



Household Storage of Medicines among Residents in Barangay Talamban, Cebu City

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Research Article

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Abstract

Objectives: The purpose of this study was to identify actual medicine storage conditions, identify factors that influenced respondents on medicine storage and knowledge of respondents on the storage of medicines.

Methodology: This was an exploratory, descriptive study. Systematic random sampling was used in the selection of respondents living among the seven cluster sites in Talamban, Cebu City. The research instrument used was a written interview questionnaire in a pre-defined order including questions on medicine storage, influence on storage, and awareness. Household visit was made to allow personal interview accompanied with a charted illustration of medicines for easier identification by the respondents.

Results & Conclusion: In a total of 101 households, tablets (81.19%), capsules (55.45%), and syrups (38.61%) were the commonly stored medicines. Cabinet (42.64%) at room temperature away from direct sunlight was the main storage condition while other respondents stored medicines in the pill container, living room, and refrigerator. Stored medicines were commonly for fever (66.34%), cough and colds (61.39%), and headache (49.5%). Influence on medicine storage was mainly based on self (47.52%) as individual perception. Furthermore, pharmacists (10.52%) were not the identified major information source for medicine storage. The respondents (60.39%) were aware that individual dosage forms have specific storage condition recommendations.

Respondents were unaware of the role of pharmacists in medicine dispensing which also includes information dissemination on medicine storage. Active participation of the

health care professionals as medicine information source must be emphasized as indicated by the data that respondents mostly relied on personal judgment on medicine storage.

Keywords: household, storage, medicine, Cebu, Philippines

Introduction

Pharmaceutical products in storage change, as they age, but they are considered to be stable as long as their characteristics remain within the manufacturer's specifications. The number of days that the product remains stable at the recommended storage conditions is referred to as the shelf life^[1].

The year-long study by the Delhi Pharmaceutical Trust showed that degradation occurs in medicines much before they approach the expiry dates due to uncontrolled temperature, exposure to light and moisture, and, among other things, during transport from the manufacturing sites to retail points^[2]. Drug potency has been altered albeit the proper storage and handling from manufacturing firms down to the retail points. Beyond the intrinsic problem of easy access to medicines in households, without medical prescription, there may be storage problems such as medications that are exposed to external factors such as heat, light, moisture, dust and many more^[3]. In many cases, these exposures lead to minor changes such as discoloration while other exposures may affect the medicine more seriously, leading to reduction or elimination of its potency. Some cases of affected medicines don't only exhibit therapeutic efficacy but may also present adverse effects on the patient's health^[4]. With this fact, household storage practices cannot be discounted from this type of adverse medicine exposure and consequently affecting drug efficacy and patient health outcomes.

It is an established fact that labile drugs and vaccines show decrease in potency if not stored under controlled temperatures. A study showed that insulin storage at temperature ranging from 32 to 37 °C had a 14 – 18% decrease in potency^[5]. This fact



doesn't hold true only for biological preparations but also for oral solid dosage forms. An example of this phenomenon is Dabigatran etexilate mesdylate capsules wherein these products should be dispensed and stored in the original bottle or blister package and patient should be aware of the specific handling requirements because of the potential for product breakdown and loss of potency^[6].

Keeping medicines at home is a common practice and one that may represent a potential risk of damage to health. Home medicine chests, which are often kept in inappropriate locations and containers, offer a range of opportunities for irrational consumption and waste, including irresponsible self-medication, and they also increase the risk of both unintentional toxic exposure (particularly of small children) and intentional intoxication. Although responsible self-medication (taking medicines that do not require a medical prescription to treat symptoms) may possibly reduce utilization of health care systems where there are access difficulties^[7].

In fact, Jassim^[8] conducted an in-home storage and self-medication with Antimicrobial drugs in Basrah, Iraq which showed that numerous indications of inappropriate storage, self-medication and poor compliance, use of drugs that have been kept beyond expiration date in their country. Furthermore, Mastroianni also conducted a survey on household storage and use of medications in Brazil which also showed similar results with the study of Jassim.

