

## Evaluation of Storage of Medicines in Households in Delta State, Nigeria

Adje U D<sup>1\*</sup>, Arute J E<sup>1</sup>, Oparah C A<sup>2</sup>, Williams F E<sup>3</sup>, Akpovwovwo<sup>4</sup>,  
Akon U F<sup>1</sup>

<sup>1</sup>. Department of Clinical Pharmacy and Pharmacy Administration, Delta State University, Abraka, Nigeria

<sup>2</sup>. Department of Clinical Pharmacy and Pharmacy Practice, University of Benin, Benin City, Nigeria.

<sup>3</sup>. Department of Clinical Pharmacy and Pharmacy Practice, University of Ilorin, Ilorin, Nigeria.

<sup>4</sup>. Drug information services, Delta state university teaching hospital, Oghara, Nigeria

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### Abstract

**Background:** Drug therapy is often the most frequent intervention in the delivery of health care services. Improper drug storage and disposal can have negative impact on treatment outcome and threaten public safety.

**Objectives:** The main objective of this study was to identify medicines stored in households, and explore variables that encourage storage of unused medicines in households.

**Method:** The study was conducted using a questionnaire adapted from a previous study. The survey included 1000 households from 7 communities located in 5 urban and 5 rural areas in delta state. Convenience sampling method was employed for the study. The sampling unit was the family head in every household

**Result:** A little less than half (45%) of households were from rural community. Left over medicines were found in 970 (97%) of households. The medicines that were frequently stored in the homes were analgesics 263 (26.3%), followed anti-hypertensive medications 153 (15.3%) and anti -asthmatic drugs 144 (14.4%). Almost half 481 (48.1%) of the households had antibiotics in their homes. More than one quarter, 340 (34.0%) of all medicines in the surveyed households had expired. Even though more than half 621 (62.1%) of households had members suffering from one or more chronic diseases, and 545 (54.5%) of stored medicines were not in use by any member of the household. The most predominant storage site was the cupboard 322 (32.2%).

**Conclusion:** Storage of leftover drugs is a very common practice among the population surveyed. Analgesics and antihypertensive drugs were the most frequently encountered medicines stored in the homes.

**Keywords:** Delta State, Households, Medications, Nigeria, Storage.

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### I. Introduction

Irrational use of medicine is a global public health issue with far reaching consequences including treatment failures, increased morbidity and mortality, drug resistance, high cost of pharmaceuticals and medicine wastage.<sup>1-2</sup> Factors responsible for medication wastage include irrational prescribing and dispensing, easy availability of prescription medication in community pharmacies and other unregulated sources and poor patient compliance.<sup>3-4</sup> Storage of large quantities of medications in the home increases the risk of a wide range of potential drug related problems, including accidental poisoning, adverse drug reactions and errors in taking medications.<sup>5</sup> Studies exploring household medicine storage behaviors show that medication wastage and unnecessary hoarding of medications is common.<sup>6-7</sup> To our knowledge no previous study characterizing household medicine storage has been carried out in the study area.

The objectives of this study were to identify and quantify types of medicines stored in households, to ascertain reasons for storing medicines at home, to identify places and conditions of stored medicines, to determine left over medicines practices and to explore the prevalence and types of chronic conditions in the surveyed household.

### II. Method

#### Setting

The setting is Delta state, Nigeria. Delta state is a multiethnic entity located in the oil rich Niger Delta region of the country with an estimated male population are 2,674,306 and female population 2,024,085.<sup>8</sup> The ministry of health has responsibility of handling medical service and training including pharmacy and nursing services. It is also responsible for primary health care, secondary health care as well as tertiary health care and disease control in the State.<sup>9</sup> The study covered four major local government areas in the state- the capital, Oshimili North, Warri south, Ethiope east and Ughelli. North.

### Study population

Five rural and five urban areas were randomly selected from 4 local government areas in Delta State. They were Umiaghwa, Urhoarivie communities in Ethiope east local government area, Orogun, Afiesere communities in Ughelli North local government area, Okpanam, community in Oshimili North local government area, Ighogbadu, Esi layout communities in Warri south local government area. A total of 450 and 550 households were selected from the rural and urban communities respectively.

### Data Collection

The study instrument was a questionnaire adapted from Abdo-Rabbo et al<sup>10</sup>. The questionnaire is made up of four sections. Section A covered socio-demography. Section B elicited information on types of medicines in the house. The third section covered information on disposal of expired and left over medicines in the households while the last section covered information about the purpose for which they were kept at home.

