Effect of Nano-Teaching Sessions on Maternal Outcome among Pregnant Women Eligible to Vaginal Birth After Cesarean Section

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Abstract

Context: Vaginal birth after cesarean section (VBAC) is a safe option for many pregnant women and is one of the strategies developed to control the rising of cesarean delivery rate. **Aim:** This study aimed to examine the effect of nano-teaching sessions on maternal outcome among pregnant women eligible to vaginal birth after cesarean section. **Methods:** A quasi-experimental design (nonequivalent control group pretest/posttest) was adopted. A purposive sample of 66 pregnant women was recruited. This study was conducted at obstetric and gynecological outpatient clinic of Kafrelsheikh general hospital, Kafrelsheikh governorate, Egypt. Data were collected using five tools: structured interviewing questionnaire, knowledge about VBAC questionnaire (pre-post-test), attitude toward VBAC scale, decisional conflict scale (DCS), and decision regret scale (DRS). **Results:** Post-intervention, the mean knowledge score of the study group was 37.7 ±3.8 as compared to 13.7 ±3.7 for control group. Concerning decisional conflict score, it was significantly lower in the study group as compared to the control group (12.7± 5.7 vs. 49.5 ± 11.9 respectively). The rate of VBAC among study group was 45.5% compared to 0.00% among control group. Moreover, the score of decision regret was significantly lower in the study group compared to the control group (11.6 ± 5.3 vs. 38.7± 17.3 respectively). **Conclusion:** Application of nano-teaching session was associated with a significantly better maternal outcome regarding knowledge, attitude, decisional conflict, mode of delivery, and decision regret ($p<0.001$). **Recommendation:** Nano-teaching session should be conducted in order to empower pregnant women to take an active role in health care decision making.

Keywords: Nano-teaching sessions, maternal outcome, vaginal birth after cesarean section

1. Introduction

The increasing rates of caesarean deliveries are becoming a concern for public health. The prevalence of caesarean deliveries varies greatly between various countries **(Roberge, et al., 2018)**. According to **Betran et al. (2021)** who conduct a study regarding global and regional estimations on trends and projections of caesarean operations rates, the rate of these operations has increased globally from about 7% in 1990 to 21% currently, and it is expected to keep rising over the next ten years. If this increasing pattern continue, by 2030, Eastern Asia would likely have the highest rates (63%) followed by Latin America and the Caribbean (54%), Western Asia (50%) Northern Africa (48%) Southern Europe (47%) and Australia and New Zealand (45%).

Globally, the intensifying rates of cesarean section (CS) poses negative impacts on maternal and fetal health as well as a significant economic burden on healthcare systems and societies as a result of increased medical expenses. Cesarean delivery is a major abdominal operation that is associated with an increased risk to bleeding, infections, blood transfusion, other organs injuries, uterine rupture, anaesthetic complications, psychological complications, and a maternal mortality that is two to four times higher than that of a vaginal birth **(Shittu et al., 2021).** In addition, newborns delivered via caesarean delivery are more likely than those delivered vaginally to experience respiratory problems including breathing difficulties, respiratory distress, and childhood asthma, altered immune system, fetal injuries, and stillbirth **(Słabuszewska-Jóźwiak et al., 2020; Fitzpatrick, et al., 2019).**

Vaginal birth after caesarean section (VBAC) is a safe choice for many women and one of the birthing strategies to control the increasing trend of caesarean deliveries. It is worth noting that recent studies reported that, the accurate prediction about the success rate of VBAC can play a vital role in reducing morbidities and complications caused by repeated caesarean deliveries, shorten the hospital stay time, and effectively plan medical resources **(Deng et al., 2022; Lau et al., 2021).** Even though it is uncommon, women who go through a trial of

labor after a previous cesarean have a seven times higher risk of having a ruptured uterus than those who had scheduled repeated caesarean section. Therefore, the obstetricians and midwives should collaborate to thoroughly assess the maternal condition in order to determine whether VBAC is required and successed **(Levin et al., 2021)**.

In an effort to determine predictors of a successful VBAC, several researches have evaluated clinical traits and obstetric factors. These predictors included proper antenatal care, maternal age, inter-delivery interval, pre-pregnancy BMI, spontaneous onset of labor, fetal head engagement, vaginal delivery history, cervical score, and estimated fetal weight. Evaluation assurance and counselling by health care professionals such as a senior obstetrician and midwifery nurses were also included **(Deng et al., 2022; Tefera et al., 2021).** On the other hand, there are several conditions that preclude VBAC, including numerous pregnancies, macrosomia, maternal age greater than 40, a previous uterine rupture, a classic caesarean scar, placenta praevia, or more than two lower segment caesarean operations **(Trojano et al., 2019)**.

It is of a great importance to reduce the of repeated caesarean delivery without medical indications and to encourage VBAC through using an effective approach for behavior change. A recent study conducted by **Hoseini Haji et al. (2020)** reported that, enhancement of pregnant woman knowledge and attitudes are critical for decision making ability regarding VBAC. As well, antenatal counseling and teaching sessions can prepare pregnant woman in term of changing attitude toward choosing a delivery mode. Therefore, the activities in terms of behavioral change in the health field should start from evaluating the knowledge level, providing sufficient knowledge, developing positive attitude, and empowering pregnant woman for making an informed decision regarding mode of delivery **(Miller & Holdaway, 2019)**.

Insufficient women participation in decision-making is a common cause of decisional conflict among these women, which can result in delayed decision-making and regret. One method for reducing decisional conflict in primary care is to use decision aids while making decisions. According to **Hong et al. (2016),** greater participation in the decision-making process will lessen regret and decisional conflict. So, it is important to inform women, in particular, about the benefits and risks of repeated caesarean deliveries performed by obstetricians during antenatal care (**Sys et al., 2022)**.

