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Original Research

Community Pharmacists' Current Safe Practice and Educational needs in Dispensing Melatonin Supplements in Jordan: A cross-sectional study

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Abstract

Objectives: This study assessed community pharmacists' attitudes about melatonin supplements' distribution, safety, and effectiveness, identified knowledge gaps, and proposed educational interventions to enhance safe practices. **Method:** A reliability-validated online survey was created and sent out to community pharmacists in Jordan in 2024 to fill out. Social media was used to extend the survey to facilitate contact among pharmacists from multiple parts of the community. A questionnaire was used to assess melatonin dispensing practices, the knowledge about adverse effects, drug interaction, safe practices, and counseling. Descriptive statistics and inferential analyses were used to evaluate the data. **Results:** A questionnaire was administered to 350 community pharmacists, those approved to participate in the study, with a response rate of 92%, and responses were recorded electronically. 69.9% are from the central area of Jordan. A considerable number of the participants (64.6%) had bachelor's degrees, and the participants were mostly male. The mean age of participants was 29.04 ± 7.56 years, and 75.8% (n = 244) of community pharmacists reported dispensing melatonin supplements. The greatest prescribing and dispensing pattern for melatonin supplements was pharmacists' recommendation ($p = 0.003$), which is an over-the-counter sublingual (34.2%) with a 5 mg strength (57.5%). However, our study revealed that many pharmacists dispensing melatonin supplements believed it safe ($p < 0.001$) and they were unaware of side effects. Furthermore, the study showed the importance of pharmacists' awareness in preventing and controlling the side effects of melatonin supplements. **Conclusion:** This research highlights the need to properly monitor prescription and distribution processes to avoid abuse, and educational gaps in melatonin supplements. We recommend targeted educational interventions to help Jordanian pharmacists improve safe practices and the health of patients and drug users.

Keywords: Counseling; Attitudes; Safety; Melatonin supplements; Community pharmacists; Effectiveness

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INTRODUCTION

The awareness and knowledge of community pharmacists about Melatonin Supplements and their dispensing practices in Jordan are crucial aspects that impact public health. Several studies have highlighted the challenges and issues concerning clinical pharmacology knowledge among community pharmacists, highlighting the need for substantial improvement and training in this area[1]. Furthermore, a Jeddah study discovered that just 38% and 37% of community pharmacists were aware of the pharmacodynamics and pharmacokinetics of melatonin supplements, indicating a probable knowledge gap in this area of study [2]. Moreover, the dispensing pattern for melatonin supplements in Jordan and Saudi Arabia has shown higher-than-expected rates, raising questions about the reasons behind this trend and the potential impact on public health[2].

Melatonin(Mel; N-acetyl-5-methoxytryptamine) is a neurohormone[3] produced by the pineal gland[4]; that helps our body know when it is time to sleep and when it is time to wake up and plays a significant role in circadian rhythms and seasonality of reproduction[5]. It is known to control sleep and wake cycles. It also helps people who are blind to establish a day and night cycle. The release of melatonin is stimulated by darkness and suppressed by light. The physiological benefits

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of melatonin include the immune system, cardiovascular, and body mass control; it also stimulates bone growth and protection; and it detoxifies free radicals [6]. There is also evidence of protective and anti-cancer properties[7], It is involved in numerous activities, including maintaining mitochondrial balance, regulating the genome, and modulating inflammatory and immune cytokines. These activities have a direct impact on both systemic and acute anti-inflammatory properties, as well as suggest a potential role in phase separation [8].

Sundaram et al. 2017 claims that melatonin has an acceptable safety profile for short-term use as a hypnotic and is a preferred agent in the elderly. Currently, it is available in many countries as a medication used in the treatment of circadian sleep disorders, jet lag, and shift work sleep disorder, and also as a dietary aid. Unlike some prescription sleep aids, melatonin is not addictive, as it does not cause physiologic dependence[9]. It is considered a dietary supplement[10] and available as a prescription-only medicine in some countries, including Australia and the USA, and as an over-the-counter medicine in others, including the USA and Canada[11,12]. Doses of melatonin available over the counter range from 0.3 mg to a maximum of 10 mg, but they typically fall within the range of 0.3 to 3 mg[13].

The use of melatonin supplements has gained popularity in recent years, particularly for addressing sleep-related issues. In this age of ubiquitous social media, recommendations from colleagues and friends on social media platforms such as Facebook, Instagram, Twitter, and WhatsApp have a greater influence on users' purchasing decisions[14]. In Jordan, community pharmacists play a significant role in dispensing melatonin supplements to the public. Understanding their knowledge and awareness regarding this supplement is crucial to ensuring the safe and effective use of melatonin within the community. The growing availability of over-the-counter pharmaceuticals and nutritional supplements may increase the risk of potential adverse outcomes, as misuse of these drugs is acknowledged as a global issue[15].

