Trends of Home Drug Storage and Use in Different Regions across the Northern United Arab Emirates

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Key Words

Home pharmacy • Storage • Drug consumption, habits

Abstract

Objectives: To investigate the habits of use and home storage of over-the-counter (OTC) and prescription drugs. **Subjects and Methods:** A pretested questionnaire was distributed to university students who represented 300 household units in different regions of the northern United Arab Emirates. Household chairs (parents) answered questions on various aspects of home use and storage of OTC and prescription medicines. The number of drugs stored at home was collapsed into 5 unequal groups (1–3, 4–6, 7–10, 11–15 and 16–20). **Results:** The response rate was 300 (100%). The average number of drugs per household unit was 6 items. Almost 40% of the participants stored between 16 and 20 drugs. More than half (56%) of the household units stored medicines in a home pharmacy kept either in the bedroom ($n = 66$; 39%) or in the kitchen ($n = 71$; 42%). No correlation was found between the level of education and the number of family members ($r = 0.29$) or drugs stored at home ($r = -0.35$). Only 2 (0.7%) of the participants did not keep drugs at home. There was a clear discrepancy in either OTC or prescription drugs stored, and the variation in the utilization and preference of drugs was obvious among the pooled sample. **Conclusion:** Various problems related to the use and storage at home of OTC and prescription drugs were revealed. Discussing the re-

sults of this survey with students who participated as members of the household units that took part in the study may prove to be a helpful intervention. The need for public educational efforts on the rational use of medicines at home is urgent to foster awareness of the proper use of drugs.

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Introduction

Pharmacy practice focuses mainly on the dispensing process: patients are given instructions on how to use prescribed drugs. However, information on the storage and organization of various medications is lacking [1]. As a result, patients' knowledge of proper storage conditions, rational drug use and hazards related to the indiscriminate use of medicines is deficient. Moreover, there has been a steady increase in consumption of both over-the-counter (OTC) and prescription drugs. Medicines are being purchased with and without prescriptions and are being stored at different places in the home. Some places in the home are not suitable for keeping drugs. For example, storage of drugs in bathrooms is a common practice. This exposes drugs to humidity and high temperature that may accelerate their degradation and expiration. Moreover, exposure of certain medicines to light can lead to photodecomposition and, consequently, loss of potency and efficacy [2]. Indiscriminate purchase of medicines,

Table 1. Educational levels of chairs of household units¹

	Number of household units (n = 300)		
	husband	wife	children
Illiterate	54 (18%)	54 (18%)	216
Primary	6 (2%)	0 (0%)	16
Intermediate	18 (6%)	102 (34%)	95
University	222 (74%)	144 (48%)	640

¹ Each household unit with 1 wife and 1 husband.

inappropriate storage conditions, exchange of medicines with family members and friends, and irrational use of medication without medical consultation may all result in serious health problems. Self-medication rates have been reported to be high and are increasing. This can result in wasted resources, the emergence of resistant strains of microorganisms, and serious adverse reactions and toxicity [3–5]. Visiting patients in their homes also revealed the storage of unlabelled, outdated and leftover used medicines [6]. In general, improper storage of medication contributes to health hazards [6]. This study was therefore undertaken to examine and assess patterns of home drug use and storage in the United Arab Emirates.

Subjects and Methods

The study was carried out over a period of 4 months (December 2005 to March 2006). A structured and pretested questionnaire (10 students randomly chosen in an area distinct from that proposed for the main study) was used as part of a 'home pharmacy' campaign. To ensure the validity of the questionnaire, 4 academics and 6 administrators in the university reviewed the survey items and were asked to comment on the face validity of the instrument, including the appropriateness and scope of the activities that were being evaluated. Their views and comments were considered and then incorporated into the final version of the questionnaire. To obtain consent of the participants prior to data collection, a cover page containing a short introduction was attached to the questionnaire ensuring confidentiality and describing the background and purpose of the study. The latter was distributed to a total of 300 pharmacy, medical and dental students at the University of Sharjah. The students, who were selected from residential areas in various regions across the northern United Arab Emirates, were instructed to ask their parents to complete the questionnaire.

For this study, we adapted the definition of the household unit as designating a place of residence for household chairs described elsewhere [1, 7]. The respondents, including those from illiterate households, were asked to answer questions related to the level of education of the household chairs (i.e. university degree holders

including those with first university degree, higher degrees and participants with some years at university who did not finish their study programme), head of household units, number of family members, number of medicines stored per household unit, presence of a home pharmacy 'drug cabinet' and its location, checking stored medications for expiry date, and methods of disposal. The students of illiterate household families were asked to explain the questionnaire items and complete the different sections of the survey for them. The questionnaire also included questions on the use of medicine before or after medical consultation and whether medicines were exchanged with others. Various therapeutic classes of drugs kept at home were checked. The participants also answered questions on the preferred form of dosage for antibiotics, length of treatment and course completion. A copy of the questionnaire is available from the authors. Due to the wide variation of drugs kept in the homes, the exact number of prescription and OTC drugs was collected and collapsed into groups ranging from 1–3 to 16–20. The Statistical Package for the Social Sciences (SPSS), version 12.1, was used to enter and analyse the data.

