



# Selection of Delivery Method and Its Related Factors in Pregnant Women of Shiraz in 2016

Seyyed Taghi Heydari<sup>1</sup>, Yaser Sarikhani<sup>2</sup>, Nasrin Asadi<sup>3</sup>, Maryam Kazemi<sup>1,\*</sup>, Ahmad Kalateh Sadati<sup>4</sup>, Shaghayagh Zarei<sup>1</sup>, Zeynab Mansuri<sup>1</sup>, Fatemeh Keshvarz<sup>1</sup>, Reyhane Jabbari<sup>1</sup>, Arezoo Mohtashami<sup>1</sup> and Kamran Bagheri Lankarani<sup>1</sup>

<sup>1</sup>Institute of Health, Health Policy Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

<sup>2</sup>Student Research Committee, Shiraz University of Medical Sciences, Shiraz, Iran

<sup>3</sup>Department of Obstetrics and Gynecology, Oncology Division, Shiraz University of Medical Sciences, Shiraz, Iran

<sup>4</sup>Department of Sociology, Yazd University, Yazd, Iran

\*Corresponding author: Institute of Health, Health Policy Research Center, Medical School, Shiraz University of Medical Sciences, 8th floor, Number 2 building, Imam Hossein Sq., Zand St., Shiraz, Iran. Tel: +98-7134845794, Email: maryamkazemi78@gmail.com

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## Abstract

**Background:** Decisions on the choice of delivery method are influenced by various factors such as family and social aspects, medical advice, previous delivery experience, and current pregnancy conditions.

**Objectives:** The present study aimed to determine the frequency of delivery methods and their related factors in pregnant women in Shiraz.

**Methods:** This cross-sectional descriptive study was conducted on 3940 pregnant women in Shiraz in 2016. All public hospitals with maternal care units in Shiraz were selected. Stratified sampling method, proportionate to the sample size, was used so that the number of registered pregnant women, during the year before the study, was determined for each center and the subjects were selected by convenience sampling. Data were collected through a checklist and was analyzed performing One-way ANOVA and chi-square test with SPSS 20 at the significance level of 0.05.

**Results:** The mean age of the pregnant women participating in the study was  $29 \pm 5.7$  years. A total of 2003 pregnant women (50.8%) decided to give birth through cesarean section (C-section), 1849 (46.9%) through standard vaginal delivery, and 68 (1.7%) in water. The most prevalent reasons cited by pregnant women were fewer complications in NVD, fewer maternal and obstetric problems in C-section, and comfort of delivery in water. The age of women requesting C-section was significantly higher than those selecting NVD and delivery in water ( $P < 0.001$ ). The prevalence of elective C-section was substantially higher in urban residents and women with higher education levels ( $P < 0.001$ ). Physicians' recommendation was mentioned as the most important reason for elective C-section by pregnant women (70.6%). Multivariable logistic regression showed that the fathers high school education, the age of mother, and living in a suburban area had a significant effect on choosing C/S as a method of delivery by pregnant women.

**Conclusions:** Great inclination of pregnant women and physicians' recommendation for elective C-section are the problems faced by the healthcare system. It can be minimized by planning and making effective interventions and through changing the attitude and culture of the community and increasing knowledge about the complications of C-section.

**Keywords:** Delivery Method, Pregnant Women, Normal Vaginal Delivery, C-Section, Delivery in Water, Iran

## 1. Background

Normal vaginal delivery (NVD) is a spontaneous process with no intervention required. With the advent of science and technology over previous decades, it has become possible to help a mother or fetus through surgery in cases where their life is in danger. Unfortunately, after some time, these methods, which were meant to be used only in emergencies, have become a way to escape labor pain (1, 2). Nowadays, in many communities nowadays C-

section has become a culture and more than half of women choose elective C-section (3).

Although, in medical texts and public opinion, the mother's request is considered as one of her fundamental rights (due to the patients, right everybody can select the method of treatment) the choice of C-section is a controversial issue (4). Some people think that pregnant women should have the right to choose a C-section, and the procedure should not only be subject to specific clin-

ical conditions. In contrast, others believe that elective C-section contravenes ethical and medical principles (5). It seems that freedom of action in such a major surgery can be considered justifiable due to the fact that the number of complications such as bleeding, infection, atelectasis, thromboembolism, and maternal and neonatal mortality is larger in unnecessary C-section than NVD (6).

