

Original Research

Pharmacists' attitude, perceptions and knowledge towards the use of herbal products in Abu Dhabi, United Arab Emirates

Sahar A. FAHMY, Shajahan ABDU, Mohammed ABUELKHAIR.

Received (first version): 15-Nov-2009

Accepted: 30-Mar-2010

ABSTRACT*

Objective: The purpose of the study was to assess pharmacists' current practice, perception and knowledge towards the use of herbal products in Abu Dhabi, United Arab Emirates (UAE). The study assessed the need for incorporating herbal medicine as a separate topic in under-graduate pharmacy student curricula.

Methods: The study was done on 600 pharmacists employed in Abu Dhabi, who were contacted electronically, out of which 271 had completed the survey. The data was collected using a structured questionnaire.

Results: Pharmacists' use of herbal products is high in the UAE, as they have a high belief on the effectiveness of herbal products, and only age was found to be the most predominant variable that was influencing pharmacists' personal use of herbal products (p -value=0.0171). Pharmacists were more knowledgeable on the uses/indications of herbal products (47%) rather than on other areas. Knowledge of the dispensing mode (prescription only or over the counter medicines) mandated by the Ministry of Health was quite good, however, it is to be noted that the source of information on the dispensing mode was provided by medical representatives (48%). Knowledge of dispensing mode of herbal products was found to be significantly influenced by the place of work with more knowledge of the dispensing mode by pharmacists working in the private sector (p -value 0.0007). The results from the study also underscore the need for including herbal medicine as a separate topic in pharmacy college curriculum and to provide for more seminars and continuing pharmacy education programs targeting pharmacists in the Emirate of Abu Dhabi.

Conclusions: Pharmacists need to be informed on indications, drug interactions, adverse events and precautions of herbal products. Concerned bodies must also provide them with regular continuing education programs apart from putting their efforts to incorporate relevant topics on herbal medicine in the pharmacy students' curriculum.

Keywords: Herbal Medicine. Education, Pharmacy, United Arab Emirates.

* Sahar A. FAHMY. PhD. Pharmaceutics Dept., Faculty of Pharmacy, Helwan University, Helwan (Egypt).
Shajahan ABDU. MD. Pharma/ Medicines and Medical Products Dept., Health Authority Abu Dhabi, Abu Dhabi (United Arab Emirates).
Mohammed ABUELKHAIR. Pharm D. Pharma/ Medicines and Medical Products Dept., Health Authority Abu Dhabi, Abu Dhabi (United Arab Emirates).

ACTITUD, CONOCIMIENTO Y PERCEPCIONES DE LOS FARMACÉUTICOS HACIA EL USO DE PLANTAS MEDICINALES EN ABU DHABI, EMIRATOS ÁRABES UNIDOS

RESUMEN

Objetivo: El propósito del estudio fue evaluar la práctica actual de los farmacéuticos, las percepciones y el conocimiento sobre el uso de plantas medicinales en Abu Dhabi, Emiratos Árabes Unidos (EAU). El estudio evaluó la necesidad de incorporar las plantas medicinales como materia separada en el currículo de los estudiantes de farmacia.

Métodos: El estudio se realizó en 600 farmacéuticos empleados en Abu Dhabi, que fueron contactados electrónicamente, de los que 271 completaron la encuesta. Los datos se recogieron utilizando un cuestionario estructurado.

Resultados: El uso de plantas medicinales es elevado en EAU, ya que existe una creencia sobre la alta efectividad de estos productos, y sólo la edad fue la variable más predominante que influyó el uso personal de plantas medicinales por los farmacéuticos (p -value=0.0171). Los farmacéuticos tenían más conocimientos de los usos/indicaciones de las plantas medicinales (47%) que de otras áreas. El conocimiento del modo de dispensación (prescripción o *over-the-counter*) obligado por el Ministerio de Salud era bastante bueno, sin embargo se vio que la fuente de información para la dispensación eran los representantes médicos (48%). El conocimiento del modo de dispensación pareció estar influenciado significativamente por el lugar de trabajo, con mayor conocimiento los que trabajaban en el sector privado (p -value 0.0007). Los resultados del estudio también señalan la necesidad de incluir las plantas medicinales como materia separada en el currículo de la facultad de farmacia y de proporcionar más seminarios y programas de formación continua enfocados hacia los farmacéuticos del Emirato de Abu Dhabi.

