Factors Explaining Nurses' Implementation of Evidence-Based Practice for Postpartum Hemorrhage Management

Jiranee Panyapin, Wanee Deoisres, Nujjaree Chaimongkol, Poonpong Suksawang*

Abstract: The implementation of evidence-based guidelines for the prevention and appropriate management of postpartum hemorrhage significantly decreases maternal morbidity and mortality. However, postpartum hemorrhage evidence-based guidelines are not optimally adhered to. This study aimed to examine individual- and organizational-level factors and the interaction effects that explain the implementation of evidence-based practice for PPH management among nurse-midwives. A multi-stage sampling technique was used in this cross-sectional study to recruit 298 nurse-midwives from 50 delivery rooms of community hospitals in Thailand between March to June 2019. Data were collected through seven self-administered questionnaires including a Demographic questionnaire, Evidence-Based Practice Implementation Activity for Postpartum Hemorrhage Management scale, Organizational Support scale, Implementation Climate Scale, Individual Innovativeness scale, Perceived Characteristics of Guidelines scale, and BARRIERS Scale. Descriptive statistics and multilevel modeling analysis were carried out to analyze the data.

The results revealed the factors that significantly influenced the implementation of evidence-based practice at the level of an individual nurse-midwife were years of experience, personal innovativeness, perceived barriers, and perceived characteristics of guidelines, and the organizational level factors were being a large community hospital and organizational climate. Individual nurse level factors significantly accounted for 68%of the variance in the implementation of evidence-based practice while organizational level factors accounted for 32% of the variance. There was an interactive effect between individual- and organization-level variables. The results of this study suggest that nurse administrators should develop a strategy to promote the adherence of evidence-based practice guidelines among nurse-midwives by decreasing their perceived barriers and establishing an organizational climate of evidence-based implementation.

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Introduction

Postpartum hemorrhage (PPH) remains one of the leading causes of maternal mortality and morbidity in many countries including Thailand,[1,2] and occurs in nearly one-quarter of all maternal deaths globally.[1] In all, 30.4% of deaths are directly caused by PPH.[2] In

Thailand, 87% of PPH cases have been referred from community hospitals due to limitations of obstetricians, resources and accessibility.[2] As PPH is a preventable condition, maternal death represents an important health problem of a country[2] and indicates that pregnancy and childbirth have poor quality of care as well as inadequate health service systems. Regarding maternal and child health care services in Thailand, several interventions have been introduced with the aim of maintaining or improving the quality of PPH care.[3] However, the burden of PPH persists, despite the fact that progression has been made in interventions for PPH management with the aim of improving the existing problem, but PPH evidence-based guidelines are not optimally adhered to. Thus, the main issue focuses on the analysis of factors influencing PPH management.

The implementation of the guideline recommendations for PPH prevention and management can result in a decline in PPH mortality.[4] There is also substantial evidence indicating major gaps in the clinical area between existing and actual practices. A report indicated that maternal deaths caused by PPH are due to delays and sub-standard care in the diagnosis and management of hemorrhage.[5] Moreover, previous studies have reported less than optimal management of severe PPH and failure to fully apply guidelines in approximately 40% of all cases.[1] Similarly, clinical practice guidelines for PPH have variations between and within countries, despite relatively similar national guidelines.[1] In other words, the poor implementation of guideline recommendations for labor management represents discontinuation between recommended and actual practice.[7,8] This problem demonstrates the gap between EBP recommendations and routine general practices.[9] Because women often do not receive optimal nursing care, the reason for the gap between EBPs and current practice needs to be explained. Although the factors influencing EBP implementation have been investigated in Thailand, the focus has been general and not specific.[10,12] Some literature reviews have revealed researchers' expression of concern about barriers and facilitators in implementing formative research.[10,12] Nevertheless, few studies in Thailand have focused on the factors related to the implementation of evidence in PPH. Despite the presence of nursing practice with several interventions for PPH prevention and management, nurse-midwives fail to pay attention to implementing such guideline practice.[11]

Moving evidence into practice is difficult for a variety of reasons, and this can include the complexity of organizations, individual health care practitioners, leadership and changing health care environments.[10] Multiple factors and barriers to guideline implementation continue to exist and the use of EBP recommended by the guidelines is inconsistent.[11] The factors potentially influencing the acquisition of evidence into practice are many and varied.[11] Various factors and dynamics within the contemporary health care system serve to impede innovation adoption by actors within the system, particularly nurses.[7] The researcher must consider nurse-midwives based on individual characteristic attributes, as well as organizational characteristics, EBP characteristics and barriers to EBPs.[7,8] The factors that influence the implementation of EBP or innovation diffusion are influenced by individual, innovation- specific and organizational characteristics in a fundamentally social and communicative process.[13]

Knowing the factors that explain the implementation of EBPs for PPH management is necessary to reduce mortality rates, however, studies in this topic in Thailand are limited. This research attempts to gain a better understanding of the reasons behind the ongoing gap between evidence and practices during intrapartum care for PPH prevention and management.

Review of Literature and Conceptual Framework

The implementation of EBP most likely refers to the process of putting to use an intervention within a specific setting.[7,8] The conceptual framework for this study was based on Rogers' Diffusion of Innovations Model[13] and empirical evidence.

Rogers explained that innovation diffusion is influenced by three major factors, namely individual, innovational and organizational characteristics. The

influencing factors make up a fundamentally social and communicative process.[13] The consequence of multiple factors is an implementation of the research evidence that can change a new clinical behavior by professionals in the health care system.[13] Rogers explained the innovation-decision process as "an information-seeking and information-processing activity where an individual is motivated to reduce uncertainty about the advantages and disadvantages of an innovation."[13(p.172)] The innovation-decision process is composed of the following five steps: (1) knowledge; (2) persuasion; (3) decisions; (4) implementation; and (5) confirmation.[13]

According to the hierarchy modeling reported in this article, the literature on factors thought to influence EBP implementation at the individual and organizational levels were examined as follows:

Individual-level Influencing Factors: A systematic literature review identified 20 studies on the relationships between the characteristics of individual factors and research utilization.[14] Individual nurse characteristics are important for evaluating EBP.[15] A positive trend in the relationships between years of experience and the implementation of EBP. The number of years in nursing has been linked as factors affecting the implementation of EBP whereby nurses with more years of working experience have more implemented EBP.[16] One study among Thai nurses indicated that those with >20 years of nursing experience perceived fewer barriers to finding research and fewer barriers to changing practice than nurses with 10-20 years of nursing experience and nurses who had >20 years of experience perceived more support of using EBPs which infers that nurses with more work experience implemented EBP better or easier than nurses with less work experience.[12]

