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Preference and determinants of delivery mode in pregnant women with one cesarean scar: a cross-sectional study in two urban Ugandan public hospitals

Brenda Nabawanuka[1*], Tom Ngabirano[2] and Joyce Nankumbi[2]

Abstract

Background The number of cesarean sections among women with a previous scar has continued to increase in Uganda. Such women can opt for a trial of labor, and the success rate for spontaneous vaginal delivery is 60–80%. This study assessed the preference and determinants of delivery mode among pregnant women with one cesarean scar.

Methods A cross-sectional analytical study was conducted among pregnant women who were attending antenatal care in two public hospitals in Uganda from 1st September to 1st October 2022. Kish Lisle formula was used to get a total sample of 169 pregnant women with one previous scar and nonrecurring indication for cesarean section. These were consecutively recruited into the study, and a modified Poisson regression was performed to identify factors associated with the preferred mode of delivery.

Results The mean age of the participants was 28 (4.88) years. Out of 169 women, the majority 137 (81%) preferred a trial of labor. Mothers who preferred to have more than four children were more likely to opt for a trial of labor (*a*PVR = 0.27, CI;1.01–1.49, $p = 0.009$). Mothers who were concerned about the cost associated with cesarean section were more likely to choose a trial of labor (aPVR = 1.2, CI;1.01–1.49, $p = 0.03$), and mothers who perceived that a cesarean section affects body image (aPVR = 3.06, CI;1.39–6.75, $p = 0.03$) and being employed (aPVR = 0.84, CI:0.74–0.96, $p = 0.01$) were more likely to prefer a cesarean section.

Conclusion Trial of labor after cesarean remains the preferred mode of delivery among women. The desire to have more children and concern about medical expenses increased the likelihood of having a vaginal birth preference. Women with body image concerns and being employed increased the likelihood of a cesarean section preference. It is recommended to consider a trial of labor after cesarean section for all women with nonrecurring indications for cesarean section. Empowering women through health education on the risks and benefits of cesarean section helps them make an informed choice.

Keywords Cesarean section, Trial of labor, Preferred mode of delivery, Previous scar

*Correspondence:
Brenda Nabawanuka
brendanabawanuka96@gmail.com

[1]Department of Nursing and Midwifery, Faculty of Health Sciences, Mountains of Moon University, Fort Portal, Uganda
[2]Department of Nursing, School of Health Sciences, College of Health Sciences, Makerere University, Kampala, Uganda

Background

A trial of labor after cesarean section (TOLAC) is a planned attempt to allow labor in a woman who had a previous cesarean birth with nonrecurring indications such as fetal malpresentation, failure of labor progress, fetal distress, cord prolapse, and antepartum hemorrhage [1, 2]. The World Health Organization (WHO) recommends cesarean section rates of 10–15% or below in all countries [3, 4]. However, there are increasing rates in most countries worldwide, including Uganda [3]. The cesarean section (CS) rates are currently estimated at 27.2% in developed countries and 8.2–24.2% in low-income countries [5]. A metanalysis and a multi- country study conducted on the trial of labor after cesarean section in Subharan Africa, revealed cesarean section rates after one previous scar varying between 37% and 97% [6–8], this indicates that many women are not given an option of trial of labor following the initial CS. In Uganda, the overall cesarean section rate is 6–11% [9], Although the overall rates of CS in Uganda is low, there is a significant variation in the rates of CS among different health care facilities throughout the country. According to the Uganda Annual National Health Sector Report of 2018/2019, the average cesarean section rates at a tertiary health care facilities in Uganda were recorded at 32% [10]. Additionally, an earlier study performed in health facilities in western Uganda showed cesarean section rates of 25% [11]. Furthermore, cesarean rates are even higher among women with a previous cesarean section at up to 68% in developing countries to an estimated 79% in developed countries [12, 13]. There is no evidence showing the benefits of cesarean delivery for mothers or babies who do not require the procedure [3]. A TOLAC remains as low as 25.5% in Uganda [14], yet high success rates among women who undergo a trial of labor after a cesarean section are between 70 and 80% [15–17].