Maternity nurses can play a vital role in encouraging and advocate for women to take an active role in decision making concerning mode of delivery and other medical interventions. By offering pregnant women eligible to VBAC with sufficient, current, and evidence-based knowledge regarding risks and benefits of VBAC as compared to repeated cesarean sections **(Hoseini Haji et al., 2020).** Furthermore, **Spong et al. (2017)** 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.

One of the newest trends in nursing education is nano-teaching, which is a bite-sized teaching approach to address a loss in attention span. It entails delivering knowledge in smaller amount over a shorter period of time usually ranging from 5-15 minutes to increase the ability to attend, take in, and retain information. Therefore, nano-teaching session is thought to be an effective and practical method for providing knowledge to pregnant women as they wait in antenatal outpatient clinic. So, the aim of the current study is to examine the effect of nano-teaching sessions on maternal outcome among pregnant women eligible to vaginal birth after cesarean section.

Significance of the study

The rate of CS in Egypt is significantly greater than the maximum threshold (15%) approved by the WHO. The incidence of CS has significantly increased during the last ten years, as evidenced. In the five years prior to the 2017 Egypt Demographic and Health Survey (EDHS), slightly more than half (52%) of live births were delivered via CS, according to the most recent EDHS. While the rate of CS reached as high as 70.2% in the Kafr El-Sheikh governorate **(El-Zanaty, 2015)**.

Women receiving repeated CS had significantly higher risks of morbidity and mortality **(Gupta & Saini, 2018)**. In this context, Arabic countries such King Abdulaziz University Hospital found patients' outcomes and problems following repeated CS were examined by **Alshehri et al. in 2019**. According to their findings, as CS increased, intraoperative and postoperative complications including moderate

and severe adhesions, increased blood loss during surgery (>1000 mL), blood transfusions, placenta accrete, caesarean hysterectomy, and admissions to the maternal intensive care unit also increased significantly.

In order to lower the economic burden and morbidities associated with elective repeated cesarean deliveries, VBAC should be encouraged in developing countries including Egypt. Unfortunately, clinical observation revealed that VBAC is uncommon among women in those countries. So that, the present study would contribute to increase the body of maternity nursing knowledge and provide evidence about the effectiveness of nano-teaching sessions on improving pregnant women knowledge, attitude regarding VBAC, decisional conflict, and therefore, increase the rate of successful VBAC.

1.2 Aim of the study

The current study aimed to examine the effect of nano-teaching sessions on maternal outcome among pregnant women eligible to vaginal birth after cesarean section.

Operational definition

In this study, maternal outcome is defined as knowledge level, attitude toward VBAC, decisional conflict regarding mode of delivery options, mode of delivery, and decision regret. These outcomes were measured using knowledge about VBAC questionnaire (pre-post-test), attitude toward VBAC scale, decisional conflict scale (DCS), and decision regret scale (DRS) respectively.

1.3 Research hypotheses

Main hypothesis

Pregnant women who receive nano-teaching sessions will have better maternal outcome than those who do not receive it.

Sub-hypotheses

H.1. Pregnant women who receive nano-teaching sessions regarding vaginal birth after cesarean section will have a higher mean knowledge score than those who do not receive it.

H.2. Pregnant women who receive nano-teaching sessions regarding vaginal birth after cesarean section will exhibit a more positive attitude than those who do not receive it.

H.3. Pregnant women who receive nano-teaching sessions regarding vaginal birth after cesarean section will have a lower decisional conflict score than those who do not receive it.

H.4. There is a difference in mode of delivery between pregnant women who receive nano-teaching sessions regarding vaginal birth after cesarean section and those who do not receive it.

H.5. Pregnant women who receive nano-teaching sessions regarding vaginal birth after cesarean section will have a lower decision regret score than those who do not receive it.

2. Subjects and Method

2.1 Research design

A quasi-experimental research design (nonequivalent control group pretest/posttest) was adopted to test the proposed hypotheses. In this design, subjects are assigned to either intervention or control group. The baseline measures of the dependent variables were performed for all subjects. Then subjects in the intervention group only received the proposed intervention. After that, all subjects were post-tested to measure the degree of change in the dependent variables **(LoBiondo-Wood & Haber, 2018).**

2.2 Setting

The study was conducted at obstetric and gynecological outpatient clinic of Kafrelsheikh general hospital, Kafrelsheikh governorate, Egypt. This hospital is affiliated to the Ministry of Health. The obstetric and gynecological outpatient clinic located in the ground floor of the hospital and consists of 3 rooms (clinics). The first clinic used for history taking and diagnosis for all women visiting the clinic. The second clinic equipped with ultrasound machine for obstetrical and gynecological examination for women referred from the first clinic. The third clinic is prepared for gynecological examination and dressing change after CS and other operations. Also there is a separate clinic for family planning services with it special waiting area. The total annual admission to outpatient clinic is approximately 2000 pregnant women.

2.3 Sample

A purposive sample of 66 pregnant women was recruited according to the following inclusion criteria: age between 18 and 35 years, singleton pregnancy with normal position (i.e., occpito-anterior position), during third trimester of pregnancy, history of only one previous transverse cesarean section, at least two years inter-pregnancy interval, and accepted to participate in the study. While, the exclusion criteria included: pregnant woman with pre-existing medical conditions including diabetes,

hypertension, renal, liver, or cardiac disease. As well as, pregnant woman with obstetrical conditions arising during current pregnancy including antepartum hemorrhage, gestational hypertension, eclampsia, preeclampsia, and gestational diabetes. Any contraindications to vaginal delivery in the current pregnancy such as large fetus, contracted pelvis, placenta previa, polyhydramnios and oligohydramnios, abnormal fetal presentation and/or position.