Personal innovativeness includes those inherent characteristics contributing to an individual's decision to implement an innovation.[13] The innovation-decision process postulates four prior conditions that consist of the following:1) previous practice; 2) perceived need or problem; 3) innovativeness; and 4)social system norms.[13] Some elements of personal innovativeness such as higher formal nursing education, higher intrinsic innovativeness, conference attendance, reading professional journals, and Internet use have been associated with increased adoption of nursing practices or research utilization.[15] The process of EBP implementation is concerned with barriers and facilitators.[14, 19] Perceived barriers are defined as the perception of nurses regarding obstacles that interrupt nurses'EBP utilization, which is an important factor.[17] The barriers include unawareness, nurses' inability to evaluate research quality, insufficient time to read or implement research, lack of authority to make practice changes, inadequate facilities and lack of support by others.[18] Moreover, perceived evidence-based characteristics are known to impact the rates of adoption.[13] Five perceived innovation characteristics, 1) relative advantage, 2) compatibility, 3) complexity, 4) observability, and 5) trialability have explained up to half of the variance in adoption rates.[13] Significant predictors of practice adoption were observability and trialability of guideline characteristics.[30] The guideline is more likely to be used if the recommendation is clear, not controversial, and does not require a change in practice.[19] These factors affect the stage of persuasion, whether the adopter will be persuaded to form an unfavorable or favorable attitude toward the innovation.[13] According to a study of the leading factors for the successful implementation of evidence-based nursing practice in Thailand, the factors of quality of research and empirical evidence are important factors related to improved quality of care.[19]

Organizational Level Influencing Factors: Based on previous research, the organization-level factors include responsible administration, staff development, control practice, staffing and support services, and innovative organizations, all of which significantly influence EBP implementation.[14,15] Many studies have confirmed the importance of organizational support to promote research use and clinical guideline implementation.[14, 15] The support systems include time, funding, administrative support, and mentors as important factors.[14] Moreover, organizational size is related to a relationship between size and adoption of research findings.[13] Rogers reported a larger size to be associated with higher levels of organizational innovativeness.[13] Hospital size is reported as a significant predictor of innovation diffusion study.[20] Organizational climate

demonstrates the largest effect on EBP implementation[21] and directly affects the rate of intra-organizational diffusion of technological innovations.[21] The consideration of nurses' EBP implementation demonstrates significant correlations with a climate supportive of EBP implementation.[20]

The literature concerns many factors influencing the adoption of research evidence. The implementation of EBPs operates at the following four levels: individuals, groups or teams, organizations and system or environment.[15, 20] Consequently, the researcher found it important to use some factors from theoretical perspectives and empirical studies. In this research, the selected variables were tested for their relation to and explanations of EBP implementation for the prevention and management of PPH.

Therefore, this study is aimed to determine the factors at an individual level (nurse-midwife characteristics, perceived barriers to EBPs and perceived characteristics of EBPs) and at organizational-level (organizational climate for EBPs, organizational support and hospital size) that explain the implementation of EBP for PPH management (see **Figure 1**). It was hypothesized that factors at individual and organizational levels explain the implementation of EBP for PPH management among nurse-midwives. Moreover, individual variables have a cross-level interaction with organizational variables on the implementation of evidence-based practice for the prevention and management of PPH.

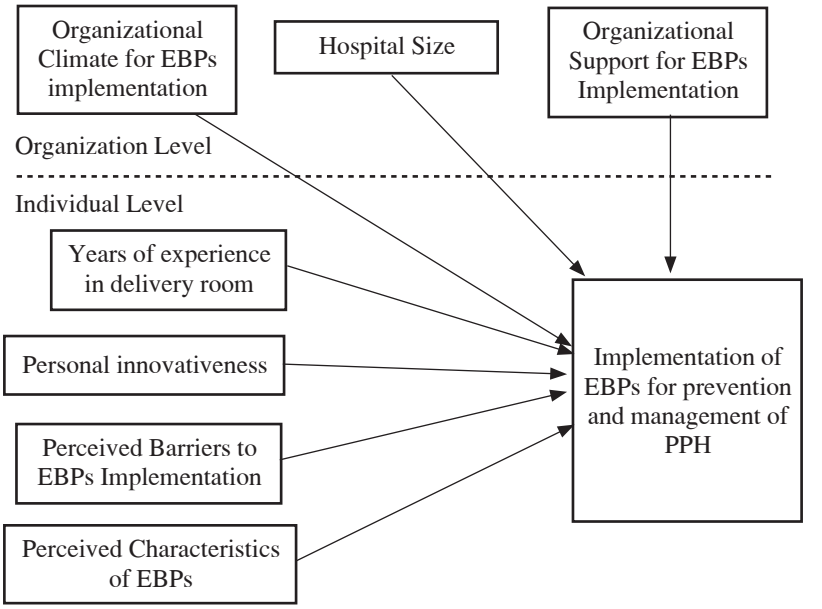

Figure 1. Conceptual framework of the study

Methods

Design: A cross-sectional design was used.

Sample and Setting: The study was conducted with nurses working at delivery rooms in 50 community hospitals governed by the Ministry of Public Health (MOPH), Thailand. The criteria for inclusion were staff nurse-midwives who have been working and providing direct care in a delivery room more than six months, and head of a delivery room who provided direct care and administration in their units.

The sample size estimation was based on multilevel linear modeling (MLM) because the multilevel analysis revealed that the group-level sample size was always smaller than the individual-level one.[23] Regarding 50 groups and a group size of 5, this is the

smallest acceptable number of non-coverage of 95% confidence interval.[23] Therefore, a sample of 50 groups with group sizes of 5-10 nurses was estimated. The sample size of 250 was adjusted for response rate and 10% was added to compensate for data attrition. However, the response rate was higher than 100%. Potential participants were 298 nurses from 50 delivery room units (one unit from each hospital) who were recruited for this study.

The multi-stage stratified random sampling method used in this study by the following steps: 1) randomly selected 4 health regions of services from total 13 health regions; 2) randomly select 1 province from each health region; 3) in each selected province, four community hospitals were randomly selected by using stratified random sampling (size of the hospital as strata); 4) head of delivery rooms in each selected hospital and 5-10 staff nurse-midwives who met the inclusion criteria were randomly selected to participate in the study. Therefore, 298 participants at the individual level from 50 delivery room units of community hospitals were recruited in this study as shown in **Figure 2**.

