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Original Article

Pharmacists' knowledge, attitudes, and practices toward evidence-based medicine: A cross-sectional survey in Vietnam's Mekong Delta

[Conocimientos, actitudes y prácticas de los farmacéuticos hacia la medicina basada en la evidencia: una encuesta transversal en el delta del Mekong de Vietnam]

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Abstract

Context: Evidence-based medicine (EBM) underpins high-quality pharmaceutical care in Vietnam, but pharmacists' engagement is understudied.

Aims: To assess EBM knowledge, attitudes, and practices (KAP) among Mekong Delta pharmacists.

Methods: Cross-sectional online survey (Oct–Dec 2023) of licensed pharmacists across 13 provinces; recruitment via professional Facebook/Zalo groups and a continuing-education session; n = 547 respondents from 1,240 invitations (44.1%). The questionnaire (Vietnamese) adapted validated items for knowledge, attitudes, and practices. Descriptive statistics were calculated, factor analysis was conducted to assess the structure of the KAP measures, and multivariable linear regression was used to identify factors associated with EBM practice.

Results: Pharmacists' EBM knowledge, attitudes, and practices had mean scores of 2.63 (on a 1–4 scale), 3.36 (on a 1–5 scale), and 3.69 (on a 1–5 scale), respectively. Knowledge (β = 0.371, p<0.001) and attitudes (β = 0.184, p<0.001) were significantly associated with EBM practice. Limited access to information sources (82.8%; 95%CI: 79.6%-86.0%) and time constraints (65.8%; 95%CI: 61.8%-69.8%) were the most frequently reported barriers.

Conclusions: Knowledge and attitude were positively associated with EBM practice among pharmacists in the Mekong Delta. Targeted EBM training within pharmacy education and continuing education may improve practice; however, causal inferences are limited by the cross-sectional design.

Keywords: clinical decision-making; continuing education; factor analysis; information barriers; workforce.

Resumen

Contexto: La medicina basada en la evidencia (MBE) sustenta la atención farmacéutica de alta calidad en Vietnam, pero la participación de los farmacéuticos ha sido poco estudiada.

Objetivos: Evaluar los conocimientos, actitudes y prácticas (CAP) de MBE entre los farmacéuticos del Delta del Mekong.

Métodos: Encuesta transversal en línea (octubre-diciembre de 2023) a farmacéuticos colegiados de 13 provincias; reclutamiento a través de grupos profesionales de Facebook/Zalo y mediante una sesión de formación continua; n = 547 encuestados de 1240 invitaciones (44,1%). El cuestionario (vietnamita) adaptó ítems validados para conocimientos, actitudes y prácticas. Se calcularon estadísticas descriptivas, se realizó un análisis factorial para evaluar la estructura de las medidas de CAP y se utilizó una regresión lineal multivariable para identificar los factores asociados con la práctica de MBE.

Resultados: Los conocimientos, actitudes y prácticas de MBE de los farmacéuticos obtuvieron puntuaciones medias de 2,63 (en una escala de 1 a 4), 3,36 (en una escala de 1 a 5) y 3,69 (en una escala de 1 a 5), respectivamente. Los conocimientos (β = 0,371, p<0,001) y las actitudes (β = 0,184, p<0,001) se asociaron significativamente con la práctica de la MBE. El acceso limitado a las fuentes de información (82,8%; IC95 %: 79,6%-86,0%) y las limitaciones de tiempo (65,8%; IC95 %: 61,8%-69,8%) fueron las barreras más frecuentemente reportadas.

Conclusiones: Los conocimientos y las actitudes se asociaron positivamente con la práctica de la MBE entre los farmacéuticos del delta del Mekong. La formación específica en MBE, dentro de la formación farmacéutica y la formación continua, puede mejorar la práctica; sin embargo, las inferencias causales se ven limitadas por el diseño transversal.

Palabras Clave: análisis factorial; barreras de información; educación continua; fuerza laboral; toma de decisiones clínicas.

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INTRODUCTION

Continuous improvement in healthcare efficiency is one of the primary challenges that healthcare service providers face in their daily tasks. Previous literature suggests that community pharmacists rely more on consumer and/or patient feedback, personal experience, and assessment than on clinical trial evidence when making recommendations (De Chun & Anwar, 2023). Furthermore, the increasing volume of medical literature underscores the importance of harnessing these resources to optimize patient treatment outcomes (Buabbas et al., 2018). Therefore, it is imperative that all healthcare service providers, including pharmacists, update their knowledge and skills in line with evidence (Abu Farha et al., 2014).

Evidence-based medicine (EBM) is understood as the integration of current best research evidence with clinical expertise to inform patient care decisions (Martini, 2021). Healthcare professionals are often expected to provide clinical advice based on the best available research evidence. Currently, expanding the role of pharmacists beyond their traditional function of drug distribution can significantly impact the provision of healthcare services. Pharmacists engage in various pharmaceutical specialties, such as designing, creating, or manufacturing pharmaceutical products; distributing drugs; and managing pharmaceutical care planning (Abdelaziz et al., 2016). Regardless of their specific role, staying abreast of the latest medical evidence updates is crucial for pharmacists to optimize their professional tasks. This expansion places additional responsibilities on pharmacists to become competent healthcare experts who deliver high-quality patient care based on evidence (Hanna & Hughes, 2012). In Vietnam, evidence-based practice is one of the criteria for assessing hospital quality (Vietnam Ministry of Health, 2013). In 2019, the Ministry of Health identified and issued the Basic Competency Standards for Vietnamese Pharmacists (Vietnam Ministry of Health, 2019). EBM is encouraged, though not explicitly mandated, for pharmacists.

