

Effect of Booking Status on Mode of Delivery and Postnatal Maternal Outcome

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Background: Booking status refers to an aspect of antenatal care experienced by pregnant women. There have been other studies that examined the relationship between booking status and maternal health in different parts of the world. The Middle East region lacks publications regarding this topic.

Objective: To evaluate the booking status on mode of delivery, postnatal complications and morbidities.

Design: A Retrospective Study.

Setting: Bahrain Defence Force Hospital, Bahrain.

Method: A total of 223 unbooked and 276 booked patients were analyzed and included in the study. Age, parity, BMI, miscarriages, Cesarean sections, fetal gender, fetal birth weight, fetal anomalies, maternal serology, Beta-hemolytic infection, Candida infection, bacterial vaginosis, infertility history, diabetes mellitus, sickle cell trait and placental abnormalities were documented. The data were analyzed using StatDirect. P-value of less than 0.05 was considered significant.

Result: Booked patients consisted mostly of older women (31.6±6), the majority of whom, have had previous Cesarean sections and infertility history. Furthermore, booked patients delivered earlier through Cesarean section and experienced longer hospital stay, including readmissions and complications.

Conclusion: Booked patients are most likely to undergo Cesarean sections where they would experience adverse events such as longer hospital stays and postnatal complications.

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A booked case is defined as the antenatal care received by pregnant women¹. A pregnant woman is confirmed to be booked if she attended at least three antenatal clinic visits and received at least one dose of tetanus immunization. In addition, she is confirmed to be booked if she makes a minimum of two visits two weeks before delivery².

The aim of booking is to monitor and improve the health quality of the mother and fetus throughout the duration of the pregnancy. This is crucial due to the morbidities associated with pregnancy. According to the World Health Organization, 830 women die from pregnancy or childbirth-related complications around the world per day; the majority of those fatalities could have been prevented³.

The maternal mortality ratio in 2015 was 239/100,000 live births in developing countries and 12/100,000 live births in developed countries⁴. This might be due to the fact that in developed countries, nearly all women have at least 4 antenatal care visits, while in developing countries, only 40% of pregnant women had the same treatment⁴.

A study found that unbooked mothers had a statistically significant incidence of pre-eclampsia and they were 13 times more likely to die in the hospital⁵. Another study found that unbooked mothers were less likely to deliver by spontaneous vaginal delivery and were twice as likely to have infant asphyxia with an Apgar score of <7⁶.

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The aim of this study is to evaluate the effect of booking status on the mode of delivery and postnatal maternal outcomes.

METHOD

A total of 223 unbooked and 276 booked patients from January 2017 to March 2017 were included in the study. Age, parity, BMI, nationality, miscarriages, Cesarean sections, fetal birth weight, fetal anomalies, maternal serology, Beta-hemolytic infection, Candida infection, bacterial vaginosis, infertility history, diabetic status, sickle cell status, and placental abnormalities were documented.

The patients were divided into three groups according to nationality: Gulf (Bahraini, Saudi, Kuwaiti, Emirati, Omani, Qatari, and Yemeni), Asian (Indian, Pakistani, Bangladeshi, Filipino, Sri Lankan and Thai) and others (Syrian, Jordanian, Iraqi, Egyptian, Sudanese, Somali, Kenyan, Russian, Moroccan, British, Seychellois and Bulgarian). Positive infertility history included patients with infertility or previous fertility treatment. Estimated fetal weight was the fetal weight estimated before delivery. Placental abnormalities included placenta previa and placental abruption. Maternal screening for previous infection was performed at the first trimester. The screening serology included VDRL, HBs AG, anti-HCV antibodies and HIV. GBS infection screening through a swab collection from the cervix/vagina was performed. Preterm delivery was classified as any delivery before 37 completed gestational weeks.

Data were analyzed using StatsDirect statistical package. A two-sided unpaired t-test was used to assess the difference in mean maternal age, maternal BMI and gestational age at delivery. The Chi-square test was used for assessing the percentages. The Fisher-Freeman-Halton exact test was used in crosstabs; the test was used to compare percentage of previous infertility, SCT and antenatal anomalies. P-values of less than 0.05 were considered statistically significant.

