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Epidemiology of Cesarean Delivery in Qassim, Saudi Arabia

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Abstract

BACKGROUND: There is a global increase in the rate of cesarean deliveries, with the higher morbidity and mortality. Few published data on cesarean delivery exist in Qassim, Kingdom Saudi Arabia (KSA).

OBJECTIVES: To investigate the incidence, type, indications, maternal and perinatal outcomes of cesarean delivery.

METHODS: A retrospective study was conducted during three months (August-October 2016) at Maternity and Children's Hospital (MCH), Buraidah, Qassim, KSA. The medical files of parturient women during the period were revised and the data extracted through questionnaires.

RESULTS: There were 936 deliveries during the study period. The mean (SD) of their age, parity and gestational age were 28.6 (6.3) years, 3.0 (2.1) and 38.8 (1.6) weeks, respectively. Out of these 936 deliveries, 396 (42.3%), 21 (2.2%), 114 (12.2%), 405 (43.3%) were vaginal, instrumental, elective and emergency cesarean deliveries, respectively. The indications of the cesarean delivery were; repeated cesarean deliveries (201, 21.5%), failure to progress (87, 9.3%), fetal distress (72, 7.7%); breach (60, 6.4%), antepartum hemorrhage (54, 5.8%), hypertension (36, 3.8%) and diabetes mellitus (9, 1.0%) and more than one indication (6; 0.6%). In binary regression, while age, parity, birth weight and newborn gender were not associated with cesarean delivery, education ≤ secondary level (OR = 2.40, 95% CI = 1.59-3.61, P < 0.001), obesity (OR = 2.30, 95% CI = 1.51-3.48, P < 0.001 and morbid obesity (OR = 3.48, 95% CI = 2.16-5.60, P < 0.001) were associated with cesarean delivery. Nine (2.2%) vs three (0.6%), P = 0.03 women in the group of the cesarean and vaginal delivery respectively developed endometritis. Apgar score at one minute was significantly lower in newborn delivered by cesarean. There were three stillbirths (all of them were delivered by emergency cesarean), P = 0.120. Fifty-four of the newborn was admitted to the nursery; 39 (7.5%) vs.15 (3.6%) were delivery by cesareans vs vaginal delivery; P = 0.010.

CONCLUSION: There is a high incidence of cesarean delivery in this hospital; most of them were due to repeated cesarean delivery. Obese women were at higher risk of cesarean delivery.

Introduction

There is an alarming increase in the rate of cesarean delivery worldwide [1]. World Health Organization (WHO) recommends a cesarean delivery rate of 10-15% [2] [3]. There is a great variation in the prevalence of cesarean delivery where a low rate of a cesarean delivery observed in some circumstances in countries with low resources indicate an unmet need for this procedure while the high rate in others countries might reflect unnecessary intervention. The rise in cesarean delivery rates is a major public health problem worldwide because of an increase in the maternal and the perinatal adverse effects [2] [4] [5] [6].

In spite of the safety of cesarean delivery that has dramatically improved over time with recent advances in medicine, there are still risks associated with this operation, e.g. hemorrhage, visceral injury, thromboembolism, infections, and risks to subsequent pregnancies, including miscarriage, antepartum hemorrhage, uterine rupture, preterm labor and neonatal mortality [7] [8] [9]. Furthermore, a growing based-evidence documenting recent complications that were not included in the previous traditional reports, e.g. cesarean delivery is associated with offspring obesity, allergy, metabolic disturbance and

even cerebral palsy for which cesarean was previously advocated was not reduced but even increased by cesareans [10] [11] [12].

Previous reports from the different regions of the kingdom of Saudi Arabia (KSA) showed an increase in the overall cesarean delivery rate by 80.2% from 10.6% in 1997 to 19.1% in 2006 [13]. Likewise, Bondok et al., [14] observed that the cesareans delivery rate exceeded the acceptable (15%) rate recommended by the WHO at King Fahd Armed Forces Hospital, Jeddah, KSA [3].

Research on the incidence, indications, maternal and perinatal outcomes of cesareans delivery is of paramount for practising clinicians and health planners. The current study was conducted to investigate the epidemiology of cesarean delivery (incidence, types, indications, predictors, maternal and perinatal complications of Cesarean delivery) at Maternity and Children's Hospital (MCH), Buraidah, Qassim, KSA.

