ORIGINAL ARTICLE

Comparing Learning Media on Evidence-Based Practice Program for Nurses: A Quasi-Experimental Study

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ABSTRACT

Introduction: The perception that research results are ineffective is the primary driver in implementing scientific evidence-based practice. A comprehensive, evidence-based practice (EBP) education model must be developed to improve nurses' cognitive, affective, and psychomotor aspects of EBP. This study aims to determine the effect of multifaceted EBP programs on the attitudes, skills, use, and barriers nurses perceive. **Methods:** A quasi-experimental study with a non-equivalent control group pre-test and post-test design was held at two teaching hospitals in West Sumatera, Indonesia. Hospital randomization was performed to determine the intervention and control groups. Respondents were taken using the convenience sampling method. The sample size calculation using the hypothesis formula for the difference in the proportions of the two groups, obtaining 25 respondents per group. The Evidence-Based Nursing Practice Questionnaire was used to collect EBP data. The researcher delivered the educational program interventions for the intervention group using learning modules provided through workshops, case studies, and demonstrations while the control group read the booklet. The data were analyzed using the t-test, Mann-Whitney, and Wilcoxon.**Results**: A total of 45 nurses participated in this study. There were any differences in age and working period between groups. The results revealed the effect of the EBP education program intervention using multifaceted learning media modules on the average subscale scores of attitudes (p = 0.007), skills (p = 0.016), and the use of EBP (p = 0.029) in the treatment group. Similarly, the use of booklets influenced the mean subscale scores of attitudes (p = 0.005), skills (p = 0.000), barriers (p = 0.008), and use of EBP (p = 0.000) in the control group. **Conclusion:** Appropriate methods and learning media are needed to improve the aspects of attitudes, skills, and application of EBP by paying attention to the characteristics of age and working period.

Keywords: Attitude, Booklet, Educational program, Evidence-based practice, Media, Nurses, Skills, Use of EBP

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INTRODUCTION

Evidence-based practices (EBP) is a fundamental approach to patient safety and quality of health services [1], and job satisfaction [2]. The literature has primarily discussed the influence of EBP on patient outcomes and health care costs [3]. Previous studies have reported that EBP improves patient outcomes and care quality, reducing variations in practices/procedures and health care costs [4–6]. Nurses with undergraduate degrees and registered nurses attended education with a curriculum in which there was no EBP course. Nurses were in the generation of industries revolutionary 2.0 where the development of computer and internet technology has not been fully spread evenly in Indonesia. Hence, nurses were less skilled in using web databases for literature searches and have little knowledge of search strategies. Our previous study in Indonesia revealed that nurses had a lack of knowledge, skills, attitudes, and application of EBP, and the main barrier was nurses felt that research had no value/benefit for practice, had limited time to read research results, and lack of nurse autonomy to change patient care procedures [7]. Thus, efforts are needed to improve this condition by establishing an evidence-based practice education model to enhance nurses' knowledge/understanding, skills, and attitudes towards EBP.

There have been several experimental studies involving EBP on knowledge, attitude, skills, and barriers perceived by nurses using some educational programs in the developed countries [8–11], while very little is known about the academic program using learning modules and booklet in the developing countries, like Indonesia, especially in West Sumatera Province.
Hence, the key objective of this study was to investigate the differences between an educational program using

a learning module and a booklet on the attitudes, skills, barriers nurses perceive, and use of EBP.

MATERIALS AND METHODS

Study Design and Setting
This research was a quasi-experimental study with a non-equivalent control group pre-test and post-test design. The population in this study was staff nurses at two teaching hospitals in Padang, Indonesia. Samples were taken using the convenience sampling method. Hospital randomization was conducted to determine the intervention group (learning module) and the control group (booklet).

Participants
The number of samples used in the study is calculated based on the formula of estimating the number of samples of different hypothesis tests two the proportion of pairs of groups of 25 respondents. The number of respondents in the intervention group who participated in the intervention program from the beginning to the end of the study was 21, and four were excluded because they did not take the post-test. Meanwhile, in the control group, the respondents who participated in the activity were 24 people.