Increasing in the rate of elective C-sections and reducing in normal delivery in pregnant women indicate the inappropriate performance of the healthcare system, because the prevalence of a normal delivery and C-section in a country is an indicator for assessing the performance of maternal health programs (7). However, it is still unclear why the normal birth rate has fallen today compared to the past, and what the main reasons for the increasing the rate of C-section are (8).

According to the WHO, a C-section should not exceed 15% of all births per year (9). In a study of 150 countries, there was an increase in the rate of C-section from 1990 to 2014, with the highest rate in Latin American followed by Asia. The highest C-section rate was observed in Latin America as well as the Caribbean countries (40.5%) and the lowest in Africa (7.3%). The C-section rate reported in Asian countries was 19.2% (10). The prevalence of C/S in Iran was 48% in 2014 (9).

The selection of delivery method is not easy for many women, and it may be affected by many factors (11), including family and social factors, medical advice, previous delivery experience, and current pregnancy conditions (12).

In many cases, ignorance, false beliefs, and wrong behaviors and attitudes determine delivery methods instead of medical indications (13). Research shows that two categories of factors related to mothers and physicians are effective in choosing the delivery type. False beliefs regarding the health of the fetus and the mother, fear of NVD and anatomic problems in the vaginal area, and ignorance of surgical complications are mainly pointed out as the reasons for pregnant women's inclination and request for C-sections. Accordingly, elective C-sections should be based on sufficient and comprehensive information (14).

Therefore, it is necessary to identify and evaluate the factors involved in choosing the delivery type and then prioritize them to introduce and implement useful strategies.

## 2. Objectives

In this regard, the present study aimed to determine delivery types and their related factors in pregnant women in Shiraz.

## 3. Methods

In this cross-sectional descriptive study, 3940 pregnant women in Shiraz were selected from all public hospitals which were affiliated to Shiraz University of Medical Sciences with maternal care units in Shiraz, Iran. Five hospitals (Zeinabieh, Hafez, Shoushtari, Kosar, and Mother and Child) were selected for the research. Convenience method was used for sampling. According to the number of registered pregnant women in the year before the study, subjects were chosen from each center. A total of 32% of pregnant women were chosen from Zeinabieh Hospital, 30% from Hafez Hospital, 16% from Shooshtari, 10% from Kosar, and 5% from Mother and Child Hospital. Pregnant women who did not have the desire to participate in the study were excluded.

In order to collect information, the interviewers, all midwives, were first trained on how to complete the checklists, and then visited the target centers and performed the sampling based on the mentioned method.

The objectives of study were first explained to the participants and written consent for participation in the study was received from them. A checklist was then filled out. It contained demographic characteristics (including the exact age calculated based on the difference of birth date and interview date, marriage age, education levels of the couples, pregnant women's occupations, and place of residence). After that, the participants were asked some questions regarding the number of pregnancies, abortions and children, history of multiple pregnancies, gestational age, previous delivery types, selected delivery method for the current pregnancy, and the factors affecting the delivery type.

Data were analyzed by using SPSS-20. Frequencies and percentages were employed to describe qualitative data and Means and Standard Deviations to describe the quantitative data. Chi-square test was used to compare the choice of delivery type according to the occupation and education of the couples as well as place of residence. One way ANOVA was also employed to compare the choice of delivery type by each subject according to her current age and her age at the first pregnancy. Logistic regression analysis was used for multivariable analysis. All variables, which were significant in univariate analysis, were used in the model as an independent variable. In addition, the type of delivery (C/S or NVD) was known as a dependent variable. The significance level was considered less than 0.05.

#### 4. Results

The mean age of the subjects was  $29 \pm 5.7$  years (age range of 14.7- 49.2 years), and the mean age of primiparous women was  $25.8 \pm 5.2$  years (age range of 14.7 - 48.4 years). A total of 2576 women (65.6%) and 2679 spouses (68.3%) had secondary school and lower education levels. The majority of women ( $n = 3382$ , 85.8%) were housewives; however, only 30 spouses (0.8%) were unemployed. A total of 2716 participants (68.9%) were urban residents, 1355 (33.9%) were primiparous, 1062 (27%) had a history of at least one abortion (Table 1), 1325 (33.6%) had a C-section at least one time, 1172 (29.7%) had a NVD at least once, and 5 (0.1%) had a history of previous delivery in water as a subtype of NVD.

In all, 2003 subjects (50.8%) chose a C-section, 1849 (46.9%) NVD, and 68 (1.7%) delivery in water. The most prevalent reasons cited by the pregnant women in selecting delivery type were fewer complications of NVD, maternal and obstetric problems for selection of C-section, and comfort of delivery in water. The reasons for choosing the delivery type are listed separately in Table 2.

