

# Influencing Factors and Rules of Behavioral Intention of Cesarean Section in Late Pregnancy

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## Abstract

**Objective:** To explore the psychological and sociological factors that affect women's behavioural intention of cesarean section in late pregnancy, so as to provide theoretical basis for guiding the opinion orientation of key groups, encouraging pregnant women to adopt natural delivery and reducing the rate of cesarean section.

**Methods:** Based on a longitudinal observational study of women's intention to cesarean section during pregnancy in Chongqing, China, multiple logistic regression was used to explore the influencing factors of women's selective cesarean section.

**Result:** The results showed that 4.64% of pregnant women had selective cesarean section. The occupation of pregnant women, exercise in late pregnancy, delivery mode of surrounding parturients, and suggestion of husband/parents/friends were significantly affected the women's choice of mode of delivery. The results of multivariate analysis showed that cesarean section suggested by friends (OR=37.172), elderly parturient aged 30-35 (OR=6.285), and the gestation-parturition history (OR=3.462) were the risky factors associated with the increase of selective cesarean section.

**Conclusion:** Pregnant women's childbirth related knowledge level, family and friends' suggestions affect pregnant women's choice of childbirth mode. Therefore, it is necessary to improve pregnant women's and their family and friends' childbirth related knowledge level, make more scientific suggestions for pregnant women's choice of childbirth mode, at the same time, strengthen women's attention to the golden age of childbirth.

**Keywords:** Behavioral intention; Cesarean section; Delivery mode; Opinion orientation; Influencing factors

## Introduction

Cesarean section is an effective method to solve the obstetric dangerous symptoms such as dystocia and malposition, which is also a powerful means to save the lives of both perinatal and newborn [1]. According to the survey conducted in Asia by WHO in 2010, the cesarean section rate in China was 46.2%, ranking first in Asia, which was far higher than 10%-15% advocated by World Health Organization [2], and the cesarean section rate has also far exceeded the range of simple medical indications. With a lack knowledge of delivery, many pregnant women blindly believe that cesarean section is the best way to ensure the safety of mother and baby [3,4]. Moreover, previous studies also found that cesarean section had a negative impact on the second delivery of pregnant women, that the second pregnancy was prone to experience the adverse consequences of uterine rupture, high incidence of placenta previa in mothers, and neonatal dyspnea and low resistance in newborns [5]. Therefore, the choice of delivery mode has a significant impact on the delivery outcome [6].

In recent years, more and more attention has been paid to natural delivery and prenatal health education, but the health education

was limited only in the hospital, which means little in promoting the whole society to correctly understand natural delivery through vagina. In addition, pregnant women's choice of delivery mode is easily affected by many external factors among them social factors are the main factors affecting the high rate of cesarean section [7-11]. In addition, with the increase of gestational age, the mental health status of pregnant women, the level of knowledge related to delivery, exercise during pregnancy, and their own physical fitness have also been changed. So gestational period is an important factor affecting the behavioural intention of cesarean section of pregnant women. Therefore, it is of great significance to explore the factors that affect the choice of delivery mode of cesarean section in different gestational periods, in order to reduce the rate of cesarean section with non-medical indications and guide pregnant women with natural delivery conditions to choose vaginal delivery [12].

## Materials and Methods

### Study procedures

The data of our study were collected from "Study on the Public

Opinion Propagation Model for Generative Mechanism and Regularity of Cesarean Delivery Behavior”, which was initiated by the National Natural Science Foundation of China (Project No.: 71573027). The study has been approved by Ethics Committee of Chongqing Medical University and conducted in Chongqing, a provincial city in China. Participants were recruited from four regions with different economic conditions in Chongqing (Yubei district, Jiangjin district, Dianjiang district and Yunyang district). After entering the group, the nurses of Maternal and Child Health Station who have received unified training were responsible for carrying out questionnaire survey and follow-up records. According to the inclusion exclusion criteria, pregnant women who built cards in the local maternal and child health station during March 1, 2018 to January 31, 2019 and had regular prenatal examination were followed up for cesarean section intention. Finally, 517 pregnant women were included in this study and subjects who chose caesarean section for medical reasons were not included.