This research aims to explore the knowledge and awareness of community pharmacists in Jordan regarding the dispensing and safety of melatonin supplements. The primary objective was to evaluate pharmacists' ability to make recommendations regarding melatonin overuse, ability to detect adverse effects and provide unambiguous information about the medication. Many studies have reported that doctors, pharmacists, and other healthcare professionals do not have enough information about melatonin supplements. Because melatonin has recently been available for prescription use in Jordan, information available to healthcare professionals in Jordan is likely limited.

This could potentially lead to patient harm if pharmacists are not educated about what conditions the supplement should be used for, or what dosages are appropriate. In particular, melatonin is known to have adverse effects with several medications, thus it is important that healthcare professionals who are knowledgeable about melatonin can correctly determine if it is suitable for certain patients.

In this case, community pharmacists must be informed, as they are usually the first point of contact for patients with health issues. Thus, community pharmacists should be knowledgeable the most about melatonin, compared to the other healthcare professionals in Jordan. It is of interest to evaluate the knowledge of community pharmacists as they are medicine experts. In addition, it is desirable to measure pharmacists' knowledge of pre and post-continuous medical education programs to show the benefits of such programs. This will allow promoter education programs to be implemented if deficiencies in the knowledge of melatonin are exposed. Finally, the findings of this study may prompt regulatory authorities and schools of pharmacy to include melatonin in their curriculum or continuous professional education programs for pharmacists.

MATERIALS AND METHODS

Study Design and Participants

From February to April 2024, a cross-sectional study was carried out to gather information on the usage of melatonin supplements among community pharmacists in Jordan. Pharmacists from all governorates were considered for inclusion in this study if they were working at community pharmacies or chain pharmacies. The survey instrument was designed with Google Forms (Google®, Menlo Park, CA, USA), and Google Forms was also used for its electronic distribution. Furthermore, involvement in the research was entirely voluntary. To ensure that the survey reached all pharmacists, social media platforms such as WhatsApp and Facebook were used to share the survey link with different pharmacy networks.

Ethical Considerations

The Al-Balqa Applied University Scientific Research Committee gave its approval for this work. An informed consent form was part of the online survey's introduction, and participation in the study was entirely voluntary. Every component of the information gathered was handled discreetly.

Sample Size

According to data obtained from the Jordan Pharmacists Association, there are approximately 32727 licensed pharmacists in Jordan. Using the Raosoft online sample size calculator (Raosoft; Raosoft, Inc., United States), a minimum representative sample size of 96 was established[16], with a 10% error margin, a 95% confidence interval, and a 50% response distribution.

Questionnaire

To collect all possible questions, a questionnaire was established after an exhaustive search of PubMed for published articles, followed by a detailed discussion and validation by a panel of experts in the field of study. Further, a web-based pilot study was conducted with twenty chosen random community pharmacists to verify the duration and structure of the questionnaire to verify that the registered melatonin supplements in the Jordanian local market are suitable (reflecting this study objective), comprehensible, and clear, and that the questions are suitable (reflecting these study

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objectives). The survey questionnaire consisted of an interface and three main parts with a total of 47 questions. The interface of the questionnaire explains the aim of the study and assures the participant on confidentiality grounds.

The four main parts of the questionnaire included the following aspects.

An in-depth survey was used, which was created after a thorough examination of PubMed articles and then verified by an expert panel. The questionnaire's appropriateness, clarity, and relevance were confirmed in a web-based pilot research that included 20 community pharmacists who were randomly chosen. A total of 35 questions were asked in the survey, which was divided into an introduction interface and three major parts. Participants were reassured of the confidentiality of their data, and the study's goal was outlined in the first section. Section two collected demographic information, while section three discussed the scientific details of melatonin supplements. This study concluded with an examination of the views, findings, and knowledge of community pharmacists in Jordan about patient education on melatonin supplements, including their use, potential side effects, and adverse occurrences.

Estimated p-Value Chi-Square Test Applied

Microsoft Excel was used to enter the data that were obtained from the online survey, and SPSS version 22 (SPSS Inc., Chicago, IL, USA) was then used to import the data. For continuous variables, the descriptive analysis was conducted using mean and standard deviations (SD), and for qualitative variables, percentages. The Shapiro-Wilk test was used to determine whether the data were regularly distributed; a p-value of less than 0.05 indicated that the continuous variables were normally distributed. The Chi-square test was used to assess the differences between the different groups. P less than 0.05 was deemed significant.

