Original Article

Evaluating the level of knowledge and attitude towards evidence-based medicine among pharmacists: perceived educational need in the pharmacy curriculum

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Abstract

Background & Objective: Evidence-based medicine (EBM) integrates the best available evidence from authentic studies with clinical expertise and patients' values, helping pharmacists to have access to the best available evidence to respond to clinical questions. The present study aimed to assess the level of awareness and attitude of pharmacists as the initial step to improve these practices.

Materials & Methods: The instrument used in this cross-sectional study was a questionnaire of awareness and attitudes towards EBM and its related terms (Abofarha et al., 2014). After localization, the questionnaire was provided to the pharmacists working in the pharmacies of Zanjan province and pharmacy students in the last two years of university, and the results were assessed.

Results: The participation rate was 75%, and 66.8% of subjects were familiar with the concept of EBM. The participants who did not have sufficient knowledge had higher mean age scores in comparison with those who did not (P=0.001). Moreover, 74.1% of students and 60% of graduates in this study showed sufficient knowledge and the difference between the two groups was significant (P= 0.023). In addition, 84.1% of the participants had a positive attitude towards EBM. Students and graduates did not significantly differ in terms of attitude.

Conclusion: As evidenced by the results of this study, pharmacists and pharmacy students in Zanjan province had a good knowledge of EBM terms. Moreover, it was found that participants with more work experience were less knowledgeable in this regard. The majority of them had positive attitudes towards EBM, and it is suggested to include EBM in the pharmacy curriculum to increase students' knowledge in this regard.

Introduction

Evidence-based medicine (EBM) was introduced in the early 1990s (1). It puts a great emphasis on valid evidence obtained from clinical trials and articles instead of expert opinions (1, 2). In addition, a main priority in evidence-based medicine is proper patient care (3-5). In fact, a classic definition of EBM is the integration of best research evidence with clinical expertise and patient values (2). Overall, the enhancement of the effectiveness and efficiency of the health care system is one of the major challenges presented to health service providers in their daily operations (6).

Health service providers should be cautious that despite the availability of numerous articles, scientific resources, and clinical guidelines, the largest part of this information is either irrelevant or useless. Consequently, experts need to be able to make a proper critical evaluation of the available texts (7). The evidence-based medicine aims to bridge the gap between knowledge and current activities in the clinic (8). Evidence-based practices help health care providers access the best available scientific evidence to answer clinical questions (2).

According to the estimates obtained in a related study, at least 11% of patients receive care that is inconsistent with the latest scientific evidence and may potentially be harmful to them (6). One of the challenges posed to medical specialists is to keep up with the latest developments and advances in various branches of this field (9). Pharmacy is one of the most dynamic fields of medical sciences. The remarkable expansion in the range of services and introduction of new sub-branches have highlighted the role of pharmacists.

The recent shift in the role of pharmacists from drug distributors to patient care providers has increased their responsibility and commitment to the improvement of their knowledge and performance (10). The EBM is considered essential in pharmacy for the provision of pharmaceutical care. The main goal pursued by EBM is that all decisions are based on the texts selected according to the standards of quantitative, qualitative, and theoretical studies (9). The EBM is key to achieving effective pharmaceutical care services (10).

Several studies have been conducted in different parts of the world to evaluate the level of knowledge, attitudes, and barriers posed to pharmacists and other health professionals regarding EBM. For instance, in 2014, Abu Farha et al. performed a study to assess the awareness, attitude, and knowledge of EBM among Jordan's primary health care doctors. The results of the referred study pointed out that more than 80% of the participants believed that evidence-based medicine was effective in improving patient care.

Despite this positive attitude, pharmacists did not have a thorough understanding of the terms used in evidence-based medicine (11). In another study, Iman Abu Ghraiba et al. (2015) in the UAE assess pharmacy student's knowledge, attitude and proficiency in the practice of EBM. They used a valid questionnaire that was designed based on evidence-based practices. Their tabulated results pointed to a significant increase in students' ability to understand different stages of EBM. In the end, in order to improve and implement EBM, they suggested that EBM training be carried out in pharmacy school and develop the proper environment to facilitate transforming current medical education and practice to an evidence-based standard in UAE (12).

