

Knowledge and Awareness of Disposal of Unused and Expired Medicines among Healthcare Professionals in Tertiary Care Hospital: A Brief Report

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Abstract

Background: The incidence and prevalence of diseases are increasing, which has resulted in a huge increase in the use of medications. However, when they were no longer required/remaining unused due to various reasons, they had to be disposed of. Since the drugs are chemicals, their expiration date indicates the amount of time that the product is anticipated to remain stable. Consumption of expired drug can result in efficacy loss, safety concerns, potency loss.

Methods: This cross-sectional questionnaire-based study evaluated knowledge, attitude and practice of drug disposal among healthcare professionals especially junior residents in tertiary health care centre. The data were collected through a google form and expressed in percentage.

Results: Out of 200, a total of 133 participants have completed the survey, which includes 42% males and 58% females. A total of (97.7%) participants were aware that improper disposal of unused and expired medicines affects the environment and health. However, (97%) of the respondents answered that the drug take back programmes should be included in the communities.

Conclusion: Majority of the study participants reported that they have unused medications at home, and throwing them in the household garbage is the most common method of getting rid of them. It is important to educate people on the correct way to dispose of unused and expired medications, and a drug take-back program in communities could be the solution to this issue.

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Keywords: Drug Disposal; Expired Medicines; Healthcare Professionals

Introduction

According to WHO (1966) "Drug is any substance or product that is used or is intended to be used to modify or explore physiological systems or pathological states for the benefit of the recipient"(1). Since it is a chemical, the expiration date is necessary because it indicates the time period that the drug is known to remain stable, meaning that when it is stored in accordance with the instructions on the label, it maintains its potency (2). If the unused medications were stored for a longer period of time, then these expired medicines may potentially alter their physical and chemical characteristics, cause them to absorb moisture, and lead to microbial contamination,(3) may lose their effectiveness, jeopardise their safety, lose their potency, or produce products that are hazardous to health (4). However, in the case of antibiotics, these

expired drugs may fail to cure infections effectively and cause antibiotic resistance. According to WHO data, more than half of all prescription and retail drug sales are improper, which results in overstocking of drugs and poses a serious environmental danger (5). It was reported that tonnes of municipal solid waste are produced as a result of unused and expired medications (6). However, according to studies conducted in other countries, the most common reason behind this overstocking of drugs is patients non-compliance. Non-compliance can occur for a variety of reasons, such as patient's refused to take prescribed medicines or due to drug side effects, recovery from illness, or the patient's desire to save the medication for use at home (7–10). Improper disposal of unused and expired medicines can cause environmental damage(11) and a number of health risks, including

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poisoning from accidental ingestion or intentional suicide (12). The appropriate handling of the expired medications is essential for solving this issue. Thus, there are specific guidelines formulated by National Formulary of India, 2011 which specifies the disposal of unused and expired medicines (13). The WHO recommends some procedures for properly discarding of unused or expired medications which includes returning them to the manufacturer, disposing of them in an engineered landfill (after immobilisation), incinerating them at medium or high temperatures, chemically decomposing them in accordance with the manufacturer's recommendations, and finally landfilling them (14). The FDA advises that the safest and most efficient method of getting rid of unused pharmaceuticals is through a "take-back" programme (15). However, the majority of individuals are unaware of these recommendations or how crucial it is to adhere to them (14). Since very few studies have been conducted in western Maharashtra about the safe disposal of unused and expired medicines among healthcare professionals (16), this study is carried out with the objective of evaluating the knowledge, attitude, and general practices concerning the correct disposal of unused and expired drugs among healthcare professionals in tertiary care teaching hospitals.

Methods

An observational, descriptive, cross-sectional questionnaire-based study was conducted at the Department of Pharmacology in a tertiary healthcare hospital for a period of six months, from March 1st, 2023, to August 1st, 2023.

The study was initiated after the approval of the study protocol by the Institutional Ethics Committee. This study was carried out among junior residents of tertiary care hospital and those who gave consent were included in the study. Participation in the study was voluntary.

A questionnaire was prepared based on the objectives of the study and in accordance with WHO guidelines (14). The questionnaire consisted of five sections; in which the relevant demographic data of study participant is recorded in section (A). Section (B), (C), (D) includes 9 Questions of knowledge, 5 Questions of attitude, 4 Questions of practice respectively. Section (E) includes 2 Questions to evaluate awareness related to the disposal of unused and expired medicines (Table 1). The questionnaire items comprised of closed ended multiple choice questions and 'YES' 'NO' type questions.

Questionnaire was developed after reviewing the existing literature and WHO guidelines regarding safe disposal of unused and expired drugs (14). After discussion with

co-authors and subject experts, relevant changes in the questionnaire were done. A pilot study was done to check the validity of questionnaire (Cronbach's alpha 0.72). The question was administered to the study participants via Google Form. Link of the Google form was shared to the participants via WhatsApp. Multiple responses from a single participant were disabled. Microsoft Excel 2010 was used to import the responses that were taken out of Google Forms. Descriptive statistics such as percentage were calculated.

Results

Out of total 140 junior residents present in the institute 133 junior residents completed the questionnaire and the response rate was 95%. Among the participants, (42%) were male and (58%) were female.

