

ORIGINAL ARTICLE

Exploring sociodemographic factors related to practice, attitude, knowledge, and skills concerning evidence-based practice in clinical nursing

Ai Tomotaki¹  | Hiroki Fukahori^{2,3†} | Ikuko Sakai⁴

¹Informatics, National College of Nursing, Japan, Tokyo, Japan

²Department of System Management in Nursing, Graduate School of Health Care Sciences, Tokyo Medical and Dental University, Tokyo, Japan

³Faculty of Nursing and Medical Care, Keio University, Tokyo, Japan

⁴Long-term Care Facilities Nursing Systems Management, Department of Nursing Systems Management, Graduate School of Nursing, Chiba University, Chiba, Japan

Correspondence

Hiroki Fukahori, Faculty of Nursing and Medical Care, Keio University, 4411, Endo, Fujisawa, Kanagawa 252-0883, Japan.
Email: fukahori@sfc.keio.ac.jp

†Present Address

Hiroki Fukahori, Faculty of Nursing and Medical Care, Keio University, Fujisawa, Kanagawa, Japan.

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Abstract

Aim: This study aimed to explore sociodemographic factors related to evidence-based practice (EBP) competency in Japanese nurses in university hospitals.

Methods: In March 2016, a survey was distributed to 843 clinical nurses who directly provide nursing care at two university hospitals in Japan. Multiple regression analyses were conducted on data received from 472 nurses using the Evidence-Based Practice Questionnaire (Japanese version).

Results: Sociodemographic factors related to EBP competency were experience with conducting nursing research as a part of continuing education, education about EBP, advanced practice certification (certified nurse specialists/certified nurses), and years of experience in clinical nursing. These factors differed across the four subscales of the questionnaire: Practice, Attitude, Knowledge of Research and Practice, and Skills of Research and Practice. Specifically, experience with two or more nursing research activities was significantly positively associated with Attitude and Knowledge/Skills Concerning Research and Practice of EBP, but not related to the implementation of EBP itself. Advanced practice certification was significantly positively associated with Practice and Attitude of EBP.

Conclusions: Our study quantitatively identified sociodemographic factors including experience with conducting nursing research and advanced practice certification status that were found to be related to EBP competency and these factors were differently associated with the four subscales of the Evidence-Based Practice Questionnaire (Japanese version). EBP education should depend on nurses' levels of EBP competency, and nursing educators and managers need to be cognizant of their nurses' sociodemographic factors when providing EBP education.

KEYWORDS

clinical nurses, continuing education, cross-sectional studies, evidence-based practice

1 | INTRODUCTION

Establishment of evidence-based practice (EBP) competency for clinical nurses is essential to improve healthcare quality. Several studies have reported that although nurses have

positive attitudes toward EBP, many do not implement it and lack knowledge and skills concerning EBP (Saunders & Vehviläinen-Julkunen, 2016, 2017).

The prevalent gap between nurses' understanding that EBP is important and their low levels of EBP competency

suggest that efficient EBP education has not been fully established. EBP education is the foundation for enhancing EBP (Fiset, Graham, & Davies, 2017). There are educational opportunities at several stages, including undergraduate education for nursing students, continuing education for clinical nurses, graduate training, and training courses for advanced practice nurses (APNs). However, a number of surveys have shown that EBP readiness and competency among nursing students and clinical nurses are inadequate. Furthermore, there is little evidence of the efficacy of educational interventions on EBP (Häggman-Laitila, Mattila, & Melender, 2016; Hecht, Buhse, & Meyer, 2016; Ramos-Morcillo, Fernández-Salazar, Ruzafa-Martínez, & Del-Pino-Casado, 2015).

Despite this, some nurses have high EBP competency. These nurses tend to be higher on the clinical ladder and have more experience in clinical nursing (Brown et al., 2010; Fealy et al., 2015; Patelarou et al., 2017). However, we should interpret these findings cautiously because most studies present only descriptive statistics and do not suitably consider confounding factors that may affect EBP competency. Few studies have evaluated EBP competencies while adjusting for confounding factors using statistical models. Particularly, the sociodemographic factors that affect EBP competency have rarely been assessed, especially using quantitative methods. Identifying the associated sociodemographic factors should be useful in promoting EBP in clinical nursing.