Several global studies have explored the knowledge, attitudes, and practices of pharmacists toward EBM in the U.S. (Burkiewicz & Zgarrick, 2005), Australia (Peterson et al., 2009), New Zealand (De Chun & Anwar, 2023), United Arab Emirates (Jairoun et al., 2021), Jordan (Abu Farha et al., 2014; Alefishat et al., 2022), and Kuwait (Buabbas et al., 2018). However, research in Vietnam was limited. Therefore, the purpose of this study is to assess the knowledge, attitudes, and practices of EBM among pharmacists in the Mekong Delta, Vietnam. This study is important in helping to identify the level of knowledge and barriers to the implementation of EBM by pharmacists in pharmacy practice. The results of this study will provide data for pharmacy policymakers and relevant regulatory bodies to promote EBM among pharmacists.

MATERIAL AND METHODS

Study setting

A cross-sectional online survey was conducted among pharmacists from 13 provinces/cities in the Mekong Delta, Vietnam, from October 2023 to December 2023. The Mekong Delta is the southernmost region of Vietnam and consists of one centrally governed city (Can Tho) and twelve provinces (Long An, Dong Thap, Tien Giang, Vinh Long, Tra Vinh, Ben Tre, An Giang, Hau Giang, Soc Trang, Bac Lieu, Ca Mau, and Kien Giang). The estimated shortage of pharmacists with undergraduate degrees in the Mekong Delta region requires approximately 3,243 additional pharmacists during the 2021–2030 period (Vietnam Ministry of Health, 2023).

Data collection

Licensed pharmacists working in the Mekong Delta were invited (Oct–Dec 2023) via professional Facebook and Zalo groups and at the conclusion of a continuing-education session. The invitation included a standardized, brief overview of EBM (script provided in the Appendix) before access to the survey. Google Forms' one-response-per-account setting was enabled, and time stamps were screened for potential duplicates; suspected duplicates were removed prior to analysis. Participation was voluntary, with electronic informed consent obtained. The study was approved by the Ethics Committee in Biomedical Research, Can Tho University of Medicine and Pharmacy, No. 24.035.GV-ĐHYDCT.

Study population and sample size

The study included licensed pharmacists working in community, hospital, industry, academia, and regulatory settings across 13 provinces/cities. The diversity in the work settings of pharmacists was covered due to the necessity of EBM for staying updated on the latest knowledge in serving their pharmaceutical professional roles. The inclusion criteria included pharmacists in provinces/cities within the Mekong Delta. The exclusion criteria include pharmacists who are currently unemployed, student pharmacists, and interns/residents.

The sample size was calculated using the single proportion formula [1].

$$n = \frac{Z^2_{1-\alpha/2}\, p(1-p)}{d^2} \quad [1]$$

Calculations indicated that a minimum of 385 completed surveys was required to achieve a 95% confidence level (Z = 1.96) and a margin of error of d = 0.05, based on an estimated p = 50.8% of pharmacists in a previous study had an adequate EBM knowledge score (Abu Farha et al., 2014). No finite population correction was applied.

Survey tool

The questionnaire was available in Vietnamese and required approximately 15 minutes to complete (Supplementary data). The survey questionnaire was organized into four sections for exploration: (1) knowledge, (2) attitudes, (3) practices related to EBM, and (4) barriers, along with (5) demographic information.

The knowledge exploration questions on EBM consisted of 12 closed-ended questions constructed based on the study of Buabbas et al. (2018). The responses to each question were assessed using four options: 1- "Do not understand and not willing to learn", 2- "Do not understand but would like to learn", 3- "Some understanding", and 4- "Understand and could explain to others." The knowledge score was calculated as the average score of the items on the knowledge scale.

Attitudes toward EBM were assessed using 18 closed-ended questions, adapted from the study by Buabbas et al. (2018), on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The response options for the negative attitude questions (9 questions) were reverse-scored, meaning that "Strongly Disagree" received a score of 5, and "Strongly Agree" received a score of 1. The attitude score was calculated as the average score of the items on the attitude scale.

Practices related to EBM were assessed using 4 close-ended questions, referenced from the studies by Alefishat et al. (2022) and Ahmad Ghaus et al. (2021), using a 5-point Likert scale ranging from 1- "Strongly Disagree" to 5- "Strongly Agree". The practice score was calculated as the average score of the items on the practice scale.

Additionally, a multiple-choice question regarding barriers to incorporating EBM was collected (Buabbas et al., 2018). The demographic information collected included gender, age, marital status, years of experience, average monthly income, workplace, sector, educational level, and the province/city where participants worked.

The initial set of questions on knowledge, attitudes, and practices related to EBM was developed in English based on prior research (Ahmad Ghaus et al., 2021; Alefishat et al., 2022; Buabbas et al., 2018). Subsequently, the questions were translated into Vietnamese and checked for face and content validity by two lecturers in the field of pharmacy and two lecturers in the field of medical statistics. The survey was tested with an initial sample of 25 individuals who met the selection criteria to assess clarity and were not included in the final analysis sample.

Data analysis

The data were entered and analyzed using SPSS (IBM SPSS Statistics for Windows, Version 22.0; Armonk, NY, USA). Descriptive statistics, including frequency, percentage (%), mean, standard deviation (SD), and median, were utilized to present the survey results. Exploratory factor analysis (EFA) was performed using Principal Axis Factoring with Promax rotation and Kaiser Normalization. Preliminary assessments of suitability for EFA were conducted using the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (>0.70), Bartlett's Test of Sphericity ($p<0.001$), and inter-item correlations below 0.7. The number of factors retained was determined by eigenvalues greater than 1, and items were retained only if they had relatively high loadings (>0.3). Internal consistency was considered acceptable when Cronbach's α exceeded the threshold value of 0.70 (Nguyen et al., 2021). Based on prior studies (Ahmed et al., 2025; Yehualashet et al., 2021), key factors potentially associated with practices—including age, work experience, knowledge, and attitudes—were included in the multivariable linear regression. The assumptions of multicollinearity were checked, and all variance inflation factor (VIF) values were below 3, indicating that multicollinearity was not a concern. The Durbin–Watson statistic was used to assess first-order autocorrelation of residuals. Missing data were handled using complete-case analysis. A $p<0.05$ was considered to indicate statistical significance.