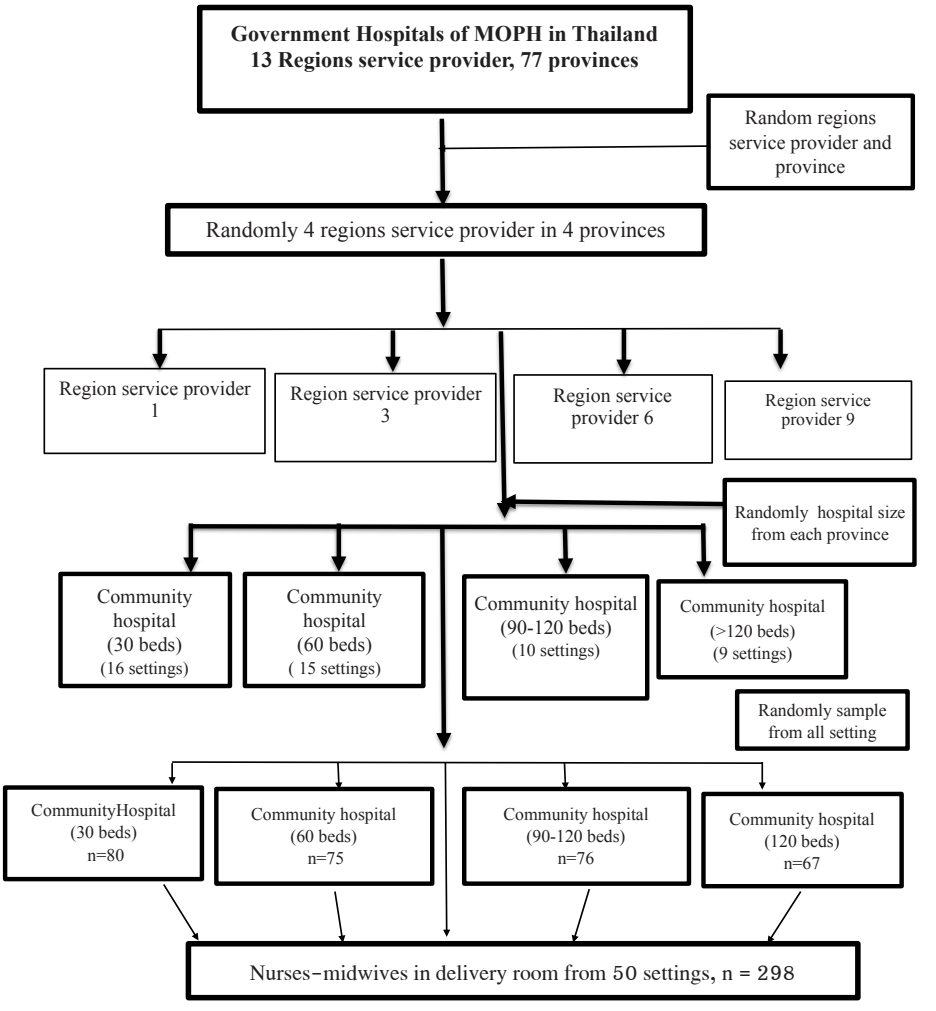

Figure 2 - Research settings and number of research participants.

Ethical Considerations: This study was approved by the Institutional Review Board (IRB), Faculty of Nursing, Burapha University, (IRB Approval No: 03-12-2561), and from the research ethics committees of the 50 hospitals. All participants received written and verbal explanations about the study purposes, data collection procedures and the right to withdraw at any time. No harmful or life-threatening risks to the participants were identified. All of the participants' identities were kept confidential. A consent form was distributed to each participant and written agreement was obtained before administering the questionnaires.

Instruments: Data were collected by self-reported questionnaires which included a Demographic Questionnaire, the EBP Implementation Activity for PPH Management (EBPIA-PPH) scale, Organizational Support (OS) scale, Implementation Climate Scale (ICS), Individual Innovativeness (II) Scale, Perceived Characteristics of Guideline (PCG) scale, and BARRIERS scale.

The Demographic Questionnaire was developed by the principal investigator (PI). It included age, education level, number of years of experience as a registered nurse; years of experience in the delivery room, work position, and attending professional training related to the management of PPH.

Translation and Testing Psychometric Properties of Questionnaires: Five questionnaires (OS scale, ICS, II scale, PCG scale, and BARRIERS) were developed in English and were translated to Thai with permission from the developers. The forward and backward translation method proposed by Brislin [24] was used. The content validity of six questionnaires was reviewed by five experts consisting of one obstetrician, three maternity nursing and midwifery instructors, and an advanced practice nurse in midwifery. Cronbach's alpha reliabilities were tested in 30 nurse-midwives who worked in community hospitals that were not the study settings. Examples of the items, the content validity index and Cronbach's alpha reliability both in the pilot and actual study are shown in **Table 1**.

Table 1 Item examples, content validity index, and Cronbach′s alpha reliability of measurements

Instruments	CVI	Cronbach′s alpha reliability	Example item
EBPIA-PPH	.90	.854	I always performed PPH risk assessment tool upon admission to evaluate risk factors.
OS	.90	.745	Nurses were given sufficient time and training to learn how to use best practice guidelines.
ICS	.90	.912	My unit provides the ability to accumulate compensated time for the use of evidence-based practices.
PCG1	.90	.894	Using this practice guideline enables me to provide care more efficiently.
PCG2	.90	.893	Using this practice guideline fits into my work style.
PCG3	.90	.892	This practice guideline is clear and understandable.
PCG4	.90	.919	In my organization, one sees this practice guideline in many locations.
PCG5	.90	.900	I have had a great deal of opportunity to try this practice guideline for patient care applications.
BARRIERS	.90	.847	The nurse feels the benefits of changing practice will be minimal.
II	.90	.810	I must see other people using innovations before I will consider them

Evidence-Based Practice Implementing Activity for Prevention and Management of PPH =EBPIA-PPH
Organizational Support=OS
Implementation Climate Scale =ICS
Relative advantage =PCG1, Compatibility= PCG2, Complexity=PCG3, Observability = PCG4, Triability = PCG5
Perceived barriers to EBPs=BARRIERS
Individual Innovativeness scale =II

1. The *Evidence-Based Practice Implementation Activity for PPH Prevention and Management* (EBPIA-PPH) scale was developed by the researchers based on recommendations of WHO guidelines[27] and the recommendations of the Royal Thai College of Obstetricians and Gynecology (RTCOG).[28] This questionnaire assesses the action of using the EBP for the prevention and management of PPH in current daily practice by nurse-midwives. The same group of experts who reviewed the content validity of the 5 translated instruments also reviewed this questionnaire, which contains 28 items with a 4-point Likert scale ranging from 1 (never practiced) to 4 (all the time). Total scores range from 28-112 with higher scores indicating a higher use of EBP recommendations for PPH prevention and management in daily practice.