Results

From the 300 questionnaires sent, 300 responses (100%) were received. Our results indicate that almost three quarters of the heads of household units' husbands (n = 222; 74%) and almost half of the wives (n = 144; 48%) were holders of a first university degree or a postgraduate degree (table 1). None of the participants admitted attending university without obtaining a degree. The number of family members (husband, wife and children) according to educational level is summarized in table 1. However, no significant correlation was evident between the level of education of the heads of household units ($r = 2.9$) or the number of family members ($r = -3.5$) and the number of drugs kept at home. A total of 1,860 drug items were kept at home during the study period. The average number of drugs per household unit was 6 items. Only 2 participants (0.7%) did not keep drugs at home. 22 (7%), 60 (20%), 66 (22%), 36 (12%) and 114 (38%) of the household units kept 1–3, 4–6, 7–10, 11–15 and 16–20 drugs, respectively.

A total of 298 household units (99%) kept drugs at home, but only 168 (56%) had a home pharmacy (table 2). The home pharmacy drug cabinet was mostly kept in the bedroom (n = 66; 39%) and kitchen (n = 71; 42%). The drug cabinet was regularly checked by the chairs of household units (table 2). The majority (n = 146; 87%) disposed of expired drugs, and only 22 participants (13%) reported that they kept but did not use expired medicines. Various methods of disposal of expired drugs are also shown in table 2. Most participants (n = 123; 84%) practised throwing outdated drugs in the waste.

Table 2. Drug storage, expired medicines and disposal methods

	Number of household units (n = 298)
Available home pharmacy	168 (56%)
Location of home pharmacy	
Kitchen	71 (42%)
Bedroom	66 (39%)
Sitting room	27 (16%)
Bathroom	5 (3%)
Checking home pharmacy for	
General condition	49 (29%)
New additions/replacement	27 (16%)
Expired medicines	92 (55%)
Expired drugs	
Kept but not used	22 (13%)
Disposed of	146 (87%)
Expired drugs are disposed of by (n = 146)	
Throwing in waste	123 (84%)
Flushing in toilet	3 (2%)
Returning to pharmacy	3 (2%)
Burying in backyard	3 (2%)

When feeling ill, 135 participants (45%) admitted using stored medicines without medical consultation, while 165 (55%) used them after medical consultation. Among the latter group, only 94 (57%) completed the treatment course. Tablets and capsules were the preferred antibiotic dosage forms for 151 participants (92%), while the remaining 14 (8%) preferred injections.

The perception of the proper duration of an antibiotic course as expressed by the participants was 3 days for 69 (23%), 5 days for 114 (38%) and 7 days for 105 (35%). A total of 204 participants (68%) stated that the administration of the antibiotic should be continued as advised. Interestingly, almost one third (n = 96; 32%) of the participants reported their perception that antibiotics should be stopped at the first signs of improvement. The habit of sharing medicines with family members, relatives and friends was reported by 258 (86%) of the sample studied throughout the study period. The various commonly stored OTC and prescribed drugs are shown in table 3.

Discussion

In the present study, the response rate was 100%. This perfect response rate may be due to the influence of students on their parents to participate in the survey.

Table 3. Number and percentage of household units storing OTC and prescription drugs (n = 298)

OTC drugs	n	Prescription drugs	n
NSAIDs	220 (74%)	Antidiabetics	42 (14%)
Antihistaminics	131 (44%)	Antihypertensives	78 (26%)
Antidiarrhoeals	60 (20%)	Anticholesterols	42 (14%)
Laxatives	72 (24%)	Antiasthmatics	18 (6%)
Eye drops	179 (60%)	Antidepressants	42 (14%)
Nasal decongestants	149 (50%)	Oral contraceptives	42 (14%)

NSAIDs = Non-steroidal antiinflammatory drugs.

There was no significant correlation between the educational level of household heads and the number of medicines stored at home. The 2% of household units that did not keep drugs at home are comparable to the 2.3% recorded in Sudan [6], but markedly lower than the 47.5% determined in Guinea [3]. The difference may be attributed to more stringent regulations on essential drugs applied in Guinea [3]. Similar to previously mentioned studies [3, 6], the number of stored medicines in the present investigation ranged from 1 to 20, but the mean number of drugs per household unit was higher (6 items) compared to 2.4 items in Guinea [3] and 4.4 items in Sudan [6]. This might reflect a higher income and purchasing power in the United Arab Emirates.