Despite the positive outcomes linked to cesarean sections, they are associated with a higher incidence of complications when compared to a successful vaginal birth after a previous CS [18, 19]. The complications of cesarean sections include increased risk of hemorrhage, one of the leading causes of maternal mortality in Uganda, postpartum maternal morbidity, anesthesia-related complications, endometritis, wound infection, peritonitis, paralytic ileus, and surgical site sepsis, among others [11, 12, 20, 21]. Cesarean section is also associated with higher medical expenses compared to a TOLAC due to a prolonged hospital stay [22]. The high cost of cesarean section leads to a high expenditure on already overburdened and economically hard-hit families [23]. Therefore, encouraging eligible women to attempt labor is one of the most effective approach to lower the rate of repeat cesarean sections and improve outcomes for both mothers and newborns [24].

Depending on the context and settings, for the subsequent pregnancy, women with one previous scar can either prefer a trial of labor or cesarean Sects. [25–27]. The right to choose the desired mode of delivery is a crucial component of compassionate and respectful care in midwifery, as it fosters both maternal and neonatal wellbeing [25]. In Uganda, client-centered care remains fundamental to the health service delivery system which includes involving clients' decision-making about their preferred mode of delivery [25, 28]. The decision of pregnant mothers to have a trial of labor after cesarean section is dependent on many factors [29]. These factors include sociodemographic factors [30–32]; obstetric factors, including previous birth experience and future fertility desire [33–35]; prenatal and family factors, such as the cost of cesarean, partner preference, and fear of labor pain [36–38]; and body image concerns, such as disfiguration and reduction of vaginal strength following vaginal delivery [32, 39]. Additionally, literature has shown a that a trial of labor would be preferred by mothers because it prevents unnecessary post-cesarean complications and consequently reduces maternal morbidity and mortality [6]. The opportunity to choose the mode of delivery is an essential element of modern obstetrics and respectful treatment [40]. In Uganda, during antenatal care visits, expectant mothers develop a birth preparedness plan that outlines their preferred delivery mode, location for child birth and expected financial expenses and the necessity of birth companions during the birthing process [10]. There is paucity of data regarding the preference and determinants of delivery mode among pregnant women with one cesarean scar in Uganda, yet understanding the preferences of women on the mode of birth can help midwives and obstetricians to better support women in making an informed choice on the mode of delivery. Therefore, this study assessed the preference and determinants of delivery mode among pregnant women with one previous scar in two public hospitals in Kampala-Uganda.

Methods

Study design and setting

A cross-sectional descriptive and analytical study was conducted from 01 September to 01 October 2022 at two public health facilities in Kampala City. The two facilities were Kawempe and Naguru. These two sites receive patients from the Kampala catchment area, they provide specialized services in obstetrics and gynecology including referrals from peripheral health facilities. The services offered at antenatal care (ANC) include counselling on danger signs, detecting complications, giving supplements, laboratory tests. According to the Health Management Information system (HMIS Feb to March 2022). Kawempe and Naguru averagely receives 1500

mothers and 750 mothers respectively. Typically during ANC attendance pregnant women make birth preparedness plan that includes planned mode of delivery, place of delivery, anticipated material and financial costs during delivery, and need for birth companions [41].

Population and Sample size determination

The sample size for this study was determined using the formula for single population proportion by Kish Leslie (1965) [42]. We adopted a proportion of pregnant women attending antenatal care with one previous cesarean section from a previous study performed in Rwanda ($p = 0.11$) [6], a precision error of 0.05, and a standard normal value (Z) corresponding to a 95% confidence level. This resulted in a total of 169 pregnant women who were included in the study. Using a proportionate sampling strategy of 2:1, a total of 112 and 57 women were selected from the two facilities, respectively. At each study site, women were recruited consecutively as they attended their antenatal care visits.

