

Women's knowledge and attitude towards mode of delivery and frequency of cesarean section on mother's request in six public and private hospitals in Tehran, Iran, 2012

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Abstract

Aim: The rate of cesarean section (CS) has been reported to be as high as 40% among Iranian women in the year 2009. The aim of this study was to determine the rate of cesarean delivery on mother's request (CDMR) and to determine maternal attitude and knowledge about various modes of delivery in private and public (university) hospitals in Tehran.

Material and Methods: All primiparous mothers delivering in six selected hospitals between April 2010 and March 2011 were included. Trained investigators handed a predesigned questionnaire to mothers 1 day after delivery to be filled out in the presence of the investigator.

Results: From 600 deliveries, 501 (83.5%) were CS and 99 (16.5%) were normal vaginal delivery. The CS rates in university hospitals versus private hospitals were 78.5% and 91.9%, respectively. In total, mothers' knowledge scores were poor, intermediate, and good in 55.6%, 37.9%, and 6.5% of cases, respectively, and no significant difference in knowledge was observed between mothers attending private or public hospitals. The overall rate of CDMR was 20.8%; and the most frequent reason was fear of pain. Women with CDMR were at higher marital age, education, insurance coverage, and socioeconomic status compared with the women with vaginal delivery.

Conclusion: Prompt action is needed to reduce the unacceptably high rate of unwarranted cesarean deliveries. Improving women's knowledge about the risks and benefits of different modes of delivery can lead to a positive maternal attitude towards vaginal delivery.

Key words: attitude, cesarean section, elective surgical procedure, knowledge, normal vaginal delivery.

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Introduction

Cesarean section (CS) is one of the most frequently performed major abdominal surgeries. Despite a lack of upsurge in obstetric emergencies, the rate of CS has increased in many parts of the world, reaching higher than 50% in some countries.¹⁻⁷

Most of these CS surgeries are performed without any medical indication and some are cesarean delivery on mother's request (CDMR).⁸ The world incidence of CDMR is estimated to be 8-14% of all cesarean deliveries.⁹

In order to prevent the dangers of vaginal delivery, the idea of elective CS in full-term pregnancy attracted the media's attention about 20 years ago.¹⁰ Since then, there have been serious discussions about performing CDMR in full-term pregnancies.¹¹

Although recent studies have shown that the risk of planned CS and planned vaginal delivery in the short term are low and similar,¹² in subsequent pregnancies, the risk will be higher in a mother who has had a previous CS.^{3,13,14}

Like other surgical operations, CS carries the risk of infection, including local wounds, pelvic, respiratory tract, and urinary tract infections, as well as lung emboli, venous thrombosis, and complications of anesthesia. Thus morbidity and mortality rates are higher in CS compared to normal vaginal delivery (NVD) in both mother and child.^{15,16} In addition, studies show that financial burden of repeated CS, including duration of hospitalization, drugs used, and their complications, are significantly greater as compared to NVD.¹⁷ Other complications of CS are the increased risk of placental adherence and uterine rupture in subsequent pregnancies,¹⁰ intensive care admission, hysterectomy, problems with subsequent fertility (e.g., reduced fertility, ectopic pregnancy, miscarriage), and increased risks of fetal and neonatal mortality.¹⁸

The limited number of studies that have been performed in Iran report an increasing rate of CS in the last few years; the CS rate was 14.3% in 1978, 22.7% in 1988,¹⁹ 35% in 2000, 40% in 2005²⁰ and even 85.3% in a public hospital in Tehran in 2008.¹⁹

The aim of this study was to determine the prevalence and frequency of CS and CDMR in private hospitals in comparison with university hospitals in Tehran, and also to define the relation between maternal knowledge and attitude towards CS and the reasons for choosing a specific mode of delivery.

Methods

This cross-sectional study was performed on 600 mothers who delivered in three public (university) hospitals and three private hospitals in Tehran, either through vaginal delivery or CS, for a period of 11 months from April 2010 to March 2011.