2. The *Organizational Support* (OS) scale was developed by Edwards et al.[26] to assess perceived organizational support for EBP implementation. It contains five items with a 4-point Likert scale ranging from l (strongly disagree) to 4 (strongly agree). Total scores range from 4-20 with higher scores indicating higher perceived organizational support.

3. The *Implementation Climate Scale* (ICS) was developed by Ehrhart et al.[22] to assess perceived organization climate for EBP implementation. It contains 18 items with a 4-point Likert scale ranging from 1 (slight extent) to 4 (very great extent). Total scores range from 18-72 with higher scores indicating nurses' higher perception of organization supportive climate for EBP implementation and support in practice.[22]

4. The *Individual Innovativeness* (II) scale was developed by Hurt et al.[25] to assess the degree to which an individual is relatively early in adopting new ideas.[13] The II contains 10 items with a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Total scores range from 46-70 with higher scores reflecting a higher level of innovativeness or earliness in adopting new ideas.[25]

5. The *Perceived Characteristics of Guidelines* (PCG) scale was developed by Edwards et al.[26] to assess the perceived characteristics of EBPs for the prevention and management of PPH by nurse-midwives. It is a multi-dimensional scale, and the guideline characteristics represent Roger's five constructs of relative advantage, compatibility, complexity, trialability and observability.[13] It consists of 15 items; relative advantage (items 1-5), compatibility (items 6-8), complexity (items 9-12), observability (items 13-14) and trialability (item 15), with a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The highest scores indicate relative advantage related to more rapid adoption, in which high compatibility may be perceived as the requirement of less behavior change, with higher complexity indicating lower compliance rates and negative influences on adoption rates, higher observability indicating that the guideline is visible to others, and a high scale of trialability which refers to an ability to try out a guideline.[26]

6. *Perceived Barriers to EBPs Scale* (BARRIERS) was developed by Funk et al.[17] to assess perceived barriers of EBP implementation. The BARRIERS consists of 29 items with a 4-point Likert scale ranging from 1 (no extent) to 4 (a great extent). Total scores range from 29-116 with higher scores indicating greater perceived barriers to the implementation of research findings.[17]

Data Collection: Data were collected from March-June 2019. After IRB approval, the nurse directors of all community hospitals were contacted and provided information about the objectives of the study. The PI selected and trained one nurse from each hospital to help in data collection. The potential participants were screened according to the inclusion criteria, then informed consent was obtained before data collection. The research assistants checked for completeness of questionnaires before sending the package of questionnaires to the PI.

Data Analysis: Data were entered, verified and cleaned using a statistical software program and Hierarchical Linear Modeling (HLM 7th student version). The level of statistical significance was set at $p < 0.05$ Assumptions of normality, linearity, multicollinearity and autocorrelation were tested for multilevel modeling. Descriptive analysis was performed for all study variables. A multilevel linear modeling analysis was performed to understand variability in the outcome shared by different levels of hierarchy in the data and to identify significant

variables explaining the variability at each level and illuminate any cross-level interactions by using two-level HLM analyses.

Results

The majority of the participants (28.2%) were aged from 23 to 30 years (M= 37.99, SD = 9.21), and the majority (96.36%) had bachelor degrees. Years of experience as a registered nurse (RN) ranged from 1 to 38 years (M = 15.56, SD = 9.41) and work experience in delivery rooms ranged from 1 to 35 years (M = 11.01, SD = 7.377). The majority (66.5%) of the nurse-midwives had been trained once or twice in EBP implementation for the prevention and management of PPH. At the organizational level, the study was conducted in the delivery room units of fifty community hospitals governed by Thailand's MOPH. Overall, hospital sizes were evenly distributed from small to middle level. In these hospitals, there were 5-13 nurse-midwives working in the delivery rooms (M= 6.795, SD = 2.462). All of these hospitals (100%) have a clinical practice guideline for the prevention and management of PPH.

Hypothesis Testing

The hypotheses were that factors at individual and organizational levels have an impact on the implementation of EBP for PPH management among nurse-midwives, and individual variables have a cross-level interaction with organizational variables on the implementation of evidence-based practice for the prevention and management of PPH. The hierarchical linear modeling (HLM) analysis was carried out to estimate the influence of individual (Level-1) and organizational (Level-2) factors on the implementation of EBP for PPH management. The first step in the hierarchical linear modeling process involved determining how the variation in the implementation of EBP for PPH was distributed among the two different levels, namely individual and organization.

The estimation of the grand mean of implementation of EBP for PPH across organizations (fixed effect) was 3.404. The total variability in the implementation of EBP for PPH was decomposed into its two components, while the estimates for variability among individuals within organizations (σ^2) and among organizations (π) were 28.11 and 12.92, respectively (see **Table 2**). This result suggests that approximately 32% of the variance in implementing EBP for PPH is attributed to the organizational characteristics and 68% of the variance in implementing EBP for PPH is attributed to the individual nurses within the organization. An assessment of the models by using chi-square was significant, thereby indicating that both models are predictors of implementing EBP for PPH (χ^2=174.82, p < .01) (**Table 2**).

Table 2 HLM estimation of unconditional model

Fixed Effects			**Coefficient**	***S.E.***	***t-ratio***
γ_{000}: average nurse implementation of EBPs for PPH score			3.404	0.148	22.937
Random Effects			**Variance Component**	***df***	***Chi-square***
σ^2: variance among nurse within organization			28.05		
τ_{00}: variance among organization			12.92	46	174.818**
Final estimation of variance components					
Random Effect	**Standard Deviation**	**Variance Component**	***df***	χ^2	***p*-value**
INTRCPT1, u_0	0.11368	0.01292	46	174.81773	<0.001
level-1, r	0.16749	0.02805			

Statistics for current covariance components model
Deviance = -58.323480
Number of estimated parameters = 2
**p < .01

Model 1 (Intercept 1) - fixed effect (γ_{00}): all individual factors had effects on the implementation of EBP for PPH management. The present analysis results revealed that years of experience in delivery rooms, personal innovativeness, and perceived characteristics of CPGs (relative advantage, observability, and trialability) could positively explain the implementation of EBP for PPH management (B = 3.741, p < .001), thereby indicating that nurse-midwives who had more experience working in delivery rooms perceived fewer barriers to EBP implementation, had more innovativeness and greater perceived characteristics in regards to CPGs were then more likely to implement EBP in PPH (b = .007, .187, .083, .132 respectively, p <.05) (**Table 3**).

