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# Comparison of Regret and Hopelessness in Primiparous Iranian Women Following Vaginal Birth and Cesarean Section

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ARTICLE INFO	ABSTRACT
<i>Article type:</i> Original article	<b>Background &amp; aim:</b> The rate of unnecessary caesarean section are exceptionally high in some countries, including Iran. Though women may choose their mode of delivery, negative feelings of regret and hopelessness can occur in relation to decision-making following birth. Thus, this study aimed to compare regret and hopelessness in primiparous women following both vaginal and cesarean birth. <b>Methods:</b> Overall, 300 participants were included in this descriptive comparative study. Participants were included following vaginal birth (n=100), birth via emergency cesarean section (n=100) and birth via elective cesarean section (n=100) between June and October 2019. Participants were recruited from comprehensive health centers in Zabol, southeast of Iran. Data collection tools included the demographic characteristics questionnaire, Decision Regret Scale, and Beck Hopelessness Scale which were completed eight weeks after childbirth. To analyze data independent-sample T test and one-way ANOVA were used. <b>Results:</b> Mean and standard deviation for scores in relation to regret eight weeks following vaginal birth and elective cesarean section were $29.70 \pm 25.97$ , $43.20 \pm 15.88$ , respectively. There was a statistically significant difference between the mean score of regret in the vaginal birth and elective cesarean section ( $P < 0.001$ ). There was no statistically significant difference in terms of hopelessness among three groups of vaginal birth, birth via emergency cesarean section, and birth via elective cesarean section. <b>Conclusion:</b> The higher scores in relation to regret in women who birthed via elective cesarean section in this study suggest that strategies are required to reduce rates of unnecessary cesarean sections.
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## Introduction

For some women, pregnancy and childbirth can be stressful events (1, 2). Despite the fact that vaginal childbirth generally is the safest way to give birth (3), the incidence of elective cesarean birth on maternal request, without medical indication has increased in recent years (4). Higher incidence of Cesarean section (C-section) are found in Latin and Caribbean countries (with an average of 40.5%), whilst

lower rates are found in African countries (with an average of 7.5%) (5). Yet the C-section prevalence in Iran is 48% (6). In Zabol, 25.2% of births occurred via C-section, which is higher than the global standard (5-15%) (7). The average rate of cesarean birth in recent years has also increased in the most world's countries (8). This is concerning, as major surgery has psychological effects on mothers and,

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consequently, on their child and their family, inducing problems in communication and social functioning (9).

Mental health is a health priority in all societies (10). History of mental disorders, physical condition, poor outcomes, marital status (11), along with tensions and stresses (12) can all be considered important factors affecting mental health in the postpartum period (12, 13). Moreover, the results of one particular study showed that poor maternal mental health in the postpartum period can have a significant and negative effect upon essential communication skills (14). As an unsatisfactory birth can contribute to this, leading to severe distress (15) it will be important to explore what effects a woman's mode of birth has upon their mental wellbeing.

Following birth, feelings of regret and hopelessness related to decision-making can occur (16). Maternal complications in particular may have a negative impact on women's feelings in relation to their mode of birth (17). For example, Women who do not give birth vaginally, may feel uncomfortable and experience pain following C-section (18, 19). When they realize that a different decision could have led to a better result, some individuals can also suffer from depression. (16). The way in which women give birth affects both their physical and mental health. If a person is not satisfied with the way in which they have given birth, this can lead to regret and distress, as well as feelings of depression (17).

Feelings of hopelessness in relation to childbirth can also cause depression (20). The results of Kjerulff & Brubaker's study (2017) showed that 4.5% of women who experienced a spontaneous vaginal birth, 8% of women who experienced an instrumental vaginal birth, 9% of women who experienced birth via planned C-section, and 22.5% of women who experienced an unplanned C-section felt hopeless (17). Likewise, findings presented by Girardi et al. (2011) showed that 1.7% of participants also experienced hopelessness in this context (21). Regret in decision-making can lead to feelings of blame in this context, and a subsequent conflict of emotions (22, 23). Thus, it will be important to explore both hopelessness and regret in relation to childbirth. In a study by Attanasio et al. (2019),

45% of those who chose to birth via C-section regretted their decision 12 months later, and instead chose to birth vaginally in subsequent pregnancies (24). This decision is often made following increased acquisition of knowledge and knowledge exchange (25, 26). This decision may also be safer where supported appropriately by obstetric teams (27).

