Bangladesh J Obstet Gynaecol, 2023; Vol. 38(2): 84-91

Reduction of Adverse Maternal Outcomes by Adequate Antenatal Care- Evidence In A Tertiary Care Hospital In Bangladesh

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Abstract:

Objective: *The objective of the study is to assess the reduction of adverse maternal outcomes by adequate antenatal care*

Materials and methods: *This cross-sectional study took place within the timeframe of January 2023 to August 2023 at the Department of Obstetrics and Gynecology, Delta Medical College Hospital in Dhaka, Bangladesh. Ethical approval was granted by the Institutional Review Board (IRB) of Delta Medical College Hospital. The study focused on 226 women who gave birth at the hospital during the specified period. A minimum of four antenatal care (ANC) visits were considered standard practice. The primary focus of the study was to examine the correlation between ANC visits and maternal outcomes.*

Result: *The average age of the participants was 27.98±5.01 years, with 75.2% being housewives. Approximately 16% were married before the age of 18. Antenatal care from a registered physician was received regularly (e"4 visits) by over 87% of participants. Primigravida accounted for 33.6% of the participants, and more than 84% gave birth via cesarean section. Prevalence of preterm labor was found in 22.6% of the participants, 12.8% experienced premature rupture of membranes, gestational diabetes mellitus (12.4%), and hypertensive disorders during pregnancy (8.8%). A notable association was found between consistent antenatal care and positive maternal outcomes. Logistic regression analysis indicated that regular antenatal checkups act as a protective factor against adverse maternal outcomes. Pregnant women who received regular antenatal checkups encountered 62% less adverse maternal outcomes. so, we can state that 38% of pregnant women who did not receive regular antenatal checkups have the probability of encountering more adverse maternal outcomes.*

Conclusion: *ANC care is an effective method for reducing adverse maternal outcome*

Keywords: *Antenatal care, effectiveness, delivery, adverse maternal outcome.*

Introduction

Addressing death and morbidity among mothers remains an obstacle to advancing global health and attaining equity in the health sector[1].

Maternal mortality rates are increasing in numerous countries, but this concerning picture has received limited recognition in both the medical and general media[2]. Every two minutes in 2020, a woman

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succumbed to death due to preventable causes associated with pregnancy[3]. According to the World Health Organization (WHO), females of childbearing age (15–49) consistently experience pregnancy, childbirth, and post-delivery-related complications, including pre-eclampsia, eclampsia, anemia, hemorrhage, and maternal and perinatal deaths[4,5]. Regrettably, a significant number of these complications and the associated maternal fatalities occur in low- and middle-income countries with fragile healthcare systems. To mitigate these issues, antenatal care (ANC) was introduced to offer comprehensive support for pregnant women.

Antenatal care (ANC), a comprehensive health approach designed to improve maternal and fetal well-being during pregnancy, has the overarching goal of minimizing adverse outcomes for all pregnant women[6]. The care that women receive during this time is improved by regular interaction with medical professionals and ensures that they get essential health services for both themselves and their unborn children[7]. Antenatal care is essential for reaching the Sustainable Development Goals (SDG), which aim to achieve a decline in the maternal mortality rate to below 70 per 100,000 live births by 2030. In 2016, the World Health Organization (WHO) endorsed a revised ANC model, increasing the number of contacts from four visits to eight, with the target of minimizing prenatal demise and enhancing pregnancy outcomes[8,9].

The primary objectives of ANC are to decrease maternal fatalities and enhance healthcare facilities. ANC providers are categorized as qualified (including physicians, nurses, midwives, and community health care workers). In a study, it has been shown that, in the South Asian region, 55% of women attained four antenatal care visits, with urban areas exhibiting a greater likelihood (77%) compared to rural areas (56%), resulting in a 21% urban-rural gap[11]. Between 2004 and 2017, Bangladesh witnessed a 31% increase in ANC coverage. Concurrently, the rate of 4 or more ANC visits escalated from 17% to 47%[12]. Despite the WHO's 2016 recommendation of eight visits for comprehensive antenatal care, Bangladesh's national guidelines persist in advocating four or more ANC visits[13].

ANC facilities yields many beneficial effects, such as screening for complications during pregnancy, evaluating risk factors, addressing potential issues during the gestational period, dispensing information to pregnant women, and preparing them physically and psychologically for the journey of childbirth and parenthood[13–15]. Comprehensive ANC care contributes to improving maternal well-being by reducing the risks of maternal near miss, postpartum hemorrhage, preterm labor, and anemia[16–18].

Therefore, this study was designed to evaluate the effectiveness of antenatal care in reducing adverse maternal outcomes.

