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Household acquisition of medicines and disposal of expired and unused medicines at two suburbs (Bohyen and Kaase) in Kumasi – Ghana

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Abstract

Disposal of unused and expired medicines has become a major concern for not only local and national health authorities but also the environmental authorities. Many individuals in various households do not have any idea on how to properly dispose of such medicines. A study has therefore been carried out to investigate how and why households in two suburbs, namely Bohyen and Kaase, in Kumasi (Ghana) acquire medicines, and how those that are unused and/or expired in their custody are disposed of.

Structured questionnaire were distributed to solicit for information on why and how individuals acquired medicines and why the acquired medicines were not used. Additionally, the questionnaire also sought to find out how the unused and expired medicines are disposed of.

The study showed that most people acquired medicines from hospitals, pharmacies, licensed chemical shops and from friends and relatives. These medicines were acquired when sick or when one wanted to improve on well-being. Unused and expired drugs were mainly generated as a result of failure to complete the dosage given because of improvement in the disease condition or undesirable side effect of the medicines. Most of the respondents claimed that they dispose of unused and expired drugs mainly through the trash, and few flush them down the sink. Some keep them as they do not know what to do with them and very few incinerate the solid and semisolid ones.

The study has shown that most of the respondents used improper methods to dispose of unwanted medicines, and this can pose a great danger as children and some unscrupulous adults could lay hands on them. Some of these products could also be found in water bodies and may harm some aquatic lives. Health and environmental authorities should enact policies that will help avoid improper disposal of medicines.

Keywords: Medicine, disposal, trash, acquisition, expired, unused.

Introduction

Expired and unused medications obtained from hospitals, community pharmacies and other sources that are not used or become expired are often left in cabinet, cupboards, and other places designated for keeping medicines in the household. Keeping such drugs may lead to a potential misuse and abuse when one inadvertently takes them. Expired medicines may not only be no longer effective but may also have dangerous consequences on one's health [1]. For example expired tetracycline has purportedly been implicated to cause serious renal tubular damage leading to serious kidney problems [2].

There are many sources from which one can acquire medicines. In many developing countries acquisition of medicines, even prescription only ones, is not difficult. Some facilities where medicines are dispensed are not properly supervised by pharmacists and this leads to retailing of different classes of medicines to many individuals. Again, because it is relatively difficult, time consuming and more expensive to seek medical care from hospitals and other recognized health facilities when sick some patients or clients resort to medicine peddlers for their health-care needs [3, 4]. Additionally, many patients at the first sign of recovery after taking medicine when sick discontinue its usage; others when encounter the slightest side effect of prescribed medicine or any other medicine would stop using them. These sources contribute to accumulation of medicines in the households. With regards to their disposal, it becomes a problem when the acquired medicines expire or are not used.

In a country like Ghana, it is not uncommon to find individuals peddling medicines in lorry stations, market places and in vehicles. Such peddlers may acquire their stocks from any source and may not bother about the shelf-life of the medicines they sell. Safe disposal of unused and expired medicines therefore guarantees that these medicines do not end up in the

wrong hands where the products may be re-packaged and sold, or children picking them up from trash.

Additionally, great deal of environmental footprint is associated with the healthcare industry and this emanates from active pharmaceutical ingredients which can be found as pollutants in the environment [5]. These pharmaceutical pollutants can come from the excretory products such as urine and faeces of users as well as sweat; from washing down especially of pharmaceutical topical preparations; from improper disposal of leftover and/or expired medicines, and from manufacturing industries [6].

The proper disposal of unused or expired medicines is therefore of great importance to avoid pollution of the environment, allergic reaction in individuals sensitive to some active medicinal ingredients and many other challenges associated with improper disposal of medicines. Some countries have defined policies and strategies on collection and disposal of expired or unused medicines. In Ghana no such policies concerning disposal of medicines are known at least at the community level. This study therefore seeks to find out how individuals acquire medicines and why such medicines are not *totally* used leading to expiry or leftovers. More importantly, the study also investigates how individuals dispose of unused or expired medicines of various dosage forms. These investigations were achieved through interview and administration of questionnaires to some individuals residing or working at Bohyen and Kaase which are suburbs of Kumasi in Ghana.

Method

Study Design

The study was carried out in Kumasi, the second largest city of Ghana; the selected suburbs were Kaase and Bohyen. The study involved a descriptive cross-sectional survey of inhabitants of the mentioned suburbs based on a structured questionnaire. The purpose of the study was explained to the participating inhabitants assuring them of confidentiality of their responses.

