



Zero Complication after VBAC: Effect of a Nursing Rehabilitative Program on Labor Outcomes

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Abstract

Vaginal birth after caesarean section (VBAC) is a planned trial to give birth vaginally by a woman who has had a previous caesarean section (CS). VBAC for mothers with one previous CS is an important mechanism for reducing the CS rate. **Aim of this study:** to evaluate the effect of a nursing rehabilitative program toward vaginal birth after caesarean section on labor outcomes. **Research design:** Quasi- experimental design **Setting:** The study conducted in the antenatal clinic at Ain Shams University hospital for Obstetrics & Gynecology. **Sample:** a purposive sample of 70 mothers were included based on inclusion criteria. **Tools:** Data collected through 3 tools: 1st tool included socio-demographic data, obstetric history and knowledge assessment sheet, 2nd tool was mothers' practice of rehabilitative measures assessment sheet and 3rd tool assessed labor outcomes and mothers' satisfaction. **Results:** the present study clarifies a highly significant improvement in the total mothers' knowledge and practice after intervention. Out of 70 studied mothers, 35 (50%) had a trial of labor after CS. 24 mothers (68.5%) had a successful VBAC, which equals the third of all studied mothers. Additionally, all mothers who delivered VBAC had normal maternal and neonatal outcomes without morbidity or mortality. **Conclusion:** The nursing rehabilitative program had a positive effect on mothers' labor outcomes. Successful VBAC trial is associated with better maternal and neonatal outcomes. **Recommendations:** nursing rehabilitative program for VBAC should be implemented into maternity hospitals to help and prepare VBAC eligible mothers to have a successful trial.

Keywords: VBAC, Nursing Rehabilitative Program, Labor out comes

Introduction:

Caesarean section (CS) is performed when the obstetrician and mother feel that CS is expected to provide a better maternal and/or fetal outcome than vaginal delivery. Indications for caesarean delivery vary depending on the clinical situation, resources available for mother care, and individual physician management techniques (**Harrison et al., 2021**).

Once the mother has delivered through CS primarily, the caesarean section is frequently performed, which raises the risk of maternal problems. Mothers who give birth via CS have a greater postpartum mortality rate, there are increased risk of anaesthetic problems, which cause the majority of maternal deaths (**Metz, 2022**).

Vaginal birth after caesarean section (VBAC) is a planned trial to give birth vaginally by a woman who has had a previous caesarean section. VBAC is a safe option, nevertheless with few risks. Trial of labor after CS (TOLAC) is preferable for a woman with one previous caesarean section while vaginal birth is not contraindicated for the pregnant women (**The American College of Obstetricians and Gynaecologist, 2019**).

VBAC has many more benefits than CS, including fulfilling the mothers' preference, decreasing maternal morbidity and mortality, risk of complications in the next pregnancy and the rate of caesarean sections at a population level (**Fait et al., 2022**).

Advantages of VBAC also include; shorter hospital stay, faster recovery, avoid major surgeries and multiple cesarean sections recurrence, increased chance of vaginal delivery in the future, feeling satisfied and empowered in a vaginal birth, reducing the risk of maternal mortality and increased likelihood of breastfeeding at birth (**Opiyo et al., 2020**).

The interprofessional team has a critically important role in keeping women safe and promoting the outcomes of labor process via monitoring and caring for mothers during labor. A wide variety of medical professionals such as nurses, midwives, pharmacists, anesthesiologists, and obstetrician/ gynecologists may be involved in a woman's labor process. So, close communication between all health care professionals is needed to create an atmosphere of safety and patient-centered care (**Avery et al., 2020**).

Significance of the study:

The global caesarean section (CS) rate has doubled in the last 15 years. Elective repeated caesarean section (ERCS) is the most significant reason contributing to the highest CS rate all over the world (**Homer et al., 2022**).

