Novelty Journals

ISSN 2394-7330

International Journal of Novel Research in Healthcare and Nursing
Vol. 7, Issue 3, pp: (578-589), Month: September - December 2020, Available at: www.noveltyjournals.com

Factors Associated with Nurses' Knowledge and Attitude toward Vaginal Birth after Caesarean Section

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***Abstract: Context*: Vaginal birth after cesarean section (VBAC) is a safe option for many women and is one of the strategies developed to control the rising rate of cesarean sections.**

***Aim:* This research aimed to assess factors associated with nurses' knowledge and attitude toward vaginal birth after caesarean section.**

***Methods:* A descriptive, correlational research design was adopted. A convenience sample of 66 nurses was recruited. The research was conducted at obstetrics and gynecology department of Kafrelsheikh University hospital and Kafrelsheikh General hospital, Kafrelsheikh Governorate, Egypt. Data collected using two tools: Structured interview schedule; and VBAC attitude assessment scale.**

***Results:* The study revealed that, 59.1% of nurses have poor knowledge level. Among a statistically significant factors associated with nurses' knowledge toward VBAC are, age, marital status, level of education, work position, working hospital, years of experience in general and obstetric nursing, hearing about VBAC, having previous knowledge about VBAC, and working in a hospital performing VBAC (P<0.001). Regarding nurses' attitude, only 4.5% of them have positive attitude. There was statistically significant difference regarding levels of attitude between single and married nurses (p= 0.017), nurses with different educational level (p= 0.019), and nurses with different years of experience in obstetric nursing (p= 0.036).**

***Conclusion and recommendation:* Nearly three-fifths of nurse have poor knowledge and neutral attitude toward VBAC. The study recommended that strategies to improve the depth and breadth of nurses' knowledge and attitude regarding VBAC should be designed and carried out.**

***Keywords:* Nurses, Knowledge, Attitude, Vaginal Birth After Caesarean Section.**

1. INTRODUCTION

Cesarean section (CS) can be a life-saving intervention for both mother and newborn. The World Health Organization announced that no nation can justify having a cesarean section rate higher than 10%–15%. Despite this advice, cesarean section rates have increased to almost 25% in some countries in the last two decades **(Esteves-Pereira et al., 2016).** Furthermore, **Gupta and Saini (2018)** reported that caesarean section higher than 19% does not appear to improve maternal and neonatal health outcomes. In fact, CS is effective in saving maternal and neonatal lives only when it is carried out for medical indications.

Cesarean section, is one of the major abdominal surgeries that caries medical risks to woman's health including: hemorrhage, need for transfusion, injury to other organs, infections, anesthetic complications, and psychological impairments **(Esteves-Pereira et al., 2016).** Some studies have found that previous CS deliveries were associated with most cases of obstetric hemorrhage and emergency postpartum hysterectomy (**Vogel et al., 2015 & Macfarlane et al., 2015**). Furthermore, maternal mortality from CS is two to four times higher than that of vaginal birth **(Esteves-Pereira et al., 2016).** These maternal deaths are mainly due to postpartum hemorrhage and anesthetic complications (**Vogel et al., 2015 & Macfarlane et al., 2015**).

Furthermore, morbidity and mortality risks were high in women undergoing emergency CS and in women with repeated CSs. **(Gupta & Saini, 2018). Alshehri et al., (2019)** had studied the outcomes and complications after repeat cesarean sections among King Abdulaziz University Hospital patients. They reported that, intraoperative and post-operative complications were significantly increased with the increasing number of CSs including both moderate and severe adhesions, an increase in blood loss during surgery (>1000 mL), blood transfusion, placenta accrete, cesarean hysterectomy, and maternal ICU and NICU admissions. In the same line **Biler et al., (2017)** announced that multiple repeated cesarean sections are associated with increased adhesions, blood transfusion, increased operation time, and length of hospitalization.

