

Original Research

Pharmacists' perception of evidence-based practice and experience in over-the-counter counseling: A cross-sectional study in Japan

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Abstract

Background: Evidence-based practice (EBP) is essential for pharmacists to select and recommend over-the-counter (OTC) drugs in medical consultations (hereinafter referred to as OTC counseling). **Objectives:** This study examined the association between pharmacists' perceptions of EBPs and their implementation of OTC counseling. **Methods:** A web-based survey was conducted. Questions regarding pharmacists' perceptions of EBP and experience in OTC counseling were set, and respondents were asked to respond based on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The association between pharmacists' perceptions of EBP and experience in OTC counseling was examined by calculating Spearman's ρ using bivariate correlation analysis. **Results:** Responses were obtained from 250 pharmacists. Although 70% of respondents indicated that EBP improves service quality, only 39, 31, and 14% had knowledge of the EBP steps, conducted a literature search, and performed a critical appraisal, respectively. Regarding OTC counseling experience, only 31% of respondents indicated that "sufficient evidence information on OTC drugs has been obtained." Over 60% of respondents expressed the need for OTC usage guidelines and support tools and revealed that brand-specific purchases of OTC drugs make EBP difficult. An association was observed between pharmacists' perceptions of EBP and experience in OTC counseling. "Level of recognition of steps for practicing evidence-based medicine" was associated with the "need fulfillment level for evidence information" ($p = 0.329$, $P < 0.001$), "brand-specific purchases of OTC drugs" ($p = 0.240$, $P < 0.001$), "perception of product advertisement" ($p = 0.227$, $P < 0.001$), and "need for OTC guidelines" ($p = 0.208$, $P < 0.001$). **Conclusions:** Pharmacists' perceptions of EBP were associated with their experience in OTC counseling

Keywords: community pharmacy; evidence-based practice; over-the-counter drugs; counseling; Japan

INTRODUCTION

Evidence-based practice (EBP) refers to the conscious, explicit, and careful application of current evidence to provide the best medical care for individual patients while also considering the experience of medical staff, patients' sense of values, and circumstances.^{1,2} Specifically, EBP implements various medical services, including formulating a clinical question, searching for the best evidence (primarily research articles) that contributes to the solution of the question, critically appraising its content, and considering other factors, such as objective evidence, clinical experience, patients' sense of values and wishes, available resources, and various environments.³ Therefore, the implementation process of EBP is based on the steps of evidence-based medicine (EBM), namely "clarification of the problem," "acquisition of information," "appraisal of

information," "application," and "evaluation."^{4,5}

Traditionally, the "M (medicine)" in EBM covers not only medical treatment by doctors but also care and rehabilitation by multiple professionals, such as pharmacists, nurses, and long-term care workers. Thus, given that medical care is an interdisciplinary effort by multiple professionals, the concept of EBP, which replaces "medicine" with "practice," is spreading across all medical specialties.

To achieve favorable patient results (outcomes), EBP is also essential for the pharmaceutical care provided by pharmacists.⁶ In addition to treatment with ethical drugs, the provision of over-the-counter (OTC) drugs, which involves the selection of OTC drugs and the practice of medical consultation and recommendations based on evidence, such as information from consulters and accurate information on drugs, requires appropriate counseling by pharmacists (hereinafter referred to as OTC counseling).⁷ However, although pharmacists recognize the importance of evidence-based OTC sales, there is a lack of evidence and knowledge regarding the effects of OTC drugs. Thus, it has been pointed out that, in reality, OTC drugs are provided based on the preferences and experiences of consumers and the brands specified by them.¹

In Japan, the Ministry of Health, Labour and Welfare announced the "Vision for Patient-centered Pharmacies" in 2015, and the "Health Support Pharmacy Certification System" was launched in 2016, providing pharmacies with a health support function

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that meets the needs of patients. Certification requirements include functions to support self-medication, such as advice on the safe and proper use of drugs and consultation on maintaining and promoting health.⁸

A study of the factors that influence the desire of customers to consult a pharmacist when purchasing an OTC drug (consultation intention) revealed that "realizing that the content of the advice was useful" has the greatest impact.⁹ It has also been shown that there is a positive correlation between OTC drug purchases by customers, the use of pharmacists as information providers, and consultations at pharmacies as information channels. Moreover, OTC drug purchasers who place importance on the individuality of information were reported to have a stronger tendency to consult pharmacists and pharmacies.¹⁰ Therefore, pharmacists play an important role in the informed choice of purchasers by providing personalized information and advice based on evidence on the efficacy and safety of OTC drugs.

