

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

Danyal Qureshi\* Rawan Abduljalil, MB BCh BAO (part I)\*\* Aysha Nabeel Nadham, MRCOG 1, MD, BSc\*\*  
Abeer ALSada, German Board in OB/GYN and Minimal Invasive Surgery Fellowships\*\*\*  
Abida Qureshi, MBBS, MCPS, MRCOG, FRCOG\*\*\*  
Nawal Dayoub, MD, FRCOG, Msc\*\*\*\*

**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.

*Bahrain Med Bull 2020; 42 (1): 47 - 50*

A booked case is defined as the antenatal care received by pregnant women<sup>1</sup>. 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 delivery<sup>2</sup>.

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 prevented<sup>3</sup>.

The maternal mortality ratio in 2015 was 239/100,000 live births in developing countries and 12/100,000 live births in developed countries<sup>4</sup>. 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 treatment<sup>4</sup>.

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 hospital<sup>5</sup>. 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 <7<sup>6</sup>.

---

\* Medical Student  
Royal College of Surgeons in Ireland – Medical University Bahrain  
\*\* Resident  
\*\*\* Consultant  
\*\*\*\* Consultant IVF  
Department of Obstetrics and Gynecology  
Banoon Assisted Reproduction Centre  
Bahrain Defence Force Hospital  
Kingdom of Bahrain  
E-mail: danyalq\_001@hotmail.com, nawaldayoub@doctors.org.uk

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 <sup>2</sup> (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%)	<b>0.001**</b>
Gestational age at delivery mean $\pm$ SD	37.8 $\pm$ 2.5	34.9 $\pm$ 2.6	<b>&lt;0.0001*</b>
Cesarean delivery	64 (28.7%)	144 (52%)	<b>&lt;0.0001***</b>
Hospital stay median ( range)	2 (17-1 )	3 (21-1)	<b>&lt;0.0001**</b>
Postnatal complications	98 (44%)	205 (74.3%)	<b>&lt;0.0001***</b>
Hospital readmission	91 (40.8%)	156 (56.5%)	<b>0.0005***</b>

\*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 contexts<sup>11</sup>. Abalos et al found conflicting recommendations provided by different guidelines focusing on the antenatal care period<sup>12</sup>. Several studies concluded that unbooked mothers were more likely to experience negative pregnancy outcomes<sup>7,8,9,12</sup>. 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 groups<sup>2</sup>.

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 visit<sup>13</sup>. On the other hand, other studies found that unbooked patients were more likely to experience poor maternal outcomes in contrast to our finding<sup>6</sup>. Similarly, a study reported higher preterm delivery in unbooked patients 8.7% compared to 6% in booked patients<sup>2</sup>.

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 morbidity<sup>2</sup>. 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 effects<sup>2</sup>. 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 risks<sup>14</sup>.

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.**

**Author Contribution:** All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

**Potential Conflicts of Interest:** None.

**Competing Interest:** None.

**Sponsorship:** None.

**Acceptance Date:** 4 October 2019.

**Ethical Approval:** Approved by the Ethical Committee, Bahrain Defence Force Hospital, Bahrain.

## REFERENCES

1. NHS. Your Antenatal Care: Your Pregnancy and Baby Guide. 2019. <https://www.nhs.uk/conditions/pregnancy-and-baby/antenatal-midwife-care-pregnant/> Accessed on 5 April 2019.
2. Chourasia S, Yadav K. Analytical Study to Assess Fetal

- and Perinatal Outcome in Booked and Unbooked Obstetric Cases. *Int J Reprod Contracept Obstet Gynecol.* 2017; 6(1):203-206.
3. Alkema L, Chou D, Hogan D, et al. Global, Regional, and National Levels and Trends in Maternal Mortality Between 1990 and 2015, with Scenario-Based Projections to 2030. *Obstetric Anesthesia Digest* 2016; 36(4):191.
  4. World Health Organization. Maternal Mortality. 2018. <https://www.who.int/en/news-room/fact-sheets/detail/maternal-mortality> Accessed on 5 April 2019.
  5. Chigbu B, Onwere S, Kamanu C, et al. Pregnancy Outcome in Booked and Unbooked Mothers in Southeastern Nigeria. *East African Medical Journal* 2010; 86(6): 267-71.
  6. Gonied A. Maternal Complications and Perinatal Outcomes in Booked and Unbooked Mothers. *Journal of American Science* 2011; 7(10): 792-796.
  7. Santpur U. Maternal and Fetal Outcome among Booked and Unbooked Pregnancies in India. *Indian Journal of Obstetrics and Gynecology* 2017; 5(4):557-560.
  8. Simkhada B, Teijlingen E, Porter M, et al. Factors Affecting the Utilization of Antenatal Care in Developing Countries: Systematic Review of the Literature. *Journal of Advanced Nursing* 2008; 61(3):244-260.
  9. Zahid B, Khawaja N, Tayyb R. Obstetric Outcome of Cases Referred to a Tertiary Care Hospital after Trial of Labor. *Annals of King Edward Medical University* 2016; 11(3): 289-291.
  10. Downe S, Finlayson K, Tunçalp Ö, et al. What Matters to Women: A Systematic Scoping Review to Identify the Processes and Outcomes of Antenatal Care Provision that are Important to Healthy Pregnant Women. *BJOG* 2016; 123(4):529-39.
  11. Abalos E, Chamillard M, Diaz V, et al. Antenatal Care for Healthy Pregnant Women: A Mapping of Interventions from Existing Guidelines To inform the Development of New WHO Guidance on Antenatal Care. *BJOG* 2016; 123(4):519-28.
  12. Ekwempu CC. The Influence of Antenatal Care on Pregnancy Outcome. *Trop J Obstet Gynaecol* 1988; 1(1):67-71.
  13. Haftu A, Hagos H, Mehari M, et al. Pregnant Women Adherence Level to Antenatal Care Visit and its Effect on Perinatal Outcome among Mothers in Tigray Public Health Institutions. *BMC Res Notes* 2018; 11: 872.
  14. Waller A, Bryant J, Cameron E, et al. Women's Perceptions of Antenatal Care: Are We following Guideline Recommended Care? *BMC Pregnancy Childbirth* 2016; 16(1):191.