Study Population

The study population included residents and/or workers in Kaase and Bohyen in Kumasi. Kumasi is located in the middle belt of Ghana; it is a busy city with many economic activities hovering around Agriculture, Industry and Commerce and the Service Sector. Participants were selected at random from both areas. In all three hundred and eighty two (382) valid responses were obtained and analysed.

Eligibility Criteria

Residents above eighteen years of age living in Kaase or Bohyen were considered eligible provided s/he would be willing to participate in the study. Additionally, workers above eighteen in the mentioned communities were also qualified to be included in the study.

Ethical Considerations

The aim of the study was explained to the participants, and their permission was sought as to whether they would be willing to participate in the study. Each respondent was informed that their participation should be of their own free will; under no compulsion or persuasion. They were further informed of the choice to discontinue with the study or to back-out at any point during the collection of data. Additionally, the participants were made aware that all data

obtained from them would be confidential and once the required information had been collated and the results published it would be destroyed. Individuals willing to take part in the study were given structured questionnaires to which they responded.

Data Collection

Data for the study was collected through the use of structured questionnaires. The questionnaire was divided into four sections. The first section dealt with personal data such as age, religion, educational background; the second section was on how respondents acquired their medicines – their source of medication. The third section also looked at the reasons why there were leftover medicines in their households, and the final section was on how unused and expired drugs were disposed of. Few respondents who could not read and/or write were helped with interpretation of the questions and their responses were appropriately put down on the questionnaires.

Data Analysis

The data accumulated were analyzed using Microsoft Office (Excel) 2007 and the obtained information from the study were summarized and presented in Tables for easy understanding.

Results and Discussion

Man has been plagued with illnesses and diseases throughout history. Many diseases are characterized by weakness in one way or the other and this has serious repercussions on productivity. A research by Price Waterhouse Coopers (2013) [7] indicated that the annual cost of absence from work due to sickness to organisations in UK was about £29 billion. According to the study the cost incurred was either a direct one such as cost of labour replacement, salary of the absent employee, or an indirect cost such as stress on other staff that cover absent employees, reduced productivity and customer services. To avoid or reduce the cost burden of absenteeism many people seek and acquire medicines to help them stay strong and healthy. Many people have now become more responsible for their healthcare and therefore acquire medicines (some as First Aid) in their homes in order to prevent common illnesses.

The current study has shown, from Table 1, that the major source from which patients/clients obtain medication are from Hospital and Clinics, Pharmacies and Licensed Chemical Sellers shops (LCSs), Herbal Centres, relatives and friends and others which include making their own medications from plants/herbs.

Table 1: Sources of household medicines.

<i>Source of acquisition of medicines</i>	<i>Frequency (%)</i>
Hospital or Health Centres	52
Pharmacies or LCSs	82
Herbal Centers	34
Relatives and Friends	38
Others	3

NB: Multiple responses were allowed in all cases.

A number of people acquire medicines on the first sign of sickness to avoid absence from work, school or any other activities. In Ghana the first point of call when sick, for many, is the Community Pharmacy or LCSs. It therefore does not come as a surprise that 82% of the respondents claimed that they acquire their medications from the Pharmacies and LCSs. In these facilities it is less expensive to get treatment as it is

only the cost of medication that is passed on to the patient. Additionally, there is mostly a short waiting time for acquisition of the medicines and patients may be able to interact more with the health professional present than at the hospitals.

Ghana introduced a National Health Insurance Scheme (NHIS) in 2003 and this enhanced hospital attendance in recent years as a patient who has registered under the scheme does not, in most cases, have to pay for the cost of treatment and drugs. Though there are some challenges with the scheme now, it still serves quite a number of people. The *free* cost of treatment and medication possibly accounts for the reason why 52% of respondents said the source of their medication was from the hospitals or clinics. Previously when patients had to pay for every service under the then *Cash and Carry* system hospital attendance was not very much. Long waiting periods at the hospitals continue to be a major problem that deter patients, especially, those whose sicknesses are not very serious from visiting hospitals or clinics even though they may have registered under the NHIS. These people would prefer to visit the Community Pharmacies or the LCSs.

