(p) ISSN Print: 2348-6805

ORIGINAL ARTICLE

Knowledge and practice of disposal of leftover and expired medicine among medical students

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ABSTRACT:

Background: A large number of pharmaceuticals and health care products are used every year for diagnosis, treatment, or prophylaxis of health conditions. The present study evaluated knowledge and practice of disposal of leftover and expired medicine among medical students. **Materials & Methods:** 126 medical students of both genders were provided with a questionnaire which comprised of number of leftover drugs, reasons for leftover, most common class of leftover drugs and dosage form etc. and responses were recorded. **Results:** 52% check the expiry date of medicine before procuring, 20% no and 28% don't know. 55% donate to hospital, 20% throw away in household garbage, 11% return to medical store and 14% give to friends or relatives. In response to what to do with expired medicine, 40% give to friends or relatives, 24% flush in toilet or sink, 18% throw away in household garbage and 18% return to medical store. 20% pharmacist, 55% ministry of health 5% general public and 20% pharmaceutical industry was responsible for creating awareness of the proper disposal of unused and expired medicine. 85% responded that improper disposal of unused and expired medicine can affect the environment and health. **Conclusion:** Knowledge about the disposal of leftover and expired medicine among medical students found to be insufficient.

Key words: Knowledge, Drug, Left over

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This article may be cited as: Rai S. Knowledge and practice of disposal of leftover and expired medicine among medical students. J Adv Med Dent Scie Res 2016;4(5):216-219.

INTRODUCTION

A large number of pharmaceuticals and health care products are used every year for diagnosis, treatment, or prophylaxis of health conditions. However, not all products that move into the hand of clients get consumed; massive portions remain unused or expire.¹ Medicinal drugs may increase in households for a selection of motives which may include; improvement of the patient's medical condition, out-sized medication packages, death of the patient and change in prescription because of side effects or loss of therapeutic effect, bad adherence as the result of patients doubting the need for medication, worry of adverse results not forgetting bad reminiscence which also adds to medicinal drug waste.²

Improper disposal of medication has several possible consequences such as childhood poisoning, environmental pollution, a negative impact on wildlife, and antibiotic resistance. Effectiveness of health care system is evaluated by measuring the drug wastage. Most of the active pharmaceutical ingredients (APIs) are polar compounds.³

Exposure to expired/degraded tetracycline has been reported to cause renal tubular damage and the

presence of antibiotic in water has been associated with antibiotic resistance, and in the long run, it can cause genetic effects in marine life and human being.⁴ In addition, inappropriately accumulating leftover household medicines and inappropriate disposal of unused and expired medicine can cause accidental poisoning of young children and has potential for abuse by adolescents specially when the medicines are habit forming.⁵ The present study evaluated knowledge and practice of disposal of leftover and expired medicine among medical students.

MATERIALS & METHODS

The present study consisted of 126 medical students of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. All medical students were provided with a questionnaire which comprised of number of leftover drugs, reasons for leftover, most common class of leftover drugs and dosage form etc. and responses were recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS Table I Distribution of subjects

Total- 126				
Gender	Male	Female		
Number	50	76		

Table I shows that out of 126 subjects, males were 50 and females were 76.

Table II Knowledge and practice regarding unused and expired medicine

Parameters	Variables	Percentage	P value
Checking of expiry date of medicine before Yes		52%	0.82
procuring	No	20%	
	Don't know	28%	
What do you do with unused medicine?	Donate to hospital	55%	0.05
	Throw away in household garbage	20%	
	Return to medical store	11%	
	Give to friends or relatives	14%	
What do you do with expired medicine?	Give to friends or relatives	40%	0.04
	Flush in toilet or sink	24%	
	Throw away in household garbage	18%	
	Return to medical store	18%	
Who is responsible for creating awareness?	Pharmacist	20%	0.02
	Ministry of Health	55%	
	General public	5%	
	Pharmaceutical industry	20%	
Improper disposal of unused and expired	Yes	85%	0.01
medicine can affect the environment and health	No	15%	

Table II, graph I shows that 52% check the expiry date of medicine before procuring, 20% no and 28% don't know. 55% donate to hospital, 20% throw away in household garbage, 11% return to medical store and 14% give to friends or relatives. In response to what to do with expired medicine, 40% give to friends or relatives, 24% flush in toilet or sink, 18% throw away in household garbage

and 18% return to medical store. 20% pharmacist, 55% ministry of health 5% general public and 20% pharmaceutical industry was responsible for creating awareness of the proper disposal of unused and expired medicine. 85% responded that improper disposal of unused and expired medicine can affect the environment and health. The difference was significant (P < 0.05).

