Risk Factors Associated with Cesarean Section in Babylon Maternity and Paediatrics Teaching Hospital

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Abstract

Cesarean section rates are increasing globally, mainly in developed countries. The World Health Organization stated that there is no justification to have cesarean section rates higher that 10-15%. Although it is necessary in some cases, but it also has high risks of complications for both woman and fetus. This study is a case-control study conducted on (151) women who had delivered in Babylon Maternity and Pediatrics Teaching Hospital during February 2019, and aims to determine its associated causes and risk factors. Participants aged (17-40) years with a mean age of (27.1 ± 5.9), 106 of them had a normal delivery, while 45 had a cesarean section. Older age was found to be significantly associated with cesarean section (P-value=0.006). Also, significant association was found between cesarean section and each of mother employment, parental education, diabetes mellitus, preeclampsia, anemia, history of stillbirth, previous cesarean section, breech presentation, and twin pregnancy (P-value < 0.05).

Keywords: Cesarean section; risk factors; Iraq

1. Introduction

The role of cesarean section (C/S) in the management of delivery has long been an important aspect for the last five centuries. It has helped in reducing maternal mortality during the recent century and half. Therefore cesarean section has become one of the most important public health concerns globally[1].

The rates of cesarean section are increasing worldwide, particularly in the developed countries[2]. The World Health Organization (WHO) had declared clearly in 1985 that "There is no justification for any region to have caesarean section rates higher than 10-15%"[3]. Therefore, concern and attention were directed on strategies and approaches to limit this increase in cesarean section, since higher rates of cesarean section are associated with increased risks for the mother and the newborn, and may complicate future pregnancies, as well as its high burden in the sources of the health system[4].

Although cesarean section is necessary in some cases, and may even be a life-saving procedure for both the mother and the newborn; but cesarean section is a surgical intervention that requires anesthesia, aseptic measures, and hospitalization, and impose a high risk for several complications[5]. These complications include hemorrhage, wound infection, septicemia, thrombosis, pulmonary embolism, and may even lead to death. Some complications are even related to the future, such as increased risk of future ectopic pregnancies and increased risk of placental problems in future pregnancies[6, 7]. The infant is at risk of cesarean section complications as well, and may develop

impairment in respiratory, gastrointestinal, metabolic, and immune system functionality[7].

An important point is that cesarean section is only required when there is a significant risk to the life of the mother or the fetus or both. However, some women are favoring cesarean section over normal vaginal delivery as a way to avoid the pain associated with normal delivery, ignoring the fact that pregnancy and delivery are normal physiological processes, and that these are generally less associated with complications than surgical intervention[8].

Several factors were reported to have a link to the likelihood of having cesarean section among pregnant women, these include premature rupture of the membrane, fetal distress, cephalo-pelvic disproportion (CPD), multiple pregnancy, breech presentation, and several other factors. Certain demographic characteristics are proposed to influence these factors, effectively leading to the occurrence of cesarean section[9].

2. Aim of the Study

This study aims to determine the causes and associated risk factors of cesarean section among pregnant females in Al- Hilla.

3. Patients and Methods

This study is a case-control study conducted on women who recently had delivered in Babylon Maternity and Pediatrics Teaching Hospital during February 2019. Collection of data from study participants was performed using an interview questionnaire designed for this purpose. Information collected included demographic information, smoking status for both the mother and father, education of both parents, obstetrical history of the recent pregnancy, past medical and obstetrical history, as well as the details of the recent delivery.

4. Statistical Analysis

Statistical Package for Social Sciences (SPSS®) Software version 23.0 for Linux® was used to perform statistical analysis for this study. Qualitative data are presented as numbers and percentages, while continuous numerical data are presented as mean ± standard deviation. Comparisons between study variables were performed using the Chi-square test for categorical data and Student's t-test for numerical data. P-value of < 0.05 was considered statistically significant.

5. Ethical Considerations

Informed consent was obtained verbally from all participants who agreed to be enrolled in the present study after describing for them the aims of this study and the aspects of data required. Collected information were handled with confidentiality, and certain measures were applied to ensure privacy and anonymity of collecting data during collection and analysis.