Questionnaires
The Evidence-Based Nursing Practice Questionnaire was constructed in Indonesia using a 5-point Likert scale answer choice, except EBP barriers sub-scale using a 4-point Likert scale. The questionnaire consists of 27 items containing four sub-scales, nine items on attitudes toward evidence-based practice, five on belief in evidence-based practice skills, seven items on perception towards barriers to implementing EBP, and six items on the practice of evidence-based practice. The response format for the EBP attitude subscale is a 5-point Likert scale, namely from "strongly disagree" (1) to "strongly agree" (5). Responses to the EBP skill subscale range from "not at all sure" (1) to "very sure" (5). The response to the EBP barriers subscale is a 4-point Likert scale, ranging from "none" (1) to "very often" (4). Responses to the EBP use subscale were "never" (1) to "very often" (5).

Educational Program
Education about EBP and research use were provided through modules in the form of a learning media. Two nurse educators within the nursing faculty are knowledgeable in the EBP principles and nursing research developing the modules. The module contains educational content such as developing clinical questions to lead the further investigation, conducting literature reviews, reading, and criticizing research articles, and examples of the application of evidence into everyday practice. All three modules were given to staff nurses in the intervention group for one month to facilitate the development of content from the series and allow sufficient completion time. Each of the modules takes around 2 hours to be completed. The educational intervention method based on the learning module was held through workshops, case studies in formulating clinical questions using PICOT, and demonstrations of search engine databases, namely PubMed, ProQuest, and the Cochrane Library. Meanwhile, the control group received a booklet containing EBP information.

Data Collection Procedure and Analysis
Before data collection, the researcher explained the procedures and benefits of the study and sought respondents' agreement by signing the informed consent. Finally, respondents who completed the pre-intervention survey questionnaire and all three learning modules were invited to participate in the research post-intervention survey section.

An educational program begins with a 10-minute pre-test. The nurses were told that the EBP learning module would be available in the unit. After completing the EBP education program, the post-test design was given to respondents, and the score was compared to the pre-test score.

Statistical tests were performed to postulate the research hypothesis that there was an effect of the EBP educational program intervention using the learning module on differences in the mean scores of attitudes, skills, barriers, and the use of EBP before and after treatment. Quantitative data were analyzed using SPSS version 23.0 (SPSS Inc., Chicago, II, USA). Data normally distributed were presented in terms of the mean and standard deviation, while those not normally distributed were presented as median, minimum, and maximum values. Meanwhile, data such as age, education level, year of education completion, length of work, room, and previous EBP training were presented as frequency and percentage distributions.

An independent t-test was performed on normally distributed data, namely the mean score of the pre-test (attitudes and barriers) and post-test (attitudes, skills, barriers, and use of EBP) between the control and intervention groups. The dependent t-test was performed on the mean score between the pre-test and post-test of the intervention group (attitudes, skills, and barriers) and the control group (barriers and use of EBP). Meanwhile, Wilcoxon and Mann-Whitney tests were performed on data that were not normally distributed. A value of $p \leq 0.05$ was considered statistically significant.

Ethical Considerations
This research has obtained ethical approval from the Medical and Health Research Ethics Committee of the Faculty of Medicine, Universitas Andalas (368/KEP/FK/2018). Permission and approval to conduct the study were received from the President Director

of Dr. M. Djamil Hospital, Padang. Before the study, the researchers explained the aim of the research, confidentiality of information, and participants' right to withdraw at any time. All participants obtained informed consent for the study and publication of the results. The participants were anonymous during the analysis and presentation of results.

RESULT

Table I figured that there were no differences in the characteristics of nurses (education level, years of school graduation, wards, and previous EBP training) in the intervention and control groups (p>0.05). However, the two groups differed in age and length of employment. Generally, respondents in the intervention group were late adults (36-45 years) (n = 14), had an undergraduate education level, and were registered nurses (n = 18) with more than ten years of work experience (n = 24). In comparison, respondents in the control group were 20-30 years old (n = 24), had bachelor's degrees, and were registered nurses (n = 24); but had less than six years of work experience (n = 17).