Methods

A retrospective study was conducted during three months (August-October 2016) at MCH, Buraidah, Qassim, KSA. The MCH is the main tertiary hospital in the region. The hospital accepts the referred cases from the other hospitals in the area as well as the women who have antenatal visits in the hospital. The medical files of parturient women during the period were revised and the data extracted through questionnaires. Twins deliveries were excluded. The data were; age, parity, gestational age, educational levels, Job and body mass index (BMI) was computed from the weight and height and expressed as weight/ square height in meter, Table 1. Then the mode of the delivery was recorded as well as gender, birth weight and Apgar score.

Table 1: Definition and categories of variables used in the analysis of the caesarean delivery

Variable	Definition and categories
Maternal age in years	Original variable presents the mother's age as continues variable. However, in the analysis mother's age was entered as it is and it was not significant. If it was significant, we planned to a categorical variable.
Parity	The original variable was continuous, and it was not significant in the analyses. If it was so we planned to group it into three categories; primiparae, porous (2 - 5 children) and multiparae > 5.
Maternal education	Variable was constructed from two variables; 1st is ever attended school. Women who reported that they attended secondary or university levels were grouped. Therefore categories were; illiterate/intermediate or less (≤8 years) and secondary or above (>8 years.
Body mass index	Was calculated from the weight/ (height, m) ^{2} and entered as a continuous variable which was significant. Then it was categorised as underweight (<18.5 kg/m^2, normal weight, (18.5-24.9 kg/m2), overweight (25-29.9 kg/m2) obese (≥30 kg/m2) and morbidly obese.
Child sex	Male /female
Gestational age	It is the pregnancy duration in weeks.
Birth weight	It the birth weight in g.
Stillbirth	It the delivery of a dead infant after 24 weeks of gestation.

A sample size of 936 women was calculated guided by the previous rate of cesarean delivery in the area [13]. This sample size has over 80% power to detect a difference of 5% at $\alpha = 0.05$. We assumed that 10% of the women might not respond or have incomplete data.

Statistics

The data were entered in the computer using SPSS software for Windows version 20.0(SPSS, Inc, Chicago, IL). The mean (SD) and the proportions of the maternal and perinatal characteristics were compared between the cases with cesarean and vaginal delivery using Student t- test, X^2(and Fisher exact tests), respectively. The binary regression analysis was performed where cesarean delivery was the dependent variable, and independent variables were age, parity, education, antenatal care, residence, body mass index, haemoglobin and fetal gender. The corrected Odd ratios and 95% confidence interval were calculated. P value < 0.05 was considered statistically significant.

The work received ethical clearance from the Research Board at Ministry of Health, Qassim, KSA.

Results

There were 936 deliveries during the study period. The mean (SD) of their age, parity and gestational age were 28.6(6.3) years, 3.0 (2.1) and 38.8 (1.6) weeks, respectively.

Around three-quarter (777; 83.0%) of these women had secondary education and three-quarter (711; 76.0%) were housewives.

There were 9 (1.0%), 159 (17.0%), 345 (36.9%), 216 (23.1%) and 207 (22.1%) women who were underweight, normal weight, overweight, obese and morbidly obese, respectively.

Out of these 936 deliveries, 396 (42.3%), 21 (2.2%), 114 (12.2%), 405 (43.3%) were vaginal, instrumental, elective and emergency cesarean deliveries, respectively. The incidence of the cesarean delivery (both elective and emergency) was 55.4%.

The indications of the cesarean delivery were; repeated cesarean deliveries (201, 21.5%), failure to progress (87, 9.3%), fetal distress (72, 7.7%); breach (60, 6.4%), antepartum hemorrhage (54, 5.8%), hypertension (36, 3.8%) and diabetes mellitus (9, 1.0%) and more than one indication (6; 0.6%), Figure 1.