RESULTS

Participant Information

The following was the most typical way that melatonin medications were prescribed and dispensed: A response rate of 92% (322/350) was obtained from the 322 community pharmacists (CPs) who were approved to participate in the study on self-medication using over-the-counter capsules with a 3 mg strength, out of the 350 CPs who advanced for the study. The research analysis includes 322 individuals who completed the online survey. Table 1 shows that the participants' average age was 29.04 ± 7.56 years, with females making up 36.6% of the group and men 63.4%. There was a wide range of educational attainment; 64.6% had bachelor's degrees, 7.1% had intermediate diplomas, and 28.3% had graduate degrees. Almost three-quarters of those who took the survey called the Jordanian central region home. The majority of them were working in a single pharmacy (54%), while a minority (46%) were part of a chain. Almost half (58.1%) of pharmacies were distributed in different areas, whereas 32% were in shopping centers or big supermarkets (malls), and around 4% were in private hospitals. The average number of prescriptions distributed per day by the pharmacies was about 27 and according to Table 1, 52% of participants reported that two or three pharmacists were present throughout one shift.

Table 1. Socio-demographic details of Questionnaire Participants who responded to the questionnaire regarding Melatonin supplements, (N=322)

Parameter	Mean (±SD)	N (%)
Age in years	29.04 ± 7.561	
23-29		232(72.0%)
30-39		63(19.6%)
40-49		14(4.3%)
50-59		13(4.0%)
Gender		
Male		204(63.4%)
Female		118(36.6%)
Education level		
Middle Diploma		23(7.1%)
Bachelor pharmacy		208(64.6%)
Postgraduate		91(28.3%)
Place of residence		
Middle area		225(69.9%)
North area		52(16.1%)
South area		45(14.0%)
Pharmacy type		
Independent pharmacy		174(54.0%)
Pharmacy chain		148(46.0%)
Pharmacy Position		
Staff pharmacist		288(89.4%)
Pharmacy owner		34(10.6%)
Pharmacy location		
Pharmacy located in a shopping mall		103(32.0%)
Pharmacy located in a private clinic		11(3.4%)
Pharmacy located in a private hospital		13(4.0%)
Pharmacy located in a gas station		8(2.5%)
Pharmacy located in other places		187(58.1%)
Average number of pharmacists during one shift work		
1		137(42.5%)
02-Mar		166(51.6%)
More than 3		19(5.9%)
Average number of daily prescriptions	**27.15 ± 47.23**	
Experience as a community pharmacist	**6.02 ± 4.59**	

Knowledge and Awareness of Community Pharmacists about Melatonin Supplements

Melatonin is prescribed or dispensed by 75.2% of community pharmacists. There were significantly more male community

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pharmacists (n = 204; 83.6%) than female community. Pharmacists who dispensed or prescribed melatonin supplements. The most common reason for melatonin supplementation (49.7% of replies) was insomnia, while 32.3% of pharmacists prescribed or dispensed melatonin for sleep disturbances. The most popular way of prescribing and dispensing melatonin supplements was through pharmacist recommendations (p = 0.003) for an over-the-counter sublingual tablet with a 5 mg strength (Figure 1). No significant correlation was found between any socio-demographic category and variations in the distribution or prescription of melatonin supplements, except for sex.

Dispensing Practices of Community Pharmacists for Melatonin Supplements

The results presented in Tables 3 and 4 illustrate the level of comprehension that the participants had regarding melatonin supplement practices. Community pharmacists prescribed or dispensed melatonin without knowing its pharmacokinetics in 71% of cases (n = 230; 70.8%) (Table 4). Pharmacokinetic awareness had a substantial effect (p-value < 0.001) on the frequency of prescribing and administering melatonin (Table 5). Furthermore, 78.3% (n = 180) of community pharmacists who dispensed or prescribed melatonin reported adverse effects of melatonin supplements over the last three months (Table 5), However, this had no significant effect on the frequency of melatonin dispensing or prescription (Tables 4 and 5). 91% of pharmacists reported an increase in demand for mineral supplements, vitamins, and medical plants among persons who use melatonin supplements. Furthermore, 80% of community pharmacists who supplied or recommended melatonin observed a rise in concerns regarding drug-drug interactions with melatonin supplements and drugs for chronic diseases such as antidiabetics, hypertension drugs, lipid therapies, and oral contraceptive drugs. They had a substantial impact on the frequency of prescribing or dispensing melatonin and were highest among male users (Table 5). According to 96% of pharmacists who provided or prescribed melatonin, utilizing sustain-release melatonin pills for up to a year is safe. Men are substantially more likely than women to be believed as pharmacists (p < 0.001). According to drug interaction, 94.4% of pharmacists who prescribed or dispensed melatonin (p < 0.001) noticed that melatonin and warfarin are still prescribed despite many studies reporting there is a drug interaction between both drugs.

