

The Effect of Educational Program on Labor Outcomes Regarding Promoting Vaginal Birth after Cesarean Section

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Abstract

Background: The rate of cesarean sections (C.S.) has significantly increased in recent years and is accompanied by a high incidence of maternal morbidity and mortality. Vaginal birth after caesarean section (VBAC) is one of the tools that aims to reduce the incidence of C.S. **Aim:** This study aimed to evaluate the effect of educational program on labor outcomes regarding promoting vaginal birth after cesarean section. **Design:** A quasi experimental research design (one group pre- posttest) was used. **Setting:** The study was conducted at the obstetrics and gynecological outpatient clinic at Fayoum University Hospital. **Sample:** A purposive sampling of 60 pregnant mothers who met the inclusion criteria. **Tools:** Three tools were used: (1) Structured Interviewing Questionnaire, (2) Self-reported mothers' practices of exercises for VBAC and (3) Labor outcomes assessment sheet. **Results:** The current study clarifies a highly statistically significant improvement in the total mothers' knowledge, practices and labor outcomes after implementation of nursing educational program where knowledge improved from (30% to 93.3%), practice changed from (5% to 85%) pre and post educational program respectively and 100% of mothers who delivered VBAC had normal labor outcomes without any complication for both the mother and newborn. **Conclusion:** The study concluded that mothers who participated in the nursing educational program showed a significant improvement in both the knowledge and practices about VBAC after the program's implementation in addition to the mothers and newborns did not experience any complications. **Recommendations:** Develop and distribute additional resources such as pamphlets or online materials that provide ongoing education and support for mothers regarding VBAC and related practices.

Keywords: Educational Program, Labor Outcomes, Vaginal Birth after Caesarean Section.

Introduction:

The rising rate of the cesarean section (C.S.) is a global health concern across middle and high income countries. Previously most of people were believed that if a woman had one cesarean delivery should have all future pregnancies delivered in cesarean delivery. However now, advances in the obstetric care made laboring after a prior cesarean delivery more safe for both the mother and the child, which led to a shift in the adage "once a caesarean, always a caesarean" and "Once a caesarean, always a hospital delivery" has taken its place (Mansour et al., 2023). Therefore, encouraging vaginal birth after cesarean section (VBAC) among eligible women is considered one of the tools that aims

to reduce the incidence of C.S (Denham et al., 2019).

According to (Habak & Kole, 2023) vaginal birth after cesarean section is a planned trial to give birth vaginally for women who have previously undergone a caesarean section. For many women who choose vaginal birth after cesarean surgery, scheduled trial of labor (TOL) or trial of labor after the cesarean section (TOLAC) are safe and low-risk options (Mamo & Siyoum, 2022). While vaginal delivery is not contraindicated for pregnant women, TOLAC is more desirable for women who have had one prior cesarean section (ACOG, 2019).

Vaginal birth after caesarean section has many more benefits than caesarean section, these benefits can include fulfilling the

mothers' preference, decreasing the more complications in the future pregnancies. Also VBAC is associated with less maternal morbidity and mortality as well as the increasing in VBAC deliveries will decrease cesarean delivery rate in the future which is considered the most important public health goal (Fait et al., 2022).

The benefits of a successful VBAC can also include avoiding surgical recovery during the postpartum period, reducing hospital stays and recovery times, preventing recurrences of major surgeries and multiple cesarean sections, lowering the risk of infections and hemorrhage, preventing bladder and bowel injuries, enhancing the likelihood of future vaginal births, and encouraging breastfeeding at birth (Opiyo et al., 2020).

More maternal complications, such as placenta previa, blood transfusions, adhesions, pulmonary embolisms, surgical injury, postpartum infections, incisional hernias, post-dural puncture spinal headaches, and hysterectomy, are linked to multiple cesarean sections. These complications rise with each additional CS and raise the risk of respiratory complications in the newborn (if done before 39 weeks). Additionally, giving birth by cesarean section increases the chance of postpartum death (Mekonnen & Asfaw, 2023).

Evidence based practice stresses that trial of VBAC is recommended for women with a previous lower segments C.S in the absence of indication for C.S as VBAC offers the most benefits to the health of both mother and child (Kurtz Landy et al., 2020). Additionally, data currently available indicates that women who have had one prior C.S. scar have a higher success rate with less difficulties following VBAC. Research has also shown that, as compared to recurrent cesarean sections, effective VBAC improves outcomes for both the mother and the fetus (Uno et al., 2020).

However, there are a number of dangers if a trial of VBAC failed including uterine rupture (the most common adverse effect associated with failed VBAC), hysterectomy and chronic urine incontinence but by selecting patients carefully after extensive counseling, estimating the risk of uterine rupture and strictly adhering

to the most recent and documented guidelines for managing labor in care units with facilities for immediate surgery in the event of complications made the VBAC safer and eliminate the potential risk of uterine rupture and other dangers associated with VBAC (Hassan et al., 2024).

Health educational program regarding promoting vaginal birth after the cesarean section helps in decision making in the pregnant women regarding any delivery mode that depends on the pregnant women's obstetric history, personal preferences and data about the benefits and risks of VBAC against repeated CS delivery in the selected birth setting (Metz et al., 2020). Accordingly, every woman should have the opportunity to be consulted early in pregnancy about the options available with the provision of written or online information materials to help decision-making throughout pregnancy (Abdel-Rahman et al., 2023).

Maternity and community health nurses as a healthcare professionals have an essential role in counseling and educating pregnant mothers that prefer VBAC by providing them with complete information about VBAC and the risks that associated with CS against vaginal delivery, factors that affect the successful vaginal delivery to promote mother's competency and practice and improve their labor outcomes and benefits of VBAC. Also, women should receive complete information to make an informed decision about the delivery mode. Educating and counseling are effective in increasing the incidence of VBAC (Barakat et al., 2023 & Fait et al., 2022).

Significance of the study:

Worldwide caesarian section rates have risen from 7% in 1990 to 21% now, exceeding the World Health Organization's (WHO) target of 15% for the maximum rate of C.S. (Angolile et al., 2023). By 2030, around a third (29%) of all newborns will likely be delivered by C.S., and this number is still rising over the present ten years (WHO, 2021). The most potent factor contributing to the rise in caesarian section rates worldwide is elective repeated cesarean sections (ERCS) (Homer et al., 2022).