Conclusiones: Los farmacéuticos necesitan estar informados de indicaciones, interacciones, efectos adversos y precauciones de las plantas medicinales. Las entidades relacionadas también deben proporcionarles programas de formación continua regulares además de incluir los aspectos relevantes de las plantas medicinales en el currículo de los estudiantes de farmacia.

Palabras clave: Plantas medicinales. Educación en farmacia. Emiratos Árabes Unidos.

INTRODUCTION

The use of herbal medicines continues to expand globally, in parallel to an increasing acceptance of herbal remedies by consumers. Despite the fact that herbal remedies are not classified as drugs by the US Food and Drug Administration (FDA), the 1994 Dietary supplement health and education act allows manufacturers to make claims regarding the benefits on the use of these products.¹

Herbal products are defined as "herbal preparations produced by subjecting herbal materials to extraction, fractionation, purification, concentration, or other physical or biological process. They may be produced for immediate consumption or as the basis for herbal products. Herbal products may contain excipients, or inner ingredients, in addition to the active ingredients. They are generally produced in larger quantities for the purpose of retail sale".²

In conjunction with this increasing use of herbal remedies worldwide, the number of adverse events, drug interactions and death involving the use of these products are on rise. The World Health Organization reported in 1995 that it had received thousands of reports of suspected Adverse Reaction to herbal Products.³ From 1994 to 1998, FDA received more than 800 reports of adverse events associated with herbal products containing ephedrine alkaloids.⁴ In 2004, after a meta-analysis commissioned by the National Institutes of Health reported more than 16,000 adverse events associated with ephedra containing herbal products.^{5,6} Drug interactions involving a number of other herbal products are also becoming increasingly well documented.^{7,8} Hence, the safety of herbal medicine has now become a major concern to both health regulatory bodies and public.

The increase in the use of herbal products by public has also contributed to an increased interest by healthcare professionals about the use of these products. A previous study done among general practitioners to evaluate the use of herbal remedies revealed that they have a high level of interest and acceptance to be used mainly due to its wide usage, low cost and their belief on their usefulness.⁹

A recent study done in the US reported that pharmacists are now receiving more questions from patients regarding the use of natural products than ever before, which necessitate that pharmacists become knowledgeable about these products and on their uses, dosing, adverse effects, drug interactions and contraindications.¹⁰ This increased use of herbal and complementary medicines, particularly herbal remedies and dietary supplements, makes it necessary for pharmacists to keep themselves updated with the current developments in this area.¹¹

In 2002, Kaufman and colleagues published the results of a telephone survey analyzing medication use among 2,590 adults in the United States. They reported that herbal products and dietary supplements were used by 14% of participants surveyed during the period of 1998 and 1999.¹² Another study published in the same year with the participation of more than 31,000 subjects found that 19% of American adults use natural products (e.g., herbs, other botanicals, enzymes).¹³

Though it is now timely to ponder on the need for integrating herbal medicine education in pharmacy schools, only limited number of studies addressing this issue exist. A study conducted in the US on 370 pharmacy students examined the extent of student knowledge of specific herbal products and found that less than half of pharmacy students were able to identify the main uses and adverse events of commonly used herbal products. Surprisingly, 39.1% of these students rely on lay press for their information and only 1.2% rely on course work as a learning method about these products.¹⁴

The use of herbal medicines is very common in the Arab world and UAE is no exception to it. Anecdotally, it is thought that herbal products are popular as a result of a widespread belief that the preparations are natural and, therefore, safe.