Materials and methods

This cross-sectional study was conducted at the Department of Obstetrics and Gynecology, Delta Medical College Hospital, Dhaka, Bangladesh, from January 2023 to August 2023. Ethical clearance was obtained from the Institutional Review Board of Delta Medical College Hospital. All women who gave birth at the Department of Obstetrics and Gynecology, Delta Medical College Hospital, during the study period were considered for inclusion in the study. Women without ANC records and those who never received ANC were excluded. The study population comprised 226 pregnant women. Purposive sampling method was used to select participants who willingly provided written consent after being fully informed about the study's objectives and procedures.

The data was collected using a pre-tested questionnaire, which was administered through various methods, including reviewing the case notes of the participants during ANC, birth records, and conducting face-to-face interviews. Obstetric history, including gestational age at first antenatal care (ANC) visit, number of ANC visits, and documentation of activities conducted during each visit. These activities may include blood pressure and weight measurements, the administration of the Tetanus Toxoid Vaccine (TTV), as well as any laboratory investigations. The information regarding the fetal and maternal outcome of deliveries was obtained from the delivery notes.

Microsoft Excel was used for data entry and cleaning. SPSS version 25.0 was used to perform the statistical analysis. In the process of calculating descriptive statistics, continuous variables were either given as mean and standard deviation or, if suitable, as median and interquartile range, while categorical data were summarized using frequencies and percentages. The association between antenatal check-up and maternal outcome was summarized using the chi-square test.

Logistic regression was employed to evaluate the correlation between the regularity of antenatal care and adverse maternal outcome. P-values less than 0.05 were considered statistically significant.

Result

The mean age of the participants was 27.98±5.01 years. Three-fourths of them were housewives. More than one-third were graduates. About 16% got married before they reached 18 years (Table I). More than 87% of participants regularly (≥4 visits) received antenatal care from a registered physician (Figure-1). One-third of the participants were primigravida. And more than 84% of the participants gave birth to the baby by cesarean section (Table II). Just less than one-fourth of the participants delivered a fetus before reaching the term. About 12.8% suffered from premature rupture of the membranes, gestational diabetes mellitus (12.4%), and hypertensive disorder in pregnancy (8.8%) (Figure-2). A significant association was observed between receiving irregular antenatal care and adverse maternal outcome (Table III). No significant association was observed between age, education, occupation, residence, etc., and maternal outcome. Logistic regression signifies that regular antenatal checkup acts as a protective factor against adverse maternal outcome. Pregnant women who received regular antenatal checkup encountered 62% less adverse maternal outcome (Table IV).

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Table-I

Socio-demographic characteristics of the study participants (N=226)

Demographic Characteristics		Frequency	Percentage
Age (years)	≤20	15	6.6
	21-30	138	61.1
	>30	73	32.3
	Mean ±SD	27.98±5.01	
	Median (range)	28 (17-43)	
Residence	Rural	49	21.7
	Urban	177	78.3
Religion	Islam	214	94.7
	Hinduism	12	5.3
Education	Up to Primary	15	6.6
	Secondary	32	14.2
	Higher Secondary	77	34.1
	Graduation	86	38.1
	Post Graduation	16	7.1
Occupation	Housewife	170	75.2
	Service	24	10.6
	Student	22	9.7
	Others	10	4.4
Age at marriage (years)	<18	36	15.9
	≥18	190	84.1

Data presented as frequency, percentage, Mean ±SD, Median (range)

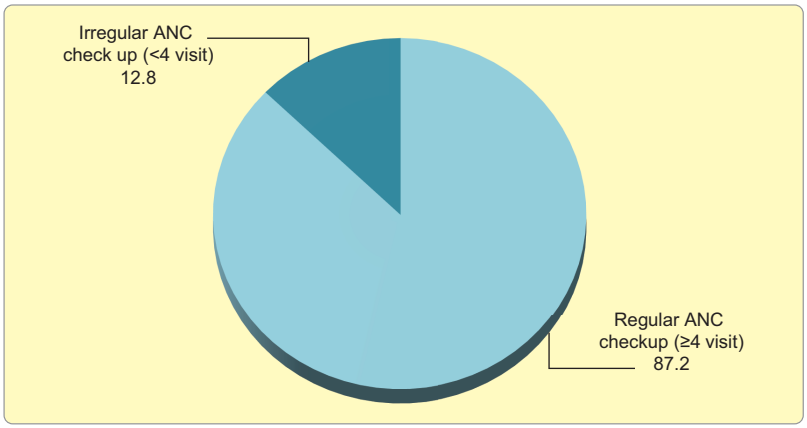

Figure 1: *Proportion of receiving antenatal care/check-up*

Table-II

Obstetrical history of the participants (N=226)