To date, no documented researches about consumer knowledge on household medicine storage are published in Cebu City, Philippines. It is very essential to probe on practices, knowledge source and other influences on medicine storage as storage affects quality of medicines. Also, if storage practices are found to be deficient, pharmacists' intervention on the buying public can be emphasized.

Results of this study may reflect the performance of pharmacists and other healthcare professionals serving the community and knowledge enhancement seminars can be made to augment their efforts during dispensing and counseling. For the academe, these studies provides them a view on the actual community practice and develop a framework for modification of teaching instructions in terms of medicine storage. Lastly, for the local government units, this study serves as basis for policy revision geared towards increasing the number of pharmacist ratio to its community since deficient number of pharmacists leads to self-medication, irrational drug utilization and inappropriate medicine storage^[9]. Eventually with this study, appropriate medicine storage maintains efficacy and potency thus improving patient health outcomes.

This study aimed to determine the household storage of medicines among residents in Talamban, Cebu City. Specifically,

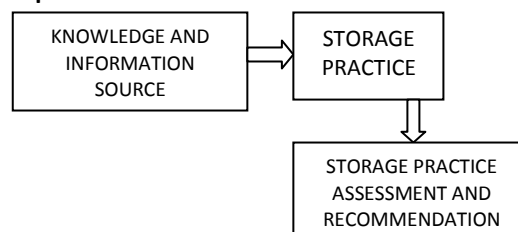
1. identified actual medicine storage conditions

2. identified factors that influenced the respondents on medicine storage

3. identified the knowledge of respondents on the storage of medicines

This paper will establish document on drug utilization knowledge and drug storage in Cebu City. It is very essential to probe on the knowledge source and other influences on drug storage since this will validate the reliability of their knowledge and if insufficient, corrective measures can be recommended. Results of this study may reflect the performance of pharmacists and other healthcare professionals serving the community and knowledge enhancement seminars can be made to retaliate their efforts during dispensing and counseling. For the academe, this will provide a view on the actual community practice and to provide modified teaching instructions that are in lined on how to meet the needs of the community in terms of medicine storage. Lastly, for the local government units, this may serve as the basis for policy revision geared towards increasing the pharmacist ratio to its community. Eventually, this will lead to the proper drug storage and efficacy may be maintained and consequently, improving health outcomes of the citizens.

Conceptual Framework



Material and Method

Research Design

This preliminary study was an exploratory, descriptive research using a written interview questionnaire. Systematic random sampling was used in the selection of respondents living among the seven cluster sites in Talamban, Cebu City.

Research Instruments

The research instrument used was a written interview questionnaire in a pre-defined order. Demographic profile of the respondents and questions on medicine storage were included. The questionnaire was divided into sections based on question category namely, medicine storage, influence on storage, and awareness. Open ended and close ended types of questions were used in the questionnaire. Also, a charted illustration of medicines was provided by the researchers for



easier identification of dosage form (medicine) by the respondents.

Sampling Size and Method

Sampling size was determined using Slovin's formula with a confidence level of 90%. A total of 101 household respondents were included in this study. Using a systematic random sampling, every 2nd household available for interview was selected by the researchers. If the respondent would decline, adjacent household was selected. One mature respondent in each family household was interviewed, usually the parents.

Slovin's Formula:

$$n = (N) / (1 + Ne^2)$$

n=sample size
N=total population
E=margin of error

Data Collection Procedure

Linkage with the local government was established through a written communication. Site visits were accompanied by site guides supplemented by the local government to endorse, assist the researchers and gather data from the households.

A structured household interview was used in the collection of data. The study instrument was a printed interview questionnaire in a pre-defined order for interviewing the respondents. The interview was accompanied with direct structured observation in order to have more reliable information on actual behaviour than interview alone. For example in order to know what medicines the respondents have at home, the interviewers asked the respondents to show the medicines they stored at home. In this case the data collector was able to see what medicines were available in the households, how they stored, and adequacy of labelling. Household visit was made to allow personal interview accompanied with a charted illustration of medicines for easier identification by the respondents.