A previous study done in the region to assess the use of herbal medicines by UAE nationals in Abu Dhabi had shown that UAE nationals have faith and confidence in herbal medicines and are consequently high users of these products, despite the country's progressive adaption of western approach to health care. The survey revealed that 60% of the respondents have more confidence in herbal medicines than conventional medicines, 42% believe that there is no problem in taking herbal medicines along with conventional medicines, 85% believe that there is no side effects from the use of herbal remedies and 80% believe that herbal medicine is safe for use over allopathic medicines.¹⁵

Another notable practice in UAE is the increased prevalence for the self medication, along with concomitant use of herbal and conventional medicines. This is an area of great concern due to its potential for drug-herb interactions.¹⁵ Moreover; several incidents of adulteration of herbal medicines with drug active ingredient, poor product quality, side effects and drug interactions is also reported from the region.^{16,17}

In the United Arab Emirates, herbal remedy is freely available to all residents through condimental shops or from retail outlets. The only outlet that is under the Ministry of health (MOH) control is pharmacies. Though substantial proportions of herbal medicines are registered with the MOH, large number of unregistered herbal products is also dispensed from wide range of outlets, other than pharmacies, with serious implications on patient safety.

Despite the fact that several studies exist that measure public interest towards the use of herbal products, the attitudes and perception of the pharmacists towards these products have not been adequately addressed. To our knowledge, there are

no studies designed to evaluate the current level of herbal medicine knowledge of community pharmacists in Abu Dhabi. The main purpose of this study is to analyze pharmacists' attitude towards dispensing of herbal products from pharmacies and to assess their perception towards the use of such products. The study also intends to address the existing potential of pharmacists to fill the role as information provider for patients who consume herbal products. In addition, the provided information may be useful in the design of educational objectives and continuing education programs in pharmacy schools and to serve as a pilot for a national survey.

METHODS

A questionnaire was designed to collect information on pharmacists' practice, prevalence and perception towards the use of herbal products. The survey questions consisted of four sections. The first section consisted of general demographic information. The second section focused on pharmacists' current practice of dispensing herbal products and contained a 5-point scale grading as follows: 1 (always), 2 (often), 3 (rarely), 4 (no) and 5 (I don't know). The third section assessed the pharmacists' perception towards the use of herbal products and the fourth section examined their perception of self-knowledge concerning herbal medicine and the required areas of training as identified by them. A pilot study was carried out on 10 pharmacists to check for readability, understanding, question design and length of questionnaires.

The questionnaire was submitted electronically to Health Authority-Abu Dhabi registered pharmacy practitioners who has accurate email address (n=600) through the period of April 2008 to June 2008, and requested to forward the completed survey to the investigators.

We used SPSS software for statistical analysis. Descriptive statistics such as frequency distributions were obtained. For Likert responses, all responses with any degree of agreement were grouped together as positive responses, and all responses with any degree of disagreement were grouped together as negative responses. Chi square test was used to find the correlation between qualitative variables at the 5% significance level. A p-value of less than 0.05 represents a significant difference.

RESULTS

Six hundred (600) registered pharmacy practitioners in Abu Dhabi were contacted to respond to the survey. Only 271 responded to the survey with 192 pharmacy practitioners having all questions completely answered. The average response rate was calculated to be 32%, which is consistent with the average response rate reported from online surveys of 32.52 and a median of 26.45 %.¹⁸

The respondents consisted of 40% female and 60% male; with varying degree of education; 15.8% with diploma, 72.3% with Bachelor degree in Pharmacy,

6.64% with Master Degree; 4.06% with Pharm. D. and only 1.1% with Ph.D. The age range showed that 48.7% of the respondents were of the age range of 30 -40 years, 27.7% were within the age range of 20 -30 years, 13.3% within 40-50 years and 10.3% above 50 years old. The majority of the pharmacists worked in private community pharmacies 73.8%, 17.7 % in governmental sector, 4.4% in pharmaceutical industry, 3.3% in sales and marketing and only 2% in academia. Of the respondents, 42.8% were practicing or residing in Abu Dhabi for more than 8 years. Table 1 illustrates demographic information of the participants.