In order to assure the quality of the data collected, the number of houses visited per day was limited to 10. Responses to the intended questions and observations were recorded immediately by interviewers. Five research assistants were trained for this purpose.

### Data Processing and Analysis

The data processing and analysis was done by means of SPSS version 21 programme.<sup>11</sup> Categorical data was reported in frequencies and percentages. A p value of less than 0.05 was regarded as significant.

## III. Results

A little less than half households surveyed (45%) were from rural community. Half (50.19%) of the fathers and slightly less than half (48.22%) of the mothers in the sampled population had at least completed basic or secondary education level and could read and write. Details of socio-demographic characteristics of the households is presented in table 1

**Table 1** Socio-demographic characteristics of households.

Characteristics	Frequency n = 1,000	Percentage %
<b>Community</b>		
Urban	550	55
Rural	450	45
<b>Educational Level of Father</b>		
University	161	16.1
Secondary	246	24.6
Basic	281	28.1
Illiterate	325	32.5
No response	37	3.7
<b>Educational Level of Mother</b>		
University	100	10
Secondary	229	22.9
Basic	278	27.8
Illiterate	439	43.9
No response	5	0.5
<b>Chronic disease</b>		
None	379	37.9
Diabetes mellitus	250	25.0
Hypertension	233	23.3
Cardiac disease	60	6.0
Bronchial asthma	58	5.8
Epilepsy	20	2.0

### Medicines used and Medicines at Home

Medicines were found in almost all 970 (97%) of the households that were surveyed. The most frequent categories of medicines kept in households were antibiotics 481(48.1), followed by analgesics 263 (26.3%), drugs for cardiovascular disease 153(15.3%) and anti- asthmatic drugs 144(14.4%). More than half 540 (54.5%) of medicines found in the surveyed households were not being used by any member of the household. Nearly three quarters 697 (69.7%) of households obtained their drugs from private pharmacies Details of types, characteristics and source of medicines found in households are presented in table 2 .

**Table 2.** Types, user characteristics and source of medicines kept at home.

<b>Item</b>	<b>Frequency N = 1,000</b>	<b>Percentage* %</b>
<b>Types of Medicine</b>		
Anti – infective drugs	123	12.3
Antibiotics	481	48.1
Analgesics	263	26.3
CNS	37	3.7
Cardiovascular	153	15.3
Cytotoxic and immunosuppressant	2	0.2
Endocrine drugs	53	5.3
Ear, nose and throat drugs	44	4.4
Eye preparation	35	3.5
Gastrointestinal drugs	87	8.7
Musculoskeletal/joint drugs	263	26.3
Nutrition supplement	34	3.4
Urinary tract infection drugs	13	1.3
Anti- asthmatic	144	14.4
Skin preparation	26	2.6
Herbal medicines	38	3.8
<b>User characteristics</b>		
Families with medicines at home	970	97.0
Medicine at home used by female	581	58.1
Medicine at home used by male	410	41.0
Medicine at home used by children (<12yrs)	284	28.4
Medicine at home used by adolescent (12-20yrs)	94	9.4
Medicine at home used by adults (>20-60yrs)	513	51.3
Medicine at home used by geriatrics (>60yrs)	96	9.6
Unused medicine at home	545	54.5
Duplicated medicine	332	33.2
Medicine used to treat multiple illness	5	0.5
<b>Source of medicines</b>		
Public Pharmacy	222	22.2
Private pharmacy	697	69.7
Patent/chemist stall	80	8
Market/general stall	10	1

\*Percentages do not add up because of multiple response

### Storage and medicine disposal practices in Households

Left – over medicines were present in 652(65.2%) of households. More than one third (34%) of left over medicines found in households had expired. Only 397(39.7%) dispose any leftover medicines irrespective of expiration date while 61.9% of the households claimed that they dispose only expired medicines. The most predominant site for storage of medicines was the cupboard (32.2%) followed by the bedroom (24.4%) and shelve (18.4%). Details of medicine storage and disposal practices is shown in table 3