Obstetrical history		Frequency	Percentage
Gravidity	Primigravida	76	33.6
	Multigravida (2-4)	138	61.1
	Grand multipara (e”5)	12	5.3
Parity	Nulliparous	93	41.2
	1-3	130	57.5
	≥4	3	1.3
Mode of Delivery	Vaginal	35	15.5
	Cesarean section	191	84.5

Data presented as frequency, percentage

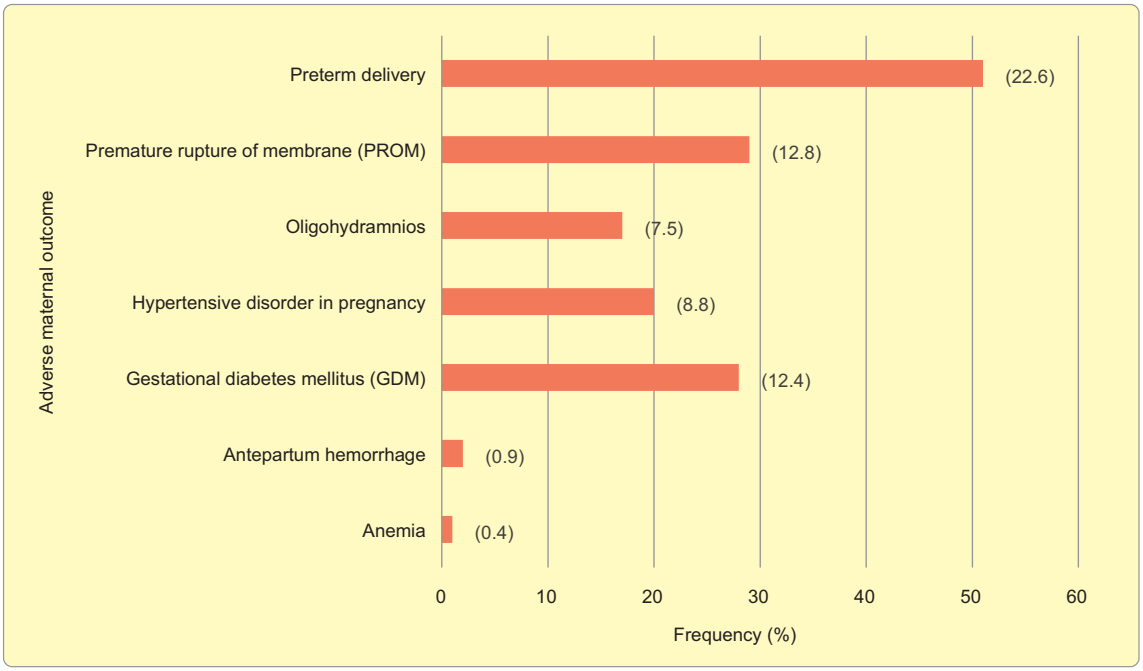

Figure 2: *Distribution of adverse maternal outcome*

Preterm delivery was reported by 22.6% of the respondents.

Table-III

Association of antenatal check-up and maternal outcome (N=226)

Antenatal Checkup	Maternal outcome		Total	P value
	Adverse	Normal		
Regular (≥4 visit)	83 (42.1)	114 (57.9)	197 (100.0)	0.018
Irregular (<4 visit)	19 (65.5)	10 (34.5)	29 (100.0)	
Total	124 (54.9)	102 (45.1)	226 (100.0)	

Chi-square test was done

Table-IV

Logistic regression for development of adverse maternal outcome in regular antenatal care or check-up

Factor	Odds ratio	95% Confidence interval		P value
		Lower	Upper	
Regular antenatal check-up	0.38	0.17	0.87	0.021

Data were presented as Odds ratio, 95% confidence interval. In this study Odds ratio is 0.38. This indicates 62% reduction of adverse maternal outcome who received regular antenatal care.

Discussion:

Antenatal care (ANC) is a cost-effective and accessible method to improve the health of pregnant mothers.[19] Inadequate antenatal care is a key factor leading to undetected complications during pregnancy, which can lead to maternal mortality and morbidity.[20] This study emphasized the need for the effectiveness of antenatal care in lessening adverse maternal outcome.