**Inclusion criteria:** (a) Women with singleton pregnancy; (b) Willingness to sign the informed consent and obey the follow-up arrangement under the guidance.

**Exclusion criteria:** (a) Women with multiple pregnancy; (b) Women with histories of cesarean section; (c) Women with health problems, such as mental illness; (d) Refuse to sign informed consent.

### Study contents

According to the gestational period of pregnant women, the questionnaire survey is divided into six surveys: first birth examination, early pregnancy, mid pregnancy, late pregnancy, postpartum and delivery records. The data of this manuscript comes from the survey of late pregnancy. The questionnaire includes social demographic characteristics such as age, residence, educational level, working status during pregnancy and monthly per capita household income; general personal condition of pregnant women; prenatal basic information including gestation-parturition history, Body Mass Index (BMI) before pregnancy; Whether to exercise in the late pregnancy, suggestions of family and friends on delivery mode, knowledge level of delivery, pregnant women's independence, family care, social support, mental health status, choice intention of pregnant women's personal delivery mode, delivery mode of surrounding parturients, etc.

### Study measurements

Measurements description: (1) Prenatal stress of pregnant women was assessed by Pregnancy Pressure Scale (PPS), compiled by Zhanghui ZJ, et al. [13]. The scale has been widely applied to related studies in Chinese pregnant women and showed favorable reliability and validity [14], an average score of  $>0$  was considered stressful. (2) Prenatal anxiety of pregnant women was measured by Hamilton Anxiety Scale (HAMA), which has been widely used in Chinese pregnant women. A total score  $>14$  was considered to be anxiety. (3) The Self-Rating Depression Scale (SDS) was used to evaluate the prenatal depression of pregnant women, when the index was  $\geq 0.5$ , it was considered to have depression symptoms. (4) Family care was assessed by the family adaptation partnership growth affection and resolve index (APGAR) used in Chinese pregnant women and proven to be valid and reliable [15,16]. Higher scores indicate better family care, with 0-3 for a low level, 4-6 for a moderate level, and 7- 10 for a high level. (5) Social support was evaluated by Social Support Rating Scale (SSRS) compiled by Xiao Shuiyuan in 1986. Scores below 35 indicate low level, 35-45 indicate medium level, and above 45 indicates high level, and the higher the score, the more social support.

### Statistical analysis

The database was established by the EpiData 3.1 software (EpiData Associations, Odense, Denmark), and real-time double entry and logical verification of the data were carried out. Statistical analysis was performed by the SAS 9.4 software (SAS Institute, Cary, NC, USA). Univariate analysis was performed by the  $\chi^2$  test, and logistic regression model was used in multivariate analysis, with  $p < 0.05$  was considered statistically significant.

### Results

#### Subjects' characteristics

A total of 517 subjects were included in this study. In the late pregnancy, the pregnant women's selective intention of cesarean section accounted for 24 (4.64%), natural delivery for 280 (54.16%), and not yet considered for 213 (41.20%). The mean age of pregnant women was  $(25.67 \pm 4.25)$  years, and the mean BMI before pregnancy was  $(21.10 \pm 2.68)$ . 33.27% of the pregnant women surveyed had junior high school education or below, 28.43% had senior high school education, and 38.39% had college education or above.

#### Expected delivery mode of pregnant women during pregnancy

In this study, the proportion of selective cesarean section in late follow-up visit was 4.64% (Table 1). There was no significant difference in the incidence of cesarean section as an expected mode of delivery between age, nationality, Residence, educational level, monthly per capita household income, payment mode of medical expenses, number of prenatal education in pregnancy, care of doctors and nurses, independence of pregnant women, family care, prenatal stress, prenatal anxiety, social support, BMI, and gestation-parturition history ( $P > 0.05$ ). However, in the univariate analysis, significant differences in the choice of expected delivery mode in the late stage of pregnancy were whether to exercise in late pregnancy, delivery mode of surrounding parturients, delivery mode suggested by husband, parents and friends ( $P < 0.05$ ).

