 59(64.8%), 65(65) % and 35(70%) lecturers in the main campus, administrative staff and respondents without formal education respectively compared to lecturers in the College of Medicine among whom 20(40%) stored drugs at home. Most of the lecturers and administrative staff obtained the drugs which they stored from pharmacy outlets or hospitals while those without formal education got theirs most commonly from patent drug stores and drug hawkers. Only the respondents without formal education obtained drugs from drug hawkers. The administrative staff and those without formal education reported that they got some of the drugs which they stored at home from relatives and friends while the lecturers did not obtain drugs from these sources. The most common places where drugs were stored included shelves, baskets, fridges and first aid boxes as reported by 92 (33.0 %), 59(21.2%), 50(17.9%) and 38(13.6%) respondents respectively. In addition, 40(14.3%) respondents stored drugs in other places such as dressing tables, bags, drawers, wardrobes and briefcases.

Thirty-eight(70.4%), 12(22.2%) and 4(7.4%) respondents stored drugs for 1 to 4 weeks, 5 to 7 weeks and more than 10 weeks respectively. Formulation types of drugs stored included tablets 203(66.1%), capsules 58(18.9%), syrups 20(6.5%), creams 15(4.9%) and injections 11(3.6%).

Table 1: Frequency of drug storage and drug sources

Various groups of respondents	Frequency/percentage who stored drugs	Sources of drugs stored				
		Hospitals	Pharmacy Stores	Patent drug stores	Drughawkers	Relatives/friends
14						
1. Main Campus Lecturers	59(64.8%)	19(18.6%)	64(62.8%)	19(18.6%)	0	0
2. Medical College Lecturers	20(40%)	24(40.7%)	23(39%)	12(20.3%)	0	0
3. Non-academic Staff	65(65%)	38(27.4%)	48(34.5%)	27(19.4%)	0	26(18.7%)
4. Nil Formal Education	35(70%)	9(13.0%)	7(10.2%)	22(31.9%)	17(24.6%)	14(20.3%)

Analgesics were the most common class of medication stored by the respondents followed by antibacterials and antimalarials, this was observed in 31.1%, 16.8% and 11.9% of cases respectively (Table 2). While there was no significant difference between the number of respondents who stored antibacterials and antimalarials, the values got for these two classes of drugs varied from that of respondents who stored analgesics, $p \geq 0.05$ and $p < 0.05$ respectively. Chloroquine and sulphadoxin/pyrimethamine varied from the number of respondents who stored paracetamol, compared with ACTs/artesunate; $p \geq 0.05$ and $p < 0.05$ respectively. These constituted 35.0%, 31.9% and 26.2% of antimalarials reported in this study (Table 3). The most common analgesic agents stored by respondents respectively were paracetamol, aspirin, ibuprofen, and naproxen. The number of respondents who stored aspirin and ibuprofen were statistically comparable though these two values

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Table 2: Commonly stored medication classes

Medication class	No of respondents	Percentage(%)
Analgesics	157	31.1
Antibacterials	85	16.8
Antimalarials	60	11.9
Sedatives	19	3.8
Antihistamines	19	3.8
Antihypertensives	23	4.6
Antispasmodics	23	4.6
Laxatives	19	3.8
Antidiarrhoeas	11	2.2
Antipsychotics	2	0.3
Antiulcer	14	2.8
Dermatological Preparations	41	8.1
Antiasthma	9	1.8
Muscle Relaxants	19	3.8
Anticonvulsants	2	0.3
Antiemetics	2	0.3

Table 3. Different antimalarials, non steroidal antiinflammatory drugs and antibacterial agents stocked by respondents.

A. Antimalarials		
Atemisinin based combination therapies/ Artesunate	42	26.2
Sulphadoxin/Pyrimethamine	51	31.9
Chloroquine	56	35.0
Proguanil	11	6.9
B. Non steroidal antiinflammatory drugs		
Aspirin	43	15.5
Paracetamol	137	49.2
Ibuprofen	30	10.8
Naproxen	20	7.2
Others	48	17.3
C. Antibacterials		
Tetracyclines	20	15.8
Metronidazole	33	25.9
Chloramphenicol	12	9.5
Co-trimoxazole	26	20.5
Gentamicin	12	9.4
Others	24	18.9

DISCUSSION

Medical practitioners were found to be the commonest source of drug information to the lecturers and administrative staff; 60.7% and 58.7% of these respondents respectively indicated this source. Interestingly, the proportions of these two categories of staff who received drug information from medical practitioners were comparable. Thus, interventions to promote appropriate drug use among these staff of the university may be conducted primarily through their physicians; this may not be difficult since the staff of the university normally report at the staff clinics when they require medical attention.