Table I: Sociodemographic characteristic of the respondents

Character-istics	Catagories	Inter-vention group (n=21) n (%)	Control group (n=24) n (%)	pVal-ue	OR (95% CI)
Age	Early adult, 20-35 years	2 (9.52)	24 (100)	**0.000**	N/A
	Late adult, 36-45 years	11 (52.38)	0 (0)		
	Early elderly, 46-55 years	8 (38.10)	0 (0)		
Education level	Academy of Nursing, Mid-wifery	2 (9.52)	0 (0)	0.081	N/A
	Baccalaureate	17 (80.95)	24 (100)		
	Masters (MN)	2 (9.52)	0 (0)		
Year of graduate education	Old, < 2016	15 (71.43)	18 (75.00)	0,656	0.56 (0.13-2.34)
	New, ≥ 2016	6 (28.57)	4 (16.67)		Ref
	Missing data	0 (0)	2 (8.33)		
Working period	New, <6 years	0 (0)	17 (70.83)	**0.000**	N/A
	Moderate, ≥ 6 – 10 years	0 (0)	6 (25.00)		
	Old, ≥ 10 years	21 (100)	1 (4.17)		
Room	Inpatient room	13 (61.90)	17 (70.83)	1.000	1.15 (0.27-4.92)
	Intensive care unit	4 (19.05)	6 (25.00)		
	Missing data	4 (19.05)	1 (4.17)		Ref
EBP training previously	Yes, 1-3 hours	2 (9.52)	2 (8.33)	1.000	Ref
	No	19 (80.95)	19 (79.17)		0.90 (0.11-7.06)
	Missing data	3 (9.52)	3 (12.50)		

N/A = Not Available
Ref = Reference

Table II illustrated the mean score subscale and statement items on attitudes, skills, barriers, and use of EBP before and after treatment in both the intervention and control groups. Both groups increased the mean score on each subscale between before and after treatment. However, the mean score of the barriers subscale in the control group decreased, indicating reduced barriers.

The mean score of the attitude towards EBP was the highest of the other subscales. The mean score of the attitude subscale before treatment in the intervention group was from 3.75 to 4.04 after treatment. Likewise, the control group was initially from 3.54 to 3.84. Similarly, the EBP skill subscale in the intervention group was from 3.26 to 3.68, and in the control group, the mean score was initially 3.20 to 3.78. EBP increased from 2.83 to 3.02 in the intervention group and from 3.11 to 3.73 in the control group. The barrier subscale had the lowest mean total score in both groups.

Table II: The mean score subscale of EBNP between before and after in the intervention and control group

		Intervention		Control	
	Variable	Pretest	Posttest	Pretest	Posttest
Attitudes		**3.75 ±0.46**	**4.04 ±0.37**	**3.54 ±0,31**	**3.84 (2.00-4.44)**
1.	Current research findings are useful in the day to day management of my clients	4.00 (1-4)	5.00 (4-5)	4.00 (3-5)	4.00 (4-5)
2.	The adoption of evidence-based practice, however valuable as an ideal, places too many demands on my workload	4.00 (2-5)	4.00 (2-5)	3.00 (2-4)	2.00 (1-4)
3.	Evidence-based practice improves client care	4.00 (0-5)	5.00 (4-5)	4.00 (3-5)	5.00 (2-5)
4.	Evidence-based practice is limited in therapy because there is not enough research evidence	3.00 (2-5)	4.00 (2-5)	3.00 (2-4)	2.00 (1-4)
5.	Client-centred evidence-based practice	4.00 (2-4)	4.00 (2-5)	4.00 (2-4)	4.00 (2-5)
6.	Evidence-based practice is important for nursing care	4.00 (0-5)	4.00 (0-5)	4.00 (0-4)	4.00 (4-5)
7.	Clinical practice based on scientific evidence	3.00 (0-5)	3.00 (0-4)	3.00 (2-5)	4.00 (2-5)
8.	Your current attitude towards EBP	4.00 (4-5)	5.00 (4-5)	4.00 (4-5)	5.00 (4-5)
9.	Attitudes of your peers to EBS	4.00 (4-5)	4.00 (4-5)	4.00 (4-5)	5.00 (4-5)
Skills		**3.26 ±0.74**	**3.68 ±0.78**	**3.20 (2.00-4.00)**	**3.78 ±0.46**
1.	Literature search	4.00 (2-5)	4.00 (2-5)	3.00 (2-4)	4.00 (3-5)
2.	Determine what the research design is	4.00 (2-4)	4.00 (2-5)	3.00 (1-4)	3.50 (2-5)
3.	Evaluating the validity of a study	3.00 (2-5)	4.00 (2-5)	3.50 (2-5)	4.00 (3-5)