Paralleling the dramatically increased C.S. rate worldwide over the past decade. In Egypt, Egypt Demographic and Health Survey (EDHS) demonstrated that the caesarean section rate increased from 28 % in 2008 to 52 % in 2014 and in the 2021 Egypt Family Health Survey (EFHS) reached 72.2 % which makes Egypt ranked first globally in C.S and this increase in C.S rate also threatened that caesarean delivery may be used for inappropriate indications or overused (Oraby, 2023 & Kassem, 2022).

There have been attempts to lower the number of repeat cesarean deliveries in response to the rising rates of cesarean sections and in line with the Sustainable Development Goals (SDGs), particularly Goal 3 (Good Health and Well-Being) given that successful vaginal birth after cesarean delivers better results for both mother and baby than recurrent cesarean births, the trial of labor after cesarean (TOLAC) is becoming more and more advocated (Girma et al, 2021). Additionally, studies show that between 60% and 80% of TOLAC and VBAC attempts end in successful vaginal births (Raleigh OB/GYN Centre, 2023).

Unfortunately, in Egypt, studies have been conducted with vaginal birth after previous cesarean section and associated factors were not adequately done compared with ones that place an emphasis on cesarean section. Therefore, this study aims to evaluate the effect of educational program on labor outcomes regarding promoting vaginal birth after cesarean section.

Aim of the study:

This study aimed to evaluate the effect of educational program on labor outcomes regarding promoting vaginal birth after cesarean section.

This was done through the following objectives:

- (1) Assessing the knowledge of pregnant mothers regarding vaginal birth after the caesarean section (C.S.).
- (2) Assessing the pregnant mothers' practices regarding vaginal birth after the caesarean section (C.S.).

- (3) Designing an educational program about vaginal birth after the caesarean section (C.S.) for pregnant mothers' candidates for VBAC.
- (4) Implementing this educational program about vaginal birth after the caesarean section (C.S.) for promoting pregnant mothers which are candidates for VBAC.
- (5) Evaluating the effect of the educational program regarding vaginal birth after caesarean section on the mothers' knowledge, practices and labor outcomes among mothers' candidates for VBAC.

Research hypothesis:

The implementation of the educational program regarding vaginal birth after the caesarean section will affect positively on improving mothers' knowledge and practices related to VBAC which in turn will positively affect labor outcomes.

Operational definitions:

Trial of labor after cesarean section (TOLAS): Regardless of the result, a woman who has previously had a caesarean section may attempt a vaginal delivery.

Vaginal delivery following cesarean section (VBAC): This occurs when a woman who has previously had a caesarean section gives birth vaginally following a trial of labor.

1. Technical Design:

A. Research design:

For this study, a one-group pretest-posttest technique was used in a quasi-experimental research design. Without using random assignment, quasi-experimental studies are empirical research projects intended to assess the causal effect of an intervention on a specific population.

B. Setting:

The study was take place in the obstetrics and gynecological outpatient clinic at the Hospital of Fayoum University. The Hospital of Fayoum University is one of the recent hospitals in Egypt. It is known for its achievements in research, health care and compassionate care, as well as for teaching,

with its full capacity of 350 beds. The obstetrics and gynecology outpatient clinic is settled in the second floor and consists of two rooms, the first contains a nursing office and another two offices for doctors and two beds for examination, while the second is a room for doing ultrasounds by doctors and in front of them there is a large reception for patients awaiting examination.

C. Sampling:

Sample type and size:

A purposive sample for the total of 60 pregnant mothers was done by the following sample size equation: Sample was calculated using the infinite equation according to Epi info 2000 software using the following assumption: confidence interval 95%, design effect 1, level 5%, the inadequate knowledge was found in 30% and 60% of the cohort at the beginning and the end of the study respectively, a sample size of 54 participants was included to achieve a power of 90% and a two-sided alpha error of 5%. The calculated sample size was increased by 10% to reach 60 participants in order to overcome missing or incomplete data. Thus, calculated size precision was 60 pregnant mothers.

Inclusion criteria:

- Pregnant women which have lower segment caesarean section previously.
- Presence of time interval more than 1.5 years between this pregnancy and previous C.S.
- Free history of any medical disease or any problems associated with current pregnancy.
- Willing to do a VBAC and recognition by the obstetrician of mother's eligibility for VBAC.

Exclusion criteria:

- Women that have done upper segment cesarean section or hysterotomy scar previously.
- Presence of obstetric complications like placenta previa, fetal malpresentation, or medical disorders like preeclampsia or diabetes mellitus.

- Presence of any signs and symptoms of rupture uterus or scar dehiscence, known uterine fibroid or anomaly.
- Suspected macrosomia of fetus (weight more than 4 kg).
- Parturient women who refused the trial of vaginal birth after caesarean section.

D. Tools for data collection: This data was collected by using three tools.

Tool I: A Structured Interviewing

Questionnaire: This tool was designed by the researcher based on reviewing related literatures (Mamo & Siyoum, 2022, Abdel-Rahman et al., 2023 & Hassan et al., 2024), it consisted of four parts as follows:

Part 1: Socio-demographic characteristics' of pregnant mothers: such as the age, educational level, residence, marital status, occupation and family income in addition to weight (measured in kilograms) and height (measured in centimeters) to calculate BMI (measured by kg/m²).

Part 2: Previous obstetric history: That was developed by researchers to assess the obstetric history of mothers and previous labor including the number of gravidity, abortion, parity, and number of living children, reason for previous C.S. and type of C.S. wound.

Part 3: History of current pregnancy: including last menstrual period (LMP), gestational age (GA), expected date of delivery (EDD), fetal weight, presenting part, amniotic fluid index in the last US if found, the space between C.S. and current pregnancy, antenatal care follow up and number of visits.

Part 4: Mothers' knowledge toward VBAC assessment sheet: It was written in a simple language(Arabic), it was consisted of (8) questions of multiple choice type and close end questions to assess the mothers' knowledge regarding VBAC including (definition of VBAC, factors increasing likelihood of VBAC, factors reducing likelihood of VBAC, benefits of VBAC to both the mother and fetus, possible risks of

VBAC for both the mother and fetus, contraindications of VBAC and the eligibility criteria of VBAC).