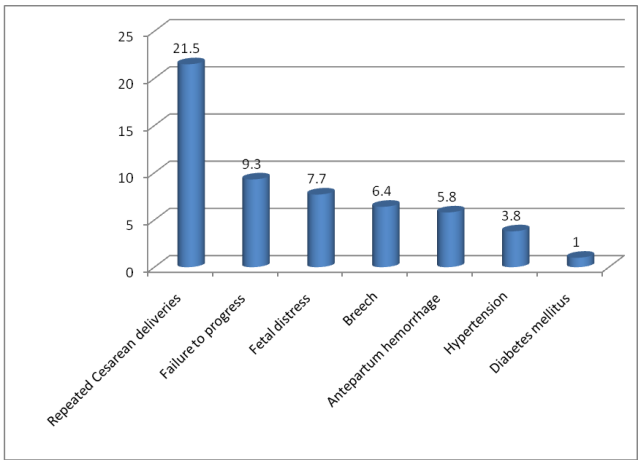

Figure 1: Indications of Cesarean delivery at Maternity and Children Hospital, Qassim, Kingdom of Saudi Arabia

While there was no significant difference in the mean (SD) of the parity and haemoglobin level in the women who delivered vaginally and women who delivered by cesarean, women who delivered by cesarean were elder and had significantly higher BMI, Table 2.

There was no significant difference in the job and gender of the newborn between women who delivered vaginally and those who delivered by cesareans. Significantly a higher number of women with education≤secondary level delivered by cesarean, Table 2.

Table 2: The mean (SD) of the maternal variables in women who delivered vaginally and women who delivered Cesarean at Qassim, Kingdom of Saudi Arabia

Variable	Vaginal delivery (n = 417)	Cesarean delivery (n = 519)	P
Mean (SD) of			
Age, years	28.1(5.7)	29.1(6.7)	0.016
Parity	2.9(1.8)	3.1 (2.3)	0. 159
Gestational age, weeks	38.9 (1.7)	38.8(1.5)	0. 641
Body mass index, kg/cm^2	29.0 (5.4)	31.0 (6.1)	< 0.001
Hemoglobin, g/d	10.7(1.3)	10.7(1.2)	0.869
Frequency (%) of			
Housewives	309 (74.1)	402 (77.5)	0.249
Education≤secondary level	324 (77.7)	453 (87.3)	< 0.001
Male gender	202 (48.4)	265(51.0)	0.379

There was no maternal death. Nine (2.2%) vs three (0.6%), P = 0.03 women in the group of the cesarean and vaginal delivery respectively developed endometritis. While Apgar scores at one minute were significantly lower in newborn delivered by cesarean, the mean (SD) of the birth weight and Apgar scores at five minutes were not different between the two groups, Table 3.

Table 3: Comparing birth weight and APGAR scores between neonates delivered vaginally and by Cesarean at Qassim, Kingdom of Saudi Arabia

Variable	Vaginal delivery (n = 417)	Cesarean delivery (n = 519)	P
Birth weight, g	3176.7 (487.1)	3189.2 (521.4)	0.706
APGAR score at one minute	7.5 (1.0)	7.2 (1.3)	< 0. 001
APGAR score at five minutes	8.0 (0.9)	7.9 (0.9)	0. 503

In binary regression, while age, parity, birth weight and newborn gender were no associated with cesarean delivery, education ≤ secondary level (OR = 2.40, 95% CI = 1.59-3.61, P < 0.001), obesity (OR = 2.30, 95% CI = 1.51-3.48, P < 0.001 and morbid obesity (OR = 3.48, 95% CI = 2.16-5.60, P < 0.001were associated with cesarean delivery, Table 4.

Table 4: Binary regression analyses for factors associated with cesarean delivery in Qassim, KSA

Variable	OR	95% CI	P
Age, years	1.02	0.99 –1.05	0.149
Parity	1.03	0.94–1.13	0. 493
Housewives	1.01	0.71–1.41	0.964
Education≤ secondary level	2.40	1.59–3.61	<0.001
Body mass index, kg/cm^2			
Normal weight	Reference	Reference	
Overweight	1.38	0.87–2.19	0.163
Obese	2.30	1.51–3.48	<0.001
Morbidly obese	3.48	2.16–5.60	<0.001
Hemoglobin, g/d	1.01	0.91–1.13	0.763
Male gender	0.99	0.73–1.33	0.961
Birth weight	1.00	0.99–1.00	0.041

There were three stillbirths (all of them were delivered by emergency Cesarean), P = 0.120. Fifty-four of the newborn was admitted to the nursery; 39 (7.5%) versus 15 (3.6%) were delivery by cesareans vs vaginal delivery; P = 0.010.

