WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.074
Volume 7, Issue 15, 110-123. Research Article ISSN 2277– 7105

PREVALENCE AND CAUSES ASSOCIATED WITH CAESAREAN SECTION AMONG PRIMI MOTHERS IN MADINAH CITY, SAUDI ARABIA

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Article Received on
13 June 2018,

Revised on 03 July 2018,
Accepted on 23 July 2018

DOI: 10.20959/wjpr201815-12998

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ABSTRACT

Background: The rate of caesarean section (CS) has significantly increased worldwide during the last few decades. The Saudi literature, however, showed paucity of data about its rate and reasons in the Kingdom. **Objectives:** To determine the prevalence of CS among primi mothers in Madinah city, Saudi Arabia, and to investigate causes related to maternal request for CS versus medically indicated CS deliveries over time. **Methods:** A web-based cross-sectional study was conducted in Madinah city, Saudi Arabia from October to December 2017. The study analyzed data from 390 women lived in Madinah city. The data were collected through questionnaires distributed electronically which consisted of socio-demographic data and obstetric history data about year of first birth, age at first birth, type of hospital, type of delivery at first birth (vaginal or caesarian), reasons of CS whether it is due to maternal request or medically indicated, and outcome of pregnancy. The collected data were analyzed using appropriate statistical methods. The level of statistical significance was defined as $P \leq 0.05$. **Results:** The mean age of the studied women was 29.1 ± 5.4 years. Out of the studied 390 women, the prevalence of CS was 56.7% (221/390 (95% CI= 51.7%-61.6%)). Of them, 13 women (5.9%) reported CS on request. The main medical reasons for CS were cephalo-pelvic disproportion (17.2%), malpresentation of the fetus (16.8%), preeclampsia (11.8%), and cervical spasm (11.3%). On request CS was significantly more

among women < 25 years (9.4%; p = 0.03). Although not significant, CS on request was also higher among highly educated women (11.8%), women with medical insurance (9.3%), and monthly income ≥10,000 SR (7.2%). None of the studied women before 2005 had reported CS on request, and all maternal requests for CS were after 2005, and it was representing 6.9% of all caesarean sections between 2005 and 2016. **Conclusions:** The study revealed a high rate of CS in Madinah city, Saudi Arabia. CS on request represented 6.5% of all CS between 2005 and 2016, and it was higher among young, highly educated, and women with high monthly income and medical insurance. An appropriate strategy has to be considered by health authority to reduce unnecessary CS delivery in Madinah city.

KEYWORDS: Caesarean section, Reasons, Maternal, Request, Saudi Arabia.

INTRODUCTION

Caesarean section (CS) delivery is a life-saving surgical procedure that is necessary when certain fatal complications arise during pregnancy or labour, though it carries a risk of serious complications.[1] Since 1985, healthcare community world wide has decided that the ideal rate for caesarean sections should be between 10-15%.[2] During the last two decades, however, caesarean section rates has significantly increased around the world, although the lack of evidence supporting substantial benefits for both mothers and their foetuses with increased CS rates.[3,4] In USA, the rate is found to increase from 21% in 1996 to 32% in 2007[5], and in Australia, the rate has jumped by about 9% in 2007 in comparison to the reported rate in 1998.[6] In Europe, the number of births by caesarean section in 2010 is approximately double the number that was reported in 1997.[7]

In Saudi Arabia, the rate has surprisingly increased up to 80% between 1997 and 2006[8], and according to the Ministry Of Health (MOH) annual report in 2006, there were a total of 86 197 CS delivery in all government and private hospitals, representing 11% of all surgical procedures.[9] In a recent retrospective study conducted at King Abdulaziz Medical City, Riyadh, the rate of CS delivery was found to increase from 12% during 2002 to become 20% during 2009.[10]

In addition to the known medical indications of CS such as; previous history of CS, cephalopelvic disproportion, placental and cord abnormalities, and fetal malpresentation, there have also been some other potential reasons for the increasing rates of CS delivery. The non-medical reasons repeatedly reported in studies from many countries included fear of

pain; psychological concerns about genital canal modifications after vaginal delivery; misconception that CS method of delivery is more safe for the baby than vaginal delivery; the convenience for health professionals and also for the mother and her family; fear of medical litigation and lower tolerance to any complications or outcomes.[11,16] The age of the pregnant women was also found to advance the possibility of caesarean section.[17]