Demographic information	n (%)
Level of education (n= 272)	
Diploma	43 (15.8%)
Bachelors	196 (72.3%)
Masters	18 (6.64%)
Pharm D.	11 (4.06%)
Ph. D.	4 (1.1%)
Gender (n = 270)	
Male	162 (60%)
Female	108 (40%)
Age distribution (n= 271)	
20 -30- years	75 (27.7%)
30 -40 years	132 (48.7%)
40-50 years	36 (13.3%)
50 years and above	28 (10.3%)
Employment status (n=271)	
Public sector*	48 (17.7%)
Private sector**	200 (73.8%)
Pharmaceutical industry	12 (4.4%)
Sales and marketing	9 (3.3%)
Academia	2 (0.7%)
Years of work experience (n= 271)	
Less than one year	22 (8.1%)
1-4 years	78 (28.8%)
5-7 years	55 (20.3%)
8 years and above	116 (42.8%)
*: Facilities owned and managed directly by the government or parties designated by the government.	
**: Facilities owned by individuals and providing health care services in accordance to the regulations set by regulatory bodies.	

Current practice:

Survey on the pharmacists' current practice of dispensing of herbal products from pharmacies revealed that herbal products were reportedly dispensed frequently 'often' by 38.4% of pharmacists from their pharmacies. Around 48.8% of the respondents reported providing more frequent patient advice 'always' on the safe use of herbal products and 34.6% of the respondents reported frequent receiving inquiries 'often' regarding the use of herbal medicine.

Survey on the pharmacists' practice of using herbal medicine for self-treatment revealed that 44.5% of the respondents less frequent use of herbal products 'sometimes' for self treatment. Data is illustrated in Table 2. There was no statistically

Table 2: Pharmacists' current practice with regard to herbal products (n=211)

Scores	Frequency (%)				
	1	2	3	4	5
1- Do you dispense herbal products from your pharmacy	26 (12.3%)	81 (38.3%)	72 (34.1%)	30 (14.2%)	2 (0.9%)
2- Do you advise consumers on safe use of herbal medicine	103 (48.8%)	52 (24.6%)	27 (12.8%)	8 (3.8%)	21 (9.9%)
3- Do you get inquiries from consumers regarding the use of herbal medicine.	26 (12.3%)	73 (34.6%)	67 (31.7%)	26 (12.3%)	19 (9.0%)
4- Have you ever used herbal medicines for self treatment before	14 (6.8%)	44 (21.3%)	88 (42.5%)	39 (18.8%)	22 (10.6%)

1= Always "more frequent"; 2= often "frequent"; 3= sometimes "less frequent"; 4= rarely; 5 = No

significant difference in the use of herbal products based on gender, level of education, place of work and years of employment. Age was found to have a statistically significant effect ($p < 0.05$) on self-treatment using herbal products. Data is illustrated in Table 3.

Characteristics	Self-treatment (%)	p-value
Gender		0.8661
Male	54.6	
Female	52.1	
Age		0.0171
20-30	69.33	
30-40	41.09	
40-50	50.00	
> 50	75.00	
Place of work		0.1855
Government	32.61	
Private	58.50	
Pharmaceutical Industry	53.33	
Sales and marketing	75.00	
Academia	54.28	
Level of education		0.5001
Diploma	48.84	
Beachelor	57.14	
Masters	33.33	
Pharm D	46.67	
PhD	53.68	
Years of experience		0.4974
< 1 year	68.18	
1y- 4y	58.75	
5y- 7y	42.59	
> 8 years	53.04	

Pharmacists' knowledge regarding the dispensing mode of herbal products either over the counter or prescription only medicines revealed that 51.5% of the respondents considered the mode of dispensing of herbal products to be both over the counter (OTC) and prescription only medicines, 13% reported it is prescription-only-medicines (POM), 23% reported it is over-the-counter and 11% with no response. Only 1.5% of the respondents reported that they do not know the mode of dispensing of herbal products.

