Original Article

Antenatal Care Paradox: Exploring the Gap between Antenatal Care Utilization and Pregnancy Outcome

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Abstract

Background: Antenatal care is the care given to the pregnant women from conception till birth. It is a structured program of observation, education and medical management of pregnant lady aimed at making pregnancy and birth a positive experience.

Objective: To find out the association of antenatal care utilization with pregnancy outcomes.

Methods: A descriptive cross sectional study was done in Obstetrics and Gynaecology department, Nishtar Hospital and Tertiary Care Hospital Nishtar- II, Multan. A sample of 362 women was included using non-probability convenient sampling technique. A questionnaire which included mother's demographic data, antenatal care utilization data, antepartum complications, postpartum complications and data related to pregnancy outcomes was administered.

Results: Among 362 women, mean age was 28.9 ±6.5 % women was among 25-34 years of age. Regarding antenatal care utilization, 136 (37.5%) women had 7 to 10 antenatal visits. 302(83.2%) women had adequate iron and calcium intake. Among 362 women, 87.1 % (316) delivered via cesarean section 12.9% (47) women delivered via spontaneous vaginal delivery. Around 10.7% (39) babies were still born and 324 (89.3%) women delivered alive baby. The variables that impacted the pregnancy outcome (alive or dead) were; number of ANC visits ($p<0.001$), age of mother ($p=0.03$) and level of education ($p=0.004$) and tetanus vaccination ($p<0.001$) while occupation, area of residency and socioeconomic status have no impact ($p>0.05$) on pregnancy outcome.

Conclusion: Health education about the value of prenatal care, along with the improvement of health facilities particularly in remote areas, will lead to frequent prenatal visits, leading to healthier pregnancy outcomes.

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Introduction

Global health and development gatherings routinely address the topic of high maternal death rates as a key global burden.[1] Prenatal care services offer a significant chance to reduce maternal mortality. ANC is among the four pillars of Safe motherhood initiative by WHO (World Health Organization).[2] (WHO) emphasizes the pivotal role of ANC(antenatal care) in ensuring a positive pregnancy experience.[3] This global perspective positions antenatal care as a cornerstone in the pursuit of optimal maternal and neonatal outcomes.

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Approximately 86% of pregnant women globally received at least one antenatal care visit, illustrating substantial progress in expanding healthcare access.[2] However, challenges persist, with regional variations and disparities affecting the quality and frequency of antenatal care services. In 2019, Global ANC Coverage was that approximately 81% of pregnant women in Eastern Asia received adequate prenatal care visits compared to 56% in Sub-Saharan Africa. However, in low-income countries, only 49% of pregnant women have adequate ANC visits, highlighting the need for targeted interventions.[2] The disparities in ANC utilization are particularly pronounced in low and middle-income countries. Women in these regions face multifaceted challenges, ranging from economic constraints to limited healthcare infrastructure, hindering their access to timely and comprehensive antenatal care.[4] Furthermore, in order to ensure universal access to reproductive health care, target 3.1 of the Sustainable Development Goals (SDGs) 3: Good Health and Well-Being called for a worldwide maternal mortality ratio (MMR) decrease of 70 or fewer per 100,000 live births by 2030(3). Pregnancy complications account for 99 percent of maternal deaths ,which can be avoided with proper antenatal care.[3]

This global scenario underscores the urgency to examine and address the factors influencing antenatal care utilization, especially in countries like Pakistan. The canvas of maternal healthcare in Pakistan is painted with both progress and persistent challenges. Despite sustained efforts to enhance healthcare infrastructure and services, maternal and child health indicators continue to pose concerns. Elevated maternal mortality rates persist, casting a spotlight on the critical need for a nuanced understanding of factors influencing antenatal care utilization and subsequent pregnancy outcomes in this specific context. Pakistan's maternal mortality ratio is 186 deaths per 100,000 live births, up 32% from 140/100,000 live births in 2017.[5] The country continues to face challenges. Even while there has been progress, 62% of expectant mothers have had at least four prenatal visits. Disparities still exist, especially in remote areas where access is major problem.[6]

In the intricate landscape of Pakistan, this narrative unfolds against a backdrop of diverse challenges, necessitating a meticulous examination of antenatal care utilization and its profound impact on pregnancy outcomes. It will aspires to contribute invaluable insights that can inform targeted interventions, policy enhancements, and healthcare practices, ultimately optimizing maternal and neonatal health outcomes in the country.

Methods

It was a descriptive cross sectional study conducted at Nishtar Hospital and Tertiary Care Hospital Nishtar-II, Multan, Pakistan for the period of two months between 2nd November 2024 to 2nd January 2024.This study was performed according to the relevant guidelines and regulations from the Institutional Ethics Review Board (IERB) with reference letter No.18958/NMU. A sample of 362 postpartum women using non-probability convenient sampling technique, was taken. Sample size was calculated by following formula. $n=z^2pq/d^2$, where, p = 17.2% (hypothesized frequency of low birth weight babies in women with <4 antenatal visits(7) . q = 100-p, d = (5% margin of error), z=1.96 (95% confidence) was used to select the sample.

Women with diagnosed cases of medical disorders like diabetes, hypertension before pregnancy, women with diagnosis of placenta previa and women with history of pre term labour were excluded. Data included was mother's demographic data, antenatal care utilization data and data related to pregnancy outcomes. It involved analysis of antenatal cards from participants providing informed consent for its use and did not involve any direct participant interaction. Demographic data included mother's age, literacy, occupation, area of residency and socioeconomic status was collected. Obstetric history included gestational age at delivery, previous history regarding miscarriages, live births, ectopic pregnancies and stillbirths were recorded. Antenatal care utilization data included utilization of antenatal care, no. of antenatal care visits, iron and calcium supplementation, folic acid supplementation and tetanus vaccination. While pregnancy outcomes that included were mode of delivery (cesarean section or vaginal delivery), pregnancy outcome (alive or dead baby), status of newborn (term or pre term newborn) and weight of newborn.