RESULTS

Participant characteristics

Of 1,240 invitations, 547 complete responses were obtained (44.1%), with details presented in Fig. 1. The majority of participants were women (72.0%), aged over 30 (54.2%), and married (51.8%). More than half of the participants had intermediate or college degrees in pharmacy (56.2%), worked in the non-public sector (63.5%), and had work experience exceeding 5 years (53.2%) (Table 1).

Exploratory factor analysis

The knowledge scale excluded three items (7, 9, and 12) due to high intercorrelations (>0.7) with other items. The KMO value was 0.93, and Bartlett's test was significant ($\chi^2(28) = 3141.3$; $p<0.001$). The scale demonstrated a one-factor structure, with an eigenvalue of 6.03, accounting for 67.0% of the total variance. Factor loadings were high (0.71–0.84). Cronbach's value for the knowledge scale was 0.94, indicating acceptable internal consistency.

The attitude scale excluded three items (2, 7, and 9) due to high intercorrelations (>0.7) with other items. The KMO value was 0.93, and Bartlett's test was significant ($\chi^2(78) = 6595.8$; $p<0.001$). Items 11 and 12 showed cross-loading on both factors and were therefore removed. The final EFA yielded two factors: Factor 1 (positive attitude included items 1, 3, 4, 5, 6, 8, and 10) with loadings of 0.79–0.92, and Factor 2 (perceived barriers: Items 13, 14, 15, 16, 17, and 18) with loadings of 0.72–0.94. Together, these two factors explained 73.3% of the variance. Cronbach's value for the attitude scale was 0.93, indicating acceptable internal consistency.

Exploratory factor analysis on the practice scale showed a KMO value of 0.82 and a significant Bartlett's test ($\chi^2(6) = 1699.242$; $p<0.001$). A single-factor model was extracted, explaining 74.9% of the variance. All four observed variables had high loadings (0.84–0.89). The Cronbach's α value for the practice scale was 0.92, indicating acceptable internal consistency.

Knowledge and attitudes toward EBM

The descriptive results of participants' EBM knowledge, presented in Table 2, indicated the highest mean score for clinical effectiveness terminology (mean = 2.91) and the lowest for publication bias (mean = 2.44). The overall knowledge score was 2.63 (SD 0.63) on a 4-point scale. Nearly 70% of participants agreed or strongly agreed that EBM plays a role in improving patient care (68.9%) and patient management (69%), as shown in Table 3. The overall attitude score was 3.36 (SD 0.51) on a 5-point scale.

EBM practices, barriers, and associated factors

Regarding EBM practices (Table 4), the overall mean practice score reached 3.69 (SD = 0.97) on a 5-point scale. Commonly reported barriers to EBM practice included limited access to information sources (82.8%) and time constraints (65.8%) (Table 5).

