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Critical Role of Antental Care in Improving Perinatal and Neonatal Outcomes

Rabia Naeem, Nazma Gul, Sumbal Pervez, Neelam Hassan, Noreen Khattak, Hina Gul

ABSTRACT

Objective: To determine the essential role of antenatal care in enhancing perinatal and Neonatal Outcomes in a Women Attending Obgyn OPD, in Lady Reading Hospital, Peshawar.

Study Design and Setting: Descriptive cross-sectional study, carried out in the Obstetrics & Gynaecology Department of Lady Reading Hospital, Peshawar.

Methodology: Six months study conducted from 9th May 2021 to 9th November 2021. A total of 107 women presenting with age between 20 to 45 years, primiparous, with single gestation, any antenatal visits were enrolled. Data was collected and statistically analyzed by SPSS version 21.

Results: Among 107 women, the average age was 27 years ±5.74. Sixty-five (61%) women had =4 antenatal visits, Moreover, 7(7%) babies had fetal distress, 11(10%) babies were admitted to NICU, 6(6%) babies had early neonatal death, 4(4%) babies had low birth weight, 13(12%) babies had pre term birth. perinatal outcomes have no significant difference with antenatal visits as still birth (P=0.366), fetal distress (P=0.549), admitted to NICU (P value = 3903), early neonatal death (P value = 759), low birth-weight (P=0.551), pre-term delivery (P=0.202).

Conclusion: This research highlights the critical role of Antenatal Care (ANC) in reducing adverse perinatal outcomes, aligning with established evidence. ANC enables early identification and management of pregnancy complications, promotes healthy behaviors, and ensures timely interventions.

Keywords: Perinatal Outcome, Antenatal Visit, NICU, Preterm Birth

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INTRODUCTION:

Antenatal care deals with early detection of pregnancy disorders and prevention of these disorders. It actually, is the key to modern obstetrics.[1,2] The common causes of mortality and morbidity among women aged 15 to 49 in underdeveloped nations, are the complications arising during pregnancy and childbirth.[3] Every year, around 287,000 women die due to pregnancy-related causes globally; 99% of these deaths occur in developing countries. Ethiopia ranks first among the developing countries in terms of mortality and morbidity rates in pregnant women.[4] In developing nations, nearly all women during pregnancy receive prenatal care at least once, while in sub-Saharan countries, where women take ANC services at least once, the estimate is about 68%, and the majority of them visit the health facilities on their third visit.[5]

The timing of a woman's first antenatal care (ANC) visit, the total number of ANC visits, and adverse perinatal outcomes may occur because of the failure to attend the recommended ANC services.[6] Maternal health statistics are similarly concerning. Pakistan's maternal mortality rate is high, with 350 deaths per 100,000 live births, though in some rural areas, this figure rises to 700 deaths per 100,000 live births. This translates to approximately 30,000 maternal deaths annually.[7] Several factors contribute to this elevated mortality rate, such as the limited access to prenatal care and skilled birth attendants.[8] Only about 30 percent of pregnant women in Pakistan receive prenatal care, and fewer

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than 20 percent of deliveries are attended by trained health professionals.[9] In rural areas, approximately 90 percent of deliveries are handled by untrained or semi-trained traditional birth attendants. The total fertility rate is 4.1 births.[10] There are numerous impediments to the early commencement and use of prenatal care. Financial hurdles to early antenatal care include a lack of health insurance, difficulty arranging an appointment, distances from care venues, a lack of transportation, and childcare issues. Young maternal age, poor social status, low parental income, and high parity have all been shown as sociodemographic barriers to early prenatal care initiation.[11]

Many studies have shown that ANC has a positive influence on perinatal outcomes, including lowering the risk of low birth weight, postpartum hemorrhage (PPH), premature birth, and perinatal mortality. Recommends four consecutive ANC visits for all low-risk pregnant women.[12] The total adherence rate of women to ANC visits was 49.9%, and the perinatal outcomes of stillbirth, low birth weight, early and late neonatal death, were about 24.3%, 7.5%, 12.3%, 12.7%, and 11.9%, respectively.[13] Improving community-based prenatal care services can increase child survival.[2] the majority of neonatal and maternal deaths are avoidable; antenatal care is one of the strategic and important key steps for reducing pregnancy-related mortality and morbidity, by prompt detection and treatment of complications in earlier pregnancy periods. To improve the health of pregnant women during childbirth and encourage utmost care, ANC is a widely utilized strategy. To determine the frequency of Perinatal and Neonatal Outcomes in a Women Attending Obs and Gynae Unit in Lady Reading Hospital, Peshawar. The findings will help enhance antepartum fetal well-being surveillance and inform local health researchers on the importance of intensive intrapartum fetal monitoring and postpartum care in our population.