More than two-thirds of pharmacists (71.4%) noticed that are the most common side effects of melatonin supplements pains in arms or legs, feeling irritable or restless, followed by headache, Dry or itchy skin, and gastric upset, based on observations of drug users' side effects, some were forced to stop taking the drug as a result. The side effects that pharmacists report the most frequently are shown in Figure 2. The majority of community pharmacists (98%) emphasized

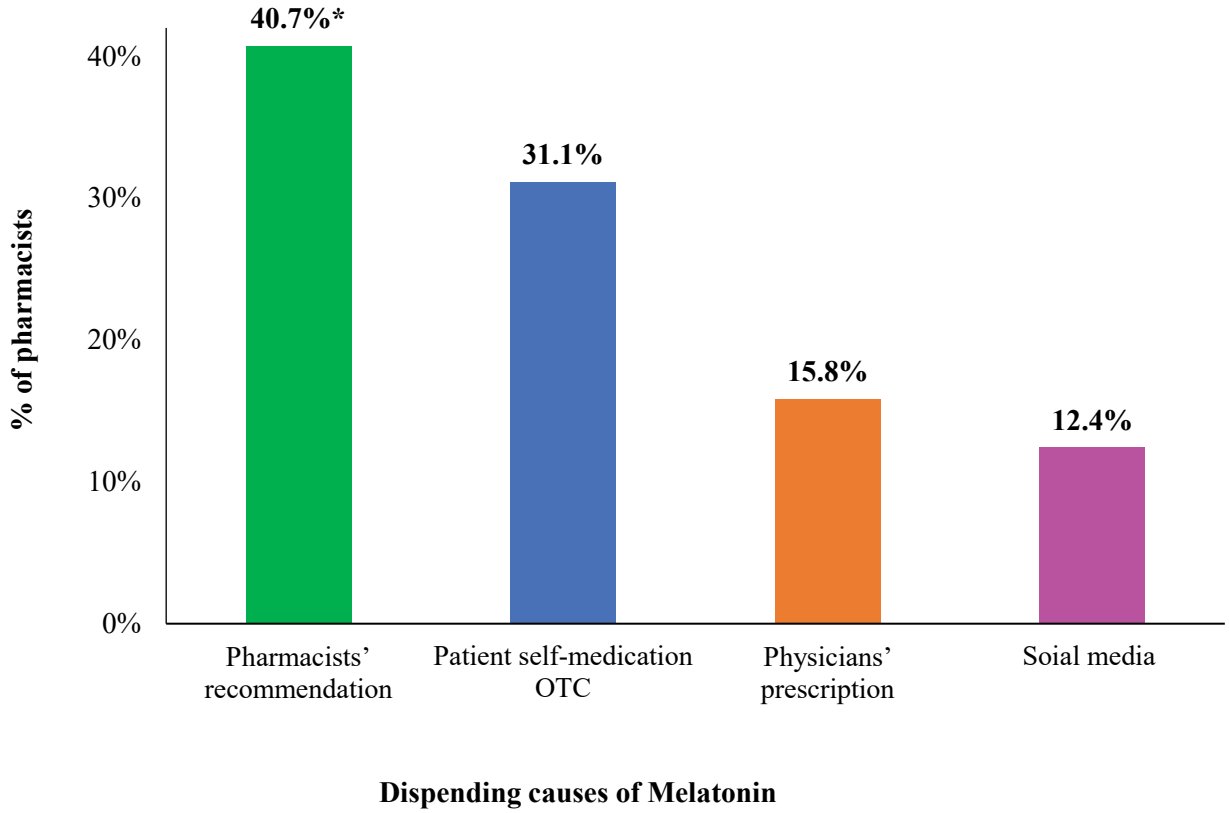

Figure 1. The most important reasons to buy melatonin supplements.
* Significant difference using the chi-square test (p = 0.003).

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Table 2. Community pharmacists' experiences with melatonin supplementation (N = 322).	
Question	**Response**
Reported dispensing and or prescribing melatonin by the participant	
Yes	244(75.8%)
No	78(24.2%)
Reported melatonin indications	
Insomnia	160(49.7%)
Sleep disorders	75(32.3%)
Jet lag	35(15.2%)
Obesity	34(10.6%)
Manic episodes in bipolar disorder.	10(3.1%)
Lowering cholesterol level	6(1.9%)
Dosage forms of prescribed or dispensed melatonin supplements	
Sublingual	110(34.2%)
Tablets	100(31.1)
Capsules	81(25.2%)
Film-Coated Tablets	22(6.8%)
Gummies	9(2.8%)
Dispended dose of melatonin supplements	
1mg	23(7.1%)
3mg	103(32.0%)
5mg	185(57.5%)
6-15mg	7(2.2%)
I don't know	4(1.2%)

Table 3: Community pharmacists' Knowledge and attitude toward safety and effectiveness of melatonin supplement (N=322) (continued).								
Variables		Scale responses					Statistical Significance	
(Statements of questionnaire)		Strongly agree	Agree	Uncertain	Disagree	Strongly disagree	Mean ± SD	% correct answer*
9. It is recommended that melatonin not be used by people with dementia.	N	42	109	126	33	12	3.42 ± 0.96	46.9
	%	13	33.9	39.1	10.2	3.7		
10. It is recommended not to use melatonin in pregnant or breastfeeding women	N	50	156	69	39	8	3.62 ± 0.97	63.9
	%	15.5	48.4	21.4	12.1	2.5		
11. Melatonin supplements have been misused	N	65	137	84	34	2	3.71 ± 0.93	62.7
	%	20.2	42.5	26.1	10.6	0.6		
12. Extended-release melatonin is safe with long-term use for up to 12 months	N	68	122	88	42	2	3.66 ± 0.97	13.6*
	%	21.1	37.9	27.3	13	0.6		
% correct answer *, % Strongly agree + % agree, ** % strongly disagree +% disagree.								