6. Results

This study included a total of (151) women who attended the hospital for delivery. Women who underwent cesarean section were (45) women, forming (29.8%) of the study population and considered as cases, while women who underwent non-operative delivery were (106) who constituted (70.2%) of the study population and were regarded as controls. Figure (1) illustrates the details of the study groups included.

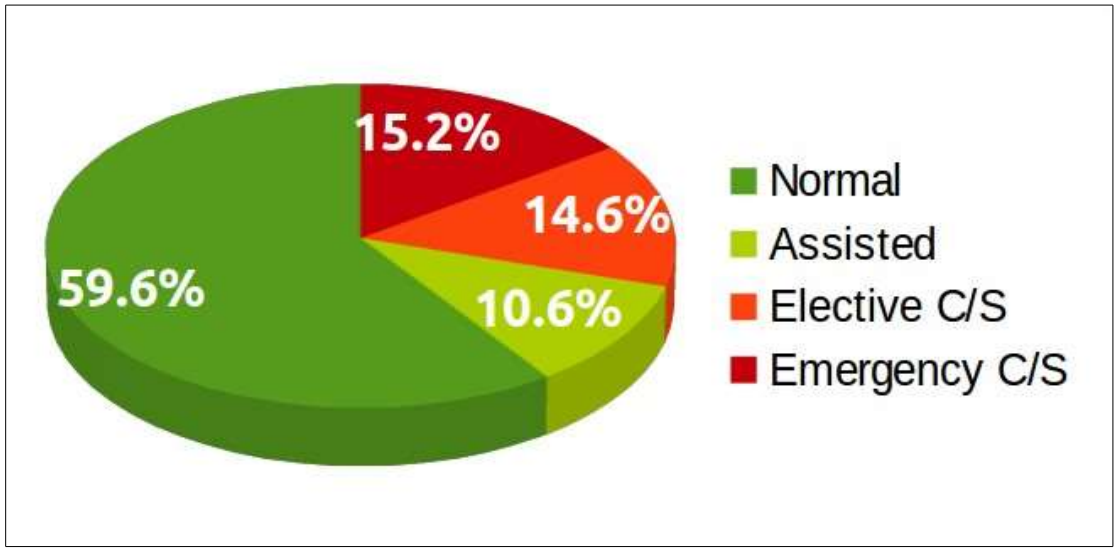

Figure (1): Mode of delivery of study participants

Age of participants ranged from (17) years to (41) years with a mean age of (27.1 ± 5.9) years and a median of (26) years. Age group distribution of the study participants are illustrated in Figure (2). Comparison of age between the two study groups was performed using Student's t-test. There was a significant difference in age between women with a normal delivery and those with cesarean section, P-value = 0.006, Table (1). Women undergoing cesarean section were about 3 years older than women with normal delivery (mean difference = 2.9 years).