After obtaining ethical approval from Shahid Beheshti University of Medical Sciences research committee and receiving informed consent from the participants, a predesigned questionnaire was given to all mothers, irrespective of their mode of delivery, to be filled out in the presence of a previously trained investigator. The questionnaire was extracted from a similar previous study performed in Iran (city of Kerman) in 2005 by Aali and Motamedi.²¹ In that study, the validity of the questionnaire contents was approved by 10 obstetric specialists. Using the Kuder-Richardson test, the reliability coefficient of the knowledge statements was calculated as 0.67; and the \pm Cronbach coefficient for attitude statements was 7. All women included in our study were primipara. In order to prevent the effects of maternal fatigue and/or anesthesia on answers, questionnaires were carried out 1 day after the delivery. The questionnaire covered the following domains: parental demographic data, maternal knowledge and awareness about different modes of delivery, maternal attitudes to CS, and mothers' reasons for choosing CS.

For scoring knowledge statements, 1 point was given to each correct response and 0 points to incorrect and 'I don't know' answers. The overall maternal knowledge score was described as good (7-10), intermediate (4-6), and poor (0-3).

Twenty questions were asked about the maternal attitude toward the mode of delivery; eight questions were related to vaginal delivery and 12 questions to CS. Attitude statements were scored on a 5-point Likert-scale (1-5) from strongly agree to strongly disagree.²² Scoring was done as follows: 1 point for complete agreement with the statement, 2 points for agreement, 3 points for no opinion, 4 points for disagreement and 5 points for complete disagreement. In statistical analysis, a score of 1-16 was considered as a positive attitude (agree or strongly agree), 17-24 as neutral and 25-40 as negative (disagree or strongly disagree).

For each variable, *t*-test and ANOVA or non-parametric equivalent tests were used to compare women's knowledge about CS based on occupation, education and other independent variables. χ^2 -test was used to compare the attitude towards CS between

women delivering in the private sector and public hospitals.

Results

General information

Out of 600 primiparous mothers, 377 mothers delivered in three public hospitals and 223 mothers delivered in three private hospitals. In total, 501 (83.5%) deliveries were by CS and 99 (16.5 %) were NVD. Rates

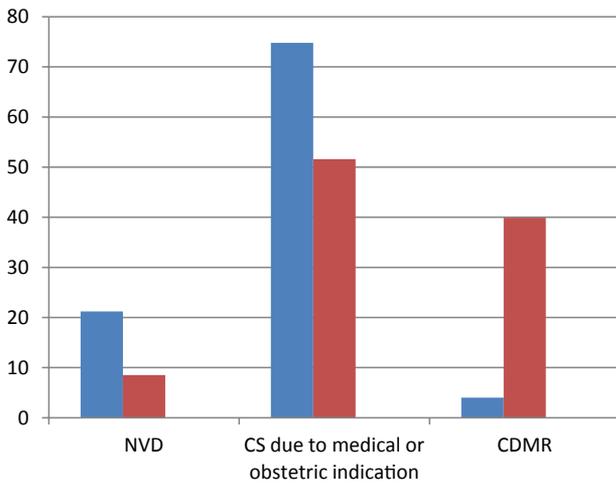


Figure 1 Rate of normal vaginal delivery (NVD) and cesarean section (CS) (due to medical/obstetrical indications and cesarean delivery on mother's request [CDMR]) in public and private hospitals. (■) public hospitals $n = 377$; (■) private hospitals $n = 223$.

of CS in public and private hospitals were 78.5% and 91.9%, respectively ($P < 0.001$) (Fig. 1).

The overall parental characteristics are presented in Table 1.

The average age of delivery for women attending private hospitals was higher than those attending public hospitals. In this group, the average age of marriage was also higher and more women had higher education, were employed and had a better socioeconomic status (Table 1).

The education levels of women delivering in public and private hospitals are presented as Figure 2.

