

Perceptions and Knowledge of Storing Medications at Home in Al-Qassim Region, Saudi Arabia

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Abstract

Objective: Globally people store medications at home, which is also common among the residents of Al-Qassim Region, Saudi Arabia. They should be stored safely to prevent the accidental ingestion or unintended use. However, the method of storing medications at homes in Al-Qassim region, Kingdom of Saudi Arabia is unknown. Therefore, in this study, we aimed to explore the perception and knowledge of medications stored at Al-Qassim region, Saudi Arabia. **Methodology:** This is a descriptive, cross-sectional survey which was conducted through the random distribution of a pre-validated structured questionnaire with the public and private sector employees and with general population from all walks of life above the age of 18 years in Al-Qassim region. The survey was designed electronically through the Survey Monkey system and was distributed through social media. **Results:** A total of 708 participants responded to this survey. Most of the responders (485 (68.10%)) were females. About half of the responders were in the age group of 18–29 years (393 (58.31%)) with a significantly dominant female population compared to males ($p < 0.05$). Most of the responders checked or almost checked the instructions of storing medications (192 (28.24%) and 273 (40.15%), respectively) without any significant difference between education level ($p > 0.05$). Most of the responders checked the expiry date of stored medications (496 (70.06%)). Most of the responders did not receive instructions on storage of medications from pharmacist or physician (597 (84.32%)). Most of the resources regarding storage of medications were obtained from the physician (388 (54.8%)), drug leaflet (320 (45.2%)) followed by pharmacist (318 (44.92%)) and self-learned (154 (21.75%)). Therapeutic classes of stored medication were analgesics and antipyretics (322 (41.87%)) followed by cardiovascular drugs (64 (8.32%)) and oral anti-diabetic drugs (58 (7.54%)). **Conclusion:** The results of this study showed that people at Al-Qassim region tend to store medication at home not just over the counter medications but also medications of chronic illnesses. They should be educated on the need of medications, safety of medications and requirements of storing medications at home. Educational activities should be conducted through all possible channels to increase the awareness and to educate people on the proper method of storing medications.

Key words: Perceptions, Knowledge, Al-Qassim, Medication Storage, Home, Saudi Arabia.

Received: 06-08-2018;

Accepted: 07-11-2018

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DOI: 10.5530/ijpcs.2019.8.14

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INTRODUCTION

The inefficient retention or disposal of medications has raised the health, safety and environmental concerns worldwide. Storing medications increases the chance to have expired medications at home, which might lead to improper disposals of these medications due to the lack of education and regulations on the correct storage and disposal of medicines. Furthermore, the accumulation of unused medications at homes is a direct result of over-prescribing practices and robust advertising of the pharmaceuticals. Treatment modifications, death of the user, or unsatisfactory therapeutic response of a patient may result in the discontinuation of the medication and hence the unused drugs gets accumulated. Almost 90% of the prescription drugs have been found to stay unused and discarded unethically, which eventually affects human being's health as well as aquatic wildlife.^[1] Another contributing factor is the quantity and diversity of medications that are added to the environment by the polypharmacy patients, who simultaneously use multiple drugs. Polypharmacy patients more often than not belong to higher age groups who are more frequently affected by chronic diseases. Even at younger ages, there is an increase in the disease conditions such as diabetes, obesity and cardiovascular diseases, which results in a high prevalence of chronic usage of multiple medications. Decreasing the usage of drugs is the key to reduce the growing crises of APIs, which are ever-present contaminants, contributed by the improper disposal of pharmaceutical products.^[2]

Though the unused medications and associated API have now become a common issue throughout the world, the misfortunate state of primary health care increases their severity in the developing countries. As they face the constant struggle to provide quality life to the citizens and advance the development within fiercely limited resources, such a study is the need of the hour to address this health and safety issue to avoid future complications of the same.

Hence this study was done to understand the frequency of unused medicine storage at homes and other related factors. Exploring the knowledge and practice towards storing medications at homes was the main focus. Considering the health and environmental hazards of improper usage storage and disposal of drugs such study is crucial to advance the education and awareness programs about the drug storage and disposal. The results would help in proactively addressing this issue

by focusing on the steps that would yield the best results in less time.