The majority of respondents (73.7%) were aware of how to discard unused and expired drugs. Out of 133 respondents, (27.07%) participants responded that the safest methods for disposing of medicine were landfill followed by high-temperature incineration i.e. 12000c (23.31%), return to donor (21.80%), burning in an open container (2.26%), waste immobilization: encapsulation (2.26%) and sewer (3.01%). Also, participants who were responded indicated that they did not know how to properly dispose of aerosol canisters (71.4%), liquid medications (52.6%) and solid medications (36.2%). Only (53.38%) participants received information about how to dispose unused and expired medicines and that too from Continuing medical education (CME) (56.39%), Internet (36.84%), Newspaper (3.76%) and through other resources (3.01%). The reason for this discrepancy was that (46.6%) of participants had never before received accurate information about how to properly dispose of unwanted and expired drugs. On the other hand, a large portion of the respondents did not know about the drug-take-back system (77.4%). A large share of the respondents (97.7%) correctly responded that improper disposal of unused and expired medicine could have detrimental effects on the environment.

The majority of participants (99.25%) responded that the safe disposal of unused and expired medicines is necessary. About (96.2%) participants suggested that awareness among the public regarding the hazards of unsafe disposal and methods of safe disposal of medicines is required and that the information should be provided by pharmacists, doctors, and other healthcare professionals. About (99%) participants agreed that there is a need for a program to collect unused and expired medicines from home, and a drug-take-Back program for such medications should be implemented in the communities.

About (65%) participants throw away expired and unused drugs, (20.3%) return them to a medical store; (11.3%) keep them at home; and (3.7%) donate unused medicines to hospitals. The medicines that are commonly stored by participants are analgesics (75.2%). The most common reason for keeping unused medicines at home is discontinuation of treatment because of an improved medical condition (41%). Also, the second most common reason seen is a shift to another treatment (18%). About (45%) participants mentioned that throwing drugs into household waste is the major route of drug disposal, followed by flushing in toilets (3%) and majority of participants in the study are from government institutes, so it seems mandatory to return the expired drugs to the central pharmacy. Thus (18%) participants return the unused drugs to the pharmacy.

A total of 109 participants (81.9%) believes that all of the following, such as newspapers, electronic media, pharmacists, doctors, etc., are the finest sources for raising society's awareness.

About (53%) participants say the hazardous effect of unused and expired medicines can be minimized or controlled by providing proper guidance to the consumer. (29%) by ensuring adequate duration; (10%) by donating the unused medicines to the hospital/ pharmacy so that if any patient is not getting the medicine because it is out of stock, then these donated unused medicines can be a great help for that patient; (9%) by lowering the number of medicines prescribed by doctors.

Discussion

An observational, descriptive, cross-sectional questionnaire-based study, was carried out in the Department of Pharmacology in a tertiary healthcare facility. The purpose of this study was to evaluate the participants' knowledge, attitude and practices about the improper disposal of unused and expired medications. Participants who understood the study well, demonstrated the right knowledge toward this study. The majority of respondents, however, were unaware of the drug take-back program and offered a variety of suggestions for reducing or managing the impact of unused and expired medication. The majority of respondents concurred that there wasn't enough information on safe disposal techniques. Throughout the study period, many people kept drugs in their homes, and the most common drugs found were analgesics. The preferred method of disposing of both unused and expired medication was to throw it in the regular household waste.

In this study, the participants response about negative impacts of improperly discarding unused and expired

medication on the environment is higher than that of a study carried out in Serbia(66%)and Karachi City(80%) (17,18). In this study, a significant number of the respondents(77.4%) were unaware of the drug-take-back system and the result is higher than that of study carried out in Harar city, Eastern Ethiopia(66.9%)(19).

In this study, a significant number of respondents believed that a programme like the "drug take-back system" was necessary to collect unused, unwanted, and expired medications from homes. Similar finding was reported in other study (20). In general, more than 90% of participants said healthcare providers should be enrolled in educational programmes for proper and safe disposal of medication and provide this information to patients when they visit. Similar finding was reported in other study (21).

Throwing away in household waste was the most popular method of disposal in the study for both unused and expired medications. This finding is consistent with study done in Kenya (22). In this study, analgesics and antibiotics were the most often stored pharmaceutical categories in homes. This study compares favourably to studies conducted in Nigeria(23)and India (24).

In this regard, a lot of the participants sought instruction from pharmacist and physicians on the best ways to dispose of pharmaceuticals safely. This agrees with the finding of earlier research that was published (25).

Since the study was only done at one centre, its generalizability is questionable. Results may be skewed because respondents may give responses, they believe are socially acceptable rather than ones that accurately reflect their knowledge and habits. Disposal practices can vary significantly based on cultural norms and regional regulations, making it challenging to draw universal conclusions. But this research provides insight into an issue that hasn't gotten the attention it merits.

Despite being aware of the impacts on the environment, the majority of participants in this survey were disposing of their medications improperly. They were probably not given sufficient disposal instructions, which left them vulnerable to this behaviour. The government should create a national drug take-back system to collect returned, unused, or expired medications at every level of government hospitals to reduce improper drug disposal. To promote proper drug disposal among the general public, awareness programmes should be frequently held for all medical professionals. To raise awareness of the environmental issues brought on by incorrect drug disposal, it is crucial to use media, such as social media and television.

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Conflict of interest

The author declares no conflict of interest, financial or otherwise.

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