However, only a few studies have examined pharmacists' perceptions and practical experiences of EBP. For example, a survey of evidence-based OTC counseling conducted among community pharmacists in Northern Ireland showed that although 88.3% (181/205) of the respondents had detailed knowledge about the concept of EBP, only 38.0% (78/205) were familiar with the methods for critically appraising research articles, and only 7.8% (16/205) practiced EBP on a daily basis.¹¹ In addition, a survey conducted in the United Arab Emirates compared the perceptions and implementation status of EBP among community pharmacists and reported that the mean score of EBP practice was lower than that of perceptions of EBP, and there was a remarkable positive correlation between the perceptions and implementation status of EBP.⁴ Therefore, although it has been suggested that there is a gap between pharmacists' perceptions and practices of EBP, only a few studies have examined how perceptions of EBP are associated with its implementation status.

This study aimed to examine the association between pharmacists' perceptions of EBPs and their implementation of OTC counseling.

METHODS

Study design

This study was based on a web survey without any interventions taking place.

Patients or the public were not involved in the design, conduct, reporting, or dissemination plans of our research.

Subjects

The selection criteria were as follows: pharmacists currently working at community pharmacies or drug stores in Japan who had experience selling OTC drugs for more than 1 year and agreed to participate in the survey. Pharmacists working in hospitals or clinics were excluded from this study. The recruitment of pharmacists matching the criteria and conducting the survey were outsourced to a web-based research agency.

Estimation of sample size

With a population of 180,000 (the number of pharmacists working in pharmacies in Japan), a confidence level of 95%, a margin of error of 10%, and a response probability of 0.5, the required sample size was calculated to be 96.0 subjects.

$$n = 1.96^2 \times 0.5 (1 - 0.5) / 0.1^2$$

Thus, a minimum sample size of 100 subjects was ensured.

Survey method

The Nextit Research Institute, Inc. (<https://www.nextit.co.jp/>; Kobe, Japan), which specializes in web surveys, was informed of the conditions for selecting (or excluding) pharmacists, the required sample size and survey items, and was requested to recruit respondents and implement the web-based survey.

Recruitment was conducted among pharmacists who met the eligibility requirements among a nationwide panel of pharmacists in Japan registered with the Medical Marketing Promotion Research survey of pharmacists by NEGGIT Research Institute, Inc. This Institute recruits response monitors online, using financial incentives, requiring the respondents to be aware of societal commitments. There is also a nationwide system of peer collaboration to ensure sufficient samples and minimize sample bias.

Consent for taking part in the survey was obtained by posting an explanation of the purpose of the study on the opening screen of the web-based survey and requesting correspondents who agreed to participate in the survey to click a button to indicate their consent to participate in the survey.

The collected data were provided to the authors as a DB file (Excel file) that did not include personal information. The survey period was from September 19, 2020, to October 30, 2020.

Survey items

The survey items included respondent attributes (gender, age, place of work, and final educational background), pharmacists' perceptions of EBP (hereafter, perceptions of EBP), and skills based on their experience in practicing OTC counseling (hereafter, practical experience). EBP and practical experience questionnaires were designed based on the scale used in a previous study.¹¹ With the assistance of a pharmaceutical English expert, the English questions were translated into Japanese and then back-translated into English to ensure the validity of the Japanese-translated questions. For questions about perceptions of EBP, the following six items were set: "I have detailed knowledge about the steps for practicing EBM (Steps for practicing EBM)," "I know methods for conducting comprehensive literature searches (Knowledge of literature search)," "I know methods for critically appraising research articles (Knowledge of critical appraisal)," "I conduct literature searches as part of my daily work (Practice of literature search)," "I conduct a critical appraisal of research articles as part of my daily work (Practice of critical appraisal)," and "Practicing evidence-based work improves the quality of patient services (EBP and quality of services)." The following factors were



