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Original Research

Evaluation of Pharmacists' Confidence, Engagement, and Knowledge about Dietary Supplements in the United Arab Emirates

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Abstract

Background: Dietary supplements (DS) are widely used, often without prescriptions, making community pharmacists key sources of guidance. In the UAE, DS use is growing due to cultural and health trends, but pharmacists' knowledge, confidence, and involvement with DS vary, which may impact patient safety and counselling quality. Despite their important role, there's limited research on how well UAE pharmacists are prepared to address DS-related questions, including effects, side effects, and interactions. **Objectives:** The aim of this study was to evaluate the confidence, involvement, and knowledge of community pharmacists in the UAE regarding dietary supplements. **Methods:** This cross-sectional study utilized a self-administered questionnaire designed to fulfil the study's objectives. The questionnaire was divided into four sections: the first collected demographic information; the second assessed pharmacists' confidence using a confidence scale; the third examined their engagement with dietary supplements (DS's); and the fourth evaluated their knowledge of DS's. A total of 333 practicing community pharmacists from across the UAE participated, with the sample size calculated using Raosoft software. A simple random sampling method was employed to ensure equal representation from all emirates. Results: A total of 333 responses were obtained. The average confidence of the respondents is found to be 9.961±3.53, indicating a significantly high confidence as the total confidence ranges from 0-15, with Cronbach's alpha reaching 0.81. The total engagement score was found to be 3.96 ±1.2, overall reliability of questions according to Cronbach's alpha is 0.48. The average knowledge of the respondents is 12.58 (0 to 21), indicating moderate knowledge of effects and interactions. the average of confidence and knowledge of pharmacists had no significant difference in terms of demographical variables such as age, academic degree, nationality, year of graduation, however, there was a statistically significant difference in terms of emirates' knowledge ($p<0.001$). **Conclusion:** In conclusion, community pharmacists in the UAE demonstrate high confidence, positive engagement, and moderate overall knowledge regarding dietary supplements, but show limited understanding of their side effects and interactions. To address this gap, integrating reliable information sources into pharmacy computer systems is essential. Providing pharmacists with accurate and accessible information on dietary supplements is crucial for enhancing their ability to offer safe and informed guidance to patients.

Keywords: Pharmacists, Dietary supplements, United Arab Emirates, Knowledge, Confidence.

INTRODUCTION

Dietary supplements (DS) are manufactured products comprising one or more vital nutrients, minerals, vitamins, fibres, probiotics, fish oils or various herbs etc[1,2]. They are anticipated to boost the nutritional value of a conventional diet for a particular therapeutic outcome or intended for the general health and welfare of the population[3]. According to the U.S Food and Drug Administration (FDA), they may also be essential for nutritional sustenance in various physiological conditions, like increasing sports stamina to avoid a disease[4]. They are also available in a variety of formulations comprising capsules, tablets, powders and liquid forms[2]. The use of DS is increasing day by day worldwide, despite its questionable value and safety[4]. In the United Arab Emirates (UAE), dietary and herbal supplements are pooled under a communal definition of health supplements (HS), including a variety of products mentioned earlier[5]. These DS sold in the UAE have been categorized and registered by the concerned authorities under the category of "Dietary supplements"[6]. The number of DS registered in UAE has increased over the last 10 years, which has resulted in mounting numbers of customers pursuing information regarding their use, efficacy and probable side effects[7]. In the Middle East region, the use of DS was significantly high; a study from Lebanon reported a 53% prevalence of DS use among the participants[8].

Approved dietary supplements are available at community pharmacies as prescribed by the physician or over the counter[9]. Consequently, pharmacists should know available data regarding existing and newly registered DS's to recommend effective treatment regimens. In previous research, the knowledge and attitude towards DS were compared among community pharmacists, medical and dental students. Pharmacists were reported as the most familiar about DS among them[10]. Pharmacists from various regions of the world have a significant role regarding the safe and effective consumption of DS products[11]. To meet the uprising demand and manage the consumption of DS, numerous studies have been conducted to evaluate the knowledge, perception and

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attitude of pharmacists towards DS in various countries like the USA[8], Canada[9], Australia[10], Kuwait[11], Saudi Arabia[12], Singapore[13] and Palestine[2]. The results of these studies revealed the pharmacist's knowledge and confidence score from fair to average, and recommended more pharmacy education and training to enhance the confidence of pharmacists and also to provide the best pharmaceutical care for better patient outcomes. These studies have also drawn attention towards evaluating the knowledge, perception and attitude of pharmacists regarding the indications, pharmacological actions and side effects of specific medicinal herbs, though to be sold in the community pharmacies[13].