Knowledge scoring system:

The scoring system for this part consisted of 8 questions. Each question was assessed using a model key answer, with the following scoring system:

- A score (1) was assigned for a wrong answer or don't know.
- A score (2) was given for an incomplete correct answer.
- A score (3) was awarded for a complete correct answer.

The scores of total knowledge ranged from 8 to 24, depending on the number of correct and complete answers provided by the pregnant mothers. Then scores were summed and a percentage score was calculated. The percentage score was classified into two categories to assess the level of knowledge:

- **Satisfactory knowledge** $\geq 60\%$ (14.5 - 24 grades).
- **Unsatisfactory knowledge** $< 60\%$ (< 14.5 grades).

Tool II: Self-reported mothers' practices of exercises for VBAC: That tool is adapted from (Barakat et al., 2024) and adjusted by the researcher to assess the mothers' actual reported practices of the exercises for VBAC. It included 7 practices (kegel exercise, squatting exercise, birth ball exercise, walking, vaginal massage, deep breathing exercise and progressive muscle relaxation).

Scoring system:

Mothers' practice of the 7 exercises as reported by the pregnant mothers assessed by three answers for every exercise:

- "Don't practice" scored by 1 point.
- "Practice 1 to 3 times per week" scored by 2 points.
- "Practice more than 3 times per week" scored by 3 points.

So, the total practice score ranged from 7 to 21 points and classified into two levels; these levels are inadequate and adequate practice.

- **Adequate practice** if $\geq 60\%$ of the total score (12.5- 21 grades).
- **Inadequate practice** if $< 60\%$ of the total score (< 12.5 grades).

Tool III: Labor outcomes assessment sheet:

This tool is adapted from (Fathy et al, 2009 & Barakat et al., 2023) and adjusted by the researcher to assess the labor outcomes and included 2 parts as the following:

Part 1: labor assessment sheet: This section evaluates the labor process of mothers through three main components, which consist of 18 questions in total:

- **Mode of Delivery:** This includes four questions addressing the type of delivery, reasons for a cesarean section (C.S.), complications linked to vaginal birth after cesarean (VBAC), and any complications encountered.
- **Progress of Labor:** This part contains six questions related to the duration of each labor stage (first, second, and third stages), episiotomy, fetal distress, and hospital stay duration.
- **Immediate Postpartum Assessment of Mothers:** This section includes eight questions focusing on vital signs, general appearance, after pains, perineal condition, uterine contractility, lochia, early ambulation, and participation in baby care.

Part 2: Newborn assessment sheet: this part to evaluate the newborn through 9 questions "newborn gender, gestational age at birth, birth weight, Apgar score at 1 and 5 minutes after delivery, newborn status and the action taken for the newborn based on the assessment result, time of initial breastfeeding and baby's rooming".

Tool validity:

The study tools were tested for face and content validity by a panel of five experts: three professors in Maternal and Neonatal Health Nursing and two professors in Community Health Nursing. The goal was to evaluate the relevance, clarity, understanding, completeness, and applicability of the tools. Based on expert feedback, necessary modifications were made, including adding,

modifying, and rearranging some questions. The content validity index (CVI) was calculated to be 96%, reflecting high agreement on the validity of the items.

Tool reliability:

Reliability was estimated among the same sample of 10 pregnant mothers by using the test-retest method on two occasions and then compared the scores through SPSS computer package. The Cronbach's coefficient alpha result indicated that the questionnaire is reliable to detect the objectives of the study.

Reliability analysis

Tool	Alpha Cronbach	Internal consistency
Knowledge	0.870	Good
Practice	0.871	Good
Labor outcomes	0.827	Good

Ethical considerations:

The research was approved by the Scientific Ethical Committee at Fayoum University in January 2024, under ethical code (R 530). Prior to starting the study, the researcher explained its purpose and expected outcomes to the pregnant mothers to establish trust and ensure their cooperation. The participants received assurances that the study would respect their confidentiality and identities. Additionally, it was stressed that the mothers' involvement in the study was entirely voluntary and that they could leave at any moment without facing any repercussions.

2. Operational Design:

a) Pilot study:

Was conducted on 10% (6 expectant mothers) in order to assess the tools' viability, clarity, application, and efficiency as well as the projected time required to complete them and to find any challenges or barriers that needed to be addressed before using them. The pilot study showed that some items need to be added that help to achieve the study objectives and others needed to be modified, such as simplification and rephrasing of some questions to be simpler for understanding and other items need to be omitted. So, pilot study was excluded from the study sample later.

b) Field work:

- After attaining the approval to conduct the study, sample was collected from the obstetrics and gynecological outpatient clinic at Fayoum University Hospital 3 days weekly from 9 am to 2 p.m.
- Actual field work was carried out in the period from the beginning of February 2024 to the end of June 2024.
- At the beginning, the researchers introduced themselves and explain the purpose of the study to the pregnant mothers then the written informed was obtained from each participant in the study.
- The women were interviewed in the reception of the obstetric outpatient clinic
- The researcher filled the questionnaire (pretest) from every mother individually, it took about 20-25 minutes to be filled.
- The educational program sessions was provided to them in 10 groups of 6 pregnant mothers in the waiting room.

Process of the Educational Program implementation:

It consists of five phases:

First: Preparatory phase:

In this phase, the researchers developed the educational program and supporting materials, such as a VBAC booklet, by reviewing the latest national and international literature, as well as theoretical knowledge relevant to the study. This process involved consulting books, articles, scientific journals, and online resources to gain a comprehensive understanding of the topic. The content of the educational program was then validated by a panel of experts in obstetrics & gynecological nursing and community health nursing

Second: Assessment phase:

This phase involved collecting pre-intervention data for baseline assessment. Pregnant mothers were interviewed to assess their knowledge and reported practices related to VBAC before the educational program was implemented. Data on socio-demographic factors, obstetric history, and medical and

surgical history were gathered through the interview to determine whether the mother was an appropriate candidate for VBAC or not.

