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A SURVEY ON THE KNOWLEDGE, PERCEPTION AND PRACTICES REGARDING UNWANTED MEDICINE DISPOSAL AMONG SECOND PROFESSIONAL MEDICAL STUDENTS IN CENTRAL INDIA

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ABSTRACT

Unwanted medicines (UM) are defined as expired, unused, damaged, or contaminated pharmaceutical products which are no longer required. The World Health Organization (WHO) recommends that unwanted medicines should always be considered as pharmaceutical waste and should never be utilized for humans and animals. As per data in year 2020, approximately 1.27 trillion U.S. dollars has been spent on medicines and this number is expected to increase to 1.6 trillion by the year 2050.Patients may not take all dispensed medicines due to poor adherence, discontinuation of medicines, adverse drug reactions in the past, proximity to the expiration date, and peer pressure. In addition to that medicines are even stored and disposed inappropriately. Ever expanding drug market, new pharmaceuticals, and enormous usage of both prescription and over the counter drugs contribute exponentially to an existing myriad of pharmaceutical and personal care products (PPCPs). The end product of expired drugs can cause antibiotic resistance, therapeutic failure, carcinogenicity. There is a need for strict compliance of disposal practices for unused/expired drugs. It is imperative that the public, including healthcare professionals (HCPs), are aware of proper disposal methods and harms associated with their improper disposal. In view of the potential

hazards posed due to improper storage and disposal of medicines, evaluation of the awareness of the consumers and their practices related to drug disposal and educating them about proper disposal methods and planning out an effective drug take back program at community level is required.

KEYWORDS: Unwanted medicines, antimicrobial drug, disposal practice.

INTRODUCTION

Unwanted medicines (UM) are defined as expired, unused, damaged or contaminated pharmaceutical products which are no longer required. The World Health Organization (WHO) recommends that unwanted medicines should always be considered as pharmaceutical waste and should never be utilized for humans and animals, whereas the worldwide drug utilization by end users for the prevention and treatment of medical conditions is steadily rising, and therefore increase in the worldwide spending on medicines. As per data in year 2020, approximately 1.27 trillion U.S. dollars has been spent on medicines and this number is expected to increase to 1.6 trillion by the year 2050.[1,2]

Medicines are essential when it comes to saving lives whereas it may also cause detrimental effects if injudiciously consumed and managed. Universal rise in health seeking awareness and change in behavior accordingly, lead to high medicine consumption and personal storage. However, patients may not take all dispensed medicines due to poor adherence, discontinuation of medicines, adverse drug reactions in the past, proximity to the expiration date, forgetting to take the drug, and peer pressure. In addition to that medicines are even stored and disposed inappropriately, open the way for hazards to the humanity and environment. Decline in the population of vultures feeding on livestock carcasses due to veterinary use of diclofenac, decrease in the number of frogs because of sterility due to exposure of traces of progestins and ethinyl estragiol in water are few examples of impact of environmental contamination with drugs.[3,4]

Ever expanding drug market, new pharmaceuticals, and enormous usage of both prescription and over the counter drugs contribute exponentially to an existing myriad of pharmaceutical and personal care products (PPCPs). Various reasons for the inability of patients to complete the number of dispensed medications is; adverse effects, dosage change, feeling better soon, expiry date proximity, advertisements, doctors' advice, advice by friends and family. The

product of expired drugs can cause antibiotic resistance, therapeutic failure, carcinogenicity. There is a need for strict compliance of disposal practices for unused/expired drugs.[5]

According to WHO recommendations, strategies to dispose large quantities of pharmaceutical waste are encapsulation and burial in a sanitary landfill or incineration in kilns equipped with pollution control devices.[6] In India rules and regulations regarding handling and management of various types of wastes are applicable to six main categories of waste: municipal solid waste, hazardous waste, bio-medical waste (BMW), plastic waste, e-waste, and batteries. All healthcare establishments, irrespective of the quantum of waste generated, come under BMW rules. These rules classify discarded, contaminated, or outdated medicines and cytotoxic drugs into category five and recommend their disposal by incineration. It is imperative that the public, including healthcare professionals (HCPs), are aware of proper disposal methods and harms associated with their improper disposal. A survey conducted in the UK revealed unhealthy practices of 400 households where they disposed unused and expired pharmaceuticals either as household waste or via the sink or toilet.[7,8]