Paralleling the dramatically increased worldwide caesarean section rate over the last decade. In Egypt, CS rate has progressively increased reaching 52% of all deliveries which indicating more than 100% increase in the CS rate since 2005 where it was 19% according to the last Egyptian Demographic and Health Survey in 2014, (**Mohamed et al., 2021**)

According to the sustainable development goals, goal 3 is (Good health and Well-being). In Egypt, special attention is directed towards woman's health in the initiative of the President of the Republic "100 million health". So, a special need for VBAC education is required because of less chance for health care providers to provide women with adequate information due to expanded duties and limited counselling time in antenatal clinics.

An obstetric nurse as a healthcare professional has a crucial role in providing mothers candidates for VBAC with relevant and complete information about VBAC to promote mother's competency and practice and improving their labor outcomes. the current study provides the evidence for implementing of a nursing rehabilitative program for improving labor outcomes among women planning for VBAC.

Aim of the study:

The aim of the study was to evaluate the effect of a nursing rehabilitative program toward vaginal birth after caesarean section on labor outcomes.

Research Hypothesis:

Nursing rehabilitative program toward vaginal birth after previous caesarean section will have a positive effect on labor outcomes.

Sample and Methods:

Design:

A quasi-experimental research design was adopted for this study.

Setting:

This study was conducted in the antenatal clinic at Ain Shams University Hospital for Obstetrics & Gynecology.

Sample:

A purposive sample of 70 mothers who met the inclusion criteria was recruited for the study. Inclusion criteria include mother Free from any history of medical disease or any problems with current pregnancy, with one previous c-section and no history of vaginal birth, willing to have a VBAC and recognition by the obstetrician of mother's eligibility for VBAC.

Tools of data collection:

Data was collected through 2 tools:

Tool 1: a structured interviewing questionnaire: this tool was developed by the researcher in a simple Arabic language used to assess mothers' socio demographic data, obstetric history, and mothers' knowledge about VBAC. It included 2 parts as the following:

Part 1: sociodemographic data: This part prepared by researcher to cover socio demographic data for the mother by 9 close ended questions which include (age, residence, educational level, occupation, marital status, and family income, in addition to weight and height to calculate body mass index).

Part 2: obstetric history: This part developed by researcher to assess mothers' obstetric history, previous labor, present pregnancy in 15 close ended questions (number of gravidity, parity, abortion, and number of living children, spacing between CS and pregnancy, cause of previous CS, type of CS wound, LMB, EDD, gestational age, "presenting part, fetal weight, amniotic fluid index in last ultrasound if available", antenatal care, plus a question about the most common type of labor in family).

Tool 2: labor outcomes assessment sheet. This tool included 2 parts:

Part 1: labor assessment sheet: This part evaluates mother's labor process by 3 items consisting of 18 questions. The first item; mode of delivery includes 4 questions (type of delivery, the cause if the mode was CS, if complications occurred with VBAC and type of complication. The second item; progress of labor consisted of 7 questions (duration of 1st stage, duration of 2nd stage, duration of 3rd stage, type of anesthesia, episiotomy, fetal distress, and hospital stay. The third item; mothers' immediate postpartum assessment included 7 questions (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 evaluates the newborn through 8 questions "newborn gender, gestational age at birth, birth weight, Apgar score at 1 and 5 minutes after delivery, fetal status and the action taken for the newborn based on the assessment result, time of initial breastfeeding and baby's rooming".

Field work:

Data collection and program implementation of this study was carried out from the beginning of December 2022 to the end of May 2023, two days per week from 9am to 1pm.