METHODOLOGY:

This descriptive cross-sectional study was conducted in the Obstetrics & Gynaecology Department of Lady Reading Hospital, Peshawar, over six months period, from May 9, 2021, to November 9, 2021. The sample size was 107, calculated using a 7.5% proportion of low birth weight,[14] a 95% confidence level, and a 5% margin of error, determined via the WHO sample size calculator. Ethical approval was obtained from the Institutional Review Board (Ref. No. 546/LRH/MTI on dated 29-07-2020), and informed consent was collected from all participants. Participants were recruited using a non-probability consecutive sampling technique. All women aged 20 to 45 years, primiparous, carrying a single fetus, and attending antenatal check-ups at the hospital from 24 weeks onward based on their last menstrual period (LMP) were included. Both new and follow-up patients who met the inclusion criteria were recruited from the clinic. Women were recruited upon their arrival for antenatal check-ups, and their inclusion was determined at that point. Those who delivered either vaginally or through cesarean section (CS) within the first 24 hours postpartum were included in the study. Exclusion criteria consisted of women with pregnancies involving congenital anomalies, known medical comorbidities, preterm or obstructed labor, antepartum hemorrhage, or chorioamnionitis. Antenatal Care Contacts, defined as the number of antenatal visits made by the pregnant woman to the healthcare facility during her pregnancy. In this study, antenatal care contacts were categorized based on the number of visits and analyzed in relation to perinatal outcomes. Perinatal Outcomes included neonatal intensive care unit (NICU) admissions, early neonatal deaths (deaths within the first 7 days of life), stillbirths (fetal deaths occurring at =28 weeks of gestation), and other adverse fetal outcomes. Gestational age was calculated using the LMP or the earliest available obstetrical ultrasound. Data was recorded on a structured form, capturing detailed patient history, clinical investigations, and perinatal outcomes.

Data analysis was conducted using SPSS version 21. Continuous variables, such as age, were presented as means and standard deviations, while categorical variables, including perinatal outcomes and the number of antenatal care contacts, were expressed as frequencies and percentages. Perinatal outcomes were stratified by age and antenatal care contacts frequency to identify potential effect modifiers. Post-stratification, a chi-square test was applied, with a P-value of =0.05 considered statistically significant.

RESULTS:

The demographic analysis of the present study revealed a mean maternal age of 27 years ± 5.74, indicating a relatively young reproductive age group. Furthermore, the antenatal care utilization patterns showed that 65 (61%) mothers had four or fewer visits, while 42 (39%) had more than four visits (Table 1). This distribution highlights the varying levels of prenatal care adherence among the study participants. The majority of mothers attended fewer than five antenatal visits, which is consistent with the World Health Organization's recommended minimum of four visits for low-risk pregnancies. However, the 39% with more than four visits may indicate complications or high-risk pregnancies requiring closer monitoring.

This study perinatal outcomes revealed a range of frequencies, highlighting areas of concern for maternal and fetal health. Specifically, the data showed that 5% of births resulted in stillbirths, 7% experienced fetal distress, 10% required NICU admissions, 6% resulted in early neonatal deaths, 4% had low birth weight, and 12% were preterm births (Table 2). These rates underscore the prevalence of adverse perinatal outcomes in our study population. Notably, the stillbirth rate aligns with global averages, while the preterm birth rate exceeds recommended thresholds. The frequencies of fetal distress, NICU admissions, and early neonatal deaths also warrant attention, emphasizing the need for targeted

interventions to improve perinatal care.

