

Analysis of medications returned to community pharmacies in Alexandria, Egypt

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Abstract: This study aimed to determine the patterns of returning unused medications to a sample of the community pharmacies affiliated to Medical Central Region in Alexandria. A cross-sectional descriptive study design was used. All drugs returned unused by all individuals attending the selected 60 pharmacies over a period of one month were documented. The randomly selected pharmacies were visited by the researcher and invited to participate in the current study. When a medicine was returned, the pharmacist interviewed the person returning it to complete a questionnaire that was especially developed for the study. This study demonstrated that an enormous amount of drugs are returned to community pharmacies in Alexandria, Egypt. "Treatment change" was the most frequent reason for the drug returns, with cardiovascular and anti-infectives are the predominant groups returned. Investment in proper patient and health-care provider education is an appropriate first step in reducing medication waste. Changing the prescription policy is needed to overcome this waste.

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110

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1. Introduction

The problem of unused medicines is widespread throughout the world, with complex multifaceted causes and multiple effects on the cost of healthcare, public health, and environment [1]. In addition to the costs of unused drugs, their economic value includes the time needed to prescribe and dispense these medications, also poor adherence leads to increased health costs through additional hospital admission and doctor visits [2].

An unused drug is a drug which is purchased after a prescription or not, but which is not taken [3]. It is likely that a number of factors influence the quantities and types of medicines that are unused. These factors may include oversupply, changes in therapy, errors in prescribing or in supply, adverse drug reactions, poor compliance or death of the patient [1]. Other factors include expired medications, patient felt better, allergic reactions and patients didn't want to take the drugs [4].

It appears that, while there are variations between different countries, the reasons for unused medicines and even the types of medicines that are commonly unused are similar across the world [1]. More than two thirds of returned medicines mostly capsules and tablets are prescription drugs; the remainder consists of over the counter products and a few samples [5]. Most returned drug classes, however, aren't necessarily those that cost the most. Studies have found that 20% to 53% of returned medicines were unopened, with many of the remainder being almost complete [6,7].

In some Arab countries, over 50% of drug products obtained from community pharmacies are

purchased either without a prescription or on the advice of the pharmacist. In addition, many medicines that require a prescription in more developed world can be purchased over the counter in these countries [8, 9].

Unused medicines generally have only been the subject of a small number of studies worldwide and consequently the data available on these remains limited and many attempts to minimize the incidence of unused medicines have been based on anecdotal evidence and estimates [1].

In Egypt, unwanted medicines are accepted for resale by the pharmacies which are not accepted from ethical and safety point of view, because it is not possible to guarantee that they were stored under appropriate conditions. Investigating medication returns may indicate areas for targeting interventions to reduce waste. To our knowledge there is a paucity of published research examining unused medicines in Alexandria, Egypt. Therefore the aim of this study was to quantify the amount of returned unused medicines to a sample of the community pharmacies in Alexandria and identify the most contributing reasons to their return.

2. Material and Methods

Study Setting and Design

The study was carried out in a sample of the community pharmacies in Alexandria, Egypt. A cross-sectional descriptive design was used for the conduction of this study.

Sampling Design

Using MedCalc 11/5/1/0 trial version, and based on an average cost per returned item of medication of 13 Egyptian Pounds (LE.) [10], taking a 95% confidence level, with 80% power and assuming a SD double the mean with an accepted error of E3, the minimum required sample size was approximately 600 unused returns.

Based on pilot study, 60 pharmacies would be needed to reach the required sample size in one month. A two-stage random sample was used, where one district was selected randomly from among the seven districts in Alexandria. A list of all pharmacies was obtained from Central Medical Region at Ministry of Health. This region contains 600 community pharmacies and the required number of pharmacies was selected from the list randomly. A number of pharmacies were invited to participate and it was stated that participation would be voluntary. Sixty community pharmacies were randomly selected, with a response rate of 93%. All the drugs returned unused by all individuals attending these pharmacies were documented. A total of 657 drugs were returned by 600 patients to the 60 pharmacies during the study period.