Knowledge about DS and its use in pharmaceutical practice is a need for modern pharmaceutical health professionals to work in collaboration with each other and have knowledge of modern medicines. Proper recommendations correct and safe use of dietary supplements are basic requirements of pharmaceutical practice, which have been found lacking in pharmacy students[4]. Evidence-based information and self-use of such products are essential indicators for such recommendations. No such study regarding the community pharmacist's confidence, engagement and knowledge about DS has been reported in the Middle East. There is an immense need to explore the factors that influence attitudes and beliefs of pharmacists about DS, in order to accurately appraise knowledge of pharmacists about DS and also to expose the causes of not documenting, monitoring or inquiring about the use of DS by patients. The evaluation of pharmacists' confidence, engagement, and knowledge regarding dietary supplements in the UAE is intrinsically linked to the country's pharmacovigilance (PV) and adverse drug reaction (ADR) reporting activities. A comprehensive understanding of this relationship is essential for enhancing patient safety and ensuring the effective use of dietary supplements[14]. This study aims to investigate the level of confidence, engagement and knowledge of community pharmacists about DS in the UAE.

MATERIALS AND METHODS

Questionnaire Development

The institutional ethics committee at Ajman University approved the conduct of this research, and informed consent was obtained from all participants at the beginning of the study. The questionnaire was specifically designed to address the objectives of the research, with questions adapted and modified from previous studies[1516]. It was tailored to reflect practices relevant to the UAE and incorporated commonly used dietary supplements identified during the pilot study.

The questionnaire was structured into four sections: the first collected general demographic data; the second included questions to assess confidence levels; the third focused on engagement with dietary supplements; and the final section evaluated participants' knowledge.

Confidence scale scores were obtained from 15 questions in a 3-point Likert scale as follows: (agree), (neutral), (disagree). Example "I feel confident responding to patients' questions about DS" each question with the response "agrees" scored 1; scores were calculated for each participant with a minimum of 0 and a maximum of 15. Cronbach's alpha reliability for the confidence scale was 0.81.

Engagement scores were obtained from 5 questions to determine the pharmacist personal use of DS and measure their engagement with the patient while they recommend DS to their patient example; "Have you recommended dietary supplements to your patients in the past week? "each question with respond "Yes" was calculated as 1, scores were calculated for each participant with minimum of 0 and maximum of 5. The fifth question included two parts the first part was to investigate if the pharmacist usually checks any information sources to confirm that the patient is a suitable candidate to take the dietary supplement before dispensing then followed by the question "which information source do you usually use?" to evaluate the information sources used by UAE pharmacists to check for adequate use, correct doses, adverse effects and interactions.

Knowledge scores were generated from 21 MCQ and true or false questions which included questions about dietary supplements use (=7), drug-supplement interactions (=6), dosage (=5), contraindications (=2) and side effects (=1), example "Echinacea as a dietary supplement is most commonly used today to treat common cold, sore throat and flu" , correct answers were scored as 1, scores were calculated for each participant with a minimum of 0 and a maximum of 20 and as percentage (0%-100%) then categorized based on percentage into the following: <40%, 41-60%, 61-80% and more than 80% were classified as "weak," "intermediate," "good," and "excellent," knowledge respectively.

The questionnaires were distributed by hand by one of the authors (a graduate student) to the participants on duty at the pharmacy and were collected immediately after completion.

Sampling Method

Since the aim of this study was to assess community pharmacists' confidence, engagement, and knowledge towards DS in the UAE, so the most suitable study design was a Descriptive cross-sectional study. The duration of the study was 7 months (October 2017 to April 2018).

There are more than 2000 pharmacies in the UAE according to the national data, the sample size was calculated using Raosoft's sample size calculator. The total sample size of 333 practicing community pharmacists in the UAE to obtained at a 95% confidence level. Using stratified random sampling methods so that each emirate is equally represented based on the number of pharmacies in the emirate, using this formula:

Stratified Sample (n emirate) = 333 (sample size) / 2000 (number of pharmacies in the UAE) * number of pharmacies in the emirate = number of pharmacists required in each emirate.