Recently, caesarean delivery on maternal request (CDMR) is added as a separate indication of CS delivery. However, the prevalence of CDMR is not precisely known in most countries, and is neither a well-defined clinical entity, nor is coded as such in official statistics.[18] Reported rates of CDMR range from 3% of all caesarean sections in USA to 26.8% in Western Australia and there are some indications that the rate might be increasing.[19,20,21]

There are a number of justifications that influence the women's demand to electively undergo (CS) in the absence of any medical needs including their fear of giving birth, that the vaginal delivery may harm the genital area or that it could interfere with their abilities during sexual intercourse.[22,23] Moreover, the presence of health insurance held in private or governmental institutions and the financial status of the individuals are observed to alter the rate of caesarean delivery.[24,26] Moreover, the medicolegal aspect and increased awareness of patients' rights has changed the attitude of obstetricians and this is in part due to their way of avoiding getting involved in malpractice by performing a more defensive practice with reduction of the risks that can be encountered.[27,28]

Up till now, however, the Saudi literature showed shortage in such studies investigating causes related to CS, particularly causes related to maternal request for CS versus medically indicated CS deliveries among primi mothers. Moreover, the literature showed no previous studies about the prevalence rate of CS among primi mothers in Madinah city. Therefore, the present study aimed to determine the prevalence of caesarean section among primi mothers in Madinah city, Saudi Arabia, to investigate causes related to maternal request for CS versus medically indicated CS deliveries, and to compare these rates prior to 2005 with that from 2005 to 2016.

METHODS

The present study is a web-based cross-sectional study conducted in Madinah city, Saudi Arabia, from October to December 2017. Madinah city, located in the western region, is the fourth largest city in Saudi Arabia. It is the second holly city and the capital of Madinah

province with a total population of 1,9 million in the province.[28] The mothers eligible to be included in this study were those lived in Madinah who have access to the available online questionnaire and who gave birth to their first child during the years from 2000 to 2016.

According to total Madinah population, and using an error margin of 5%, a confidence interval of 95. The sample size was calculated by sample size calculator using the website: surveysystem.com.[30] The primary calculated sample size was estimated to be 290 women. To overcome the problem of missing data, if any, the final size of the sample was increased to become 390 women.

The data were collected by using a predesigned structured questionnaire. The questionnaire included variables on socio-demographic characteristics, (age, level of education, residence) and data concerning the obstetric history (year of first birth, age at first birth, type of hospital, type of delivery at first birth whether it's vaginal or caesarian, reasons of CS whether it is due to maternal request or medically indicated, and outcome of pregnancy).

The questionnaire data were formulated according to the findings of previous similar studies. The question items were translated into Arabic. A pilot study of 30participants was performed prior to conduction of the study. The questionnaire was distributed electronically to the eligible women in Madinah city until the required sample has reached. Finally, 380 women have filled and return back the study questionnaire. The background and purpose of the study were explained at the beginning of the questionnaire.

The collected data were entered and analysed using the statistical package for social science (SPSS), version 23.0. Data were presented using frequencies, mean and standard deviation as appropriate. The prevalence of CS among the studied women was estimated and its 95% CI was calculated. The participants were then divided into two groups; those who submitted to CS because of medical indication and those who submitted to CS because of their request. Chi square and Fischer exact tests were use as appropriate to compare the studied two groups according to their socio-demographic characteristics, obstetric data, outcome as well as their birth date (before 2005 and after 2005). *P* values ≤ 0.05 were used as indicators of statistical significance differences between the studied groups. The Approval for this research has been taken from the ethics committee at Taibah College of Medicine. Ethical consideration was also considered to ensure absolute confidentiality and privacy of the collected data. All of the collected data were analysed anonymously and were used only for research purposes.

RESULT

The prevalence of CS among the studied women was 56.7% (221/390 (95% CI= 51.7%-61.6%)). Of them, 13 women (5.9%) reported CS on demand.

Table 1: Socio-demographic characteristics of the studied women (n=390).

Characteristics	No.	%
Age in years		
< 25	89	22.8
25-< 30	135	34.6
≥ 30	166	42.6
Mean ± SD	29.1 ± 5.4 years	
Education level		
Basic	127	32.6
Bachelor	236	60.5
Postgraduate	27	6.9
Monthly income in SR		
< 5.000	72	18.5
5.000-<10.000	141	36.2
≥10.000 SR	177	45.4
Mean ± SD	10.225 ± 8.526 SR	
Has medical insurance:		
Yes	92	23.6
No	298	76.4

Table 1 presented the socio-demographic characteristics of the volunteering women. Their mean age was 29.1 ± 5.4 years, with 22.8% of them who were aged < 25 years. Sixty percent of the studied women reported to have had bachelor degree and 6.9% to have had postgraduate degree. Less than half of the studied women (45.4%) reported a monthly income ≥10,000 SR, with an overall average of 10.225 ± 8.526 SR for the study group. About quarter of women (23.6%) had medical insurance.