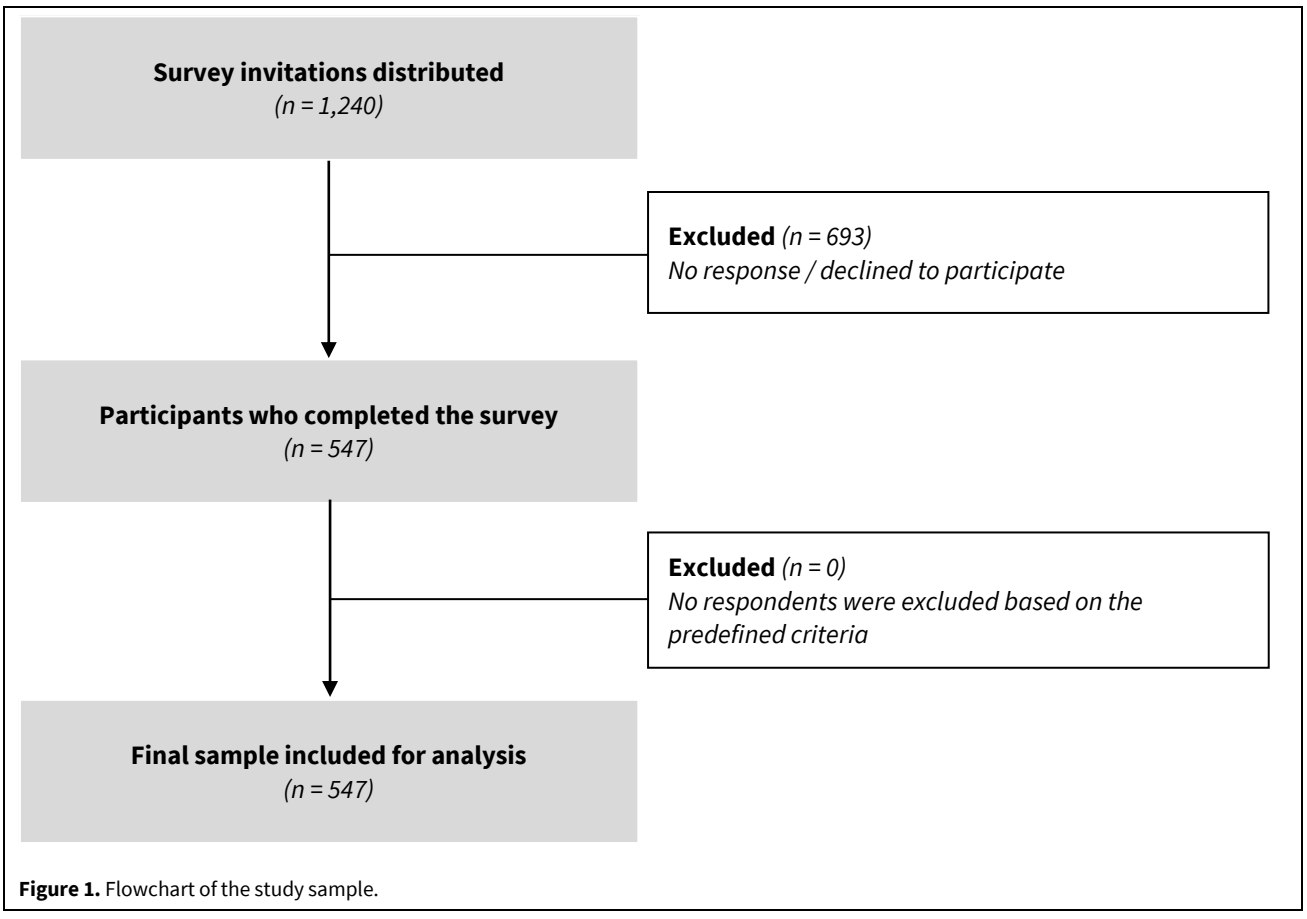

Figure 1. Flowchart of the study sample.

Table 1. Demographic characteristics and work-related factors of participants (n = 547).

Characteristics		Frequency (n)	Percent (%)
Gender (n = 546)	Women	393	72
	Men	153	28
Age group (year) (n = 522)	18-25	96	18.4
	26-30	143	27.4
	>30	283	54.2
Marital status (n = 541)	Single	261	48.2
	Married	280	51.8
Work experience (year) (n = 547)	Less than 3 years	125	22.9
	3 to 5 years	131	23.9
	Over 5 years	291	53.2
Monthly income (VND)* (n = 540)	Less than 5 million VND	144	26.7
	5 million VND or more	396	73.3
Workplace (n = 521)	Private pharmacy/drugstore	219	42
	Chain pharmacy/drugstore	34	6.5
	Hospital pharmacy/drugstore	19	3.6
	Hospital pharmacy department	158	30.3
	Pharmaceutical company	70	13.4
	Educational institution	14	2.7
	Regulatory agency	7	1.3
Sector (n = 471)	Public	172	36.5
	Non-public	299	63.5
Educational background (n = 537)	Intermediate degree in pharmacy	41	7.6
	College degree in pharmacy	261	48.6
	Undergraduate degree in pharmacy	195	36.3
	Postgraduate degree in pharmacy	40	7.4
Work location (n = 547)	Long An	10	1.8
	Tien Giang	10	1.8
	Ben Tre	11	2
	Vinh Long	95	17.4
	Tra Vinh	21	3.8
	Hau Giang	35	6.4
	Soc Trang	36	6.6
	Dong Thap	60	11
	An Giang	32	5.9
	Kien Giang	29	5.3
	Bac Lieu	52	9.5
	Ca Mau	39	7.1
	Can Tho	117	21.4

*VND: Vietnamese Dong, equivalent in USD: 1 USD = 26,350 VND (November 15, 2025).

Table 2. Participants' knowledge of evidence-based medicine (n = 547).

No.	Terminology	n (%)				Mean (SD)
		Do not understand and not willing to learn	Do not understand but would like to learn	Some understanding	Understand and could explain to others	
1	Relative risk	21 (3.8)	207 (37.8)	242 (44.2)	77 (14.1)	2.69 (0.76)
2	Absolute risk	19 (3.5)	208 (38.0)	242 (44.2)	78 (14.3)	2.69 (0.75)
3	Systematic review	28 (5.1)	263 (48.1)	185 (33.8)	71 (13.0)	2.55 (0.78)
4	Odds ratio	30 (5.5)	262 (47.9)	200 (36.6)	55 (10.1)	2.51 (0.75)
5	Meta-analysis	27 (4.9)	263 (48.1)	188 (34.4)	69 (12.6)	2.55 (0.77)
6	Clinical effectiveness	13 (2.4)	149 (27.2)	260 (47.5)	125 (22.9)	2.91 (0.77)
8	Confidence interval	21 (3.8)	180 (32.9)	249 (45.5)	97 (17.7)	2.77 (0.78)
10	Heterogeneity	32 (5.9)	238 (43.5)	197 (36.0)	80 (14.6)	2.59 (0.81)
11	Publication bias	35 (6.4)	289 (52.8)	169 (30.9)	54 (9.9)	2.44 (0.76)
	Overall					2.63 (0.63)

Note: Each item was rated on a 4-point scale (1 = "Do not understand and not willing to learn"; 2 = "Do not understand but would like to learn"; 3 = "Some understanding"; 4 = "Understand and could explain to others"). All 547 participants answered each item, and percentages were calculated using 547 as the denominator for every item. The overall knowledge score is calculated as the mean of item scores, with higher scores indicating better knowledge. SD: standard deviation. Items 7, 9 and 12 were excluded.

Table 3. Participants' attitudes toward evidence-based medicine (n = 547).