The sample size for each emirate was (nDubai)= 104, (nAbu Dhabi) = 76, (nSahrjah)= 76, (nAjman)= 27, (nRAK)=24, (nFujairah)= 12, (nUAQ)= 4. Inclusion criteria: practicing

community pharmacist. Exclusion criteria: non- practicing community pharmacist, hospital pharmacist, pharmacy students, other health professionals.

Pilot, refinement of questionnaire

A two-phase pilot study was executed to enhance the questionnaire's validity and reliability. The first phase was done to list the most used dietary supplements in the UAE. The acquired data was considered while the questionnaire was under development. In phase two, the questionnaires were randomly distributed to a sample of 10 practicing pharmacists

Statistical analysis

Data entry, processing of data and statistical analysis was carried out using computer software SPSS version 26 for windows. Quantitative variables are presented as Mean ± SD and data will be presented with frequency and percentage. Chi square test was used to see their effects on the outcomes and to compare categorical variables levels with p value of ≤ 0.05 as significant. Chi Square test, Pearson chi-square test and ANOVA test were performed to analyze the data. Reliability of the scales was evaluated through Cronbach's α coefficient of internal consistency.

RESULTS

A total of 579 questionnaires were distributed to community pharmacists working in pharmacies across the UAE to ensure all the emirates are represented equally using a stratified sampling method. 333 responded positively, and the response rate was 57.51%. The respondents, 181(54%), were male, aged 22- 60 years, with a mean age of 31.33±6.02 years. Most of the respondents were of Indian nationality, 113(34%), followed by Egyptian, Pakistani, Filipino, and Syrian; 17%, 13%, 11%, and 9% respectively. Table 1 presents the sociodemographic characteristics of the respondents.

Table 1. Sociodemographic data of participants (n = 333)

Variables	Frequency (%)
Gender	
Male	181 (54)
Female	152 (46)
Age	
20 - 29	138 (41)
30 - 39	163 (49)
40 - 49	24 (7)
50+	8 (2)
Nationality	
Indian	113 (34)
Pilipino	35 (11)
Pakistan	43 (13)
Egyptian	56 (17)
Syrian	30 (9)
Jordanian	14 (4)
Palestinian	14 (4)
Iraq	7 (2)
Bangladesh	2 (1)
Yemeni	3 (1)
Sudanese	10 (3)
Other	6 (1.8)
Emirate where pharmacy is located	
Dubai	104 (31)
Abu Dhabi	86 (26)
Sharjah	76 (23)
Ajman	27 (8)
RAK	24 (7)
Fujairah	12 (4)
UAQ	4 (1)
Years since pharmacist graduated	
less than 4	6 (2)
4 to 9	148 (44)
10 to 14	112 (34)
15 to 19	42 (13)
20 to 24	10 (3)
more than 24	15 (5)
Academic qualification of pharmacist	
Pharmacy diploma	21 (6)
Bachelor of Pharmacy	258 (77)
Pharm D	37 (11)
Postgraduate	17 (5)

Confidence

The average confidence score achieved by respondents was 9.961±3.53, indicating a high confidence as reported by the pharmacists; the total confidence scores ranged from 0-15. Table 2 presents participants' confidence data.

Engagement

The frequencies and percentage of the response with categories of items related to engagement are presented in Table 3. It can be observed that most of the participants indicated positive engagement towards DS. However, the average score was 3.96 ±1.2. the total engagement scores ranged from (0-5).

Information sources

It was observed that the most common source of information was google, followed by BNF, and Medscape see Figure 1.