Vaginal birth after cesarean section (VBAC) is a safe option for many others and is one of the developed strategies to control the increasing rate of cesarean sections (**WHO, 2016; Saadia, et al., 2018).** Vaginal birth after caesarean section is associated with a lower risk of blood transfusion, maternal ICU admissions, and emergency hysterectomy than planned repeated CS. Although rare, the rate of the ruptured uterus among women undergoing a trial of labor after a previous CS is seven times higher than among women with planned repeated CS **(Curtin et al., 2015).**

Midwives provide women-centered, evidence-based, and cost-effective maternity care **(Renfrew et al., 2014).** Midwifery care is associated with good maternal and neonatal health outcomes in developing and developed countries **(Ten Hoope-Bender et al., 2014)**. In other words, midwives play a significant and central role in supporting normal physiologic birth (**Renfrew et al., 2014; Sandall et al., 2015)**. The midwifery nurse can make an imperative contribution to the woman's ability to take an informed decision about their delivery mode of choice. The nurse is an advocate, educator, and counselor for women in making this vital healthcare decision. **Spong et al., (2012)** reported that women who select a VBAC after thoroughly reviewing the risks and benefits of this mode of delivery can make an informed and evidence-based decision and are more satisfied with their healthcare provider and the quality of care provided to them.

Significance

In Egypt, the rate of CS is by far higher than the maximum threshold accepted by the WHO (15%). The past decade has testified a severe increasing in the incidence of CS. According to the most recent Egypt Demographic and Health Survey (EDHS) a slightly more than half (52%) of the live births in the five-year period before the 2014 EDHS were delivered by caesarean section. While at Kafr El-Sheikh governorate the cesarean section rate was as high as 70.2% **(Ministry of Health and Population [Egypt], 2015).**

Nurses have the responsibility to provide women with an appropriate, evidence-based information about the risks and benefits of VBAC. As well, health care providers including nurses supporting women during their planned VBAC procedure should be adequately trained, educated and certified to support and manage any potential emergency situation in which the woman might have to divert to an emergency CS instead of a planned VBAC **(Van, 2018; Munro et al., 2017).** In order to carry out these responsibilities, nurses should have adequate, up-dated and evidence-based information regarding VBAC. Unfortunately, there is no studies to assess the knowledge and attitude of nurses toward VBAC. So, the current research was carried out to assess factors associated with nurses' knowledge and attitude toward vaginal birth after caesarean section.

Aim of the research

This research aimed to assess factors associated with nurses' knowledge and attitude toward vaginal birth after caesarean section

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Research questions

1) What is the nurses' knowledge level regarding VBAC?
2) What is the nurses' attitude towards VBAC?
3) What are the factors associated with nurses' knowledge regarding VBAC?
4) What are factors associated with nurses' attitude towards VBAC?

2. SUBJECTS AND METHODS

Research Design: A descriptive, correlational research design was adopted in this study. It is a type of non-experimental research design aimed to observe, describe, and document aspects of a situation, a population, or phenomenon that is being studied as it naturally occurs. Sometimes it is also serving as a starting point for hypothesis generation or theory development **(LoBiondo-Wood & Haber, 2018).**

Setting: The research was conducted at obstetrics and gynecology department of Kafrelsheikh University hospital and Kafrelsheikh General hospital, Kafrelsheikh Governorate, Egypt. Obstetrics and gynecology department of Kafrelsheikh University Hospital consisted of 1 outpatient clinic, 2 in-patient rooms occupying 10 beds, and 2 operation rooms. While obstetrics and gynecology department of Kafrelsheikh General hospital consisted of 3 outpatient clinics, 1 family planning clinic, 4 in-patient rooms occupying 24 beds, and 2 operation rooms.

Sample: The target population of the current study was 70 nurses working at the previously mentioned settings. Due to the small target population size, the researchers planned to recruit all nurses who were actively involved in clinical work during the period of data collection and who accepted to participate in the study. Based on these two conditions, a convenience sample of 66 nurses was enrolled in the study.

Tools: two tools were constructed by the researchers after reviewing related literature which are structured interview schedule and VBAC attitude assessment scale.