Currently, pregnant women play an important role in choosing how they give birth (3). Such decision making may be influenced by the prevailing view of society (28). Ethnic differences and various cultures are also among the factors that affect different stages of pregnancy and childbirth decision-making (29). Promoting maternal health requires recognizing multiple and complex factors in choice making, whilst paying attention to beliefs, values and cultural beliefs (30). In this sense, feelings of both regret and hopelessness may have influence over future choices made in relation to mode of birth. Crucially, it is important to address the mental health of mothers in childbearing (31). Considering the above and the lack of studies on psychological dimensions of childbirth choices, the aim of present study was to compare regret and hopelessness among the Iranian primiparous women following vaginal birth and birth via cesarean section.

## Materials and Methods

This study was a descriptive comparative study including primiparous women who had given birth eight weeks prior to data collection. Participants were referred via comprehensive health centers affiliated to Zabol University of Medical Sciences. Sampling in this study was performed from June to October 2017.

In order to determine the sample size at 95% confidence level and 80% test power, the standard deviation of hopelessness score in both groups (vaginal birth and birth via C-section) was estimated 2.5 (21). Assuming that the hopelessness score of those who had given birth vaginally in comparison to those who had birthed via C-section was 1 (one-tenth of the median score of the tool) to consider this difference statistically significant, the sample size was estimated 98 based on the hopelessness score. To determine the required sample size at 95% confidence level and 80% test power, the standard deviation of regret

score in each of the two groups was estimated to be 14.4 (32). The regret score of those who experienced birth vaginally was assumed to be 6 points compared to those who birthed via C-section. In order to make this difference statistically significant, the sample size was estimated to involve 90 participants. Therefore, the sample size estimated from hopelessness was the criterion and with regard to three study groups, it was calculated about 300 women: (1) women who birthed vaginally (n=100), (2) women who birthed via emergency cesarean section (n=100) and (3) women who birthed via elective cesarean section (n=100).

$$n = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2 (\sigma_1^2 + \sigma_2^2)}{(\mu_1 - \mu_2)^2} = \frac{(1.96 + 0.84)^2 (2.5^2 + 2.5^2)}{(1.96 - 0.84)^2} = 98$$

Sampling was done based on the number of primiparous individuals covered in all comprehensive health centers, and the samples were determined as quotas. After involving all urban and rural centers, qualified samples were taken according to the quota of that center. (Additional file 1: Table S1). Participants were included if they were Iranian, women over 18 years, had the ability to read and write, and had given birth between the 37<sup>th</sup>- 42<sup>nd</sup> week of pregnancy. Women were excluded from participant if they had physical and/or mental illness (diabetes, hypertension, depression, etc.), experienced problematic substance use and/or infants with congenital abnormalities.

Data collection tools included the personal characteristics' questionnaire, Decisional Regret Scale (DRS), and the Beck Hopelessness Scale (BHS). The hopelessness questionnaire was completed by the three study groups; the regret questionnaire was completed by participants following vaginal birth and all who birthed via elective C-section (considering that those who experienced an emergency C-section did not interfere with decision-making, regret was not considered relevant in this case). The personal characteristics' questionnaire consisted of two parts: A) demographic questions including the age of mother, age of spouse, level of education of mother and spouse, employment status of mother and spouse, income level, place of residence, ethnicity, spousal drug use; and B) midwifery questions including the number of

pregnancies, the number of abortions, contraceptive methods, whether the pregnancy was intended, prenatal care, prenatal care location, infant sex, the satisfaction of the infant sex.