#### Multivariate logistic regression analysis

The stepwise regression method was used for variables screening, with each variable visited in each period as the independent variables, whether to choose cesarean section as the dependent variable, and the categorical variable was assigned a dummy variable (Table 2). In the late follow-up visit, there were four variables in the model, which were occupation, delivery mode suggested by friends, age and gestation-parturition history. Freelance and unemployment status would increase the risk that pregnant women choose cesarean section as their delivery mode. Compared with no suggestion, cesarean section suggested by friends would increase the risk of pregnant women choosing cesarean section as the delivery mode (OR=37.172, 95% CI: 6.986-197.797). Moreover, younger women with a maternal age  $< 20$ , and older women with age of 30-35 years were inflation factors relative to women's normal reproductive age of 20-29, and the risk of choosing a cesarean section as the delivery mode were 3.098 and 6.285 times than the normal age group respectively. Besides, pregnant women with a gestation-parturition history were more likely to choose cesarean section as the delivery method compared to those without births.

### Discussion

Cesarean section with non-medical indications has a serious impact on the health of mothers and newborns, and controlling the rate of cesarean section with non-medical indications can effectively

**Table 1:** Sample characteristics of pregnant women and univariate analysis.

Characteristics	Natural delivery/Not sure	Cesarean Section	p-Value
	N(%)	N(%)	
<b>Age</b>			0.0733*
<20	11(2.13)	2(0.39)	
20-29	403(77.95)	16(3.09)	
30-35	63(12.19)	6(1.16)	
>35	16(3.09)	0(0)	
<b>Nationality</b>			0.4204*
Han nationality	480(92.84)	24(4.64)	
Minority nationality	13(2.51)	0(0)	
<b>Residence</b>			0.5666
Urban	296(57.25)	13(2.51)	
Rural	197(38.1)	11(2.13)	
<b>Educational level</b>			0.8852
Junior high school or below	163(31.53)	9(1.74)	
Senior high school	141(27.27)	6(1.16)	
College education or above	189(36.56)	9(1.74)	
<b>Working status during pregnancy</b>			0.0069
Employment	145(28.05)	3(0.58)	
Freelance	85(16.44)	10(1.93)	
Housewife/Unemployment	263(50.87)	11(2.13)	
<b>Monthly per capita household income</b>			0.9067
≤ 3000RMB	127(24.56)	7(1.35)	
3000-5000RMB	215(41.59)	9(1.74)	
5000-10000RMB	123(23.79)	7(1.35)	
>10000RMB	28(5.42)	1(0.19)	
<b>Payment mode of medical expenses</b>			0.1395*
At their own expense	184(35.59)	14(2.72)	
Urban medical insurance	304(58.8)	10(1.95)	
Rural cooperative medical insurance	2(0.39)	0(0)	
<b>Whether to exercise in late pregnancy</b>			0.0343
Yes	347(67.12)	12(2.32)	
No	146(28.24)	12(2.32)	
<b>Number of prenatal education in pregnancy</b>			0.9788
0	277(53.58)	14(2.72)	
5-Jan	173(33.46)	8(1.55)	
>5	43(8.32)	2(0.39)	
<b>Medical Staff Service</b>			0.4938
Great	343(66.34)	15(2.90)	
Moderate	115(22.24)	8(1.55)	
Low	35(6.77)	1(0.19)	
<b>Delivery mode of surrounding parturients</b>			0.0034