Table 4. Community pharmacists' knowledge and expertise on the pharmacokinetics and pharmacodynamics of melatonin supplements (n = 322).

Question	Response
Are you aware of the pharmacokinetic interactions and drug-drug interactions of melatonin supplements?	
Yes	228(70.8%)
No	94(29.2%)
Are you aware of melatonin supplements' pharmacodynamics and adverse drug reactions?	
Yes	224(69.6)
No	98(30.4%)
Have you observed any adverse drug reactions associated with the use of melatonin supplements in the last three months?	
Yes	230(71.4%)
No	92(28.6%)
In what patient group(s) do you recall the Adverse effect occurring?	
Female	79(39.9%)
Children	41(20.7)
Male	25(12.6%)
Personal experience	15(7.6%)
Other group	38(19.2%)
Have you noticed an increase in asking pharmacists about nutritional supplements, vitamins, or medicinal herbs that can be used with melatonin to increase its effectiveness?	
Yes	192(59.6%)
No	130(40.4%)
Have you noticed an increase in questions directed to pharmacists about melatonin supplements and drug interactions with chronic medications?	
Yes	197(61.2%)
No	125(38.8%)
Have you noticed the dispensing or prescription of melatonin and warfarin?	
Yes	127(39.4%)
No	195(60.6%)
Have you noticed other uses for melatonin supplements?	
Autism or attention deficit hyperactivity disorder	4(21.1%)
Obesity and insulin resistance	5(26.3%)
Polycystic ovary syndrome	10(52.6%)
What are the most important tips you give to patients who use the drug?	
Follow up with the doctor or pharmacist	60(18.6%)
Use medications that reduce side effects	111(34.5%
Advice on how to use it, when to use it, and interaction with drugs	37(11.5%)
Adhering to the specified doses	112(34.8%)
Reviewing the pharmacy in case of any side effects of the medication or any questions about the drug	33(10.3%)
Use for short periods and under medical supervision	38(11.8%)
Do you think that melatonin supplements are safe and can be given to everyone?	
Yes	166(51.6%)
No	156(48.4%)

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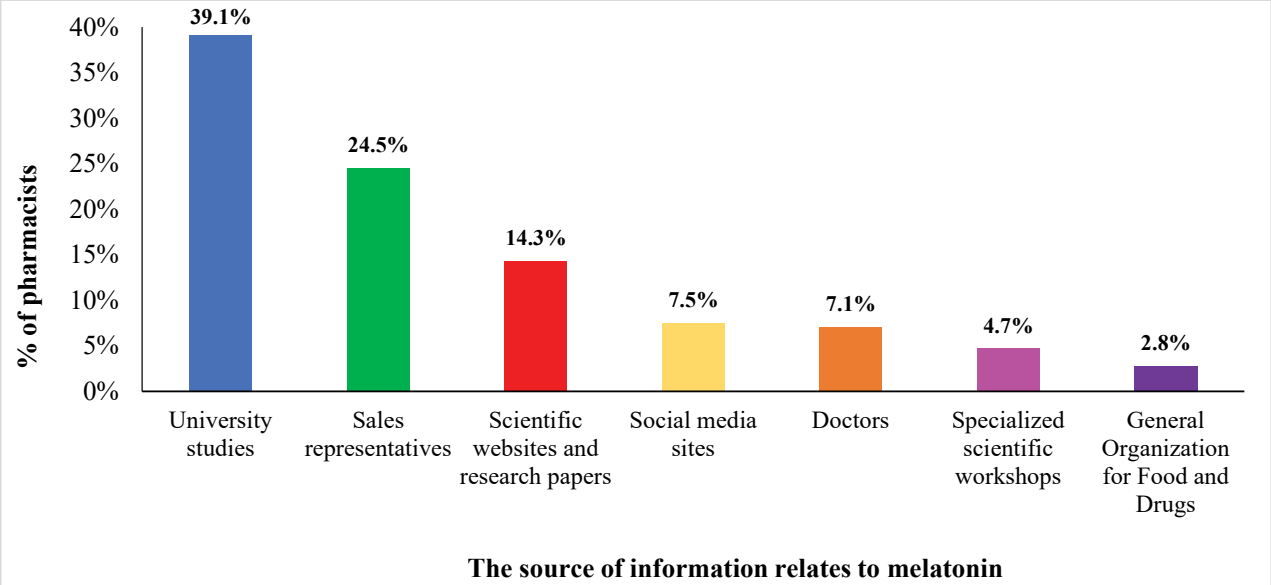
Table 5. The association between unawareness of pharmacokinetics and pharmacodynamics to dispensing and prescribing melatonin.