The most common indications for CS in university hospitals were non-reassuring fetal heart rate pattern, dystocia and maternal medical indications, while maternal request, non-reassuring fetal heart rate pattern and physician's advice were the most common indications for CS in private hospitals (Table 2).

Knowledge and attitude towards mode of delivery

The details of the questionnaire related to patients' knowledge are presented in Table 3. Overall, 333 (55.6 %) mothers attained poor scores, 228 (37.9%) attained intermediate scores, and 39 (6.5%) attained good scores on knowledge. Older mothers (>35 years) had higher knowledge scores ($P = 0.005$).

No significant deference in mean knowledge score was observed between mothers in private and public hospitals (3.57 ± 1.79 vs 3.35 ± 1.86 , $P = 0.107$) (Table 4).

The details of the questionnaire related to patients' attitude and its answers are presented in Table 5. Overall, 44% of mothers had positive attitude towards

Table 1 Background characteristics of mothers delivering in public and private hospitals

Subject	Public hospitals Mean \pm SD (n)	Private hospitals Mean \pm SD (n)	P-value
Average maternal age (years)	27.2 \pm 5.4 (377)	29.09 \pm 5.33 (223)	<0.001
Maternal average age of marriage (years)	20.93 \pm 4.5 (377)	23.11 \pm 4.42 (222)	<0.001
Average husband's age (years)	31.43 \pm 6.1 (376)	33.78 \pm 5.41 (222)	<0.001
Husband's average age of marriage (years)	25.18 \pm 4.3 (377)	27.33 \pm 4.45 (221)	<0.001
	n (%)	n (%)	
Rate of housewife mothers	362 (69.7)	157 (30.3)	<0.001
Rate of husbands with private job	333 (88.6)	111 (50.2)	<0.001
Insurance coverage	287 (76.1)	198 (88.8)	<0.001
Monthly income:			<0.001
<\$200	81 (21.6)	10 (4.5)	
\$200–400	250 (66.7)	84 (38)	
\$400–800	38 (10.1)	93 (42.1)	
>\$800	6 (1.6)	34 (15.4)	
University education	26 (6.9)	110 (49.3)	<0.001

SD, standard deviation.

vaginal delivery (51.8% in public and 30.5% in private hospitals), and believed that vaginal delivery is a natural and acceptable method. Tables 6 and 7 show a comparison between mothers' attitude towards NVD

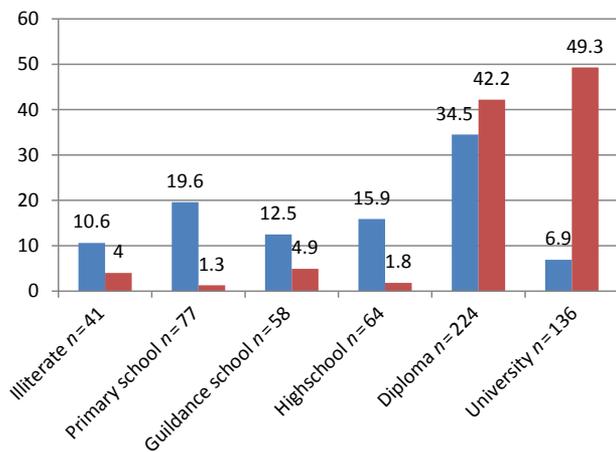


Figure 2 Maternal education level in public and private hospitals. (■) University hospitals $n = 377$; (■) private hospitals $n = 223$.

($P < 0.001$) and CS ($P = 0.217$) in public and private hospitals.

Of all the mothers studied, 57.7% completely agreed that it is a pleasant experience to see the baby immediately after the delivery; and 55.2% agreed that the mother recovers sooner after NVD (Table 5). Also, 26.4% of mothers who had a CS stated that if they had been aware of the complications of CS, they would never have accepted it.