MATERIALS AND METHODS

Method

It was a detailed, 1-month cross-sectional survey which conducted through a pre-validated structured questionnaire. The study was conducted in Qassim region in 2017 with a random distribution of the survey to students, public and private sector employees and population from other walks of life above the age of 18 years. The questionnaire designed in English with Arabic version validated by the research team. The survey was composed of two sections: Section One: the socio-demographic characteristics of respondents. Part Two: the participants asked about who guided them about the appropriate use of these medications before taking them, the way of getting these medications whether purchased upon prescription or without prescription and the situations of the labels. The participants asked about their opinion about storing these medications at home. The survey designed electronically through monkey survey and distributed through social media. Also, 100 copies of the questionnaire were printed and then spread in all around the area of Al-Qassim region. The data analyzed by using Survey Monkey system and SPSS version 22.

RESULTS

A total of 708 participants responded to this survey. Most of the responders were females (485 (68.10%)). About half of the responders were in the age group of 18–29 years (393 (58.31%)) with a more significant number of female population than that of males ($p < 0.05$), whereas 206 (30%) responders were in the age group of 30–39 years without any differences in the gender. With respect to the educational status, 592 (83.62%) responders completed their higher education with a significant number of female population ($p < 0.05$). Most of the families (299 (42.23%)) comprised 5–7 members; 183 (26%) families comprised more than 8–10 members and 163 (23%) families comprised 2–4 members without any significant differences in the educational status. Furthermore, 493 (69.63%) responders had at least one elderly person in their home regardless of any significance with respect to age or educational status ($p > 0.05$). However, 322 (45.48%) responders had at least one family member working in the healthcare sector with significant difference toward

female gender and without any significant differences in educational status (Table 1). The sources of the stored medications were mostly from governmental hospital (533 (75.28%)), community pharmacy (453 (63.98%)) and private clinics (231 (32.63%)) without any significant difference concerning gender or education level as factors ($p>0.05$). Most of the responders purchased the stored medications with prescriptions (487 (68.79%)) without any significant difference in educational status ($p>0.05$). Furthermore, females tended to buy medications with the prescription

as compared to males with a significant difference ($p<0.05$) (Tables 2 and 3). Most of the responders checked (192 (28.24%)) or almost checked (273 (40.15%)) the instructions of the stored medications without any significant difference in educational status ($p>0.05$); females tended to check the instructions more than that of males with a significant difference ($p<0.05$) (Tables 2 and 4). Most of the stored medications were adequately labeled (495 (69.92%)) without any significant difference either in gender or in education status ($p>0.05$). Most of the responders checked the expiry date of the stored medications (496 (70.06%)) without any significant difference in education status ($p>0.05$); females checked the expiry date more than that of males to a significant level ($p<0.05$) (Tables 2 and 3). Most of the responders reviewed (259 (38.08%)) or almost reviewed (281 (41.32%)) the stored medications for any physical changes in the products, without any significant difference in educational status ($p>0.05$); females reviewed the medications more than that of males ($p<0.05$) (Tables 2 and 5). Most of the responders did not receive instructions on storage medications from pharmacists or physicians 597 (84.32%); this result was significantly different with respect to gender or educational status ($p>0.05$). Number of stored medications increased with patients who did not receive instructions on medication use significantly ($p<0.05$) (Tables 2 and 6). Physicians were the major source of information for the instructions on storage of medications (388 (54.8%)) followed by drug leaflets (320 (45.2%)), pharmacists (318 (44.92%)) and self-initiated learning (154 (21.75%)) without any significant difference with respect to gender or educational status ($p>0.05$). However, females significantly received more information from physicians than that of males, whereas females perform self-initiated learning significantly more than that of males ($p<0.05$). Moreover, responders who completed secondary school education tended to perform self-initiated learning regarding the use of medication than that of university degree holders in a significant manner ($p<0.05$). The major reason for the accumulation of unused drugs at home was cure from the disease (471 (66.52%)) followed by self-discontinuation (192 (27.12%)) and changes in the doses and/or medication discontinuation by doctors (156 (22.03%)) without any significant difference in gender or educational level ($p>0.05$). In this study, a total of 769 medications were stored at home. Most of the stored medications were analgesics and antipyretics (322 (41.87%)) followed by cardiovascular (64 (8.32%)) and oral antidiabetics (58 (7.54%)) (Table 7).