Variable	Dispensing or Prescribing Melatonin	Not Dispensing nor Prescribing Melatonin	P-Value`
Aware of the pharmacokinetic interactions and drug-drug interactions of melatonin, N=228	182(79.8%)	46(20.2%)	<0.001 *
Aware of the pharmacodynamics and the adverse drug reactions of melatonin, N=224	177(79%)	47(21%)	0.040*
Report adverse drug reactions (ADRs) over the last three months, N=230	180(78.3%)	50(21.7%)	0.1
Report an increase in asking pharmacists about nutritional supplements, vitamins, or medicinal herbs, N=192	174(90.6%)	18(9.4%)	0.77
Report an increase in questions about melatonin supplements and drug interactions with chronic medications, N=197	158(80.2%)	39(19.8%)	0.020*
Noticed dispensing and prescription of melatonin and warfarin, N = 127	120(94.5%)	7(5.5%)	<0.001*
Think that melatonin supplements are safe, N=166	159(95.8%)	7(4.2%)	<0.001 *

* A significant difference using the chi-square test.



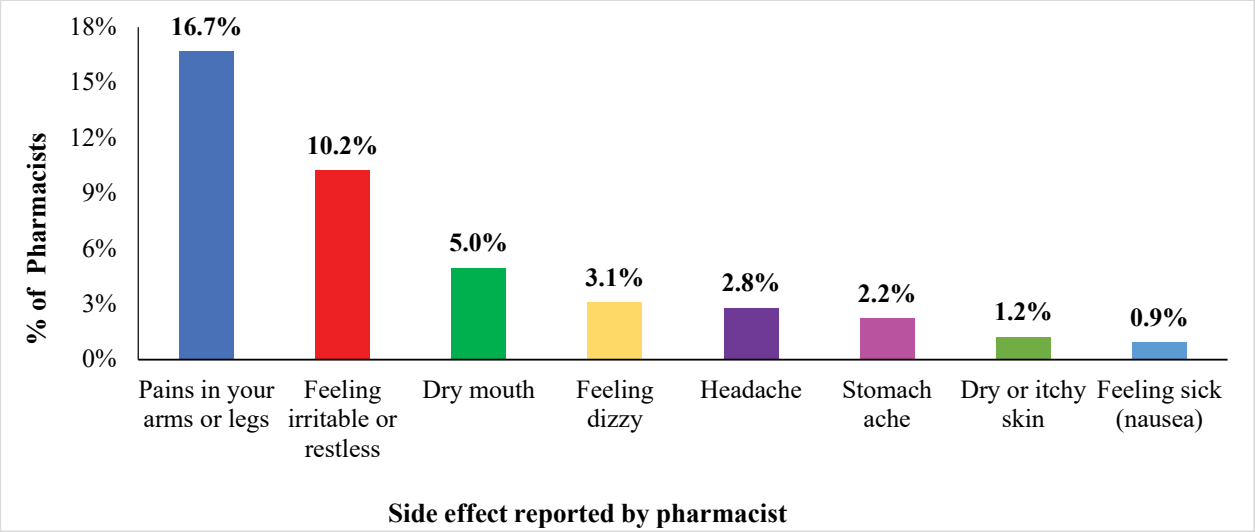


Figure 2. (A) Shows the source of information about melatonin supplements, and **(B)** Adverse events reported by pharmacists based on melatonin supplements user responses.

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that patients must be informed about the benefits and risks of taking melatonin supplements and that they must refer themselves to their clinicians or pharmacists.

3.5. Source of information about melatonin supplements

Regarding the source of knowledge and information about melatonin supplements, Figure 2 shows that the majority of respondents (39.1%) cited academic studies, medical representatives (24.5%), scientific websites and articles (14.3%), social media sites (7.5%), doctors (7.1%), scientific workshops (4.7%), and the Jordanian Food and Drug Administration (2.8%).

DISCUSSION

Melatonin supplements have gained popularity in Jordan, as in many other parts of the world, due to the increasing prevalence of sleep disorders and the growing awareness of the importance of sleep for overall health and wellness. As such, customers frequently approach community pharmacists seeking advice on melatonin supplements. This research emphasizes the significance of healthcare professionals, particularly pharmacists, in ensuring the proper administration of Melatonin supplements. The findings underscore pharmacists' need to engage in targeted educational initiatives to enhance their knowledge of melatonin supplements and their associated advantages. Regulations should be implemented to mandate pharmacists participate in continuing education programs, given that a subset of them exhibit hesitancy in prescribing or administering melatonin supplements, potentially signifying inadequate training[17].

