Motives for - and prevalence of - cesarean delivery on maternal request: A survey in Saudi Arabia

Anwar E. Ahmed¹, Rouzait S. Mohammad²

ABSTRACT

Background: Although cesarean delivery on maternal request (CDMR) has been associated with an increase in the frequency of cesarean sections (CSs), there is a lack of studies reporting the frequency of CDMR in Saudi Arabia. This study was conducted to estimate the prevalence of and the motives for CDMR and identify its associated factors.

Methods: This cross-sectional study was conducted between March and June 2017 on 364 pregnant women who planned a CS at King Abdulaziz Medical City in Riyadh. The characteristics of the women and their motives for undergoing a CS for the current pregnancy term were collected.

Results: The prevalence of CDMR was found to be 13.7% (50/364) [95% confidence interval (CI): 10.370% – 17.706%]. Older maternal age (≥ 40 years) [adjusted odds ratio (aOR) = 3.9; p = 0.019], family history of CS (aOR = 2.9; p = 0.038), non-Saudi nationality (aOR = 5.0; p = 0.050), and receiving education or medical information about the possibility of delivering by CS (aOR = 13.7; p = 0.030) were significantly associated with a higher prevalence of CDMR. As the number of previous CSs increased by one (aOR = 0.6; p = 0.011), the odds of CDMR decreased by 40%.

The most common motives for demanding a CS in the absence of medical indications were avoiding labor or possible complications from vaginal birth (60%) and fear of pain on vaginal delivery (46%).

Conclusions: A high prevalence of CDMR was documented at King Abdulaziz Medical City, especially among women of older maternal age, having a family history of CS, of non-Saudi nationality, and who received education or medical information about the possibility of delivering by CS. Counseling programs might be helpful for pregnant women who fear pain in delivery.

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vaginal delivery or have had a previous traumatic birth experience.

Keywords: cesarean delivery on maternal request, older maternal age, on demand, Saudi Arabia

INTRODUCTION

The worldwide prevalence of cesarean deliveries has increased dramatically over the past few decades. In fact, cesarean deliveries have evidently become an epidemic phenomenon in some parts of the world, whereas the number of vaginal deliveries is on the decline. Furthermore, several reports have mentioned that cesarean delivery on maternal request (CDMR) is the major contributor for the increasing prevalence of cesarean deliveries. The American College of Obstetricians and Gynecologists has defined CDMR as a primary cesarean delivery at maternal request in the absence of any medical or obstetric indication, wherein cesarean deliveries are performed due to nonmedical or emergency reasons. The rate of CDMR shows significant variations according to the country. In China, the rate exceeds 24%, whereas it is 8% in Sweden, 5.1% in Switzerland, 3.2% in Denmark, 3% in the United States, and 3% in Australia among all deliveries. In Saudi Arabia, several studies have investigated CDMR; however, only one study that was based on a retrospective cohort study design (medical records) reported a rate of CDMR of 10.1%. A previous history of a cesarean section (CS) has been reported to be a major contributor for increasing the rate of CDMR. In addition, women with an older maternal age are known to often request a cesarean delivery. However, to our knowledge, it still remains unknown whether the trend of CDMR exists in Saudi Arabia, and if so, the nature of its contributing factors is also not clear.

The most common reasons influencing women’s decisions for requesting a CS have been found to be 1) anxiety due to lack of support during labor and 2) concern for fetal injury or death. In Saudi Arabia, no study has yet reported the reasons or motivations for demanding delivery by a CS in the absence of medical indications. In the present study, several hypotheses were investigated, whether 1) older maternal age, 2) family history of CS, and 3) receiving education or medical information about the possibility of delivering by CS increase the rate of CDMR. The aims of this study were to 1) estimate the prevalence of CDMR among women who undergo cesarean delivery at King Abdulaziz Medical City in Riyadh, 2) identify the factors associated with the high rate of CDMR, and 3) determine the motives for requesting CDMR.

METHODS

A self-reporting cross-sectional survey was performed to determine the motives and the prevalence of CDMR among women who attended routine pregnancy follow-up in the Gynecology and Obstetrics Clinic at King Abdulaziz Medical City in Riyadh between March and June 2017. This study was approved by the institutional review board at King Abdullah International Medical Research Center in Riyadh, with the study approval # RC17/051-R. Pregnant women were asked whether they would undergo or were planning a CS for the current pregnancy term. Only those who would undergo or were planning a CS were included. A total of 440 pregnant women who responded that they would undergo or were planning a CS for the current pregnancy term were requested to participate in the study. Written informed consents were obtained from each participant. Of these 440 pregnant women, 364 consented to participate and complete the study questionnaire, with a response rate of 82.7%.