2 | METHODS

2.1 | Aims

The aims of this study were to describe EBP competency in terms of the implementation of, attitudes toward, and knowledge and skills related to EBP among Japanese nurses in university hospitals, and to determine the sociodemographic factors related to nurses' EBP competency in university hospitals.

2.2 | Design

This study was a cross-sectional survey using secondary data from the validation study of the Evidence-Based Practice Questionnaire, Japanese version (EBPQ-J; Tomotaki, Fukahori, Sakai, & Kurokohchi, 2018).

2.3 | Participants

The study sample was drawn from two university-affiliated hospitals in Tokyo, Japan, which had participated in the validation study of the EBPQ-J. Participants were selected

through convenience sampling. Thirteen clinical nurses (including managers and/or nursing educators) working at these hospitals were recruited in March 2016; directors of nursing were excluded because they were not directly involved in EBP.

2.4 | Data collection

2.4.1 | EBPQ-J

The EBPQ-J is the Japanese version of the Evidence-Based Practice Questionnaire (Tomotaki et al., 2018), which Upton and Upton (2006) developed to measure implementation of, attitudes toward, knowledge about, and skills applicable to EBP. The EBPQ, both the original and other language versions, has been used in numerous studies of nurses to evaluate EBP competency among them (Upton, Upton, & Scurlock-Evans, 2014) and is a well-established scale with high reliability and validity (Leung, Trevena, & Waters, 2014). Reliability and validity of EBPQ-J (Tomotaki et al., 2018) have been shown to be moderate (Cronbach's alpha for the entire questionnaire = .90; the convergent and discriminant validity for each item = .44 to .88 and .08 to .50, respectively; range of weighted kappa coefficients for each item = .39 to .57 for test-retest reliability), after confirmation of face validity of a questionnaire and authorization of the back translation from Japanese to English by the author of the original version. However, the EBPQ-J excludes six of the 24 items of the original EBPQ and does not have the same factor structure (with the latter containing only three subscales: Practice of EBP, Attitudes toward EBP, and Knowledge of EBP).

The EBPQ-J is comprised of 18 items on four subscales: Practice, Attitude, Knowledge/Skills Related to Research, and Knowledge/Skills Related to Practice. A 7-point Likert-scale is used for each item, ranging from 1 (never) to 7 (frequently). Items on the Practice subscale include statements such as, "As a first step toward improving my knowledge pertaining to practice, I clearly formulated questions regarding the practice that were easy to understand," and "After formulating questions, I examined the relevant evidence". The Attitude subscale includes statements such as, "I find it unpleasant to be asked about my own practice. /I am happy to answer questions regarding my own practice." The subscale Knowledge/Skills Related to Research includes items such as, "Ability to apply necessary information to hypotheses in research studies" and "Ability to critically analyze evidence by using evaluation criteria for studies". The subscale Knowledge/Skills Related to Practice includes statements such as, "Ability to share ideas and information with colleagues" and "Ability to convey new information regarding care with colleagues". For the three items on the Attitude subscale, responses are made on a scale of 1 to 7;

participants must select a numeric response closest to one of two contradictory alternatives (e.g. I find it unpleasant to be asked about my own practice [1], and I am happy to answer questions regarding my own practice [7]).

2.4.2 | Sociodemographic variables

Sociodemographic factors regarding important background information about the population of interest, such as age and educational status, were collected on the participants. Various studies have analyzed sociodemographic factors to explore factors related to the outcomes of interest (Nölke, Mensing, Krämer, & Hornberg, 2015; Terlutter, Bidmon, & Röttl, 2014). Our study included the following sociodemographic variables based on previous studies and Japan's education system: age, years of experience in clinical nursing, academic background, current position, experience in conducting nursing research, education on research methods, education on EBP, and APN certification status.

Certified Nurse (CN) and Certified Nurse Specialist (CNS) are types of APNs in Japan. Certifications for these titles are provided by the Japanese Nursing Association (JNA). To be certified as CNs and CNSs, nurses must complete a standard curriculum and pass a credential examination conducted by the JNA. Specifically, to be certified as a CN, nurses must have accumulated a certain amount of experience and completed a 6-month education program. On the other hand, nurses must have specific advanced nursing knowledge and skills and provide efficient, high-level nursing care for individuals, families, and groups with complex and intractable nursing problems in order to become CNSs; they must also obtain a Master's degree (Japanese Nurse Association, n.d.).