Statistical Analysis

The results of this study were calculated by percentages. Percentage is commonly used to represent statistical data and provides an easy to read statistic. It is considered an important tool to illustrate the proportion of something. To calculate the survey percentage, the researchers used basic division wherein the total selected options among the given choices in the questionnaire would be divided by the total responses.

Formula to calculate percentage response:

$$\% \text{response} = \frac{\text{number of responses}}{\text{total number responses}} * 100$$

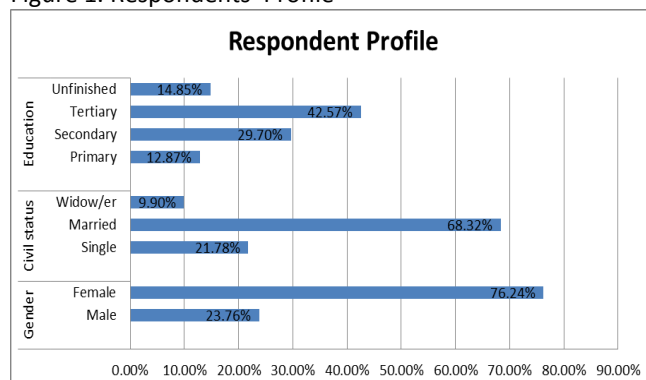
Results

Demographics

A total of 101 households were interviewed in this study (See Figure 1). All respondents were Filipinos. Approximately half (51.42%) of the respondents were residents of the urban community. Among the respondents, 76.24% were female and 23.76% were male. Majority of the respondents were housewives. In terms of the educational attainment, majority

(42.57%) attended tertiary education. With regards to civil status, most (68.32%) of the respondents were married, 21.78% were single and 9.90% were widow/er.

Figure 1. Respondents' Profile



Household Storage of Medicines

The respondents were asked regarding the purpose of buying medicines. Majority (49.50%) of the respondents described the purpose as for immediate use (i.e., new prescription), emergency purposes (44.55%) and maintenance (25.74%) (See Figure 2). When asked whether they store medicines at home, 97.03% of the respondents affirmed. Stored medicines at home were reported to be used for: Fever (66.34%), Cough & Colds (61.39%), Headache (49.50%), Multivitamins and Supplements (31.68%), and Hypertension (19.80%). Dosage form stored among the household were reported to be the following: Tablet (81.19%), Capsule (55.45%), Syrup (38.61%), Creams (9.90%), Ointment and Suspension (6.93%). The storage locations of the medicines were reported to be at the: Cabinet (42.64%), Pill container (22.84%), Living room (18.78%), Refrigerator (12.18%), Bedroom (3.55%) (See Figure 3).