The relation between maternal knowledge score and attitude towards the mode of delivery is presented in Table 8. As Table 8 shows, a higher percentage (>50%) of mothers in the intermediate and good knowledge score groups had a positive attitude towards NVD compared to the poor knowledge group.

CDMR

In total, 20.8% of cesarean deliveries were CDMR, and the rate of CDMR in private hospitals and public hospitals was 87 (42.44%) and 18 (6.08%), respectively. The reasons for requesting CS in public and private

Table 2 Indications for cesarean section in public and private hospitals

Indications for cesarean section	Public hospitals n (%)	Private hospitals n (%)
Non-reassuring fetal heart rate	118 (39.86)	42 (20.48)
Dystocia	40 (13.51)	6 (2.93)
Maternal medical complications	37 (12.5)	12 (5.85)
Maternal request	18 (6.08)	87 (42.44)
Physician advice	19 (6.42)	33 (16.1)
Meconium passage	15 (5.07)	6 (2.93)
Placental complications	11 (3.72)	7 (3.41)
Abnormal presentation or multiple gestation	10 (3.38)	6 (2.93)
Others	20 (6.76)	6 (2.93)

Table 3 Answers to the questions related to maternal knowledge about the mode of delivery among studied mothers

Questions	Expected answer	Incorrect or do not know n (%)	Correct n (%)
1. Cesarean delivery is less painful	True	432 (72)	168 (28)
2. Maternal complications of cesarean delivery are greater	True	353 (58.8)	247 (41.2)
3. Infection risk of cesarean delivery is higher than vaginal delivery	True	409 (68.1)	191 (31.9)
4. Emotional relationship between mother and baby after vaginal delivery is better	True	344 (57.3)	256 (42.7)
5. Infants born by CS are smarter compared with those born by vaginal delivery	False	464 (77.3)	136 (22.7)
6. Infant bone fractures are impossible in CS	False	519 (86.5)	81 (13.5)
7. It is reasonable to request CS again for next delivery after the first CS	True	270 (45)	330 (55)
8. Respiratory disorders in infants born by CS are less than vaginal delivery	False	516 (86)	84 (14)
9. Hemorrhage after cesarean delivery is less than vaginal delivery	False	439 (73.2)	161 (26.8)
10. CS is reasonable when the baby is in breech presentation	True	193 (32.2)	407 (67.8)

CS, cesarean section.

Table 4 Comparison of women's knowledge between public and private hospitals

Knowledge status	Public hospitals <i>n</i> (%)	Private hospitals <i>n</i> (%)	<i>P</i> -value*
Poor (0–3)	220 (58.4)	113 (50.7)	0.107
Intermediate (3–6)	137 (36.3)	91 (40.8)	
Good (7–10)	20 (5.3)	19 (8.5)	
Total	377 (100)	223 (100)	

*Data were analyzed with the χ^2 -test.

Table 5 Answers to questions related with the attitude towards vaginal delivery and CS in studied mothers