In our country, Iran, similar studies have been conducted in this field. For example, Masoumeh Sadeghi et al. in 2009 believed that evidence-based medicine has been accepted as a new and reliable approach in medical sciences to improve the quality of clinical patient care. With this background in mind, they conducted a study to determine the level of knowledge and attitude of clinical assistants of Kerman University of Medical Sciences towards the concept of evidence-based medical approach and investigate its application. The results of the mentioned study demonstrated that 83.3% of the participants believed that the use of EBM is effective in patient care.

Moreover, 88.3% of participants were interested in progress in the field of EBM. The results of the stated study suggested that assistants at Kerman University of Medical Sciences have little knowledge of evidence-based medicine (13). It is noteworthy that despite the existence of similar studies in other parts of the country, they were not conducted among pharmacists. In addition, in Zanjan province, no study has been carried out to evaluate the awareness and attitude towards EBM.

Considering the importance of EBM in pharmaceuticals and the fact that the assessment of the current situation is the first step in the enhancement of performance in any field, the present study aimed to evaluate the level of knowledge, attitude, and practice of EBM among pharmacists in Zanjan and pharmacy students in the University of Medical Sciences in Zanjan province.

Material & Methods

This cross-sectional study was conducted on all pharmacists working in Zanjan (regardless of the place of graduation) and pharmacy students in the last two years in the pharmacy school in this province (students of the 11th, 10th, 9th and 12th semesters, respectively). The inclusion criteria were pharmacists working in Zanjan province and pharmacy students in the last two years at the School of Pharmacy, Zanjan University of Medical Sciences, Zanjan, Iran.

The data collection tool was a questionnaire used in the study conducted by Abu Farha et al. in Jordan (2014) (11). This questionnaire includes items on participants' knowledge and attitude towards evidence-based medicine. Translation-retranslation method was used for the linguistic localization of this questionnaire. To this end, the original version of the questionnaire was initially provided to a person fluent in English with pharmaceutical knowledge, and he/she was asked to translate the questionnaire into Persian. Thereafter, the researcher gave the Persian-translated questionnaire to another person with the same characteristics for back translation into English. Following that, the initial questionnaire was compared with the translated one to identify the incongruent items. The process of translation and re-translation was repeated by the researcher until the achievement of total consistency between the two versions.

For content validity, the questionnaire was submitted to at least six pharmacy experts and two experts in statistics and social medicine. They were asked to rate the appropriateness and relevance of the items on a scale, ranging from completely appropriate, somewhat appropriate, and inappropriate, as well as completely relevant, relevant, somewhat relevant, and irrelevant. Based on the Lawshe criteria, inappropriate and partially appropriate (irrelevant and partially irrelevant) items were removed. In order to determine the reliability of the questionnaire, it was given to 30 pharmacists and students from other provinces who

were not supposed to be included in the study, and they were asked to complete it twice with a 10-day interval. The test-retest correlation coefficient was higher than 0.7, pointing to the good reliability of the questionnaire. In addition, internal consistency of the questionnaire was confirmed by carrying out reliability test, rendering a Cronbach alpha coefficient of 0.7.

Due to the Covid-19 pandemic and the absence of students in the faculty, data collection was performed online. For this purpose, the Porsline system (https://porsline.ir/) was used to design the questionnaire. The number of responders was estimated with the help of education experts of the relevant faculty. Subsequently, the phone numbers or virtual IDs of the students were obtained through their representatives. The link made by the system along with relevant explanations were provided to the students in succession and they were asked to participate in the study.

In the case of graduates, the number of official pharmacists (licensed) and the list of pharmacies were obtained through the Association of Pharmacists and Food and drug deputy of the province. In the case of this group, since pharmacists were present at work, there was no restriction on in-person visits and field data collection was on the agenda. To this end, pharmacies were visited in the morning, evening, and night shifts in Zanjan city and then in several cities and other parts of Zanjan province. The questionnaires were given to the pharmacists and they were provided with the objectives of the study and were asked to participate in the study.