A total of 633 (16.1%) of the pregnant women were inclined to choose elective C-section without indication for this surgery, and 1370 of participants who decided on a C-section (68.4 %) had justifiable reasons. Among the subjects who decided to have an elective C-section without indication, 447 (70.6%) did so based on their physician's advice.

The age of who would choose a C-section for delivery was significantly higher than those who selected NVD or delivery in water ( $P < 0.001$ ), and the age of NVD requester was higher than that of the delivery in water requesters ( $P = 0.02$ ). The selection any type of delivery had no significant correlation with the age of marriage ( $P = 0.7$ ).

Choosing the type of delivery was correlated to education levels of the couples. The highest number of NVD requests were observed among illiterate couples ( $P < 0.001$ ). Higher levels of the couples' education were associated with significantly increased desire for elective C-section without medical indication ( $P < 0.001$ ).

The occupation of couples did not affect the selection of delivery method ( $P = 0.3$  for pregnant women and  $P = 0.1$  for their spouses).

Urban or rural residency influenced the choice of delivery type: those who lived in the outskirts of the cities were more inclined to have a C-section ( $P = 0.02$ ). The prevalence of elective C-section without medical complication was significantly higher among urban residents ( $P < 0.001$ ) (Table 3).

Multivariable logistic regression showed that a fathers

**Table 1.** Frequency of Demographic Characteristics of Pregnant Women Who Are Referred to Maternity Care Units of Shiraz Public Hospitals in 2016<sup>a</sup>

Variables	Value
<b>Age of mother</b>	$29 \pm 5.7$
<b>Number of children</b>	$1 \pm 0.9$
<b>Education of mother</b>	70 (1.8)
Illiterate	360 (9.1)
Elementary	640 (16.2)
Secondary	1506 (38.2)
High school	403 (10.2)
Associate degree	811 (20.6)
Bachelor degree	134 (3.4)
Master/PhD degree	70 (1.8)
<b>Education of husband</b>	
Illiterate	57 (1.4)
Elementary	297 (7.5)
Secondary	839 (21.3)
High school	1486 (37.7)
Associate degree	360 (9.1)
Bachelor degree	678 (17.2)
Master/PhD degree	207 (5.2)
<b>Mother job</b>	
Home keeper	3382 (85.8)
Clerical job	176 (4.5)
Health worker	94 (2.4)
School teacher	97 (2.5)
University teacher	12 (0.3)
University student	31 (0.8)
Other	148 (3.7)
<b>Husband job</b>	
Business	1756 (44.6)
Clerical job	529 (13.4)
Engineer	60 (1.5)
School teacher	90 (2.3)
University teacher	29 (0.8)
Hand worker	385 (9.8)
Military officer	108 (2.8)
Unemployed	30 (0.8)
Other	953 (24)
<b>Number of pregnancies</b>	$2.1 \pm 1.1$
<b>Number of abortion</b>	$0.5 \pm 1.1$
<b>Age of marriage</b>	$21.5 \pm 4.6$
<b>Age of first pregnancy</b>	$23.6 \pm 4.8$

<sup>a</sup>Values are expressed as mean  $\pm$  SD or No. (%).

high school education (OR = 1.5, 95% CI: 1.2 - 2 ), age of mother (OR = 3.2, 95% CI: 2.6 - 3.9 ), and living in a suburban area (OR = 1.3, 95% CI: 1.08 - 1.5 ) had a significant effect on choosing C/S as a method of delivery in pregnant women (Table 4).

**Table 2.** Frequency of Reasons for Delivery Method Selection (Based on a Questionnaire) by Pregnant Women Who Are Referred to Maternity Care Units of Shiraz Public Hospitals in 2016

Delivery Type/Reasons	No. (%)
<b>Normal vaginal delivery</b>	
Fewer complication	1188 (30.2)
Faster recovery	1064 (27)
Lower cost	490 (12.4)
Newborn health	467 (11.9)
Fear of anesthesia	180 (4.6)
Family advise	251 (6.4)
Physician advise	553 (14)
<b>C-section</b>	
Fear of pain	199 (5.1)
Physician advise	1229 (31.2)
Previous C-section	1002 (25.4)
Intention for tubal ligation	13 (0.3)
Husband request	24 (0.6)
Planned delivery	12 (0.3)
Fear of pelvic damages	67 (1.7)
Fear of newborn complications	5 (0.1)
Meconium excretion	44 (1.1)
Twin/multiple pregnancy	55 (1.4)
CPD (cephalo pelvic disproportion)	49 (1.2)
Position fetus	1.1 (2.6)
History of infertility	14 (0.4)
Other	136 (3.5)
Mothers comorbidities	95 (2.4)

## 5. Discussion

The present study was performed on 3940 pregnant women in Shiraz with the average age of  $29 \pm 5.7$  years. A high percentage of women reported a history of at least one C-section compared to NVD. For their current pregnancies, nearly 60% of women selected a C-section and 47% selected NVD. Older women with higher education levels and living in a suburban area were more inclined to have a C-section.