Table 2: Obstetric and relevant characteristics of the studied women (n= 390).

Characteristics	No.	%
Age at first delivery		
< 20 years	40	10.3
20-< 25 years	201	51.5
25-< 30 years	115	29.5
≥ 30 years	34	8.7
Mean ± SD	24.0 ± 4.0 years	
Type of hospital		
Governmental	217	55.6
Private	173	44.4
Mode of delivery		

Vaginal delivery	169	43.3
Caesarean section (CS)	221	56.7
Reasons of CS (n=221)		
Medical reasons	208	94.1
Maternal request	13	5.9
Complications of CS (n=221)		
Yes	74	33.5
No	147	66.5

Table 2 presented the obstetric history of the studied women. The mean age of first delivery was 24.0 ± 4.0 years, with 51.5% of them had their first delivery at the age between 20-<50 years, while only 10.3% had it before reaching the age of 20 years. Delivery in the governmental hospitals was slightly more frequent than that in private hospitals (55.6% vs. 44.4%). More than half of the studied women (56.7%) were delivered by caesarean section. Of caesarean section women, 94.1% were for medical reasons, and 5.9% were done upon their request, and the complications of CS were reported by about one third of them (33.5%).

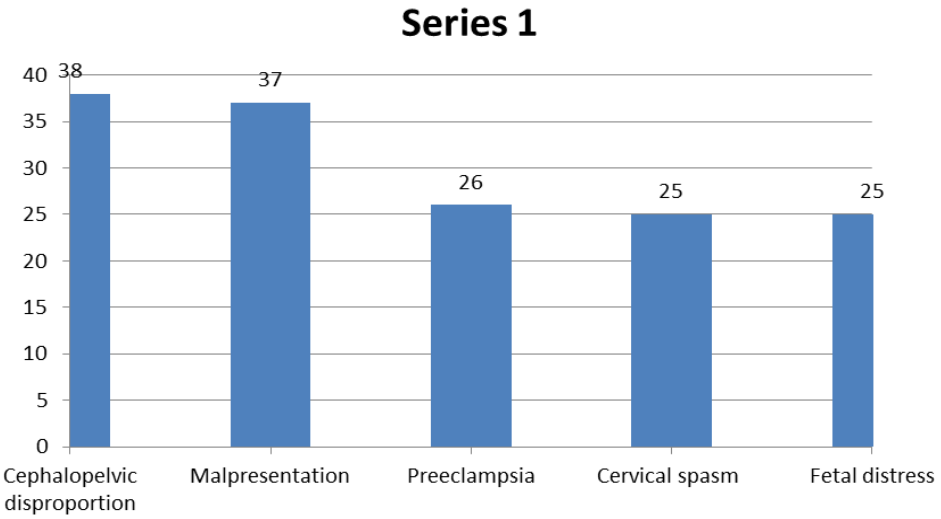

Figure 1: Self reported reasons for caesarean section.

Figure 1 Showed the medical reasons among the studied CS women. The top four reported reasons were cephalo-pelvic disproportion 38 (17.2%), malpresentation of the fetus 37 (16.8%), preeclampsia 26 (11.8%), and cervical spasm 25 (11.3%). In this context, it is worth to mention that 11 of the mothers (5%) did not know why they had been delivered by caesarean section. Among patients who had complications after caesarean section (n=74 (33.5%)), the most commonly reported complications were the problems related to anaesthesia (37.8%), inflammations (23%), adhesions (16.2%), and haemorrhage (12.2%) as depicted in figure 2.