There was no statistically significant difference on the knowledge of dispensing mode of herbal products mandated by MOH based on gender, age, level of education and years of employment. Place of work was found to have a statistically significant effect ($p < 0.05$) on knowledge of mode of dispensing of herbal products. It is expected that Pharmacists working on community pharmacies would be more

likely to know how these products are dispensed. Data is illustrated in Table 4.

Characteristics	Knowledge of mode of dispensing (%)	p-value
Gender		0.0948
Male	44.10	
Female	31.19	
Age		0.4823
20-30	50.67	
30-40	34.11	
40-50	33.33	
> 50	42.86	
Place of work		0.0007
Government	10.87	
Private	46.50	
Level of education		0.626
Diploma	39.53	
Bachelor	41.33	
Masters	33.33	
Pharm D	27.27	
Years of experience		0.287
< 1 year	50.00	
1y- 4y	48.75	
5y- 7y	38.89	
> 8 years	31.30	

The source of information provided on the dispensing mode of herbal products was assessed. Survey revealed that 48.1% of the pharmacists were informed on dispensing mode of herbal products by the medical representatives, 13.1% from regulatory authority; 9.7% from the MOH; 11.7% just dispensed these medications based on their perception and 17.5% reported that they do not know the mode of dispensing of herbal products. Herbal products available in UAE are registered with the MOH either as over-the-counter (OTC) medications, which are dispensed by a pharmacist without needing a physician's prescription or Prescription only medicines (POM), which must be prescribed by a physician. Assessing the pharmacists' knowledge on the MOH mandated dispensing mode which is revealed that 36.8% of respondents knew the mode of dispensing for all herbal products; 39.2% responded that they only knew the dispensing mode for the majority of the products; 11.3% did not know the mode of dispensing mandated by MOH for the majority of the products and 12.7% did not know the mode of dispensing of all herbal products dispensed from their Pharmacy.

Herbal products are registered with the MOH either as prescription only medicines or over the counter

products. When the respondents were asked regarding the registration status of the herbal products in their pharmacies, 73.4% reported that all products were registered with the MOH; 9.9% reported that majority of them were registered; 2% reported that the majority were not registered and 14.3% did not know the registration status of the herbal products in the pharmacy.

The most commonly dispensed dosage forms of herbal products were tablets and capsules (48%), syrups (41%), followed by creams and ointments (5%). The least dispensed dosage forms were the powder (4%) and lotions (2%).

Perception:

Fifty percent (50%) of the pharmacists agreed that the doses of the marketed herbal medicines in UAE are well standardized, 11.7% disagreed with this fact and 31.6% of the respondents were neutral.

Pharmacists' belief in the beneficial effect of herbal products was assessed. 51.7% of the respondents agreed on the beneficial effects with the use of herbal medicines and only 0.5% disagreed on the fact that herbal medicines have a beneficial effect. There was no statistically significant difference on the pharmacists' belief in the beneficial effects of herbal products based on different confounding variables i.e. gender, age, level of education, place of work and years of employment ($p>0.05$) as shown in Table 5. Among the respondents, 44.0% of them agreed on the fact that herbal medicines have less side effects than conventional medicine, 12.1% strongly agreed, 32.4% were neutral and 10.1% of the respondents disagreed on the fact that herbal medicines have less side effects than conventional medicine. Data is illustrated in Table 6.