Program implementation:

1- Designing the nursing rehabilitative program (NRP)

The NRP was designed to be 7 sessions implemented in three phases, where the first session was for pre-assessment and program introduction, 5 sessions for applying nursing rehabilitative program, while the final session for conclusion and program evaluation.

a. Preparation of the content:

NRP and the supported material (VBAC booklet) were prepared after reviewing of the current, past, local, and international related literature. Designing the NRP included (program aim and objectives, timetable, teaching methods, required activities for each session/exercise and evaluation methods). The content of the program was divided into theoretical and practical sessions, theoretical sessions included all information about VBAC (definition, factors increasing & factors reducing likelihood of VBAC, benefits, possible risks, contraindications, eligibility criteria and stages of labor) and the practical sessions included Kegel exercise, birth ball exercises, perineal massage, squatting exercise, walking, progressive muscle relaxation and deep breathing exercise.

b. Studied mothers' recruitment and allocation:

The researcher introduced herself and interviewed each mother individually after explaining the aim of the study and obtaining written consent. Data related to sociodemographic, obstetric, medical, and surgical history were assessed through interview to determine whether the mother was a candidate for VBAC or not. The mothers were divided into groups to match the upcoming antenatal visit.

c. Pretest data collection phase:

Mothers were interviewed to complete the baseline questionnaire (pretest). The researcher explained the questionnaire and the NRP plan, mothers' answers were recorded, and their questions were answered. This phase ranged from 20-30 minutes.

2. Implementation phase of NRP:

This phase included implementing the NRP in a waiting area outside the antenatal clinic two days/ week. Mothers were divided into 8 groups with 8:9 mothers/ group. Two groups received one session per day alternatively so that every group received one session per two weeks.

Time of the first session was from (10 am to 11: am) and the second from (11:30 am to 12:30 pm). The researcher used lectures, group discussion, question and answer, and demonstrations to accomplish sessions. At the beginning of each session, the researcher revised the previous session for 5 mins then taught the selected topic in (35-40) mins and made a

summary in 5 mins. At the end of the session, mothers were allowed to ask questions and give feedback in the last 10 mins. During sessions, brochures were distributed on mothers and the booklet at the last session.

3- Evaluation phase of NRP:

Mothers evaluated by using the same tools of pretest after the end of program sessions, in addition to the tool of labor outcomes that was used after mothers given birth to evaluate fetal, maternal, and neonatal outcomes and determine the cause of CS and the program effectiveness.

Ethical considerations

The research proposal approval was obtained from the Scientific Research Ethics Committee (Number 25, August 2021) at Faculty of Nursing Helwan University before conducting the study. Before carrying out the study, the researcher clarified the aim of the study and the expected outcomes to gain mothers' trust and cooperation. A written informed consent of each participant to share in the study was obtained.

The mothers were assured about confidentiality and anonymity of the gathered data and were used for research purposes only. Mothers were allowed to participate or not and they had the right to withdraw from the study at any time. The researcher respected ethics, values, culture, and beliefs of mothers.

Administrative items: -

Permissions for data collection and implementation of the Nursing Rehabilitative Program were obtained by submission of official letters issued from the Dean of the Faculty of Nursing, Helwan University to the Manager of Ain Shams University Hospital for Obstetrics and gynecology. The researcher met and discussed the aim and objectives of the study and the nursing rehabilitative program with the hospital administrative personnel.

Statistical items:

Data was collected and coded then the collected data were organized and analyzed using appropriate statistical significance tests using the Computer Statistical Package for Social Science (SPSS), version 21.

Results:**Table (1): Distribution of the studied mothers according to sociodemographic characteristics N =70.**

Socio-demographic data	No	(%)
*Age (Years)		
• Less than 20 years	0	0 %
• 20-25	14	20 %
• 26-30	55	64.3 %
• 31-35	11	15.7 %
Mean ± SD	27.84 ± 3.188	
* Place of residence		
• Urban	57	81.4 %
• Rural	13	18.6 %
* Occupation		
• Employee	18	25.7 %
• Housewife	52	74.3 %
* Marital status		
• Married	70	100 %
* Monthly income		
• Sufficient	62	88.6 %
• Insufficient	8	11.4 %
* General examination items		
• Weight Mean ± SD = 77.96 ± 19.382		
• Height Mean ± SD = 162.17 ± 6.336		
* Body Mass Index (BMI)		
• Underweight (<18.5)	6	8.6 %
• Normal weight (18.5-25)	26	37.1 %
• Overweight (26-30)	38	54.3 %
Total	70	100%

Table (1) indicated that nearly two-thirds 64.3 % of studied mothers were 26-30 years old, with a mean age of 27.84 ± 3.188 years. Regarding the occupation 74.3 % of studied mothers were housewives. Concerning the place of residence 81.4 % of them were urban citizens. Regarding monthly income, 88.6 % of the studied mothers have a sufficient monthly income. Concerning the body mass index, 54.3 % of studied mothers were overweight. Besides that, the majority 80% of studied mothers had a university education.