Data Collection Methods

Data were initially gathered over a 4-week period from community pharmacies during March 2011. Data were collected using interview technique. Pharmacists working at the pharmacies that agreed to participate were asked to collect the drugs that were returned voluntarily by individuals attending their pharmacies. When a medicine was returned or when a person asked the staff members to discard a medicine, the pharmacist interviewed the person returning it to complete a pre-designed questionnaire that was especially developed for the study. Pharmacists working at the selected pharmacies were trained by the researchers on filling the questionnaire.

The information recorded on the questionnaire included: pharmacy name, patient's personal data, who was returning the drug, who recommended the drug, number of returned drugs, returned medicine data (trade name, pharmaceutical form, pharmacological category, expiry date, amount to be discarded, total sales price of amount to be returned or discarded), payment method (health insurance system, patient himself) and the reason for returning or discarding the medicine.

The drugs were counted and classified according to the British National Formulary classification of active ingredients [11]. Costs were determined by multiplying cost per pill by the estimated number of pills remaining in the container according to the list of drug prices provided by the Egyptian Ministry of Health. Cost was calculated in Egyptian currency (1 USD equals 5.93 LE.).

Statistical analysis

The collected data were entered into a data base and a descriptive statistical analysis was performed using Statistical package for Social Sciences (SPSS) Version 11.5 (SPSS Inc., Chicago IL, USA).

3. Results

In 60 community pharmacies, 657 returned drugs were collected during one month from 600 patients with an average number of drugs returned per patient of 1.09. Males constituted the higher percentage of the participants (56.7%). Elderly having 60 years or above constituted the highest proportion of the sample (28.3%), while the lowest percentage (4.0%) was within the age group "10 to less than 20". Concerning the sample's occupations, the highest percentages of the patients pertained to the employee category (29.8%) followed by not working category (28.3%).

Of the 657 returned drugs, the predominant groups were cardiovascular system (19.4%) and anti-infectives (19.2%), as shown in Table 1.

Figures 1 & 2 showed that in more than half of the returned drugs the patients in person (57.2%) returned their drugs. Relatives returned a considerable proportion of drugs (32.9%). The majority of drugs had been prescribed by physician (53.7%), or pharmacist (24.9%). Friends recommended 11.8% of the returned drugs and 9.4% were chosen by the patient himself.

The reasons for the drugs being returned were listed in Table 2. The most frequent reason stated was treatment change (35.2%) followed by ineffective drug (12.0%). On the other hand, error in dispensing was the reason with the lowest frequency (0.8%).

Regarding the cost of the returned medicines, data from Table 3 illustrated that the average drug cost per pharmacy per month was 825.1 LE (140 \$). The estimated total cost was 49507.2 LE (8348.5 \$), with the mean drug cost of 75.5 LE. "Cardiovascular" drugs was the therapeutic category of the highest cost percentage (44.6%) total cost of 22.115 LE., while "ear, nose, throat" was the therapeutic category of lowest cost percentage (1.12%) with a total cost of 556.2 LE. Concerning who had initially paid for returned drugs, 68.6% of the cost had been borne by patient himself, with the remaining percent (31.4%) had been borne by health insurance system (data not shown).

4. Discussion

Improper drug use has major ramifications not only in the therapeutic and economic fields, but also from the environmental perspective [4, 7]. Moreover, the number of times a drug is returned gives an indication of frequency of prescribing and the level of medication noncompliance [12].

Table 1 Therapeutic classifications of drugs returned to the selected community pharmacies during the study period.

Drug category	Number	%
Anti-infectives	126	19.2
Cardiovascular system	127	19.4
Endocrine system	49	7.5
Ear-Nose-Throat	7	1.1
Gastrointestinal system	66	10.9
Genitourinary system	7	1.1
Musculo-skeletal system	2	0.3
Nutrition and Blood	69	10.6
Nervous system	61	9.3
Non-steroidal anti-inflammatory	64	9.8
Respiratory system	58	8.9
Skin care	19	2.9
Total	657	100

Average number of drug returned per patient 1.09

Table 2 Reasons for returning drugs to the selected community pharmacies during the study period.