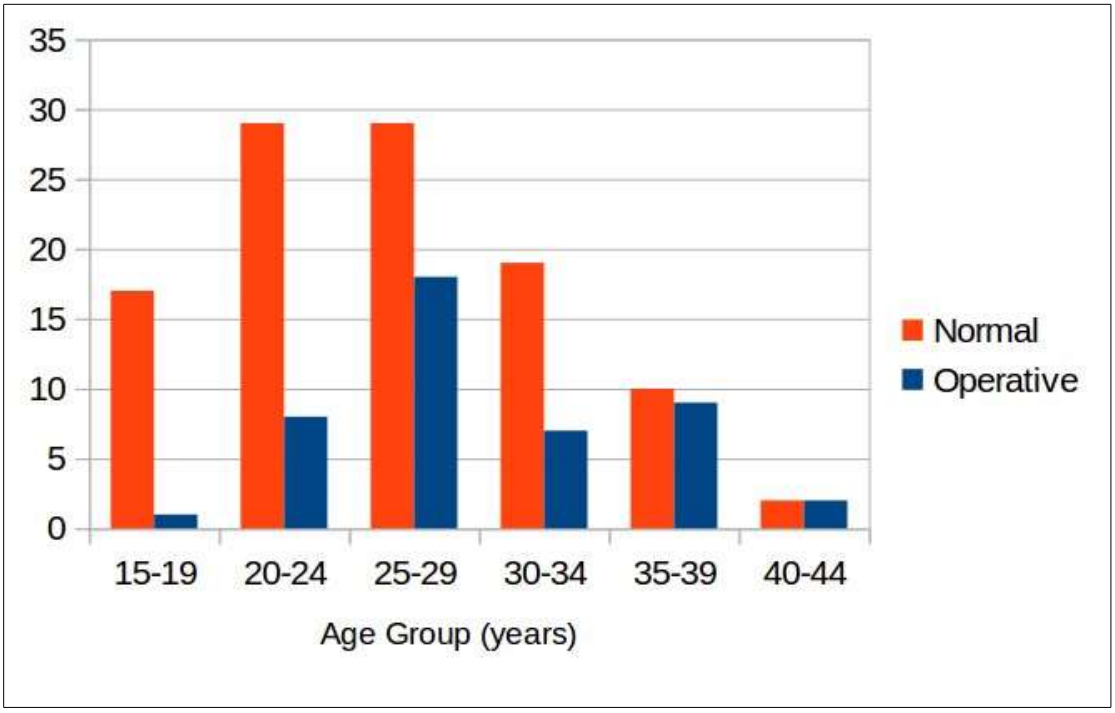

Figure (2): Age group distribution of the study groups

Table (1): Age characteristics of the study groups

Group	Age (years)			P-value
	Mean ± SD	Median	Range	
Normal delivery (n=106)	26.18 ± 5.70	25	17 - 40	
Cesarean section (n=45)	29.09 ± 6.12	28	19 - 41	**0.006**
Total (n=151)	27.05 ± 5.96	26	17 - 41	
Student's t-test = 2.81, P-value = 0.006				

Demographic data of the study participants, including employment and educational state, are presented in details in Table (2). There was a strongly significant relationship between mode of delivery and employment of the mother, with P-value = 0.007. Similarly, there was a significant relationship between both maternal and

paternal education with the mode of delivery, P-value = 0.023 and 0.029, respectively, as detailed in Table (2).

Table (2): Demographic characteristics of the study participants

Demographic Data		Normal delivery (n=106)	Cesarean section (n=45)	P-value
Residence	Urban	43 (69.35%)	19 (30.65%)	0.850
	Rural	63 (70.79%)	26 (29.21%)	
Mother employment	Housewife	91 (75.21%)	30 (24.79%)	**0.007**
	Employed	15 (50.00%)	15 (50.00%)	
Mother education	Illiterate	12 (57.14%)	9 (42.86%)	**0.023**
	Primary	51 (79.69%)	13 (20.31%)	
	High School	17 (53.13%)	15 (46.88%)	
	University	26 (76.47%)	8 (23.53%)	
Father education	Illiterate	9 (64.29%)	5 (35.71%)	**0.029**
	Primary	35 (85.37%)	6 (14.63%)	
	High School	38 (71.70%)	15 (28.30%)	
	University	24 (55.81%)	19 (44.19%)	

Smoking status of both the mother and the father were also compared to the mode of delivery as detailed in Table (3). No significant relationship was observed between mode of delivery and any maternal or paternal smoking, P-value = 0.811 and 0.418, respectively.

Table (3): Smoking status of the study participants

Smoking Status		Normal delivery (n=106)	Cesarean section (n=45)	P-value
Mother	Non-smoker	100 (70.42%)	42 (29.58%)	0.811
	Smoker	6 (66.67%)	3 (33.33%)	
Father	Non-smoker	56 (67.47%)	27 (32.53%)	0.418
	Smoker	50 (73.53%)	18 (26.47%)	

Body-Mass Index (BMI) of study participants ranged from (19.53) Kg/m^2 to (42.32) Kg/m^2 with a mean of (27.06 ± 3.54) and a median of (26.65). Figure (3) illustrates the nutritional status of study participants. Comparison between the two study groups regarding BMI did not reveal any relationship between mode of delivery and BMI, P-value = 0.830, Table (4).