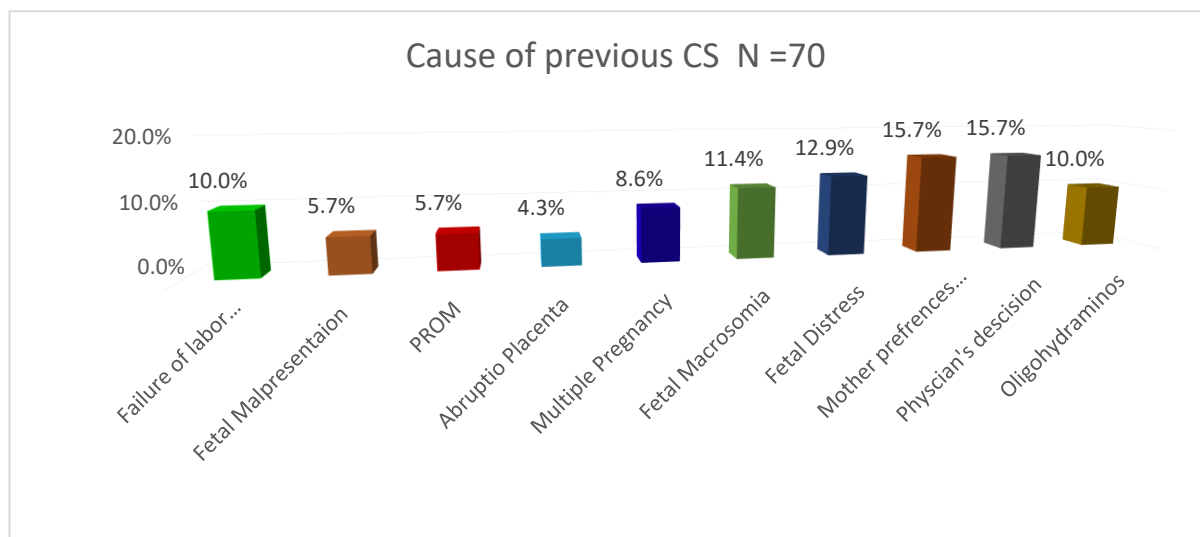


Figure (1): Distribution of studied mothers according cause of previous CS. N=70

Figure (1) reveals that the most common two causes of previous CS among studied mothers were physician's decision and mother's preferences 15.7%, followed by fetal distress and fetal macrosomia with percentage 12.9% and 11.4% respectively, while the less common cause was abruptio placenta 4.3 %.

Table (2): Distribution of the studied mothers according to obstetric history (N =70).

Obstetric history	No	(%)
* Gravidity		
• Gravida (2)	48	68.6 %
• Gravida (3)	14	20 %
• Gravida (4)	6	8.6 %
• Gravida (5)	2	2.9 %
* Abortion		
• Yes	22	31.4 %
• No	48	68.6 %
* Number of Abortion		
• Abortion (1)	13	59.1 %
• Abortion (2)	7	31.8 %
• Abortion (3)	2	9.1 %
* Spacing between CS & Current pregnancy		
• From 18-24 months.	21	30 %
• From 25-36 months.	22	31.4 %
• More than 36 months	27	38.6 %
* Type of previous CS incision		
• Lower segment CS (LSCS)	70	100 %
Total	70	100%

Table (2) indicates that more than two-thirds 68.6% of the studied mothers were pregnant for two times (gravida 2). Concerning abortion, more than two-thirds 68.6 % of

studied mothers didn't experience abortion, while about one third 31.4% had aborted previously. More than the half 59.1 % of women who had abortion previously experienced two abortions. Besides, more than one-third 38.6 % of studied mothers had a space period between previous CS and the current pregnancy for more than 36 months. Besides that, all the studied mothers had a LSCs incision of previous CS.