After assigning appropriate codes, the data were entered into SPSS software (version 23) and analyzed. Knowledge questions were scored based on previous studies (11). The options were rated as 0 ("I don't know and I don't want to know"), 1 ("I don't know, but I want to know"), 2("almost know"), and 3 ("I know and can explain to others"). Accordingly, the total scores ranged from 0-36. The cut-off point was also considered 18 based on previous studies (11). A total score of less than 18 was regarded as insufficient knowledge, and a total score of more than 18 was considered sufficient knowledge.

Considering the negativity or positivity of the view presented in each attitude question, agreement or disagreement with these statements was evaluated in such a way that a positive or appropriate attitude towards EBM was assigned a score of 1, and a negative or inappropriate attitude was given a score of 0. in light of this and other similar studies, the cut-off point was regarded as 9. The total score of less than 9 was considered inappropriate attitude and the total score of more than 9 was deemed as appropriate attitude (11).

In descriptive statistics, continuous quantitative data were presented as mean and standard deviation, while for qualitative and nominal data, percentage and frequency were reported in the form of tables. In inferential statistics, independent t-test was used to compare the two groups due to the normality of the data. Pearson's chi-square test was used to evaluate the correlation between the classified variables to determine the existence of a significant difference between the expected frequencies and the frequencies of the research findings. The significance level for all tests was considered 0.05. This research was a Knowledge, Attitude and Practices (KAP) survey (mostly used in medical and health education) in which there was no intervention. However, all participants entered the study voluntarily and were assured that all their information would be kept confidential

Results

After distributing the questionnaire among the target population (final two-year students and pharmacists working in the pharmacy), out of the 308 people who were eligible to participate in the study, 232 cases completed the questionnaire (more than 75%), and despite the full explanation of the goals and importance of the study, 76 subjects refused to cooperate. The students were more cooperative than graduates. Out of a total of 130 students in the last two years of study in Zanjan Faculty of Pharmacy, 112 cases, and out of 178 licensed pharmacists according to the statistics of Zanjan Pharmacists Association, only 178 subjects participated in this study.

The mean age of participants was 30.83±10.82 years (age range: 22-70). Table 1 depicts the participants' demographic characteristics. This table illustrates such information as the percentage of participants based on gender, educational status (student or graduate), and the year they entered the university as freshmen. Regarding gender, the majority of participants (56.5%) were female. Moreover, graduates (51.7%) and the students who had entered the university from 2011-2021 (69.5%) had the highest level of participation in this study.

Table 2 displays the percentage and frequency of awareness of the terms related to evidence-based medicine. This table illustrates the percentage of selection of each option, demonstrating respondents' awareness of the epidemiological terms of EBM. Based on this, 1.3%-4.7% of the participants selected the option "I don't know, and I don't want to know" in response to all 12 items in the questionnaire. Moreover, 10.3%-68.5% of the participants selected the option "I don't know, but I want to know", 19.4%-48.3% responded "almost know," and 8.6%-41.8% of the participants

answered, "I know and can explain to others".

Table 1. Demographic information of people participating in the study

Variable	Sub Group	Number	%
Sex	Male	101	% 43.5
	Female	131	% 56.5
Educational Background	Student	112	% 48.3
	Graduate	120	% 51.7
Entry Cohort	Before 1370	24	% 10.3
	1370 to 1380	14	% 6
	1380 to 1390	33	% 14.2
	1390 to 1400	161	% 69.4

The frequency and percentage of participants who had insufficient knowledge were 77 and 33.2%, respectively. In addition, the frequency and percentage of subjects who had sufficient knowledge were obtained at 155 and 66.8%, respectively. The mean total knowledge score was 21.76±6.02. The mean age of 77 participants who had insufficient knowledge about EBM was 34.56±13.33 years. The mean age of 155 people who had sufficient knowledge was 26.99±8.78 years. The subjects who had sufficient knowledge and those who did not significantly differ in age (P= 0.0001).