Third: Implementation phase:

- Educational program was implemented for a period of 6 months, it carried out in three sessions; one theoretical and two practical (each session took 30 - 45 minutes).
- The pregnant mothers were divided into 6 groups; every group contained 10 mothers. This grouping was done to match with their upcoming visits or follow-up appointments. Two groups alternatively was received one session per day.
- The first session was theoretical and covered VBAC, including its definition, factors that influence the chance of VBAC, advantages, potential hazards, contraindications, and eligibility requirements. It also included an introduction to the program and its goals.
- Kegel exercises, squats, perineal massages, birth ball movements, walking, progressive muscle relaxation, and deep breathing techniques were all part of the other two hands-on sessions.
- The goals of each session were explained at the beginning, and then the key topics were summarized.
- Lectures, group discussions, demonstrations, and redemonstrations were among the educational methods used.
- The instructional resources included a PowerPoint presentation and videos that explained how to perform the exercises correctly.
- Every expectant mother received a guided booklet at the conclusion of the last session, which was designed to deliver proper information and practices on VBAC in Arabic.

Fourth: Follow up phase:

- The researcher and the studied mothers shared for telephone numbers and the researcher made whats app group including all the pregnant

mothers to be in contact and follow up with mothers to assess the labor outcomes after delivery of each mother through observation in hospital and follow up to with the obstetricians, maternity nurses and the mothers to complete data about labor outcomes.

Fifth: Evaluation phase:

Evaluation was done after implementation of the program through posttest that used the same tools. The mothers' knowledge was evaluated at the end of theoretical sessions while the mothers' practices assessment was reported weekly via mobile call, WhatsApp or in the next session. Finally, the tool of labor outcomes was done after the mothers' delivery to evaluate the neonatal and maternal outcomes and determine the cause of C.S. and the program efficacy.

Limitations of the study:

- The mothers' recruitment was a challenging process and took long time to select mothers meet the inclusion criteria and eligible for VBAC and accepted to participate in the study which resulted in limited sample size.
- Conducting sessions at fixed time each week was difficult due to some of the studied mothers were employed so the researcher hardly tried to organize time schedules to be suitable for all mothers.

3. Administrative Design:

The manager of Fayoum University Hospital received an official letter from the dean of the Faculty of Nursing at Fayoum University, outlining the goal and context of the study and asking for cooperation and permission to conduct the study.

4. Statistical analysis:

The data were collected, coded, and organized for analysis using SPSS (version 21). Statistical analysis included arithmetic mean, standard deviation, chi-square (χ^2) test, paired and independent t-tests, and p-values. The significance of results was evaluated based on established criteria.

P-value > 0.05 indicates statistically insignificant difference.

P-value ≤ 0.05 indicates statistically significant difference.

P-value ≤ 0.01 indicates statistically highly significant difference.

Results:

Table (1) shows that, (50%) of the studied mothers aged between 25- \leq 35 years with mean 24.7 ± 3.5 , (53.3%) and (51.7 %) of them were rural citizens and working respectively. Regarding the educational level and income status, (31.7%) and (28.3 %) of them had secondary education and sufficient income respectively as well as (100 %) of them were married.

Figure (1) clarifies that, (50%) of the studied mothers had normal weight with BMI ($18 < 25$) and (36.7%) of them were overweight with BMI ($25 < 30$), while (13.3%) of them were underweight with BMI less than 18.

Table (2) clarifies that, (66.7%) of the studied mothers got pregnant twice and didn't have an abortion before, as well as (73.3%) of them had spacing time between the previous C.S and the present pregnancy that was < 24 months. Regarding C.S wound, 100% of the studied mothers had transverse (LSCS) C.S wound.

Figure (2) illustrates that, the causes of previous caesarean delivery (18.3%, 16.7%, 13.3 %, 11.7%, 10% and 8.3 %) were physician's decision, mother's preference, fetal distress, PROM, failure of labor and multiple pregnancy respectively.

Table (3) shows that, (88.3%) of the studied mother were in the third trimester of pregnancy. Concerning ultrasound presenting part, the ultrasound showed that (85%) of fetal presentation were cephalic presentation with mean of ultrasound fetal weight 3 ± 0 kg as well as (95%) of the studied mothers followed antenatal care two times every month.

Table (4) reveals that, there was highly statistical significant differences between pre and posttest score with $p < 0.001$ in all knowledge items pre and post implementing the educational program including the definition of VBAC, factors increasing and decreasing VBAC, benefits of VBAC, risks of VBAC for the mother and fetus, contraindications of VBAC and the eligibility criteria of VBAC.

Figure (3) shows that, statistically significant differences between total level of knowledge

among the studied mothers at pre- and post-educational program implementation where (30%) of them had satisfactory knowledge before implementation the educational program while (93%) of them had satisfactory knowledge after implementation the educational program.

Table (5) illustrates that, highly statistically significant differences with $p < 0.001$ were found in exercises items pre and post implementing the educational program among studied mothers' practices of the exercises including kegel, squatting, birth ball, walking, vaginal massage, deep breathing and progressive muscle relaxation exercise.

Figure (4) shows that, there was a statistically significant difference between total practices of the exercises at pre and post implementation of the educational program where total adequate practice before program was (5%) while after program was (85%).

Table (6) displays that, (43.3%) of the studied mothers after post the educational program delivered vaginal included (25%) of them delivered vaginally without episiotomy and (18.3 %) delivered vaginal with episiotomy in addition to (100%) of them didn't suffer from any complications during vaginal labor. On the other hand (56.7%) of the studied mothers delivered caesarean section. (26.5%) of them had failure of labor progress, (23.5%) and (20.6%) were due to PROM and abnormal fetal presentation respectively as well as (17.7%), (5.9%) and (2.9%) of causes were physician's decision, fetal distress and oligohydrominious respectively.

Table (7) indicates that, the progress of labor for mother's delivered VBAC regarding duration stage of labor. In first stage (40.8%) of mothers delivered vaginally took from 15-12 hours while in second stage (51.9%) took more than 90 minutes, in addition to in third stage (61.6 %) of them took less than 10 minutes as well as (100%) of mother delivered their fetus without distress and (53.8 %) of them needed a hospital stay for less than 13 hours.

Table (8) illustrates that, (100%) of mothers delivered VBAC had normal vitals, (88.5%) of them had normal general appearance and uterine contractility as well as (57.7 %) of them had moderate pain after labor and (73.1%) of them had normal perineal condition and early ambulation.