1) Structured Interview schedule: It included two main sections:

a. Personal Background Data: This section included data related to age, place of residence, marital state, level of education, work position, working hospital, and years of experience in general and obstetric nursing. It also included four questions related to ever hearing about VBAC, having any previous knowledge bout VBAC, source of this knowledge, and if working hospital performing VBAC.

b. Knowledge about VBAC and repeated CS: This section included a total of 30 multiple choice questions. Seven questions of them bout risk and benefits of VBAC, 9 questions about risk and benefits of repeated CS, 7 questions about contraindication of VBAC, and finally 7 questions about factors associated with successful VBAC.

Scoring system:

A score of (1) was given to correct answer, and a score of (0) for incorrect and don't know the answer.

The total knowledge scores were classified into three levels: Poor (< 50%), acceptable (50% to <75%), and high (≥75%).

2) VBAC Attitude Assessment Scale: It consisted of 10 statements to which nurses were requested to document their attitude towards VBAC on a 3-point Likert-scale ranging from agreeing to neutral and disagree. An example of these statements includes, women should be involved in deciding their mode of delivery, VBAC should be encouraged, VBAC carries more risk for women, VBAC carries more risk for the fetus, CS carry more risk for women, and CS carry more risk for the fetus.

Scoring system:

A score of 3 was given to agree; a score of 2 for neutral; and a score of 1 for disagree. Each statement scored, and the aggregate attitude score was classified into three levels: negative attitude (<35%), neutral attitude (35%-<60%), and positive attitude (> 60%).

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Tools Validity and Reliability

Tool was submitted to five scholastic nursing specialists in the field of Maternity and Midwifery Nursing to test content validity. Modifications were carried out according to the recommendations of specialists. Tools validate for clarity, appropriateness, and completeness of the content. The reliability of the proposed tools was tested utilizing Cronbach's alpha. For the structured interviewing questionnaire, Cronbach's alpha of 0.86 showed a strong significant positive correlation between the items of the tool. While for VBAC attitude assessment scale, it was 0.82, which indicates accepted tools reliability.

Ethical consideration

Official permission was taken from Kafrelsheikh University Hospital administration as well as from Kafrelsheikh General Hospital. After that, each nurse informed about the purpose of the research and its importance. The researchers emphasized that participation in the research is entirely voluntary, and all nurses informed that they can withdraw from the research at any time. Anonymity and confidentiality were assured through the coding of the data. Informed verbal consent took from nurses who accept to be included in the research.

Pilot Study

A pilot study was conducted on 10% of the sample (6 nurses) who met the criteria of selection to assess the feasibility of the study process and clarity of the tools and to determine the time needed to complete the tools. Accordingly, the needed modifications were performed.

Procedure

Data was collected through a period of one month from the beginning of January 2020 to the end of January 2020. Each nurse was interviewed individually to keep her privacy and prevent contamination of the result where the researcher firstly explained the purpose and nature of the study to obtain informed consent. After that, a Structured Interview schedule was used by the researchers to obtain personal background data and knowledge regarding VBAC. The questions were asked in Arabic and the nurse's responses were documented by the researchers. Then the VBAC Attitude Assessment Scale was given to the nurse to document her attitude toward VBAC herself. The time taken to complete these tools was about 30 minutes. The researcher appreciates and acknowledges the nurse for her time and effort.

Statistical analysis

Collected data were organized, coded, and entered into a computer. Statistical Package for Social Science (SPSS) version 20 was used for the statistical analysis of data. Data analysis was carried out using both descriptive and inferential statistics. The arithmetic mean and standard deviation were used for continuous variables to describe the central tendency of observations and to measure the dispersion of results around the mean, while frequency distribution was used for nominal and categorical variables. T-test and analysis of variance (ANOVA) were used to examine if the association exists between variables. The differences between two means were tested using t-test while differences between more than two means were examined using one-way ANOVA. Comparison of categorical variables was performed using chi-square [X^2] test. P-value less than 0.05 was accepted as statistically significant.