Natural delivery mainly	227(43.91)	5(0.97)	
Cesarean section mainly	59(11.41)	8(1.55)	
The two delivery methods are equal	207(40.04)	11(2.13)	
<b>Delivery mode suggested by husband</b>			0.0009*
No Suggestion	107(20.7)	4(0.77)	
Natural Delivery	211(40.81)	7(1.35)	
Cesarean Section	12(2.32)	4(0.77)	
No Specific Suggestion	163(31.53)	9(1.74)	
<b>Delivery mode suggested by parents</b>			0.0006
No Suggestion	84(16.25)	5(0.97)	
Natural Delivery	270(52.22)	7(1.35)	
Cesarean Section	7(1.35)	4(0.77)	
No Specific Suggestion	132(25.53)	8(1.55)	
<b>Delivery mode suggested by parents in law</b>			0.0719*
No Suggestion	99(19.15)	4(0.77)	
Natural Delivery	224(43.33)	8(1.55)	
Cesarean Section	6(1.16)	2(0.39)	
No Specific Suggestion	164(31.72)	10(1.93)	
<b>Delivery mode suggested by friends</b>			<0.0001*
No Suggestion	98(18.96)	4(0.77)	
Natural Delivery	210(40.62)	4(0.77)	
Cesarean Section	7(1.35)	8(1.55)	
No Specific Suggestion	178(34.43)	8(1.55)	
<b>Independence of pregnant women</b>			0.6889*
Group-Oriented	18(3.48)	1(0.19)	
Intermediate State	470(90.91)	23(4.45)	
Self-Sufficient	5(0.97)	0(0)	
<b>Knowledge level of delivery</b>			0.1310
Low	95(18.38)	6(1.16)	
Moderate	266(51.45)	16(3.09)	
High	132(25.53)	2(0.39)	
<b>Family care</b>			0.8617
Severe family dysfunction	14(2.71)	1(0.19)	
Moderate family dysfunction	108(20.89)	6(1.16)	
Family functioning well	371(71.76)	17(3.29)	
<b>Prenatal stress</b>			0.4745*
No	58(11.22)	1(0.19)	
Slight	393(76.02)	20(3.87)	
Moderate	41(7.93)	3(0.58)	
Severe	1(0.19)	0(0)	
<b>Prenatal anxiety</b>			0.2286
No	347(67.12)	14(2.72)	
Moderate	136(26.31)	9(1.74)	
Severe	10(1.93)	1(0.19)	

<b>Prenatal depression</b>			<b>0.5567*</b>
No	486(94)	24(4.64)	
Yes	7(1.35)	0(0)	
<b>Social support</b>			<b>0.9385</b>
Low	106(20.5)	5(0.97)	
Moderate	292(56.48)	15(2.90)	
High	95(18.38)	4(0.77)	
<b>BMI</b>			<b>0.5722*</b>
Thin	80(15.47)	6(1.16)	
Normal	350(67.7)	17(3.29)	
Overweight	52(10.06)	1(0.19)	
Obese	11(2.13)	0(0)	
<b>Gestation-parturition history</b>			<b>0.1168</b>
No	336(64.99)	20(3.87)	
Yes	157(30.37)	4(0.77)	

\*Fisher's exact probability test

Bold values indicate statistical significance at  $P < 0.05$ .

**Table 2:** Multivariate logistic regression analysis.

Characteristics	$\beta$	Wald	P-Value	OR (95% CI)
<b>Working status during pregnancy</b>				
Employment				Reference
Freelance	1.4287	3.7576	0.0526	4.173(0.984-17.694)
Housewife/Unemployment	0.5463	0.5702	0.4502	1.727(0.418-7.129)
<b>Delivery mode suggested by friends</b>				
No Suggestion				Reference
Natural Delivery	-0.6237	0.7062	0.4007	0.536 (0.125-2.296)
Cesarean Section	3.6155	17.9693	<0.0001	37.172(6.986-197.797)
No Specific Suggestion	0.3351	0.2475	0.6189	1.398(0.373-5.235)
<b>Age</b>				
<20	1.1.307	1.3429	0.2465	3.098(0.458-20.968)
20-29				Reference
30-35	1.8381	7.9015	0.0049	6.285(1.745-22.641)
<b>Gestation-parturition history</b>				
No				Reference
Yes	1.242	3.4176	0.0645	3.462(0.928-12.919)

reduce the rate of cesarean section [17-19]. The selective intention of cesarean section in pregnancy excluded medical indications factors such as large baby size and dystocia, which were mainly affected by social factors [20].