Table 5: Pharmacists' belief in the beneficial effect of herbal products (n=211)

Characteristics	Pharmacists' belief on the beneficial effect of herbal products (%)	p-value
Gender		0.5679
Male	73.29	
Female	78.90	
Age		0.7729
20-30	66.67	
30-40	81.33	
40-50	70.54	
> 50	72.22	
Place of work		0.0951
Government	58.70	
Private	80.00	
Level of education		0.7693
Diploma	65.12	
Bachelor	77.04	
Masters	72.22	
Pharm D	90.91	
Years of experience		0.9121
< 1 year	77.27	
1y- 4y	77.50	
5y- 7y	68.52	
> 8 years	76.52	

Knowledge and training needs:

Most of the respondents felt that their training did not provide them with the necessary skills and knowledge to counsel patients with regard to the use of herbal medicine. Moreover, they also felt that herbal medicine was not sufficiently addressed in their undergraduate curriculum.

Regarding the Pharmacist's familiarity concerning relevant areas of herbal medicine, 62.2% of the respondents showed that they were more familiar with the indications than with precautions of use of such products (3.7%), drug interactions (2.1%) and side effects (2.7%). 23.9% of the respondents were familiar with all aspects regarding the use of herbal medicine and only 5.3% felt that they did not know much about it.

It is hence to be concluded that the pharmacists' self-perception of their knowledge regarding the indications and uses of herbal products is much better than their understanding of other areas such as precautions, interactions and side effects.

Pharmacists' response to the need for training in this area was that 97.4% of the surveyed pharmacists were interested in attending continuing pharmacy education programs covering herbal medicine topics. They felt that they need more education with focus on drug interactions (46.7%), side effects (23.6%), precautions (11.0%), uses and indications (9.3%) and (9.3%) on topics focused on adverse events associated with the use of herbal medicine.

To assess the pharmacists' knowledge on how to report any adverse event associated with the use of herbal medicines to the regulatory authorities; 16.3% responded that they knew the mechanism of reporting adverse events associated with the use of herbal medicine to the regulatory authority in Abu Dhabi, 51.1% knew about the system but requested for more information and training with regard to the reporting system, 17.9% did not know how to report adverse events to the use of herbal products and 14.7% did not ever heard about this reporting system implemented in Abu Dhabi.

Comments from the respondents:

The respondents posted several anecdotal comments with regard to the use of herbal medicine at the end of the survey. Generally, pharmacists realized the importance of herbal medicine use by UAE residents and they would like to equip themselves with the necessary skills and knowledge to counsel patients on the use of herbal medicine in particular and on other complementary therapies in general, such as acupuncture and homeopathy.

DISCUSSION

The study reveals that pharmacists' personal use of herbal products in UAE is high. This finding is similar to other studies assessing pharmacists' use of herbal products.¹⁹

Table 6: Pharmacists' perception towards the use of herbal products (n=207)

Scores	Frequency (%)				
	1	2	3	4	5
1- Do you agree that doses of commercially marketed herbal medicines in UAE are well standardized	11 (5.3%)	103 (50.0%)	65 (31.6%)	24 (11.7%)	3 (1.5%)
2- Do you agree that herbal medicines have beneficial effect	21 (10.1%)	107 (51.7%)	77 (37.2%)	1 (0.5%)	1 (0.5%)
3- Do you agree that herbal medicines have less side effects than conventional medicines	25 (12.1%)	91 (44.0%)	67 (32.4%)	21 (10.1%)	3 (1.4%)

1= Strongly agree; 2= Agree; 3= Neutral; 4= Disagree; 5 = Strongly disagree

Considering the fact that UAE nations have a strong belief in benefits of herbal products, pharmacists experienced increased instances of counseling patients on this subject. This finding is also in consistent with the previous survey report, which revealed that UAE nationals consider herbal products to be more effective and safer for use than western medicine in different aspects.¹⁵

It is therefore essential for pharmacists to be knowledgeable on all aspects of herbal medicine to be able to provide accurate information to consumers on the safe use of herbal products.