Statistical analyses

Data were analyzed using the IBM SPSS software, version 24, for Windows. The characteristics of the study participants were summarized using frequency and percentages (Table 1). The prevalence of CDMR was reported as percentages with 95% confidence intervals (CIs). The prevalence of CDMR was classified according to the characteristics of the women and assessed by a Chi-square test to determine the relationships between the characteristics of the participants and the prevalence of CDMR (Table 1). Women’s motives for intending to undergo a CS were summarized using frequency and percentages.
A multiple logistic regression model was used to determine the factors associated with the high prevalence of CDMR (Table 3). The Hosmer–Lemeshow test was used to evaluate the goodness-of-fit for the model.

RESULTS

Table 1 shows the characteristics of the 364 pregnant women undergoing a CS. The mean age of the women was 31.3 (± SD = 5.7) years, with an age range of 16 – 45 years. A little more than half of the women had a university degree, 10.2% of them had no or low income, and 12.5% had a family history of CS.

The overall prevalence of CDMR was found to be 13.7% (50/364) (95% CI: 10.370% – 17.706%).

Table 2 presents the women’s motives for intending to undergo a CS. Regarding the motives for CDMR, the following information were obtained: 60% (30/50) of the women reported that they chose to avoid labor or possible complications from vaginal birth, 46% (23/50) reported fear of labor pain and childbirth, 30% (15/50) reported concerns about unsuccessful

(Table 2). A multiple logistic regression model was used to determine the factors associated with the high prevalence of CDMR (Table 3). The Hosmer–Lemeshow test was used to evaluate the goodness-of-fit for the model.

Table 1. Sample characteristics and its association with cesarean delivery on maternal request (n = 364).

| Levels                        | Overall (n = 364) | No (86.3%) | Yes (13.7%) | P    |
|-------------------------------|------------------|------------|-------------|------|
| Age                           |                  |            |             |      |
| < 40                          | 329 (91.4)       | 286 (86.9) | 43 (13.1)   | 0.170|
| ≥ 40                          | 31 (8.6)         | 24 (77.4)  | 7 (22.6)    |      |
| University                    |                  |            |             |      |
| Yes                           | 180 (52.0)       | 153 (85.0) | 27 (15.0)   | 0.331|
| No                            | 166 (48.0)       | 147 (88.6) | 19 (11.4)   |      |
| Income                        |                  |            |             |      |
| No income or < 5000 SR        | 283 (85.0)       | 247 (87.3) | 36 (12.7)   | 0.495|
| > 10,000 SR                   | 16 (4.8)         | 14 (87.5)  | 2 (12.5)    |      |
| Nationality                   |                  |            |             |      |
| Saudi                         | 333 (96.2)       | 290 (87.1) | 43 (12.9)   | 0.023*|
| Non-Saudi                     | 13 (3.8)         | 8 (61.5)   | 5 (38.5)    |      |
| Employed                      |                  |            |             |      |
| Yes                           | 95 (27.4)        | 87 (91.6)  | 8 (8.4)     | 0.073|
| No                            | 252 (72.6)       | 212 (84.1) | 40 (15.9)   |      |
| Family history of CS          |                  |            |             |      |
| Yes                           | 41 (12.5)        | 28 (68.3)  | 13 (31.7)   | 0.001*|
| No                            | 286 (87.5)       | 254 (88.8) | 32 (11.2)   |      |
| Received education or medical |                  |            |             |      |
| on the possibility to deliver  |                  |            |             |      |
| by CS?                         |                  |            |             |      |
| Yes                           | 301 (82.7)       | 254 (84.4) | 47 (15.6)   | 0.023*|
| No                            | 63 (17.3)        | 60 (95.2)  | 3 (4.8)     |      |
| Health educator               |                  |            |             |      |
| Yes                           | 80 (22.0)        | 66 (82.5)  | 14 (17.5)   | 0.268|
| No                            | 284 (78.0)       | 248 (87.3) | 36 (12.7)   |      |
| Nurse                         |                  |            |             |      |
| Yes                           | 53 (14.6)        | 41 (77.4)  | 12 (22.6)   | 0.042*|
| No                            | 311 (85.4)       | 273 (87.8) | 38 (12.2)   |      |
| OB/GYN doctor                 |                  |            |             |      |
| Yes                           | 172 (47.3)       | 142 (82.6) | 30 (17.4)   | 0.052|
| No                            | 192 (52.7)       | 172 (89.6) | 20 (10.4)   |      |
| Internet                      |                  |            |             |      |
| Yes                           | 190 (52.2)       | 170 (89.5) | 20 (10.5)   | 0.063|
| No                            | 174 (47.8)       | 144 (82.8) | 30 (17.2)   |      |
| Husband                       |                  |            |             |      |
| Yes                           | 31 (8.5)         | 24 (77.4)  | 7 (22.6)    | 0.135|
| No                            | 333 (91.5)       | 290 (87.1) | 43 (12.9)   |      |
| Friends                       |                  |            |             |      |
| Yes                           | 138 (37.9)       | 117 (84.8) | 21 (15.2)   | 0.521|
| No                            | 226 (62.1)       | 197 (87.2) | 29 (12.8)   |      |