Community pharmacists need to be aware of the potential interactions between melatonin and other medications or health conditions. Inadequate knowledge in this area may result in the dispensing of melatonin to patients who should not use it due to contraindications or potential adverse reactions. Therefore, community pharmacists need to proactively educate themselves on the potential interactions of melatonin with other medications and conditions to ensure safe and appropriate dispensing practices[3], and 75.8% (n = 244) of community pharmacists reported dispensing melatonin supplements.

The research sample consisted of 322 individuals representing a diverse range of educational backgrounds. Among the participants, males comprised the majority (63.4%), and the mean age was 29.04 ± 7.56 years. A majority of the pharmacists (52.4%) in the central region of Jordan held bachelor's degrees. 75.2% of community pharmacists dispense and or prescribe melatonin. Dispensing patterns among adults and the reported efficacy of melatonin supplements in treating sleep disturbances were found to be significantly positively correlated. This result is in line with the body of research that shows melatonin supplementation can effectively treat insomnia and balance the circadian rhythm[18,19].

Pharmacists must possess adequate knowledge about these supplements to ensure safe and appropriate use by their customers. However, a study conducted in Jordan revealed gaps in community pharmacists' knowledge and awareness of melatonin supplements. Many pharmacists were found to have a limited understanding of the proper indications, dosages, and potential side effects of melatonin. This lack of knowledge could potentially lead to inappropriate dispensing and inadequate counseling of patients, thus compromising the safety and efficacy of melatonin supplementation[3]. Furthermore, the regulatory framework for dispensing melatonin supplements in Jordan must be adhered to by community pharmacists. This includes being aware of any restrictions or requirements for selling melatonin, such as age restrictions, maximum allowable dosages, and documentation of sales. Pharmacists need to be familiar with regulations related to melatonin dispensing to ensure compliance and accountability in their practice[20].

Continuing education and training programs can play a significant role in enhancing community pharmacists' knowledge and awareness of melatonin supplements. By participating in such programs, pharmacists can stay updated on the latest research, guidelines, and recommendations regarding melatonin supplementation. Moreover, these programs can provide pharmacists with the necessary tools to effectively communicate with patients seeking melatonin supplements, enabling them to provide accurate information, advice, and counseling[21].

Community pharmacists in Jordan play a role in dispensing herbal medicines and dietary supplements, including melatonin supplements. However, there are concerns regarding their knowledge and awareness of these products. A study conducted among Jordanian community pharmacists found that their knowledge of herbal medicines was moderate, with a mean knowledge score of 3.7 out of 5[2]. The study also revealed that 98.5% of pharmacies in Jordan sell herbal supplements, indicating their availability in the community. However, there is a lack of awareness among pharmacists regarding potential herb-drug interactions, with 63.1% of pharmacists not being aware of such interactions. This highlights the need for enhanced education and training for pharmacists to provide evidence-based information on the benefits and risks of herbal medicines, including melatonin supplements. Additionally, pharmacists should be encouraged to attend educational courses and use reliable resources to stay updated on herbal products and their medication interactions. However, the dispensing of melatonin supplements requires a sound understanding of its effects, potential interactions, and appropriate usage. This article purposes to discover the knowledge and awareness of community pharmacists in Jordan concerning melatonin supplements and their dispensing practices[22].

Community pharmacist do not have enough information or awareness regarding the safe and rational use of these products. Some community pharmacists may not be familiar with piecing together clues to determine the identification of herbal or natural products yet they are the first point of contact for patients seeking general health information or advice on herbal medicine use. Since the 1990s, Jordanian pharmacists have been allowed to sell a wide range of herbal medicines,

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including melatonin supplements, without the supervision of a physician. Recently, a pilot study among Jordanian community pharmacists assessed the perception and knowledge of herbal medicines. The participants in this study were exposed to true/false questions on the identification criteria, therapeutic indications, adverse reactions, cautions, and contraindications of herbal medicines. The results revealed moderate knowledge with the mean knowledge respective to identification, pharmacological actions/ therapeutic indication, adverse reactions, and cautions (ie, interactions) as 3.6, 3.5, 2.5, and 1.3 out of 5 respectively. A pharmacovigilance study among Jordanian community pharmacies revealed that 98.5% of pharmacies sell herbal supplements. Another study addressed sub-optimal knowledge among Jordanian community pharmacists regarding herb-drug interaction. The authors found that 63.1% of pharmacists were not aware of the existence of herb-drug interaction. Clearly, more education is required for pharmacists and their awareness should be improved to supply adequate and accurate information to consumers who seek general health information and advice on the use of herbal medicine. Pharmacists should be encouraged to attend educational courses and use reliable resources regarding herbal products and their medication interactions. However, dispensing melatonin supplements is not an easy job because it requires certain amount of knowledge about the effects, possible interactions, and the appropriate indication or use of melatonin supplements. In view of the herbal medicine use in the community, pharmacists make a large number of decisions on assessment and identification of herbal products, prescribing and recommending herbal medicines, and ensuring safe and appropriate use. In addition, pharmacists dispense herbal medicine and advice on nutritional supplements. Furthermore, pharmacists provide a significant service in several countries by contributing to pharmacovigilance activities as many products are often removed from the market with evidence of harm. Thus, this article aimed to provide more information on community pharmacist's knowledge and awareness of the medicinal use of melatonin supplements.