Knowledge

Regarding the knowledge, the knowledge of use of DS is higher than the dose knowledge and effect & interactions, among the participants, as it can be observed that the percentages of correct answers are higher in the use knowledge than others. The mean of the overall knowledge and subcategories is

Table 2. Pharmacist reported confidence in handling dietary supplements

	Confidence Items *Disagree*	**Frequency (%)**		
		Neutral	***Agree***	
1	I feel confident responding to patients' items about DS.	4 (1.20)	53 (15.91)	276 (82.88)
2	I feel confident initiating discussions with patients about DS.	1 (0.30)	61 (18.31)	271 (81.38)
3	I know how to ask about which brands and doses patients are using of DS.	0 (0)	74 (22.22)	259 (77.77)
4	I can warn patients about side effects of commonly used DS.	5 (1.50)	79 (23.72)	249 (74.77)
5	I can warn patients about interactions between commonly used DS and medications	6 (1.80)	97 (29.12)	230 (69.06)
6	I can provide evidence-based information about DS to patients.	14 (4.20)	123 (36.93)	196 (58.85)
7	I can refer patients where to find information about the quality of different brands of DS.	15 (4.50)	113 (33.93)	205 (61.56)
8	I can tell my patients about the appropriate dose for DS use.	6 (1.80)	76 (22.82)	251 (75.37)
9	I know where to refer patients for more information about DS	10 (3.00)	108 (32.43)	215 (64.56)
10	I know where I can turn for reliable information about DS.	9 (2.70)	101 (30.33)	223 (66.96)
11	I feel confident talking with colleagues about DS.	9 (2.70)	100 (30.03)	224 (67.26)
12	I know more about DS than many health care providers.	32 (9.60)	165 (49.54)	136 (40.84)
13	I know where and how to report adverse effects related to DS.	19 (5.70)	110 (33.03)	204 (61.26)
14	I could give a short lecture or demonstration to my colleagues about DS.	18 (5.40)	133 (39.93)	182 (54.65)
15	I can give a lecture about DS for students in my profession.	19 (5.70)	118 (35.43)	196 (58.85)