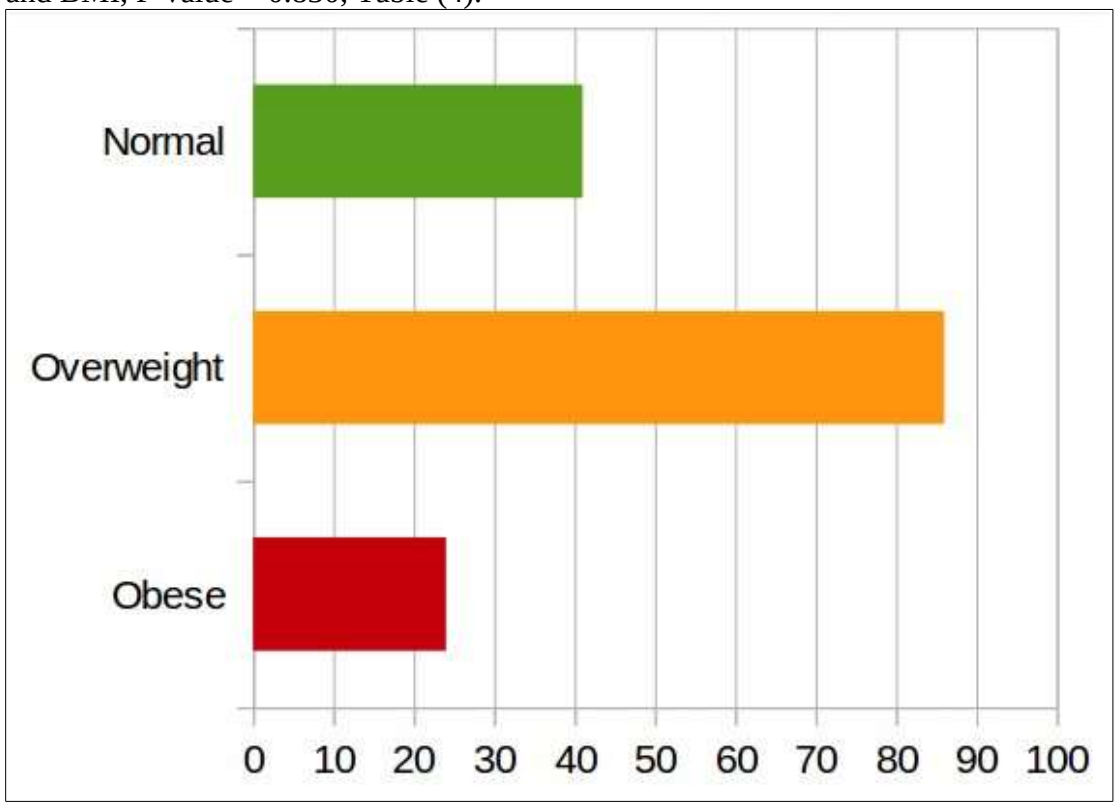

Figure (3): Nutritional status of study participants

Table (4): BMI of the study groups

Group	BMI (Kg/m^2)			P-value
	Mean ± SD	Median	Range	
Normal delivery (n=106)	27.10 ± 3.67	26.56	19.53 – 42.32	0.830
Cesarean section (n=45)	26.96 ± 3.22	27.06	19.53 – 33.33	
Total (n=151)	27.06 ± 3.54	26.65	19.53 – 42.32	
Student's t-test = 0.22, P-value = 0.830				

Both Antenatal care (ANC) visits during the recent pregnancy and number of previous deliveries were compared to the mode of delivery, neither of them had shown any relationship with mode of delivery, P-value = 0.236 and 0.089, respectively.

Certain possible risk factors for cesarean section (C/S) were compared between the two study groups using chi-square test in order to identify significant factors that had supposedly influenced the mode of delivery among study participants. These comparisons are presented in Table (5).

Diabetes was found to have a significant relationship with C/S, with P-value of (0.014) and odds ratio of (6.5) with 95% confidence interval (95% C.I.) of (1.21–34.87). Preeclampsia was also found to be significantly associated with cesarean section, with P-value of 0.011 and odds ratio of 3.5, (95% C.I. = 1.28-9.58). Another significant risk factor observed was anemia, with P-value = 0.003 and odds ratio = 3 (95% C.I. = 1.43-6.29).

History of stillbirth, previous history of C/S, breech presentation, and twin pregnancy all have a highly significant association with C/S, with P-value of less than 0.001, as detailed in Table (5). The most common indication for C/S was breech presentation, with a proportion of (31.11%). The second most common indication was previous C/S with proportion of (24.44%). Figure (4) illustrates the indications.