Table 2. The percentage and frequency of awareness of the common terms of evidence-based medicine

No.	phrase	I know and I can explain		I know partially		I don't know but I would like to know		I don't know and I don't desire to know	
		Number	%	Number	%	Number	%	Number	%
1	Relative risk	41	٪ 17.7	108	٪ 46.6	76	٪ 32.8	7	٪ 3
2	Absolute risk	47	٪ 20.3	112	٪ 48.3	68	٪ 29.3	5	٪ 2.2
3	Systematic review	61	٪ 26.3	82	٪ 35.3	82	٪ 35.3	7	٪ 3
4	Odds ratio	20	٪ 8.6	45	٪ 19.4	159	٪ 68.5	8	٪ 3.4
5	Meta-analysis	37	٪ 15.9	88	٪ 37.9	100	٪ 43.1	7	٪ 3
6	Clinical effectiveness	97	٪ 41.8	80	٪ 34.5	52	٪ 22.4	3	٪ 1.3
7	Number needed to treat	70	٪ 30.2	83	٪ 35.8	72	٪ 31	7	٪ 3
8	Confidence interval	42	٪ 18.1	66	٪ 28.4	117	٪ 50.4	7	٪ 3
9	P-Value	68	٪ 29.3	68	٪ 29.3	90	٪ 38.8	6	٪ 2.6
10	Heterogeneity	60	٪ 25.9	76	٪ 32.8	87	٪ 37.5	9	٪ 3.9
11	Publication bias	27	٪ 11.6	68	٪ 29.3	126	٪ 54.3	11	٪ 4.7
12	Sensitivity	126	٪ 54.3	78	٪ 33.6	24	٪ 10.3	4	٪ 1.7

Table 3 demonstrates the percentage and frequency of sufficient and insufficient knowledge of existing terms based on input. The groups that entered the university before and after 2001 were statistically significantly different. Among the different entry periods, the pharmacists who entered the university between 2001 and 2011 had the highest percentage of awareness (87.9%), while pharmacists who had entered the university before 1991(29.2%) were assigned the lowest level of knowledge.

Table 3. Percentage and frequency of knowledge about evidence-based medicine based on the year of entering the university

Entry Cohort	Sufficient		Insufficient		P-Value*
	Number	%	Number	%	
Before 1370	7	٪ 29.2	17	٪ 70.8	0.0001
1370-1380	5	٪ 35.7	9	٪ 64.3	
1380-1390	29	٪ 87.9	4	٪ 12.1	
1390-1400	114	٪ 70.8	47	٪ 29.2	

*Chi-Square, The significance level was considered 0.05

Table 4 shows the percentage and frequency of awareness of existing terms based on the educational status of the participant. There was a statistically significant difference between students and graduates. In this regard, 74.1% of students had sufficient knowledge about EBM, while this value was obtained at 60% among graduates.

Table 4. Percentage and frequency of knowledge about evidence-based medicine based on educational status

Educational Background	Sufficient		Insufficient		P-Value*
	Number	%	Number	%	
Student	83	٪ 74.1	29	٪ 25.9	0.023
Graduate	72	٪ 60	48	٪ 40	

*Chi-Square, The significance level was considered 0.05

Chart 1 shows the percentage and frequency of negative and positive responses to attitude questions. Total attitude scores ranged from 4-18. The frequency and percentage of people who had an inappropriate (negative) attitude were 37 and 15.9%, respectively. On the other hands, the frequency and percentage of people who had a good (positive) attitude were reported as 195 and 84.1%, respectively.

The mean total attitude score was calculated at 12.0862±2.71302. Moreover, 79.5% of students and 88.3% of graduates had a positive attitude towards evidence-based medicine and no significant difference was observed between these two groups (P= 0.065). Table 5 demonstrates the percentage and frequency of attitude towards EBM based on the entry year to the university. As displayed in this table, there was no significant difference between the participants based on the years they entered the university.