Also, in most cases, the choices of drugs stored by the lecturers and administrative staff were influenced by doctors' prescription. The fact that the respondents most commonly relied on their physicians' prescription while deciding on which drug to store again underscores the role of medical practitioners in their drug storage practice, invariably the physicians will influence these respondents' drug use practices. The lecturers and administrative staff sampled were educated and had access to medical journals and magazines which are sources of drug information, hence, it is interesting that they relied more on their

physicians for drug information and stored drugs based on their observation of medical practitioners' prescriptions. Such reliance on physicians may be a pointer to the respondents' confidence in the skills of these medical practitioners and underscores the possibility of drug use interventions through physicians. It is not surprising that the choices lecturers in the medical college made while storing drugs at home were guided by medical practitioners, this observation was because this group of lecturers were not medical doctors, hence they acted as other lecturers in the main campus did, in contrast medical doctors are

normally expected to make independent decision when storing drugs at home. It is not clear why the respondents without formal education relied more on other sources such as television adverts, friends and parents while making their choices of drugs to be stored at home, thus exhibiting less reliance on medical practitioners. Such a trend may be due to their lack of education, this may constitute an obstacle to the appreciation of the beneficial role a medical practitioner's influence may play in this regard. Another factor which might have been responsible for the response of the group without formal education was their relative lack of interaction with medical practitioners compared with the staff of the university who are provided with medical facilities within their work place where they can easily receive medical attention. It should be expected that those respondents who lacked formal education will therefore acquire needed information on drugs and drug storing from sources which are readily available to them. In addition to physicians' prescription, other factors which guided the choice of drugs stored at home by the lecturers and administrative staff included television adverts, medical journals/magazines availability of particular preparations and formulations. The values recorded for television adverts, medical journals/magazines availability of particular preparations and formulations were comparable statistically and quite high, these factors grouped together could therefore be said to play equal significant roles. An implication of such a significant determinant is that these factors could be useful points of intervention towards achieving more rational storage and therefore appropriate self-medication practices. An illustration of the role

some of these latter factors could play in drug use and therefore serve as mode of intervention could be found in the case of artemisinin based combination therapies which are available in malaria endemic regions as fixed dose combination preparation currently, the policy change which led to the formulation of this preparation was to prevent the use of monotherapy in the treatment of malaria in regions where plasmodium falciparum resistance is of utmost concern. One of the key roles of Pharmacists is provision of drug information¹⁸. It is pertinent to note that reliance on pharmacists as a source of drug information was not reported prominently, this is not acceptable, every effort should be directed at correcting this. Most (63%-70%) of the respondents stored drugs at home, interestingly, the staff of the university despite the fact that they have unhindered access to official clinics stored drugs at home as frequently as the respondents who did not have formal education despite the fact that the latter group does not have access to such facility. Therefore, it appears access to medical facility did not discourage storage of drugs at home, this is a departure from the assertion of some workers⁷. However, acquisition of education may be a factor which encouraged the educated respondents to store drugs at home because this study revealed that medical journals and magazines influence the educated respondents' knowledge and drug storage practice and previous studies have linked increasing levels of education with self-medication^{19,20}.

In contrast to the practice of other respondents, drugs were stored at home to a significantly lesser degree (40%) by the lecturers in the college of medicine; this either reflects the fact that these lecturers rely more on buying drugs at the time medication is needed, consulting the staff clinic

or medical doctors when the need arises. The level of accessibility of medicare service to them are reasonable factors. The argument of some authors that self-medication and storage of drugs at home should be encouraged when done appropriately appears reasonable. Appropriate storage of drugs will include keeping the minimal quantity at home, omission of prescription only drugs particularly those not required on emergency basis in the list of drugs stored at home. Such drugs not expected to be stored at home include antibacterial agents. Incidentally the list of drugs reported in this study included antibacterial agents, this is definitely indicative of inappropriate drug storage practice among the respondents in this study. Other studies have also reported storage of prescription drugs at home^{21,22}. The fact that the extent to which antibacterial agents were stored at home was significantly similar to that of antimalarial agents is further prove of inappropriate storage of the antibacterial agents. Malaria is endemic in Nigeria hence the use of antimalarial is expected to be more than that of antibacterial agents, this is against the backdrop that some infective illnesses which are not of malaria origin may not necessarily be caused by bacteria since viruses are also potential infective agents. Viral infections do not require antibacterial agents. Hence, intervention is necessary among all the groups of respondents so that antibacterial agents should not be stored at home. The storage of chloroquine and sulphadoxine/pyrimethamine by greater number of respondents suggests that some of these respondents breach the current guideline for the home-treatment of malarial in Nigeria; ACTs are the current first-line therapy for uncomplicated malaria in the country. Similar to a previous study²², analgesics constituted the largest proportion of drug class stored at home (31.1%). The find that paracetamol constituted approximately half of the analgesics

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itored by respondents was not unexpected because this is the commonest analgesic used in the Nigerian society. It would be rewarding if the factors which are responsible for the much lower frequency of drug storage among the lecturers in the medical college are identified by subsequent studies since these may be useful tools for intervention directed at achieving appropriate drug storage practices. Since most of the respondents got the drugs stored at home from pharmacy outlets and hospitals, these sources would be useful points of intervention^{23,26}, the practitioners at these outlets need to keep to the basic principles of their practices: prescriptions should be issued for every prescription drug, clients who request for such drugs without prescriptions should have their requests turned down. Prescriptions should be closed and drug administration by patients should be monitored to achieve adequate adherence; patient education should also be done.

CONCLUSION

This study found the drug storage practices of selected staff of the University of Lagos to be determined mostly by physicians' prescription while those of the traders in Ojota market were influenced by other factors such as television adverts, friends and parents. Therefore, intervention programmes directed at drug storage practices of the staff of University of Lagos may be beneficial if done through the physicians and pharmacists whom these staff patronize. Implementing appropriate drug storage practices among those without formal education especially those who lack access to health care facilities may be better done through television programmes and other media of communication, thus, underscoring the need that such programmes should conform to standard ethical practices.

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