Table (5): Comparison of certain factors with mode of delivery

Factors		Normal delivery (n=106)	Cesarean section (n=45)	P-value
Diabetes Mellitus (DM)	Yes	2 (28.57%)	5 (71.43%)	**0.014**
	No	104 (72.22%)	40 (27.78%)	
Hypertension (HT)	Yes	8 (66.67%)	4 (33.33%)	0.780
	No	98 (70.50%)	41 (29.50%)	
Preeclampsia	Yes	8 (44.44%)	10 (55.56%)	**0.011**
	No	98 (73.68%)	35 (26.32%)	
Anemia	Yes	45 (59.21%)	31 (40.79%)	**0.003**
	No	61 (81.33%)	14 (18.67%)	
History of stillbirth	Yes	8 (36.36%)	14 (63.64%)	**< 0.001**
	No	98 (75.97%)	31 (24.03%)	
Previous C/S	Yes	4 (8.89%)	41 (91.11%)	**< 0.001**
	No	102 (96.23%)	4 (3.77%)	
Fetal presentation	Cephalic	106 (77.94%)	30 (22.06%)	**< 0.001**
	Breech	-	15 (100%)	
Pregnancy type	Singleton	106 (73.61%)	38 (26.39%)	**< 0.001**
	Twin	-	7 (100%)	

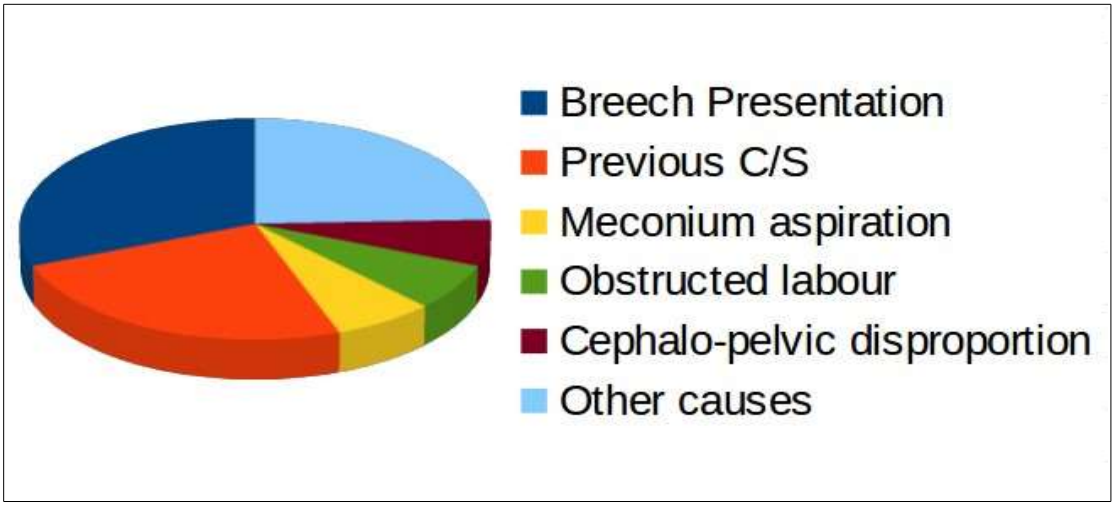

Figure (4): Indications for C/S among study participants

Regarding the birth weight of the newborn, there was no significant difference between women with normal delivery (mean = 3450g, SD = 3240g) and women with cesarean delivery (mean = 3330g, SD = 540g), P-value = 0.805.

7. Discussion

The results of the present study have demonstrated that older age of pregnant women is significantly associated with more occurrence of cesarean section. This finding is supported by the finding by Al-Busaidi et al. in their study conducted on 500 females in March 2009[10]. This association could be explained by the increased likelihood of older women to develop pregnancy complications such as preeclampsia and DM, as well as the decrease in uterine contractility that is related to the aging process.

Regarding demographic characteristics, the present study has demonstrated that educational level of both parents as well as the employment of the mother had a significant influence of the incidence of cesarean section. Batieha et al. had reached a similar conclusion in their study conducted in Jordan between 2011 and 2012, and included a sample of patients from 18 different hospitals in Jordan[9].