Table (9) shows that, (53.8%) of newborns of mothers delivered VBAC were male with mean SD for gestational age of all newborns were (40.04±1.17) and (61.5 %) of them had birth weight ranged from (2.5- 3) Kg. Regarding APGAR score at 1 minute assessment reveals that (57.6%) of newborns had score above 6 (normal) while (96.1%) of

them had score above 6 after 5 minutes, in addition to (100%) of newborns were alive and didn't need neonatal intensive care unit as well as (53.9%) of them started breast feeding directly after labor.

Table (1): Frequency Distribution of the Studied Mothers According to Their Demographic Characteristics (n= 60):

Demographic data	No	%
Age:		
• < 20	5	8.3
• 20- 25	25	41.7
• 25- ≤ 35	30	50.0
Mean ± SD	24.7±3.5	
Residence:		
• Rural	32	53.3
• Urban	28	46.7
Occupation:		
• Working	31	51.7
• Not working	29	48.3
Level of education:		
• Can't read and write	3	5.0
• Read and write	10	16.7
• Primary education	13	21.6
• Secondary education	19	31.7
• University and more	15	25.0
Marital status:		
• Married	60	100
Family income:		
• Sufficient	17	28.3
• Barely sufficient	37	61.7
• Insufficient	6	10.0

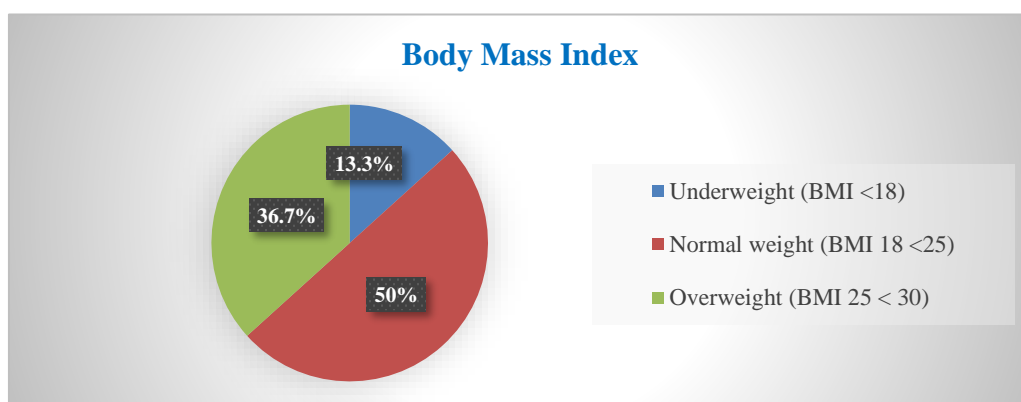
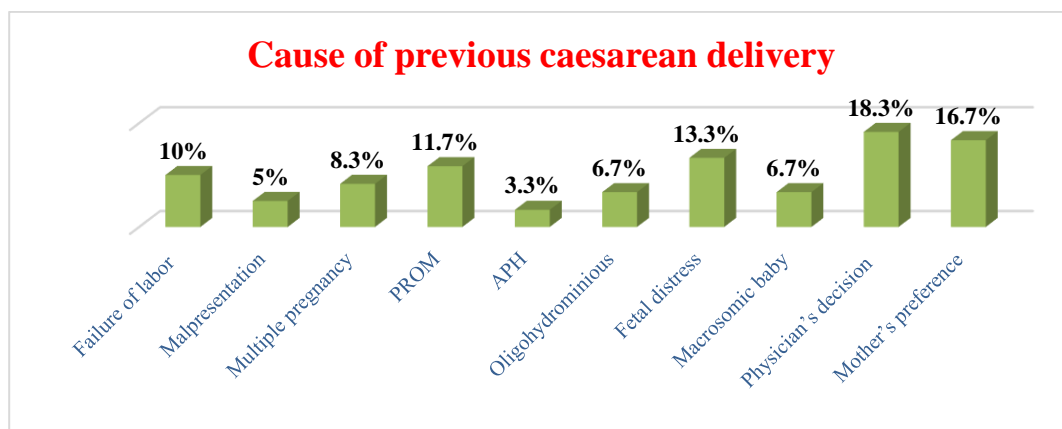


Figure (1): Frequency Distribution of the Studied Mothers according to Their Body Mass Index (n=60).

Table (2): Frequency Distribution of the Studied Mothers According to Their Obstetric History (n= 60):

Items	No.	%
Gravidity:		
• Gravida (2)	40	66.7
• Gravida (3)	12	20
• Gravida (4)	6	10
• Gravida (5)	2	3.3
Abortion:		
• Yes	20	33.3
• No	40	66.7
No of Abortion (n= 20):		
• Abortion (1)	15	75
• Abortion (2)	4	20
• Abortion (3)	1	5
Spacing between women's previous CS and present pregnancy:		
• From 18-24 months.	16	26.7
• More than 24 months.	44	73.3
Type of CS wound:		
• Transverse (LSCS)	60	100

**Figure (2):** Frequency Distribution of the Studied Mothers According to the Cause of Previous Caesarean Delivery (n= 60).**Table (3):** Frequency Distribution of the Studied Mothers According to Their Current Pregnancy History (n= 60):

Items	No	%
Gestational age:		
• 2 nd trimester	7	11.7
• 3 rd trimester	53	88.3
Mean	31.4±1.78	
Range	24-32	
Ultrasound presenting part:		
• Cephalic	51	85
• Breech	9	15
Ultrasound fetal weight:		
• Mean	3±0	
• Range	2-3	
Follow antenatal care:		
• 1/ month	3	5
• 2/ month	57	95

Table (4): Frequency Distribution of the Studied Mothers According to Their Knowledge Regarding VBAC Pre and Post Educational Program Implementation (n= 60):

Knowledge items:	Pre						Post						χ^2	P-value
	Incorrect (Don't know)		Correct & incomplete		Correct & complete		Incorrect (Don't know)		Correct & incomplete		Correct & Complete			
	N	%	N	%	N	%	N	%	N	%	N	%		
1. Definition of VBAC.	43	71.7	12	20.0	5	8.3	0	0.0	6	10.0	54	90.0	7.4	<0.001**
2. Factors increasing likelihood of VBAC.	9	15.0	23	38.3	28	46.7	0	0.0	5	8.3	55	91.7	4.8	<0.001**
3. Factors decreasing likelihood of VBAC.	18	30.0	20	33.3	22	36.7	0	0.0	1	1.7	59	98.3	5.8	<0.001**
4. Benefits of VBAC for both the mother and fetus.	19	31.7	20	33.3	21	35.0	1	1.7	10	16.7	49	81.7	5.1	<0.001**
5. Possible risks of VBAC for the mother.	11	18.3	36	60.0	13	21.7	4	6.7	8	13.3	48	80.0	5.6	0.005**
6. Possible risks of VBAC for the fetus.	15	25.0	31	51.7	14	23.3	9	15.0	30	50.0	21	35.0	5	<0.001**
7. Contraindications of VBAC.	26	43.3	16	26.7	18	30.0	0	0.0	10	16.7	50	83.3	5.8	<0.001**
8. The eligibility criteria of VBAC.	18	30.0	27	45.0	15	25.0	1	1.7	9	15.0	50	83.3	5.7	<0.001**

P < 0.001* means highly statistically significant.