2.3.1 Sample size calculation

Based on data from literature **(Hadizadeh-Talasaz et al., 2021)**, to calculate the sample size with precision/absolute error of 5% and type 1 error of 5%, Sample size is calculated according to the following formula,

$$n=\frac{(Z1-\alpha/2)^2.P(1-P)}{d^2}$$

where, $Z_{1-\alpha/2}$ at 5% type 1 error ($p<0.05$) is 1.96, P is the expected proportion in population based on previous studies and d is the absolute error or precision. Therefore, sample size

$$n=\frac{(1.96)^2.(0.651)(1-0.651)}{(0.165)^2}=32.1.$$

Based on the above formula, the sample size required per group is 33, giving a total sample of 66 pregnant women.

2.3.2 Sample recruitment and group allocation

A total of 79 pregnant women were screened for eligibility and invited to participate in the current study. From them, 9 pregnant women did not met the eligibility criteria and 4 pregnant women refused to participate in the study. After confirmation of eligibility and taking informed written consents, the first 33 pregnant women were assigned to the control group to prevent contamination of data collection and maintain interval validity. After the completion of the control group the researchers begin to recruit pregnant women for the study group. The statistical analysis was conducted on 66 pregnant women. A flowchart of the study groups is presented in Figure1.

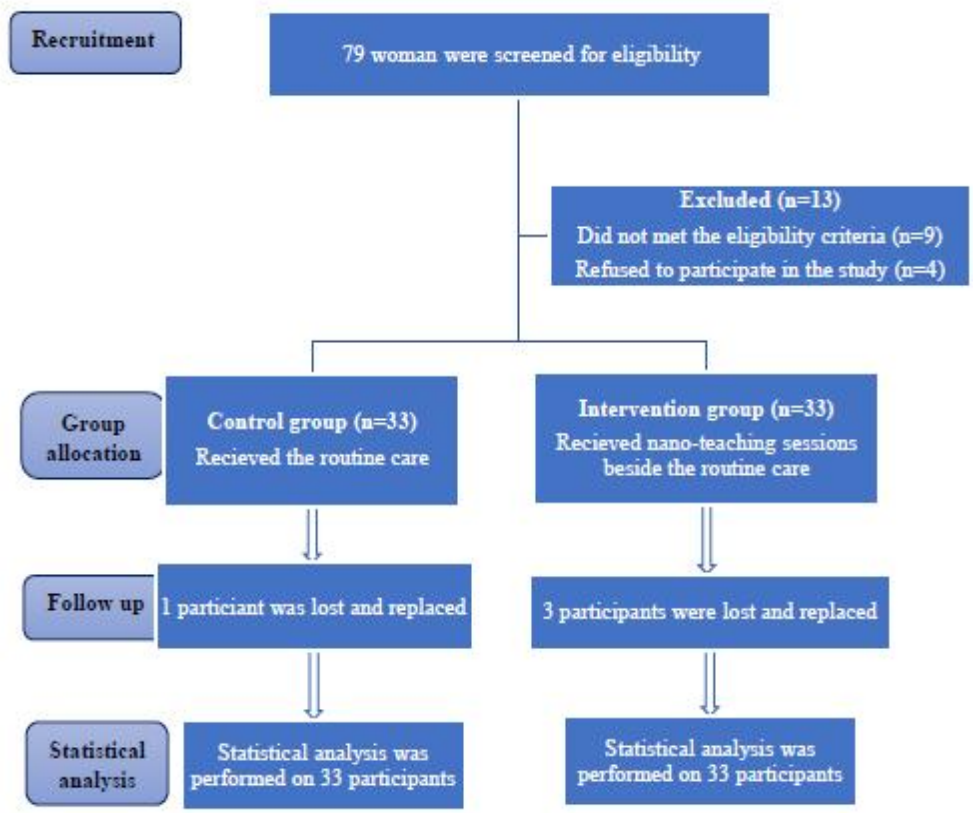

Figure 1. Study flowchart showing number of included pregnant women, excluded or lost to follow-up and analyzed.

2.4 Tools of data collection

Data pertinent to the study were collected using five tools: structured interviewing questionnaire, knowledge about VBAC questionnaire (pre-post-test), attitude toward VBAC scale, decisional conflict scale (DCS), and decision regret scale (DRS).

2.4.1. Structured interviewing questionnaire:

This tool was developed by the researchers after reviewing the related literatures, and consists of three main sections: ***a. personal background data:*** This section included items as age, place of residence, level of education, and occupation; ***b. past obstetrical history:*** This section included data about type of previous CS, fetal, and maternal causes of previous CS; and ***c. present obstetrical history:*** Included items as gestational age at enrollment, and mode of current delivery.

2.4.2. Knowledge about VBAC questionnaire (pre-post-test):

This tool was developed by the researchers and consisted of 24 closed ended questions. Seven questions of them bout risks and benefits of VBAC, 6 questions about risk and benefits of repeated CS, 6 questions about contraindications of VBAC, and finally 5 questions about factors associated with successful VBAC.

Scoring system: A score of 2 was given to the correct and complete answer; a score of 1 for correct but incomplete answer; and a score of 0 for the wrong or when the pregnant women answered “she does not know”. The scores of all questions were summed up to give a total score ranging from 0 to 48. The total knowledge scores were classified into three levels: poor knowledge (< 50% i.e., less than 24 marks); acceptable (50% to less than <75% i.e., from 24-35 marks); and high (≥75% i.e., equal to or more than 36 marks).