No.	Attitude	n (%)					Mean (SD)
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
1	EBM helps unify the quality and practice of healthcare providers	12 (2.2)	28 (5.1)	146 (26.7)	212 (38.8)	149 (27.2)	3.84 (0.96)
3	Research findings are helpful in the management of patients	9 (1.6)	30 (5.5)	131 (23.9)	206 (37.7)	171 (31.3)	3.91 (0.96)
4	Practicing EBM improves patient care	11 (2.0)	25 (4.6)	134 (24.5)	201 (36.7)	176 (32.2)	3.93 (0.96)
5	EBM is good educational tool	11 (2.0)	25 (4.6)	152 (27.8)	210 (38.4)	149 (27.2)	3.84 (0.94)
6	EBM provides a quick knowledge update	13 (2.4)	32 (5.9)	136 (24.9)	207 (37.8)	159 (29.1)	3.85 (0.98)
8	EBM reduces health care costs	12 (2.2)	46 (8.4)	151 (27.6)	185 (33.8)	153 (28.0)	3.77 (1.02)
10	I have confidence in the evidence-based value of daily information sources in the field	8 (1.5)	41 (7.5)	162 (29.6)	209 (38.2)	127 (23.2)	3.74 (0.95)
13	EBM is not applicable to my culture*	81 (14.8)	107 (19.6)	156 (28.5)	116 (21.2)	87 (15.9)	2.96 (1.28)
14	The adoption of EBM increases the load on pharmacists*	28 (5.1)	76 (13.9)	191 (34.9)	149 (27.2)	103 (18.8)	2.59 (1.10)
15	EBM is of limited value in pharmacy practice*	50 (9.1)	88 (16.1)	167 (30.5)	154 (28.2)	88 (16.1)	2.74 (1.18)
16	The integration of EBM into practice restricts my therapeutic freedom*	53 (9.7)	85 (15.5)	167 (30.5)	154 (28.2)	88 (16.1)	2.75 (1.19)
17	I find it difficult to base my advice on evidence*	54 (9.9)	102 (18.6)	162 (29.6)	145 (26.5)	84 (15.4)	2.81 (1.19)
18	EBM would not improve the care I give to patients*	85 (15.5)	109 (19.9)	149 (27.2)	122 (22.3)	82 (15.0)	2.99 (1.28)
	Overall						3.36 (0.51)

Note: Each item was rated on a 5-point Likert scale (1 = "Strongly disagree" to 5 = "Strongly agree"). All items had full response rates (n = 547), and percentages were calculated using this denominator. *Negatively worded items were reverse-coded so that higher scores consistently reflect more positive attitudes toward EBM. EBM: Evidence-based medicine. SD: standard deviation. Items 2, 7, 9, 11, and 12 were excluded.

Table 4. Participants' practices regarding evidence-based medicine (n = 547).

Practice	n (%)					Mean (SD)
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
Using EBM in daily practice	27 (4.9)	64 (11.7)	155 (28.3)	170 (31.1)	131 (23.9)	3.57 (1.12)
Search for evidence-based medicine in science journal articles	22 (4)	56 (10.2)	156 (28.5)	179 (32.7)	134 (24.5)	3.63 (1.08)
Based on EBM to establish current best practices	14 (2.6)	45 (8.2)	153 (28)	185 (33.8)	150 (27.4)	3.75 (1.03)
Join continuous medical education for update regarding EBM	21 (3.8)	40 (7.3)	134 (24.5)	194 (35.5)	158 (28.9)	3.78 (1.06)
Overall						3.69 (0.97)

Note: Items were rated on a 5-point Likert scale (1 = Strongly disagree to 5 = Strongly agree). All items had full responses (n = 547), and percentages are based on this denominator. Mean scores reflect item averages, with higher values indicating better EBM practice. SD: standard deviation.

Table 5. Barriers to implementing evidence-based medicine among participants (n = 547).

Barriers	Percent (%)	Lower 95% CI	Upper 95% CI
No Internet connection	14.4	11.5	17.3
EBM is a threat to clinical freedom	17	13.9	20.1
No incentives in using EBM	26.5	22.8	30.2
No access to international journals or guidelines	32	28.1	35.9
The absence of an effective computer system	33.8	29.8	37.8
EBM focuses on research and is not clinically applicable	35.1	31.1	39.1
Lack of clear presentation of evidence	38	33.9	42.1
EBM is too difficult/theoretical to apply to practice	40.8	36.7	44.9
Patient overload	40.8	36.7	44.9
Lack of critical appraisal skills	58.9	54.8	63
Too much evidence is available	58.9	54.8	63
EBM is too complicated	61.2	57.1	65.3
Lack of personal time	65.8	61.8	69.8
Limited access to EBM sources	82.8	79.6	86

Note: 95% CI: 95% confidence interval; EBM: Evidence-based medicine.

In the multivariable linear regression analysis (Table 6), knowledge ($\beta = 0.371$, $p<0.001$) and attitudes ($\beta = 0.184$, $p<0.001$) were significantly associated with EBM practice. The model showed acceptable fit, with a significant F-test ($F = 30.050$, $p<0.001$). R^2 and adjusted R^2 values (0.189 and 0.182) indicated that the predictors explained about 18–19% of the variance in practice. The Durbin–Watson statistic (1.809) suggested no autocorrelation, and VIF values (1.017–1.854) confirmed the absence of multicollinearity.

DISCUSSION

This study found that pharmacists' EBM-related knowledge, attitudes, and practices showed mean scores of 2.63 (SD 0.63) on the 1–4 scale, 3.36 (SD 0.51) on the 1–5 scale, and 3.69 (SD 0.97) on the 1–5 scale, respectively. Knowledge and attitude were independently associated with self-reported EBM practice. These findings suggest that targeted educational interventions and improved access to evidence resources may be required to strengthen EBM implementation among pharmacists in the Mekong Delta.

Table 6. Factors associated with practice (linear regression) (n = 547).

Factor	B	SE(B)	β	t	p-value	95% CI	VIF
Age	-0.012	0.008	-0.083	-1.541	p=0.124	-0.027 – 0.003	1.854
Work experience	0.104	0.064	0.088	1.634	p=0.103	-0.021 – 0.229	1.846
Knowledge	0.572	0.063	0.371	9.147	p<0.001	0.449 – 0.695	1.048
Attitudes	0.346	0.075	0.184	4.597	p<0.001	0.198 – 0.494	1.017

Note: B: Unstandardized coefficient; SE(B): Standard error; β (Beta): Standardized coefficient; t: t-statistic; p: p-value; 95% CI: 95% confidence interval; VIF: Variance inflation factor.