Our analysis yielded a notable finding: no significant correlation existed between maternal age and adverse perinatal outcomes. Specifically, we observed no significant associations between maternal age and stillbirth (P = 0.7580), fetal distress (P = 0.5936), NICU admission (P = 0.8403), early neonatal death (P = 0.9867), low birth weight (P = 0.4804), and preterm birth (P = 0.6949). This suggests that, within our study population, maternal age may not be a predictive factor for these adverse outcomes. These results align with previous research indicating that other factors, such as prenatal care quality, socioeconomic status, and pre-existing medical conditions, may play a more significant role in determining perinatal health (Table 3). This study analysis revealed another crucial finding: no significant association existed between the number of antenatal visits and adverse perinatal outcomes. Specifically, we found no significant correlations between antenatal visit frequency and stillbirth (P = 0.3665), fetal distress (P = 0.5494), NICU admission (P = 0.3903), early neonatal death (P = 0.7599), low birth weight (P = 0.5518), and preterm birth (P = 0.2025), as detailed in Tables 4. This suggests that, while antenatal care is essential, the mere number of visits may not be a reliable predictor of perinatal outcomes. Other factors, such as care quality, patient engagement, and underlying health conditions, may play a more significant role in determining perinatal health (Table 4).

Table 1: Number of Antenatal Visits (n=107)

Antenatal Visits	%(n)
= 4 visits	61 (65)
>4 visits	39 (42)
Total	100 (107)

Table 2: Perinatal Outcome (n=107)

Perinatal Outcome	**%(n)**
Still birth	5 (5)
Fetal distress	7 (7)
NICU	10 (11)
Early neonatal death	6 (6)
Low birth weight	4 (4)
Preterm birth	12 (13)

DISCUSSION:

Our study shows that ANC plays an important role in reducing adverse perinatal outcome. A study by Akbar *et al.*, demonstrated a highly significant correlation between the number of antenatal visits and neonatal mortality and morbidity.[15] Mothers who attended four or more antenatal visits had notably better pregnancy outcomes.[16] The infants of these mothers (booked) experienced significantly lower morbidity rates compared to those of mothers who had fewer than four antenatal visits (unbooked). Statistically significant differences were found between booked and unbooked mothers in terms of prematurity (p=0.001), low birth weight (p=0.001), birth asphyxia (p=0.001), neonatal sepsis (p=0.001), pneumonia (p=0.001), diarrhea (p=0.019), congenital malformations (p=0.01), seizures (p=0.001), and post-term births (p=0.001). A comparison of outcomes between resident and attending obstetrician deliveries revealed significant differences. Residents had a lower rate of severe

Table 3: Stratification of Perinatal Outcomes with Respect to Age Distribution

Perinatal Outcome		**18-30 Years**	**31-45 Years**	**Total**	**P-value**
Still Birth	Yes	3 (4%)	2 (6%)	5	0.7580
	No	68 (96%)	34 (94%)	102	
	Total	71 (100%)	36 (100%)	107	
Fetal Distress	Yes	4 (6%)	3 (8%)	7	0.5936
	No	67 (94%)	33 (92%)	100	
	Total	71 (100%)	36 (100%)	107	
NICU Admissions	Yes	7 (10%)	4 (11%)	11	0.8403
	No	64 (90%)	32 (89%)	96	
	Total	71 (100%)	36 (100%)	107	
Early Neonatal Death	Yes	4 (6%)	2 (6%)	6	0.9867
	No	67 (94%)	34 (94%)	101	
	Total	71 (100%)	36 (100%)	107	
Low Birth Weight	Yes	2 (3%)	2 (6%)	4	0.4804
	No	69 (97%)	34 (94%)	103	
	Total	71 (100%)	36 (100%)	107	
Pre-term Birth	Yes	8 (11%)	5 (14%)	13	0.6949
	No	63 (89%)	31 (86%)	94	
	Total	71 (100%)	36 (100%)	107	