RESULT

Two hundred and twenty-three unbooked and 276 booked patients were included in the study. Maternal age differed between both groups; unbooked patients were 30.1±6.5 years while booked patients were 31.6±6 years, P-value of 0.008. The unbooked group had fewer Bahraini patients and more Indian/Pakistani patients compared to the booked group, P=0.0005. Furthermore, the booked group had more patients with previous Cesarean sections and previous infertility, P<0.0001 and P<0.001, respectively. The booked group also had more patients with DM, 44 (15.9%) compared to 15 (6.7%) in the unbooked group. There were no differences between the groups regarding maternal BMI, parity, previous miscarriage and PMH, see table 1.

The booked group had more patients with multiple pregnancies, P<0.0001. The estimated fetal weight and actual fetal birthweight were higher in unbooked patients, P-value of <0.0001 in both cases. In addition, positive maternal serology proved significant in favor of booked patients with a P-value of 0.02. Several other antenatal features did not prove significantly different between the two groups including fetal gender, antenatal anomalies and placental abnormalities,

Table 1: Patients Characteristics

	Unbooked Patients (N=223)	Booked Patients (N=276)	P-value
Maternal Age in Years (mean ± SD)	30.1±6.5	31.6±6	0.008*
Maternal BMI in kg/m ² (mean ± SD)	30.5±6.3	30.7±5.9	0.798*
Nationality			
Bahraini/GCC	156 (70%)	227 (82.2%)	0.0005***
Indian/Pakistani/Asian	37 (16.6%)	17 (6.2%)	
Other	30 (13.4%)	32 (11.6%)	
Parity median (range)	2 (9-0)	2 (11-0)	0.84**
Previous miscarriage median (range)	0(4-0)	0 (9-0)	0.37**
Previous cesarean	14 (6.3%)	79 (28.6%)	<0.0001***
Previous infertility	1 (0.5%)	15 (5.4%)	0.001****
PMH	53 (23.8%)	83 (30.1%)	0.12***
DM	15 (6.7%)	44 (15.9%)	0.001***
SCT	3 (1.4%)	0 (0%)	0.08****

*two-sided unpaired t-test **Mann-Whitney U test ***Chi-square ****Fisher-Freeman-Halton exact

Table 2: Antenatal History

	Unbooked Patients (N=223)	Booked Patients (N=276)	P-value
Multiple pregnancy	5 (2.2%)	41 (14.9%)	<0.0001***
Fetal gender			
Female	117 (52.5%)	134 (48.6%)	0.384***
Male	106 (47.5%)	142 (51.4%)	
Estimated fetal weight median (range)	2.8 (4-0.6)	2.6 (3.8-0.500)	<0.0001**
Actual fetal birthweight median (range)	3.1(4.4-0.645)	2.7 (4.3-0.516)	<0.0001**
Antenatal anomalies	1 (0.5%)	4 (1.5%)	0.39****
Placenta abnormalities	13 (5.8%)	27 (9.8%)	0.11***
Maternal serology +ve	14 (6.3%)	34 (12.3%)	0.02***
BHS +ve	33 (14.8%)	52 (18.8%)	0.23***
Candida +ve	32 (14.4%)	41 (14.9%)	0.87***
BV +ve	47(21.1%)	42 (15.2%)	0.09***

*two-sided unpaired t-test **Mann-Whitney U test *** Chi-square **** Fisher-Freeman-Halton exact

Candida and beta-hemolytic infections. However, the presence of bacterial vaginosis infections was predominant in unbooked patients, P-value of 0.09 not statistically significant, see table 2.

Booked patients had more preterm deliveries, 27 (9.8%), compared to 6 (2.7%) in the unbooked group, P=0.001. The booked group also had double the chance of a Cesarean delivery, 144 (52%) compared to 64 (28.7%) in the unbooked group, P<0.0001. Booked patients were more likely to have a longer hospital stay, P<0.0001. In addition, 205 (74.3%) of

the booked patients experienced postnatal complications with P-value of <0.0001 compared to 98 (44%) of the unbooked patients. Booked patients were also more likely to experience hospital readmissions, P-value of 0.0005, see table 3.