In view of the potential hazards posed due to improper storage and disposal of medicines, evaluation of the awareness of the consumers and their practices related to drug disposal and educating them about proper disposal methods and planning out an effective drug take back program at community level is required. Present study aims at evaluating a survey on the knowledge, perception and practices regarding unwanted medicine disposal among second professional medical students in north India

MATERIAL AND METHOD

Study design - This is a prospective cross sectional observational, questionnaire-based study was conducted during the period of December to February 2023-24 in department of pharmacology, BRLSABVM medical college and hospital Rajnandgaon Chhattisgarh India.

Study population – The study population was of either gender, above the age of 18 years who were second year MBBS students attending lectures.

Sampling/sample size – A non – probability sampling techniques (convenience method) was used to achieve representative sample from the whole batch. Data collection is done after institutional ethics committee approved this study. A total of 125 participants were recruited

for the study and goggle form was distributed via email. Before filling out the questionnaire, the study participants explained the study importance and purpose. After the informed consent was obtained from the target population, the semi structured questionnaire were distributed and sufficient time was given to the participants to complete the questionnaire, out of which 77 participants given consent and their response were considered. The questionnaire comprises three parts; in which part I includes demographic details of study participants such as name, email and knowledge of unwanted medicines. The inquiries related to awareness and attitude of participants would come under part II and practices of unused and expired drug disposal were included in part III. The data were represented as percentage and analyzed through the Microsoft office package.

Data analyses – At the end data were collected and tabulated in summery sheets and were analyzed by using computer software SPSS version 20 and Microsoft Excel 2019. The data has been expressed as mean + standard deviation, frequency and percentage.

RESULT

Evaluation of knowledge of unwanted medicines disposal

The majority of the participants under evaluation understood the concept of medication waste 69 (89.65 %) meanwhile most of them also confess that they read medicine disposal instruction 55 (71.4%) with small proportion admitting that they don't 22 (28.6%). The majority of the population was unaware of "Drug take back programme" 60 (74%). Albeit, the majority of the students know that misused/repeated change or not complete antibiotics may cause drug resistance 69 (89.6%). Most of the people evaluated had knowledge of the improper disposal of unused and expired medicines can affect the environment and health 70 (90.9%). Table no 1.

Evaluation of perception towards unwanted medicine disposal

Regarding participants perception on disposal method of unwanted medicines, result were as presented in Table no 2 and they revealed that 44 (57.1 %) of them, agreed upon that unwanted medicines present potential risk at home while 40 (53.2%) agreed that children are more vulnerable to the risk associated with keeping unwanted medicines at household. Furthermore majority 55 (72.4%) agree upon lack of adequate information on safe disposal of unwanted medicines meanwhile 35 (45.5%) strongly agree that doctors and healthcare professionals must provide advice on safe disposal methods for unwanted medicines in household. Participants were also asked if they are willing to use "Drug take back

programme" for the safe disposal of unused and expired medicines, to which 35 (45.5%) of them agreed upon that programme to be introduced in the communities. Table no 2.

Evaluation of disposal practices of unwanted medicines

The majority of the participant's confessed that they dispose unused medicines by returning back to pharmacy 46 (60.5%) while small percentage admitted that they either keep it in their home until they expire 11 (14.5 %) or throw them away in household garbage 10 (13.2%). Table 3 Among expired medicines at home, more than half of participants 40 (53. 2%) admitted that they return those expired medicines back to pharmacy while fewer practices by throwing them away in household garbage 14 (18.2%). Figure no 1. Also responses suggest that most medicines remain unused at home are both analgesic and antibiotics 47 (61.8%) while antibiotics are next them 11 (14.5%). Table no 4.