Questions	Strongly agree <i>n</i> (%)	Agree <i>n</i> (%)	Neither agree nor disagree <i>n</i> (%)	Disagree <i>n</i> (%)	Completely disagree <i>n</i> (%)
1. Vaginal delivery is a natural and acceptable method	259 (43.5)	187 (31.4)	99 (16.6)	35 (5.9)	16 (2.7)
2. It is pleasant for a mother to see her baby immediately after the birth	346 (57.7)	184 (30.7)	50 (8.3)	6 (1)	11 (1.8)
3. The mother recovers sooner after vaginal delivery	331 (55.2)	156 (26)	88 (14.7)	15 (2.5)	9 (1.5)
4. Emotional relationship between mother and the infant is better after vaginal delivery	228 (38)	165 (27.5)	138 (23)	45 (7.5)	23 (3.8)
5. Because of anesthesia, vaginal delivery is much better	184 (30.7)	138 (23)	182 (30.3)	68 (11.3)	25 (4.3)
6. Vaginal delivery is much better in long term	186 (31)	142 (23.7)	186 (31)	61 (10.2)	23 (3.8)
7. I prefer vaginal delivery because I don't like the scars of surgery on my abdomen	64 (10.7)	81 (13.5)	180 (30)	109 (18.2)	164 (27.3)
8. Vaginal delivery is less risky for the mother	136 (22.7)	132 (22)	212 (35.5)	76 (12.7)	44 (7.3)
9. If there is no financial problem, CS is much better	64 (10.7)	81 (13.5)	180 (30)	109 (18.2)	164 (27.3)
10. I prefer CS because I don't like mother's position on the gynecology bed	94 (15.7)	115 (19.3)	168 (28.1)	84 (14.1)	136 (22.8)
11. I prefer CS because it is less painful than vaginal delivery	99 (16.5)	102 (17)	183 (30.5)	88 (14.7)	128 (21.3)
12. Infants born by CS are healthier than those born by vaginal delivery	81 (13.5)	107 (17.8)	263 (43.8)	74 (12.3)	75 (12.5)
13. If there is an intention for tubal ligation, CS is much better	168 (28)	169 (28.2)	168 (28)	49 (8.2)	46 (7.7)
14. CS prevents uterine and bladder prolapse	139 (23.2)	155 (25.8)	233 (38.8)	46 (7.7)	27 (4.5)
15. CS prevents deformation and malformation of female genital tract	153 (25.5)	130 (21.7)	230 (38.3)	51 (8.5)	36 (6)
16. Vaginal delivery has lower risk for the mother	49 (8.2)	100 (16.7)	264 (44)	110 (18.3)	77 (12.8)
17. If I knew CS complications, I would never request CS	158 (26.4)	98 (16.4)	217 (36.2)	68 (11.4)	58 (9.7)
18. If I knew CS complications, I would request CS again	60 (10)	98 (16.4)	245 (40.9)	55 (9.2)	141 (23.5)
19. I believe that a mother should have her own right to request CS	198 (33.1)	220 (36.7)	89 (14.9)	51 (8.5)	41 (6.8)
20. I believe that CS should be done when vaginal delivery is risky	311 (51.9)	101 (16.9)	100 (16.7)	57 (9.5)	30 (5)

Scoring: Strongly Agree = 1, Agree = 2, No Opinion = 3, Disagree = 4, Strongly Disagree = 5. CS, cesarean section.

hospitals were: fear of pain (35.5%), fear of damage to the fetus (20.2%), fear of future maternal complications (28%), fear of losing vaginal tonicity (5.3%), fear of urinary incontinency (11%), and physician's advice

(29%). Also, the mean knowledge score was not significantly different between mothers with CDMR and CS due to other indications. The university education rate in mothers with CDMR and mothers who had CS due

Table 6 Comparison of mother's attitude towards NVD between private and public hospitals

Place	Strongly agree (positive) <i>n</i> (%)	Agree (positive) <i>n</i> (%)	Neutral (no opinion) <i>n</i> (%)	Disagree (negative) <i>n</i> (%)	Strongly disagree (negative) <i>n</i> (%)	<i>P</i> -value*
Public hospitals	28 (7.4)	167 (44.4)	162 (43.1)	18 (4.8)	1 (0.3)	<0.001
Private hospitals	1 (0.5)	66 (30)	127 (57.7)	21 (9.5)	5 (2.3)	

*Data were analyzed with the χ^2 -test.

Table 7 Comparison of mother's attitude towards cesarean section between private and public hospitals

Place	Strongly agree (positive)† <i>n</i> (%)	Agree (positive) <i>n</i> (%)	Neutral (no opinion) <i>n</i> (%)	Disagree (negative) <i>n</i> (%)	Strongly disagree (negative) <i>n</i> (%)	<i>P</i> -value*
Public hospitals	0 (0)	26 (6.9)	251 (66.8)	94 (25)	5 (1.3)	0.217
Private hospital	0 (0)	20 (9.1)	158 (71.8)	40 (18.2)	2 (9)	

*Data were analyzed with the χ^2 -test. †The mean attitude score for all patients was over 1 after summing up the results, so there was not any strongly agree statement.