Table (3): Distribution of the studied mothers according to present pregnancy N =70.

present pregnancy	No	(%)
* Gestational Age		
• 2 nd trimester	37	52.9 %
• 3 rd trimester	33	47.1 %
* Ultrasound Presenting Part		
• Cephalic	54	77.1 %
• Breech	16	22.9 %
* Ultrasound fetal weight	Mean \pm SD = 828.43 \pm 380.707	
* Following antenatal care	70	100 %
Total	70	100%

Table (3) shows that more than half 52.9% of the studied mothers were in the second trimester of pregnancy. As regards the ultrasound presenting part more than three-quarters 77.1 % of the studied mothers showed cephalic presentation with mean of the fetal weight 828.43 \pm 380.7gm and mean amniotic fluid index was 13.70 \pm 1.973 . Besides that, all the studied mothers had regular antenatal care.

Table (4): Distribution of studied mothers according to mode of delivery (N=70).

Mode of delivery	No	(%)
* Type of current delivery		
• Vaginal delivery	10	14.3 %
• Vaginal delivery with episiotomy	14	20 %
• Cesarean section	46	65.7 %
* Cause of current CS		
• Failure of labor progress	12	26.1 %
• Abnormal fetal presentation	11	23.9 %
• PROM	8	17.4 %
• Abruptio placenta	3	6.5 %
• Fetal distress	3	6.5 %
• Physician's decision	7	13 %
• Oligohydramnios	3	6.5 %
* Complications during VBAC		
• No	24	100 %
• Yes	0	0 %
Total	70	100%

Table (4) one third of the studied mothers 34.3% delivered vaginally either with episiotomy or without episiotomy, 20% and 14.3% respectively and without any complications with VBAC. Regarding the cause of current CS, the most common cause among mothers who delivered by CS was the failure of labour progress 26.1%, while the least common causes were abruptio placenta, fatal distress, and oligohydramnios 6.5%.

Table (5): Distribution of mothers delivered VBAC according to their labor progress (N=24).

Labor progress	No	(%)
* First stage' duration		
• Less than 12 hours	2	8.3 %
• From 13-15 hours	9	37.5 %
• More than 15 hours	13	54.2 %
* Second stage' duration		
• Less than 60 mins.	21	87.5 %
• From 61-90 mins.	2	8.3 %
• More than 90 mins.	1	4.2 %
* Episiotomy		
• No	10	41.7 %
• Yes	14	58.3 %
* Type of Anesthesia		
• Local anesthesia with sedation	6	40 %
• Regional anesthesia "Local"	7	46.7 %
• Regional anesthesia "epidural"	2	13.3 %
* Third stage's duration		
• Less than 10 mins.	5	20.8 %
• From 10-15 mins.	19	79.2 %
• From 16-30 mins.	0	0 %
* Fetal distress		
• Yes	0	0 %
• No	24	100 %
* Hospital stays after VBAC		
• From 6-12 hours	9	37.5 %
• From 13-24 hours	11	45.8 %
• More than 24 hours	4	16.7 %
Total	24	100%

Table (5) illustrates the progress of labor among mothers who delivered vaginally after CS. According to the duration of labor stages, more than half of mothers 54.2% taken more than 15 hrs. in the first stage of labor while majority of them 87.5% taken less than 60 minutes in the second stage and more than three quarters 79.2% their third stage of labor lasted 10-15 minutes. More than half 58.3% of mothers who were delivered by VBAC had episiotomy and less than half 46.7 % had regional local anesthesia. No fetal distress had occurred with

all mothers delivered by VBAC while the hospital stay was "13-24 hours" in 45.8 % and "6-12 hours" in more than third 37.5%.