2.4.3. Attitude toward VBAC scale*:*

The researchers constructed it to assess pregnant women's attitudes on VBAC. It had 10 statements, to which expectant women were asked to respond on a 3-point Likert scale, with agree, neutral, and disagree being the possible outcomes. These assertions include things like "repeated CS should be promoted," "VBAC should be encouraged," "VBAC provides more benefits for pregnant women, VBAC carries more benefits for the fetus," and "VBAC carries more hazards for pregnant women and her fetus".

Scoring system: A score of 3 was given to agree; a score of 2 for neutral; and a score of 1 for disagree. Five statements were reversely scored. A score was given to each statement to give and aggregate attitude score ranging from 10 to 30. The total score was classified into three levels: negative attitude (<35%); neutral attitude (35% to less than <60%); and positive attitude (≥ 60%).

2.4.4. Decisional Conflict Scale (DCS) (O’Connor, 1993)

O'Connor (1993) created the DCS, which is used to measure an individual's level of uncertainty when making decisions or selecting options. In addition to the changeable causes of uncertainty, such as lack of information, uncertainty regarding one's own values, and lack of support for making decisions. There are 16 items in the self-report questionnaire. The scale is divided into five subscales: informed (items 1, 2, and 3), values-clear (items 4, 5, and 6), social support (items 7, 8, and 9), uncertain (items 10, 11, and 12), and effective decision (items 13, 14, 15, and 16). A 5-point Likert scale with a range of 0 (strongly disagree) to 4 is used by participants to answer to each item (strongly disagree). The overall score is determined by adding the scores of each item, dividing by the total number of items (16), and then multiplying by 25 to produce a score that can range from 0 (no decisional conflict) to 100. (extremely high decisional conflict). DCS had a 0.81 test-retest reliability coefficient.

2.4.5. Decision Regret Scale (DRS) (O’Connor, 1996)

O'Connor (1996) developed the DRS, which is intended to quantify regret after health care decision has been taken. There are five items total. The respondents rate each item on a Likert scale from 1 (strongly agree) to 5 (disagree) (strongly disagree). Items 2 and 4 are scored in the opposite direction, with a higher score indicating more regret for each item. The items are added together and averaged to determine the final score. The overall rating, which ranges from 0 (no regret)

to 100 (high regret). With a range of 0.81 to 0.92, Cronbach's alpha coefficient, DRS's dependability was proven **(Brehaut et al., 2003)**.

Tool validity

The content validity of the tool developed by the researchers, the structured interviewing schedule, was tested and confirmed by three scholastic nursing specialists in the field of pregnant woman's health and midwifery nursing. The tools were validated for clarity, relevance, and completeness of its contents. Accordingly, the recommended modifications were performed.

Tool reliability

The reliability of the tools constructed by the reassurers was tested using Cronbach's alpha coefficient test. For knowledge about VBAC questionnaire (pre-post-test), the Cronbach's alpha value (internal consistency) was 0.889 and for attitude toward VBAC scale was 0.902.

2.5 Ethical consideration

The Mansoura University Faculty of Nursing's Research Ethics Committee gave its approval to conduct the study. Additionally, a formal permit was obtained from the authorities in the aforementioned setting (i.e., directors of Kaferelshiekh general hospital). Each expecting mother was then informed of the study's significance and goal. emphasized that the participation in the study was entirely voluntary, and any pregnant woman had the ability to discontinue participation at any moment without having to give a reason. By coding the data, anonymity and confidentiality were guaranteed. Pregnant women who met the eligibility requirements and agreed to participate in the study were then asked for their signed informed permission.

2.6 Pilot study

A pilot study was carried out on 10% of the pre-determined sample size (7 pregnant women) who met the selection criteria. It aimed to assess the practicality of the research process as well as the clarity, application, and relevance of the research tools. Based on the findings of the pilot study, no issues were discovered that might hinder the data gathering procedure, and no changes were made to the instruments. The primary study sample size was kept separate from the pilot study's participants.

2.7 Procedure

Data were collected within a period of six months - from the beginning of June 2022 to the end of November 2022. The researchers visited the study setting three days a week from 9:00 am to 12:00 pm.

After enrollment, the researchers hold an interview with each pregnant woman individually to obtain baseline data related to personal background data, past and present obstetrical history through using the structured interviewing questionnaire. In addition, pregnant woman's knowledge and attitude are assessed using the knowledge about VBAC questionnaire and the attitude toward VBAC scale. Then decisional conflict was assessed using decisional conflict scale. The questions were asked in Arabic and the responses were documented by researchers. The assessment was carried out at waiting area of family planning clinic for all pregnant women in the control and the study group. The time taken to complete this assessment was about 20-30 minutes for each pregnant woman.

After obtaining baseline data, pregnant women in the control group received the routine care according to the hospital protocol of care such as history taking of woman complain for attending the outpatient clinic, and if needed, performing ultrasound examinations, prescribing nutrients supplements such as iron and calcium, and performing laboratory investigations. While pregnant women in the study group were received the routine care beside the study intervention (i.e., nano- teaching sessions). The study group were divided into five groups (5 to 6 pregnant women each group). Each group attending a weekly session for a total of two sessions. Each session took about 10-15 minutes. The first session aimed to orient the pregnant women to the definition of VBAC, its indications, and the eligibility criteria for VBAC. The purpose of the second session is to help pregnant women differentiate between VBAC and repeated CS as an option for delivery, based on the advantages and

disadvantages of each option and associated complications.