3. RESULTS

Nurses' age ranged between 21-38 years with a mean of 27.3 ±4.1year. In relation to residence, 81.8% were living in rural areas, 68.2% of them were married, 45.5% of them have Bachelor's degree in nursing, 86.4% of them were staff nurse and 54.5% of them worked in Kafrelsheikh university hospital. Concerning nurses' experience, 54.5% of them have less than five years experience in general nursing, while 59.1% of them have less than five years experience in obstetric nursing (Table, 1).

Table (2) shows that 68.2% of nurses reported that they heard about VBAC before, and 50.0% of them reported that they have previous knowledge about VBAC**,** 54.5% of them reported their colleagues as the source of their knowledge. Forty-five point five percent of nurses worked in a hospital performed VBAC.

In relation to level of total knowledge table (3) shows that 59.1% of nurses have poor knowledge level. Regarding factors associated with nurses' knowledge table (4) shows that there is a statistically significant higher mean knowledge score among nurses who aged 35 years and more, nurses who lived in urban areas, nurses who are married, among head nurse, nurses worked at Kafrelsheikh General Hospital, nurses who have greater than ten years experience in general nursing and greater than five years experience in obstetric nursing, nurses who heard about VBAC, nurses who have previous knowledge about VBAC, and nurses working in a hospital performing VBAC (P<0.001).

Considering attitude of nurses towards VBAC, 59.1% of nurses have neutral attitude and only 4.5% of them have positive attitude (Table, 5). Concerning factors associated with nurses' attitude table (6) shows that there is a statistically significant difference regarding levels of attitude between single and married nurses (p= 0.017), between nurses with different educational level (p= 0.019), and also between nurses with different years of experience in obstetric nursing (p= 0.036). As well, there is a statistically significant higher mean knowledge score among nurses who have positive attitude toward VBAC (p= 0.004) (Table, 7).

Table (1): Frequency and Percentage Distribution of Nurses According to their Personal Data

Variable	Frequency	%
Age (years)		
<25	24	36.4
25 to <30		31.8
30 to <35	18	27.3
≥35	3	4.5
Mean ±SD	27.3 ±4.1	
Range	21 – 38	
Place of residence		
Urban	12	18.2
Rural	54	81.8
Marital status		
Single	21	31.8
Married	45	68.2
Level of education		
Technical institute	30	45.5
Bachelor's degree	30	45.5
Diploma	6	9.1
Work position		
Staff nurse	57	86.4
Head nurse	9	13.6
Working hospital		
University hospital	36	54.5
General hospital	30	45.5
Years of experience in general nursing		
<5 years	36	54.5
5-10 years	24	36.4
>10 years	6	9.1
Median [IQR]	54.0 [84.0]	
Years of experience in obstetric nursing		
<3 years	39	59.1
3-5 years	9	13.6
>5 years	18	27.3
Median [IQR]	24.0 [60.0]	

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Table (2): Frequency and Percentage Distribution of Nurses According to their background about VBAC

Variable	Frequency	%
Hearing about VBAC		
No	21	31.8
Yes	45	68.2
Having previous knowledge about VBAC		
No	33	50.0
Yes	33	50.0
Source of knowledge (n=33)		
Work experience	15	45.5
Colleagues	18	54.5
Curriculum	0	0.0
In-service training program	0	0.0
Working in a hospital performing VBAC		
No	36	54.5
Yes	30	45.5

Table (3): Frequency and Percentage Distribution of Nurses' Levels of Knowledge

Levels of knowledge	Frequency	%
Poor knowledge	39	59.1
Acceptable knowledge	12	18.2
High knowledge	15	22.7
Mean ±SD	13.7 ±6.3	

Table (4): Factors Associated with Nurses' Knowledge regarding VBAC

Variable	Knowledge score (mean ±SD)	T or F	p- value
Age in years			
<25	10.6 ±5.1		
25 to <30	11.4 ±5.7		
30 to <35	19.2 ±3.4		
≥35	24.0 ±1.0	F=17.191	P<0.001
Place of residence			
Urban	17.5 ±5.6		
Rural	12.9 ±6.2	t=2.352	P=0.022
Marital status			
Single	10.0 ±5.0		
Married	15.5 ±5.7	t=3.790	P<0.001
Level of education			
Technical institute	13.1 ±5.3		
Bachelor's degree	12.6 ±6.4		
Diploma	23.5 ±0.8	F=9.806	P<0.001
Work position			
Staff nurse	12.8 ±6.1		