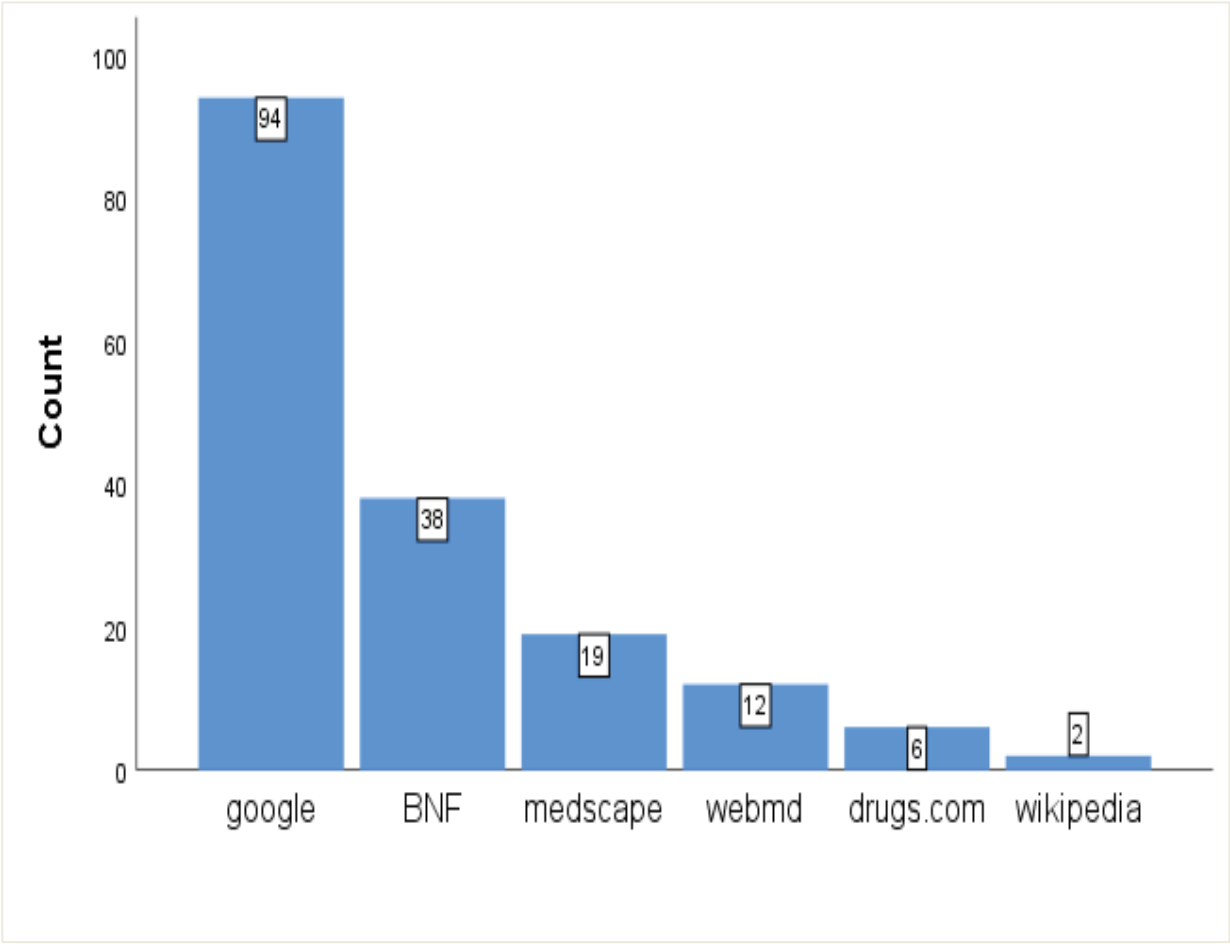

Figure 1. Sources of information about DS.

Table 3. Pharmacist engagement and practice related to D**S**

Engagement Items		**Frequency (%)**	
		Yes	**No**
1	Do you use dietary supplements to improve your health?	290 (87.08)	43 (12.91)
2	Have you recommended dietary supplements to your patients in the past week?	294 (88.28)	39 (11.71)
3	Do you usually recommend dietary supplements to your patients currently taking a medication?	275 (82.58)	58 (17.41)
4	If yes, do you usually check for drug- supplement interactions before dispensing?	281 (85.22)	52 (15.61)
5	Do you usually check any information sources to confirm that the patient is a suitable candidate to take the dietary supplement before dispensing?	180 (54.05)	153 (45.94)

provided. It can be observed that the average use knowledge of the respondents is 4.77 (use knowledge is ranges from the 0 to 7), indicating good knowledge of use, the average dose knowledge of the respondents is 2.66 (dose knowledge is ranges from the 0 to 5), indicating moderate knowledge of dose, and the average effects and interaction knowledge of the respondents is 5.15 (dose knowledge is ranges from the 0 to 9), indicating moderate knowledge of effects and interactions. The average overall knowledge of the respondents is 12.58 (overall knowledge is ranges from the 0 to 21), indicating moderate knowledge of effects and interactions. that most of the participants (50.2%) in the survey have moderate knowledge, 43% have poor knowledge and the rest (6%) have good knowledge Table 4.

The overall reliability of the questionnaire according to Cronbach's alpha reaches to 0.713, in knowledge, engagement and confidence, which is acceptable. The correlation coefficients between the confidence, engagement and knowledge are presented in Table 5. It can be observed that the confidence and are positively correlated with each other ($p < 0.05$). However, the strength of this relationship is weak. The knowledge and confidence are positively correlated with each other, which implies that having more knowledge will lead to higher confidence.

The average of the confidence score had a significant difference in terms of gender; female pharmacists' confidence toward DS was higher than males ($P<0.05$). Meanwhile, the average of confidence and knowledge were not different for males and females. Furthermore, according to ANOVA, the average of confidence, and knowledge of pharmacists were not statistically different in terms of demographical variables of age, academic degree, nationality, year since graduation, however there was a statistically significant difference in term of area of work (emirates where pharmacist works); knowledge ($p<0.001$); confidence ($p=0.002$). Table 6 provides all of the details.