Table (6): Distribution of mothers delivered VBAC according to their immediate postpartum assessment (N=24).

Mother's immediate postpartum assessment	No	(%)
* Vital signs		
• Normal	24	100 %
• Abnormal	0	0 %
* General appearance		
• Normal	18	75 %
• Pale	6	25 %
* After Pains		
• Mild	8	33.3 %
• Moderate	14	58.3 %
• Severe	2	8.3 %
* Uterine contractility		
• Contracted	21	87.5 %
• Contracted with a massage.	3	12.5 %
• Atonic	0	0 %
* Perineal condition		
• Normal	19	79.2 %
• Edematous	5	6.9 %
* Early participation in baby care (1st two hrs.)		
• Participated	9	37.5 %
• Not participated	15	62.5 %
* Early ambulation		
• With assistance	5	6.9 %
• Without assistance	19	79.2 %
Total	24	100%

Table (6) highlights the immediate post-partum assessment of mothers who delivered VBAC. All mothers who delivered VBAC 100% had normal vital signs and three quarters of them 75% were normal in general appearance. After pains were moderate in more than half 58.3% and the uterus was contracted in most 87.5 % of mothers delivered VBAC. The majority of mothers 79.2 % had a normal perineal condition and ambulated early without assistance while 62.5% hadn't participated in their baby care at the first 2 hours post labor.

Table (7): Distribution of newborns of mothers delivered VBAC according to newborn assessment (N=24).

Newborn assessment	No	(%)
* Baby's gender		
• Male	10	41.7 %
• Female	14	58.3 %
* Gestational age at birth		
• From 39-40 weeks.	7	29.2 %
• From 41-42 weeks.	17	70.8 %
Mean \pm SD = 40.75 \pm 0.8		
* Birth weight		
• From 2500-3000 grams	13	54.2 %
• From 3001-3500 grams	11	45.8 %
Mean \pm SD = 3048.96 \pm 202.6		
* Fetal status		
• Dead	0	0 %
• Alive	24	100 %
* NICU Admission		
• Yes	0	0 %
• No	24	100 %
* Birth trauma		
• Yes	0	0 %
• No	24	100 %
* Time of Initiating breastfeeding.		
• Started immediately.	17	70.9 %
• After half an hour.	5	20.8 %
• After one hour	2	8.3 %
• More than one hour	0	0 %
* Baby's rooming in		
• Yes	24	100 %
• No	0	0 %
Total	24	100%

Table (7) displays that more than half of newborns 58.3% were females and greater than two thirds 70.8% of newborns delivered at 41-42 weeks gestation with a mean gestational age at birth 40.75 ± 0.8 weeks. Regarding newborns' birth weight, more than half 54.2 % were between 2500-3000 grams with mean 3048.96 ± 202.6 grams. All of newborns 100% were alive, without birth trauma, didn't admitted to NICU and were rooming in with their mothers. Greater than two thirds 70.9% of newborns started breastfeeding immediately after birth. The results indicate that during the fourth stage of labor, there were no complications observed for both mothers and neonates.