The finding of this study demonstrates that pharmacists were more knowledgeable about the purported indications of herbal products than about other aspects such as drug interactions, adverse events and precautions. This is in keeping with the findings of other studies.^{10,11,20} Also, this finding is similar to a previously reported study from the US which reported that pharmacists' had a greater knowledge of the purported uses of herbal medicines than on the precautions, drug interactions, and side effects of these products. This knowledge was attributed mainly due to attendance of continuing education programs with regard to herbal medicines.^{11,21}

More than half of the respondents to the survey confirmed that they provide advice on the safe use of herbal products while dispensing these products from pharmacies. It is therefore essential that pharmacists have a greater knowledge regarding different aspects of herbal products to be able to counsel patients regarding the use of herbal products.

Another finding of this study is that pharmacists working in the private sector were more inclined, than in public sector, towards dispensing of herbal products. This is expected because of the existence of a restricted drug formulary in the public sector, which is approved by Pharmacy and Therapeutic Committee (PTC) at the regulatory body level. Due consideration should be given to include therapeutically effective herbal products in the formulary and to encourage pharmacists to dispense herbal products to the needed patients.

It is documented in this study that the vast majority of pharmacists are interested in getting more information and training regarding herbal products to facilitate improved and comprehensive pharmaceutical care. This points to the possible need for revising existing local pharmacy curriculum

to include a course on natural products as reported in other studies.^{10,11,22,23}

Another important finding of this study is that pharmacists' were mainly informed on the dispensing mode of these products either over the counter or prescription only medicines by the sales/marketing representatives (48%). Pharmaceutical companies' representatives' outdoor visits targeted physicians and pharmacists working in community pharmacies are very common practice here in UAE for providing information and marketing for their products. These sources may not be reliable and often are not under the oversight of the regulatory authority, which may lead to potential errors in dispensing 'Prescription Only' herbal medicines, leading to high risk of adverse reactions. It is therefore very important that concerned regulatory authorities inform, regulate and monitor the dispensing of herbal products from the Pharmacies.

Yet another finding is the perceived need for pharmacists to be provided with more information and training towards reporting any or suspected adverse drug events related to the use of herbal medicine to the concerned regulatory authority. The training should focus on the reporting mechanism and the need for information sharing regarding drug safety with all concerned parties including regulatory bodies to facilitate necessary corrective measures, as required.

Appropriate educational activities may improve knowledge and awareness of adverse drug reactions and stimulate reporting.

One of the main roles of pharmacists is indeed to counsel the patients regarding their medications and it is all the more important for them to develop these skills to reinforce their existing role as the primary information provider to consumers.

There is also an urgent need for the concerned regulatory bodies to identify a reliable source of drug information pertaining to herbal medications. This may be achieved by establishing and /or upgrading current drug information centers. It is no doubt that these efforts will facilitate for provision of enhanced and comprehensive pharmaceutical care in the Emirate of Abu Dhabi.

CONCLUSIONS

The use of herbal medicine among the residents (nationals and expatriates) of Abu Dhabi has become more prevalent. Though pharmacists are aware of this upsurge in the use of herbal products,

they are less informed regarding their side effects, drug interactions and precautions for use. This necessitates the need for more education and training for pharmacists in this area.

CONFLICT OF INTEREST

None declared.