Table 1: Sociodemographic characteristic of the respondents, N=708.

	Response Count	Response Percent
Sex		
Female	485	68.50%
Male	223	31.50%
Answered question	708	
Skipped question	0	
Age		
18–29	412	58.19%
30–39	216	30.51%
40–49	60	8.47%
50–59	15	2.12%
60+	5	0.71%
Answered question	708	
Skipped question	0	
Educational status		
Illiterate	0	0.00%
Primary/intermediate	8	1.13%
Secondary	108	15.25%
University / more	592	83.62%
Answered question	708	
Skipped question	0	
How many family members in your house?		
2-4	163	23.02%
5-7	299	42.23%
8-10	183	25.85%
more than 10	63	8.90%
Answered question	708	23.02%
Skipped question	0	
Do you have any elderly in your family?		
Yes	493	69.63%
No	215	30.37%
Answered question	708	
Skipped question	0	
Is there any member in your family working in Health sector?		
Yes	322	45.48%
No	386	54.52%
Answered question	708	
Skipped question	0	

Table 2: Medication storage knowledge and perception.

	Response Count	Response Percent	
What is the Source of medications you have?			
Government hospital	533	75.28%	<i>P</i> > 0.05 in the gender factor <i>P</i> > 0.05 in the Educational status factor
Community pharmacy	453	63.98%	
Private clinic	231	32.63%	
From friend or someone work in hospital	49	6.92%	
Others	17	2.40%	
Answered question	708		
Skipped question	0		
How do you purchase the medications usually?			
With prescription	487	68.79%	<i>P</i> > 0.05 in the Educational status factor
Without prescription	221	31.21%	
Answered question	708		
Skipped question	0		
Some medications have special instructions for storage. Do you usually check these special instructions on your drug label?			
Yes	192	28.24%	<i>P</i> > 0.05 in the Educational status factor
Mostly	273	40.15%	
No	215	31.62%	
Answered question	680		
Skipped question	28		
What is the situation of labeling?			
Adequately labeled	495	69.92%	<i>P</i> > 0.05 in the gender factor <i>P</i> > 0.05 in the Educational status factor
Not Adequately labeled	213	30.08%	
Answered question	708		
Skipped question	0		
Did you check the expiry date of your medications periodically?			
Yes	496	70.06%	<i>P</i> > 0.05 in the Educational status factor
No	212	29.94%	
Answered question	708		
Skipped question	0		
Are you interested in checking your medications to notice any changes in them?			
Yes	259	38.09%	<i>P</i> > 0.05 in the Educational status factor
Mostly	281	41.32%	
No	140	20.59%	
Answered question	680		
Skipped question	28		
Does your pharmacist/doctor tell you how to store your medicines?			
Yes	111	15.68%	<i>P</i> > 0.05 in the gender factor <i>P</i> > 0.05 in the Educational status factor
No	597	84.32%	
Answered question	708		
Skipped question	0		
Before starting to use the medications at home, who guided you to the appropriate use?			
Physician	388	54.80%	F more than M <i>P</i> < 0.05
Drug leaflet	320	45.20%	
Pharmacist	318	44.92%	
What are the reasons behind availability of unused drugs at home?			
cure from disease	471	66.52%	<i>P</i> > 0.05 in the gender factor <i>P</i> > 0.05 in the Educational status factor
Self-discontinuation	192	27.12%	
Change or discontinuation from doctor	156	22.03%	
Sharing drug from other	112	15.82%	
Take exact amount of medication required	97	13.70%	
Answered question	708		
Skipped question	0		
Others	33	4.66%	
Self-initiated	154	21.75%	M more than F <i>P</i> < 0.05 <i>P</i> < 0.05 in the Educational status factor with secondary than university holders
Others	33	4.66%	<i>P</i> > 0.05 in the Educational status factor
Answered question	708		
Skipped question	0		

Table 3: Factors gender vs. purchase the storage medications and check the expiry date.