Discussion

Since the first step in the promotion of evidence-based medicine is the identification of the level of awareness and attitude of people towards this approach, the present study aimed to determine the level of knowledge and attitude of pharmacists working in Zanjan province and pharmacy students in the University of Medical Sciences of this province. The results of this study can be of great in identifying their weaknesses in this field and consequently improving their level of awareness and attitude.

Evidence-based medicine can play an effective role in improving the quality of patient care. In confirmation of this article, we can refer to the result of several studies. In a study conducted by Abu Farha et al. (2014), more than 80% of pharmacists participating in the study believed that evidence-based medicine was effective in improving patient care (11). In another study, Ebrahimipour et al. (2013) reported that 95.7% of interns in Mashhad University of Medical Sciences believed that evidence-based medicine is useful in improving patient care (14).

The results of the present study also pointed out that 87.5% of the participants believed that the use of EBM improves patient care. It is a significant percentage compared to similar studies, confirming the same results. The results of the current study pointed out that 84.1% of participants had a positive and appropriate attitude towards evidence-based medicine. In the study by Jeihan et al. (2015), this value was obtained at 80% among doctors, and in the study by Nadira et al. (2004), 90.8% of participants had a positive and appropriate attitude (15, 16).

Although the majority of study participants had a positive and appropriate attitude toward evidence-based medicine, the results indicated that in some issues and aspects, positive and appropriate attitudes towards EBM were not optimal, and maybe in some cases, the majority had a negative attitude. For example, 49.1% of the participants (about half of them) considered it difficult to make treatment recommendations on the basis of evidence-based medicine (negative attitude).

In this regard, in another item of the questionnaire, 47.4% of subjects believed that accepting EBM imposes a heavier burden on the pharmacist (negative attitude). Various reasons can be speculated for this result. These negative attitudes can be attributed to insufficient experience in applying evidence-based medicine, lack of complete and comprehensive knowledge in this regard, or insufficient practice to apply this approach practically in internship units. The results of the current study did not point to a significant difference between the attitudes of students and graduates (both positive). Perhaps the reason is that the community of pharmacists, including students (future graduates) and graduates (past students), have both come to the conclusion that the application of this approach (EBM) is the first step in improving the role and position of pharmacists in society.