CONTINUE

Table II: The mean score subscale of EBNP between before and after in the intervention and control group

		Intervention		Control	
	Variable	Pretest	Posttest	Pretest	Posttest
Skills		**3.26 ±0.74**	**3.68 ±0.78**	**3.20 (2.00-4.00)**	**3.78 ±0.46**
4.	Determining the clinical significance of the study results	3.00 (2-4)	4.00 (2-5)	3.00 (2-5)	4.00 (2-5)
5.	Using the Cochrane Library's electronic database	3.00 (2-4)	4.00 (2-5)	3.00 (1-4)	4.00 (2-5)
Barriers		**2.46 ±0.50**	**2.61 ±0.55**	**2.72 ±0.44**	**2.41 ±0.62**
1.	Lack of time	2.00 (0-4)	2.00 (1-4)	3.00 (1-4)	2.00 (1-3)
2.	Lack of computing resources	2.00 (1-4)	2.00 (1-4)	3.00 (1-4)	2.00 (1-4)
3.	Not enough evidence	3.00 (0-4)	3.00 (0-4)	3.00 (2-3)	2.50 (1-4)
4.	Lack of access to research literature	2.00 (1-4)	3.00 (2-4)	3.00 (1-3)	2.00 (1-4)
5.	Lack of skills to understand research	2.00 (0-4)	3.00 (2-4)	3.00 (2-4)	3.00 (1-4)
6.	Lack of skills to understand research	3.00 (1-4)	3.00 (2-4)	3.00 (2-4)	3.00 (1-4)
7.	Lack of incentives to use evidence-based practices	3.00 (1-4)	3.00 (1-4)	3.00 (2-4)	2.00 (1-4)
Use of EBP		**2.83 (1.00-3.67)**	**3.02 ±0.68**	**3.11 ±0.55**	**3.73 ±0.49**
1.	How often do formulate questions to answer the gap between theory and practice	3.00 (2-4)	3.00 (1-4)	3.00 (2-4)	4.00 (3-5)
2.	How often to search for relevant scientific evidence each time formulating a question	3.00 (1-4)	3.00 (1-4)	3.00 (2-4)	4.00 (3-5)
3.	How often to critically assess the criteria set	3.00 (1-4)	3.00 (1-4)	3.00 (1-4)	4.00 (2-5)
4.	How often to integrate scientific evidence according to expertise	2.00 (1-4)	3.00 (1-4)	3.00 (2-4)	4.00 (2-5)
5.	How often to evaluate practical achievement	3.00 (1-4)	3.00 (1-5)	3.00 (2-4)	4.00 (2-4)
6.	How often do you share information with your colleagues?	3.00 (1-5)	3.00 (2-5)	3.50 (2-4)	4.00 (3-5)

Table III: Differences in changes in EBNP subscale scores in the intervention and control groups