How do you purchase the medications usually?

Gender	With prescription	Without prescription	Total	P value
Male (A)	58.30%	41.70%	31.50%	P<0.05
	130	93	223	
	B	B		
Female (B)	73.61%	26.39%	68.50%	P<0.05
	357	128	485	
	A	A		
Total Respondents	487	221	708	

Did you check the expiry date of your medications periodically?

Gender	Yes	No	Total	P value
Male (A)	61.88%	38.12%	31.50%	P<0.05
	138	85	223	
	B	B		
Female (B)	73.81%	26.19%	68.50%	P<0.05
	358	127	485	
	A	A		
Total Respondents	496	212	708	

Table 4: Factors gender vs. check these special storage instructions on your drug label.

Gender	Yes	Mostly	No	Others	Total	P value
Male (A)	21.40%	38.60%	40.00%	0.00%	31.62%	P<0.05
	46	83	86	0	215	
	B	B				
Female (B)	31.40%	40.86%	27.74%	0.00%	68.38%	P<0.05
	146	190	129	0	465	
	A	A				
Total Respondents	192	273	215	0	680	259

Table 5: Factors gender vs. checking storage medications for any changes and medication instruction in the leaflets.

Gender	YES-	MOSTLY-	NO-	TOTAL-	P value
Male (A)	29.30%	46.05%	24.65%	31.62%	P<0.05
	63	99	53	215	
	B				
Female (B)	42.15%	39.14%	18.71%	68.38%	P<0.05
	196	182	87	465	
	A				
Total Respondents	259	281	140	680	259

What is your behavior towards medication instruction in the leaflets?

Gender	I always try to follow it	Sometimes Yes, sometimes Not	I try to take medication shorter than recommended	Total	P value
Male (A)	46.05%	39.07%	14.88%	31.71%	P<0.05
	99	84	32	215	
	B		B		
Female (B)	55.29%	34.99%	9.72%	68.29%	P<0.05
	256	162	45	463	
	A		A		
Total Respondents	259	281	140	680	259

Table 6: Number of medications vs. pharmacist/doctor instruction of medication storage.

Number of medications	Yes	No	Total	P value
One Medications (A)	29.63%	70.37%	3.81%	
	8	19	27	
Two Medications (B)	35.09%	64.91%	8.05%	P<0.05
	20	37	57	
	CDE	CDE		
Three Medications (C)	18.00%	82.00%	14.12%	P<0.05
	18	82	100	
	B	B		
Four Medications (D)	15.19%	84.81%	11.16%	
	12	67	79	
Five or more Medications (E)	B	B		P<0.05
	11.91%	88.09%	62.85%	
	53	392	445	
Total Respondents	111	597	708	

Table 7: Type of stored medications.

No	Medication	Frequency	Percentages
1	Analgesic and Antipyretics	322	41.87%
2	Cardiovascular	64	8.32%
3	Oral anti-diabetic	58	7.54%
4	Others	51	6.63%
5	Vitamin and Supplements	50	6.50%
6	Antibiotics	44	5.72%
7	Anti-allergy	43	5.59%
8	Gastrointestinal	37	4.81%
9	Respiratory	32	4.16%
10	Insulin	24	3.12%
11	Antiplatelet and Anticoagulation	21	2.73%
12	Endocrine	14	1.82%
13	CNS Medications	9	1.17%
14	Total	769	

DISCUSSION

The increased quantity of unused medications resulted either in their improper storage or improper disposal. With the lack of guidelines, regulations and education related to the storage and disposal of the accumulated medications at homes, they might lead to health crises if they are not properly stored at homes and if not safely disposed. The results of this study have revealed that females are more aware of the use of medications, their expiry dates and their proper storage in the studied Saudi Arabian population. It may make it easier to understand that we must focus more on the women to drive awareness about this crisis. Educating women means teaching families, making it easier to reach the masses.