To achieve the objectives of each session, several teaching methods were used such as discussion and interactive lecture. PowerPoint presentation was used as a visual aid to help in clarifying the presented knowledge. During the training session, the researchers utilized the teach-back strategy in which pregnant women were asked to repeat the information they learned in their own words. The researchers asked questions and were open to receiving feedback to encourage the active participation of pregnant women. After the completion of the two sessions, Arabic brochure containing brief information that was presented during the sessions was given to each pregnant woman.

Evaluation of maternal outcomes was carried out two times through conducting a telephone interview from 15-20 minutes with each woman. The first evaluation took place two weeks after obtaining the baseline data for the control group. While for the study group it took place two weeks after completion of the nano-teaching sessions. This first evaluation was conducted to assess three main outcomes: knowledge, attitude, and decisional conflict using the knowledge about VBAC questionnaire, attitude toward VBAC scale, and DCS respectively. The second evaluation took place one month after delivery for both the control and the study groups. It is conducted to assess decision regret regarding mode of delivery using decision regret scale.

2.8 Statistical analysis

The Collected data was coded, categorized, and entered into a computer. Statistical software for social science version 20.0 was used for all statistical studies (SPSS, Chicago, IL). Statistics were used for both descriptive and inferential data analysis. Continuous data were reported as mean standard deviation and had a normally distributed distribution (SD). Numbers and percentages were used to express categorical data. The chi-square [X2] test or Fischer's exact test was used to compare categorical variables, if appropriate, and the t-test was used to determine the significance of the difference between two means. P-values were regarded as significant when they were less than 0.05, and highly significant when they were less than 0.001.

Results

Results of the current study presented in seven main sections: I. personal background data; II. Obstetrical profile; III. Knowledge of pregnant women regarding VBAC; IV: attitude of pregnant women toward VBAC; V. Decisional conflict regarding mode of delivery; VI. Mode of delivery; and VII. Decisional regret after delivery.

I. Personal background data

Findings of the current study revealed homogeneity of the pregnant women and matching between both groups, as there were no statistically significant differences between both groups in relation to age, place of residence, educational level, and occupational status (p= 0.071, 0.621, 0.843 and 0.284 respectively). As shown in table (1), the mean age of the study group was 21.7 ±2.9 years as compared to 22.9 ±3.9 years for control group. Concerning place of residence, 57.6 % of the study group, as compared to 51.5 % of the control group lived in rural areas. In relation to education, 48.5 % of the study group as compared to 51.5% of the control group had completed their secondary education. Regarding occupation, 63.6%, and 75.8% of the study and control group respectively were housewives.

II. Obstetrical profile

Concerning gestational age, the current study revealed that, 51.5% of the study group fall in the range of 28 – 32 weeks of gestation as compared to 54.5% of the control group. Regarding types of previous CS, findings of the current study revealed that, 69.7% of the study group had an elective CS as compared to 66.7% of the control group. In relation to causes of the previous CS, sense of fatigue was the most reported maternal cause for previous CS accounting 70.8% of the study group and 61.9% of the control group. While Malpresentation was the most common fetal cause for previous CS accounting 37.5% of the study group and 40.0% of the control group (Table, 2).

III. Knowledge of pregnant women regarding VBAC

Regarding pregnant women's knowledge, table (3) shows that pre-intervention the mean knowledge score of study group was 11.5 ±2.9 as compared to 10.9 ±2.3 for control group. While post-intervention, the mean knowledge score of study group was 37.7 ±3.8 as compared to 13.7 ±3.7for control group. Moreover, and the results of the Student's T – Test illustrates a highly statistically significant difference between both groups in the mean knowledge post-intervention (P <0.001).

IV. Attitude of pregnant women toward VBAC

Concerning attitude toward VBAC, pre-intervention 36.4% of the study group as compared to 57.6% of the control group had a negative attitude toward VBAC and there was no statistically significant difference between both groups (P = 0.184). However post-intervention 66.7% of the study group had positive attitude toward VBAC as compared to no one in the control group therefore, the difference between both groups was highly statistically significant (p=<0.001) (Figure, 2).

V. Decisional conflict regarding mode of delivery

As shown in table (4) pre-intervention, the mean total scores of decisional conflict in the study group and control group were got at 58.6 ±12.3 and 54.4 ±19.7 respectively, and no significant difference was observed between both groups (P = 0.302). On the other hand, post-intervention the mean total score of decisional conflict was significantly lower among the study group as compared to the control group (12.7 ±5.7 vs. 49.5 ±11.9 respectively; P <0.001).

VI. Mode of delivery

As regards to mode of delivery, the findings of the current study reported that 45.5% of pregnant women in study group had a successful VBAC compared to 100.0% of pregnant women in the control group had a repeated CS and there was a highly statistically significant difference between both groups in relation to mode of delivery (P <0.001) (Figure, 3).

VII. Decisional regret after delivery

Table (5) illustrates that the mean scores of decision regret one month after delivery was 11.6 ±5.3 in the study group as compared to 38.7 ±17.3 in the control group. Furthermore, there was a highly statistically significant difference between both groups in terms of decision regret score (P<0.001).