identified as components of quality patient services based on Tadokoro's study: (1) knowledge, (2) clinical reasoning and experience, (3) attitude, (4) skills, and (5) quantity of practice.¹² Additionally, for questions about practical experience, the following six items were set based on past practical experience: "Sufficient evidence-based information on OTC drugs has been obtained (Need fulfilment level for evidence information)," "Evidence-based OTC guidelines would have been helpful (Need for OTC guidelines)," "One of the reasons for the difficulty in implementing evidence-based response in OTC drugs has been product advertisement (Perceptions of product advertisement)," "Evidence-based responses have been easier to implement when responding according to symptoms than when responding to requests for specific products (Relationship between brand-specific purchases and EBP)," "Patient selection has been more important than evidence of effects when responding to the requests for products (Prioritization of evidence-driven selection and patient requests)," and "Tools that can be used in practice to support triage for the selection of OTC drugs and the recommendations of medical consultation would have been convenient (Need for tools to support OTC counseling)." Respondents were asked to respond on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Before conducting this survey, a pilot survey was carried out with 50 pharmacists to assess the validity of question-wording translated into Japanese, with resultant corrections.

Statistical methods

The 5-point responses regarding perceptions of EBP were converted into scores, and their sum was regarded as perceptions of EBP (overall). Thereafter, the presence or absence of differences by final educational background ("4-year pharmacy program graduate" and "Other than 4-year pharmacy program graduate") was compared using Student's t-test.

Furthermore, the association between perceptions of EBP and practical experience was examined by calculating Spearman's ρ with bivariate correlation analysis using the scores for each question. SPSS for Windows version 25.0 (SPSS Inc., Chicago, IL, USA) was used for the analysis, and the significance level was set at 5%.

Ethics approval

In the pre-screening stage of the research ethics review within the authors' institution, it was concluded that this study did not require a research ethics review for the following reasons:

- (1) No handling of personal information was carried out.
- (2) No material was collected from a human body.
- (3) The use of a web-based questionnaire involved no bodily stress or invasiveness.
- (4) The participants provided the responses voluntarily, and the content of the questions was not expected to cause psychological distress.

We paid close attention to information security so that the

information from the web-based questionnaire would remain confidential. Moreover, the survey contractor and researchers assumed responsibility for protecting the privacy and human rights of respondents as well as for storing and disposing of information (including materials related to the information used in the study).

RESULTS

Respondent attributes

The total number of pharmacist panel members was 3,342, of which 392 met the eligibility criteria. Of these, 349 agreed to participate in the survey and responded (response rate: 89.0%). Data containing outliers (the screening question, where the number of OTC items handled at the pharmacist's work location is a missing value or an outlier such as 0) were excluded, and 250 respondents were included in the analysis (valid response rate: 63.8%). Among these, 56% were male, and the mean age of the respondents was 43.1 (SD = 10.3) years. In addition, 60% of the respondents worked at community pharmacies, whereas 40% worked at drug stores with pharmaceutical dispensing facilities. With regard to final educational background, 68% of respondents graduated from a 4-year program at a pharmacy faculty (Figure 1).

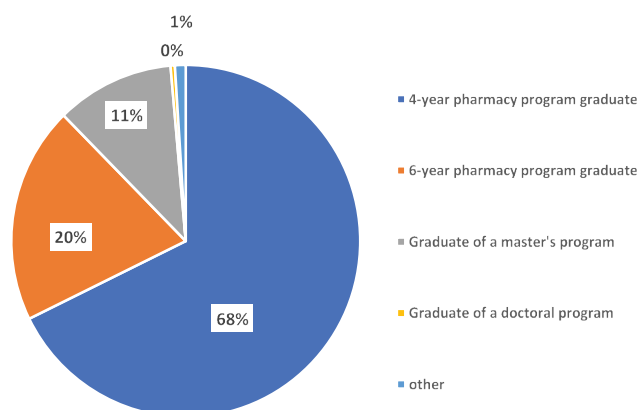


Figure 1. Final educational background (N = 250)

Perceptions of EBP

The value of Cronbach's alpha, a measure of reliability, was 0.9. Regarding the items related to the process of EBP, more than 30% of respondents answered "Strongly agree" or "Agree" to the following three items: "I have detailed knowledge about the steps for practicing EBM," "I know methods for conducting a comprehensive literature search," and "I conduct a literature search as part of my daily work." In contrast, less than 30% answered "Strongly agree" or "Agree" to the following two items: "I know methods for critically appraising research articles" and "I conduct a critical appraisal of research articles as part of my daily work." On the contrary, 70% responded "Strongly agree" or "Agree" to the item "Practicing evidence-based work improves the quality of patient services" (Figure 2).