Women who were educated and residence of the cities had more desire to have a C-section without medical indication.

Approximately three out of every four pregnant women without complications were advised by the physicians to undergo C-sections.

In a systematic review in Iran in 2014, the estimated prevalence of C-section was 48% with the lowest in Bam (16.2%) and the highest in Tehran (66.5%) (9). The rate of C/S in the Fars province, in 2007, was 51.6%, which increased to 53.3% in 2009 (15). In another study, 31.7% of pregnant women in the Fars province, in 2013, preferred

C/S as their delivery method (16). However, in our study, the estimated prevalence of C-section in the current pregnancy was about 60%.

Different studies have found a significant relationship between the choice of C-section and being older, high education levels of couples, better socioeconomic status, older age in marriage, and living in large cities (1, 13-19). It was stated in one study that the older age of mother alone played an essential role in the physicians' decision to perform a C-section (20). This is consistent with the results of our study. It seems that the higher tendency to choose a C-section in older women may arise from the association between older age and medical problems. Education level often leads to marriage and pregnancy at older ages, which causes problems and complications and ultimately results in C-sections. However, in another study, there was no significant relationship between the age and education level of couples and the choice of C-section (3). This is inconsistent with the results of the present study.

Our results showed that women who were living in suburban areas selected C/S as their delivery method more than citizens of cities and villages. It could be due to lack of knowledge and empowerment due to inappropriate access to health services. Joulaei et al. expressed in a study that limitation of access to health care services and low level of knowledge regarding facilities of health care are barriers of health care utilization in suburban areas (21).

The inclination for elective C-section without medical indication is higher in women with higher education levels and in urban residents. This can be explained by the lack of proper culture in communities as well as by reasons provided by pregnant women such as a C-section is painless and can be planned. Since the implementation of the health system reform in Iran in 2014, which emphasizes the expansion of NVD that is performed by free of charge, women with lower education levels and those living in villages have been more likely to choose NVD due to their lower economic status. However, this inclination is less observed among urban residents and people with higher education levels who have a higher income.

In addition, the results of this study showed that physicians recommended a C-section in more than 70% of pregnant women without any medical indication. This problem arises from the misconceptions of physicians and patients and common culture regarding C-sections (1, 9).

### 5.1. Conclusions

The results of this study indicated that the inclination of pregnant women and physicians for C-section is about four times higher than the maximum rate recommended

**Table 3.** Association Between Selection of Delivery Method and Demographic Characteristics of Pregnant Women Who Are Referred to Maternity Care Units of Shiraz Public Hospitals in 2016<sup>a</sup>