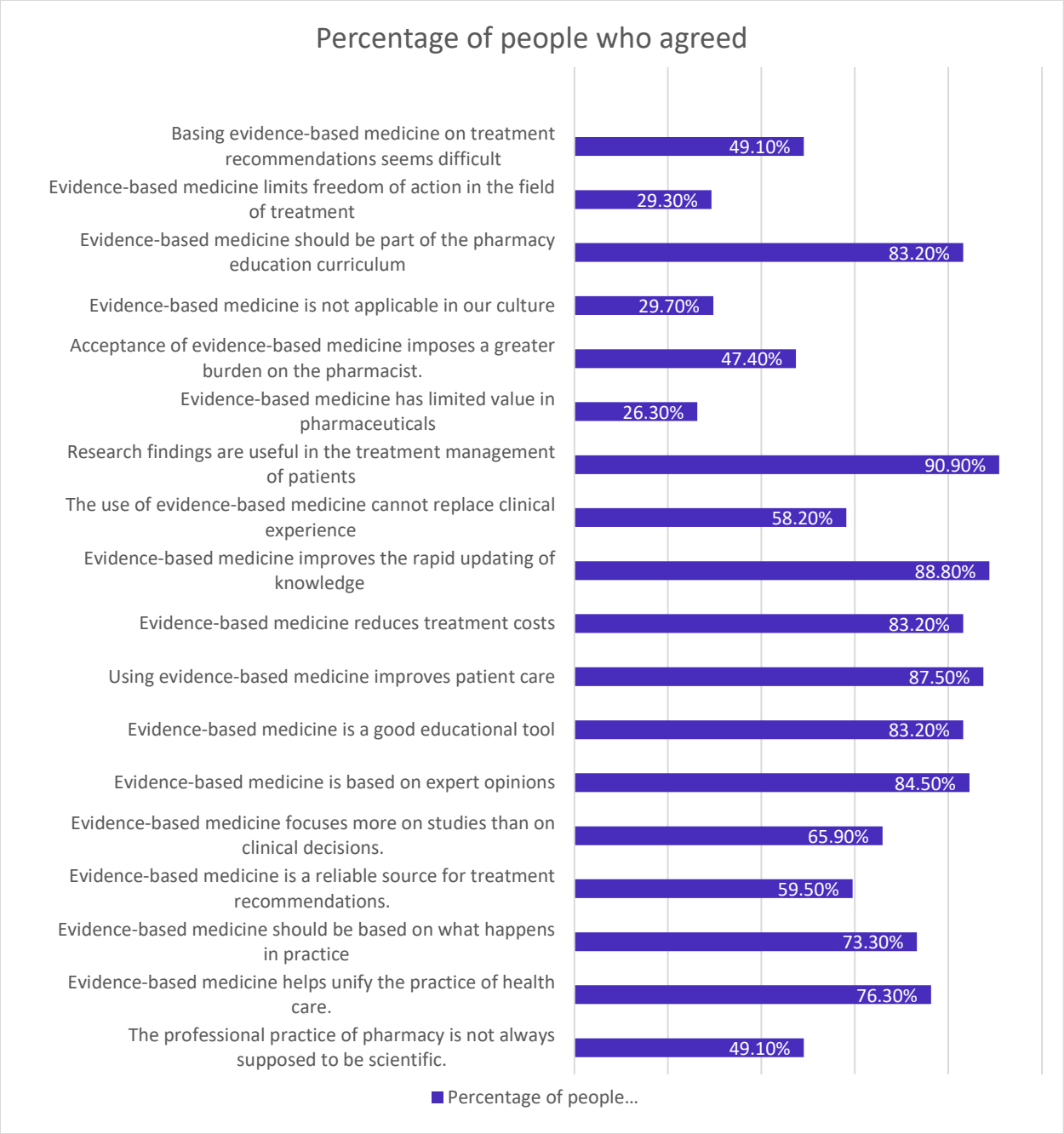

Chart 1: The percentage of attitude of pharmacists participating in the study towards evidence-based medicine

Table 5. Percentage and frequency of attitudes towards EBM based on the year of entering the university

Entry Cohort	Suitable		Unsuitable		P-Value*
	Number	%	Number	%	
Before 1370	21	٪ 87.5	3	٪ 12.5	0.192
1370 - 1380	13	٪ 92.9	1	٪ 7.1	
1380-1390	31	٪ 93.9	2	٪ 6.1	
1390 - 1400	130	٪ 80.7	31	٪ 19.3	

*Chi-Square, The significance level was considered 0.05

The results of the current study pointed out that 66.8% of participants had sufficient knowledge of the epidemiologic terms used in evidence-based medicine. These results were much more hopeful than those obtained by Nadira et al. (2004), who reported that only 39.6% of people knew something about this approach (16). The results of the study by Abu Farha (2014) also indicated that pharmacists have a partial and not complete understanding of the terms used in evidence-based medicine (11).

In the study by Sadeghi et al. (2009), residents in Kerman University of Medical Sciences had a low level of knowledge regarding evidence-based medical terms, and our results were far more promising than their (13). According to the history of studies, this issue can be related to increased awareness over time. With the considerable importance attached to evidence-based and the diligent attention attracted to this issue among the medical science community and researchers, people's awareness has also improved over time.

Although, overall, the results of the present study pointed to the adequacy of the participants' awareness of evidence-based medicine, a low percentage of participants were familiar with the meaning of epidemiological terms of evidence-based medicine. For example, 68.5% of participants admitted that they do not know the meaning of the term "Odds ratio", but they would like to know. Moreover, 3.4% of cases not only did not know but also had no desire to do so (about 72% in total).