In Japan, conducting nursing research is part of the "Code of Ethics For Nurses" (Japanese Nursing Association, 2003) Japanese clinical nurses often conduct research as a part of their continuing education in hospitals (Sakashita et al., 2013). For example, nurses with 3–5 years of clinical experience conduct their own research over 1 year, or nurses are allocated the responsibility of planning and conducting nursing research in their own organizations. Such nursing research activity is similar to EBP, suggesting that experience in nursing research might be a factor associated with enhanced EBP.

2.5 | Ethical considerations

This study was approved by two Research Ethics Committees. At the two participating hospitals, ethics approval by an Institutional Review Board was waived based on the ethical judgments made by each department in the hospital. After the director of each hospital gave written informed

consent, consent forms and questionnaires were distributed to all eligible nurses. Nurses completed and returned the questionnaires if they agreed to participate in the study.

2.6 | Data analysis

Only completed questionnaires without any missing values were used in the analysis. Descriptive statistics were computed for each item in the EBPQ-J, the total score, the scores on the four subscales (e.g. Practice, Attitude, Knowledge/Skills Related to Research, and Knowledge/Skills Related to Practice) and participants' characteristics.

To investigate the relationships of EBPQ-J total and subscale scores with the sociodemographic variables, we used multiple regression analyses. Seven variables were included as covariates: academic background, years of clinical experience, APN certification status, current position, experience in conducting nursing research, education about EBP, and education about research methods. Estimated regression coefficients (beta) and 95% confidence interval were calculated. The significance level was set at 5%. All statistical analyses were performed using SAS version 9.4 (SAS Institute Inc, Cary, NC, USA).

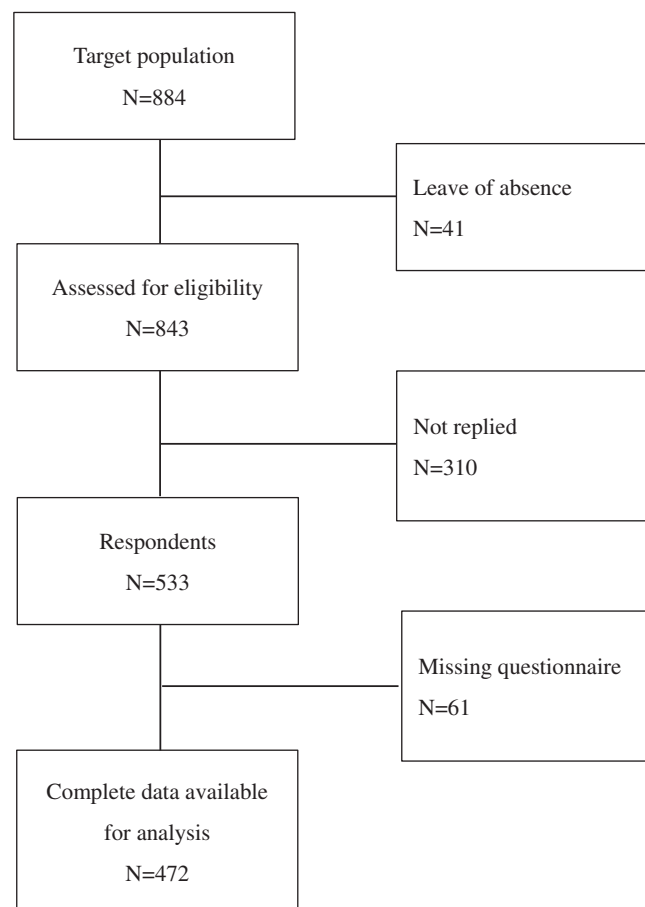


FIGURE 1 Participant flow

3 | RESULTS

3.1 | Participants

Among the 884 nurses of these two hospitals, 843 nurses met the criteria for inclusion in the study. Of these, 533 completed the survey (response rate 63%). Sixty-one respondents were excluded because of missing values on the questionnaire; therefore, the data of only 472 nurses were analyzed (Figure 1). Three-quarters of the participants were in their 20s and 30s. Of all participants, 42% had less than 5 years of clinical experience, 63% had a bachelor's degree, and 1.5% had a Master's degree. One was a CNS (0.2%), and 14 were CNs (3%). A total of 29% of nurses had been educated in EBP, and more than 70% had experience in nursing research and learned research methods (Table 1).