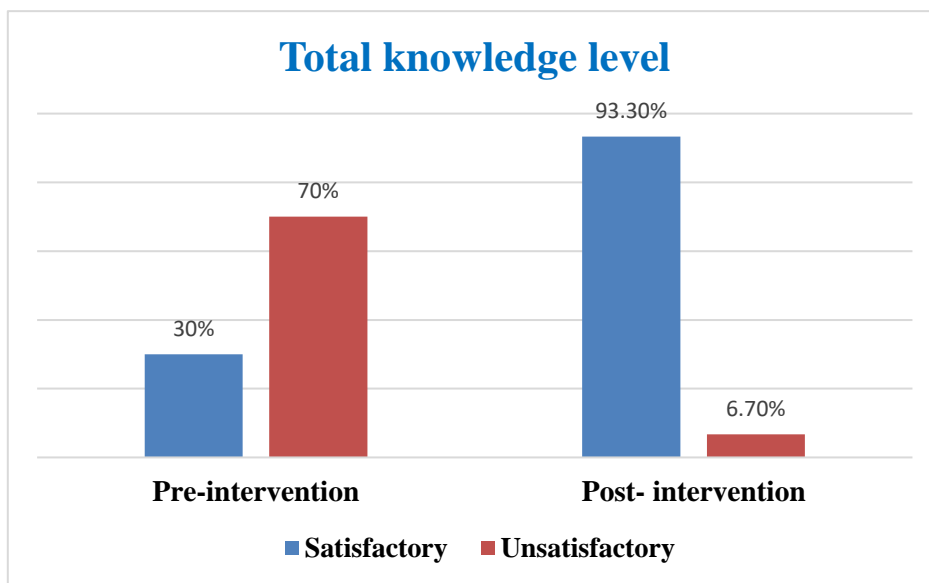


Figure (3): Frequency Distribution of the Studied Mothers According to Their Total Knowledge Score Regarding VBAC Pre and Post Educational Program Implementation (n = 60).

Table (5): Frequency Distribution of the Studied Mothers According to Their Reported Practices of Exercises Pre and Post the Educational Program Implementation (n=60):

Exercise practice	Pre						Post						χ ²	p-value
	Don't practice		Practice 1 to 3 times per week		Practice < 3 times per week		Don't practice		Practice 1 to 3 times per week		Practice < 3 times per week			
	N	%	N	%	N	%	N	%	N	%	N	%		
1. Kegel exercise.	47	78.3%	12	20.0%	1	1.7%	7	11.7%	11	18.3%	42	70.0%	6.54	<0.001**
2. Squatting exercise.	54	90.0%	6	10.0%	0	0.0%	8	13.3%	22	36.7%	30	50.0%	6.58	<0.001**
3. Birth ball exercise.	55	91.7%	5	8.3%	0	0.0%	6	10.0%	25	41.7%	29	48.3%	6.66	<0.001**
4. Walking.	6	10.0%	53	88.3%	1	1.7%	1	1.7%	8	13.3%	51	85.0%	6.75	<0.001**
5. Vaginal massage.	60	100.0%	0	0.0%	0	0.0%	6	10.0%	26	43.3%	28	46.7%	6.97	<0.001**
6. Deep breathing exercise.	34	56.7%	25	41.7%	1	1.7%	1	1.7%	8	13.3%	51	85.0%	6.89	<0.001**
7. Progressive muscle relaxation.	57	95.0%	3	0.5%	0	0.0%	7	11.7%	25	41.7%	28	46.7%	6.97	<0.001**

*: Significant at P ≤ 0.05, **: highly significant at P=0.000.

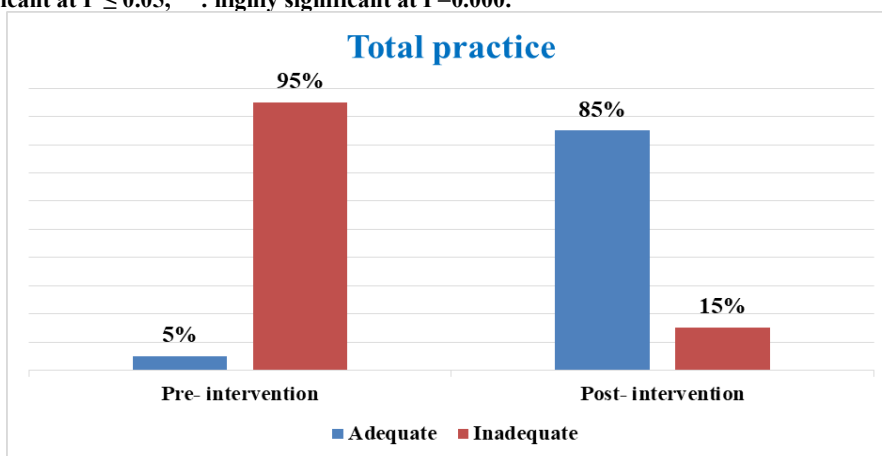


Figure (4): Frequency Distribution of the Studied Mothers According to Their Total Reported Practices Score Regarding Exercises Pre and Post Educational Program Implementation (n = 60).