In this study, most of the women (61.1%) belonged to the age group of 21-30 years with a mean age of 27.98±5.01 years, 84% of women were married at more than 18 years of age, more than half of the women were (61%) multigravida (2-4) and most of the women (57.5%) were documented with parity (1-3), LSCS was mentioned as a way of delivery by 84.5% of women. An observational study carried out among 950 women in a tertiary hospital in Africa, consistently found that the mean age of their study population was 30.39±5.57 years, the most common age group was (31-35 years).[21] Akhila, Prasanth, and Bhavani narrated that, almost all (96%) of their study population chose to get married at more than 18 years of age, cesarean section reported by 30% of women.[22]

A positive finding of this study was that almost 87% of the women took regular ANC (WHO recommended minimum 4 antenatal visits). Seth Amponsah-Tabi and colleagues similarly found that more than half of their study participants (63.4%) received adequate ANC.[21] The findings were correlated with present study.

The present study revealed that among the participants most of them (78%) lived in an urban area, almost all of them were Muslim (95%), about 38% were graduate, three fourth of them were housewives (75%). A secondary data analysis was conducted by Bangladesh Demographic and Health Surveys (BDHSs) to find out the quality of antenatal care in Bangladesh along with the influencing factors. From this report, it had been similarly narrated that, about 35% of participants belonged to the age group of 20-24 years, 72% of participants lived in rural areas, 22.3% were economically rich, more than half (52%) of the study population completed their secondary level of education, and almost all of them (92%) were Muslim by religion.[20]

Preterm delivery had the most common (22.6%) detrimental effect on maternal health, documented in this study followed by PROM (13%), GDM (12.4%), hypertensive disorder in pregnancy (8.8%), APH (0.9%), and anemia (0.4%). In a systematic review by Jennifer Hollowell, stated that mothers who delivered at preterm (89%) suffered from most unfavorable consequence.[23] Another observational study of Mesfin Tadesel, revealed that the manifestation of adverse pregnancy outcome was 28.3% including obstructed labor (7.4%), retained placenta (5.3%), pregnancy with hypertensive disorders (2.4%), and preterm birth (2.3%).[24] The findings were quite different from this study. This might be due to the difference in age group, lifestyle, and different study designs.

In the present study, logistic regression reveal that maintaining a regular schedule of antenatal checkup acts as a safeguard against unfavorable maternal outcome. Pregnant women who received regular antenatal checkup encountered 62% less adverse maternal outcome. Several research published comparable findings. A systematic review from Yifru Berhan and Asres Berhan noted that receiving both antenatal care and giving birth in a healthcare facility provides an additional benefit in lowering maternal mortality. In the absence of antenatal care and choosing non-facility deliveries, there is a potential risk for delayed recognition of pregnancy-related complications, thereby elevating the chance of maternal mortality.[25] Some other studies have demonstrated a significant rise in poor maternal outcome among women who don't undergo adequate ANC.[26–30] These findings highlighted the need to improve the standard of ANC provided to women during their pregnancies.

In a cross-sectional study conducted by Akhila and colleagues, binary logistic regression results indicated a robust connection between socioeconomic status and the frequency of antenatal care visits, impacting the pregnancy outcome of their study population. Furthermore, another logistic regression in the same study narrated a significant link between low birth weight as a dreadful maternal outcome and ANC visits, as well as between ANC visits and stillbirths/ abortions.[22]

Ebisa Turia and colleagues conducted a systematic review and meta-analysis where they observed that ANC has a significant impact on preventing maternal near-miss cases in Ethiopia. A minimum of one ANC visit was capable of preventing about 75% maternal adverse incidents in Ethiopia.[31] Jesmin Pervin conducted a cohort study in rural Bangladesh and revealed a connection between the frequency of antenatal visits and preterm birth. Women with less than one antenatal care visit had a 2.4 times higher adjusted risk of preterm birth compared to those who took more than three antenatal care visits. This study encountered certain limitations, notably a small sample size, and the possibility of recall bias emerged due to retrospective questioning conducted during interviews with the participants.

Conclusion

In conclusion, the study revealed the important implications for maternal healthcare, with notable percentages of adverse events observed among participants, including preterm labor, premature rupture of membranes, gestational diabetes mellitus, and hypertensive disorders during pregnancy. Crucially, a significant positive association is found between consistent antenatal care and more favorable maternal outcomes, indicating that pregnant women who received regular antenatal checkups encountered sixty-two percent fewer adverse maternal outcomes. These findings underscore the vital role of routine antenatal care in mitigating the adverse events and improving overall maternal well-being.

Recommendation

Prioritizing healthcare staff training along with identifying the barriers for pregnant women who have received ANC to enhance overall quality. Interventional studies are required to conclusively establish the link between antenatal care quality and unfavorable maternal outcome.

Acknowledgements

Cordial gratitude and regards to all participants who participated voluntarily in the study. Special thanks to the doctors who cordially helped for data collection.

Conflict of Interest

There is no conflict of interest

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