Table 3: Maternal Outcome

	Unbooked patients (N=223)	Booked patients (N=276)	P-value
Preterm delivery	6 (2.7%)	27 (9.8%)	0.001**
Gestational age at delivery mean \pm SD	37.8 \pm 2.5	34.9 \pm 2.6	<0.0001*
Cesarean delivery	64 (28.7%)	144 (52%)	<0.0001***
Hospital stay median (range)	2 (17-1)	3 (21-1)	<0.0001**
Postnatal complications	98 (44%)	205 (74.3%)	<0.0001***
Hospital readmission	91 (40.8%)	156 (56.5%)	0.0005***

*two-sided unpaired t-test **Mann-Whitney U test ***Chi-square
****Fisher-Freeman-Halton exact

DISCUSSION

Booking status in pregnancy reflects the level of medical care received during the antenatal period. Logically, booked patients should experience a better pregnancy course and delivery outcome. In a systematic review, the researchers concluded that positive pregnancy experience matters across all cultural and sociodemographic contexts¹¹. Abalos et al found conflicting recommendations provided by different guidelines focusing on the antenatal care period¹². Several studies concluded that unbooked mothers were more likely to experience negative pregnancy outcomes^{7,8,9,12}. In our study, we found that booked patients have a higher Cesarean section rate, longer hospital stay and higher rate of postnatal complications. This could simply reflect that those patients were considered to be at risk of complications, hence were booked. However, unbooked mothers are assessed less frequently, therefore, would be more unaware of any insidious conditions.

We also found that booked patients were more likely to have preexisting infertility and diabetes. Patients with preexisting medical conditions are more attentive to the need of attending for booking to prevent any adverse outcome. Those patients will end up needing early interventions to prevent any deterioration in their condition. In our study, booked patients gave birth to offspring with a younger median gestational age of 34.9 weeks. This finding reflected in a higher Cesarean delivery rate of 52%. Furthermore, more surgical delivery meant more complications and longer hospital stay. Contrary to this finding, Chourasia et al found no difference in Cesarean section rate between the booked and unbooked groups².

Booked patients had higher rates of preterm delivery (9.8%) compared to unbooked patients (2.7%) and had a higher incidence of low birthweight offspring. This may be due to the higher incidence of maternal complications, which may contribute to the early onset of labor. Haftu et al reported a preterm delivery rate of 52% among women with complete adherence to antenatal clinic visit¹³. On the other hand, other studies found that unbooked patients were more likely to experience poor maternal outcomes in contrast to our finding⁶. Similarly, a study reported higher preterm delivery in unbooked patients 8.7% compared to 6% in booked patients².

Unbooked patients had a lower incidence of previous Cesarean section. This primes the patient to perceive the pregnancy as more of a natural phenomenon with no need for monitoring. Meanwhile, the higher incidence of previous Cesarean sections in booked patients highlights the frequency of past complications.

The two groups in our study had similar high BMI. Our findings were inconsistent with other studies, which supported the idea that unbooked patients were more likely to experience morbidity². Maternal age was higher in the booked patients which implies higher exposure to adverse events. Furthermore, this may relate to the higher rates of infertility witnessed in the booked patients. This association is dissimilar with other studies, where women generally proved to be at a younger age despite experiencing similar adverse effects². A woman's perception of antenatal care is a very crucial factor when discussing the booking implication. A survey of 223 pregnant patients reported suboptimal rates of screening and management of antenatal risks¹⁴.

This study had limitations as it was retrospective. Therefore, not all the relevant data was available. The booking status was documented by the staff at the labor admission room. Furthermore, 223 unbooked and 276 booked patients were selected randomly. This would create bias and would result in an inadequate representation of both patient groups. This study may be improved by collecting data prospectively.

CONCLUSION

Booking status impacts maternal outcome by increasing the likelihood of Cesarean-section, in which the patients would experience more adverse events such as longer hospital stays and postnatal complications.

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