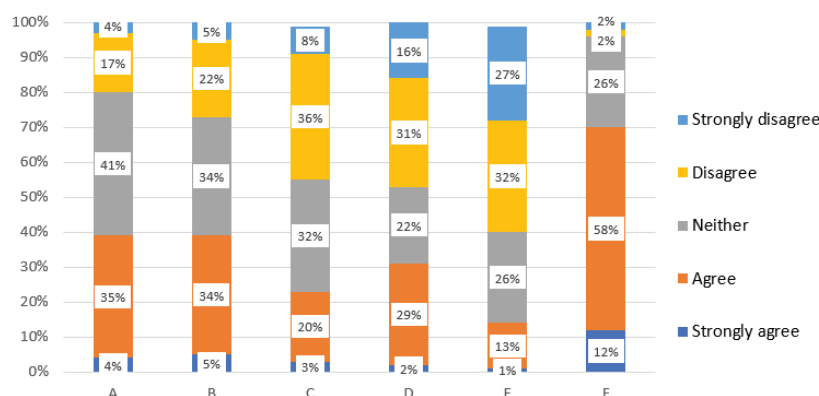


Figure 2. Perceptions of evidence-based practice (N = 250)

- A. I have detailed knowledge about the steps for practicing “evidence-based medicine (EBM).”
- B. I know methods for conducting a comprehensive literature search.
- C. I know methods for critically appraising research articles.
- D. I conduct literature searches as part of my daily work.
- E. I conduct a critical appraisal of research articles as part of my daily work.
- F. Practicing evidence-based work improves the quality of patient services.

Practical experience

The value of Cronbach’s alpha was 0.7. More than 60% of respondents answered “Strongly agree” or “Agree” to the following three items: “Evidence-based OTC guidelines would have been helpful,” “Tools that can be used in practice to support triage for the selection of OTC drugs and the recommendations of medical consultation would have been convenient,” and “Evidence-based responses were easier to implement when responding according to symptoms than when responding to requests for specific products.” On the contrary, only 31% responded “Strongly agree” or “Agree” to the item “Sufficient evidence-based information on OTC drugs has been obtained” (Figure 3).

Association between perceptions of EBP and final educational background

In general, respondents who had an educational background “Other than 4-year pharmacy program graduate” had a high mean score, and significant differences were found in the following three items: “I know methods for conducting a comprehensive literature search” ($P = 0.008$), “I know methods for critically appraising research articles” ($P = 0.004$), and “Practicing evidence-based work improves the quality of patient services” ($P = 0.012$) (Table 1).

Association between perceptions of EBP and practical experience

An association between perceptions of EBP and practical

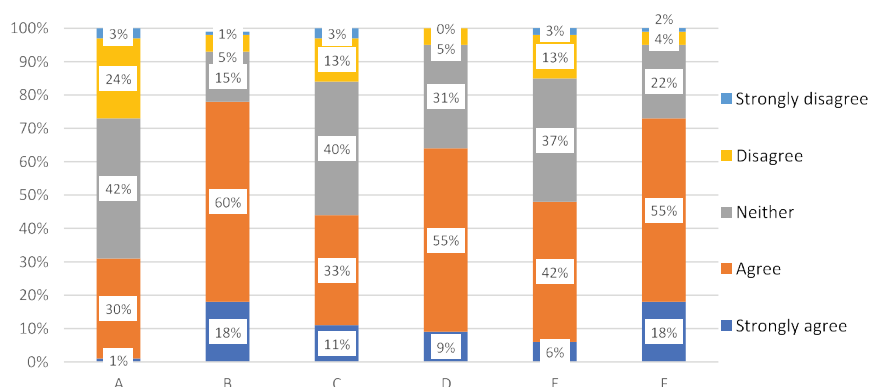


Figure 3. Experience in evidence-based practice (N = 250)