The DRS was designed by Brehaut et al. This tool has 5 items on the 5-Likert scale (with the severity of -1 = strongly agree to -5 = strongly disagree), the minimum score of 0 and the maximum of 100. Increasing the score and approaching 100 is a sign of regret for the decision. The alpha coefficient of the tool was reported from 0.81 to 0.92 (33). The reliability of the Persian version of this tool was confirmed using internal consistency by Ghiaasvandian et al. in Tehran, with the Cronbach's alpha coefficient of 0.9 (34).

The BHS is a 20-item scale with three dimensions inviting 'true or false' responses. This questionnaire is designed for 17- to 80-year-old people, with scores ranging from 0 to 20, and higher scores indicating greater hopelessness (35). The severity of hopelessness is determined by the score obtained from the questionnaire. Minimum hopelessness score = 0-3, mild hopelessness score = 4-8, moderate hopelessness score = 9-14, severe hopelessness score = 15-20. In the original version of the scale, the reliability of the questionnaire was reportedly 0.69 after one week and 0.66 after six weeks using the test-retest method (35, 36). The reliability of this tool in Iran with Cronbach's alpha has been reported between 0.79 and 0.86 (37, 38). Reliability was assessed through internal consistency in this study. In assessing the internal consistency of the tool, the reliability of hopelessness and regret was confirmed with Cronbach's alpha equaling 0.72 and 0.89, respectively.

Sampling was conducted after obtaining ethical approval from the Ethics Committee of Iran University of Medical Sciences and receiving the code of ethics (IR.IUMS.REC.1398.135). Participants were introduced to the topic, research goals and invited to offer their informed written consent if eligible. Participants were also assured of the confidentiality of information.

The data were analysed using SPSS V.23 (SPSS). Following the assessment of skewness and kurtosis, the quantitative data were

considered to be normally distributed. Descriptive statistics, including frequencies and percentages, mean and SD, were used for describing personal characteristics variables, regret, and hopelessness scores.

One-way analysis of variance (one-way ANOVA) was used to compare quantitative variables between the three groups; (1) women who birthed vaginally, (2) women who birthed via emergency cesarean section and (3) women who birthed via elective cesarean section. Chi-squared test and Fisher's exact test were also used to compare qualitative variables between the three groups. Independent-sample T test was used to compare the regret score between groups 1 and 3 and one-way ANOVA was used to compare the hopelessness score between all three groups.

To compare the scores of regret and hopelessness (quantitative variables) among personal characteristics variables (categorical variables), an Independent-sample T test and one-way ANOVA were used. Pearson's correlation coefficient test was used to determine the relationship between the scores of regret and hopelessness with personal characteristics variables that were considered quantitative variables.

## Results

### Participants

All three study groups completed 300 hopelessness questionnaires. Those who experienced birth vaginally and via elective C-section completed 200 regret questionnaires. The mean age of mother and spouse in the three groups studied is shown in Table 1.

**Table 1.** Quantitative variables by three study groups and test results (n = 300)

Variables	Groups			P. value
	Mean $\pm$ SD			
	Vaginal birth	Emergency C-section	Elective C-section	
Mother's age	23.43 $\pm$ 4.20	24.59 $\pm$ 5.00	24.86 $\pm$ 4.26	P = 0.06
Spouse's age	26.68 $\pm$ 3.69	27.73 $\pm$ 4.41	28.45 $\pm$ 3.41	P = 0.005

**Table 2.** Frequency distribution of personal characteristics in the three study groups and test results (n = 300)

Variables	Groups			P-value
	Vaginal birth	Emergency C-section	Elective C-section	
	Frequency (%)	Frequency (%)	Frequency (%)	
<b>Mother's educational level</b>				
High school	41 (41)	37 (37)	41 (41)	P = 0.002
Diploma	22 (22)	32 (32)	24 (24)	
University level	37 (37)	31 (31)	35 (35)	
<b>Spouse's educational level</b>				
High school	31 (31)	34 (34)	14 (14)	P = 0.001
Diploma	30 (30)	40 (40)	45 (45)	
University level	39 (39)	26 (26)	41 (41)	
<b>Spouse's employment status</b>				
Non-employed	17 (17)	19 (19)	3 (3)	P = 0.01
Employed	23 (23)	28 (28)	36 (36)	
Self-employed	60 (60)	53 (53)	60 (60)	
<b>Income level</b>				
Undesirable	6 (6)	6 (6)	1 (1)	P = 0.001
Relatively desirable	31 (31)	26 (26)	6 (6)	
Desirable	63 (63)	68 (68)	93 (93)	
<b>Residential location</b>				
City	82 (82)	64 (64)	87 (87)	P < 0.001
Village	18 (18)	36 (36)	13 (13)	