This study revealed that the surveyed pharmacists self-assessed their understanding of EBM research terms, such as clinical effectiveness, relative risk, absolute risk, and sensitivity, consistent with the findings of Buabbas et al. (2018) and Valinejad et al. (2022). It is not surprising that most pharmacists self-assessed statistical terms such as systematic review, odds ratio, meta-analysis, and publication bias as not being understood. This may be because these terms are not formally introduced in pharmacy training programs, which are more common among research-oriented professionals. However, a positive aspect is that participants in this study expressed a willingness to learn. These findings suggest that pharmacy managers and healthcare administrators should implement continuous training courses to fill the knowledge gaps of pharmacists. Understanding statistical terms is crucial for reading and evaluating research accurately, allowing the application of EBM in current pharmacy practice by selecting the best available clinical evidence (Buabbas et al., 2018). Developing a mobile application to facilitate easy access to reliable research evidence in a short period could be considered a practical solution for daily use, as suggested by most pharmacy students (Chandran et al., 2022).

The pharmacists in the present study believe that EBM benefits patient management and improves patient care. Our findings align closely with those of a study conducted in Kuwait (Buabbas et al., 2018). A study by Zanaridah et al. (2021) reported that attitudes toward EBM among pharmacy students improved after an EBM course (Vira et al., 2019). Similarly, educational interventions have been shown to enhance the attitudes of health professionals toward EBM (Bahmaid et al., 2018; Shuval et al., 2007). Furthermore, the study by Aoe et al. (2022) demonstrated that implementing an EBM workshop using the team-based learning method may lead to higher educational effectiveness for fifth-year students after clinical practice (Aoe et al., 2022). Currently, there is no specialized EBM course for pharmacy students in Vietnam; instead, various aspects of EBM are introduced sporadically in different courses, such as research methods, applied informatics, and statistical probability, with an emphasis on theory rather than practical training to enhance skills. These gaps suggest that future interventions using EBM education may help improve pharmacists' attitudes and engagement (Bahmaid et al., 2018; Shuval et al., 2007; Vira et al., 2019). Such educational efforts should be reinforced by practical measures, including institutional access to Cochrane and national evidence repositories.

The level of practice (mean = 3.69) among the pharmacists in this study was lower than that reported by Alefishat et al. (2022) in Jordan (mean = 3.74). The current study revealed that limited access to EBM information is the most commonly cited barrier to practicing EBM. Access to online resources, particularly foreign databases, is generally restricted in Vietnam. This limitation may stem from the misconception that practicing EBM may not provide financial benefits related to patient care costs.

The barrier of insufficient time has been identified as a significant obstacle to practicing EBM, as has been reported in many other studies (Abu Farha et al., 2014; Al-Jamei et al., 2019; De Chun & Anwar, 2023; Ozaki et al., 2019). This difference may be explained by the understaffed status of the participants at work while facing a high workload, which is a daily challenge for pharmacists. Nguyen et al. (2016) indicated that Vietnam was currently facing a shortage of pharmacy personnel at all levels, with limited distribution among regions. Due to the diversity of tasks and increasing workloads, pharmacists find it challenging to take on additional EBM-related responsibilities. The study suggested increasing the number of pharmacy assistants and pharmacists to alleviate the burden of practicing EBM. The cost-effectiveness of increasing staff numbers and the willingness of these organizations to undergo such changes are common limitations in implementing EBM practices (Abu Farha et al., 2014).

Our study's results align with the findings of Shibabaw et al. (2023), who found that those with adequate knowledge are more likely to practice EBM than those with inadequate knowledge. The reason behind these similarities could be the relationship between knowledge and practice. Understanding and being

well-versed in EBM increases the likelihood of applying it in practical or clinical settings (Shibabaw et al., 2023). However, Zanaridah et al. (2021) did not find this relationship to be significant. More research is needed to draw more accurate conclusions about the presence of this relationship.

Regarding the relationship between attitudes and EBM practices, pharmacists with a favorable attitude were more likely to practice EBM. This study concurs with the findings of Zanaridah et al. (2021) in Malaysia and Alefishat et al. (2022) in Jordan. This positive correlation is attributed to the boost in attitude resulting from EBM.

Limitations of the study

Our study has several limitations. As with all self-report surveys, responses may be influenced by social desirability, potentially biasing estimates. This cross-sectional, convenience sample may overrepresent pharmacists who are active on social media or who attend continuing education (CE) sessions, thereby limiting generalizability to the broader pharmacist population. The provision of a pre-survey EBM primer could have increased apparent knowledge and improved attitudes, potentially biasing results upward. Although efforts were made to ensure anonymity and reassure participants that no personally identifiable information would be collected, self-report bias may still be present. Pharmacists without reliable internet access or those not participating in the CE session were likely underrepresented. Given the cross-sectional design, the associations identified cannot be interpreted as causal. The questionnaire items were adapted from previously published instruments with established reliability; however, closed-ended items limited our ability to explore barriers in depth. Future qualitative research is warranted to examine contextual factors influencing EBM practice, particularly constraints related to information access and limited time.

CONCLUSION

Knowledge and attitudes were associated with EBM practice. Interpretation is limited by the cross-sectional design, convenience sampling via social media and a training session, and self-reported measures. The findings of this study underscore the need to prioritize improving the current attitudes of pharmacists toward EBM. Intervention trials introducing a dedicated EBM course are warranted to assess whether such changes improve competencies, supported by practical measures such as institutional access to Cochrane and structured continuing professional development activities, including team-based learning and journal clubs.

CONFLICT OF INTEREST

The research was conducted entirely free from any involvement in commercial, financial, or personal matters that might be perceived as a possible conflict of interest or that could have influenced the outcomes or interpretation of the study.

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DATA AVAILABILITY

Data sets generated during the current study are available from the corresponding author on reasonable request.

GENERATIVE ARTIFICIAL INTELLIGENCE (AI)

The authors declare that no generative artificial intelligence (AI) or AI-assisted technologies were used in the preparation, writing, or editing of this manuscript. All content was developed solely by the authors, who take full responsibility for its accuracy and integrity.