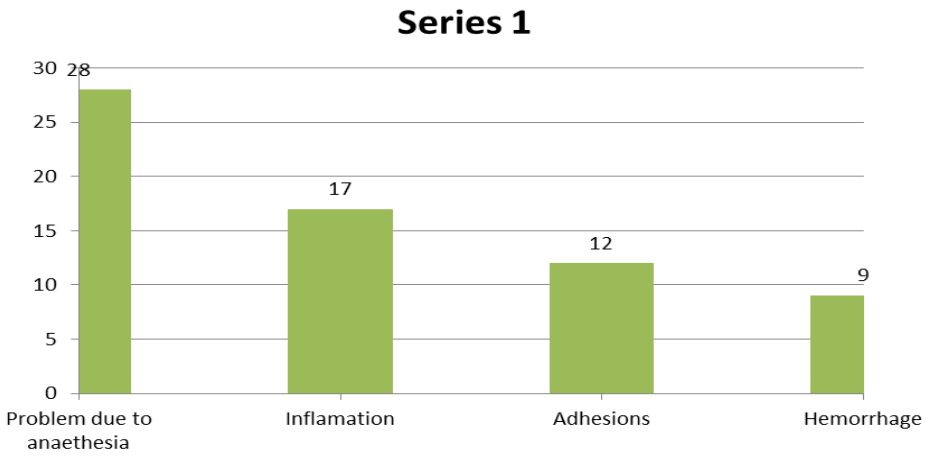

Figure 2: Common complications of caesarean section as reported by the mothers.

Table 3: Comparison of caesarean section among women according to their characteristics and reason of CS.

Characteristics	Reasons for CS				X^2	P
	Medical reasons		Maternal request			
	No	%	No	%		
Age at first delivery in years					6.777	0.034*
< 25	116	90.6%	12	9.4%		
25-< 30	66	98.5%	1	1.5%		
≥ 30	26	100.0%	0	0.0%		
Education level					5.23	0.728
Basic	63	100.0%	7	0.0%		
Bachelor	130	97.0%	4	3.0%		
Postgraduate	15	88.2%	2	11.8%		
Monthly income in SR					1.165	0.559
< 5.000	39	92.9%	3	7.1%		
5.000-<10.000	79	96.3%	3	3.7%		
≥ 10.000	90	92.8%	7	7.2%		
Medical insurance					1.472	0.225
Yes	49	90.7%	5	9.3%		
No	159	95.2%	8	4.8%		
Date of delivery**					0.613	0.923
Before 2005	20	100.0%	0	0.0%		
From 2005 to 2016	188	93.5%	13	6.5%		

*Significant

**Fisher exact test was used

Table 3 presented the comparison of CS groups (CS for medical reason vs. CS upon woman's request) according to their characteristics. The analysis demonstrated that the younger is the age of the mother the more likely she requests to deliver by caesarean section where 9.4% of the mothers aged < 25 years undergone caesarean section upon their request. The percentage of CS upon request, however, was much lower among mothers aged 25-< 30 years (1.5%), meanwhile, none of the mothers aged thirty or older at their first delivery requested CS from

their own, these differences are statistically significant (p= 0.034). Also, the higher percent of women reported that CS in their first delivery was upon their request was among highly educated women (11.8%) compared with other educational levels, although not reporting a significant statistical difference was detected. The percentage of women who requested CS in first delivery was also higher among mothers with monthly income ≥10,000 SR (7.2%), but without statistically significant differences.

The percentage of studied women undergone CS upon their request was higher among women with medical insurance (9.3%) by comparison to those who didn't have a medical insurance (4.8%). None of the studied women before 2005 had reported CS for their first delivery upon their request, and all maternal requests for CS were after 2005 (13/188), representing 6.9% of the caesarean sections done between 2005 and 2016.

DISCUSSION

The present study demonstrated a high prevalence rate of CS in the studied women in Madinah, Saudi Arabia. The prevalence was 56.7% (221/390), and the majority was found in the years from 2005 to 2016 (90.5%). The increased CS prevalence in the last decade has also been reported in previous local, regional and international studies. According to the Ministry of Health (MOH) annual report in 2006, the CS delivery in all governmental and private hospitals was presented 11% of all surgical procedures done during this year.[9] In an early Saudi study, a raise in CS rate by 80% was reported between 1997 and 2006.[8] Also, the recent retrospective study carried out byAl-Kadri et al.[10], conducted at King Abdulaziz Medical City, Riyadh, the rate CS delivery was found to jump from 12% during the year 2002 to become 20% during the year 2009.[10] Regionally, the prevalence rate of CS has found to significantly increase during the last decade. In Egypt, in a study conducted at Women's Health Hospital, Assiut, Egypt, during the period from 2008 to 2011, the rate of CS delivery was 32% (443/1357) in 2008 and 38% (626/1628) in 2011.[13] Globally, the rate of CS in USA was found to increase from 21% in 1996 to 32 % in 2007.[5] In Australia, the rate has raised in 2007 by around 9% in comparison to the reported rate in 1998.[6] Other countries with high rate of CS rates include Brazil (55.6%), Turkey (47.9%), South America (42.9%), Latin American and the Caribbean (40.5%), Italy (38.1%), and New Zealand (33.4%).[33]