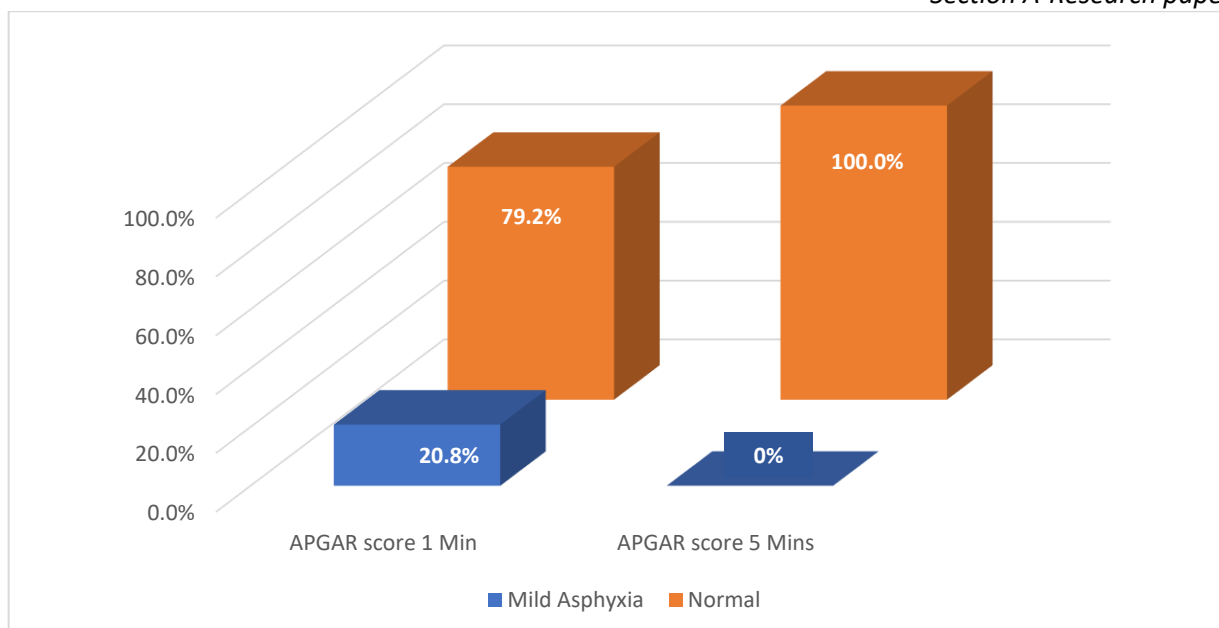


Figure (2) Newborn APGAR score at the first- and fifth-minutes assessment. (N=24)

Figure (2) demonstrates that about one-fifth 20.8% of the newborns had a moderate Apgar score "4 – 6" at the first minute Apgar score assessment, while all the newborns 100% were normal at the fifth minute Apgar score re-assessment.

Discussion

According to the sociodemographic characteristics of the studied mothers, the current study reveals that the majority of the studied mothers aged below 30 years old. This finding agrees with the finding of the Ireland study conducted by (Lennon et al., 2023) who reported that the majority of the studied women aged below 30 years old. However, the previous finding contradict with the Indian study conducted by (Kumari et al., 2021) who reported that majority of the women belonged to age group 30–34 years.

Concerning the place of residence, the finding of the current study shows that four fifths of the studied mothers were urban citizens. This finding agrees with the finding of the study conducted by (Nguemni et al., 2023) who reported that the majority of the studied mothers were an urban citizens.

However, this finding mismatch with the finding of the Ethiopian study conducted by (Mekonnin & Bulto, 2021) who reported that nearly two fifths of the studied mothers were rural citizens which may return to the difference in the setting of the study.

Regarding the educational level of the studied mothers, finding of the current study reveals four fifth of studied mothers have university education. This finding is in agreement

with the study conducted by (**Grylka-Baeschlin et al., 2019**) who reported that about half of the studied mothers had a university education.

Regarding gravidity of the studied mothers, the current study demonstrates that more than two thirds of the studied mothers were gravida two (the second pregnancy), While this finding corroborated by the finding of the Saudi Arabian study conducted by (**Rouzi et al., 2021**) who repeated attempts at trial of labor after cesarean birth on maternal and neonatal outcomes, and conveyed that near two thirds of the studied mothers were gravida two.

The causes of previous CS finding among studied mothers of the current study illustrates that the most common two causes were either mother's preference "Elective" or physician's decision. However, Abruption placenta was the less common cause. This finding contradict with the finding of the Saudi Arabian study conducted by (**Alkhamis, 2019**) who informed that the most common cause was failure of labor progress.

The difference in the cause of the previous cesarean section may be returned to, in Saudi Arabia, obstetricians and hospital policies support vaginal delivery and perform caesarean section only for absolute medical indications however in Egypt CS is more applied for many reasons other than the medical indications.

