Short Communication

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Knowledge, Attitude and Practice on Awareness of Pharmaceutical Waste Disposal among Local Public of Karachi

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ABSTRACT

Inappropriate disposal of expired and unused drugs by households is a major source of environmental pollution and contamination, posing a significant health hazard. This study aims to evaluate the general knowledge and practices of pharmaceutical waste disposal among the masses of Karachi. The study is a descriptive cross-sectional survey involving household members who use prescribed and Over the counter (OTC) medicines from different localities of Karachi. The study was conducted through a predesigned structured questionnaire from January 2025 to March 2025. A total of 2000 participants were included. Results revealed that 74% participants were aware of the harmful effects of medicinal wastes. However, only 4% were following drug take back programs, 96% even educated participants were oblivious to the existence of any such system. Around 86% of the participants mentioned disposing of expired/unused medicines in the dustbin, while 8% admitted flushing them down the sink/toilet. Hence, it is concluded that knowledge and proper implementation of pharmaceutical waste disposal are severely lacking in this global city and require urgent attention to prevent further adverse effects on human health.

Keywords: *Drug take back program, Human health, Pharmaceutical waste disposal.*

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INTRODUCTION

Over the past few decades, social, commercial, and lifestyle alterations have increased the occurrence of ailments, including obesity, diabetes, cardiovascular diseases, tumors, and autoimmune diseases, which in turn has accelerated the consumption of pharmaceuticals[1]. Karachi, the largest city in Pakistan, with an estimated population of 20 million, generates over 16500 tons of municipal waste daily[2]. Pharmaceutical waste includes expired or unused pharmaceutical products, spilled or surplus drugs, vaccines, or sera, and discarded bottles, boxes, gloves, masks, tubes, vials, blades, broken glass, and radioactive wastes[3].

In developing countries, self-medication, polypharmacy, and lack of knowledge are the factors leading to inaccurate disposal of pharmaceuticals[4]. Inappropriate disposal, for example, in dustbins or on road sides, causes serious health hazards such as respiratory distress, contamination of drinking water, accidental poisoning, accumulation in food chains to the general population[5] and leads to the evolution of antibiotic-resistant bacteria[6]. Major hurdles in the management of pharmaceutical waste include insufficient storage space, insufficient waste transportation facilities, inadequate and improper disposal sites, and the high cost of processing the waste. This study aims to evaluate the existing knowledge and practices of pharmaceutical waste disposal among the masses of Karachi.

MATERIAL and METHODS

This was a cross-sectional, community-based study conducted from January 2025 to March 2025 approved from department of Pharmaceutical Chemistry, Institute of Pharmaceutical Sciences, Jinnah Sindh Medical

University (Ref No: IPS/DRC/PCM/2024/15). Data was collected from randomly selected 2000 respondents (aged 18-60 years) from different localities of Karachi using a structured, closed-ended questionnaire in English.

The questionnaire included demographic details, questions related to knowledge, attitude, and practice about the use and disposal of medicines. The terminologies were thoroughly explained to participants, where needed. Participants who were unable to understand English were excluded. An informed consent was taken from participants priorly.

RESULT

The data collected from common household people aged between 18 to 60 years, where 72% of the respondents were female and 28% were male. The results revealed that 79.02% respondents keep the medicines at home for later use, until expired. Around 74% participants were aware of the harmful effects of medicinal wastes but only 4% were returning the unused medicines to community pharmacies and were aware of drug take back programs. Almost 96% were oblivious to the existence of any such system. Around 86% of the participants mentioned disposing of expired/unused medicines in the dustbin, while 8% admitted flushing them down the sink/toilet. 95% of the respondents consider government authorities, physicians and pharmacist are equally responsible to propagate awareness on drug disposal through social and print media and 99% agreed to include such knowledge in educational system.

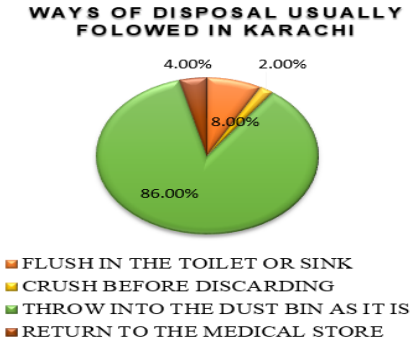

Fig. 1 Ways of disposal of pharmaceutical wastes in Karachi

DISCUSSION

In economically underdeveloped countries, the major cause of inaccurate disposal of pharmaceutical wastes is actually the lack of proper guidelines[4]. The results recorded in the present survey revealed that Karachi is severely lacking in knowledge and practices of proper pharmaceutical waste disposal. Majority, even the educated people, were unaware of the proper disposal methods. According to the data collected 99% of the respondents were keeping the unused medicines at home for future use which was a major reason for self-medication and poly pharmacy practices which give rise to excessive pharmaceutical waste. Results shown in figure 1 indicated that chief method for disposal, used by local people, was throwing in dust bins followed by flushing in toilet or sink which coincides with results in the other studies. In a review study Tabassum et al., reported house hold trash as the major way of disposal followed by flushing and limited percentage of return to pharmacies in Asian countries[8].

The study found that 74 % of people were aware of the adverse effects of pharmaceutical wastes however 10% respondents were absolutely unaware of any such effects and 16% were not sure. Similarly a study declared majority of the participants were aware of risks of improper pharmaceutical waste disposal still discarded wastes in house hold bins[9]. This is due to inadequate information about the discarding methods. In this respect, the following risk minimization measures can be adopted organizing awareness campaigns for masses, to provide information related to the use and the return of medicinal products, using clear labels that specify proper use and disposal, developing regulations for internet pharmacies and implementation of laws devised for proper disposal of pharmaceutical wastes. However the study explored the situation in Karachi only, further studies are required to evaluate the issue all over the country.

CONCLUSION

It was concluded that knowledge of proper pharmaceutical waste disposal is severely lacking in this global city and must be addressed urgently. The successful implementation of an accurate waste-disposal system requires proper legislation, the engagement of all stakeholders in educating the masses, and the provision of appropriate sites and technology for disposal.

Author Contributions

EZ: Data Collection and Manuscript Writing
KR: Conception & Design, Final Approval
SU: Data Analysis, Critical Revision
BH: Data Collection

Conflict of Interests

No conflict of interest.

Data Availability:

Data will be available upon request.

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