Figure 2. Drug Storage

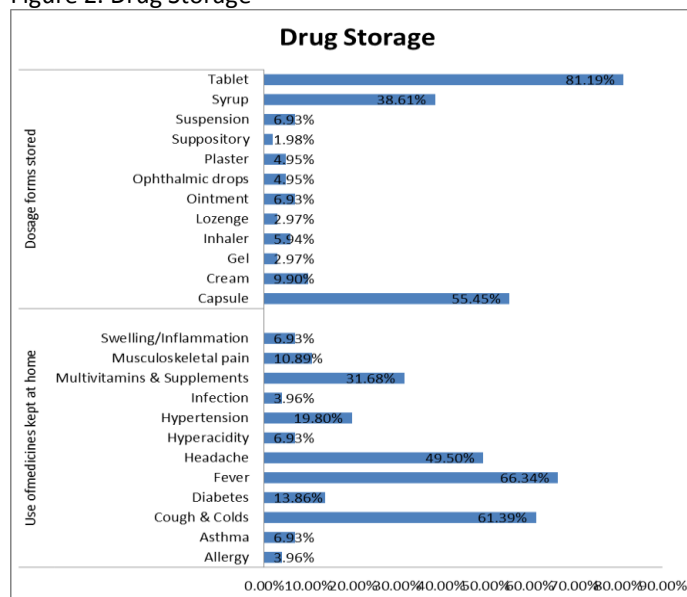




Figure 3. Location of Stored Medicines

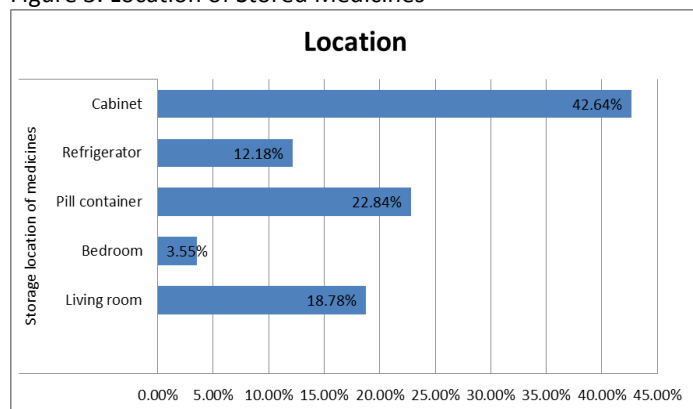
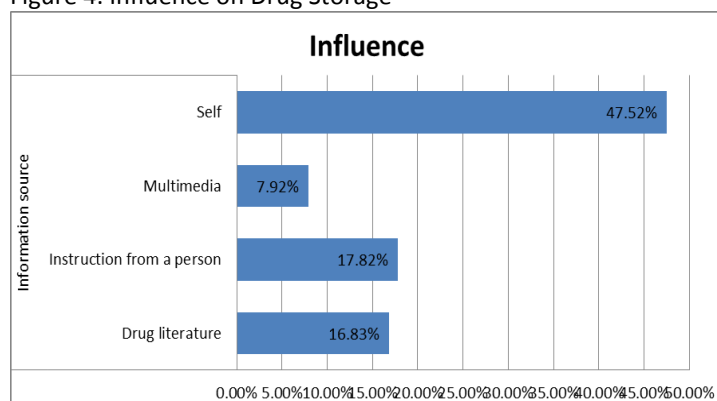


Figure 4. Influence on Drug Storage



Influence

Information on medicine storage practice were mainly based on one's personal judgment (47.52%), instruction from a person (17.83%), drug literature (16.83%) and multimedia (7.92%). Site of storage was mainly due to the respondents' ease of access (46.53%) and restricted access to children (38.60%) (See Figure 4).

Awareness

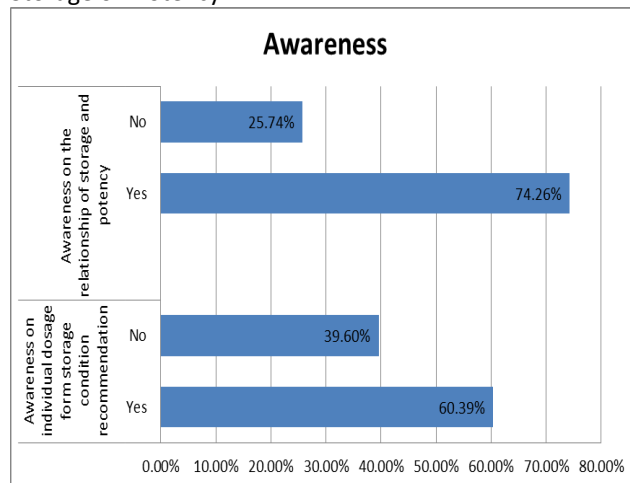
The respondents (97.03%) affirmed that they know about the proper storage condition of medicines (See Figure 5). When asked regarding their awareness on the recommended storage condition on each dosage form (medicine), 60.39% responded yes while 39.60% responded otherwise. Furthermore, 74.26% of the respondents were aware that improper storage condition of medicine will damage the medicine.

Discussion

Various reasons stem why people store and use medicines at home. The respondents in Talamban, Cebu City bought and consequently stored medicines for the purpose of immediate use (49.50%), emergency situations (44.55%), and maintenance (25.74%). Hardon^[10] suggested that people have lost their trust in one's body to fight disorders without the utilization of medicines, even for self-limiting disorders like diarrhea and fever. People already manage or treat (self – medication) a large proportion of their ailments without consulting a doctor or pharmacists^[11]. This study showed that

residents of Talamban resort to immediate use of medicines in the management of self – limiting disease which is suggestive of self medication.