**Table 3:** Medicine storage and disposal practice of households surveyed

Item	Frequency N = 1,000	Percentage* %
<b>Medicine storage</b>		
Cupboard	322	32.2
Bedroom	244	24.4
Shelf	184	18.4
Drawer	131	13.1
Refrigerator	62	6.2
Box	6	0.6
Kitchen	31	3.1
Bag	64	6.4
No response	5	0.5
<b>Medicine disposal</b>		
Households with left over medicines	652	65.2
Households that throw out leftover medicines	349	34.9
Households that dispose only expired medicines	619	61.9
Households that dispose both expired and non-expired left over medicines	397	39.7

\*Percentages do not add up because of multiple response

#### IV. Discussion

Improper storage and disposal of left over medicines is a potential threat to the household and public safety. The predominance of antibiotics, analgesics and cardiovascular drugs in households is consistent with the results of similar studies conducted in other countries. For example, a study conducted in Sudan found that the most commonly stored medicines found at homes were antibiotics (22%) followed by analgesics (12%).<sup>12</sup> These findings however, differ from that of other workers. De Bolle et al reported that the most commonly encountered categories of medicines in Belgium were non opioid analgesics (7.2%), followed by non -steroidal anti-inflammatory drugs (6.9%), and nasal decongestants (3.5%).<sup>13</sup> In Saudi Arabia, respiratory drugs were the most predominant, followed by central nervous system drugs and antibiotics.<sup>7</sup> In Iran, drugs acting on the central nervous system were the most commonly encountered medications (23.7%), followed by anti – infective (14%) and gastro intestinal agents (13%).<sup>14</sup>

Many factors may be responsible for presence of left over medicines at home. Some patients visit multiple health facility simultaneously and discard medicines collected from successive health facilities. In some places, medicines were obtained from public health facilities free of charge. Therefore there is little incentive to avoid medicine wastage as quantities prescribed and dispensed were often in excess of recommended quantities.<sup>15</sup> Patient non – compliance with prescribed medicines and failure to take the prescribed dosage or complete the entire course of prescribed medication may also contribute to the problem.<sup>16</sup> Medications stored in the home is a fairly common practice worldwide.<sup>17-18</sup> A study conducted in Saudi Arabia found a mean of eight drugs per household and up to 30% had at least 10 medications.<sup>7</sup> It is estimated that up to 40% of elderly patients kept prescription medication that they no longer used at home<sup>19</sup>. Elderly patients tend to have more medication in their homes and a larger household size was found to be predictive of storage of more medication.<sup>20-21</sup>

More than one third of left over medicines found in households had expired at the time of survey. In a British study, about half of medicines in the households were not in current use and around 40% of these medicines were expired<sup>6</sup>. The cupboard was the most predominant storage site for medicines found in households. Medicines were also kept in the bedroom, refrigerator and on shelves. Poor storage of medicine could not increase risk of accidental childhood poisoning but can lead to drug degradation and consequent reduction or elimination of its effectiveness and strength or sometimes its toxicity.<sup>16</sup>

This survey also collected data about self- reported morbidity in households. More than half of the surveyed households reported at least one chronic condition. This result is a little higher than the results of a previous study conducted in the Arabian Gulf where the presence of chronic disease was noted in 44%, 31.9% and 49.4% of Saudi, non-Saudi, and other Gulf households.<sup>7</sup> The accumulation of unwanted or unused medicines in the households represents a significant source of accidental medication poisoning particularly for young children. There is therefore, the need for enlightenment about appropriate methods for disposal of unwanted medication in the home. Guidelines on safe disposal of unwanted medicines are required and an organized method of collecting unused medication is needed to be introduced.

A number of key issues must be considered before generalizing the finding of studies. One such issue is the existence and enforcement of pharmacy regulations governing the sales, classification, prescribing and dispensing of medication. This has a direct bearing on public access to medication and the potential hazard associated with that access). In most countries, the regulations are strictly enforced but this cannot be said of

Nigeria where both prescription only and over the counter (OTC) medication are treated as mere articles of trade and all kinds of persons sell and access these drugs.

## V. Conclusion

Left over medicines were found in 970 (97%) of households. Antibiotics, analgesics and antihypertensive drugs were the most frequently encountered medicines stored in the surveyed households. About 340(34%) of medicines in households had already expired. Chronic diseases were reported in more than half 621(62.1%) of the surveyed households with the most frequent being diabetes mellitus 250(40.25%), followed by hypertension 233(37.52%) and cardiac diseases 60(9.66%). There is great need for public educational programs in the communities to promote rational use and safe disposal of left over medicines in the home.

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