References

1. Dietary supplement Health and Education Act 1994, Public Law 103-417, 103rd congress page. Food and Drug Administration Website. Available at <http://www.fda.gov/opacom/laws/dshea.html>. Accessed on June 20, 2009.
2. Legal status of traditional medicine and complementary/ alternative medicine, A worldwide review, World Health Organization, Geneva 2001.
3. Edwards R. Monitoring the safety of herbal remedies [letter]. WHO projects under way. *BMJ*. 1995;311:1569-1570.
4. Updates: Warning about herbal fen-phen. FDA Consumer. January-February 1998. Available at: http://www.fda.gov/FDAC/departs/1998/198_upd.html. Accessed January 19, 2007.
5. Shekelle P, Hardy ML, Morton SC, Maglione M, Suttrop M, Roth E, et al. Ephedra and ephedrine for weight loss and athletic performance enhancement: clinical efficacy and side effects. *Evid Rep Technol Assess*. 2003; March: 1-4. AHRQ Pub No. 03-E021. Available at: <http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=hstat1.chapter.88505>. Accessed January 19, 2007.
6. HHS acts to reduce potential risks of dietary supplements containing Ephedra [press release]. Washington, DC: US Food and Drug Administration; February 28, 2003. Available at: <http://www.fda.gov/bbs/topics/NEWS/2003/NEW00875.html>. Accessed January 19, 2007.
7. Cupp MJ. Herbal remedies: adverse effects and drug interactions. *Am Fam Physician*. 1999; 59:1239-1245. Available at: <http://www.aafp.org/afp/990301ap/1239.html>. Accessed January 19, 2007.
8. Fugh-Berman A. Herb-drug interactions [review] [published correction appears in *Lancet*. 2000;355:1020]. *Lancet*. 2000;355:134-138.
9. Hasan MY, Das M, Behjat S. Alternative medicine and the medical profession: views of medical students and general practitioners. *East Mediterr Health J*. 2000;6:25-33.
10. Clauson KA, Mc-Queen CE, Sheild KM, Bryant PJ. Knowledge and attitudes of pharmacists in Missouri regarding natural products. *Am J Pharm Educ*. 2003;67:301-309.
11. Chang ZG, Kennedy DT, Holdford DA, Small RE. Pharmacists' knowledge and attitudes towards herbal medicines. *Ann Pharmacother*. 2000;34:710-715.
12. Kaufman DW, Kelly JP, Rosenberg L, Anderson TE, Mitchell AA. Recent patterns of medication use in the ambulatory adult population of the United States: the Slone survey. *JAMA*. 2002;287:337-344.
13. Barnes PM, Powell-Griner E, McFann K, Nahin R. Complementary and alternative medicine use among adults: United States, 2002. *Adv Data*. May 27, 2004;1-19. Available at: <http://www.cdc.gov/nchs/data/ad/ad343.pdf>. Accessed January 19, 2007.
14. Mackowiak ED, Parikh A, Freely J. Herbal product education in United States pharmacy schools: core or elective program? *Am J Pharm Educ*. 2001;65:1-6.
15. Al Braik FA, Rutter PM, Brown D. A cross-sectional survey of herbal remedy taking by United Arab Emirate (UAE) citizens in Abu Dhabi. *Pharmacoepidemiol Drug Saf*. 2008;17:725-732.
16. Kanan S., Abu-Yousef I., Gunasekar C., Abdo N. and Narasimhan. Detection and quantification of synthetic drugs in herbal slimming formula. *Eur J Sci Res*. 2009;34(3):348-357.
17. Saxena A. How harmless are herbal remedies on human kidney. *Saudi J. Kidney Dis Transplant*; 2003; 14(1):205-206. Downloaded from <http://www.sjkdt.org>.
18. Michael Braun Hamilton. Online survey response rates and times; background and guidance for industry. http://www.thequestionauthority.com/papers/supersurvey_white_paper_response_rates.htm. Accessed on Sept. 15 2009.
19. Welna EM, Hadsall RS, Schomer JC. Pharmacists' personal use, professional practice behaviors, and perceptions regarding herbal and other natural products. *J Am Pharm Assoc*. 2003;43:602-611.
20. Abahussain NA, Abuhassain EA, Al-Oumi FM. Pharmacists' attitudes and awareness towards the use and safety of herbs in Kuwait. *Pharm Pract (Internet)*. 2007;5(3):125-129.
21. Rickert K, Martinez RR, Martinez TT. Pharmacist knowledge of common herbal preparations. *Proc West Pharmacol*. 1999;42:1-2.
22. Mackowiak ED, Parikh, Freely J. Herbal product education in unites States Pharmacy schools: core or elective program? *Am J Pharm Educ*. 2001;65:1-6.
23. Kouzi SA, Herbal remedies: the design of a new course in pharmacy. *Am J Pharm Educ*. 1996;60:358-364.