3.2 | Practice, attitude, and knowledge/skills concerning EBP

The majority of nurses (81%) indicated that "EBP is the foundation of professional practice" in the attitude subscale (i.e. their responses ranged from 5 to 7). However, only about half the nurses indicated a positive attitude toward the other attitude items. For the practice and knowledge/skills related to practice subscales, 60–85% of nurses reported inadequate levels. Similarly, almost all nurses (more than 90%) reported a lack of knowledge/skills related to research (Table 2).

3.3 | Nurses' EBP competency and their associations with sociodemographic factors

Multiple regression analysis showed that the total score of the EBPQ-J was statistically significantly associated with years of clinical experience, APN certification status, experience in conducting nursing research, and education in EBP ($\beta = 5.6$ to 9.5 ; Table 3). On entering the four subscales of the EBPQ-J into the same regression model, we obtained the following results (Table 4): Practice was significantly associated with APN certification status and education in EBP ($\beta = 2.5$ to 6.9); Attitude was significantly associated with APN certification status and experience in conducting nursing research ($\beta = 1.2$ to 2.1); Knowledge/Skills Related to Research was significantly associated with academic background, years of clinical experience, experience in conducting nursing research, and education in EBP ($\beta = 3.2$ to 7.1); and Knowledge/Skills Related to Practice was associated with years of clinical experience and experience in conducting nursing research ($\beta = 0.7$ to 1.6).

TABLE 1 Participants' characteristics (N = 472)

	N	%
Age (years)		
20s	247	52.3
30s	126	26.7
40s	63	13.4
50s	36	7.6
Years of experience as clinical nurses		
<5	200	42.4
6–10	107	22.7
11–15	52	11.0
≥16	113	23.9
Academic background		
High school, nursing school, or junior college	170	36.0
Bachelor's degree	295	62.5
Master's degree	7	1.5
Doctor's degree	0	0
Advanced practice certification		
No	457	96.8
Certified nurse	14	3.0
Certified specialist nurse	1	0.2
Current position		
Nurse caring for patients	423	89.6
Nurse manager/administrator educator	49	10.4
Number of experiences with conducting nursing research		
None	107	22.7
1	215	45.6
2–4	130	27.5
More than 5	20	4.2
Education on research methods		
No	103	21.8
Yes	369	78.2
Education on EBP		
No	337	71.4
Yes	135	28.6

EBP, evidence-based practice.

4 | DISCUSSION

In our study, sociodemographic factors of clinical nurses were related to some EBP competencies. Our findings identify an overall trend of EBP competency similar to that found in previous studies (Saunders & Vehviläinen-Julkunen, 2016, 2017): average scores on EBPQ-J were

TABLE 2 Responses (%) on each item of evidence-based practice questionnaire – Japanese version (N = 472)

	Never					Frequently	
	1	2	3	4	5	6	7
Practice							
As a first step toward improving my knowledge pertaining to practice, I clearly formulated questions regarding practice that were easy to understand.	21.8	13.8	19.7	28.8	9.5	4.9	1.5
After formulating questions, I examined relevant evidence.	22.7	14.2	19.7	21.6	13.8	6.1	1.9
Using evaluation criteria, I critically examined all studies I obtained.	41.5	26.1	17.0	10.4	3.8	1.1	0.2
I integrated elucidated evidence into my own expert knowledge and use of technologies.	23.5	13.6	17.4	21.6	17.4	5.3	1.3
I conducted a self-assessment of my practice results.	24.2	14.2	18.0	22.0	16.1	3.6	1.9
I shared my evaluation results with colleagues.	32.8	15.7	17.6	17.4	11.2	4.2	1.1
Attitude							
I find it unpleasant to be asked about my own practice. (1) / I am happy to answer questions regarding my own practice. (7)	1.5	4.7	8.3	36.4	22.5	15.3	11.4
EBP is a waste of time. (1) / EBP is the foundation of professional practice. (7)	2.3	2.5	2.3	11.9	19.3	28.8	32.8
Instead of changing to new methods, I focus on trusted methods already in practice. (1) / Based on evidence I have obtained, I change my own practice. (7)	1.1	4.7	8.9	37.1	26.1	16.3	5.9
Skills/Knowledge1-Research							
Research skills	34.8	30.9	17.6	13.1	3.4	0.2	0.0
IT skills	29.5	26.9	20.6	14.6	5.3	2.8	0.4
Ability to apply necessary information to hypotheses in research studies	21.2	28.0	28.8	17.0	3.4	1.3	0.4
Knowledge of methods to search for and obtain evidence	9.3	15.9	30.9	28.6	10.8	4.2	0.2
Ability to critically analyze evidence by using evaluation criteria for studies	19.9	26.9	28.4	18.2	5.1	1.3	0.2
Ability to determine whether the contents of a study are valid (level of bias)	18.4	29.0	27.8	18.0	5.3	1.1	0.4
Ability to judge how useful and clinically applicable information obtained from studies is	14.6	25.6	29.2	19.7	8.5	1.9	0.4
Skills/Knowledge2-Practice							
Ability to share ideas and information with colleagues	3.6	9.1	18.4	32.4	22.7	12.1	1.7
Ability to convey new information regarding care with colleagues	6.8	14.0	22.5	31.6	17.6	6.8	0.9

