

Revisiting Evidence-Based Medicine in Online Breastfeeding Management Training for Medical and Pharmacy Students

Elizabeth*, Lisa Aditama, Astrid Pratidina Susilo

Fakultas Farmasi, Universitas Surabaya, Raya Kalirungkut, Surabaya 60293

*Corresponding author: lisa_aditama@staff.ubaya.ac.id

Abstract — Introduction: Evidence-Based Medicine (EBM) is essential for informed clinical decision-making. Despite efforts to integrate EBM into medical and pharmacy education in Indonesia, challenges remain. This study examines a critical appraisal assignment integrated into an online breastfeeding management training module specifically designed to enhance medical and pharmacy students' EBM competencies in the context of breastfeeding. The research aimed to evaluate the effectiveness of the critical appraisal assignment in developing participants' skills applying EBM principles to address clinical questions in breastfeeding. Methods: An online breastfeeding training program consisting of six sessions was conducted on the XXX platform and opened to volunteer medical and pharmacy students. In the third session, participants were assigned to conduct a critical appraisal of a published study on breastfeeding. The assignment results were analyzed descriptively. Results: The analysis of the assignments' critical appraisal revealed that participants struggled to correctly appraise the article. Out of five questions, only two were answered correctly by all participants. This indicates that the students need to improve their critical skills in EBM. Conclusion: To improve the effectiveness of EBM education, future learning strategies should incorporate both demonstration and procedural texts. These strategies can provide students with practical support in conducting a critical appraisal.

Keywords: Evidence-Based Medicine; Breastfeeding; Critical Appraisal; Medicine; Pharmacy

Abstrak— Pendahuluan: Kedokteran Berbasis Bukti (*Evidence-Based Medicine* atau EBM) sangat penting untuk pengambilan keputusan klinis yang tepat dan berdasar. Meskipun telah ada upaya untuk mengintegrasikan EBM ke dalam pendidikan kedokteran dan farmasi di Indonesia, berbagai tantangan masih tetap ada. Studi ini mengkaji tugas telaah kritis yang diintegrasikan ke dalam modul pelatihan daring mengenai manajemen menyusui, yang dirancang khusus untuk meningkatkan kompetensi EBM mahasiswa kedokteran dan farmasi dalam konteks menyusui. Penelitian ini bertujuan untuk mengevaluasi efektivitas tugas telaah kritis tersebut dalam mengembangkan keterampilan peserta menerapkan prinsip-prinsip EBM untuk menjawab pertanyaan klinis terkait menyusui. Metode: Sebuah program pelatihan menyusui daring yang terdiri dari enam sesi dilaksanakan pada platform XXX dan terbuka bagi mahasiswa kedokteran dan farmasi yang bersedia berpartisipasi secara sukarela. Pada sesi ketiga, peserta diberi tugas untuk melakukan telaah kritis terhadap sebuah studi yang telah dipublikasikan mengenai menyusui. Hasil tugas tersebut dianalisis secara deskriptif. Hasil: Analisis terhadap tugas telaah kritis menunjukkan bahwa peserta mengalami kesulitan dalam melakukan penilaian artikel secara tepat. Dari lima pertanyaan yang diajukan, hanya dua yang dijawab dengan benar oleh seluruh peserta. Hal ini mengindikasikan perlunya peningkatan keterampilan berpikir kritis mahasiswa dalam penerapan EBM. Kesimpulan: Untuk meningkatkan efektivitas pendidikan EBM, strategi pembelajaran di masa mendatang sebaiknya mengintegrasikan metode demonstrasi serta penggunaan teks prosedural. Strategi-strategi ini dapat memberikan dukungan praktis bagi mahasiswa dalam melakukan telaah kritis.

Kata kunci: Pengobatan Berbasis Bukti; Menyusui; Penilaian Kritis; Kedokteran; Farmasi

Introduction

In Indonesia, many breastfeeding mothers ask healthcare professionals about benefits of katuk leaves for breast milk production. Healthcare practitioners require evidence-based information regarding safe medications for breastfeeding and foods and drinks to avoid or consume during breastfeeding. Healthcare professionals need evidence-based medicine (EBM) to seek reliable sources of scientific evidence to support arguments and defend their clinical practices for each patient unique situation[1]. Addressing these concerns requires healthcare practitioners to critically appraise and apply the best available, current, valid, and relevant evidence to clinical decision-making while considering individual patient values and circumstances [2,3].