Variable	Type of Delivery			P Value
	C-Section	NVD	Delivery in Water	
<b>Mother education</b>				< 0.001
Illiterate	25 (35.7)	45 (64.3)	0 (0)	
Elementary	200 (55.9)	154 (43)	4 (1.1)	
Secondary	326 (50.9)	310 (48.4)	4 (0.6)	
High school	809 (54.1)	664 (44.4)	23 (1.5)	
Associate degree	182 (45.5)	206 (51.5)	12 (3)	
Bachelor degree	387 (47.8)	402 (49.6)	21 (2.6)	
Master/PhD degree	65 (48.5)	65 (48.5)	4 (3)	
<b>Husband education</b>				< 0.001
Illiterate	23 (41.1)	33 (58.9)	0 (0)	
Elementary	136 (46.3)	156 (53.1)	2 (0.7)	
Secondary	435 (52)	391 (46.7)	11 (1.3)	
High school	817 (55.2)	645 (43.6)	19 (1.3)	
Associate degree	155 (43.3)	195 (54.5)	8 (2.2)	
Bachelor degree	334 (49.4)	319 (47.2)	23 (3.4)	
Master/PhD degree	98 (47.5)	103 (50)	5 (2.5)	
<b>Mother job</b>				0.1
Home keeper	1722 (51.1)	1589 (47.2)	56 (1.7)	
Clerical job	81 (46.3)	93 (53.1)	1 (0.6)	
Health worker	46 (48.9)	44 (46.8)	4 (4.3)	
School teacher	59 (60.8)	37 (38.1)	1 (1)	
University teacher	8 (66.7)	4 (33.3)	0 (0)	
University student	7 (22.6)	22 (71)	2 (6.5)	
Business/other	27 (52.9)	23 (45.1)	1 (2)	
<b>Husband job</b>				0.3
Business/other	833 (47.7)	887 (50.8)	27 (1.5)	
Clerical job	260 (49.3)	256 (48.6)	11 (20.1)	
Engineer	33 (55.9)	24 (40.7)	2 (3.4)	
School teacher	54 (60)	34 (37.8)	2 (20.2)	
University teacher	6 (23.1)	17 (65.4)	3 (11.5)	
Hand worker	215 (56)	165 (43)	4 (1)	
Military officer	58 (55.2)	45 (42.9)	2 (1.9)	
Driver	117 (59.4)	77 (39.1)	3 (1.5)	
Farmer	87 (53)	75 (45.7)	2 (1.2)	
<b>Living location</b>				0.02
City	1346 (49.8)	309 (48.4)	50 (1.8)	
Village	336 (52.3)	298 (46.4)	8 (1.2)	
Suburban	303 (57.1)	227 (41.6)	7 (1.3)	

<sup>a</sup>Values are expressed as No. (%).

by the World Health Organization. There was no clinical indication for more than one-third of C-sections chosen by pregnant women. The high inclination level among pregnant women and the physicians' recommendation of elective C-section are the health problems that can be minimized by planning and making effective interventions through changing the attitude and culture of the commu-

nity by making people aware of the complications of a C-section. Although the implementation of the Health Sector Revolution Plan in Iran has somewhat reduced the growth rate and number of provided C-sections, there is still a considerable way to go to reach the desired goal. In this regard, it is recommended that educational interventions be made from the beginning of pregnancy for pregnant

**Table 4.** Logistic Regression Model of Delivery Method Selection by Pregnant Women Who Are Referred to Maternity Care Units of Shiraz Public Hospitals in 2016

Item	OR <sup>a</sup>	95% CI	P Value
<b>Mother education</b>			
Illiterate and primary school	1		
Secondary/high school	1.1	0.9 - 1.4	0.26
Associate/bachelor degree	0.87	0.6 - 1.1	0.32
Master/PhD degree	0.86	0.5 - 1.3	0.51
<b>Husband education</b>			
Illiterate and primary school	1		
Secondary/high school	1.5	1.2 - 2	0.001
Associate/bachelor degree	1.3	1 - 1.8	0.05
Master/PhD degree	1.3	0.8 - 1.9	0.18
<b>Age of Mother</b>			
≤ 25 y/o	1		
26 - 34	2.4	2.0 - 2.8	< 0.001
≥ 35	3.2	2.6 - 3.9	< 0.001
<b>Location of Living</b>			
City	1		
Village	1.1	0.93 - 1.3	0.20
Suburban	1.3	1.08 - 1.5	0.005

<sup>a</sup> OR compares group that select NVD method with C/S.

women and health care providers and appropriate infrastructures be established for replacing a C-section.

The objectives of the study were first explained to the participants and then written consent was received.

## Footnotes

**Authors' Contribution:** Research idea and management: Seyyed Taghi Heydari, Kamran Bagheri Lankarani, Maryam Kazemi and Nasrin Asadi; analysis of the data: Seyyed Taghi Heydari, Maryam Kazemi, Yaser Sarikhani, Shaghayagh Zarei, Zeynab Mansuri, Fatemeh Keshvarz, Reyhane Jabbari and Arezoo Mohtashami; writing the manuscript: Seyyed Taghi Heydari, Maryam Kazemi, Kamran Bagheri Lankarani, Nasrin Asadi, Yaser Sarikhani, Ahmad Kalateh Sadati, Shaghayagh Zarei, Zeynab Mansuri, Fatemeh Keshvarz, Reyhane Jabbari and Arezoo Mohtashami; technical advisors: Kamran Bagheri Lankarani, Nasrin Asadi, Seyyed Taghi Heydari and Ahmad Kalateh Sadati; technical management and supervision: Kamran Bagheri Lankarani, Nasrin Asadi, Maryam Kazemi, Seyyed Taghi Heydari and Ahmad Kalateh Sadati.

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