



Disposal Methods of Expired and Unused Medications among the General Public in Al-Bayda City

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Abstract: Medication disposal is a hot topic in pharmacy today, and it is rapidly gaining the attention of more and more professionals and consumers alike. Improper disposal of expired or unused medications has been reported to create serious consequences on healthcare and the environment. This study was performed to determine how residents of Al-Bayda, in the north-eastern region of Libya, dispose of their unused and expired medications and discuss the possible impact of improper medication disposal on humans, animals, and the environment. Data was collected over six months within Al-Bayda city as people were approached randomly and invited to participate by filling out a questionnaire to examine their expired medicine disposal habits. With responses from 925 participants, the survey found that 77.3 % disposed of medicines with household waste, 6.9 % flushed medicines down the sink or toilet, 4 % gave them to relatives or friends, 2.8 % returned medicines to the pharmacy, and 9 % do not know. Campaigns run by health care professionals, mainly pharmacists as they have a potential role to raise public awareness regarding appropriate ways to dispose of unused medicines, will promote appropriate disposal practices.

Keywords: Safe Disposal; Al-Bayda; Libya; Pharmacists; Return Unwanted or Expired Medicines.

INTRODUCTION

Globally, the correct disposal of medicine faces obstacles and is receiving worldwide attention (Bashatah & Wajid, 2020), since many unwanted and expired medicines in the community are disposed of via general waste or sewage. Medicines discarded in household rubbish bins end up in landfills and may damage the environment. Another possible risk is the proliferation of drug-resistant microorganisms in the environment from health care facilities as a result of the presence of antibiotics and chemotherapy medications in the sewage treatment systems (Milica Paut Kusturica et al., 2016).

They may also be found by unintended recipients including children and animals, increasing the risk of poisonings, misuse, and abuse by adolescents as well as adults. Medicines dis-

posed of through the household water system, such as toilets and sinks, not only enter waterways affecting marine life but also enter the water table via the sludge component of the waste water treatment process, thereby potentially affecting human and animal life (Diaz, 2003) (Bound & Voulvoulis, 2005). It is therefore strongly recommended that unwanted drugs should be disposed of safely. This study aimed to determine how the general public in Al-Bayda city do with expired and leftover medications and also could help the residents with relevant knowledge that could raise awareness of serious impact on health and environment.

MATERIALS AND METHODS

This cross-sectional study was designed in a questionnaire form, which was conducted in 11 different locations within Al-Bayda city over

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six months, from June 2019 to December 2019. Using a random sampling technique, in which subjects were randomly invited to participate in the study. The study questionnaire included demographic details of the respondents like age and gender.

The questionnaire was completed by 925 residents in Al-Bayda city. The participants were asked questions about ways of purchasing medicines, classes of medicines used, whether they checked the expiry date before purchasing a medicine, and whether any quantity of medicines remains unused at their home. The participants were asked also about what they did with unused and expired medicines and those who are responsible for creating awareness about the proper disposal of such medicines, and lastly test their knowledge whether improper disposal of unused and expired medicines can seriously affect the environment and health.

Data were analyzed statistically by using Microsoft Excel and SPSS Statistics Pack software version 20.

RESULTS

There was a total of 925 participants. The demographic characteristics of respondents in the study sample are shown in Table 1. The respondents' practices concerning expired and leftover medications in the study sample are presented in Table 2.

Table:(1). Demographic Data of Survey Responders

Participant classifications	N	%
Gender		
Male	431	46.6
Female	494	53.4
Age		
18-24	691	74.7
25-31	112	12.1
32and above	122	13.2

Table:(2). Knowledge about purchasing, classes and environment and health effects of medicines among respondents.

Variables	N	%
Ways of purchasing medicines		
Brought through prescription	587	63.5
Brought without prescription	163	14.7
Received from friends/relatives	114	12.3
Brought upon the advice of friends/ relatives	88	9.5
Do you check the expiry date of medicine before obtaining it?		
Yes	667	72.1
No	258	27.9
Classes of drugs used by participants		
NSAIDS	385	41.6
Antibiotics	366	39.6
Anti-hypertensive	8	0.9
Anti-diabetic	9	1
Miscellaneous	157	17
Who is responsible for creating awareness about the proper disposal of unused and expired medicines?		
Government	543	58.7
Pharmaceutical companies	370	40
Pharmacist	12	1.3
Can improper disposal of leftover and expired drugs affect the environment and health?		
Yes	322	34.8
No	266	28.8
Do not know	377	36.4

In this survey, more than three-quarters (77.3%) of the respondents in this study disposed of the medicine in the rubbish, and the rest flushed medicines down the sink or toilet, gave them to a relative or friend, returned medicines to the pharmacy, or responded that they do not know (6.9%, 4%, 2.8%, and 9% respectively) as illustrated in Figure (1).