Table 1. Distribution of pregnant women in both groups according to personal background data

Variable	Study group (n=33)		Control group (n=33)		Chi – Square / Fischer's exact test	
	Freq.	%	Freq.	%	X^2	P
****Age (Years)**						
18 – >27 years	23	69.7	29	87.9		
27– 35 years	10	30.3	4	12.1	3.264	0.071
***Mean ±SD**	21.7 ±2.9		22.9 ±3.9		1.442	0.154
Place of residence						
Urban	14	42.4	16	48.5		
Rural	19	57.6	17	51.5	0.244	0.621
****Education**						
Cannot read and write	5	15.2	4	12.1		
primary education	8	24.2	6	18.2		
Secondary education	16	48.5	17	51.5		
University education	4	12.1	6	18.2	0.827	0.843
Occupation						
House wife	21	63.6	25	75.8		
Working	12	36.4	8	24.2	1.148	0.284

**Comparison using Student's t test*

*** Comparison using Fischer's exact test*

Table 2. Distribution of pregnant women in both groups according to obstetric history

Variables	Study group (n=33)		Control group (n=33)		Fischer's exact test	
	Freq.	%	Freq.	%	X^2	P
Gestational Age at enrollment						
28 – <32	17	51.5	18	54.5		
32 – <36	11	33.3	9	27.3		
36- 40	5	15.2	6	18.2	3.294	0.091
***Mean ±SD**	32.5 ±1.7		31.2 ±1.3		1.462	0.159
Type of Previous cesarean section						
Elective	23	69.7	22	66.7		
Emergency	10	30.3	11	33.3	0.070	0.792
Maternal causes for previous cesarean section						
Yes	24	72.7	21	63.6		
No	9	27.3	12	36.4	0.629	0.428
****If yes, mention them**	(n=24)		(n=21)			
Oligohydramnios	1	4.2	2	9.5		
Preeclampsia	2	8.3	1	4.8		
Sense of fatigue	17	70.8	13	61.9		
Placenta previa	1	4.2	1	4.8		
As doctor order	3	12.5	4	19.0	1.148	0.887
Fetal causes for previous cesarean section						
No	25	72.7	23	63.6		
Yes	8	27.3	10	36.4	0.629	0.428
****If yes, mention the cause**	(n=8)		(n=10)			
Fetal distress	2	25.0	1	10.0		
Malpresentation	3	37.5	4	40.0		
Post-date pregnancy	1	12.5	2	20.0		
Twin pregnancy	1	12.5	2	20.0		
Decreased fetal movement	1	12.5	1	10.0	0.992	0.963

**Comparison using Student's t test*

*** Comparison using Fischer's exact test*

Table 3. Comparison of pregnant women 's knowledge regarding VBAC between both groups

Levels of knowledge	Pre – Intervention				Post – Intervention			
	Study Group (n=33)		Control Group (n=33)		Study Group (n=33)		Control Group (n=33)	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Knowledge Score								
Poor	27	81.8	29	87.9	1	3.0	28	84.8
Acceptable	4	12.1	2	6.1	5	15.2	3	9.1
High	2	6.1	2	6.1	27	81.8	2	6.1
Fisher's exact test [X^2, P]	X^2=0.738, P=0.691				X^2=47.189, P<0.001**			
Mean ±SD	11.5 ±2.9		10.9 ±2.3		37.7 ±3.8		13.7 ±3.7	
Student's T – Test [T, P]	T=1.273, P=0.207				T=69.010, P<0.001**			

Figure 2. Comparison of pregnant women's attitude toward VBAC between both groups

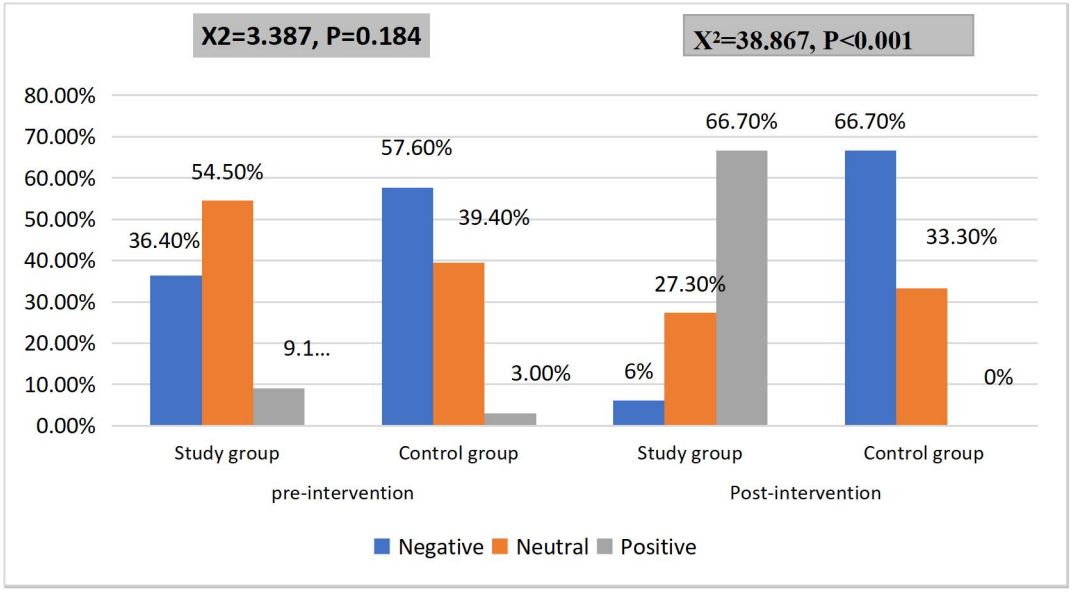

Table 4. Comparison of pregnant women 's decisional conflict scores between both groups