In recent years there has been an increase in the use of herbal medicines to treat various diseases. Many people from all walks of life now prefer the use of herbal medicine in the treatment of various ailments. Because of this there are quite a number of herbal medicine centers and clinics where people seek medical care when sick. This trend is what is seen with the 34% who acquire their medication from the herbal centres. Some patients claimed that they get their medications from friends or relatives; these are likely to be leftover drugs from the *donors*. Taking medicines from friends who may not have much knowledge in medicines may be dangerous as this can lead to abuse and misuse of the medicines. Few people also claimed they prepare their own medications from plants and herbs when sick and this comes under 'others' as found in Table 1.

Prescribers, more often than not, issue instructions on the amount or quantity of medicines to be given out to a patient, and when a patient buys medicines from a Pharmacy or LCSs, the quantity required to treat or manage the disease condition is what is given. Patients, however fail to adhere to instructions on the use of their medicines hence the leftovers. From Table 2, respondents gave reasons such as improvement in medical conditions, change of medication by prescribers, unwanted side effects of medications, leaving some medicines for future use, for keeping medicines which may eventually expire in the households.

Table 2: Reasons for not completing medications.

<i>Reason for incomplete medication</i>	<i>Frequency (%)</i>
Improvement in medical condition	81
Change of medication by prescriber	29
Unwanted effect of medication	64
Keeping for future use	18
Others	12

NB: Multiple responses were allowed in all cases.

The goal of therapy for most treatment protocols is to alleviate the disease condition or improve upon the condition. Thus for most patients there is no need to continue taking medications once there is an improvement in the health status; this situation is very common for non-chronic diseases. This leads to accumulation of medicines in the homes. Other reasons cited by respondents for having medications at homes include

change of medication by prescriber and unwanted side effect of the medicine. Interestingly, some people claim that once their disease condition improves the remaining medications are kept for future use. Incomplete dosages especially those from antimicrobial agents can lead to problems such as resistance to antimicrobial agents.

The study further revealed from Table 3 that after keeping medicines at home, many people do not know how to properly dispose of them when they eventually expire or become unusable. From Table 3, throwing medicines away among other rubbish is the commonest method of disposal of medicines for both solid, liquid and semi-solid dosage forms. Flushing medications down the sink or throwing them in gutters is another method used by many people to get rid of expired or unused medications. Others throw unrequired medications into the toilet as a way of disposing of them; and few incinerate such medications in the household. Other people, according to them, not sure of what to do with such medications keep them in the house and even give some out when other people require similar medications.

Table 3: Routes of disposal of expired and unused medicines in households.

<i>Disposal Route</i>	<i>Dosage Forms (%)</i>		
	Solids	Liquids	Semi-solids
Toilet	9	18	5
Sink/Gutters	34	68	21
Rubbish/Trash	85	71	72
Incineration/Burning	7	1	3
Others*	10	5	4

* This includes keeping of the medicines and giving to charity

NB: Multiple responses were allowed in all cases

Most of the methods of disposal of unwanted medicines cited in Table 3 are not recommended methods though they are commonly used in many places^[8, 9]. The only recommended one among the methods mentioned is incineration or burning¹⁰. Improper disposal of pharmaceuticals and their waste, which include undispensed compounded products, discontinued in-dated items, unused unit dosed items, unused intravenous infusions, and patients' personal medications^[11] can have potential dangerous effects.

Trace amounts of numerous medications have been found in groundwater, surface water and drinking water^[10] in many places. According to the WHO (2011)^[9] the trace amounts of pharmaceuticals in drinking-water are unlikely to pose risks to human health because of the substantial margin of exposure or margin of safety between the concentrations detected and the concentrations likely to evoke a pharmacological effect. In spite of this, there is still the need to avoid improper disposal methods that may contribute to pharmaceuticals finding their way in environmental media.

Improper disposal of unused, expired, or unwanted pharmaceuticals can adversely affect communities in three distinct areas. First, there can be issues of unintentional poisonings. Secondly, abuse issues comprising misuse, diversion, and abuse can also be major factors; and finally, environmental issues (environmental contamination) can also arise^[12].

Conclusion

The study has shown that many households acquire medications from local pharmacies and hospitals. Patients mostly fail to complete the full dosage given to them once

there is an improvement in their medical condition, experience side effect of the medications, or when a prescriber changes their medications; and these lead to unused or expired medicines in the homes. Such medicines are normally disposed of by throwing them away in the trash or rubbish, flushing them down the toilet, sink or gutter; and others keep them for future use.

The current study has identified the need for proper education on disposal of pharmaceuticals that accumulate in households, and also the need for laws and regulations to clearly and specifically describe how unused medications should be properly disposed of.

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