*Chi-square is significant at α = 0.05. ($1 = SR 3.75), CS = cesarean section, %, percent; n, sample in each category.
vaginal birth after cesarean, 26% (13/50) reported that they had a previous traumatic delivery, 14% (7/50) reported having a precious first baby (a baby born after multiple poor pregnancy outcomes), and 12% (6/50) reported an older maternal age.

Results of subgroup analyses shown in Table 1 report the prevalence of CDMR classified according to the characteristics of the women. A higher prevalence of CDMR was detected among non-Saudi women (38.5% vs. 12.9%, \( p = 0.023 \)), women with a family history of CS (31.7% vs. 11.2%, \( p = 0.001 \)), and those who received education or medical information about the possibility of delivering by CS (15.6% vs. 4.8%, \( p = 0.023 \)). Moreover, women who received education or medical information from a nurse about the possibility of delivering by CS were included (22.6% vs. 12.2%, \( p = 0.042 \)).

Table 2. Motives related to cesarean delivery on maternal request (n = 50).

| Motives                                               | n    | %   |
|-------------------------------------------------------|------|-----|
| Fear of labor pain and childbirth                     | 23   | 46.0|
| A previous traumatic delivery                         | 13   | 26.0|
| Previous traumatic antenatal                          | 1    | 2.0 |
| To avoid labor or possible complications of vaginal birth | 30   | 60.0|
| Older maternal age                                    | 6    | 12.0|
| Precious first baby                                   | 7    | 14.0|
| In vitro fertilization baby                           | 0    | 0.0 |
| Sexual dysfunction                                    | 1    | 2.0 |
| Concern on unsuccessful vaginal birth after cesarean (VBAC) | 15   | 30.0|
| Concern on using instrumental (forceps and ventouse) deliveries | 4    | 8.0 |
| The belief of CS can effectively prevent subsequent incontinence | 5    | 10.0|

% percent; n, sample in each category.

Table 3 shows the multivariate factors associated with the prevalence of CDMR. After adjusting for the study sample characteristics, the following factors were found to be significantly associated with a high prevalence of CDMR: older maternal age [odds ratio (OR): 3.9 (95% CI: 1.251–11.937)], family history of CS [OR: 2.9 (95% CI: 1.058–8.018)], and receiving education or medical information about the possibility of delivering by CS [OR: 13.7 (95% CI: 1.295–144.556)]. In contrast, the following factors were significantly associated with a low prevalence of CDMR: Saudi nationality [OR: 0.2 (95% CI: 0.051–0.998)] and an increase in the number of previous CSs [OR: 0.6 (95% CI: 0.386–0.883)]. The Hosmer–Lemeshow test indicated that the model has a good fit for the data (\( p = 0.088 \)).

Table 3. Multivariate factors associated with cesarean delivery on maternal request (n = 364).

| Factors                                           | B    | SE   | P     | OR     | Lower  | Upper  |
|---------------------------------------------------|------|------|-------|--------|--------|--------|
| Age ≥40 years                                     | 1.35 | 0.58 | 0.019*| 3.9    | 1.251  | 11.937 |
| University                                        | 0.30 | 0.44 | 0.503 | 1.3    | 0.565  | 3.202  |
| No income or income < 5000 SR                     | 0.49 | 1.36 | 0.717 | 1.6    | 0.113  | 23.796 |
| Income 5000–10,000 SR                             | 0.61 | 1.18 | 0.601 | 1.8    | 0.185  | 18.515 |
| Saudi nationality                                 | −1.49| 0.76 | 0.050*| 0.2    | 0.051  | 0.998  |
| Employed                                          | −0.81| 0.52 | 0.118 | 0.4    | 0.160  | 1.229  |
| Family history of CS                              | 1.07 | 0.52 | 0.038*| 2.9    | 1.058  | 8.018  |
| Received education or medical info on CS          | 2.62 | 1.20 | 0.030*| 13.7   | 1.295  | 144.556|
| Number of previous CS                             | −0.54| 0.21 | 0.011*| 0.6    | 0.386  | 0.883  |