Table (6): Frequency Distribution of the Studied Mothers According to Their Mode of Delivery after Educational Program Implementation (n= 60):

Mode of delivery	N	%
Type of current delivery (n= 60):		
• Vaginal delivery	15	25.0
• Vaginal delivery with episiotomy	11	18.3
• Caesarean section	34	56.7
Causes of current caesarean labor (n= 34):		
• Failure of labor progress	9	26.5
• PROM	8	23.5
• Abnormal fetal presentation	7	20.6
• APH	1	2.9
• Fetal distress	2	5.9
• Oligohydrominious	1	2.9
• Physician's decision	6	17.7
Complications occurred during VBAC (n= 26):		
• Yes	0	0.0
• No	26	100

Table (7): Frequency Distribution of the Studied Mothers Delivered VBAC According to Their Labor Progress (n=26):

Labor progress	N	%
Duration of 1st stage of labor:		
• Less than 12 hours	8	29.6
• From 12- 15 hours	11	40.8
• More than 15 hours	8	29.6
Duration of 2nd stage of labor:		
• Less than 60 minutes	10	37.0
• From 60 -90 minutes	3	11.1
• More than 90 minutes	14	51.9
Duration of 3rd stage of labor:		
• Less than 10 minutes	16	61.6
• From 10-15 minutes	5	19.2
• From 16- 30 minutes	5	19.2
Episiotomy:		
• Yes	11	42.4
• No	15	57.6
Fetal distress:		
• Yes	0	0
• No	26	100
Hospital stay after VBAC:		
• From 6- 12 hours	14	53.8
• From 13- 24 hours	7	26.9
• More than 24 hours	5	19.3

Table (8): Frequency Distribution of the Studied Mothers Delivered VBAC According to Their Immediate Postpartum Assessment (n=26):

Items	N	%
Vital signs:		
• Normal	26	100
• Abnormal	0	0
General appearance:		
• Normal	23	88.5
• Pale	3	11.5
After pains:		
• Mild	9	34.6
• Moderate	15	57.7
• Severe	2	7.7
Uterine contractility:		
• Contracted	23	88.5
• Contracted with massage	3	11.5
Lochia:		
• Normal	25	96.2
• Abnormal	1	3.8
Perineal condition:		
• Normal	19	73.1
• Edematous	7	26.9
Early ambulation:		
• Yes	19	73.1
• No	7	26.9
Baby care after labor:		
• Yes	26	100

Table (9): Frequency Distribution of the Studied Mothers Delivered VBAC According to Their Newborn Assessment (n=26):

Items	N	%
Gender of the baby:		
• Male	14	53.8
• Female	12	46.2
Gestational age at birth:		
• Mean \pm SD	40.04 \pm 1.17	
• Range	38- 42 w	
Birth weight:		
• From 2.5- 3 Kg	16	61.5
• From 3.1- 3.5 Kg	10	38.5
APGAR score at 1 minute:		
• Normal above 6	15	57.6
• Moderate 5-6	11	42.4
APGAR score at 5 minutes:		
• Normal above 6	25	96.1
• Moderate 5- 6	1	3.9
NICU admission:		
• Yes	0	0.0
• No	26	100
Fetal status:		
• Alive	26	100
Time of initiating breast feeding:		
• Started immediately	14	53.9
• After 1 hour	7	26.9
• After 2 hours	3	11.5
• more than 2 hours	2	7.7
Baby's rooming in:		
• Yes	26	100

Discussion:

Recent years have seen a sharp rise in the number of cesarean sections (C.S.), which has raised maternal morbidity and mortality rates. VBAC, or vaginal birth after cesarean section, is seen to be a successful strategy for reducing the number of cesarean deliveries. VBAC is acknowledged as a safe and satisfying delivery method for women who have previously had C.S. (Saadia et al., 2018). The safety and feasibility of trying a vaginal delivery after a cesarean section have been continuously validated by research. The purpose of this study is to investigate how an educational program affects labor outcomes, with a particular emphasis on promoting VBAC.

Based on the demographic features of the mothers under research, the current study shows that more than half of the mothers were rural residents and between the ages of 25 and

< 35, with a mean age of 24.7 \pm 3.5. These findings are consistent with an Egyptian study by (Mansour et al., 2023) titled "Evaluation of success of vaginal birth after caesarean section in patients attended Ain Shams University maternity hospital between 2017 and 2019," which found that the mean age was 26.1 \pm 4.9 years and that more than half of the women were under 25 years and agree with the Ethiopian study by (Mekonnin & Bulto, 2021) that titled "Determinants of Successful Vaginal Birth After Caesarean Section at Public Hospitals in Ambo Town, Oromia Region, Central Ethiopia: A Case-Control Study," which found that nearly two fifths of the studied women were rural residents.

In terms of the mothers' gravidity and the space between their previous cesarean sections, the current study shows that two-thirds of the mothers were gravida two and that there was a space of more than 24 months between their

CS and current pregnancy. This conclusion is partially supported by the Egyptian study titled "Zero Complication after VBAC: Effect of a Nursing Rehabilitative Program on Labor Outcomes by " (**Barakat et al., 2023**) which found that almost three-quarters of the mothers in the study were pregnant for the second time and had more than 24 months between pregnancies.

The current study reveals that, in terms of body mass index, half of the mothers were of normal weight, more than one-third were overweight, and a small percentage were underweight. This result is consistent with a study by (**Hassan et al., 2024**) titled "Successful Vaginal Birth Subsequent to Cesarean Section," which found that the body mass indices (BMIs) of women who had successful VBACs were normal. On the other hand, women who had an emergency repeated cesarean section were more likely to become fat than women who had a successful VBAC.

Concerning the cause of previous cesarean delivery, the current study demonstrates that there are many different causes for cesarean delivery which include physician's decision, mother's preference, fetal distress, PROM, failure of labor and multiply pregnancy baby respectively. But the highest percentage rate is physician's decision. These results agree with (**Abdel-Rahman et al., 2023**) who conducted a study that entitled "Exploring the Lived Experience of Women with Vaginal Delivery after Cesarean (VBAC) "A Phenomenological Study" reported that half of the participants delivered C.S. based on their doctors' recommendations without any maternal or fetal indications . In contrast to the Saudi Arabian study by **Asgarian et al. (2019)**, which found that failure of labor progress was the most common cause,

According to the current study, there are statistically significant variations in the mothers' overall level of knowledge before and after the educational program was put into place. This result is consistent with that of a study named "Vaginal Birth after Cesarean Delivery" by (**Habak & Kole, 2023**), which found that women who are empowered by information are more likely to attempt VBAC.