EBP, evidence-based practice; IT, information technology.

generally higher overall among clinical nurses with sociodemographic factors including higher educational background, more years of clinical nursing experience, APN status, current position as a manager or educator, more experience in nursing research activity, and education in research methodologies. In addition, in our results with adjustment of these factors using multiple regression, some

sociodemographic factors were not significantly associated with the total score or with each subscale score (attitude, practice, and knowledge/skills concerning research and practice) of EBPQ-J and such sociodemographic factors differed among each subscale.

Regarding sociodemographic factors related to EBP competency, experience in two or more nursing research

TABLE 3 The results of multiple regression analysis for EBP-J (all items)

Variable	EBPQ-J (all items) (Range: 1–126)			
	M	SD	β	95% CI
Academic background				
High school, nursing school, or junior college	59.3	16.4	Ref.	
Bachelor's degree	58.1	14.3	2.1	(−1.2, 5.5)
Master's degree	69.7	13.3	4.7	(−5.9, 15.4)
Years of experience as clinical nurses				
–5	56.2	13.8	Ref.	
6–10	56.6	14.1	−0.4	(−3.4, 3)
11–15	60.1	16.4	2.6	(−2.0, 7.2)
16–	64.5	16.2	5.6	(1.2, 10.0)
Advanced practice certification				
No	58.1	14.7	Ref.	
Yes	77.1	15.2	9.5	(1.8, 17.3)
Current position				
Nurse caring for patients	58.1	15.1	Ref.	
Nurse manager/administrator educator	63.7	14.8	0.4	(−4.1, 4.9)
Number of experiences with nursing research				
None	53.4	14.1	Ref.	
1	56.5	14.4	2.1	(−1.4, 5.6)
2–4	64.6	13.6	7.5	(3.5, 11.4)
5 or more	72.2	18.0	9.2	(1.6, 16.9)
Education of research method				
No	54.4	14.6	Ref.	
Yes	59.9	15.1	1.6	(−1.9, 5.1)
Education on EBP				
No	56.0	14.6	Ref.	
Yes	65.4	14.3	6.5	(3.6, 9.4)

CI, confidence interval; EBP, evidence-based practice; EBPQ-J, evidence-based practice questionnaire – Japanese version; Ref., reference category.

activities might promote attitude and knowledge/skills concerning research and practice of EBP, but might still not promote the implementation of EBP itself. Thorsteinsson (2013) previously reported the positive relationship between “use research in practice” and “participation in research” ($r = .40$). These results could be inferred to mean that nurses with experience in nursing research had high interest in research and perceived such activities as opportunities to reflect on their care for patients and gain knowledge and skills in practice and research for self-improvement. The reasons why the practice subscale of EBPQ-J was not related to

nursing research activities could be as follows; EBP's steps have a similar process as nursing research activity but are not the same as those of nursing research; many clinical nurses have conducted cross-sectional surveys, and there was little research to evaluate the implications of evidence in practice in Japan.

As with many studies, APN certification status was positively related to the implementation of and attitude toward EBP. On the other hand, accumulating experience in nursing, attaining the position of manager and educator, and acquiring an academic background do not necessarily enhance the practice of and favorable attitudes toward EBP. In order to promote EBP competency, both awareness of the need to take the initiative in EBP and the ability to act appropriately when given the authority to change routine care in the process of EBP might be important. These results would indicate that a nurse with the abovementioned aspects would be an APN.