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AUTHOR CONTRIBUTION:

Contribution	Tran VD	Dao TNP	Nguyen MC	Tran TN	Vo QLD
Concepts or ideas	x	x	x		
Design	x	x			
Definition of intellectual content	x	x			
Literature search	x				
Experimental studies					
Data acquisition			x		x
Data analysis	x	x		x	x
Statistical analysis	x	x		x	x
Manuscript preparation	x	x	x	x	x
Manuscript editing	x	x	x	x	x
Manuscript review	x	x	x	x	x

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Supplementary Data

PHARMACISTS' KNOWLEDGE, ATTITUDES, AND PRACTICES TOWARD EVIDENCE-BASED MEDICINE

The term "Evidence-Based Medicine" (EBM) has become increasingly prominent in the medical and pharmaceutical sciences. EBM represents an approach to clinical practice that emphasizes the systematic application of the best available scientific evidence derived from well-designed and reliable studies. According to the classic definition by Sackett, EBM is "the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients," integrating the clinician's clinical expertise with the values and preferences of the patient.

Knowledge of evidence-based medicine

Please mark an "x" in the appropriate box from 1 - 'Do not understand and not willing to learn' to 4 - 'Understand and could explain to others'.

Terminology	1-Do not understand and not willing to learn	2-Do not understand but would like to learn	3-Some understanding	4-Understand and could explain to others
Relative risk				
Absolute risk				
Systematic review				
Odds ratio				
Meta-analysis				
Clinical effectiveness				
Sample size calculation				
Confidence interval				
P-value				
Heterogeneity				
Publication bias				
Sensitivity				

Attitude towards Evidence-Based Medicine in Pharmacy Practice

Please mark an "x" in the appropriate box from 1 - 'Strongly disagree' to 5 - 'Strongly agree'.

Items	**1**	**2**	**3**	**4**	**5**
EBM helps to unify the quality and practice of healthcare providers					
EBM is a convenient source of advice					
Research findings are helpful in the management of patients					
Practicing EBM improves patient care					
EBM is good educational tool					
EBM provides a quick knowledge update					
EBM teaching should be part of the curriculum for pharmacy students					
EBM reduces health care costs					
Practicing EBM does not replace clinical experience					
I have confidence in the evidence-based value of daily information sources in the field					
EBM is more focused on research than clinical decision making					
EBM is based on expert opinions					
EBM is not applicable to my culture					

The adoption of EBM increases the load on pharmacists					
EBM is of limited value in pharmacy practice					
The integration of EBM into practice restricts my therapeutic freedom					
I find it difficult to base my advice on evidence					
EBM would not improve the care I give to patients					

Practices related to evidence-based medicine in pharmacy practice
Please mark an "x" in the appropriate box from 1 - 'Strongly disagree' to 5 - 'Strongly agree'.

I have…	**1**	**2**	**3**	**4**	**5**
Utilized evidence-based medicine in daily practice					
Conducted searches for evidence-based medicine in science journal articles					
Relied on evidence-based medicine to establish current best practices					
Engaged in continuous medical education for update regarding evidence-based medicine					

Barriers to applying evidence-based medicine in pharmacy practice
Please select multiple correct options.

☐ Limited access to EBM sources	☐ Lack of critical appraisal skills
☐ EBM is too complicated	☐ Too much evidence is available
☐ Lack of personal time	☐ Lack of clear presentation of evidence
☐ Patient overload	☐ EBM focuses on research and is not clinically applicable
☐ The absence of an effective computer system	☐ EBM is too difficult/theoretical to apply to practice
☐ No incentives in using EBM	☐ No access to international journals or guidelines
☐ No Internet connection	☐ EBM is a threat to clinical freedom

Participant information

Gender: ☐ Male ☐ Female

Age (years): ……

Marital Status: ☐ Single ☐ Married ☐ Other

Work Experience: ☐ < 3 years ☐ 3 – 5 years ☐ > 5 years

Average Monthly Income: ☐ < 5 million VND ☐ ≥ 5 million VND

Workplace: ☐ Private pharmacy/drugstore ☐ Chain pharmacy/drugstore ☐ Hospital pharmacy/drugstore
☐ Hospital pharmacy department ☐ Pharmaceutical company ☐ Educational institution
☐ Regulatory agency ☐ Other

Sector: ☐ Public ☐ Nonpublic

Educational background: ☐ Intermediate degree in pharmacy ☐ College degree in pharmacy
☐ Undergraduate degree in pharmacy ☐ Postgraduate degree in pharmacy

Work location: ☐ Long An ☐ Tien Giang ☐ Ben Tre ☐ Vinh Long ☐ Tra Vinh
☐ Hau Giang ☐ Soc Trang ☐ Dong Thap ☐ An Giang ☐ Kien Giang
☐ Bac Lieu ☐ Ca Mau ☐ Can Tho

KIẾN THỨC, THÁI ĐỘ, THỰC HÀNH CỦA DƯỢC SĨ ĐỐI VỚI Y HỌC CHỨNG CỨ

Thuật ngữ "Y học chứng cứ" (Evidence-Based Medicine – EBM) ngày càng được ứng dụng rộng rãi trong các lĩnh vực khoa học y – dược. EBM là cách tiếp cận thực hành y khoa dựa trên việc vận dụng có hệ thống các chứng cứ khoa học tốt nhất hiện có, được rút ra từ những nghiên cứu có thiết kế và phương pháp đáng tin cậy. Theo định nghĩa kinh điển của Sackett, EBM là "việc vận dụng một cách thận trọng, rõ ràng và hợp lý các bằng chứng khoa học tốt nhất hiện có trong việc đưa ra quyết định chăm sóc cho từng người bệnh", đồng thời kết hợp với kinh nghiệm lâm sàng của thầy thuốc và giá trị, mong đợi của người bệnh.