Table 8 Mothers' attitude towards NVD according to their knowledge score

Knowledge score	Attitude of mothers to NVD			<i>P</i> -value*
	Positive (agree) <i>n</i> (%)	Neutral (no opinion) <i>n</i> (%)	Negative (disagree) <i>n</i> (%)	
Poor (0–3)	127 (38.4)	179 (54)	25 (7.6)	0.026
Intermediate (3–6)	116 (51.1)	96 (42.3)	15 (6.6)	
Good (7–10)	19 (51.4)	14 (37.8)	4 (10.8)	

*Data were analyzed with the χ^2 -test. NVD, normal vaginal delivery.

to other indications was 43% and 19.6%, respectively ($P < 0.001$). In terms of maternal age, husband's age, and husband's age at marriage, there was no significant difference between mothers who preferred CS versus those who preferred vaginal delivery. However, there was significant difference in terms of: older maternal age ($P < 0.001$), mother's occupation (76.6% of working women vs 47% of housewives, $P = 0.010$), health insurance status (57% insured vs 28.6% with no insurance, $P = 0.001$), mean knowledge score ($P = 0.005$), positive attitude to NVD ($P = 0.014$), husband's higher education level ($P < 0.0001$), and husband's government employment (69.5% vs 43%, $P = 0.001$).

Mothers who had higher education level requested CS more often (5% of the illiterates, 55.3% of those with high school diploma and 76.3% of university educated women, $P < 0.0001$).

In addition, higher husband's income level was associated with an increase in requests for a CS ($P < 0.0001$). Women whose husbands had personal or mortgaged

homes had more requests for CS in comparison with those with rented houses ($P < 0.001$).

Also, 83.5% of women with CDMR, versus 15.1% of those who had wanted a vaginal delivery, stated that they would choose a CS for subsequent deliveries ($P < 0.0001$).

Discussion

This study showed that the rate of CS in our studied hospitals is much higher than the upper limit suggested by the World Health Organization, which indicates this rate should not exceed 15%. In most countries, including Iran, the rate of CS is much higher and in many cases there are no definite medical or obstetrical indications for CS.²³ In the study by Ahmadnia and colleagues on 17 991 women in different areas of Iran, CS prevalence rates were 35.0% in total, 41.9% for urban women and 22.5% for rural women.²⁴ These rates were significantly correlated with indices of socioeconomic development.

According to Garmaroodi *et al.*²⁵ and Larijani *et al.*,²⁶ the rate of CS in Iran is between 26 and 60% and some reports have even quoted figures of up to 87% in some centers.

Ferriman mentioned that the rate of CS in England was 2% in 1950, 18% in 1977 and 20% in 2000, half of which were elective CS.²⁷ Dobson reports that 21.5% of pregnant women have CS in England and Ireland; whereas the rate was only 4% 30 years ago.²⁸ The rates of CS in Tehran are similar to those in the Latin American countries,^{29,30} India^{31,32} and Nigeria.³³

In this study, the rates of CS in three private and three public hospitals, were 91.9% and 78.5%, respectively. In Ahmadnia's study,²⁴ the rates of CS are 32% and 63.6% in public and private hospitals, respectively. One of the reasons for high rates of CS in university hospitals is that these are referral centers for high-risk and complicated pregnancies, which may lead to elective or emergency operative deliveries due to fetal or maternal indications.

In our study, the most common reason for CS in university hospitals and the second most common reason in private hospitals was 'non-reassuring fetal heart rate pattern'. In recent years, the widespread use of electronic fetal monitoring has been followed by increasing rates of CS. But it has also been observed that this has not reduced the risk of cerebral palsy or perinatal death compared to intermittent heart rate auscultation.³⁴ Restricting the use of continuous electronic fetal monitoring to more selected cases and paying attention to more strictly defined criteria on 'non-reassuring fetal heart rate patterns' by obstetricians may reduce the rate of unwarranted CS. We observed that dystocia was another common indication for CS, especially in the university hospitals. Restricting cesarean deliveries to mothers who meet more precise criteria for dystocia could also decrease the overall CS rate.