Evidence-based medicine (EBM) education in Indonesia began with a series of intensive training programs and was subsequently integrated into medical and pharmacy curricula [4]. This integration aims to prepare future healthcare practitioners to apply their knowledge and skills in clinical practice while developing the capacity for lifelong learning and adaptation to evolving healthcare needs [5]. For undergraduate students, EBM education extends beyond research skills to developing the ability to effectively utilize research evidence in clinical decision-making [6].

Therefore, integrating EBM into medical and pharmacy curricula can support the development of students' ability to critically appraise and apply research evidence to clinical practice [6,7].

To strengthen EBM skills, students need continued practice through structured training programs that are contextually relevant to clinical practice. In this educational innovation, EBM was integrated into an online breastfeeding management training by assigning a critical appraisal task. While previous studies have evaluated EBM skills among pharmacy students using validated questionnaires[8], there is limited evidence assessing critical appraisal skills through assignment results, which reflect their ability to apply EBM. This study addresses that gap.

Material and Methods

The online breastfeeding management training was conducted through the XXX platform. The online format was chosen for its flexibility, accessibility, and broader reach. The instructors were teachers from the faculties of medicine and pharmacy.

Participants were third- and fourth-year medical and pharmacy students from a private university in Surabaya. This study was approved by the institutional ethics committee of Universitas Surabaya (No. 461/KE/XII/2024). All the participants provided written informed consent. The pharmacy students had previously received comprehensive Evidence-Based Medicine (EBM) education, including types of evidence, research design, bias assessment, systematic reviews, and application of evidence. While the medical students had been introduced to this type of research but had limited experience in critical appraisal, this training facilitated interprofessional collaboration, allowing students to learn from each other in identifying the best scientific evidence to answer clinical questions.

The program ran from July to August 2023 and consisted of six sessions with various assignments. In the third session, participants critically appraised a quasi-experimental research article to answer the question, "Can katuk leaf decoction affect breast milk production in breastfeeding mothers?" [9] After receiving initial instructions on critical appraisal via video, participants completed the assignment in groups using a five-question checklist.

This study analyzed a critical appraisal task from the third session, which aimed to improve participants' ability to apply EBM to clinical decision-making. The checklist focused on key aspects of randomized controlled trials (RCTs), considered the gold standard for minimizing bias and assessing cause-and-effect relationships. However, the analyzed articles were quasi-experimental, so participants were expected to identify gaps. These five questions were as follows [10] :

1. Were the study participants randomized? And was the randomization table concealed?
2. Were the characteristics of the two groups comparable before the in
3. Were the patients and researchers blinded to the treatment?
4. Aside from the drug or treatment given, did the groups receive the same treatment?
5. Were all patients participating in the clinical trial included in the final
analysis? And were they analyzed in the original group during randomization?

We analyzed the assessment results using descriptive statistics to determine the percentage of groups that answered correctly in this critical appraisal assignment.

Results and Discussion

We analyzed the critical appraisal assignments and reflected on the results. The answers to the five questions from the six groups are shown in Table 1. We added a column showing the correct answer. The group discussion results showed that all groups agreed that the study participants were randomized, as indicated by the randomization table (Question 1), and that the characteristics of the two study groups were comparable before the intervention (Question 2). However, in Question 3, some groups stated that patients and researchers were blinded to the treatment, while others considered the information unclear. For Question 4, all groups agreed that the study groups did not receive the same treatment. In Question 5, all groups agreed that all study participants who participated in the clinical trial should be included in the final analysis.