Pregnant women with one previous scar with non-recurring indications for cesarean section who above 18 years, and had a low transverse section incision were included in the study. Pregnant women who had less than two years of pregnancy interval, those with complications such as hypertension or other medical conditions, and mothers who were not in good condition or medically unstable enough to answer questions as identified by the health worker were excluded.

The data collection tool and study variables

Data were gathered using a researcher-administered semi-structured questionnaire specifically designed for this study. Pretesting was done on 20 pregnant women at Mulago Women's Specialized and Neonatal Hospital, and necessary corrections were made to the questionnaire.

The dependent variable in the study was the preferred mode of delivery. The preferred mode of delivery is defined as the choice of either a trial of labor or a repeat cesarean section by women with a history of one cesarean scar. This preference was determined by asking women about their preferred mode of delivery in the questionnaire. The response was categorized as a trial of labor or cesarean section. To capture data on potential determinants, participants responded to questions to generate information on socio-demographics, obstetric characteristics, prenatal, and body image concerns. In addition, a Likert Scale was used to assess attitudes and perceptions that influenced the mode of delivery. The perceptions and attitudes were graded into strongly agree, agree, neutral, strongly disagree, and disagree.

Data collection

Data were gathered using a researcher-administered semi-structured questionnaire which was adopted from a review of relevant literature. All questions were written in English and translated into Luganda (the local language) and then back to English by two different language experts to check for clarity and consistency.

Data were collected by two research assistants who were health workers trained at the bachelor's level and one at each study site. At each study site, consecutive sampling was used to select participants and this took one month at both study sites to achieve the desired sample of 169 participants. The information about a mother having one previous cesarean section was subjectively obtained from the woman and confirmed with the Health Information Management System (HMIS) antenatal register and the antenatal card. Each selected participant was provided with information about the purpose and procedure for the study, and consent was obtained. Women were asked questions on the preferred mode of delivery, obstetric and prenatal factors such as gravidity, the desired number of children, costs, hospital length of stay, previous childbirth experience, doctor's suggestions, partner preferred mode, the fear of pain of vaginal birth, cultural beliefs, perceiving cesarean section as risky, perception that cesarean section distorts body image, and sociodemographic factors such as age, level of education, employment, and income levels, among others.

Data analysis

Data were entered into the statistical software STATA version 17 for analysis. In order to dichotomize as binary data, the Likert scale responses were collapsed into three categories: disagree and strongly disagree were collapsed to disagree, agree and strongly agree were collapsed to agree, and the neutral category was oriented to either direction depending on the nature of the question being a positive or a negative question [43],. Descriptive statistics were used to summarize the sociodemographic characteristics of the participants. The preferred mode of delivery was categorized as cesarean or TOLAC. The relationship between the preferred mode of delivery and independent variables was evaluated using bivariate and multiple Poisson regression analyses. Factors that exhibited a p value of less than 0.2 in the bivariate analysis were subsequently included in the multivariate model. A p value of less than 0.05 was considered statistically significant.

Ethical considerations

Ethical clearance was obtained from the Makerere University School of Health Sciences Research and Ethics Committee (SHSREC 2022 – 336). Administrative approval was obtained from the directorate of