Head nurse	20.0 ±3.1	t=3.462	P<0.001
Working hospital			
University hospital	11.6 ±6.8		
General hospital	16.4 ±4.4	t=3.337	P<0.001
Experience in general nursing			
<5 years	10.9 ±5.7		
5 – 10 years	15.8 ±4.7		
>10 years	23.5 ±0.8	F=15.050	P<0.001
Experience in obstetric nursing			
<3 years	10.6 ±5.6		
3-5 years	16.7 ±4.8		
>5 years	19.2 ±3.4	F=19.773	P<0.001
Hearing about VBAC			
No	8.0 ±2.0		
Yes	16.5 ±5.8	t=6.541	P<0.001
Having previous knowledge about VBAC			
No	9.8 ±4.6		
Yes	17.7 ±5.2	t=6.572	P<0.001
Work in a hospital performing VBAC			
No	11.6 ±6.8		
Yes	16.4 ±4.4	t=3.337	P<0.001

Table (5): Frequency and Percentage Distribution of Nurses' attitude toward VBAC

Attitude level	Frequency	%
Negative	24	36.4
Neutral	39	59.1
Positive	3	4.5

Table (6): Factors Associated with Nurses' attitude toward VBAC

	Attitude levels							
	Negative (n=24)		Neutral (n=39)		Positive (n=3)		Chi square test	
	n	%	n	%	n	%	χ^2	p
Age in years								
<25	12	50.0	9	23.1	3	100.0		
25 - <30	6	25.0	15	38.5	0	0.0		
30 - <35	6	25.0	12	30.8	0	0.0		
≥35	0	0.0	3	7.7	0	0.0	11.423	0.076
Place of residence								
Urban	3	12.5	9	23.1	0	0.0		
Rural	21	87.5	30	76.9	3	100.0	1.816	0.403
Marital status								
Single	9	37.5	9	23.1	3	100.0		
Married	15	62.5	30	76.9	0	0.0	8.159	0.017
Level of education								
Technical institute	9	37.5	21	53.8	0	0.0		
Bachelor's degree	15	62.5	12	30.8	3	100.0		

Diploma	0	0.0	6	15.4	0	0.0	11.804	0.019
Work position								
Staff nurse	21	87.5	33	84.6	3	100.0		
Head nurse	3	12.5	6	15.4	0	0.0	0.601	0.740
Working hospital								
University hospital	15	62.5	18	46.2	3	100.0		
General hospital	9	37.5	21	53.8	0	0.0	4.220	0.121
Experience in general nursing								
<5 years	15	62.5	18	46.2	3	100.0		
5 – 10 years	9	37.5	15	38.5	0	0.0		
>10 years	0	0.0	6	15.4	0	0.0	7.219	0.125
Experience in obstetric nursing								
<3 years	18	75.0	18	46.2	3	100.0		
3 – 5 years	0	0.0	9	23.1	0	0.0		
>5 years	6	25.0	12	30.8	0	0.0	10.251	0.036
Hearing about VBAC								
No	9	37.5	12	30.8	0	0.0		
Yes	15	62.5	27	69.2	3	100.0	1.777	0.411
Having previous knowledge about VBAC								
No	15	62.5	18	46.2	0	0.0		
Yes	9	37.5	21	53.8	3	100.0	4.731	0.094
Work in a hospital performing VBAC								
No	15	62.5	18	46.2	3	100.0		
Yes	9	37.5	21	53.8	0	0.0	4.220	0.121

Table (7): Association Between Nurses' Knowledge and Attitude Toward VBAC

	Attitude			**Significance**
	Negative	Neutral	Positive	
Knowledge score (mean ±SD)	11.8 ±5.6	14.3 ±6.2	24.0 ±1.0	F=6.060 P=0.004