Variable	Intervention (n = 21)	Control (n = 24)	pValue
Pretest			
Attitudes, mean ±SD	3.75 ±0.46	3.54 ±0,31	0.077 [b]
Skills, mean ±SD	3.26 ±0.74	3.20 (2.00-4.00)[a]	0.384 [c]
arriers, mean ±SD	2.46 ±0.50	2.72 ±0.44	0.066 [b]
Use of EBP, mean ±SD	2.83 (1.00-3.67) [a]	3.11 ±0.55	0.059[c]
Posttest			
Attitudes, mean ±SD	4.04 ±0.37	3.84 (2.00-4.44) [a]	0.114 [c]
Skills, mean ±SD	3.68 ±0.78	3.78 ±0.46	0.643 [b]
Barriers, mean ±SD	2.61 ±0.55	2.41 ±0.62	0.274 [b]
Use of EBP, mean ±SD	3.02 ±0.68	3.73 ±0.49	**0.000** [b]

[a] median (min-maks)
[b] Independent sample t-test
[c] Uji Mann-whitney

Table IV: Effectiveness of intervention on EBNP subscale scores in the intervention and control groups

Variable	Pretest	Posttest	pValue
Intervention (n = 21)			
Attitudes, mean ±SD	3.75 ±0.46	4.04 ±0.37	**0.007**[b]
Skills, mean ±SD	3.26 ±0.74	3.68 ±0.78	**0.016** [b]
Barriers, mean ±SD	2.46 ±0.50	2.61 ±0.55	0.187 [b]
Use of EBP, mean ±SD	2.83 (1.00-3.67) [a]	3.02 ±0.68	**0.029**[c]
Control (n = 24)			
Attitudes, mean ±SD	3.54 (0,31)	3.84 (2.00-4.44) [a]	**0.005** [c]
Skills, mean ±SD	3.20 (2.00-4.00)[a]	3.78 ±0.46	**0.000** [c]
Barriers, mean ±SD	2.72 ±0.44	2.41 ±0.62	**0.008** [b]
Use of EBP, mean ±SD	3.11 ±0.55	3.73 ±0.49	**0.000** [b]

[a] median (min-maks)
[b] Dependent sample t-test
[c] Uji Wilocoxon

Table III indicated a difference in the mean score of the post-test of the EBP use subscale between the treatment group and the control group (p = 0.000).

Table IV showed the effectiveness of the EBP education program intervention using the multifaceted module on the mean scores on the attitudes (p = 0.007), skills (p = 0.016), and EBP use (p = 0.029) subscales in the treatment group. While the use of booklets was also effective on the average score of the attitude subscale (p = 0.005), skills (p = 0.000), barriers (p = 0.008), and the use of EBP (p = 0.000) in the control group.
[Insert Table IV here]

DISCUSSION

This study described the attitudes, skills, barriers, and use of evidence-based practice (EBP) by nurses before and after intervention in the form of a multifaceted EBP program using modules, case studies, and demonstrations in the intervention group and giving booklets to the control group. The results revealed that the mean score of attitudes towards EBP in the intervention and control group was the highest among other subscales. This finding was in line with previous results, which stated that nurses in Singapore had a positive attitude towards EBP. However, the perceived level of EBP

skills was still sufficient and found that guidance from nurses experienced with EBP could encourage nurses to implement EBP [12]. A systematic review of 20 articles reported that nurses had a positive attitude toward EBP, but their knowledge was inadequate, and they were not ready to implement EBP [13]. Thus, EBP training and guidance are essential in improving the skills and implementation of EBP by nurses in providing clinical practice services.

In this study, the mean score of barriers perceived by nurses in the intervention and control group was low to moderate, including lack of time, computational ability, skills to find scientific evidence, and access to literature, as well as insufficient numbers of scientific evidence and incentives. This finding was consistent with previous studies that there were barriers to EBP implementation, such as time constraints [14,15], lack of ability to access scientific evidence [16], and lack of incentives for nurses to continue their education or be engaged in research [17]. The literature describes that barriers to research include five domains: research quality, access to research, research utilization processes, nurses' attitudes, knowledge, and the organization in which research results are applied [18].