Table 1

Groups' answer to each question

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Correct Answer
Question 1	Yes, there is a randomization table	Yes, there is a randomization table	Yes, there is a randomization table	Yes, there is a randomization table	Yes, there is a randomization table	Yes, there is a randomization table	No, the type of research is a quasi-experiment that does not use randomization techniques
Question 2	Yes, the characteristics of both groups are comparable	Yes, the characteristics of both groups are comparable	Yes, the characteristics of both groups are comparable	Yes, the characteristics of both groups are comparable	Yes, the characteristics of both groups are comparable	Yes, the characteristics of both groups are comparable	Unclear, the characteristics of each group are not explained so it cannot be said that they are comparable or not
Question 3	No	No	No	Unclear	Unclear	Unclear	No, patients and researchers were aware of the treatment. The intervention group was given boiled katuk leaf water,

							while the control group was given nothing.
Question 4	No	No	No	No	No	No	No, the control group was not given any treatment
Question 5	Yes	Yes	Yes	Yes	Yes	Yes	Yes, no patients dropped out

This study revisited an Evidence-Based Medicine (EBM) assignment in an online breastfeeding management training for medical and pharmacy students. Of the five questions, only two were answered correctly by all participants, indicating room for improvement in their critical appraisal skills, particularly in study design, subject comparisons, and blinding procedures. Although participants concluded that the article was valid, they were unable to answer the relevant clinical question of whether katuk leaf extract could be recommended for breastfeeding mothers. This reflects limited skills to apply critical appraisal findings to clinical decision-making.

The analysis of the first question showed that participants were unable to correctly identify the study design, as the study used a quasi-experimental design without randomization. For the second question, participants did not understand how to assess whether the two study groups were comparable. For the third question, participants failed to provide a clear justification for the blinding procedure. The article did not explain the blinding or the placebo in the control group, indicating that both the researchers and participants were aware of the treatment being administered.

The fourth question demonstrated a better understanding, as all participants correctly identified the difference in treatment between the intervention and control groups. The final question consisted of two parts. All participants correctly answered "Yes" to the first part, as no participants dropped out of the study. However, none answered the second part, which asked whether all patients were analyzed in their original groups, indicating that this question was missed.

Students' difficulties in implementing EBM may have been influenced by the online training format, which can limit interaction and opportunities for immediate clarification. Although participants were instructed to complete the critical appraisal task in groups, the activity was conducted without direct, real-time facilitation from instructors. The instructional video and group-based discussion may therefore have been insufficient to demonstrate the step-by-step process of critically appraising scientific articles. Previous research suggests that structured critical appraisal training incorporating multimedia-based instruction and online workshops may improve students' knowledge and confidence in applying critical appraisal skills [11]. However, previous research has also shown that structured peer-led teaching can effectively support the development of critical appraisal skills [12]. This difference may be related to the level of instructional support provided during the learning process, as the present training relied on group-based learning without direct facilitation during the appraisal process. Furthermore, although participants had prior exposure to EBM or research methods, they remained unable to effectively apply that knowledge. These findings align with previous research indicating that increases in EBM-related knowledge and confidence are not accompanied by the effective application of EBM skills in clinical practice [13].

Despite these limitations, online training remains a viable option because it can reach a larger number of participants across different locations. To improve learning outcomes, we recommend integrating demonstration-based methods, procedural texts providing clear step-by-step guidance for critical appraisal, and interactive workshops, supported by initial EBM review sessions and guided case studies to facilitate the application of EBM skills to clinical questions

[8,13-15].

In addition to these factors, the materials used for critical appraisal may also have influenced participants' performance. One limitation of this study is that the selected articles employed a quasi-experimental design and presented data unclearly, which may have hindered participants' ability to identify key methodological elements and conduct a thorough critical appraisal. Therefore, the findings should be interpreted with caution.

Conclusions

The critical appraisal assignment provided an opportunity for medical and pharmacy students to apply EBM principles to breastfeeding-related clinical questions; however, participants demonstrated limited ability to critically appraise the study. These findings suggest that the assignment alone was insufficient to develop critical appraisal skills. Future EBM learning should incorporate demonstration-based methods, procedural texts, and guided case studies to provide clearer and more structured support for applying EBM principles in clinical practice.