- A. Sufficient evidence-based information on over-the-counter (OTC) drugs has been obtained.
- B. Evidence-based OTC guidelines would have been helpful.
- C. One of the reasons for the difficulty in evidence-based response to OTC drugs has been product advertisement.
- D. Evidence-based responses have been easier to implement when responding according to symptoms than when responding to requests for specific products.
- E. Patient selection has been more important than evidence of effects when responding to requests for products.
- F. Tools that can be used in practice to support triage for the selection of OTC drugs and recommendations of medical consultation would have been convenient.

experience was observed, and “steps for practicing EBM” was associated with “Need fulfillment level for evidence information” ($p = 0.329$), “Relationship between brand-specific purchases and EBP” ($p = 0.240$), “Perceptions of product advertisement” ($p = 0.227$), and “Need for OTC guidelines” ($p = 0.208$). Of the items related to practical experience, the four items above also showed an association with “Knowledge of literature search” ($p = 0.300, 0.195, 0.249, \text{ and } 0.132$, respectively). Moreover, the “Practice of literature search” was associated with the “Need for OTC counseling support tools” ($p = 0.150$), in addition to the four items indicated at the beginning

of this section ($p = 0.250, 0.160, 0.189, \text{ and } 0.150$, respectively). Additionally, both “Need fulfillment level for evidence information” and “Perceptions of product advertisement” showed an association with “Knowledge of critical appraisal” ($p = 0.219 \text{ and } 0.188$, respectively) and “Practice of critical appraisal” ($p = 0.215 \text{ and } 0.200$, respectively). Furthermore, “EBP and quality of services” showed an association with the “Need for OTC guidelines” ($p = 0.304$), “Perceptions of product advertisement” ($p = 0.173$), “Relationship between brand-specific purchases and EBP” ($p = 0.206$), and “Need for OTC counseling support tools” ($p = 0.262$) (Table 2).

Table 1. Association between perceptions of EBP and final educational background

Item	4-year pharmacy program graduate (n=169)	Other than 4-year pharmacy program graduate (n=81)	P
	Mean score (SD)	Mean score (SD)	
I have detailed knowledge about the steps for practicing “evidence-based medicine (EBM).”	3.2 (0.92)	3.3 (0.81)	0.469
I know methods for conducting comprehensive literature search.	3.0 (0.97)	3.4 (0.92)	0.008
I know methods for critically appraising research articles.	2.6 (0.98)	3.0 (0.94)	0.004
I conduct literature search as part of my daily work.	2.7 (1.11)	2.8 (1.14)	0.746
I conduct critical appraisal of research articles as part of my daily work.	2.3 (1.03)	2.4 (1.07)	0.490
Practicing evidence-based work improves the quality of patient services.	3.7 (0.72)	4.0 (0.61)	0.012

SD: standard deviation

Table 2. Association between perceptions of EBP and practical experience

	A. Steps for practicing EBM	B. Knowledge of literature search	C. Knowledge of critical appraisal	D. Practice of literature search	E. Practice of critical appraisal	F. EBP and quality of services
a. Need fulfillment level for evidence information	0.329**	0.300**	0.219**	0.250**	0.215**	0.053
b. Need for OTC guidelines	0.208**	0.132*	0.058	0.150*	0.028	0.304**
c. Perceptions of product advertisement	0.227**	0.249**	0.188**	0.189**	0.200**	0.173**
d. Relationship between brand-specific purchases and EBP	0.240**	0.195**	0.096	0.160*	0.095	0.206**
e. Prioritization of evidence-driven selection and patient requests	-0.034	0.029	0.007	-0.057	-0.011	-0.034
f. Need for tools to support OTC counseling	0.042	0.103	0.097	0.150*	0.062	0.262**

Values in the table are correlation coefficients (* $P < 0.05$, ** $P < 0.001$)

DISCUSSION

The study findings of an association between community pharmacists' perceptions of EBP and their experience practicing OTC counseling are the first such results in Japan. The findings suggest that improved knowledge and practice skills regarding the steps of EBM practice (specifically, literature search and critical appraisal, the basis of EBP) facilitated access to the required information. However, the percentage of respondents who “Strongly agree” or “Agree” with the statement “I know how to conduct a comprehensive literature search and critical appraisal of research articles” was higher than that of those who “Strongly agree” or “Agree” with the statement “I conduct

a literature search and its critical appraisal as part of my daily work.” This result suggests that there is a gap between the perception of EBP and its practice.