Table 1 Socio-demographics and obstetric characteristics of participants

Variable	Frequency (*N* = 169)	Percentage (%)	Mean (SD)
Age	38	22.5	28(4.88)
15–24	109	**64.9**	
25–34	22	13.0	
35 and above			
Residence	34	20.1	
Rural	30	17.8	
Suburban	105	**62.1**	
Urban			
Level of Education	6	3.6	
No formal education	95	**56.2**	
Primary education	46	27.2	
Post-primary education	22	13.0	
Tertiary education			
Employment status	56	33.1	
unemployed	113	**66.9**	
Employed			
Marital status	15	8.9	
Not married	154	**91.1**	
Married			
Religion	40	23.7	
Anglican	56	23.1	
Catholic	43	**25.4**	
Moslem	30	17.8	
Others			
Gestational age(weeks)	100	59.2	27(7.1) (0.49
≤ 28	69	40.8	
28–40			
Parity	90	53.3	2(1.36)
2	69	40.8	
3–4	10	5.9	
> 5			
Gravidity	79	46.8	3(1.53)
2	68	40.2	
2–4	22	13	
≥ 5			
Experience with previous CS	68	40.3	
Good	101	59.8	
Bad			
The desired number of children	116	68.7	
< 4	53	31.4	
> 4			
Resuming chores/recovery	61	36.1	2(0.8)
Within 6 weeks	108	63.9	
Above 6 weeks			
Length of hospital stay	20	11.9	1.57(0.49)
Less than 2	52	30.9	
3 days	96	57.1	
> 3 days			
Cost of cesarean	72	43.1	362,784(626333)
Less than 60,000	48	28.8	
60,000–300,000	29	17.4	
300,001–800,000	18	10.8	
800,001–3,000,000			

both facilities. All study participants provided written informed consent and were informed about their right to withdraw from the study at any time.

Results

Sociodemographic and obstetric characteristics of the study participants

The mean age and standard deviation of the pregnant women was 28 (± 4.9) years. Most of the women 109 (64.5%) were in the third trimester of pregnancy, with a mean gestational age of 27 (7.1) weeks. The mean length of hospital stay in the previous cesarean section was 7 (11.6) days, and less than half of the participants 72 (42.9%) were discharged after three days. The majority of women reported having been able to resume normal activities within 6 weeks of cesarean section. The mean time to the resumption of normal functioning in the previous cesarean section was 2 ± 0.8 weeks (Table 1).

Preferred mode of delivery

The proportion of women that preferred a trial of labor after cesarean was 81% at 95% (CI 74-86%).

Factors associated with preferred mode of delivery

The results from binary modified Poisson regression analysis showed that level of education (cPVR = 0.76, CI; 0.71-092, $p = 0.09$), employment status (cPVR = 0.81, CI;0.71-092, $p = 0.001$), desired number of children (cPVR = 1.1, CI; 0.99–1.31, $p = 0.057$), fear of pain during vaginal delivery (cPVR = 0.82, CI;0.68–0.98, $p = 0.03$), medical expenses (cPVR = 3.06, CI;1.39–6.75, $p = 0.005$), and a cesarean section affecting body image (cPVR = 1.25, CI;1.04–1.48, $p = 0.01$) were significantly associated with the preferred mode of delivery (Table 2).

The multivariate analyses were conducted by entering all the plausible variables in the bivariate analyses as independent variables into a modified Poisson regression model.

After controlling for confounding factors, women who had a perception that a CS affects their body image (those with a desire to have more than four children (aPVR = 0.27, CI;1.01–1.49, $p = 0.009$)) and mothers who were concerned about the cost associated with cesarean section (aPVR = 1.2, CI;1.01–1.49, $p = 0.03$) were more likely to choose a trial of labor, whereas those who were employed (aPVR = 0.84, CI;0.74–0.96, $p = 0.01$) were more likely to opt for a cesarean section. (Table 3)

Discussion

Our study found that more than 81% of pregnant women preferred a TOLAC in their current pregnancies. This indicates that women are both aware of and willing to pursue vaginal deliveries following a cesarean section. This could be due to concerns about the safety of

Table 2 Prenatal characteristics, family factors, and body image concerns of participants