Variables	Groups			P-value
	Vaginal birth	Emergency C-section	Elective C-section	
	Frequency (%)	Frequency (%)	Frequency (%)	
<b>Ethnicity</b>				
Fars	84 (84)	71 (71)	86 (86)	P = 0.02
Non-Fars	16 (16)	29 (29)	14 (14)	
<b>Insurance status</b>				
Does	89 (89)	94 (94)	98 (98)	P = 0.03
Does not	11 (11)	6 (6)	2 (2)	
<b>Newborn sex</b>				
Female	55 (55)	64 (64)	42 (42)	P = 0.007
Male	45 (45)	36 (36)	58 (58)	

**Table 3.** Mean score of regret and hopelessness and comparing them in the study groups

Variable	Mode of birth			P
	Vaginal birth (N =100)	Emergency C-section (N =100)	Elective C-section (N =100)	
Regret, Mean ± SD	29.70 ± 25.97	_*	43.20 ± 15.88	P = 0.001
Hopelessness, Mean ± SD	4.60 ± 3.02	4.78 ± 2.92	4.52 ± 1.94	P = 0.2

\* Measuring regret following emergency cesarean section was not applicable

Among individual characteristics, there was only a statistically significant relationship between the place of residence and the regret score in primiparous women following vaginal birth, which was significantly higher in urban residents than rural residents. Also, there was no statistically significant relationship between these variables and regret scores in those who experienced elective C-sections. Overall, there was no significant relationship between individual characteristics and hopelessness scores in the three groups.

## Discussion

The aim of the present study was to compare regret and hopelessness among the Iranian primiparous women following vaginal birth and birth via cesarean section. Those who experienced birth via elective C-section scored higher with regards to regret. There were no significant differences between the three groups in the mean scores of hopelessness.

The results of a study by Edwards et al. (2019) are congruent with results presented here as scores in relation to the regret of women with previous anal sphincter injury who chose

to birth vaginally in subsequent pregnancies were similarly lower (39). Such lower levels of regret may be due to the fact that births took

place in a teaching hospital, in the presence of midwifery students and residents (40, 41). Women's experience of C-section in a study by Burcher et al. (2016) indicated poor communication, fear of the surgery room, mistrust of the medical team and loss of control caused dissatisfaction and regret in these women (18). In the present study, only 13% chose to re-elect to birth via C-section. While, in a study by Chong and Mongelli (2003), only 6.1% of the participants agreed to re-elect to birth via C-section in a subsequent pregnancy (42). Similarly, in another study, 6 months after birth via C-section, 41% of participants chose to birth vaginally in their next pregnancy whilst only 23% chose to re-elect to birth via C-section (43).

Many individuals who experience one C-section wrongly assume that they can no longer choose to birth vaginally (44). In a study by Keedle et al. (2019), most Australian women who birthed via elective C-section in their first pregnancy and then chose to birth vaginally in subsequent pregnancies regretted their previous choice of C-section (45). Therefore, education could usefully inform people in relation to their subsequent birth choices and avoid such regret in better informing birth preferences in future.



Feelings of hopelessness and ways of coping with stress in women can differ after poor obstetric outcomes such as a preterm birth (46). The results of a study by Deliktas et al. (2018) also showed that in women who were eager to birth vaginally, interventions such as oxytocin, episiotomy, and continuous monitoring of the fetus were mildly disappointing (47). Yet the results of a study by Kjerulf and Brubaker (2017) showed that 4.5% of women who birthed vaginally and spontaneously had a minimum level of hopelessness (17), while 41.4% of the individuals who birthed vaginally had a low level of hopelessness. This amount of hopelessness in women can be due to reasons such as feelings of danger, stress, fear, and anxiety from the hospital, interventions during birth, abdominal pressure on the uterus, and multiple examinations by midwifery students and residents for educational purposes (41). In future it will be important to ensure that when women chose to birth vaginally in future that any interventions remain minimal, whilst avoiding those which are unnecessary.