Organizing OTC and prescription medicines in a home pharmacy kept in a cool dry place as advised by both manufacturers and pharmacists preserves medications and may also safeguard health and prevent economic losses. On the other hand, unorganized storage of medicines at various places in the household may lead to unintentional non-compliance, health hazards to children, accelerated degradation and wasted resources. It should be pointed out that keeping medicines in a drug cabinet away from the reach of children is highly recommended. However, only 168 (56%) of the pooled sample reported that they had a home pharmacy to keep medication out to the reach of children. Only a minority (3%) of the household units kept the drugs in cabinets in the bathroom. The bathroom is certainly not an advisable site for keeping medications as they are at risk of exposure to high humidity and temperatures that accelerate their instability. The high temperature in the kitchen during cooking, a daily activity, may also have the same effect as the high humidity and temperatures in the bathroom. Unfortunately, 44% of participants stored drugs in kitchen cupboards, bedroom drawers and refrigerators. How-

ever, the kitchen drug cabinet, as opposed to the bathroom drug cabinet, was regularly checked by household chairs for general conditions, replacements/additions and expiry dates of medicines as it could lead to the disposal of expired drugs. The habit of keeping but not using expired medicine, as followed by 22 participants (13%), is certainly not advisable as it could increase the likelihood of misunderstanding and the risk of health hazards because of ineffectiveness or possibly toxic degradation products [2].

As with most self-administered questionnaires, the results were dependent on the information given by the respondents [8]. In the present survey none of the participants admitted using expired medicines, a practice that is not uncommon in real daily life [9].

The problem of self-medication is evidenced by the high rate of use of medicine prior to medical consultation, as in this study, where 135 participants (45%) directly used medicines stored at home. Inappropriate self-medication may result in wasted resources, increased resistance of pathogens, serious health hazards, adverse reactions and prolonged suffering [1, 3–5]. Moreover, the problem of intentional non-compliance is expected to be more prevalent with self-medication. The situation could be exacerbated by the exchange of drugs between family members, relatives and friends, as was observed in 258 participants (86%) in this study. Socioeconomic factors

cannot have been the only reason for drug exchange since most participants are covered by medical insurance. Both the problems of self-medication and non-compliance warrant more efforts to educate not only the public, but also health professionals in order to avoid the irrational use of drugs.

Although the participants' perception of the duration of a course of antibiotic was between 3 and 7 days, about one third admitted stopping the antibiotic at the first sign of improvement, despite instructions given by the health care providers. This non-compliance is a problem that can lead to undertreatment of a condition and/or to the emergence of resistant pathogens [10–14]. As frequently stressed by the WHO [15], the role of the pharmacist in providing information on self-care and self-medication is important. Pharmacists should also provide information on the proper storage conditions of various prescription and OTC drugs.

This study revealed various problems related to the use and storage of OTC and prescription drugs at home. Discussing the results of this survey with students who participated as members of the household units that took part in the study may prove a helpful intervention. The need for public educational efforts on the rational use of medicines at home is urgent in order to foster awareness of the proper use of drugs.

References

- 1 Cameron K: Medication safety in the home: the need for pharmacist involvement. *CPJ* 2007;140:47–49.
- 2 Langner MD, Maibach HI: Many common drugs in dermatology are light, temperature, or moisture-sensitive. *Skin Therapy Lett* 2009;14:3–6. http://www.skintherapyletter.ca/stl/download/stl_14_1.pdf (accessed December 15, 2009).
- 3 Kiyangi KS, Lauwo JAK: Drugs in the home: danger and waste. *World Health Forum* 1993;14:381–384.
- 4 Clavinjo HA: Self-medication during pregnancy. *World Health Forum* 1995;16:403–404.
- 5 Yayehyirad K: Self-care: a study of three communities in Ethiopia (special issue). *Ethiop J Health Dev* 1997;2:9–75.
- 6 Yousif MA: In-home drug storage and utilization habits: a Sudanese study. *East Mediterr Health J* 2002;8:1–10.
- 7 Interviewer's manual. Ann Arbor, Michigan, Survey Research Center, Institute for Social Research, University of Michigan, 1976:39, 91, 94.
- 8 Abahussain E, Matowe LK, Nicholls PJ: Self-reported medication use among adolescents in Kuwait. *Med Princ Pract* 2005;14:161–164.
- 9 Seehusen DA, Edwards J: Patient practices and beliefs concerning disposal of medications. *J Am Board Fam Med* 2006;19:542–547.
- 10 World Health Organization: WHO model prescribing information? Geneva, World Health Organization, 2001.
- 11 Mayo Clinic Staff: Antibiotics: Misuse puts you and others at risk. <http://www.mayoclinic.com/health/antibiotics/FL00075> (accessed August 4, 2009).
- 12 American Academy of Family Physicians 2008: Antibiotic resistance. <http://www.md-consult.com/das/patient/body/110084196-2/0/10062/15492.html> (accessed August 4, 2009).
- 13 American College of Physicians: Antibiotic resistance. http://www.acponline.org/patients_families/disease_conditions/antibiotic_resistance (accessed October 4, 2009).
- 14 Sharif SI, Al-Shaqra M, Hajjar H, Shamout A, Wess L: Patterns of drug prescribing in a hospital in Dubai, United Arab Emirates. *Libyan J Med* 2008;3:10–12.
- 15 World Health Organization: The role of the pharmacist in self-care and self-medication: report of the 4th WHO Consultative Group on the Role of the Pharmacist. The Hague, Department of Essential Drugs and Other Medicines, World Health Organization, 1998. <http://apps.who.int/medicinedocs/en/d/Jwhozip32e/#Jwhozip32e> (accessed February 4, 2009).