Kiến thức về các thuật ngữ của y học chứng cứ

Vui lòng đánh dấu "x" vào ô thích hợp từ 1 - 'Không hiểu và không muốn học' đến 4 - 'Hiểu và có thể giải thích cho người khác'

Thuật ngữ	1-Không hiểu và không muốn tìm hiểu	2-Không hiểu nhưng muốn tìm hiểu	3-Hiểu một phần	4-Hiểu và có thể giải thích cho người khác
Nguy cơ tương đối (Relative risk)				
Nguy cơ tuyệt đối (Absolute risk)				
Tổng quan hệ thống (Systematic review)				
Tỷ số chênh (Odds ratio)				
Phân tích gộp (Meta-analysis)				
Hiệu quả lâm sàng (Clinical effectiveness)				
Tính toán cỡ mẫu (Sample size calculation)				
Khoảng tin cậy (Confidence interval)				
Giá trị P (P-value)				
Tính không đồng nhất (Heterogeneity)				
Thiên lệch về công bố (Publication bias)				
Độ nhạy (Sensitivity)				

Thái độ và ý kiến về việc sử dụng Y học chứng cứ trong thực hành dược

Vui lòng đánh dấu "x" vào ô thích hợp từ 1 - 'Hoàn toàn không đồng ý' đến 5 - 'Hoàn toàn đồng ý'.

	1	2	3	4	5
Y học chứng cứ giúp đồng nhất về chất lượng và thực hành của các nhà cung cấp dịch vụ y tế					
Y học chứng cứ là một nguồn tư vấn thuận tiện					
Những kết quả nghiên cứu mang lại lợi ích trong quản lý bệnh nhân					
Thực hành Y học chứng cứ cải thiện chăm sóc bệnh nhân					
Y học chứng cứ là một công cụ giáo dục tốt					
Y học chứng cứ cung cấp kiến thức cập nhật nhanh chóng					
Việc giảng dạy Y học chứng cứ nên là một phần trong chương trình học của sinh viên dược					
Y học chứng cứ giúp giảm chi phí chăm sóc sức khỏe					
Thực hành Y học chứng cứ không thể thay thế kinh nghiệm lâm sàng					
Tôi tự tin về các giá trị mang lại của các nguồn thông tin hàng ngày dựa trên bằng chứng					
Y học chứng cứ tập trung nhiều vào nghiên cứu hơn là đưa ra các quyết định lâm sàng					
Y học chứng cứ là việc dựa trên ý kiến của các chuyên gia					
Y học chứng cứ không phù hợp với văn hóa của tôi					
Việc áp dụng Y học chứng cứ làm tăng khối lượng công việc tại nhà thuốc/quầy thuốc					
Y học chứng cứ có giá trị hạn chế trong thực hành dược					
Việc áp dụng Y học chứng cứ làm tăng khối lượng công việc của dược sĩ					
Tôi thấy khó khăn khi xây dựng lời khuyên dựa trên bằng chứng					
Y học chứng cứ không cải thiện việc chăm sóc bệnh nhân của tôi					

Sử dụng Y học chứng cứ trong thực hành dược

Vui lòng đánh dấu "x" vào ô thích hợp từ 1 - 'Hoàn toàn không đồng ý' đến 5 - 'Hoàn toàn đồng ý'.

Tôi có	1	2	3	4	5
Sử dụng y học chứng cứ trong thực hành hàng ngày					
Tìm kiếm y học chứng cứ trong các bài báo khoa học					
Dựa vào Y học chứng cứ để thiết lập các thực hành tốt nhất hiện tại					
Tham gia đào tạo y khoa liên tục để cập nhật kiến thức về y học chứng cứ					

Những rào cản trong việc ứng dụng y học chứng cứ vào thực hành dược

Chọn nhiều câu đúng

Hạn chế trong việc truy cập nguồn thông tin Y học chứng cứ	Thiếu kỹ năng đánh giá bằng chứng khoa học tìm được
Y học chứng cứ quá phức tạp	Có quá nhiều thông tin có sẵn
Thiếu thời gian	Thiếu sự trình bày rõ ràng của bằng chứng
Quá tải bệnh nhân	Y học chứng cứ chỉ tập trung vào nghiên cứu mà không áp dụng lâm sàng
Thiếu hệ thống máy tính hiệu quả	Y học chứng cứ quá khó/quá lý thuyết để áp dụng vào thực hành
Không có động lực để sử dụng Y học chứng cứ	Không có quyền truy cập tạp chí hoặc hướng dẫn quốc tế
Không có kết nối Internet	Y học chứng cứ đe dọa sự tự do lâm sàng

THÔNG TIN NGƯỜI THAM GIA

Giới tính

☐ Nam ☐ Nữ

Tuổi: ……

Trình trạng hôn nhân:

☐ Độc thân ☐ Khác

☐ Đã kết hôn

Thâm niên công tác

☐ Dưới 3 năm ☐ Trên 5 năm

☐ Từ 3 đến 5 năm

Thu nhập bình quân hàng tháng:

☐ < 5 triệu đồng ☐ ≥ 5 triệu đồng

Nơi làm việc:

☐ Nhà thuốc tư nhân ☐ Công ty dược

☐ Chuỗi nhà thuốc ☐ Cơ sở giáo dục

☐ Nhà thuốc bệnh viện ☐ Cơ quan quản lý

☐ Khoa dược bệnh viện ☐ Khác

Lĩnh vực

☐ Công lập ☐ Ngoài công lập

Trình độ chuyên môn

☐ Trung cấp dược ☐ Đại học dược

☐ Cao đẳng dược ☐ Sau đại học chuyên ngành dược

Tỉnh/thành:

☐ Long An ☐ Tiền Giang ☐ Bến Tre ☐ Vĩnh Long ☐ Trà Vinh ☐ Hậu Giang

☐ Sóc Trăng ☐ Đồng Tháp ☐ An Giang ☐ Kiên Giang ☐ Bạc Liêu ☐ Cà Mau

☐ Cần Thơ