Decisional Conflict Score	Pre – Intervention				Post – Intervention			
	Study Group (n=33)	Control Group (n=33)	Student's T – Test		Study Group (n=33)	Control Group (n=33)	Student's T – Test	
	Mean ±SD	Mean ±SD	T	P	Mean ±SD	Mean ±SD	T	P
Informed	63.0 ±6.3	64.5 ±18.7	0.436	0.663	7.3 ±3.1	43.7 ±18.8	10.974	<0.001**
Values clarity	57.3 ±14.1	50.6 ±15.3	1.849	0.069	16.5 ±7.4	48.2 ±16.2	10.224	<0.001**
Social support	49.7 ±17.1	53.1 ±11.6	0.945	0.348	7.3 ±3.6	44.3 ±18.7	11.161	<0.001**
Uncertainty	55.1 ±13.3	56.2 ±16.9	0.293	0.769	8.7 ±4.3	52.8 ±15.4	15.844	<0.001**
Effective decision	62.9 ±17.0	48.7 ±16.4	3.453	<0.001**	6.7 ±2.3	40.1 ±8.6	21.552	<0.001**
Total score	**58.6 ±12.3**	**54.4 ±19.7**	**1.038**	**0.302**	**12.7 ±5.7**	**49.5 ±11.9**	**16.021**	**<0.001****

Figure 3. Distribution of pregnant women in both groups according to mode of delivery

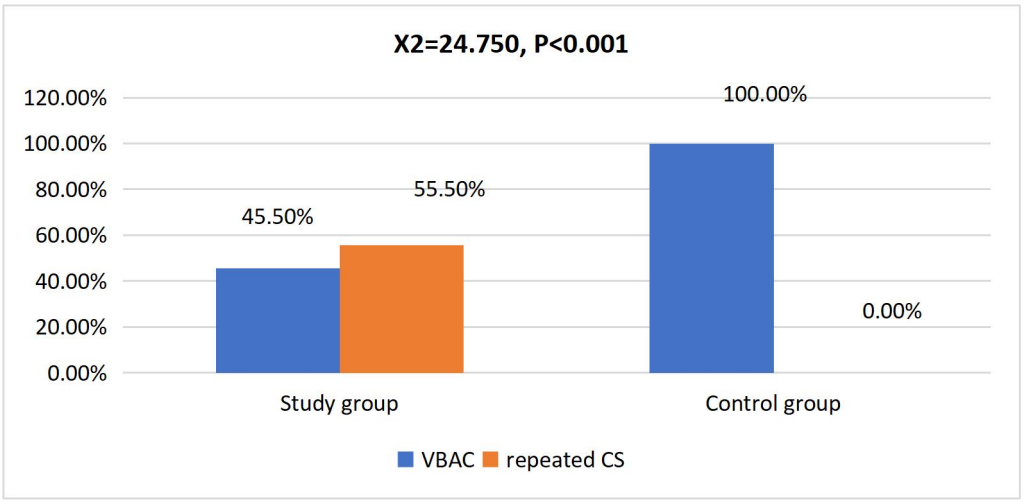

Table 5. Comparison of pregnant women 's decisional regret regarding mode of delivery between control group and study group

Decisional regret items	Study group (n=33)		Control group (n=33)		Fischer's exact test	
	Freq.	%	Freq.	%	X^2	P
It was the right decision						
Strongly agree (1)	12	36.4	2	6.1		
Agree (2)	6	18.2	2	6.1		
Neither agree nor disagree (3)	4	12.1	9	27.3		
Disagree (4)	6	18.2	7	21.2		
Strongly disagree (5)	5	15.2	13	39.4	14.698	0.005*
I regret the choice that was made						
Strongly agree (1)	13	39.4	2	6.1		
Agree (2)	5	15.2	3	9.1		
Neither agree nor disagree (3)	10	30.3	4	12.1		
Disagree (4)	4	12.1	6	18.2		
Strongly disagree (5)	1	3.0	18	54.5	26.748	<0.001**
I would go for the same choice if I had me a lot of harm						
Strongly agree (1)	10	30.3	3	9.1		
Agree (2)	8	24.2	3	9.1		
Neither agree nor disagree (3)	3	9.1	4	12.1		
Disagree (4)	7	21.2	9	27.3		
Strongly disagree (5)	5	15.2	14	42.4	10.697	0.030*
The choice did me a lot of harm						
Strongly agree (1)	2	6.1	3	9.1		
Agree (2)	6	18.2	4	12.1		
Neither agree nor disagree (3)	7	21.2	8	24.2		
Disagree (4)	2	6.1	13	39.4		
Strongly disagree (5)	16	48.5	6	18.2	13.266	0.010*
The decision was a wise one						
Strongly agree (1)	14	42.4	2	6.1		
Agree (2)	4	12.1	5	15.2		
Neither agree nor disagree (3)	7	21.2	6	18.2		
Disagree (4)	5	15.2	4	12.1		
Strongly disagree (5)	3	9.1	16	48.5	18.193	<0.001**
***Mean ±SD**	**11.6 ±5.3**		**38.7 ±17.3**		**8.604**	**<0.001****

**Comparison using Student's t test*

Discussion

The impact of culture on cesarean deliveries rates is a poorly researched topic that may be a contributing factor to the limited acceptance of VBAC rates. In Egypt, there are currently limited opportunities for pregnant women and obstetricians to discuss choices regarding birth after caesarean in actual practice. This study aimed to examine of nano-teaching sessions on maternal outcome among pregnant women eligible to vaginal birth after cesarean section.

Regarding the level of knowledge about VBAC, the current study revealed that, pre-intervention, there was no statistically significant difference between the intervention and the control group in relation to the levels of knowledge (P = 0.207) because the majority of pregnant women in both groups had poor level of knowledge. However, post-intervention the level of knowledge in the intervention group dramatically improved as the majority of the pregnant women now had high levels of knowledge. On the other hand, the majority of the pregnant women in the control group still

recorded poor knowledge levels. Therefore, the difference between both groups was highly statistically significant ($p < 0.001$). These findings may be explained by the absence the role of obstetric healthcare providers as educators. As well as, the absence of maternal health teaching sessions can also be another contributing factor. These findings highlight the effectiveness of nano-teaching session and the teaching material administered to the pregnant women in the current study. Therefore, the first hypothesis, pregnant women who receive nano-teaching sessions regarding VBAC will have a higher mean knowledge score than those who do not receive it, was accepted.