However, when attributes the instrument of perceived characteristics of CPGs had three guideline characteristics they positively effected the implementation of EBP for PPH management; relative advantage, observability, and trial-ability (relative advantage χ^2 = 4.12, p = .04], observability χ^2= 12.59, p = .01], and trialability χ^2= 17.01, p = .01])

In Model 2 (Intercept 2), the fixed effect (γ_{00}) of organizational factors, the results revealed that large community hospitals and organizational climates of EBP implementation could positively predict the implementation of EBP for PPH management (B = 2.93, p < .001), thereby indicating that nurse-midwives who worked in large community hospitals had better organizational climates of EBP implementation and were more likely to implement EBP for PPH (b=.110, .173 respectively, p <.05). However, organizational support was an insignificant predictor (**Table 3**).

Table 3 Multilevel modeling for intercept only (n = 297)

	Estimate	S.E.	*t*	*p* value
Fixed effects				
Intercept 1	3.741611	.433195	8.332	**.000**
Exp.	.007450	.001656	4.498	.000
INNO	.082626	.031358	2.635	.009
PCG1	.132244	.065148	2.030	.006
PCG4	.102084	.035725	2.857	.020
PCG5	.108045	.037289	2.898	.030
BAR	-.187422	.057404	-3.265	.001
Intercept 2	2.930137	.225117	13.016	**.000**
F1HS	.110586	.044744	2.472	.017
OS	.046619	.098189	.475	.637
OC	.173001	.072151	2.398	.020

Years of experience in delivery room = Exp., Organizational Support = OS,
Organization Climate = OC, Relative advantage = PCG1, Observability = PCG4, Triability = PCG5
Perceived barriers to EBPs = BAR, Individual Innovativeness scale = INNO,
Large community hospital = F1HS

Table 4 shows the multilevel analysis results analyzed by using HLM with intercepts and slopes as outcomes modeling to illuminate any cross-level interactions. After adjusting for important individual and organization variables, the two factors identified as significant organization variables associated with higher levels of implementation of EBP for PPH remained the organizational climate in the implementation of EBP and hospital size (large community hospitals) (p < .05). Both organizational-level variables had a significant impact on average EBP implementation for PPH management across hospitals (**Table 4**).

Table 4 Multilevel modeling model with combined model (n = 283)

Fixed Effect	Coefficient	Standard error	*t*-ratio	Approx. *df*	*p*-value
For INTRCPT1, β_0					
INTRCPT2, γ_{00}	3.404820	0.143451	23.735	46	<0.001
OS, γ_{01}	−0.009928	0.052303	−0.190	46	0.850
OC, γ_{02}	0.095436	0.035430	2.694	46	0.010
F1HS, γ_{03}	0.116219	0.049494	2.348	46	0.023
For Exp. slope, β_1					
INTRCPT2, γ_{10}	0.016264	0.013132	1.239	232	0.217
OS, γ_{11}	−0.004464	0.005371	−0.831	232	0.407
OC, γ_{12}	0.001745	0.003226	0.541	232	0.589
F1HS, γ_{13}	−0.008658	0.003703	−2.338	232	0.020
For INNO slope, β_2					
INTRCPT2, γ_{20}	0.035563	0.109505	−0.325	232	0.746
OS, γ_{21}	−0.004931	0.041072	−0.120	232	0.905
OC, γ_{22}	0.008788	0.027730	0.317	232	0.752
F1HS, γ_{23}	0.020949	0.037357	0.561	232	0.575
For PCG1 slope, β_3					
INTRCPT2, γ_{30}	−0.103451	0.199205	−0.519	232	0.604
OS, γ_{31}	0.131459	0.070362	1.868	232	0.063
OC, γ_{32}	−0.069640	0.047548	−1.465	232	0.049
F1HS, γ_{33}	−0.100712	0.065594	−1.535	232	0.126
For PCG4 slope, β_4					
INTRCPT2, γ_{40}	−0.002489	0.003239	−4.691	232	0.443
OS, γ_{41}	0.027576	0.058962	0.468	232	0.642
OC, γ_{42}	0.102084	0.042301	2.413	232	0.175
F1HS, γ_{43}	−0.065725	0.035444	−1.854	232	0.070
For PCG5 slope, β_5					
INTRCPT2, γ_{50}	−0.015728	0.015802	−0.995	232	0.321
OS, γ_{51}	0.019164	0.054246	0.353	232	0.725
OC, γ_{52}	0.108045	0.037289	2.898	232	0.193
F1HS, γ_{53}	−0.065773	0.049842	−1.824	232	0.075
For BAR. slope, β_4					
INTRCPT2, γ_{40}	−0.076084	0.254989	−0.298	232	0.766
OS, γ_{41}	−0.145584	0.085125	−1.710	232	0.089
OC, γ_{42}	0.135225	0.057642	2.346	232	0.020
F1HS, γ_{43}	−0.072375	0.079999	−0.905	232	0.367

Years of experience in delivery room = Exp., Organizational Support = OS,
Organization Climate = OC, Relative advantage = PCG1, Observability = PCG4, Trialability = PCG5
Perceived barriers to EBPs = BAR, Individual Innovativeness scale = INNO,
Large community hospital = F1HS

The HLM results revealed that the two interactions found to be statistically significant in providing support had a cross-level interaction between the individual (Level 1) and organizational (Level 2) predictors. This interaction was found to be statistically significant, thereby suggesting that nurse-midwives who worked in large community hospitals and had more delivery room work experience were more likely to implement EBP for PPH ($B = -0.008$, $p = .02$). The second interaction found to be statistically significant indicated that nurse-midwives who worked in higher organizational climates of EBP implementation and perceived fewer barriers to EBP implementation were likely to implement EBP for PPH ($B = 0.135$, $p = .02$)