Our research highlights a number of problems with applying eligibility requirements in real-world settings, including as variations in pharmacy practices, mismatches between pack sizes and treatment length, and misunderstandings among the general public regarding melatonin's eligibility for over-the-counter use. To address knowledge gaps regarding sleep and circadian health, pharmacists and intern pharmacists indicated the need for additional education (Table 3). Most participants (n = 322) discovered that melatonin down-scheduling had little effect on sales of other over-the-counter sleep treatments (Table 1). The fact that not all pharmacists (n = 322) thought melatonin was a preferable alternative to the OTC sleep aids on the market could be the reason for this.. Healthcare professionals' opinions influence their clinical decisions[2320]. The majority of research on melatonin use in pediatric patients has focused on kids who also have other conditions, such as attention-deficit/hyperactivity disorder or autistic spectrum disorder[24]. In this study, community pharmacists reported that they dispense melatonin supplements in the following maximum daily doses: 5 mg (57.5%), 3 mg (32.0%), 1 mg (7.1%), and 6-15 mg (2.2%). However, 1.2% of pharmacists are unsure about the dosage of melatonin supplements available in pharmacies. A clinical evaluation found that older people' sleep disturbances can be effectively treated with melatonin doses ranging from 1 mg to 6 mg [25].

Further research discovered that dosages ranging from 0.5 to 5 mg were equally efficacious. Larger melatonin dosages, however, could result in more drowsiness. Daily doses of melatonin in clinical trials varied from 0.15 mg to 12 mg. It's worth noting that a dose of 20 mg did not reduce fatigue or other symptoms in patients with advanced cancer[2627]. Regarding the factors affecting the pharmaceutical knowledge of community pharmacists, which needs significant strengthening and training. 75.8% of pharmacists reported dispensing melatonin supplements as OTC drug without knowledge of melatonin pharmacokinetics, pharmacodynamics, and distribution rates. The negative effects of over-the-counter (OTC) drugs, such as drug interactions, overdose, misdiagnosis, and misuse, should be known to community pharmacists[28]. Organizations must improve the vital properties of time Melatonin which increases the risk of misuse.

Multiple studies reported a significant knowledge gap, doubt, and self-reported practice among pharmacists, regarding potential moderate to severe warfarin-melatonin interactions[29, 30]. Melatonin has been associated with bleeding complications and reduced prothrombin time (PT) in four case reports of patients who received both melatonin and warfarin. Furthermore, they change INR and PT and affect coagulation activity[30] despite that the pharmacist in this study still dispenses or notices prescriptions of melatonin and warfarin. While melatonin supplements are generally considered safe, it is crucial to use them under the supervision of a healthcare professional, as they can interact with certain medications and may not be appropriate for everyone [4].

CONCLUSION

In conclusion, the knowledge and awareness of community pharmacists in Jordan regarding melatonin supplements and their dispensing practices require improvement. Pharmacists must possess a comprehensive understanding of the indications, dosages, potential interactions, and regulatory requirements associated with melatonin supplementation through the findings of forthcoming studies that address the existing knowledge deficits. It is of the utmost importance to address these deficiencies to facilitate informed decision-making and deliver optimal patient care, thereby facilitating melatonin's seamless integration into the healthcare system of Jordan. By enhancing their knowledge and awareness through continued education and training, community pharmacists can ensure the safe and appropriate dispensing of melatonin supplements, thereby promoting the health and well-being of their customers. The key to helping Jordanian pharmacists promote the safe use of melatonin supplements is education. Additionally, conducting long-term studies is necessary to assess the impact of education on participants' perspectives

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and engagement levels.

AUTHOR CONTRIBUTIONS

We declare that Jumanah Al-Shawabkeh and Ali Alsarhan contributed to the conceptualization, questionnaire design, focus, and organization of the manuscript. Jumanah performed the statistical analysis in addition to the graph generation. The authors will bear all liabilities about claims relating to the content of this article. All authors have participated sufficiently in all the different aspects of this work, including conception, design, analysis, and interpretation of data, drafting the article, revising it critically for important intellectual content, and final approval of the version to be published.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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