DISCUSSION

Academic institutions contribute to the accumulation of an enormous amount of expired and unused medicines, and this can damage the environment and as well as causing public health problems.[9] Environmental pollution with drugs such as antimicrobial agents has been reported to be a common cause of antimicrobial resistance (AMR) in the environment. Therefore, our study aimed to assess the knowledge, perception and practice on the disposal method of expired and unused medicines among second year MBBS students. In this study majority of the participants under evaluation understood the concept of medication waste 89.6% however this finding is above compared to a study conducted among pharmacy students in Bangladesh in which 63.7% of participants did not know about medication waste which is also coincide with other studies conducted in India and Ethiopia.[10.11] The difference could be due to government variation in the sensitization of proper ways of medicines disposal waste.

More than half of the students 71.4 % admitted that they read medicine disposal instruction and when respondents were asked if they were aware of "Drug take back programme" around 74% responded positively. This finding are comparable to the findings of another study where only 3.7% of the respondents knew about the drug take back program.[10] In our study more the half of the students aware to this program could be due to young age, pursing professional medical degree and it can be believed that these people had more exposure to the drug disposal methods via frequently conducted seminars and conferences in the institution.

Substantial students 89.6% admitted that misused/repeated change or not complete antibiotics may cause drug resistance whereas 90.9% knew that the improper disposal of unused and expired medicines can affect the environment and health. These findings are consistent with the findings of the other studies where more than half of the participants understood very well the negative impact of improper disposal of unused and expired medicines on the environment.[12,13]

In this study, 57.1% of the respondents acknowledge that unused and expired medicines present potential risk at home whereas study conducted in north India 56.36% consumers had 1 – 5 unused drugs at home.[14] Study done in Karachi had similar findings.[15] Regarding the risks of storing such medicines at home 53.2% agreed that children are more susceptible to the risks related to unused and expired household medicines. Accidental pharmaceutical poisoning in young children is common and therefore, the need to appropriately store and safely dispose of unused and expired medicines.[16]

Additionally, 72.4% candidates denied receiving adequate information on safe disposal of unused and expired medicine meanwhile study done in Telangana India where only 58% has accepted that they received instructions.[4] Furthermore 45.5% strongly agree that doctors and healthcare professionals must provide advice on safe disposal methods for unused and expired medicines in household which is consistent with the finding of other studies.[3,17] Data also suggest that 45.5% of them said to introduce “Drug take back programme” in the communities simultaneously improving consumer awareness.[3,10]

Current study suggests that most of the respondents prefer disposing unused medicines by returning back to pharmacy 60.5% while fewer kept in their home until they expire, on the contrary similar studies states majority of people stored unused medicine at home 87%. Similarly, many studies done in Nepal and New Zealand.[3,5,18] Additionally, 53. 2% of participants preferred returning those expired medicines back to pharmacy. This finding are is consistent with studies done elsewhere.[19,20] This practices across various countries of stopping medications before therapy completion depicts the lack of awareness of the importance of completing the treatment and also indicates the prevalent ignorance regarding the antimicrobial resistance in case of antibiotic usage. Among the various therapeutic classes of drugs the majority of respondents stored both analgesic and antibiotics 61.8% followed by antibiotics 14.5% which coincide with the study done New Delhi and national capital region.[5]

Table 1: Respondents knowledge of unwanted medicines disposal in medical institution in Chhattisgarh.

Sl. No.	Question/Statement	N (%)	
		Yes	No
1.	Do you know about medication waste	69 (89.6)	8 (10.4)
2.	Have you ever read medicines disposal instructions	55 (71.4)	22 (28.6)
3.	Do you know about "drug take back programme"	17 (26)	60 (74)
4.	Do you know that misused/repeated change or not complete antibiotics may cause drug resistance	69 (89.6)	8 (10.4)
5.	Do you know that on proper disposal of unwanted medicines can affect the environment and health	70 (90.9)	7 (9.1)

Table 2: Perception towards unwanted medicines disposal in medical institution in Chhattisgarh.