In this study, the types of medications stored was also a factor considered in this study. Cardiovascular drugs were found to be the second most stored medications in this study following analgesics and antipyretics. Considering the increase in cardiovascular diseases; such as hypertension, these results are not surprising. A higher percentage of unused cardiovascular medicines was found in a Mexican population, where they accounted for most unused medicines after the nonsteroidal anti-inflammatory drugs.^[1] Moreover, the highest fraction of the unused medications was antipyretics and analgesics, which are comparatively less harmful and usually stored for future emergency usage except paracetamol, which was also found to be the most unused medication in the Jordanian population.^[3] The other types of drugs were stored in

cases of cured diseases, death, change in therapy and other circumstances. The cured diseases accounted for more than half of the total stored medications followed by almost one-third that was discontinued by the patient's discretion. Such increased amount of unused medications along with the availability of information on all topics on the internet has promoted self-medication, which is harmful and a reason for the development of antibiotic resistance. About one-third of the subjects in this study accepted to consume medicines without a prescription in a manner less than the consumption of the unused drugs for self-medication purposes as in Jordanian Population. The reasons for having unused medicines at home were found to be similar in various studies conducted on different populations.^[3,4] Larger families use a significant number of medications as a result of having a more substantial number of unused medicines through self-medication. The educational status of the subjects and their proximity to the healthcare field was found ineffective in enhancing the proper disposal of unused medicines. Similar results were observed in the US population.^[4]

The health hazards of the expired medications along with the toxicity and poisoning capabilities of such medications make them a serious threat. One-third of the subjects in this study did not check the expiry date, whereas almost the same proportion of subjects did not check it regularly. These results strengthen the possibility that expired drugs form a major proportion of the unused medications found at homes. Studies on the Swedish^[5] and Spanish population^[6] revealed that the expired medications formed the highest proportion of the unused medications in the respective populations. Moreover, even if these drugs are disposed of, they enhance the local levels of APIs which are again hazardous for people's health in a community or locality. Other than the environmental and health implications of the unused medicines, their economic implications were also found to be enormous; at least 25.8% of the medications in Saudi Arabia were reported being wasted^[7] and 41.3% of medications were wasted in other Gulf countries. Polypharmacy and self-medication were two principal reasons for this wastage. These factors very essential in developing nations as they have limited resources and inadequate healthcare.

The solution to this widespread problem can only be addressed by focusing on the physicians and pharmacists, as they are the primary source of guidance about medicines for most populations.

This study found that physicians were the source of useful information and the pharmacists as well. At the same time, 84% of the same population admitted that neither the pharmacists nor the physicians guided them about the proper storage of medications. This data shows that we need to focus on training the physicians and pharmacists to educate and promote appropriate storage and timely prescriptions. As they are in in-direct contact with the patients, they can also be guided to ask the patients to return any unused medications which can then be collected and disposed of by the pharmaceuticals or the hospitals. The role of pharmacists should exceed the role of physicians in educating patients on the proper use of medications, as well as to eliminate the self-initiated knowledge, which can be a risky to their health. Therefore, pharmacists should work more on counseling patients concerning the proper way of storing medications at home.

CONCLUSION

This study depicts several different factors responsible for such a large proportion of unused medications in the households. Women can be the source of driving this change as they manage the health issues and medicine of their family. This study also suggests that people can be most readily influenced by the physicians and pharmacists to incorporate positive changes. They should be made aware of this issue and should be motivated to make patients aware of the risks of improper disposal and self-medication. These two channels can have the most promising results in increasing awareness about the proper storage and disposal of medications.

ACKNOWLEDGEMENT

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS

APIs: Active pharmaceutical ingredients; **SPSS:** Statistical Packages for Social Sciences; **WHO:** World health Organization.

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Cite this article as: Alenazi AB, Alsharidah MS, Al-Najjar AH, Alghazy SA, Alqadi AA, Marzouk A. Perceptions and Knowledge of Storing Medications at Home in Al-Qassim Region, Saudi Arabia. *Int J Pharmacol. Clin. Sci.* 2019;8(1):79-85.