4. DISCUSSION

Worldwide, the rate of vaginal birth after a previous caesarean section has diminished in the recent years. For example, in the USA, from 1996 to 2004, the VBAC rate decreased from 28.3% to 9.2%, with a corresponding increase in the rate of repeat CS **(Obeidat et al., 2013).** Knowledgeable nurses can make an important contribution to the women's ability to make an informed choice about their mode of delivery through providing knowledge and support and advocate for their autonomous decision. So, this study aimed to assess factors associated with nurses' knowledge and attitude toward vaginal birth after caesarean section

In relation to level of nurses' knowledge the current study revealed that about three-fifths of nurses have poor knowledge level compared to less than one-quarter of them have high knowledge level. This noticeable poor knowledge level may be due to the lack of training program conducted for nurses and also to the absence of basic information obtained during their formal education concerning VBAC as the current study revealed that, no one of the nurses who reported that they having previous knowledge about VBAC mentioned training program in the hospitals or nursing curricula as the source of their

knowledge. In the line of these findings, **Biresaw et al., (2020)** in their study about knowledge, attitude, and associated factors towards patient safety among nurses working at University of Gondar specialized hospital reported that more than one-half of nurses had poor knowledge about patient safety.

Similarly, **Kahsay and Pitkäjärvi (2019)** who carried out a study to assess the emergency nurses´ knowledge, attitude, and perceived barriers regarding pain management. They reported that emergency nurses have poor knowledge level about pain management. Contradicting our study result, **Appleton et al. (2000)** conduct a study to assess knowledge and attitudes about vaginal birth after caesarean section in Australian hospitals and reported that there was a high level of awareness about outcomes and the relative importance of many issues in considering VBAC.

Regarding factors associated with nurses' knowledge, the current study findings showed there is a statistically significant higher mean knowledge score among nurses who aged 35 years and more (P<0.001). This result could be explained by experience in obstetric nursing as work experience is considered an important factor that improves one's knowledge and actually less than one -half of the nurses in the current study reported work experience as the source of their knowledge regarding VBAC. This finding was compatible with other studies in which **Biresaw et al., (2020)** reported that nurses who were equal to or more than 30 years old were 3.3 times [AOR = 3.30, 95% CI (1.797, 6.071)] more likely to have good knowledge compared to those of less than 30 years old.

Moreover, the current study revealed that head nurse, have a statistically significant higher mean knowledge score than staff nurse (P<0.001). This is because head nurses always have higher educational level and usually older than staff nurses and therefore have more experience in their work field. Similarly, **Chan (2009)** carried out a study aimed to evaluate knowledge, skills, and attitudes levels of nursing staff members toward the clinical management system and to determine factors affecting their knowledge, attitudes, and skill levels. He reported that older age (P = 0.01), and higher educational levels (P = 0.001) are factors that significantly improve nurses' knowledge. Another study conducted by **Ahsan and Mallick (2017)** aimed to identify the factors affecting knowledge and attitude of nurses in a teaching hospital towards adverse drug reaction. They reported that statistically significant difference was seen in the knowledge scores among respondents with different educational qualification (p<0.001).

Another factor associated with nurses' knowledge regarding VBAC is working hospital. Our study revealed that nurses who worked at Kafrelsheikh General Hospital have a statistically significant higher mean knowledge score than nurses who worked at Kafrelsheikh university Hospital (P<0.001). This can be regarded as an expected finding because Kafrelsheikh General Hospital undertaken VBAC although not planned. When nurses work at such a hospital, their knowledge may be improved through providing care for woman undergoing VBAC, reading more about it, exchange knowledge with their colleagues and even they may know about or faced risks and benefits of it. In this context, the current study revealed that more than one-half of nurses reported their colleagues as the source of their knowledge about VBAC and less than one-half of them worked in a hospital performing VBAC.