Discussion

The findings revealed that implementing EBP for PPH management was explained significantly by individual factors consisting of years of delivery room experience, perceived barriers, personal innovativeness and perceived characteristics of CPG. Similarly, the organizational factors, working in large community hospitals and the organizational climate of EBP implementation, also significantly explained the implementation of EBP for PPH management. There was also an across-level interactions significance between individual nurse-midwives and organizational-level factors on the implementation of EBP for PPH management. Our findings support the diffusion of the Innovations Model in that an individual's adoption of new ideas through communication channels of the social system influence the entire innovation-decision process with interactions between an individual and their environment.[13]

Our study also found that individual nurse-midwife factors with more years of work experience significantly explained the implementation of EBP for PPH. A possible explanation for this finding may lie in that nurse-midwives with more experience perceived more of an existing need to change problem.[14] Furthermore, a study of Thai nurses revealed that nurse-midwives with >20 years of nursing experience perceived fewer barriers to change practice and received more support for using EBPs than younger nurse-midwives.[12] It was also found that a high perception of barriers of EBP significantly decreased the implementation of EBP. This finding was not surprising and is supported by various studies among nurses and midwives.[12,15,18,31-33]

In the present study, perceived characteristics of CPG explained the influential factors on EBP implementation. Three attributes of guideline characteristics effected the implementation of EBP were a relative advantage, observability, and trialability. This finding is congruent with Rogers' Diffusion Model which postulated that attributes of perceived innovation characteristics such as relative advantage, compatibility, complexity, trialability, and observability increase adoption, except for complexity, which is inversely related to the adoption of an innovation.[13] Findings were also supported by a study of critical care nurses in which perception of guideline characteristics of compatibility, relative advantage, and trialability increased CPG adoption; however, complexity was associated with decreased adoption.[30] Our finding of high relative advantage, and high trialability were consistent with a previous study of guideline adoption.[34] Moreover, nurses with more positive attitudes toward general and specific guidelines were significantly more likely to implement recommendations of the guideline.[34] A possible explanation for this finding is that when the recommendations of a guideline are easy to follow and compatible with norms and values, the application of the guideline will be facilitated.[19]

Personal innovativeness could explain the implementation of EBPs in this study. Although individual innovativeness was measured differently, most previous studies provided consistent findings indicating that a nurse's individual innovativeness characteristics including knowledge and training, were most strongly associated with an increased adoption

of CPGs,[18,30,35] despite personality types such as willingness to embrace change being related to improved attitudes towards guideline implementation.[35] In sum, this current study showed that all individual nurse-midwife level factors explained a variance of 68% in the implementation of EBPs for PPH management.

Organizational factors influencing implement of EBP among nurse-midwives have been explored in previous studies. However, the reciprocal interactions between individual nurses and their organizational context are not well understood. Regarding the organizational level factor, this study found that nurse-midwives working in large community hospitals had a better organizational climate for EBP implementation in the prevention and management of PPH. This finding was supported by a study in Thai nurses which revealed that nurses working at large size hospitals had a higher usage of each of the EBPGs recommendations than those at mid-size hospitals.[12] Larger hospitals with high or partially high contexts were able to provide more staffing and support services and opportunities for staff development than smaller hospitals, thereby increased the practice adoption.[20,30] Moreover, nurses implemented evidence-based care to a greater extent when they perceived their culture as more supportive for EBP implementation.[21]

In the significant multi-level model that included two-level factors, it was found that the organizational climate of EBP implementation is an influential factor with a higher effect and contributed to stronger EBP adoption or implementation for PPH management. This finding was supported by a prior study in that the significant predictors of research utilization in nursing practice were research experience, support resources and research climate.[10] Organizations where nurses perceived a more satisfactory culture, leadership and evaluation were found to be associated with more research utilization than those nurses with lower perceptions of their context.[20,21] This finding emphasized the significance of the across-level interactions between the individual and organizational level factors influencing EBP implementation for PPH management. The first interaction was the nurse-midwife working in a large community hospital which was associated with more work experience in the delivery room, thus, resulting in the likelihood of implementing EBP for PPH. The second interaction was the nurse-midwife who had a higher organizational climate of EBP implementation perceived fewer barriers to EBP, thus, resulting in the likelihood of implementing EBP for PPH. These findings supported the evidence from previous studies in that hospitals are complex organizations with multiple-levels of decision-making, and decisions in the prevention of disease in hospitals are influenced by a variety of factors.[15,20] These factors include: nurses working in a hierarchical structure in the hospital setting. Individual nurses working within their respective nursing units.[15] The individual nurse and nursing unit represent different hierarchical levels, and are conceptualized to influence each other.[36]

Contrary to other studies, organizational support for EBP implementation was not an insignificant factor in explaining EBP implementation in this study. Possibly nurse-midwives perceived less organizational support because the implementation of EBP is congruent with organizational support, thus a failure to provide and support staff by organizations did not change practice-created barriers to the implementation of EBP.[30] Previous studies also revealed that nurses implemented EBP when they perceived a more supportive system.[12,30]

Limitation

This study was conducted at the community hospital level, therefore results cannot be generalized to other hospital levels such as teaching or regional hospitals. Another limitation is the assessment of the EBP implementation activity for the management of PPH. If a nurse-midwife did not have experience in actual practice in EBP for PPH management, their responses to this part of the questionnaires might reflect their perception and not actual practice.

Conclusions and Implications for Nursing Practice

Factors explaining the implementation of EBP for PPH management among nurse-midwives in Thailand include individual-level factors as years of experience worked in the delivery room, perceived characteristics of CPG, perceived barriers and personal innovativeness. At the organizational level, working in large community hospitals and organizational climate for EBP implementation was associated with stronger implementation of EBP for PPH management. Nurse administrators can use these findings to develop strategies to promote EBP implementation by decreasing perceived barriers to EBP implementation, and establishing the use of those guidelines in a way that is open to the public for accessing clinical practice guidelines. Nurse educators need to teach nurses about EBP implementation and work alongside nurse leaders to help them implement recent knowledge into practice and be involved in the collection of syntheses of selected guidelines in specific topics that are appropriate to problems/needs in clinical settings.