Concerning the mode of delivery, the current study shows that above one third of the studied mothers delivered vaginally (VBAC), which differs with the finding of the study conducted by (**Peneva et al., 2022**) who reported that nearly three quarters of the studied mothers achieved VBAC. This difference in results is because many mothers in the current study had started vaginal delivery but the trial wasn't complete.

In the current study, more than one third of the studied mothers who delivered vaginally hadn't an episiotomy, this finding mismatch with the Chinese study conducted by (**Sun et al., 2019**) who found that more than two thirds of the studied mothers delivered vaginally without episiotomy.

Furthermore, no one of mothers who delivered by VBAC in our study had experienced any complications with VBAC. This confirms that VBAC complications are rarely occur especially with good management and following the eligibility criteria of VBAC mothers' selection. This finding differs with the study conducted in Iran by (**Noori et al., 2022**) who

demonstrated that VBAC complications included blood transfusion with 2.3%, cervical rupture with 1.7%, infant mortality with 1.7%, and uterine rupture with 0.6%.

In researcher's point of view, the difference may return to the cooperation and integration of roles of obstetrician and nurse during antenatal care which resulted in zero complications for mothers in the current study.

The hospital stay among VBAC mothers in the present study was between 13-24 hours in nearly half of them and more than the third stayed at hospital for duration between 6-12 hours. This differs with (**Ekanayake et al., 2021**) who conducted a study of vaginal birth after cesarean section vs elective repeat cesarean section: A cost-consequence analysis, who found that the mean hospital stay of VBAC mothers was 2 days. Hospital stay depended on the progress rate of labor for every mother, the time of hospital admission from the beginning of labor and maternal postpartum assessment and hospital policy.

In the immediate post-partum assessment of mothers who delivered VBAC, all mothers had vital signs within normal range and three quarters of them generally appeared normal. As well as after pains were moderate in more than half and the uterus was contracted in the most of mothers delivered VBAC. The most of mothers had a normal perineal condition and had ambulated early without assistance. These study results clarify the effectiveness of the NRP with regular antenatal care in helping mothers to have a successful VBAC without maternal complication.

Regarding fetal status the finding of the current study reveals that all the neonates were delivered a live, this finding contradict with the study conducted by (**Chen et al., 2022**) who reported that five percent of the studied mother's newborns were died.

Concerning neonatal admission to neonatal intensive care unit (NICU), the current study result demonstrated that all the neonates didn't need to be admitted to neonatal intensive care unit and no one experienced birth trauma. This finding isn't in line with the previously mentioned study by (**Chen, 2022**) who stated that seven percent of the neonates were admitted to NICU.

On assessing fetal outcome regarding the Apgar score at 1st and 5th minutes, the results of the current study displayed that one-fifth of the newborns had Apgar score "4-6" at the 1st

minute Apgar score assessment, while all the newborns became normal (Apgar score 7-10) at the 5th minute Apgar score re-assessment.

This is partially agree with the study conducted by (Ahmed et al, 2022) who found that fetal Apgar score at 1st minute was normal among majority of the study group (95 %), while mild asphyxia was found in only two of newborns. Additionally, fetal Apgar score at 5th minute was normal among most of the study group (97.5%) and mild asphyxia was observed in only one newborn of the study group.

Conclusion

Based on the study findings, we can conclude that nursing rehabilitative programs toward VBAC had a positive effect on labor outcomes. The study results indicate that mothers who received the nursing rehabilitative program toward VBAC and had a successful VBAC trial and their neonates experienced no complications throughout all stages of labor and immediate postpartum period.

Recommendation:

Based on the study findings, the following recommendations are suggested:

- Nursing rehabilitative program for VBAC should be implemented into maternity hospitals to help and prepare VBAC eligible mothers to have a successful trial.
- Obstetricians and maternity nurses should counsel and encourage mothers after the first CS about the option of VBAC trial in next pregnancy since the early postpartum period.

Future Recommendations

- Future replication of the current study on mothers with more than one CS to evaluate the effectiveness of the nursing rehabilitative program toward VBAC for them.

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