Among factors associated with nurses' knowledge experiences either in general nursing or in obstetric nursing. The current study revealed that nurses who have greater than ten years of experience in general nursing and greater than five years of experience in obstetric nursing have a statistically significant higher mean knowledge score (P<0.001). Incongruent with this result **Ahsan and Mallick (2017)** in their study found that there was a significant correlation between the knowledge scores of the participant and working experience in years (p<0.05). As well, **Biresaw et al., (2020)** revealed that work experience of equal to or greater than 10 years [AOR: 2.7, 95% CI (1.21, 6.05)] was associated with good knowledge. Furthermore, **Kassew et al., (2020)** reported that short (<2 years) work experience was associated with a lower-level of knowledge (p < 0.05).

As regards nurses' attitude towards VBAC the current study revealed that more than one-third of nurses have negative attitude and only 4.5% of them have positive attitude. Poor level of knowledge may explain these findings as three-fifths of nurses have poor knowledge. Actually, one can demonstrate either positive or negative attitude toward anything only when having adequate knowledge about that thing. In the line with our finding, **Kahsay and Pitkäjärvi (2019)** reported that the attitude of the emergency nurses regarding pain management was poor. Contradicting these findings **Biresaw et al., (2020)** in their study reported that more than one-half (56.1%) of the nurses had a favorable attitude while the rest of the respondents had an unfavorable attitude towards patient safety.

Concerning factors associated with nurses' attitude toward VBAC the present study showed that, there is a statistically significant difference regarding levels of attitude between single and married nurses (p= 0.017). This difference may be probably due to married nurses themselves may experience different modes of delivery and also may experience risks and benefits of these modes of delivery so that, they exhibit different attitudes toward VBAC than single nurses. In fact, life experience is among the strongest factors that cultivate one's attitude.

The current study also revealed that nurses' educational level is also associated with nurses' attitude (p= 0.019). As well, there is a statistically significant difference regarding levels of attitude between nurses with different years of experience in obstetric nursing (p= 0.036). Because educational level and experience in obstetric nursing can contribute to nurses' knowledge and therefore shaping their attitude. In the same line, **Ahsan and Mallick (2017)** in their study reported that the attitude was significantly better among participants with higher educational level (p< 0.001). Another study conducted by **Andualem et al. (2019)** revealed that work experiences had significant association with nurses' attitude towards nursing care documentation (p=0.027).

Furthermore, the current study revealed that, there was a statistically significant association between higher mean knowledge score and positive attitude toward VBAC (p= 0.004). In fact, knowledge play an important role in shaping attitude of people and vice versa attitude can play an important role in pushing people to seek an in-depth information about something. This result is congruent with the result of **Aksoy et al. (2018)** who carried out a study to investigate nurses' knowledge and attitudes toward clinical research, and factors affecting them. They reported that there was a significantly positive correlation between the knowledge level and the attitude scores (p<0.01). As well, **Andualem et al. (2019)** in their study found that knowledge level of nurses had significant association with nurses' attitude (p<0.001). Furthermore, **Kassew et al., (2020)** reported that nurses with a higher level of knowledge regarding physical restraint in intensive care units were more likely to have positive attitude [95% CI = 0.49, 1.41].

5. CONCLUSION

The study concluded that 59.1% of nurses have poor knowledge regarding VBAC and only 4.5% of them have positive attitude towards VBAC. Among a statistically significant factors associated with nurses' knowledge toward VBAC are, age of 35 years and more, living in urban areas, head nurse work position, working at Kafrelsheikh General Hospital, greater than ten years experience in general nursing, and greater than five years experience in obstetric nursing, and Working in a hospital performing VBAC (P<0.001). Concerning factors associated with nurses' attitude, the study findings revealed that marital state, level of education, and years of experience in obstetric nursing are significantly associated with nurses' attitude (p= 0.017, 0.019, and 0.036 respectively).

6. RECOMMENDATIONS

Based on the findings of this study, the following are recommended:

- These findings could be used to formulate strategies to improve the depth and breadth of nurses' knowledge and attitude regarding VBAC
- In-service training program should be planned and provided to nurses in order to keep their knowledge up to date
- Nursing curricula need to be revised, updated, and designed to incorporate VBAC- related content as an important topic
- Further studies are necessarily recommended to examine the effect of training program regarding VBAC on nurses' knowledge and attitude
- Replication of the current study on large sample and other sitting is necessary

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