An interesting finding in the present study is that relationship between body-mass index (BMI) and cesarean section was observed to be non-significant. This finding contrasts with the finding by Al-Busaidi et al. in their study, which found that higher BMI was associated with more cesarean deliveries with an odds ratio of 2.11[10].

Diabetes mellitus was found to be a significant risk factor for cesarean section, with an odds ratio of 6.5. This is consistent with the finding by Al-Busaidi et al who identified diabetes as a risk factor with an odds ratio of 9.3[10]. Both anemia and preeclampsia were also significant risk factors in the present study. This is in concordance with the findings by Batieha et al. who found both anemia and preeclampsia to be significant risk factors[9]. However, the study of Batieha et al. demonstrated that smoking is a significant risk factor, while the present study did not find any significant relationship.

The history of previous stillbirth among women in the present study was found to be a highly significant risk factor. This is similar to the finding by Rajabi et al. in

their study conducted between 2012 and 2013 which included a total of (4229) pregnant women who were followed up until delivery[11]. Breech presentation was also found to be significantly associated with cesarean section with a P-value of < 0.001. This finding was also reported by Al-Busaidi et al. in their study, with a P-value of less than 0.001[10].

The present study did not demonstrate significant a relationship between the birth weight of the newborn and the occurrence of cesarean section. This finding however is different from the finding by Rajabi et al. who suggested a significant relationship between birth weight and cesarean section[11].

8. Conclusions

This study concludes that several risk factors are statistically associated with increased risk of having cesarean section for pregnant women in Al-Hilla city. These risk factors include older age, mother employment, low educational level of both parents, diabetes mellitus, preeclampsia, anemia, previous history of stillbirth, previous history of cesarean section, breech fetal presentation, and twin pregnancy.

The study also found that more than half the Cesarean sections are due to either breech presentation or history of previous cesarean section. Smoking, hypertension, and body-mass index (BMI) were found to have no association with Cesarean section.

9. Recommendations

i A prospective cohort study with large sample size is recommended to further establish the temporal and causal link between risk factors of cesarean section and its incidence in pregnant women.

ii Pregnant women with any of the identified risk factors require additional attention and regular follow up in order to reduce the likelihood of requiring cesarean section and also to reduce any associated complications for the mother and the newborn.

iii Good glycemic control and good monitoring of hemoglobin level during pregnancy are recommended in order to reduce the risk of having cesarean section.

Conflict of Interests.

There are non-conflicts of interest .

10. References

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17.

الخلاصة

إن معدلات الولادة القيصرية تتزايد في كل دول العالم خصوصا في الدول المتقدمة. وقد صرحت منظمة الصحة العالمية عن عدم وجود مبرر لحدوث الولادة القيصرية بنسبة تفوق ١٠–١٥٪. ورغم انها ضرورية في بعض الحالات، الا انها ايضا تعرض الام والطفل إلى مضاعفات خطيرة. هذه الدراسة هي دراسة للحالات والشواهد اجريت على(١٥١) إمرأة في مستشفى بابل للولدة والأطفال ممن انجبن في شباط ٢٠١٩، وتهدف الدراسة إلى تحديد الاسباب والعوامل المرتبطة بحدوث الولادة القيصرية. تتراوح اعمار النساء المشمولات بالدراسة من(١٧–٤٠)سنة مع معدل(٢٧,١ ± ٥,٩)، ١٠٦ منهن انجبن بشكل طبيعي، في حين ٤٥ منهن انجبن بولادةقيصرية. تم إيجاد علاقة معتمدة إحصائيا بين تقدم العمر وزيادة حدوث الولادة القيصرية (قيمة P= ٠,٠٠٦)، كذلك تم إيجاد إرتباط معتمد إحصائيا بين الولادة القيصرية وكل من عمل الام،مستوى التعليم للوالدين، داء السكري، تسمم الحمل، فقر الدم، حدوث ولادة ميتة سابقا، حدوث ولادة قيصرية سابقا، وضع الجنين المقعدي، والحمل بالتوائم (قيمة P أقل من ٠,٠٥).

الكلمات الدالة: ولادة قيصرية؛ عوامل الخطورة؛ العراق