The present study has suggested some possible medical reasons for the increased rate of CS during the studied period. The top five reasons reported by women in this study were

cephalo-pelvic disproportion 38 (17.2%), malpresentation of the fetus 37 (16.8%), preeclampsia 26 (11.8%), and cervical spasm 25 (11.3%). Potential causes for the increasing rates of CS are repeatedly reported in the previous studies and they were consistent with that reported in this study. Anatomical abnormalities, placental and cord abnormalities, and abnormal presentation were the most medical reasons for CS delivery.[11,16] The age of the pregnant women was also found to advance the possibility of caesarean section.[17] In this study, the age of women was related to CS, particularly those done on maternal request. In a previous Saudi study conducted on 393 nulliparous women at Abha maternity hospital, the most common indication for CS among the studied women were maternal age, failure of progress in labour, and antepartum haemorrhage.[33]

In the present study, caesarean section delivery on maternal request (CDMR) was representing 5.9% of totally reported CS, and 6.5% of CS done during the period from 2005 to 2016. Over the previous decade, a surge of interest in the topic was prompted by the results of a survey conducted in London in 1997 and it showed that 31% of the studied female obstetricians would choose CS delivery for themselves in case of uncomplicated pregnancy.[34] Thereafter, CDMR has taken its concern and importance in many research papers.[35,38] High rate CDMR was also obtained from other studies; where the reported rates of CDMR was found to range from 3% of all caesarean sections in USA[19], to 26.8% in Western Australia[20] and there are some indications that the rate might be increasing.[21] Recently, caesarean delivery on maternal request (CDMR) is added as a separate indication of CS delivery. However, the prevalence of CDMR is not precisely known in most countries, and is neither a well-defined clinical entity, nor is coded as such in official statistics.[18]

The increased rate of CDMR observed during this decade may be attributed to several factors including fear of pain; concerns about genital modifications after vaginal delivery as vaginal delivery may harm the genital area.[22,23] Financial aspects and the presence of health insurance are also found to affect the rate of caesarean delivery.[24,26] In the present study, the rate of CDMR was higher among women with medical insurance (9.3%), among women with monthly income ≥10,000 SR (7.2%), and among highly educated women (11.8%). Consistent with these findings, a recent study has reported the influence of maternal educational level and their husband's wealth in the prevalence of CS, particularly those performed on maternal request.[39] In this study, the rates was 33.3% among highly educated women which was nearly two times higher than the corresponding figures in the illiterates (14.8%) and women

with primary education (15.8%). Also, the rate of CS was 28.6% among high income women compared with 16.4% and 19.5% among low middle income women, respectively.[39]

It is pertinent here, however, to denote that CDMR is not risk free, and despite the woman's explicit request, litigation might arise in case of adverse outcome.[40] In the present study, the complications of CS were reported by 74 women (33.4%). The most common reported complications were the problems related to anaesthesia (37.8%), inflammations (23%), adhesions (16.2%), and haemorrhage (12.2%). Similar percent of CS complications was reported in a retrospective study on 371 women where the rate of complications in that study was 31% and the most common types were adhesions and bladder injury.[41] Compared with vaginal delivery, CS delivery carries a higher number of postpartum complications in an early retrospective study carried out by Levorro et al. in the university hospital of Bari during the period 1988-98.[42]

To best of available knowledge, the present study is considered the first study in Madinah city to explore the prevalence rate of CS among primi mothers. Also, the study has assessed the differentials of CS rate based on community based data and assessed the trend over a reasonable period of time (before 2005 and from 2005 to 2016). This study, however, has also number of limitations. Selection bias may have been a limitation factor in this study because not every member of the population under study in Madinah city has internet access. Also, recall of data about the first delivery may be a potential bias; however, because of its non-differential distribution among the whole studied women, this factor may have no effect on the study results.

In summary, the study revealed a considerable high rate of CS in Madinah city, Saudi Arabia. CS on request represented 6.5% of all CS between 2005 and 2016, and it was higher among young, highly educated, and women with medical insurance. Moreover, the observed high rate of CS in this study is alarming. Given the associated morbidity and mortality of CS, it is imperative that health authority in Madinah city to develop an appropriate strategy with aim to reduce unnecessary CS deliveries. Knowledge has to be disseminated, particularly to the future women in the high schools and universities, that CS when not medically indicated is not better than vaginal delivery. A large sample design on a large scale and over time is the key point for future research concerning this important topic.

ACKNOWLEDGEMENTS

The author would like to thank women who volunteered in this study. Also, the author would like to acknowledge Mr. Adel Ibrahim for his efforts in data processing and analysis.

Conflict of interest

The author declares that there no conflict of interest and the study was self-funded.

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