The current study reported no difference in the mean scores of attitudes, skills, and perceived barriers between nurses in the intervention and control groups. This was possible because both groups obtained information and knowledge about EBP through different learning media. However, there was a significant difference in the use of EBP between the two groups. Perhaps this was due to differences in the characteristics of nurses from the aspect of age, as previous studies reported that the most cited facilitators were academic training, management functions, and the younger generation [13]. Furthermore, other studies report that the utilization of EBP in practice is still low. This study found that the predictors of EBP utilization were lack of work experience, adequate knowledge, communication skills, EBP training, internet access, and availability of EBP guidelines [19].

This current study revealed a significant increase in nurses' attitudes toward EBP, perceived EBP skills, and use of EBP after multifaceted EBP program interventions. Our teaching methodology in this program was a series of intensive workshops followed by activities that build positive EBP attitudes. Then, case studies formulate clinical questions using PICOT and web page demonstrations using journals search engine databases such as PubMed, ProQuest, and the Cochrane library. The results of this study were in line with previous findings that perceived organizational culture and readiness, beliefs, and EBP implementation increased significantly after receiving an EBP mentorship program intervention consisting of an intensive two-day workshop, booster consultations with individual project teams, and EBP skill-building activities over seven months [3]. The study

by Levin, Fineout-Overholt, Melnyk, Barnes & Vetter (2011) reported similar results using this mentorship intervention program [20]. Another study also reported a significant difference between before and after the computer-based EBP education intervention [9] and lecture and discussion-based [21,22] perceptions of knowledge, attitudes, and skills of EBP of nurses and nursing students. However, there was no significant effect of the multifaceted EBP program intervention through modules on alteration in the perceived barrier score, where there was an increase in the perceived barrier. This finding indicates that the EBP education obtained impacts the more precise identification of the obstacles faced. Nurses found inhibiting aspects after using EBP, and two experienced an increase in their score, which meant that the barriers increased, including the lack of time and computing resources. This study is in line with previous findings [11], which reported no difference in the nurse's perceived barrier after the 6-month EBP program.

Interestingly, the study findings presented a significant improvement in nurses' attitudes towards EBP, EBP skills, barriers, and the use of EBP in the control group. The treatment given to this group was reading a booklet about the importance of EBP and the steps for implementing EBP for 30-45 minutes, as well as the advantages and disadvantages of EBP, then followed by strengthening the material through a brief explanation of important things related to EBP for 10 minutes. It can be explained by the characteristics of respondents who are generally in the early adult group, undergraduate education level, and completed their last education after 2016 (fresh graduate) so that respondents can absorb information quickly and accurately. Previous studies reported that nurses' age, length of practice, and several years since obtaining a professional degree influenced the use of knowledge resources and perceived power [23]. Similarly, a previous study reported that young nurses were much more prepared to implement EBP and were more receptive to being involved in new things such as EBP implementation [24].

Our findings involve two teaching hospitals in one province in Indonesia, so it may not be easy to generalize to nurses in the same setting. However, this study has compared two learning media, namely multifaceted modules, and booklets, that can be adopted in providing EBP education and training to nurses by paying attention to aspects that affect the ability and characteristics of nurses to receive and absorb the information correctly. Evidence from this study suggests that there are differences in the characteristics of respondents in terms of age and length of work. The implication of further research is the need for homogeneity of respondents from the aspect of age and working period of nurses. Furthermore, it will be interesting to examine the factors that can influence attitudes, skills, barriers, and supports for the use of EBP.

CONCLUSION

Based on the study results, it can be concluded that multifaceted EBP programs using various learning methods such as intensive workshops, case studies, and demonstrations can improve attitudes, skills, and the use of EBP. However, using booklets in early adult groups with enthusiasm and high learning motivation can also improve attitudes, skills, and use of EBP and reduce perceived barriers to EBP.

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