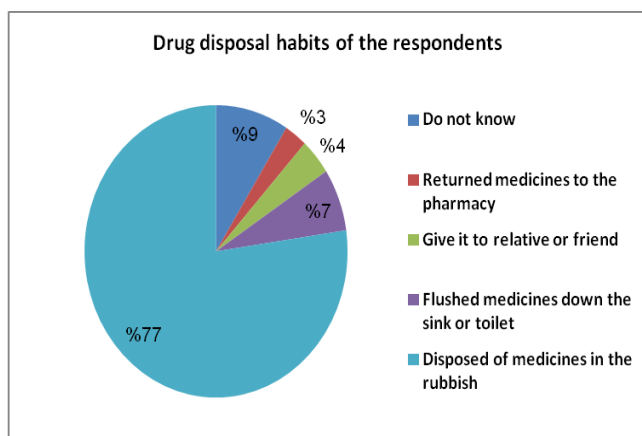


Figure: (1) Drug disposal habits of the respondents

DISCUSSION

Generally, expired medications have no community hazard if they are disposed of safely. But serious threat emerges when they reach groundwater or the surrounding environment, for instance, flushing large amounts of home medications directly in the toilet or sink or throwing them away in the garbage (Nipa et al., 2017).

Although the disposal of hazardous pharmaceutical waste generated by health care facilities is partially regulated by the municipal guard, no such regulation governs the disposal of household hazardous wastes, which includes unused or expired medications.

Therefore, it is crucial for frontline health care professionals, in particular, pharmacists, to educate their patients on the importance of proper medication disposal from delivering relevant information and the correct way to dispose of medications to tackle inappropriate habits of drug disposal (Pieters, 1991).

In the present study, the result of drug disposal habits was similar to several previous studies. A study performed in Serbia in 2010 reported that 87.9% of participants disposed of their unused drugs via household garbage or toilet (Milica P Kusturica et al., 2012). An Irish study in 2014 has shown that 72.0% of participants threw their drugs into the trash, sink, or toilet

(Vellinga et al., 2014). Another study in the United States revealed that 85.0% of participants disposed of their unused drugs in household waste, sink, or toilet (Law et al., 2015).

An additional serious problem arises when focusing on classes of drugs used by participants, as almost 40% of the participants have used antibiotics. Antibiotics resistance is an intensely hot topic under the scope of scientists. It is considered one of the major threats to global health that can affect everybody, at any age, in any country. The resistance to antibiotics occurs naturally, however, misuse of antibiotics in humans and animals is accelerating the process. An increasing number of infections for instance gonorrhoea, tuberculosis, and pneumonia became harder to treat because the antibiotics used to treat them become less effective, accompanied by prolonged hospitalization, higher medical costs, and high rates of mortality (CDC 2019).

Although the majority of participants in this study obtained their medications through prescription (63.5%), the over prescription of antibiotics by doctors for symptoms, that in many cases, may not be caused by bacteria, and without initially ordering an antibiotic susceptibility test, in addition to the public misconceptions of antibiotic usage, many studies reported antibiotic prescriptions decreased globally for symptoms including colds, ear infections, sinusitis, bronchitis, and sore throats. Nevertheless, patients do not adhere to the antibiotics' specified period and stop taking them as soon as they start getting well after 2 or 3 days which promotes the growth of antibiotic-resistant bacteria (Fair & Tor, 2014).

Moreover, it must be taken into account, that approximately 15% of the participants could have obtained most of their medications from private pharmacies without a prescription, which includes 40% of the antibiotics, since there is no law to forbid getting antibiotics without prescription in the Libyan pharmaceutical regulation.

A return program for unused medicines should be introduced in Libya and collection facilities identified, as worldwide national drug take-back programs are running all over the world in many countries in order to address this issue. These programs have been accepted by society with significant achievements (Thach et al., 2013) (Lauer et al., 2010) (Coma et al., 2008) (Ekedahl, 2006). Consequently, obligatory regulations for the acceptance of returned medication to pharmacies need to be introduced, as currently, some pharmacies do not accept unused or leftover drugs. Evidence shows that advice about medication disposal by a health care provider such as a pharmacist can have a considerable impact on patient behaviors. Studies have shown that educating patients on medication disposal can inspire them to change the way they dispose of their medications, as confirmed in a previous study which found that, previous counseling by a health care provider on how to properly dispose of medications, as well as having more recent pharmacy visits, was highly associated with returning medications to a pharmacy, as opposed to disposing of them in the toilet or sink. (Seehusen & Edwards, 2006).