DISCUSSION

This study aimed to assess the confidence, engagement, and knowledge of community pharmacists towards dietary supplements (DS) in the UAE. In order to take good care of the patient, community pharmacists should make Decisions based on the best available evidence. The findings of this study reveal that community pharmacists of the UAE, during their routine practice, do not focus on the significant score of evidence about the use of DS. These findings are in good correlation with a study conducted in Australia that specified only 15% of pharmacists answered with confidence regarding the safety, drug interactions and benefits of the use of DS[16]. In another survey in Jordan, it was reported that community pharmacists were less familiar with the accurate dosage, safety, adverse effects and professional counselling of DS using high-quality sources from literature[18]. From our findings, a high percentage of experienced pharmacists used Google 94/333, followed by BNF 38/333 as the most common source of information, compared to non-experienced pharmacists. The results of this study showed a good confidence score of 9.961±3.53 out of 0-15 by the pharmacists. The confidence score was measured by Cronbach's alpha reached 0.81 which indicating good reliability. No such study has been reported about the confidence of pharmacists in the use of DS. The average of the confidence had a substantial variation regarding gender wise distributions, and females showed a more positive response than males towards DS. The reason for this variation is the better engagement of females in DS than males. Moreover, the results of this study also revealed good knowledge about the use of DS among the participants in comparison to the dose, effect, and interaction. The average knowledge of the participants indicates good knowledge about the use of DS, while the average dose knowledge was moderate among the participants. The overall knowledge of the respondents is 12.58 out of 0-21 range, specifying moderate knowledge of effects and interactions. Furthermore, most of the respondents in the study showed positive engagement towards DS with an average score of 3.96 ±1.2 out of 0-6 range. The lack of appropriate knowledge, insufficient training and absence of standard training procedures were three of the illustrated problems in former studies[4,19,20].

Pharmacists might not use high-quality scores as they did not have enough time to search for suitable literature and do analysis[21, 22]. Senior pharmacists usually had more duties in managerial posts and they are unable to give enough time to patients and develop evidence-based pharmacy in their common practice[21]. Also, for various DS's, there might be an alleged dearth of pertinent knowledge regarding their effectiveness and safety[23]. A virtual study conducted in Australian pharmacies revealed various limitations in their routine practices about DS's endorsement and provision, including recommending the usage of various products with

Table 4. Pharmacist knowledge of DS

	Knowledge item	**Correct response**
	Use Knowledge	**Frequency (%)**
1	5-HTP (5-Hydroxytryptophan) is most used for…	296 (88.88)
2	A knee osteoarthritis patient asked you for supplements that can help with the symptoms which of these would you recommend?	229 (68.76)
3	Echinacea as a dietary supplement is most commonly used today to treat common cold, sore throat and flu.	298 (89.48)
4	Most research suggests that taking this supplement by mouth or intravenously (by IV) can improve red blood cell counts during hemodialysis for patients with kidney failure.	249 (74.77)
5	Which of the patients below might be taking (L-Arginine) supplement?	265 (79.57)
6	Would you advise a patient in her 50s to take St. John's worth for her menopausal symptoms such as hot flashes?	252 (75.67)
7	Taking vitamin D for long periods of time in doses higher than 4000 units daily may affect levels of calcium in the blood.	190 (57.05)
Dose Knowledge		
8	Magnesium doses more than 3 g daily are possibly safe for Healthy individuals.	202 (60.66)
9	The correct Biotin daily dose for healthy adult is…	173 (51.95)
10	The recommended dose of folic acid for a pregnant woman is:	24 (7.20)
11	The recommended daily maximum dose for calcium for age 19 to 50 is…	298 (89.48)
Effects and Interactions		
12	Vitamin K has a potential drug-supplement interaction with…	302 (90.69)
13	Vitamin B_{12} has a potential drug-supplement interaction with…	28 (8.40)
14	Would you advise your patient with indigestion problems to take magnesium hydroxide?	73 (21.92)
15	Could OMEGA 3 supplement increase the effect of blood thinners?	271 (81.38)
16	Magnesium has a potential drug-supplement interaction with…	205 (61.56)
17	Ginseng can cause one of these side effects…	242 (72.67)
18	Would you advise a patient with diabetes to take raspberry ketones for weight loss?	144 (43.24)
19	Gingko biloba is an antioxidant, and it improves the blood flow to the brain but its contraindicated for patients with the following disease…	68 (20.42)
20	Calcium has a potential drug-supplement interaction with…	192 (57.65)
21	When vitamin C is taken with estrogen what is most likely to happen?	296 (88.88)

Table 5. Correlations between participant Confidence, Engagement and Knowledge scores

	Confidence	**Attitude**	**Knowledge**
Confidence	1		
Engagement	0.13**	1	
Knowledge	0.25**	0.09	1

**. Correlation is significant at the 0.05 level.

Table 6. Participant confidence and knowledge according to sociodemographic characteristics