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References

1. World Health Organization. World health statistics 2017: monitoring health for the sustainable development goals [Internet]. 2018 [cited 2018 May 2]. Available from: http://www.who.int/gho/maternal_health/en/
2. Bureau of Policy and Strategy, Department of Health, Ministry of Public Health. Public Health Statistics 2016 [Internet]. 2017[cited 2018 May 2]. Available from: http://bps2moph.go.th/sites/default/files/kpimoph61.pdf
3. Bureau of Policy and Strategy, Department of Health, Ministry of Public Health. Public Health Statistics 2015 [Internet]. 2016 [cited 2018 May 2]. Available from: http://bps.moph.go.th/new_bps/sites/default/files/stratistics60.pdf
4. Shields LE, Wiesner S, Fulton J, Pelletreau B. Comprehensive maternal hemorrhage protocols reduce the use of blood products and improve patient safety. Am J Obstet Gynecol. 2015; 212(3): 272-80. DOI:10.1016/j.ajog.2014.07.012.
5. Woiski MD, van Vugt HC, Dijkman A, Grol RP, Marcus A, Middeldorp JM et al. From postpartum haemorrhage guideline to local protocol: a study of protocol quality. Matern Child Health J. 2016; 20(10):2160-8. DOI: 10.1007/s10995-016-2050-9.
6. Driessen M., Bouvier-Colle MH, Dupont C, Khoshnood B, Rudigoz RC, Deneux-Tharaux C. Postpartum hemorrhage resulting from uterine atony after vaginal delivery: factors associated with severity. JOGNN. 2011; 117(1): 21-31. doi:10.1097/AOG.0b013e318202c845.
7. Holleman G, van Tol M, Schoonhoven L, Mintjes-de Groot J, van Achterberg T. Empowering nurses to handle the guideline implementation process: identification of implementation competencies. J Nurs Care Qual. 2014; 29(3): E1-E6. doi: 10.1097/NCQ.0000000000000052.
8. Nienke OK, Gerrie WB, Jan PH, Gertrudis IJM K, Rixt Z. Feasibility of the Translating Innovations into Practice-toolbox (TIP-toolbox): a mixed-methods study for implementing activity innovations in nursing homes. Geriatric Nurs. 2017; 38(6): 498-504. DOI: 10.1016/j.gerinurse.2017.03.011.
9. Herr K, Titler M, Fine PG, Sanders S, Cavanaugh JE, Swegle J, et al. The effect of a translating research into practice (TRIP)-cancer intervention on cancer pain management in older adults in hospice. Pain Med. 2012; 13(8): 1004-17. doi:10.1111/j.1526-4637.2012.01405.x.
10. Sanluang CS, Aungsuroch Y. Predictive factors for research utilization in nursing practice among professional nurses, regional hospitals, Thailand. J Health Res. 2015; 30(1): 25-31. doi:10.14456/jhr.2016.4.
11. Squires JE, Estabrooks CA, Gustavsson P, Wallin L. Individual determinants of research utilization by nurses: a systematic review update. Implem Sci. 2011; 6(1): 1-20. doi: 10.1186/1748-5908-6-1.

12. Suwanraj M. Current practice, perceived barriers, and perceived facilitators of Thai nurses on using the evidence-based practice on pain assessment and pain management in older adults. (3422198 Ph.D.), The University of Iowa, Ann Arbor, 2010.
13. Rogers E. Diffusion of Innovations, 5th ed. New York: Simon & Shuster; 2003.
14. Melnyk, BM, Fineout-Overholt, E. Evidence-based practice in nursing & healthcare: a guide to best practice. Lippincott Williams & Wilkins; 2011.
15. Estabrooks CA, Squires JE, Strandberg E, Nilsson-Kajermo K, Scott SD, Profetto-McGrath J, et al. Towards better measures of research utilization: a collaborative study in Canada and Sweden. J Adv Nurs. 2011; 67(8): 1705-18. doi.org/10.1111/j.1365-2648. 2011.05610.x.
16. Heydari A, Mazlom SR, Ranjbar H, Scurlock-Evans L. A study of Iranian nurses' and midwives' knowledge, attitudes, and implementation of evidence-based practice: the time for change has arrived. Worldviews on Evidence-Based Nurs. 2014; 11(5): 325-31. doi: 10.1111/ wvn.12052.
17. Funk SG, Champagne MT, Wiese CR, Tomquist EM. Barriers: the barriers to research utilization scale. App Nurs Res. 1991; 4(1): 39-45. doi: 10.1016/s0897-1897(05)80052-7.
18. Kajermo KN, Boström A-M, Thompson DS, Hutchinson AM, Estabrooks CA, & Wallin L. The BARRIERS scale – the barriers to research utilization scale: a systematic review. Implem Sci. 2010; 5: 32-32. doi: 10.1186/1748-5908-5-32.
19. Puttaruksa L, Subgranon R, Othaganont P. Factors leading to success in the implementation of evidence based nursing practice of professional nurses. J of Faculty of Nursing, Burapha University. 2016; 24(3): 94-103. (in Thai).
20. Cummings GG, Hutchinson AM, Scott SD, Norton PG, Estabrooks CA. The relationship between characteristics of context and research utilization in a pediatric setting. BMC Health Serv Res. 2010; 10: 1-10. doi: 10.1186/1472-6963-10-168.
21. Shuman C. Addressing the practice context in evidence-based practice implementation: leadership and climate. (10670409 Ph.D.), The University of Michigan, Proquest, 2017.
22. Ehrhart MG, Aarons GA, Farahnak LR. Assessing the organizational context for EBP implementation: the development and validity testing of the Implementation Climate Scale (ICS). Implement Sci. 2014; 9: 1-10. doi:10.1186/s13012-014-0157-1.
23. Hox JJ. Multilevel analysis. Techniques and applications, 2nd ed. New York, US: Routledge/Taylor & Francis Group; 2010.
24. Brislin RW. Back-translation for cross-cultural research. J Cross-Cultural Psychol. 1970; 1(3):185-216.
25. Hurt HT, Joseph K & Cook CD. Scales for the measurement of innovativeness. Human Comm Res. 1977; 4(1): 58-65.
26. Edwards N, Davies B, Danseco E, Pharand D, Brosseau L, Ploeg J, et al. Evaluation of nursing best practice guidelines: organizational characteristics. Comm Health Res Unit Monograph Series. 2004; 04-02: 1-31.
27. World Health Organization. WHO recommendations for the prevention and treatment of postpartum haemorrhage [Internet]. Geneva: WHO; 2012 [cited 2018 May 2]. Available from: http://who.int/iris/bitstream/handle/ 10665/ 75411/9789241548502_eng.pdf
28. Royal Thai College of Obstetricians and Gynaecologists (RTCOG). Clinical practice guideline: management of atonic postpartum hemorrhage. In: Royal Thai College of Obstetricians and Gynaecologists (RTCOG), editor. Clinical management guidelines for obstetrician-gynecologists. 2nd. ed. Bangkok; 2012 (in Thai).
29. Aarons GA, Ehrhart MG, Farahnak LR. Sklar M. Aligning leadership across systems and organizations to develop a strategic climate for evidence based practice implementation. Ann Rev of Pub Health. 2014; 35: 255-74. doi: 10.1146/ annurev-publhealth-032013-182447.
30. Bourgault AM, Hooper V, Sole ML, Waller JL. Factors influencing critical care nurses' adoption of the AACN practice alert on verification of feeding tube placement. Nutr in Crit Care. 2014; 23(2): 134-44. doi: 10.4037/ ajcc2014558.
31. Zhou F, Maier M, Hao Y, Tang L, Guo L, Liu H, et al. Barriers to research utilization among registered nurses in traditional Chinese Medicine hospitals: a cross-sectional survey in China. Evid Based Complementary Altern Med. 2015: 1-8. doi.org/10.1155/2015/475340.
32. Leo A, Bayes S, Geraghty S, Butt J. Midwives' use of best available evidence in practice: an integrative review. J Clin Nurs. 2019;28:4225-35. doi: 10.1111/jocn.15027.