Discussion

The main findings of the current study were; there was a high rate of cesarean delivery (55.4 %.), and obese women were at higher risk to deliver by cesarean. This goes with the previous report which showed an increase of in the rate of cesarean delivery in the different region of KSA. Both vaginal breech and operative vaginal deliveries showed a significant decrease of 38% and 29%, respectively [13]. In a retrospective analysis, the cesareans delivery rate exceeded the acceptable 15% rate suggested by the World Health Organization (WHO) [3] at King Fahd Armed Forces Hospital, Jeddah, KSA [14]. In contrast, a lower rate (12%) cesarean delivery has been estimated in developing countries based on nationally representative data from 82 countries [6]. Recent reports from sub-Saharan Africa showed that out of 1276 women underwent a cesarean delivery, the most common indications were obstructed labor (399, 31%), poor presentation (233, 18%), previous cesarean delivery (184, 14%), and fetal distress (128, 10%), uterine rupture (117, 9%) and antepartum hemorrhage (101, 8%) [15]. Likewise, it has been shown that previous cesarean, a referral from another facility and suspected cephalopelvic-disproportion, vaginal bleeding near full term, hypertensive disorders, previous cesarean delivery and premature rupture of membranes were the main indications of cesarean delivery [16]. It has recently been shown that repeated previous cesarean, failure-to-progress,

breech presentation and hypertensive disorder, were the main indications of cesarean delivery in Khartoum Sudan [17]. On the other hand, many African couturiers have a low rate of cesarean delivery, e.g. the rate of cesarean section was 4.5% in Congo, and it was between 0.1% and 1% in Kenya, Rwanda, Southern Sudan, and Uganda [18] [19]. Many explanations could behind the low rate of cesarean deliveries in African countries such as hospital/institution distance where the lowest cesarean delivery rates were found in the more remote part of the hospital catchment area in Rwanda [20]. However recent reports showed that one third and two-fifths of the deliveries in Yemen and Sudan respectively were cesareans [17] [21].

The high rate of cesarean delivery in this hospital could be explained by the low rate of instrumental delivery as well as because the hospital is tertiary referral hospital receiving the high-risk patients. It has been mentioned that in Jordan there was rising rate of cesarean sections and a significant decrease in the use of both the vacuum extractor and the forceps after the new millennium during the 15-year period [22].

Repeated cesarean deliveries, failure to progress, fetal distress and breech were the main indication of cesarean delivery in the current study. Previous reports showed that fetal distress, previous cesareans and breech presentation were the most common indications for cesarean delivery in a tertiary level hospital in Jeddah, KSA [14]. Kamil et al. observed that fetal distress was the commonest indication for cesareans at Women Specialized Hospital Riyadh, King Fahd Medical City, KSA [23].

Maternal age and parity were the most associated factors for cesareans, and fetal distress was the commonest indication for cesareans at Women Specialized Hospital Riyadh, King Fahd Medical City, Kingdom of Saudi Arabia [23]. In the current study; repeated cesarean delivery, failure to progress, fetal distress; breech, antepartum haemorrhage, hypertension and diabetes mellitus were the main indications of cesarean delivery. It has recently been shown that 44.2% of cesarean deliveries were emergency ones and repeated previous cesarean, failure-to-progress, breech presentation and hypertensive disorder, were the main indications of cesarean delivery in Khartoum Sudan [17].

Likewise in, the vast majority (three-quarters) of the Cesareans were emergencies, and maternal indications accounted for two-third of the cesareans [24]. The current study showed that body mass index was significantly higher in women delivered by cesareans. Previous recent reports showed that obese women were at four times at higher risk to deliver by cesarean delivery [17]. The previous study showed that maternal age and parity were the most associated factors for cesareans and fetal distress was the commonest indication for Cesareans at Women Specialized Hospital Riyadh, King Fahd Medical City, Kingdom of Saudi Arabia [23].

In the current study, there was no difference in the gestational age, Apgar scores and there was no maternal death. This goes with the previous reports where Gasim et al., 2013 reported no maternal death in their recent study of complicated cesareans. They reported that the number of preterm birth and low Apgar scores<7 at 5 minutes were significantly higher in complicated Cesareans [25].

In conclusion, there is a high incidence of cesarean delivery in this hospital; most of them were due to repeated cesarean delivery. Obese women were at higher risk of cesarean delivery.

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