Reason	Number (N=657)	%
Treatment change	178	35.2
Ineffective drug	79	12.0
Get back money	74	11.3
Oversupply	71	10.8
Patient feels better	69	10.5
Passed expiry date	68	10.4
Inconvenience to use	59	9.0
Patient non compliance	36	5.5
Patient died	31	4.7
Side effects	26	3.9
Manufacture problem	20	3.0
Error in dispensing	17	2.6

Table 3 Cost of drugs returned to the selected community pharmacies during the study period.

Drug Category	Cost (L.E.)	Cost percent
Anti-infectives	5801	11.71
Cardiovascular system	22115.75	44.6
Endocrine system	3621.2	7.3
Ear-Nose-Throat	556.2	1.12
Gastrointestinal system	2999.3	6.05
Genitourinary system	648	1.3
Musculo-skeletal system	194.5	0.39
Nutrition and Blood	3786.2	7.6
Nervous system	5117.95	10.3
Non-Steroidal anti-inflammatory	1241.1	2.5
Respiratory system	2200	4.44
Skin Care	1225	2.44
Total	49507.5=8251 \$	100
Mean drug cost ± SD	75.5 L.E.	

Average drug cost per pharmacy per month 4950.6 E.P (825.1 \$)

LE stands for Livre Egyptian (the Egyptian currency).

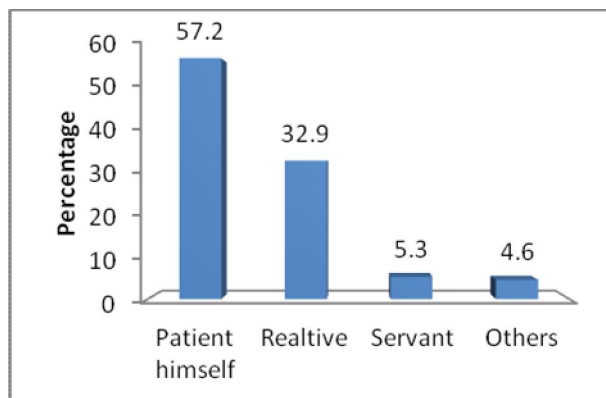


Figure 1: Person who returned the unused drugs to the selected community pharmacies during the study period (N=657).

No drugs were returned during the study period in only 10 out of 60 pharmacies that participated in the present study. This is considered within the normal variability among pharmacies, their locations and number of patients they are serving.

Patients aged 50 years or over made half of the return events (51.5%). This may not necessarily indicate that this age group uses less of their prescribed medications. However, there is some evidence that inappropriate prescription may decrease adherence in elderly patients [13, 14]. This aligns with other studies which showed increased spending on prescribed medications with increasing age [14-16].

The two main reasons indicated for the medications not being used were 'treatment changes' (35.2%) and 'ineffective drug' (12%). Other frequent reasons declared by the present respondents were 'oversupply', 'patient feels better' and 'sell to get back money'. These reasons were somewhat consistent with that of other published studies [6, 12, 14].

Change of treatment as a frequent reason for returning drugs is important as the most likely time for changing the prescribed medications for a patient is during the early phases of treatment, so it may be prudent not to dispense the whole of the prescription quantity when treatment is being initiated. This may also allow the prescriber to more closely monitor the effectiveness of the chosen treatment. The huge percentage of patients returned their medications due to treatment change in the present study indicates an urgent need to change the current dispensing practices. Trial prescriptions have been implemented in Canada to overcome this problem and they lead to reducing the direct cost of medication wastage [17].

Medication wastage resulting from oversupply can be reduced through reducing the dispensed

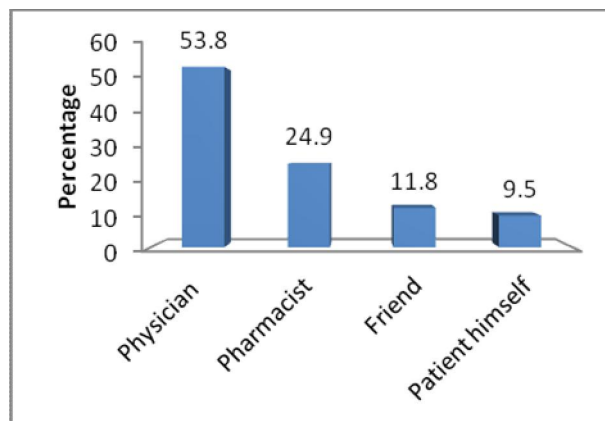


Figure 2: Person who recommended the drugs returned to the selected community pharmacies during the study period (N=657).

package size or by adapting the pack to the most frequent dosages, or by synchronization of prescription quantities and the deletion of inappropriate items from the repeat order forms or even by dispensing through individualized dosing system depending on each prescription.