This finding is also in the same line with the finding of study done by (**Davis et al., 2020**) that entitled "Choosing vaginal birth after caesarean section: Motivating factors" who reported that women who are knowledgeable about VBAC are more likely to have better maternal and neonatal outcomes. Also the findings are supported by a study by (**Firoozi et al., 2020**) entitled "Impact of Motivational Interviewing on Women's Knowledge, Attitude, and Intention to Choose Vaginal Birth after Cesarean Section: which founded that motivational interviewing improves knowledge and attitudes for vaginal birth following cesarean delivery, according to a randomized clinical trial. Consequently, this approach can be used for prenatal counseling regarding vaginal delivery following a cesarean section.

From the researchers' point of view, one of the most facilitators to select a labor after cesarean was the women's level of knowledge about physiologic birth and possibilities for vaginal birth after cesarean. The necessary information regarding VBAC power to effectively self-advocate.

Regarding mothers' reported exercise habits, the current study shows that there are highly statistically significant changes between the mothers' exercise habits before and after the educational program was put into place. The Egyptian study titled "The Effect of a Nursing Rehabilitative Program on Mother's Knowledge and Practices toward Vaginal Birth after Cesarean Section" by (**Barakat et al., 2023**) supports these results by showing that the implementation of the nursing rehabilitation program improved the mothers' practice of rehabilitative exercises.

These findings are also in the same line with the findings of a study done by (**Ibrahim et al., 2020**) that entitled "Women's perceptions of barriers and facilitators to vaginal birth after cesarean in the United States" who reported that the woman's interaction with the healthcare provider, the rules and procedures of the health system were factors affecting the accessing process of VBAC.

Regarding the delivery method, the present study reveals that almost half of the mothers in the sample gave birth vaginally (VBAC) and most of them didn't have complications during VBAC. This finding agrees with (**Lennon et al., 2023**) that entitled "VBAC or Elective CS? An Exploration of Decision-Making Process Employed by Women on Their Mode of Birth Following a Previous Lower Segment Caesarean Section" who demonstrated that nearly three-quarters of the studied mothers achieved VBAC without any complications.

This finding differs with the results of a study conducted by (**Peneva et al., 2022**), which reported that nearly three-quarters of the mothers in their sample achieved VBAC and another study by (**Girma et al., 2021**) entitled "Vaginal delivery after caesarean section and its associated factors in Mizan Tepi University Teaching Hospital, Southwest Ethiopia" who reported that the percentage of vaginal births following cesarean sections that are successful (VBAC) during the study period was 76.5% and only (3.5%) were assisted by vacuum extraction.

This discrepancy in results was caused by the fact that several of the mothers in the current study had begun vaginal birth, but the experiment was terminated due to fetal distress, physician choice, and failure of labor progress.

Concerning the progress of labor for mothers during VBAC the current study revealed that the majority of mothers experienced normal progress in cervical dilatation and station, and about two-thirds of them did not require episiotomy or anesthesia during vaginal delivery. This finding is supported by a study by (**Simeone et al., 2019**) entitled "Experience of vaginal birth after cesarean: A phenomenological study" who reported that the duration of cervical dilatation, station progress, and reduced hospitalization period are associated with successful vaginal birth after previous cesarean section.

This result is also consistent with the Iranian study "Outcome of Vaginal Birth after Cesarean Section (VBAC)" by (**Noori et al., 2022**) which showed that the complications of VBAC included only uterine rupture with

0.6%, infant mortality (1.7%), cervical rupture (1.7%) and blood transfusion (2.3%).

In the researcher's opinion, the lack of complications for mothers in the present study may be due to the collaboration and coordinated roles of obstetricians and nurses during antenatal care, regular follow-up, and the effectiveness of the educational program.

Concerning labor outcomes, the current study found that the majority of mothers who had a vaginal birth after a previous cesarean had normal vital signs, appeared generally well, and had contracted uteruses. Additionally, more than two-thirds of them had normal perineal conditions and were able to start walking soon after giving birth. All of these mothers also participated in baby care after labor.

This finding is supported by a study done by (**Mansour et al., 2023**) entitled "Evaluation of success of vaginal birth after caesarean section in patients attended Ain Shams University maternity hospital between 2017 and 2019" who reported a successful VBAC carries a significantly lower risk of problems for both the mother and the newborn than a failed one. This finding is also in the same line with the finding of study done by (**Vikhareva et al., (2022)**) entitled "Strategies to increase the rate of vaginal deliveries after cesarean without negative impact on outcomes." who reported that the participants experienced intolerable pain during uterine contraction and early and easier mobilization after delivery than post-cesarean section, and the participants expressed their feeling as they can carry, care for and breastfeed their babies immediately after vaginal delivery.

Regarding the assessment of newborns born to mothers who had a VBAC, all of the newborns were born alive, had normal APGAR scores after 5 minutes and did not require neonatal intensive care. This finding aligns with the results of a study conducted by (**Keedle et al., 2020**) that entitled "Women's experiences of planning a vaginal birth after caesarean in different models of maternity care in Australia" who observed that the fetal Apgar score at the 1st minute was normal for the majority of the study group, with only two

newborns showing signs of mild asphyxia. Similarly, at the 5th minute, the fetal Apgar score was normal for most of the study group, with only one newborn showing mild asphyxia.

In conclusion, the pregnant woman and the physician should jointly decide on VBAC. This should entail careful observation of the labor evaluation and a thorough comprehension of the VBAC indications and contraindications.

Conclusion:

The current study concluded that mothers who participated in the nursing educational program showed a significant improvement in both the knowledge and practices about VBAC after the program was implemented compared to before. Additionally, the results indicated that the mothers who successfully delivered vaginally after a cesarean did not experience any complications and the newborns also. The findings of the current study achieved the study's aim and supported the research hypothesis that the implementation of the educational program regarding vaginal birth after caesarean section had a positive effect on improving mothers' knowledge and practices related to VBAC which in turn positively affected labor outcomes.

Recommendations:

- Develop and distribute additional resources such as pamphlets or online materials that provide ongoing education and support for mothers regarding VBAC and related practices.
- Integrate the educational program into routine prenatal care to ensure that all expectant mothers have access to information about VBAC and rehabilitative practices.
- Conduct further research to evaluate the long-term outcomes of the educational program including its impact on maternal and neonatal health beyond the immediate post-delivery period.

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