Elsewhere, 9% of women who birthed via elective C-section had low levels of hopelessness (17). In the present study, however, 36% of the participants reported feeling hopeless. Some women who choose to birth via C-section expect to have better outcomes for themselves and their babies (48). Yet the results of a study by Kjerulff and Brubaker (2017) showed that 22.5% of women who birthed via emergency C-section were feeling hopeless (17). In the present study, 33% of the participants in this group were the least hopeless. In future, it will be important to recognize that women's view of birth via emergency C-section will be individualised and can differ from that of treatment personnel (49, 50).

Similar to the results of the present study, no statistically significant difference was found in hopelessness scores in a study conducted elsewhere (21). Yet contrary to this, the results of the study by Kjerulff and Brubaker (2017) showed that hopelessness scores were higher in women who experienced unplanned C-section ( $P < 0.001$ ) (17). In the Kjerulff's study, the outcome score of hopelessness was assessed during 1, 6, 12, 18, 24, 30, and 36 months postpartum (17), whereas in the present study,

the assessment was performed at 8 weeks postpartum, where the individuals' behavioral changes in each time zone can be different. Only the residential place had a significant relationship with regret scores in the study of the relationship between individual characteristics and regret scores in primiparous women. This average was significantly higher in urban than in rural areas. This is significant as urbanization is one of the prominent examples of social factors affecting women's birth (51). For example, people in rural areas have less access to health care and suffer from more poverty, lower incomes, and less insurance coverage (52). In future it will be important to consider this in the delivery of future interventions.

Our results revealed no statistically significant relationship between the characteristics evaluated in the present study with hopelessness scores in the groups of women who birthed vaginally, via emergency cesarean, and via elective cesarean section. Likewise, in a study by Kjerulff and Brubaker (2017), there was no significant relationship identified between maternal age, education, ethnicity, income, and insurance status and hopelessness scores in these three groups (17). The results of our study also demonstrate that for women who birth via elective C-section, the individual characteristics studied did not have a statistically significant relationship with the regret score. Similarly, in a study by Burcher et al. (2016), there was also no statistically significant relationship between the individual characteristics including maternal age and ethnicity with C-section regret (18). Yet in a study by Edwards et al. (2019), there was a statistically significant relationship between the age of participants and the regret score in those who birthed vaginally (39). This discrepancy may be due to the difference in the mean age in the two studies. Also, adolescents tend to birth vaginally while older adults tend more to birth via C-section (53, 54). Overall, our results present important insights in relation to hopelessness and regret in the context of birth choices and the importance of education and further exploration in this area.

This study is one of the rare studies that quantitatively examine the psychological effects

of childbirth. The study was carried out cross-sectionally, yet our sample met a quota that could lead to biases. A prospective study is recommended to include women who are selected during their pregnancy whereby after vaginal birth or birth via cesarean section feelings and frustrations about the decision made are measured over the 8 weeks following birth. It is also recommended that in future studies, other studies with similar objectives in other cities of Iran with different cultures and ethnicities be conducted on a population-based basis using probabilistic sampling methods. In this study, only frustration and regret were measured. Other measurements, such as those in relation to depression and anxiety were not considered, and their association with the mode of birth could usefully be examined in future studies. It is suggested that future studies also address the causes of women's regret over elective cesarean section using a qualitative approach.

### Conclusion

Given the high level of regret score in those who birthed via elective C-section in this study and the fact that C-section is an emergency intervention used to save the mother and baby, future avoidance of unnecessary C-sections would seemingly be preferable. Prenatal education may be useful in this task, as women require evidenced-based information when choosing how to birth their babies. Further research is required to ascertain how such decision making can be facilitated to reduce feelings of regret.

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### Conflicts of interest

Authors declared no conflicts of interest.

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