### Personal factors

The selective intention of pregnant women's delivery mode is affected by multiple factors including physiology and psychology conditions. This study showed that the occupational status of pregnant women would affect the selective intention of cesarean section, and the unemployed or freelance would increase the risk of selective cesarean section. In addition, the lower the pregnant women's

knowledge of delivery, the higher the risk of their selective intention to cesarean section. Many pregnant women blindly think that cesarean section is the safest mode of delivery, resulting in selective cesarean section. Therefore, delivery knowledge education for pregnant women can effectively reduce the rate of selective cesarean section. Moreover, no exercise in the late pregnancy could also increase the risk of selective cesarean section, because over weight would cause a huge newborn [21]. Thus pregnant women would worry about the risk of natural delivery, and the prenatal depression would also increase the probability of selective cesarean section. The early and middle pregnancies are the golden period for fetal development, while depression in pregnant women would not only affects fetal

development, but also affects the belief for natural delivery. Moreover, negative emotions can amplify the pain of natural delivery and the negative effects of vaginal relaxation. Therefore, encouraging and caring about changes in the mental state of women during pregnancy could guide women with natural delivery conditions to choose natural delivery. The research results also indicated that too young or too old would increase the risk of pregnant women choosing cesarean section as a delivery mode, due to younger or older pregnant women will worry about whether their physical conditions are suitable for natural delivery. So encouraging pregnant women to give birth at an appropriate age can effectively reduce selective cesarean delivery. Besides, our research found that pregnant women with a reproductive history were more likely to choose cesarean section. However, with the "second child" policy in China, many families choose to reproduce one, but due to the increase in pregnant women's advanced age and many other pregnancy complications, the selective cesarean section rate of postpartum women has increased [22].

### Social factors

Previous studies have shown that the rate of cesarean section in China was as high as 46.2%. Among them, selective cesarean section with non-medical indications accounted for 11.7%, becoming the highest in the world [23]. This study revealed that delivery mode suggested by family and friends were important factors affecting pregnant women's selective intention of cesarean section. Because many pregnant women lack childbirth experience, their choice of delivery mode would be more based on suggestions from family and friends, calling as "an experienced hand", with a one-sided understanding of delivery they usually blindly believe that cesarean section is a safe and reliable method, but do not know the adverse effects and consequences of cesarean section. Moreover, in mainland China, most of the elders believe in some traditional superstitions. They choose cesarean section in order to let the newborn be born on the auspicious day they believe, and some hold the view that cesarean section is conducive for the recovery of the pregnant woman's body and will not affect the sexual life of the couple. In addition, pregnant women's friends and family's description of the pain of natural delivery may reduce the confidence of them in natural delivery, just because they are afraid of pain and choose cesarean section as the delivery mode early. Therefore, relevant health institutions should carry out health education on delivery mode for pregnant women to let them know the basic process and precautions of different delivery modes, so as to improve their cognitive level of delivery knowledge. In addition, much attention should be paid to their family and friends' knowledge of delivery to eliminate the misunderstanding of delivery knowledge, and appropriately guide and control their suggestions, which can effectively reduce the selective intention of cesarean section with non-medical indications.

### Gestation period

Studies have shown that the weight and psychological status of pregnant women change with pregnancy, and prenatal screening and psychological intervention can reduce the prenatal depression of pregnant women [24]. The psychological state of pregnant women in the late pregnancy may decrease their fear of delivery, if constructive psychological intervention and family care have been taken, so cesarean section will not be chosen. Besides, our research also indicated that the age and gestation-parturition history of pregnant women in the late pregnancy were the important factors that affect their selective intention of cesarean section. With the change of pregnancy week, pregnant women may have a higher knowledge level of delivery. It is the objective conditions that affect pregnant women's choice of

cesarean section in late pregnancy period, the physical condition of pregnant women can't support a natural delivery. Therefore, it can be seen that the selective intention of cesarean section of pregnant women in late pregnancy is significantly affected by the medical indications of cesarean section.

### Limitations

This study has some limitations. We did not examine the experience of the "previous" vaginal delivery. Previous bad experience during vaginal delivery may increase the choice of cesarean section, whereas previous good experience will inevitably reduce it. We did not examine this effect in this study.

### Conflict of interest

None

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