References

1. 'Malloch K, 'Porter-O'Gradu T. Introduction to Evidence-Based Practice in Nursing and Health Care. 2nd ed. Jones & Bartlett Publisher; 2009.
2. Tikkinen KAO, Guyatt GH. Understanding of research results, evidence summaries and their applicability—not critical appraisal—are core skills of medical curriculum. *BMJ Evid Based Med*. 2021;26(5):231-233. doi:10.1136/bmjebm-2020-111542.
3. Chow N, Gallo L, Busse JW. Evidence-based medicine and precision medicine: complementary approaches to clinical decision-making. *Precis Clin Med*. 2018;1(2):60-64. doi:10.1093/pcmedi/pby009
4. Sastroasmoro, S. (2013). Implementing evidence-based medicine practice in Indonesia: Before, now, and the future. *International Journal of Pediatric Endocrinology*, 2013(Suppl 1), O4.
5. Wynne K, Mwangi F, Onifade O, Abimbola O, Jones F, Burrows J, et al. Readiness for professional practice among health professions education graduates: a systematic review. *Front Med (Lausanne)*. 2024;11:1472834. doi:10.3389/fmed.2024.1472834.
6. Kumaravel B, Jenkins H, Chepkin S, Kirisnathas S, Hearn J, Stocker CJ, et al. A prospective study evaluating the integration of a multifaceted evidence-based medicine curriculum into early years in an undergraduate medical school. *BMC Med Educ*. 2020;20:278. doi:10.1186/s12909-020-02140-2.
7. Li XH, Zhang Q, Li C, Yin YL, Yang Z, Fu Y, et al. Examination of learning ability development through the implementation of the "autonomy-collaboration" learning mode grounded in evidence-based medicine practice. *BMC Med Educ*. 2024;24:651. doi:10.1186/s12909-024-05447-6.
8. Abu-Gharbieh, E. (2015). Refining knowledge, attitude, and practice of evidence-based medicine (EBM) among pharmacy students for professional challenges. *Saudi Pharmaceutical Journal*, 23(2), 162–166. <https://doi.org/10.1016/j.jsps.2014.07.006>
9. Situmorang, T. S. (2019). Pengaruh konsumsi air rebusan daun katuk terhadap pengeluaran produksi ASI pada ibu nifas di Bidan Praktek Mandiri Manurung Medan tahun 2018. *Indonesian Trust Health Journal*, 1(2), 55–60. <https://doi.org/10.37104/ithj.v1i2.13>
10. Sastroasmoro, S. (2014). Menelusur asas dan kaidah evidence-based medicine: Buku kajian mandiri (Exploring the principles and rules of evidence-based medicine) (1st ed.). Sagung Seto.
11. Varai S, Kaur M, Kaur M, et al. Critical appraisal skills training to undergraduate medical students: a randomized control study. *J Educ Health Promot*. 2022;11:302. doi:10.4103/jehp.jehp_1716_21.
12. Widyahening IS, Findyartini A, Ranakusuma RW, Dewiasty E, Harimurti K. Evaluation of the role of near-peer teaching in critical appraisal skills learning: a randomized crossover trial. *Int J Med Educ*. 2019;10:9-15. doi:10.5116/ijme.5c39.b55b.
13. Stack MA, DeLellis NO, Boeve W, Satonik RC. Effects of teaching evidence-based medicine on physician assistant students' critical appraisal, self-efficacy, and clinical application: a randomized controlled trial. *J Physician Assist Educ*. 2020;31(3):159-165. doi:10.1097/JPA.0000000000000313.
14. Lee AE, Ardissino M, Bednarczuk NF, Tennyson M, Khajuria A. Prospective assessment of a critical appraisal teaching programme on medical students' confidence and performance in appraising medical literature. *J R Coll Physicians Edinb*. 2020;50(1):60-66. doi:10.4997/JRCPE.2020.118.

15. Daou D, Chakhtoura M, El-Yazbi A, Mukherji D, Sbaity E, Refaat MM, et al. Teaching critical appraisal to large classes of undergraduate medical students using team-based learning versus group discussions: a randomized controlled trial. *BMC Med Educ.* 2022;22:77. doi:10.1186/s12909-022-03145-9