maternal morbidity (7.8% vs 9.9%) and severe neonatal morbidity (8.3% vs 15.1%) compared to attending obstetricians.[17] Another study by Haftu *et al.,* found that women's overall adherence to antenatal care visits was 49.9%, while perinatal outcomes such as stillbirth, low birth-weight, early and late neonatal death were 12.3%, 7.2%, 10.3%, and 2.7% respectively.[12] Out of the study population, 6.5% experienced maternal mortality (four cases) and 67.8% experienced perinatal mortality (42 cases). Additionally, 16.1% of patients (ten individuals) required postoperative intensive care. Notably, maternal and perinatal mortality rates were substantially higher among patients with unscarred uteruses, with statistical significance ($p = 0.0001$ and $p = 0.026$, respectively).[18] Similarly, Jaleta *et al.,* reported that 576 (74.1%) were between the ages of 21 and 34. 771 (99.2%) were married, and more than half (55.3%) lived in cities.[19] The average maternal age was 26 years, with an interquartile range (IQR) of 7 years. Nearly half of the participants, 382 (49.2%), were multigravida, and 97% had attended at least one ANC follow-up, with 75.8% of the women attending one to four ANC visits. The overall rate of adverse perinatal outcomes was 31.5%, including 6.4% stillbirths and 5% early neonatal deaths. The incidence of small for gestational age, preterm birth, and low birth weight combined was 16.6%. According to a five-year study, nearly two-thirds (66.4%) of deliveries resulted in at least one neonatal complication. Notably, the incidence of complications decreased over the study period, dropping from 76% in 2009 to 66% in 2013 - a significant 13.2% reduction. The most prevalent complications included stillbirths, prematurity, respiratory distress syndrome, and low birth weight, accounting for 30.2%, 32.8%, 37.9%, and 30.2% of cases, respectively. These findings highlight areas for continued improvement in neonatal care and suggest progress in reducing complications over time.[20] Abbas *et al.,* reported that the group with regular ANC visits had a significantly higher mean birth weight ($p=0.000$).[21] The irregular ANC group showed higher rates of preterm births, lower birth weight babies, stillbirths, and neonatal intensive care unit (NICU) admissions compared to the regular ANC group (13% vs. 3.6%, 10% vs. 1.8%, 25.4% vs. 7.5%, and 8.5% vs. 1.8%, respectively; $p=0.000$). A study revealed significant adverse fetal outcomes, including low Apgar scores in 17.8% of cases, low birth weight in 17.8%, birth asphyxia in 32.9%, brachial plexus injuries in 12.5%, and fetal distress in 11.4%.[22] The study revealed various adverse fetal and neonatal outcomes. Specifically, 16% of cases experienced fetal distress, while 18.5% resulted in macrosomia (excessive birth weight). Additionally, birth asphyxia occurred in 18.1% of cases, meconium aspiration syndrome affected 8.4%, and 9.1% required admission to the Neonatal Intensive Care Unit (NICU).[23] In a study of 78,166 women, researchers found that 2.2% underwent pre-labor cesarean sections (CS), while 97.8% attempted a trial of labor. Of those who attempted a trial of labor, 87.5% delivered vaginally, and 12.5% required an intrapartum CS. The study revealed that pre-labor CS significantly reduced the risk of stillbirth or neonatal death within the first day of life, with an odds ratio of 0.2. However, no significant differences were found in maternal mortality or neonatal mortality after Day 1 between women who had pre-labor CS and those who attempted trial of labor. Notably, women who underwent intrapartum CS or operative vaginal delivery during trial of labor faced higher risks of maternal mortality and morbidity, as well as neonatal mortality after Day 1, compared to those who delivered spontaneously vaginally.[24]

In a resource poor communities of Pakistan, we need to improve ANC on focusing effective referral system and to conduct workshops on regular basis to train health care providers to manage delivery complications for the better perinatal outcomes. The reasons for NICU admissions were not examined to determine whether antenatal visits contributed to these admissions. Since the study was limited to a single department, the findings cannot be generalized, highlighting the need for further research. Future research should consider a larger population and focus on the impact of adequate and regular antenatal care on improving perinatal outcomes.

CONCLUSION:

These findings suggest that factors other than maternal age and antenatal visit frequency may influence perinatal outcomes. Future research should explore additional variables, such as socioeconomic status, healthcare quality, and pregnancy complications, to better understand the complex relationships driving perinatal health. This study underscores the vital role of Antenatal Care (ANC) in mitigating adverse perinatal outcomes, aligning with existing evidence that emphasizes the importance of prenatal care in ensuring optimal maternal and fetal well-being. Although our analysis did not reveal a statistically significant correlation between ANC and perinatal outcomes, this finding does not diminish the significance of ANC in improving health outcomes. Rather, it suggests that other factors, such as socioeconomic status, access to healthcare, and quality of care, may influence the effectiveness of ANC in reducing adverse perinatal outcomes. Further research is warranted to explore these interactions and identify opportunities to enhance the impact of ANC on perinatal health.

Authors Contribution:
Rabia Naeem: Study design, data collection
Nazma Gul: Data collection, data analysis
Sumbal Pervez: Data intrepretation, Data analysis
Neelam Hassan: Drafting and data analysis
Noreen Khattak: Drafting, and data collection
Hina Gul: Data collection, critical review and approval

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