In our findings, sociodemographic factors related to EBP competency might not always promote EBP competency in all nurses. Knowledge/Skills of Practice including communication with colleagues and sharing information might not depend on a position and role in one's own hospitals, but might be affected by accumulating experience through nursing practice and research activities. Additionally, Knowledge/Skills of Research would be largely affected by education, such as in graduate school, participating in nursing research activity, and EBP education. Educational programs for EBP may need to vary depending on the sociodemographic characteristics of the nurses.

In order for nurses' EBP competency to improve, they must acquire further knowledge and skills related to both practice and research. We recommend that EBP educators provide nurses with EBP education programs depending on nurses' levels of EBP competency and sociodemographic factors (position and role in hospitals, experience in nursing practice, and conditions of learning). Our findings further suggest that years of experience in clinical nursing and position were not necessarily related to EBP competency, meaning that it is important to conduct EBP education for nursing managers and highly experienced nurses. Especially, nursing managers who are in a position to decide the policy of care and build a positive culture concerning EBP would be expected to promote EBP by receiving EBP and research education. Educators need to provide training and support to better integrate learning of research methods for understanding existing literature into daily activities for the quality improvement of care (e.g. journal club for EBP). Further, modifying nursing research activities in Japan to EBP activities might provide useful opportunities to cultivate EBP competency. In addition, staffing of nurses skilled in EBP (e.g. APNs) is an important strategy to promote EBP.

TABLE 4 The results of multiple regression analysis for Evidence-Based Practice Questionnaire – Japanese version (four subscales: Practice, Attitude, and Knowledge/Skills of Research and Practice)

Variable	Practice (range: 6–42)				Attitude (range: 3–21)			
	M	SD	β	95% CI	M	SD	β	95% CI
Academic background								
High school, nursing school, or junior college	17.4	8.5	Ref.		14.9	3.5	Ref.	
Bachelor's degree	17.4	7.8	0.5	(−1.3, 2.4)	14.8	3.0	0.5	(−0.3, 1.2)
Master's degree	17.4	6.9	−1.6	(−7.6, 4.4)	15.9	1.7	0.1	(−2.2, 2.5)
Years of experience as clinical nurses								
−5	17.3	7.4	Ref.		14.5	2.7	Ref.	
6–10	16.0	7.8	−1.3	(−3.2, 0.6)	14.4	3.6	−0.3	(−1, 0.5)
11–15	17.7	8.7	0.1	(−2.5, 2.7)	14.8	3.5	0.02	(−1, 1)
16–	18.8	8.7	1.0	(−1.5, 3.5)	15.8	3.0	0.8	(−0.2, 1.7)
Advanced practice certification								
No	17.2	7.9	Ref.		14.7	3.1	Ref.	
Yes	25.5	6.6	6.9	(2.5, 11.2)	17.9	1.8	2.1	(0.4, 3.8)
Current position								
Nurse caring for patients	17.3	7.9	Ref.		14.7	3.2	Ref.	
Nurse manager/administrator educator	18.3	8.9	0.1	(−2.4, 2.7)	15.7	2.8	0.2	(−0.8, 1.2)
Number of experiences with nursing research								
None	15.6	7.5	Ref.		14.2	3.3	Ref.	
1	17.2	7.9	0.9	(−1.1, 2.8)	14.3	3.0	0.1	(−0.7, 0.8)
2–4	19.1	8.0	2.0	(−0.2, 4.3)	15.8	3.1	1.2	(0.3, 2.1)
5 or more	19.0	10.4	−0.8	(−5.0, 3.5)	17.0	2.3	1.4	(−0.2, 3.1)
Education of research method								
No	15.3	7.7	Ref.		14.3	3.2	Ref.	
Yes	18.0	8.0	1.4	(−0.5, 3.4)	15.0	3.1	0.1	(−0.6, 0.9)
Education on EBP								
No	16.4	7.9	Ref.		14.6	3.0	Ref.	
Yes	19.9	7.8	2.5	(0.9, 4.1)	15.4	3.3	0.3	(−0.4, 0.9)
Variable	Knowledge/Skills Related to Research (range: 7–49)				Knowledge/Skills Related to Practice (range: 2–14)			
	M	SD	β	95% CI	M	SD	β	95% CI
Academic background								
High school, nursing school, or junior college	19.1	7.2	Ref.		8.0	2.6	Ref.	
Bachelor's degree	18.5	6.8	0.9	(−0.6, 2.4)	7.5	2.5	0.3	(−0.3, 0.9)
Master's degree	27.0	6.7	5.1	(0.2, 10.1)	9.4	2.0	1.0	(−0.8, 2.9)
Years of experience as clinical nurses								
−5	17.4	6.4	Ref.		7.0	2.4	Ref.	
6–10	18.6	6.9	0.7	(−0.9, 2.2)	7.6	2.6	0.6	(−0.02, 1.2)
11–15	19.4	7.2	1.2	(−0.9, 3.4)	8.2	2.3	1.3	(0.5, 2.1)
16–	21.2	7.5	2.2	(0.2, 4.2)	8.7	2.4	1.6	(0.9, 2.4)
Advanced practice certification								
No	18.6	6.9	Ref.		7.6	2.5	Ref.	
Yes	25.3	7.7	1.1	(−2.5, 4.7)	8.5	2.0	−0.6	(−1.9, 0.8)