The perception of EBP was related to the educational background, with respondents with “Other than a 4-year pharmacy degree” being more skilled in literature searches and critical appraisal, possibly due to the extension in 2006 of study at Japanese pharmacy schools from 4 to 6 years and the gradual enhancement of EBM education. Nevertheless, no significant differences were observed in the routine practice of literature searches and critical appraisal based on participants' educational backgrounds. This finding reinforces the notion



that knowledge acquisition has not yet been translated into actual practice.

Furthermore, we found that "Evidence-based practices improve the quality of patient care" correlated with the "Need for OTC guidance and tools" to support EBP practices and "Inappropriate advertising" and "Brand-specific purchasing" that inhibit EBP, whereas none of the perception items correlated with "Providing OTCs that prioritize patient choice over evidence of efficacy."

Previous research indicates that only 40% of pharmacists select OTC based on EBP, and data from OTC clinical trials may not be well used by pharmacists in OTC counseling.^{6,13} Pharmacists may also focus on safety rather than evidence of efficacy when recommending OTC.¹⁴ Pharmacists' main criteria for OTC selection devolve from personal use experience and consumer feedback, and they may be reluctant to discuss the rationale for OTC selection with consumers.^{15,16} Factors influencing OTC counseling include "The responsiveness of the consumer" and "Brand-specific purchases," while "Familiarity with the name and brand" influences consumer purchase of OTC.^{17,18} Based on these findings and those from the current study, the importance of EBP training for OTC counseling is highlighted.

The educational strategy for EBP in health services is based on acquiring EBM steps and practical training through lectures and workshops (especially critical appraisal and literature application).² However, the educational effect of guideline-based OTC counseling for pharmacists is limited, and improved questioning skills to identify symptoms may encourage better OTC recommendations.¹⁹ Therefore, a multifaceted approach is needed to promote EBP, including educational, policy, and practice interventions.²⁰

Combining EBM education with practical communication training at universities is essential, starting from the clinical situation of OTC counseling. A system wherein OTC counseling cases in clinical settings are collated is required, and the appropriateness of OTC selection (counseling recommendation) must be retrospectively evaluated. These developments may support guidelines and tools to enable evidence-based OTC counseling, including scientific data and consumer information.

Limitations

As this survey was conducted online, it is possible that the study did not obtain responses from pharmacists unfamiliar with web-based surveys. This might have resulted in selection bias if perceptions of EBP and practical experience differed significantly between non-respondents and respondents. However, a study comparing electronic keypad responses with responses to paper questionnaires reported a high correlation between the responses obtained using the two methods.²¹ In addition, the respondents recruited by the web research company were distributed nationwide, and a web interface was constructed so that respondents could respond efficiently. Furthermore, as the statistical analysis was performed using

accurate responses that exceeded the pre-calculated required sample size, the findings obtained from this study were judged to reflect a general trend.

CONCLUSIONS

The findings of the current study indicate that pharmacists' perception of EBP is connected to their experience in OTC counseling and their implementation of EBM practice steps, which are fundamental aspects of EBP. Moreover, engaging in EBM practices assists pharmacists in accessing evidence and obtaining the required information for their practice. However, knowledge is not yet associated with the quality of OTC counseling in practice. Therefore, multifaceted educational interventions must be implemented, and they must be linked to practice.

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DATA SHARING STATEMENT

Data are available from the corresponding author upon reasonable request.

CONSENT

We have read and agree to the privacy policy.

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CONFLICTS OF INTEREST

The authors have no relevant financial or non-financial interests to disclose.

AUTHORS' CONTRIBUTIONS

NU analyzed the data and wrote the manuscript. MS assisted with data organization. MO conceptualized and conducted the research, managed the project, and supervised the writing of the manuscript.



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