'Patient feels better' was one of the frequent reasons for returning drugs in the current study (10.5%). This might give an indication to the important role that should be played by comprehensive doctor/patient counseling on appropriate drug use especially in chronic conditions where long term treatment course should be followed.

Considerable proportions of the current participants returned unused drugs to get their money back, and this might be due to the finding that the highest percentage of payment for drugs was by the patient himself.

Drug reaching expiry date was among frequent the reasons for returning unused drugs. However, no information about the date of dispensing could be recorded in order to evaluate how long people tend to keep drugs they have stopped using. The information on the reason for returning each drug together with a note stating the age of the returned drug would help to provide a quantitative estimate of the relative importance of the reasons for drug being returned unused.

The therapeutic groups responsible for the most present returns were 'cardiovascular system', 'anti-infectives' and 'gastrointestinal' (Table 1). This finding is somewhat consistent with that of another Egyptian study [12]. Studies from different countries showed variability in the returned drugs by therapeutic groups, with cardiovascular and nervous systems among the highly ranked groups [14, 18, 19].

Generally, the majority of patients taking medications for cardiovascular system are chronic patients. Patient adherence to prescribed therapy (especially with chronic illness) is often not ideal, which may explain why a large number of returned drugs belonged to the cardiovascular system. Patients' non adherence to treatment could be the root cause that stands behind many other cited reasons [20]. Unfortunately, over-the-counter antibiotic use is common in Egypt, with evidence on over use of many antibiotics [21, 22]. This mostly explains why anti-infective ranked the first on the list of restored drugs in the present study.

When comparing based upon the cost of the returns, in the current study the therapeutic categories that showed the highest percentages of occurrence were also responsible for the highest cost, where the 'cardiovascular' group represents 19.4% of returns by number, and 44.6% of the cost. In a study conducted in New Zealand, although cardiovascular category showed the highest percentage of return, respiratory system category showed the highest cost [14].

In relation to the cost of the returned drugs in the present study, the average drug cost per pharmacy per month was 825.1 LE (140 \$). This value is higher than that was reported by another Egyptian study (average drug cost per pharmacy per month of 549.4 LE (103.5 \$) [12]. This confirms the substantial economic value of the unused drugs. Unfortunately, when considering the total number of pharmacies in Alexandria Governorate (3443), the average drug cost per month would be expected to reach 1.891.584 LE (318.986 \$).

The present data also indicated that patients themselves paid for almost 70% of the returns. In contrast, a study conducted in Spain revealed that the public insurance paid for more than 50% of the returns [18]. Payment systems for drugs vary between countries due to differences in the health care systems.

We acknowledge that there are limitations to the present study. The questionnaire on the returned medicines was answered by the patient, relative or others, which highlights the subjectivity of the answers. In some instances, respondents may not have known exactly why the medicines had not been used, especially when the patient was deceased.

Also the return of unused medicines may be subjected to seasonal variations, so data better to be collected over a longer period (1 year) before a reasonable annual figure can be estimated. This study had not attempt to quantify the other routes of disposal or to estimate quantities of unused medicines in patient's homes, therefore, it is likely that it has substantially underestimated the extent of unused medicines in the community.

Conclusion

In this study, more than one third of the return events made were attributable to changes in prescribed therapy. Additionally, cardiovascular and anti-infectives drugs were the most frequent therapeutic categories returned. This emphasizes the need for changing the drug dispensing policy, especially in chronic patients, and for anti-infectives, policy revision would have the highest priority. Based on the present findings, it is necessary to consider new measures to reduce the size and the cost of unused drugs in Egypt that entails more efficient prescription and dispensing systems. An investment in proper patient -and health provider education is an appropriate first step in reducing medication waste.

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Conflicts of interest

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