TABLE 4 (Continued)

Variable	Knowledge/Skills Related to Research (range: 7–49)				Knowledge/Skills Related to Practice (range: 2–14)			
	M	SD	β	95% CI	M	SD	β	95% CI
Current position								
Nurse caring for patients	18.6	7.0	Ref.		9.5	2.5	Reference	
Nurse manager/administrator educator	20.9	7.2	−0.3	(−2.4, 1.8)	8.8	2.5	0.3	(−0.4, 1.1)
Number of experiences with nursing research								
None	16.8	6.7	Ref.		6.9	2.6	Ref.	
1	17.5	6.3	0.5	(−1.2, 2.1)	7.5	2.5	0.7	(0.1, 1.3)
2–4	21.4	6.7	3.2	(1.3, 5.0)	8.4	2.4	1.0	(0.3, 1.7)
5 or more	27.0	7.8	7.1	(3.6, 10.7)	9.3	1.7	1.4	(0.1, 2.7)
Education of research method								
No	17.4	6.7	Ref.		7.4	2.3	Ref.	
Yes	19.2	7.0	0.04	(−1.6, 1.7)	7.8	2.6	−0.04	(−0.6, 0.6)
Education on EBP								
No	17.6	6.6	Ref.		7.5	2.6	Ref.	
Yes	21.9	7.0	3.2	(1.9, 4.6)	8.2	2.2	0.4	(−0.1, 1.0)

CI, confidence interval; EBP, evidence-based practice; Ref., reference category.

4.1 | Limitations

First, the participants might not be representative of the participating hospitals because the response rate was only 60%. Second, the generalizability of our findings is limited. The participating hospitals had well-developed continuing education systems that focused on nursing research and conducted many more clinical trials on certain drugs and devices than other hospitals. The sociodemographic factors related to EBP competency might, therefore, differ according to hospital type and human resources, such as the number of APNs. Third, EBPQ-J is a self-report questionnaire, and it might not be the same as objective evaluation for the practice of, attitudes toward, knowledge about, and skills applicable to EBP. In future research, similar surveys should be conducted in a variety of other types of hospitals in order to explore the impact of hospital-level factors (Williams, Perillo, & Brown, 2015).

5 | CONCLUSION

Japanese nurses working at university hospitals in an urban area had positive attitudes toward EBP. However, in general, nurses felt that they were lacking in knowledge and skills related to EBP. Various sociodemographic factors were found to be related to EBP competency, including experience in conducting nursing research, APN certification

status, and education in EBP. These factors were differently associated with the four subscales of the EBPQ-J. Continuing education regarding EBP should depend on the nurses' levels of EBP competency, and sociodemographic factors need to be provided to clinical nurses in order to improve the overall level of EBP competency in nurses in Japan.

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CONFLICT OF INTEREST

All authors have no conflict of interest to declare regarding this study.

AUTHOR CONTRIBUTIONS

All authors contributed to this manuscript. All authors conceived and designed the study; A.T. analyzed the data; all authors interpreted the data; A.T. drafted and wrote the article; all authors read and approved the final manuscript.

ORCID

Ai Tomotaki  <https://orcid.org/0000-0002-8891-7950>

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