Figure 5. Awareness on Effect of Proper Medicine Storage on Potency



The study reveals further that medicine storage information was largely based on personal judgment (47.52%) while pharmacists' interaction with buying patient is reported to be as low as 48.57%. Most of the patients' community pharmacy visits were not handled in majority by pharmacists, rather by pharmacy assistants. Furthermore, pharmacists (10.52%) are not the identified major information source for medicine storage, rather, physicians (78.94%). A buying patient may have become aware of the medicine only by reading, seeing or hearing an advertisement or may have been suggested by a friend who has little or no knowledge on the potential difficulties associated with the use of medicines^[12]. Often, pharmacists insist that they do pharmaceutical care when all evidence indicates that what they are actually doing is only a variation on a vague theme of counseling^[13]. Moreover, a pharmacist should not assume that a buying patient is fully aware of the medicines' properties, potential side effects, possible interactions and drug storage. Ironically, the study reveals that 60.39% were aware that each medicine has a recommended storage condition and 74.26% were aware that improper storage of medicine will damage the quality of medicine. This, however, does not signify the accuracy of their assumed knowledge on drug storage.

The most frequently stored medicines in households were analgesics intended for fever, cough and colds, and headache. This result is parallel with a study in Qatar wherein 21% of most frequently stored medications at home were also analgesics^[14]. These common self-limiting diseases which include fever, cough and colds and headache afflict many Filipinos that require immediate intervention to relieve pain



and discomfort. Majority of stored dosage forms were tablets (81.19%) followed by capsules (55.45%). Results of this study revealed a similar data with a study that was conducted in Iran where tablets and capsules being the prevalently stored dosage forms among households.

As suggested by the respondents, the medicines were mainly kept in the cabinet (42.64%). Cabinets were located in area of the household away from sunlight and apparent to the people who are taking those medicines. A number of respondents placed their medicine in pill containers which are located in the dining table. Respondents stored their medicines in those areas for ease of access (46.53%).

Conclusion

Majority (42.64%) of the medicines were stored in cabinets at room temperature away from direct sunlight. The same conditions follow with medicines stored in pill containers (22.84%), living room (18.78%), refrigerator (12.18%) and bedroom (3.55%). Tablets, capsules and syrups were the commonly stored dosage forms used for fever, cough and colds and headache.

Medicine storage was largely based on personal judgment (47.52%). Pharmacists' interaction with buying patient is as low as 48.57%. Furthermore, pharmacists (10.52%) were not the identified major information source for drug storage. Active participation of the health care professionals as medicine information source must be emphasized as indicated by the data that respondents mostly relied on personal judgment on drug storage. This reveals the performance of the community pharmacists specifically in Barangay Talamaban, Cebu City. This problem reveals that respondents were unaware of the role of pharmacists in drug dispensing which also includes information dissemination on drug storage. Moreover, respondents further revealed that acquisition of medicine from government – run health centers were made without pharmacists to provide them information on drug storage. Pharmacists must be actively involved in patient education in order to bridge the gap on the knowledge and practice on drug storage. This will elevate patient know-how on drug storage and other practices and consequently better health outcomes.

In terms of the knowledge of the respondents on the storage of medicine, this study revealed that respondents were aware that each dosage forms (medicine) have a recommended storage condition and majority was also aware that improper storage of medicine may affect efficacy and potency.

RECOMMENDATIONS

The researchers recommended reinforcement of proper storage instructions to community pharmacists by the Food and Drug Administration – Philippines (FDA). For the academe, the findings of this study can be emphasized in instructions specifically, in subjects such as drug dispensing, pharmaceutical drug delivery system, and pharmaceutical manufacturing to bridge the gap between the public understanding and current teachings on drug storage. Lastly, the findings can be beneficial as well to the government – run

community health centers by incorporating in their information dissemination.

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AUTHORS' CONTRIBUTIONS

Authors contributed equally to all aspects of the study.

PEER REVIEW

Not commissioned; externally peer reviewed.

CONFLICTS OF INTEREST

The authors declare that they have no competing interests.