*Wald Chi-square test is significant at \( \alpha = 0.05 \). ($1 = SR 3.75$), CS = cesarean section. OR, odds ratio; CI, confidence interval.
DISCUSSION

This cross-sectional study determined the prevalence of CDMR in a sample of pregnant women attending routine pregnancy follow-up in the Gynecology and Obstetrics Clinic at King Abdulaziz Medical City in Riyadh. This topic was focused upon because of the following reasons: 1) CDMR is present in the Saudi population but with undocumented frequency, 2) the CS rate at our center (King Abdulaziz Medical City in Riyadh) has been reported to be 19.1% during June 2008 to February 2011, which exceeds the rate of CS (10% – 15%) recommended by the World Health Organization, 3) it has not yet been documented in Riyadh whether demanding a CS is below the high rate of CS, and 4) it was intended to evaluate the motives for CDMR in pregnant women at King Abdulaziz Medical City in Riyadh.

Based on our study results, CDMR at King Abdulaziz Medical City in Riyadh contributed to a high number of CSs. The prevalence of CDMR among pregnant women who were undergoing cesarean delivery at our center was found to be 13.7% (95% CI: 10.370% - 17.706%). This prevalence was found to be non-significantly higher than that reported at our center (a rate of 10.1%) in an earlier research that was based on a different study design (retrospective cohort) by Al Rowaily et al. However, our finding was significantly higher than that reported in studies conducted in Western countries but significantly lower than that reported in China. These differences in CDMR prevalence could be due to the effects of culture, healthcare setting, and political motives.

Women's motives for demanding the procedure in the absence of medical indications may result in an increase in the number of CSs. Our results indicated that the most common motives for demanding a CS in the absence of medical indications were to avoid labor or possible complications from vaginal birth (60%), followed by fear of pain on vaginal delivery (46%), concerns about unsuccessful vaginal birth after a CS (30%), and a previous traumatic delivery (26%). These motives have also been reported in several studies in various populations. In Saudi Arabia, the motives for CDMR need further investigation, including the assessment of women's knowledge and attitude about CDMR and its complications. This is because a study among pregnant women in Singapore found that low levels of awareness about cesarean delivery predicted complications.

In the present study, women of older maternal age reported a higher rate of CDMR, which is consistent with several studies. This finding is expected, as a maternal age > 35 years has been considered as a prognostic factor for CDMR and may lead to a cesarean delivery as it is a factor responsible for a high-risk pregnancy. This study also demonstrated that the adjusted ORs of CDMR were 2.9 times higher among pregnant women with a family history of CS than among those without a family history of CS. A study by Chong et al., has reported similar results, wherein 50% of their sample had their relatives or friends requesting a CS. A significant association was also found between receiving education or medical information about the possibility of delivering by CS and the high rate of CDMR. Pregnant women who received education or medical information about this issue were more likely to request a CS in the absence of medical indications than those who did not receive education or medical information. Results of the bivariate analysis of data regarding the sources of information showed that receiving education or medical information from a nurse about the possibility of delivering by CS was associated with CDMR in the absence of medical indications. This association should be assessed in future research by 1) developing related policies of cesarean delivery on demand or 2) conducting educational programs on the potential complications of CS to reduce the rate of CDMR.

There are several issues that could limit the results of this study. Because of the cross-sectional study design, the findings must be carefully interpreted as associations and do not represent causation. The study sample represents pregnant women who attended routine pregnancy follow-up in the Gynecology and Obstetrics Clinic at King Abdulaziz Medical City in Riyadh. CDMR was evaluated using a self-report questionnaire rather than through a retrospective review. Nevertheless, this study provides useful results in terms of several aspects, as it documents 1) the rate of CDMR in a sample of pregnant women in Saudi Arabia, 2) that CDMR is associated not only with older maternal age or family history of CS but also with having received education or medical information about the possibility of delivering by CS, and 3) women's motives to demand a CS in the absence of medical indications in Saudi Arabia.

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CONCLUSION
A high prevalence of CDMR was detected at King Abdulaziz Medical City in Riyadh, especially among women with older maternal age, family history of CS, non-Saudi nationality, and those who received education or medical information about the possibility of delivering by CS. An interventional educational program on the potential complications of CS is warranted to reduce the rate of CDMR. The most commonly reported motives for demanding a CS were related to labor such as complications and fear of pain on vaginal delivery. Counseling programs might be useful to pregnant women who fear pain in vaginal delivery or have had a traumatic birth experience.

Compliance with Ethical Standards
All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

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Conflict of Interest
All authors declare that they have no competing interests.

Informed Consent
Written informed consent was obtained from all participants included in the study.

Ethics Approval and Consent to Participate
The study received ethical approval from the Institutional Review Board at King Abdullah International Medical Research Center.

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