In a study performed in Brazil, the rates of CS in public and private hospitals were 36% and 84%, respectively, and it was claimed that the only limitation for CS in Brazilian private hospitals is when the physician arrives later than scheduled, leading to progression of labor to such a level that the only choice open to the physician is to assist in a vaginal delivery.³⁵ In a post-natal survey in Chile, women with private obstetricians showed consistently higher rates of CS (range 57–83%) than those cared for by midwives or doctors on duty in public or university hospitals (range 27–28%).³⁶

In our study, 16% of cesarean deliveries in private hospitals were performed due to the physician's advice

and examining patients' files revealed that the dates of these elective operations had been decided previously and agreed upon by the physicians and the parents. In our opinion, factors such as scheduling the delivery time due to the surgeon's timetable and potential financial benefits for the physician to perform a CS in private sectors might be responsible. However, surgeons' motivations to recommend such elective CS need to be evaluated in further controlled trials.

Although it has been shown that the incidence of neither neonatal seizures nor cerebral palsy diminished as the rate of CS increased,³⁷ concerns for malpractice litigations could lead to a higher rate of physician's recommendation to undergo a CS.³⁸ Organizing continuous education programs for obstetricians to update their knowledge about the increasing adverse outcomes of repeated cesarean deliveries and encouraging them to avoid unindicated CS, as well as providing appropriate facilities for physicians to perform more vaginal deliveries are effective recommendations to reduce the increasing number of CS in Iran. Further large studies are also required to evaluate the reasons of increasing obstetricians' preference to perform CS.

In a study performed by Alaei and Motamedi in the city of Kerman, 66.7% of women regarded vaginal delivery as a natural and acceptable mode of delivery.²¹ Another study in South Korea reported that despite the 40% rate of CS, most women showed more favorable attitudes towards NVD than CS and only 10.6% of women who delivered by CS stated that they had requested a CS.³⁹

In our study, 57.7% of mothers with a positive attitude towards NVD described vaginal delivery as a physiologic process. Unlike traditional vaginal delivery, in physiologic vaginal delivery the mother is free to have her favorable position and interventions, such as the i.v. line, prescription of oxytocin and episiotomy are not used and the placenta exits spontaneously. It seems that providing the equipment for physiologic vaginal delivery for mothers and encouraging the obstetrical team to attempt physiologic vaginal delivery may lead to a higher percentage of women with positive attitude towards NVD.

It has been observed by Ali Mohammadian *et al.* that the rate of CS on mother's request in uncomplicated pregnancy is increasing to 22%.²³ Johnson *et al.* has reported a 10% rate of CDMR in 1986⁴⁰ and the study performed by Jackson *et al.* in London in 1988 showed that the frequency of CS was 9.1%, and 3.8% of those were on mother's request.⁴¹ In our study,

approximately 21% of the total cesarean deliveries performed in public and private hospitals were CDMR.

The most common reason for CDMR was the fear of pain (35.5%). This was to some extent similar to developed countries.^{1,2,3} Increasing maternal knowledge about pain-relief methods during labor and providing equipment and certified personnel to optimize obstetrical anesthesia in both public and private hospitals may result in reduced maternal fear of pain and encourage more mothers to prefer vaginal delivery. The obstetricians should keep it in mind that a request for pain relief by the woman is sufficient medical indication for its use.⁴²