An insignificant percent (1.3%) of the participants reported the responsibility of the pharmacist for creating awareness about the proper disposal of unused and expired medicines when compared with government and pharmaceutical industries 58.7% and 40% respectively. Pharmacy students were used as volunteers to educate the community during an educational event about drug disposal. The results of the survey showed that 80.1% of patients were motivated to change their disposal practices. Participants also stated an increased knowledge of the environmental problems associated with medication waste following the session (Abrons et al., 2010).

In the current study, it was found that a significant number of participants were seen to keep unwanted or unused medications at home (74.5%) and dispose them inappropriately.

Several previous studies have reported that keeping unused medications at home is worldwide spread, ranging from 15 to 98%. Excess and leftover medications at home could be due to both overprescribing and poor medication adherence which include discontinuation of medication by a doctor, self-discontinuation, buying medication because of advertisements, and possessing expired medication (Abruquah et al., 2014). A 2006 survey in the US reported more than half storing unused and expired medications in their homes (Seehusen & Edwards, 2006). In Sweden (2007), 55% stated that they saved unused medicines (Persson et al., 2009). Another study in Iraq in 2010 has shown that, 94% of the sample have stored medicines at home (Jassim, 2010). Thach and his colleagues conducted a survey and found that almost 80% of the respondents kept non-prescription medicines at home (Thach et al., 2013). The most cited reason for keeping unused medicines was “in case they are needed later” (68%), and they keep it in different places at home: in the kitchen (67%), the bedroom (19%), and the bathroom (13%). No differences were observed according to age or group. (Vellinga et al., 2014) which can pose a potential risk to children and be mistakenly used by them.

Medical waste companies approved for the destruction of medicines, which are controlled by three governmental sectors, which are Municipal guard, Ministry of health member's and Libyan food and drug authority must take part in a Libyan drug disposal system to overcome the current impaired waste treatment system to prevent accidental consumption of prescription medications either by disposing any unused or expired medications in the toilet or down the drain, or discarding them in the trash, thus, recommendations for medication disposal practices should begin this shift.

LIMITATIONS

Further similar studies should be taken in other different cities in order to obtain more data re-

garding drug disposal behavior. Furthermore, nonresponsiveness from some of the participants was a problem due to a lack of interest.

CONCLUSION

Campaigns to create greater awareness among consumers about the health and environmental effects of improper disposal of medications are very useful. They can advise patients on how to return unwanted medicines to pharmacies or the appropriate disposal methods. Also organized methods of collecting unused medications needs to be introduced through the cooperation of environmental, government, and health-related organizations.

Further research on the reasons why consumers return or otherwise dispose of medicines is also needed to promote medication adherence and rational prescribing of medicines and to minimize wastage.

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ETHICS

The authors declare that they have no competing interests.

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طرق التخلص من الأدوية المنتهية الصلاحية وغير المستخدمة بين عامة الناس في مدينة البيضاء

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المستخلص: يعد التخلص من الأدوية موضوعًا ساخنًا في الصيدلة اليوم، ويحظى باهتمام متزايد من المهنيين، والمستهلكين على حد سواء. سجلت التقارير أن التخلص غير السليم من الأدوية المنتهية الصلاحية، أو غير المستخدمة يؤدي إلى عواقب وخيمة على الرعاية الصحية، والبيئة. حيث أجريت هذه الدراسة لتحديد كيفية التخلص سكان مدينة البيضاء، شمال شرق ليبيا، من أدويتهم غير المستخدمة، والمنتهية الصلاحية، ومناقشة التأثير المحتمل للتخلص غير السليم من الأدوية على الإنسان، والحيوان، والبيئة. وتم جمع البيانات على مدى 6 أشهر داخل مدينة البيضاء، حيث تم الاتصال بالناس بشكل عشوائي، ودعوتهم للمشاركة من خلال ملء استبيان لفحص عادات التخلص من الأدوية المنتهية الصلاحية، وبلغ عددهم 925 مشاركًا. وجد الاستطلاع أن 77.3% تخلصوا من الأدوية في القمامة، و6.9% تم التخلص من الأدوية في الحوض، أو المراض، و4% أعطوها للأقارب، أو الأصدقاء، و2.8% أعادوا الأدوية إلى الصيدلية، و9% لا يعرفون. وبينت النتائج أن الحملات التي يديرها المتخصصون في الرعاية الصحية، وبشكل رئيسي الصيدلة؛ لأن لهم دورًا محتملاً في زيادة وعي الجمهور بشأن الطرق المناسبة للتخلص من الأدوية غير المستخدمة، ستعزز ممارسات التخلص المناسبة.

الكلمات المفتاحية: التخلص الآمن؛ البيضاء؛ ليبيا؛ الصيدلة؛ إعادة الأدوية غير المرغوب فيها، أو المنتهية الصلاحية.