	Percentage	
Improper disposal of unused and expired medicine can affect the environme nt and health	No Yes	85%
Who is responsible for creating awareness?	Pharmaceutical industry General public Ministry of Health Pharmacist	20%
What do you do with expired medicine?	Return to medical store Throw away in household garbage Flush in toilet or sink Give to friends or relatives	18% 18% 24% 40%
What do you do with unused medicine?	Give to friends or relatives Return to medical store Throw away in household garbage Donate to hospital	14% 11% 20% 55%
Checking of expiry date of medicine before procuring	Don't know No Yes	28% 20% 52%
	(0% 10% 20% 30% 40% 50% 60% 70% 80% 90%

Graph I Knowledge and practice regarding unused and expired medicine

DISCUSSION

Universally, the correct disposal of medicine poses a challenge and is receiving increasing attention.⁶ A lack of knowledge about proper disposal of unused medicine can lead to serious consequences, such as an accumulation of toxins and chemicals from the medicine into the environment, unintentional overdose, and prescription drug abuse. A number of countries have established guidelines for disposing of leftover or expired medication.⁷

Unused and expired medicines can be introduced into the environment when leftover medicines are thrown tohousehold trash through landfill and the liquid medications through the sewerage system. The entry of these medications into the ecosystem can cause diverse environmental hazards.⁹For example, contamination of water bodies by estrogen contraceptives even in trace amount impairs sexual development development feminization of fishes affecting their reproduction.⁸ The present study evaluated knowledge and practice of disposal of leftover and expired medicine among medical students.

In present study, out of 126 subjects, males were 50 and females were 76. Osei-Djarbeng et al⁹suggested

that prescribed medicines are not used as prescribed and as soon as the illness improved, drugs were stopped which would have harmful consequence even though they feel better, because this kind of behavior can increase the resistant organisms to active drug molecule and other reasons were left-over from the previous OTC drugs (59%), and around 50% of them cited drugs passed expiry date and doctor changed treatment.

We found that 52% check the expiry date of medicine before procuring, 20% no and 28% don't know. 55% donate to hospital, 20% throw away in household garbage, 11% return to medical store and 14% give to friends or relatives. In response to what to do with expired medicine, 40% give to friends or relatives,24% flush in toilet or sink, 18% throw away in household garbage and 18% return to medical store. Alazmi et al¹⁰in their study a total of 318 medicines items (2.56 items per student's room) of which 37.1% were leftover medicines were present in respondents' rooms. Analgesics (34.3%) and antibiotics (25.2%) were the common classes of medicines present in respondents' rooms. Respondents reported getting these medicines on

prescription (25.8%) and self-medication (56.5%) or both (17.7%). Self-medication practice was common among respondents (53.2%); however, no significant relationship (P>0.05) existed between having medicine in students' room and self-medication practices. Common reasons given by respondents for having medicines in their rooms were that they were leftover medicines and that they were keeping them for emergency use or for use in an event of a similar illness. Most respondents (72.2%) reported disposing of their unused medicines in a trash can/dust bin. This study demonstrated that the prevalence of medicine storage in students' room and selfmedication practice is high. Analgesics and antibiotics were the most common types of medicines present in students' residence.

We observed that 20% pharmacist, 55% ministry of health 5% general public and 20% pharmaceutical industry was responsible for creating awareness of the proper disposal of unused and expired medicine. 85% responded that improper disposal of unused and expired medicine can affect the environment and health. Seehusen et al¹¹ in their study a total of 301 patients at an outpatient pharmacy completed a survey about medication disposal practices and beliefs.More than half of the patients surveyed reported storing unused and expired medications in their homes, and more than half had flushed them down a toilet. Only 22.9% reported returning medication to a pharmacy for disposal. Less than 20% had ever been given advice about medication disposal by a health care provider. Previous counseling was highly associated with returning medications to a pharmacy (45.8% vs 17.1%, P <.001) and was the variable most associated with returning medications to a provider (28.8% vs 10.0%, P < .001). Previously counseled respondents were significantly more likely to believe that returning medications to a pharmacy (91.5% vs 60.3%, P <.001) or a medical provider (74.6% vs 47.3%, P <.001) was acceptable.

CONCLUSION

Authors found that knowledge about the disposal of leftover and expired medicine among medical students found to be insufficient.

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