Similar to our finding, in Alimohammadian's study,²³ there was a significant relation between the mother's education level and employment and requesting a CS. Also, in a study performed in Tehran by Garmarudi *et al.*, a significant relation was observed between requests for CS and educational level, and the family socioeconomic status.²⁵ Fisher and colleagues believe that in addition to the mother's personality, education and high economic level play a role in choosing the mode of delivery.⁴³ In a study performed by Wiklund and colleagues, there were more mothers with CDMR who felt their health status was not good compared to those with NVD. These mothers more frequently wanted to have only one child, felt they had less support during delivery, and were worried about damage to or death of the infant.⁴⁴ Another study shows that with high maternal age, requests for CS increase.⁴⁵

Forty-two percent of cesarean deliveries performed in private hospitals in our study were due to maternal request and like other studies more mothers with higher education level and better socioeconomic status referred to private hospitals for delivery. Despite their higher education level, the possible factors responsible for requesting CS in this group could be higher marriage age, older maternal age, better financial status and probably preferring to have fewer children.

On the other hand, despite the higher education level of private hospital mothers, the knowledge status about the modes of delivery was not significantly different between mothers attending private and public hospitals and only a small percent of mothers had good knowledge status in both sectors. It seems that a higher education degree is not necessarily accompanied by higher reproductive knowledge status. This may represent the lack of reproductive health education in Iranian high schools and even universities for women in reproductive age.

In a study in Nigeria,⁴⁵ 15% of pregnant women who presented for prenatal care were aware of their rights to request CS, but only 2.4% had requested a CS. Their reasons for this request were: long-term infertility, repeated miscarriages, and high maternal age at first pregnancy. In this study, 70.9% of the women believed that only the physician should determine the mode of delivery; and only 5.3% of those who were aware of their rights about requesting a CS said that they would request their physician for CS. The reasons why 94.7% of women did not insist on CS were: physician awareness of the complications of CS, family fear of complications, fear of being given negative answers by the physician and not being aware of their own rights for requesting CS. In another study in Ghana,⁴⁶ 93.3% of women preferred vaginal delivery, whereas only 3.5% leaned towards a CS; 51.7% of the women believed that CS is dangerous for the mother, but 95.5% said they were willing to have a CS if the physician advised it.

In our study, a high percentage of women in both public and private hospitals had no opinion about the suitable routes of delivery and were absolutely dependent on the physician's advice. After providing sufficient data to mothers by the obstetric team, including mothers in the decision-making process about the route of delivery may also decrease the rate of unnecessary CS.

Based on our data, more than 50% of mothers in public hospitals and also in private hospitals had a poor level of knowledge about the risks and benefits of different routes of delivery. On the other hand, it has been observed that with increased maternal knowledge the positive attitude towards NVD is raised. This finding reveals the importance of educating mothers and increasing their knowledge about the risks and benefits and indications of different delivery routes. Educating pregnant women during their prenatal visits, organizing group classes by obstetricians and certified midwives and educating reproductive aged women in their preconceptional counseling sessions may provide some suitable opportunities to achieve this goal.

As a limitation, we were not able to obtain data from women before their experience of delivery in this cross-sectional study as many women who had emergency CS were admitted to hospitals with the onset of delivery and women with elective CS were scheduled by their physicians to be admitted on the day of surgery. Thus, in a future cohort study it is recommended to obtain data from pregnant women weeks

before the expected time of delivery and in their prenatal care visits to lower any possible biases.

In conclusion, our findings show that although many mothers would prefer a vaginal delivery, the rate of CS and also CDMR is increasing in Tehran. In addition, this study reveals that more than 60% of mothers have a neutral attitude to the manner of delivery because they lack sufficient information about the advantages and disadvantages of different routes of delivery.

Our findings emphasize the need for educating families, especially pregnant women, about the pros and cons of different modes of giving birth to their babies. Well-trained health-care workers should help mothers in antenatal visits to choose the method of delivery. Women should be informed about their right to an explanation for the obstetrician's decisions about performing a CS. Appropriate public awareness may lead to a decline in the rate of unnecessary CS.

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Disclosure

The authors declare that they have no conflicts of interest.

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