	Confidence	**P value**	**Knowledge**	**P value**
Gender				
Male	9.82±3.55	0.029	12.51 ±2.63	0.61
Female	10.12±3.51		12.66 ±2.81	
Age				
20 – 29 years	10.15±3.49	0.67	12.82±2.41	0.43
30 – 39 years	9.85±3.55		12.47±2.88	
40 – 49 years	9.04±3.43		12.25±2.40	
50+ years	11.50±3.77		11.62±4.47	

Academic Degree				
Pharmacy diploma	9.23±4.48	0.58	12.00±2.81	0.69
Bachelor of Pharmacy	10.06±3.39		12.64±2.65	
Pharm D	9.72±3.51		12.38±3.23	
Postgraduate	9.83±4.46		12.82±2.43	
Nationality				
Indian	9.56±3.68	0.45	12.30±2.60	0.45
Pilipino	9.60±3.55		13.40±2.02	
Pakistan	9.95±3.67		12.26±2.98	
Egyptian	10.85±2.74		12.88±2.63	
Syrian	9.23±3.50		12.97±2.91	
Jordanian	11.07±3.89		10.86±2.14	
Palestinian	9.21±3.21		12.14±4.11	
Eritrean	9.00±--		12.00 (--)	
Iraq	11.71±4.30		13.14±2.48	
Lebanese	14.00±--		14.00 (--)	
Bangladesh	10.00±1.41		13.00±5.66	
Iran	15.00±--		15.00 (--)	
Yemeni	10.33±4.04		12.33 ±2.08	
Sudanese	9.20±4.15		13.50±2.92	
Algeria	14.00±--		15.00 (--)	
UAE	15.00±--		14.00 (--)	
Somalia	11.00±--		12.00 (--)	
Emirate where pharmacy is located				
Dubai	9.64±3.84	0.002	13.07±2.21	<0.001
Abu Dhabi	10.19±3.20		12.06±3.00	
Sharjah	10.723±3.22		12.05±2.48	
Ajman	9.44±3.844.05		13.18±2.84	
RAK	9.66±4.05		14.50±2.78	
Fujairah	8.91±2.67		9.83±2.16	
UAQ	7.00±1.41		13.50±1.00	
Years since pharmacist graduated				
less than 4	11.0±4.23	0.98	11.33±3.33	0.73
4 to 9	9.32±3.75		12.66±2.59	
10 to 14	9.85±3.14		12.62 ±2.76	
15 to 19	10.33±3.39		12.67± 2.77	
20 to 24	7.40±3.56		11.60 ±1.78	
more than 24	11.26±4.23		12.47 3±.64	

unverified effectiveness and safety[24]. The reasons for the low knowledge of the participants and low test scores in the studies are unidentified. Various pharmacy courses taught in the UK, USA and Australia do not comprise obligatory nutrition-specific units[25,26]. This low knowledge test score of the community pharmacists may be because of the dearth of knowledge supporting the effectiveness of numerous Dietary supplements.

Demographically, the community pharmacists included in this sampled study were composed of the emigrants, signifying that a high ratio of community pharmacists in the UAE was professionals from another region of the world, mostly from South Asia and graduated from their native countries. But the average confidence and knowledge of pharmacists about DS were not statistically different in terms of demographic variables like age, academic degree, nationality, and year since graduation. The male community pharmacists were 54%, while

the 46% female pharmacists were included in this study. Most of them had a bachelor's degree in pharmacy, while the least qualification for the surveyed community pharmacists was a Pharmacy diploma. In a similar study conducted in Saudi Arabia, the least qualification for the surveyed community pharmacists was a Bachelor's degree, while the Male ratio was high as compared to female pharmacists[27].

CONCLUSION

Our study found that participants exhibited high confidence, positive engagement, and moderate overall knowledge regarding dietary supplements; however, their understanding of adverse effects and interactions was notably limited. These findings highlight the need to integrate reliable information sources into pharmacy computer systems to ensure pharmacists have access to accurate and timely information on the side effects and interactions of dietary supplements. Additionally, the study revealed that many pharmacists are unaware of the process for reporting adverse effects related to dietary supplements in the UAE, despite clear guidelines being available on the health authority's website. Overall, the results emphasise the critical role of knowledge and confidence in enabling pharmacists to effectively counsel patients on the safe use of dietary supplements in the UAE.

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