These findings are in line with a randomized clinical trial conducted by **Hoseini Haji et al. (2020)** aimed at exploring the effect of motivational interviewing on knowledge, attitude, and intention of pregnant women to select VBAC among Iranian pregnant women. Their study reported that, pre-intervention the mean score of knowledge about VBAC was not significantly different between the two groups. As well as, **Torigoe and Shorten (2018)** conducted a study aimed to examine effect of using a decision aid program on birth choices after caesarean among Japanese pregnant women. Their findings revealed that, the mean score of knowledge about options for birth after caesarean increased from a baseline improved after intervention, and the difference was highly statistically significant ($p <0.001$) between the two groups.

Regarding attitude of pregnant women toward VBAC, the current study findings revealed that, pre-intervention there was no significant difference between both groups. However, post-intervention the difference between both groups was highly statistically significant ($p<0.001$). This finding highlights the importance of educating and counseling pregnant women in order to improve their self-confidence, create a positive attitude and also can increase their trust in obstetric health care professionals and consequently, results in more suitable decision. So, the second hypothesis, pregnant women who receive nano-teaching sessions regarding VBAC will exhibit a more positive attitude than those who do not receive it, was supported. These findings are corroborated by the findings of **Attarian et al. (2021)** who conducted a study to determine the effect of individual consulting on choosing vaginal birth after cesarean delivery. Their findings revealed that, there was a statistically significant difference in choosing VBAC in the counseling group pre and post the intervention ($p<0.05$) and also the rate of intention to choose VBAC between the two groups post intervention ($p<0.05$).

In relation to decisional conflict regarding mode of delivery, the current study revealed that, pre- intervention the difference between both groups was not statistically significant ($P = 0.302$). On the other hand, post-intervention the total score of decisional conflict was significantly lower in the study group compared to that in the control group ($p<0.001$). Therefore, these findings support the third hypothesis, pregnant women who receive nano-teaching sessions regarding VBAC will have a lower decisional conflict score than those who do not receive it. This is a logic finding because decisional conflict which often resulted from inadequate woman involvement in decision making, may lead to delayed decision making and regret about the choice that were made. When pregnant women are equipped with an adequate information regarding risks and benefits of health-related alternatives, they feel more empowered, more self-confident, and more enthusiastic to take an active role in decision making process so that, they have lower sense of uncertainty regarding that decision.

The current study had a decisional conflict score similar to those reported by **Hadizadeh-Talasa et al. (2021)** who conducted a randomized clinical trial aimed to explore the effect of shared decision on mode of delivery and decisional conflict and regret in pregnant women with previous cesarean. They reported that, post intervention an improvement in the recorded decisional conflict score in the study group and were significantly lower compared to that in the control group with a statistically significant difference ($P < 0.001$). another study conducted by **Pakdaman et al. (2022)** to investigate the effect of supportive interventions on decision self-efficacy and decision conflict in mothers with previous cesarean to choose mode of birth. Their

findings revealed that, post-intervention, the mean total score of decisional conflict in the study group was significantly lower compared to that in the control group (P=0.010).

Concerning mode of delivery, the current study findings support the fourth hypothesis, there is a difference in mode of delivery between pregnant women who receive nano-teaching sessions regarding VBAC and those who do not receive it. The current study finding revealed that, about one-half of pregnant women in the study group had a successful VBAC. On the other hand, all pregnant women in the control group delivered by repeated cesarean delivery. These findings can be explained by the improved level of knowledge and the positive attitude obtained post-intervention. This explanation is supported by **Nilsson et al. (2017)** who reported that, women who wish for VBAC have difficulties in obtaining relevant information in maternity organizations and cultures having risk-oriented views on VBAC. The finding of the current study is congruent with the finding of **Hadizadeh-Talasaz et al. (2021),** who also reported that, the enhancement rate of VBAC was nearly half of participants in the study group gave birth vaginally and nearly three-quarters in the control group gave birth elective cesarean delivery with a significant difference regarding mode of delivery in the two groups (P < 0.001).

In relation to the decisional regret after delivery, the current study finding showed that, the decision regret scores after one month postpartum was significantly lower in the study group compared to those got in the control group (P < 0.001). Therefore, these findings support the fifth hypothesis, pregnant women who receive nano-teaching sessions regarding vaginal birth after cesarean section will have a lower decision regret score than those who do not receive it. These findings are corroborated by the findings of **Hadizadeh-Talasaz et al. (2021).** Their study reported that, two months postpartum, the mean score of decision regret was lower in the intervention group in comparison to that in the control group with a statistically significant difference (P = 0.007).

Conclusion

Application of nano-teaching sessions was effective and associated with a significantly better maternal outcome in relation to knowledge about VBAC, attitude regarding VBAC, decisional conflict regarding mode of delivery options, mode of delivery, and decision regret (p<0.001).

Recommendations

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

- Teaching sessions should be encouraged in order to empower pregnant women to take an active role in decision making concerning mode of delivery.
- Simple Arabic brochures or pamphlets containing updated evidence-based guidelines regarding mode of delivery choices should be available in maternity care units
- Pregnant woman should be equipped with knowledge related to VBAC as an option of delivery through conducting such nano-teaching sessions during their routine antenatal care.
- Indorse VBAC in nursing syllabus.

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