Sl. No.	Statements	Strongly agree N (%)	Agree N (%)	Neutral N (%)	Disagree N (%)	Strongly disagree N (%)
1.	Unwanted medicines present potential risk at home	21 (27.3)	44 (57.1)	7 (9.1)	5 (6.5)	0 (0)
2.	Children are more vulnerable	33 (42.9)	40 (53.2)	4 (3.9)	0 (0)	0 (0)
3.	Lack of adequate information on safe disposal	11 (14.5)	55 (72.4)	8 (10.5)	3 (2.6)	0 (0)
4.	Advise by doctors and healthcare professionals should be given	35 (45.5)	32 (41.6)	10(12.9)	0 (0)	0 (0)
5.	Drug take back programme of unwanted medicines should be mandatory	30 (39)	35 (45.5)	7 (9.1)	5 (6.7)	0 (0)

Table 3: Disposal practice of unused medicines.

Sl. No.	Disposal practice of unused medicines	Number of respondents N (%)
1.	Throwing them away in household garbage	10(13.2)
2.	Donating them to hospital	0 (0)
3.	Giving them to friends or relatives	3(2.6)
4.	Returning them back to pharmacy	46(60.5)
5.	Keeping them at home until expired	11(14.5)
6.	Flushing them in toilet	0 (0)
7.	Burning them	7(9.2)

Table 4: Types of medications remaining unused at home

Sl. No.	Types of medications remaining unused at home	Number of respondents N (%)
1.	Analgesic	7(9.2)
2.	Antibiotic	11(14.5)
3.	Antihypertensive	3(4)
4.	Both analgesic and antibiotic	47(61.8)
5.	Antidiabetic	3(3.5)
6.	Both antihypertensive and antidiabetic	6(7)

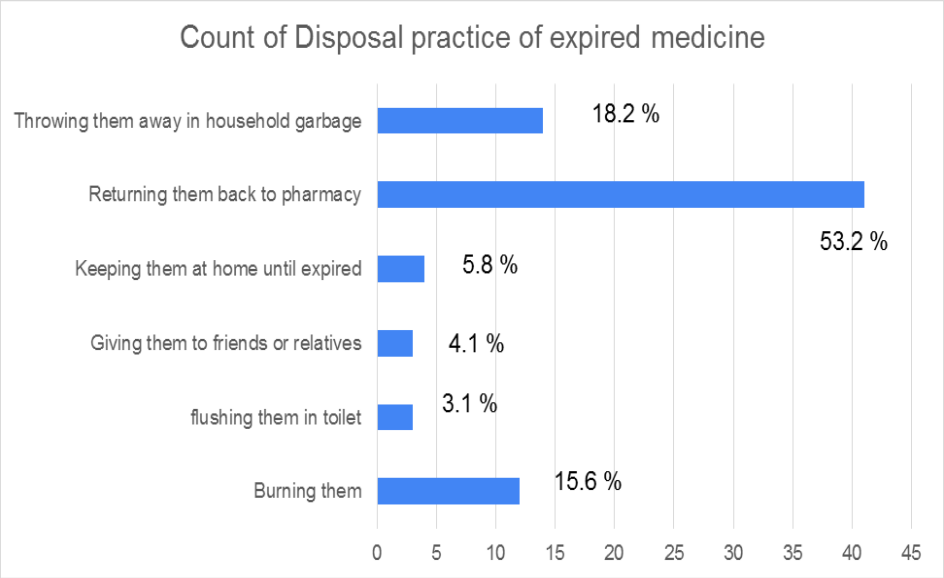

Figure no 1: Number and percentage of respondents regarding disposal practices of expired medicine.

CONCLUSION

The level of knowledge, perception and practices among professional medical students on unwanted medicines was inferior and need to be noticed. Conversely, the majority of the participants had positive attitude towards safe disposal method. Though the disposal practices followed by respondents are not fulfilling. Thus, there is a need for proper educational sessions in the form of awareness programs, and regulatory interventions, with the government, media, pharmacists, health professionals as well as consumers. National guideline on drug take back programs, drug disposal and monitoring processes should be implemented through national policy.

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