Variable	Disagree *n* (%)	Neutral *n* (%)	Agree *n* (%)
Previous childbirth experience	23(13.61)	13(7.7)	**133 (78.7)**
Future fertility desire	58(34.3)	32(18.9)	**78(46.8)**
Doctors' suggestion	27(15.9)	3(1.8)	**139(82.3)**
Partner choice	**101(59.8)**	16(9.5)	52(30.5)
Fear of pain during vaginal delivery	**97(57.4)**	13(7.7)	59(34.9)
Cultural beliefs	**120(71.0)**	19(11.2)	30(17.8)
Medical expenses	40(23.7)	14(8.3)	**115(68.3)**
Repeat cesarean section is perceived to be risky	54(31.9)	10(5.9)	105(62.1)
Long hospital stays	48(28.4)	11(6.5)	**110(65.1)**
The woman prefers a safe choice	76(44.9)	6(3.5)	**87(55.5)**
Women's belief	43(25.4)	37(47.3)	**89(52.6)**
Time needs	40(23.7)	21(12.4)	**108(63.9**)
Gynecology examination anxiety	**91(53.9)**	2(1.2)	76(44.9)
A cesarean section will affect my body image	64(37.9)	4(2.37)	101(59.8)
A vaginal delivery will cause body disfiguration	114(67.5	18(10.7)	37(21.9)
A vaginal delivery will lower my vaginal strength	99(58.6)	24(14.2)	46(27.2)

Table 3 Bivariable and multivariable analyses of factors associated with the choice of mode of delivery

Variable	CS	TOL	cPVR (95% CI)	*p* Value	aPVR (95% CI)	*p* value
The desired number of children	26(81.3)	90(65.7)	Ref	0.057	Ref	**0.009***
< 4	6(18.7)	47(34.3)	1.1(0.99–1.31)		0.27(0.15–1.01)	
> 4						
Cesarean section affects body image	39(60.9)	71(67.6)	Ref	0.004	Ref	**0.03***
Disagree	25(39.0)	34(32.4)	1.2(1.08–1.53)		1.2(1.01–1.49)	
Agree						
Fear of pain during vaginal delivery	97(69.8)	20(66.7)	Ref	0.03		
Disagree	42(30.2)	42(33.3)	0.82(0.68–0.98)			
Agree						
Marital status	29(90.6)	125(91.1)	Ref	0.91		
Married	3(9.4)	12(8.8)	0.01(0.25–0.27))			
Single						
Previous Experience with cesarean section	10(31.4)	58(42.3)	Ref	0.235		
Good	22(68.8)	79(57.7)	0.92(0.79–1.06)			
Bad						
Medical expenses affecting choice	40(23.7)	14(8.3)	Ref	0.005	Ref	**0.03***
Disagree	54(31.9)	10(5.9)	3.06(1.39–6.75)		3.06(1.39–6.75)	
Agree						
Occupation	4(12.5)	52(37.9)	Ref	0.001	Ref	**0.01***
Not employed	28(87.5)	85(62.0)	0.81(0.71-092)		0.84(0.74–0.96)	
Employed						
Partner choice	20(62.5)	97(70.8)	Ref	0.39		
Disagree	12(37.5)	40(29.2)	0.92(0.78–1.10)			
Agree						

cesarean sections to both the mother and the neonate [44], socioeconomic consequences of cesarean sections among others [45].Therefore health care providers caring for candidates of TOLAC should be aware of and able to counsel patients regarding the benefits of a trial of labor and knowledgeable in quality intrapartum care for better maternal outcomes in this setting [46, 47]. Our results were similar to those in a systematic review of thirty-eight studies comprising 19,403 women, where 85% of the women preferred vaginal delivery over CS after a previous scar [16]. The findings were also similar to a study in Brazil and other studies that reported high levels of willingness to have vaginal birth after cesarean [48].

The factors that were found to be associated with the preferred mode of delivery were the desire to have more children, the belief that a cesarean section affects body image, a concern that cesarean section is associated with increased medical expenses, and being employed. Women who had body image concerns were more likely to choose a trial of labor compared to their counterparts.

This could be due to women who underwent cesarean section expressing fear of negative reactions from their husbands regarding their surgical scars, which would affect their marital relationship, among others. This is in agreement with studies that cited that cesarean section delivery was associated with body image disturbances and low self-esteem [49, 50],.