These results were in agreement with those obtained by Ebrahimipour et al. (2013), who reported that 67.1% of subjects did not know the meaning of this term (14). In their study, Amini et al. study (2016) obtained better results since 56.33% of participants in total were unaware of this term (17). Another term that can be mentioned is "confidence interval", and more than half of the participants (50.4%) were not familiar with its concept. These results were also in line with the study by Amini et al. who obtained the value of 53.51% (17).

Abu Farha et al. (2014) reported more promising results and the percentage of the participants who were unaware of this term was 41.6% (11). It is worth mentioning that although 66.8% of subjects had sufficient knowledge of evidence-based medical terminology, this knowledge cannot be described as excellent. In the case of most terms, the cases who were aware mostly chose the third option, that is to say, they had a partial awareness and were not able to explain it to another person. The percentage of participants choosing option four elaborates on this issue.

The highest percentage of choosing option four was related to the term "Sensitivity", which was the only term that more than half of the participants (54.3%) were fully aware of and could explain its meaning to others. The rest of the questions, except for the two items that were assigned 41.8% and 30.2% in the choice of option four, were all below 30%. This issue was also observed in the study by Amini et al., who reported that the highest percentage of choosing option four was related to the phrase "absolute risk" (30.98), and in the rest of the questions, choosing option four was all below 30% (17). Therefore, the present study was in accordance with the stated research in terms of thorough and excellent knowledge and did not obtain a more promising result in this regard.

Therefore, it seems that despite the general progress of pharmacists' awareness in the last few years, this awareness is still not as high as it should be due to some reasons. For instance, evidence-based medicine is not prioritized in the educational system of universities and the regulatory systems of pharmacies. Other notable reasons are a lack of interest and suitable platform for students to work in new and updated research fields or the students and pharmacists' lack of seriousness in pursuing the real and complete meaning of terms in this approach.

The results of the study by Abu Farha et al. (2014) indicated the existence of an inverse relationship between pharmacists' experience and evidence-based medicine knowledge (11). In the present study, it was observed that less than 36% of the participants who entered the university before 2001 had knowledge, while among the subjects who entered after 2001, more than 70% of cases had this knowledge. This is also evident when comparing graduates and students. There is a significant difference between the level of knowledge of current students and pharmacist graduates regarding EBM terminology.

Students with a percentage of 70.1 had higher levels of knowledge than graduates (60%). As a result, the current study also showed a consistent and similar result, indicating the variable effect of time and experience on this issue. With the considerable importance attached to evidence-based and the assiduous attention attracted to this issue among the medical science community and researchers, we are witnessing a marked improvement in the awareness of newer generations of pharmacists.

Among the notable limitations of the study, we can refer to the low response rate, which is basically one of the challenges of questionnaire studies. However, the researcher attempted to obtain the voluntary consent of the pharmacists and students by explaining the objectives of this research and emphasizing the confidentiality of information. Another limitation was the effect of social

desirability bias on the participants' responses, which is also one of the challenges of questionnaire studies. It was strived to diminish this bias by emphasizing the confidentiality of information.

Conclusion

As evidenced by the obtained results, the pharmacists working in Zanjan province and pharmacy students of the University of Medical Sciences in this province had sufficient knowledge about EBM; nonetheless, this knowledge was not perfect and ideal. There is a significant difference between graduates and students in their level of awareness, and the students were more knowledgeable in this regard. Furthermore, the attitude of most pharmacists in Zanjan province and pharmacy students in the last two years of university in this province is positive, and there is no significant difference between these two groups.

Ethical considerations

The current research has been approved by the ethical code of IR.ZUMS.REC.1400.034 in the research ethics committee of Zanjan University of Medical Sciences. The goals and methods used in the research were fully explained to the participants. The participants were assured of confidentiality and anonymity.

Conflict of Interests

The researchers did not have any conflict of interest in any of the research stages.

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Contribution

Sina Valinejad: Conducting the survey, writing the first draft of the article. Farzaneh Karamitanha: Statistical analysis of the results, correction of the initial draft of the article. Nima Motamed: Study design, statistical analysis. Mehran Mohseni: Design of the initial draft of the article, submitting and revising the article, helping with the initial design of the article.

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