33. Abuejheisheh A, Omar T, Qaddumi J, Almahmoud O, Darawad MW. Predictors of intensive care unit nurses' practice of evidence-based practice guidelines. J of Health Care. 2020; 57:1-7. doi: 10.1177%2F004695802090 2323.
34. Quiros D, Lin S, Larson EL. Attitudes toward practice guidelines among ICU personnel: a cross-sectional anonymous survey. Heart Lung J. 2007 ; 36(4): 287-297. doi: 10.1016/j.hrtlng.2006.08.005.
35. Ball K. Compliance with surgical smoke evacuation guidelines: implications for practice. AORN J. 2012; 30(1): 142-9. doi: 10.1016/j.aorn.2010.06.002.
36. Cho E, Lee N-J, Kim E-Y, Kim S, Lee K, Park K-O, et al. Nurse staffing level and overtime associated with patient safety, quality of care, and care left undone in hospitals: a cross-sectional study. Intern J of Nurs Stud. 2016, 60: 263-71. doi: 10.1016/j.ijnurstu.2016.05. 009.

ปัจจัยอธิบายการนำหลักฐานเชิงประจักษ์ไปใช้สำหรับการจัดการภาวะตกเลือดหลังคลอดในพยาบาลห้องคลอด ประเทศไทย

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บทคัดย่อ: การนำหลักฐานเชิงประจักษ์ไปใช้สำหรับการป้องกันและการจัดการที่เหมาะสมในภาวะตกเลือดหลังคลอดสามารถลดการเจ็บป่วยและการเสียชีวิตของมารดาได้อย่างมีนัยสำคัญ อย่างไรก็ตามในการปฏิบัติตามหลักฐานเชิงประจักษ์เพื่อป้องกันการตกเลือดหลังคลอดยังคงไม่ได้ยึดตามแนวทางอย่างเหมาะสม การศึกษาครั้งนี้มีวัตถุประสงค์ เพื่อศึกษาปัจจัยระดับบุคคลและระดับองค์กร และปฏิสัมพันธ์ระหว่างปัจจัยเหล่านั้น ในการอธิบายการนำหลักฐานเชิงประจักษ์ไปใช้สำหรับการจัดการภาวะตกเลือดหลังคลอด รูปแบบการศึกษาเป็นแบบภาคตัดขวาง กลุ่มตัวอย่างเป็นพยาบาลผดุงครรภ์ จำนวน 298 ราย จากห้องคลอด 50 แห่ง ของโรงพยาบาลชุมชนสังกัดกระทรวงสาธารณสุข ระหว่างเดือนมีนาคม ถึง มิถุนายน 2562 โดยใช้การสุ่มตัวอย่างแบบหลายขั้นตอน เก็บรวบรวมข้อมูลโดยใช้แบบสอบถาม 7 ชุด ได้แก่ การปฏิบัติการพยาบาลเพื่อป้องกันและการจัดการภาวะตกเลือดหลังคลอด การสนับสนุนขององค์กร บรรยากาศองค์กรในการปฏิบัติตามหลักฐานเชิงประจักษ์ ลักษณะบุคคลที่ยอมรับนวัตกรรมสิ่งใหม่ การรับรู้คุณลักษณะของแนวปฏิบัติทางคลินิก และอุปสรรคในการนำหลักฐานเชิงประจักษ์ไปใช้ วิเคราะห์ข้อมูลด้วยค่าสถิติเชิงพรรณนา และการวิเคราะห์พหุระดับ

ผลศึกษาพบว่าอธิบายปัจจัยที่ส่งผลต่อการนำหลักฐานเชิงประจักษ์ไปใช้สำหรับการจัดการภาวะตกเลือดหลังคลอด มีดังนี้ ปัจจัยในระดับบุคคล ได้แก่ ประสบการณ์การทำงานพยาบาลผดุงครรภ์ การยอมรับนวัตกรรมของบุคคล, การรับรู้คุณลักษณะของแนวปฏิบัติทางคลินิก และการรับรู้อุปสรรค ปัจจัยในระดับองค์กร ได้แก่ การทำงานในโรงพยาบาลชุมชนขนาดใหญ่ และการรับรู้บรรยากาศองค์กร โดยปัจจัยเหล่านี้สามารถอธิบายความแปรปรวนของการนำหลักฐานเชิงประจักษ์ไปใช้สำหรับการจัดการภาวะตกเลือดหลังคลอดได้ ร้อยละ 68 และปัจจัยระดับองค์กรสามารถอธิบายความแปรปรวน ร้อยละ 32 ซึ่งมีความแตกต่างกันในแต่ละบุคคลของพยาบาลผดุงครรภ์ นอกจากนี้ยังพบว่ามีปฏิสัมพันธ์ข้ามระดับระหว่างตัวแปรระดับบุคคลและระดับองค์กรอย่างมีนัยสำคัญ ผลจากการศึกษาครั้งนี้ เสนอแนะผู้บริหารการพยาบาล สามารถพัฒนากลยุทธ์เพื่อส่งเสริมการนำหลักฐานเชิงประจักษ์ไปใช้สำหรับการจัดการภาวะตกเลือดหลังคลอด โดยลดการรับรู้อุปสรรคของพยาบาลและส่งเสริมบรรยากาศองค์กรในการนำหลักฐานเชิงประจักษ์ไปใช้

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คำสำคัญ: หลักฐานเชิงประจักษ์ พยาบาลผดุงครรภ์ การวิเคราะห์พหุระดับ ภาวะตกเลือดหลังคลอด

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