The desire to have more children in the future was also found to be associated with a preference for a TOLAC. A growing body of medical literature documents this as a robust fact, women undergoing cesarean section end up having less children, and this association could be physiological or through maternal behavior after cesarean section, for example, they may engage in contraception after delivery to have faster recovery [40]. This is also in line with a study done among pregnant women in Isfahan on correlates and determinants: intention for cesarean section versus vaginal delivery revealed that women who intended to have fewer children, cesarean section would be more considered. Because, one important indication for cesarean section is repeat cesarean section whereas a woman who has greater fertility intention tends to have lower intention to do CS [51]It is therefore not surprising that in this study, women who wanted more than four children were more likely to opt for vaginal deliveries than a repeat cesarean section.

In our study, a belief that a cesarean section is expensive increased the likelihood of choosing a TOLAC. This is because Uganda is still a low-middle-income country where people lack access to medical care because they cannot afford it [52]. This is in agreement with a WHO report that looked at global numbers of cost of additionally needed and necessary cesarean sections performed per year that revealed high costs associated with cesarean Sect. [53]. Additionally a study performed in Bangladesh on the economic burden of cesarean section showed a high cesarean section delivery rate, and the negative health outcomes associated with the procedure on mothers and childbirths incur enormous economic burdens on the families [54].

The employment status of the women was also another associated factor; this is because employment status highly correlates with good living standards and high income. This further implies that they can afford to pay for cesarean section and all the expenses associated with it. These findings are consistent with the results of several studies where a significant association was found between the mother's employment status and requesting a cesarean delivery [55]. However, other studies have reported no association [56].

Study strengths

To our knowledge, this is the first study in Uganda that examines and expands information on the preference and determinants of mode of delivery among pregnant women with one previous scar in a resource limited setting. The study conducted an association between a wide variety of factors, among these are body image concerns that are commonly excluded in earlier studies.

Study limitations

This study looked at the factors that were associated with the mode of delivery only from the mother's perspective and thereby did not capture provider and health systems perspectives, which may have a larger influence on cesarean section rates.

Conclusion and recommendations

This study investigated the preference and determinants of delivery mode among pregnant women with one previous cesarean section, the majority of pregnant women preferred a trial of labor over a repeat cesarean section. The factors that were found to be significantly associated with the preferred mode of delivery were as follows: the factors that were found to be associated with a trial of labor after cesarean section were the desire to have more children, the belief that a cesarean section affects body image, a concern that cesarean section is associated with increased medical expenses, and being employed was associated with having a CS.

Health education for women should continue with current information regarding the risks and benefits of cesarean delivery during ANC. This will enable them to make decisions that will be in the best interest of the mother and the child.

The findings of this study provide a direction for midwives in maternity care on continuous education, counseling of women about the benefits of a trial of labor, and supporting them in making meaningful decisions regarding their preferred mode of delivery. Providing a trial of labor to pregnant women with one previous scar instead of a repeat cesarean section will reduce the economic burden and cost of cesarean sections.

More in-depth rationales and reasons for intention to do a trial of labor after cesarean be explored in a qualitative study.

Abbreviations

VBAC	Vaginal birth after Cesarean section
TOLAC	Trial of labor after cesarean
WHO	World Health Organization
CS	Cesarean section
PVR	Prevalence ratios
cPVR	Crude prevalence ratio

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Author contributions
BN, JN and TN wrote the main manuscript text, and TN prepared the figures.all authors reviewed the manuscript.

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Data availability
The data set can be provided by the primary author on request.

Declarations

Ethics approval and consent to participate
Ethical approval was sought from the Makerere University School of Health Sciences Research Ethics Committee (approval number MAKREC-2022-336). Ethical approval and consent to participate in the study were obtained from the Makerere School of Health Sciences Research Ethics Committee (SHSREC-2023-336). Administrative clearance was sought from the study hospitals, and all participants provided written informed consent before completing the questionnaire. The study was performed based on the ethical principles in the Declaration of Helsinki.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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