All the data was anonymized and analyzed in an aggregated form to ensure the privacy of the participants involved. The Obtained data was entered and analyzed using SPSS version 27. Descriptive statistics was used to summarize data. Mean or median was calculated for quantitative variables like age, Gestational age of patient. Frequencies and percentages were calculated for categorical variables like birth weight of baby. Effect modifiers like age, gestational age and parity was controlled by stratification. Post stratification Chi-square test was applied to calculate the association of antenatal care utilization with pregnancy outcomes. All tests were two sided and judged statistically significant at $p<0.05$.

Results

Mean age was 28.9 ±6.5%. Most of the women were among 25-34 years of age; (206)56.9%. Around 203 (56.1%) were living in urban area and 123(33.9%) women were illiterate. Regarding Antenatal care Utilization, 27.1% (98) women had <4 antenatal visits. 35.4% (128) women had 4-7 antenatal visits and 37.5% (136) women had 8 antenatal visits. Around 302(83.2%) women had history of iron and calcium intake. 60 (16.8%) women had no history of supplement intake. Women had history of folic acid intake were 81.1 %(294) and 18.9% (680) women had no history of folic acid intake.

Table 1: *Sociodemographic Factors among participants*

Variables	Categories	Frequency (N=362)	Percentage (N=362)
Age (years)	18-24	85	23.5
	25-34	206	56.9
	35 and above	71	19.6
Residence	Rural	159	43.9
	Urban	203	56.1
Education	illiterate	123	33.9
	Primary education	77	21.4
	Middle education	68	18.9
	Matric and above	93	25.7
	Unemployed	339	93.6
	Employed	23	6.4
Socio-economic status	Low (<Rs.15000/month)	224	61.8
	Moderate(Rs 16000/- to 40000/month)	132	36.4
	High(>Rs.40000/month)	7	1.8

Around 78.2% (283) women were vaccinated against tetanus and 21.8% (79) women were not vaccinated. Only 23.2 % (84) women received information about family planning. Women did not receive any information about family planning were 76.8% (278).(Table No.1)

Proportion of women with adequate ANC visits were 72.9% (264) and women with <4 visits were 98(27.1%) (Figure:1).Regarding perinatal outcome, 87.1% (316) had cesarean section, 12.9%(47) women had spontaneous vaginal delivery. Total 10.7% (39) women had still born babies. Babies born at term were 78% (282) while 22% (80) were pre term. Around 324 (89.3%) women delivered alive baby. Babies were birth weight of >2.5 kg were 67.2% (243).32.8% (119) women had low birth weight (<2.5kg) babies.

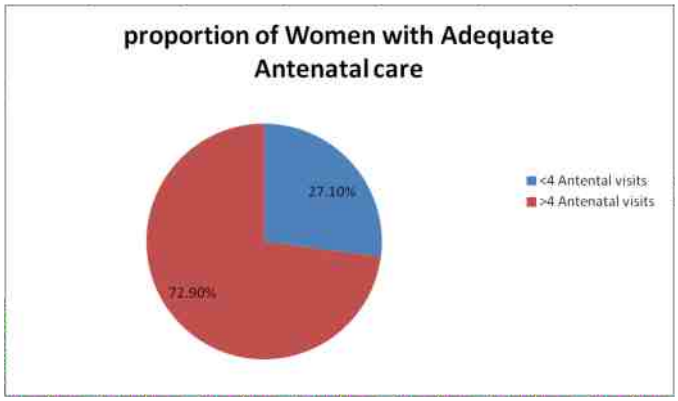

Figure :1

On comparison of different variables with pregnancy outcomes, the variables that impacted (p value less than 0.05) the status of pregnancy (alive or dead) were; ANC

Table 2: *Association of ANC with Perinatal outcome*

Antenatal Care		Perinatal outcome (Live Birth)		Total (%)	P-Value
		No	Yes		
Antenatal Visits	Adequate (>4 visits)	(16)4.4%	(248)68.5%	72.9	<0.001
	Inadequate(<4 visits)	(23)6.4%	(75)20.7%	27.1	
Awareness about danger sign of pregnancy	Yes	(7)2%	(188)52%	54	<0.001
	No	(30)8%	(138)38%	46	
Iron and Calcium Supplementation	Yes	(18)5%	(282)78%	83.2	<0.001
	No	(18)5%	(43)12%	16.8	
Folic Acid intake	Yes	(18)5%	(275)76%	81	<0.001
	No	(21)5.7%	(48)13.2%	19	
Age of the mother	18-24 years	(9)2.5%	(76)21%	23.5	0.03
	25-34 years	(16)4.3%	(190)52.5%	56.8	
	35 years and more	(14)3.9%	(57)15.7%	19.6	
Education of the mother	Illiterate	(25)6.9%	(98)27.1%	34	0.04
	Primary	(6)1.7%	(70)19.3%	21	
	Middle	(4)1%	(65)18%	19	
	Metric and Above	(4)1.1%	(90)24.9%	26	

visits (p<0.001), place were antenatal care was utilized (p=0.006), awareness about danger signs (p<0.001), iron and calcium supplementation (p<0.001), folic acid supplementation (p<0.001) and tetanus vaccination (p< 0.001). All these variables are related to antenatal care utilization. Among the demographic variables, age of mother (p=0.03) and level of education (p=0.004) had impacted status of pregnancy while occupation, area of residency and socioeconomic status had no impact (p>0.05) on status of pregnancy.(Table No.2)

Discussion

Our study analyzed the impact of ANC utilization on positive pregnancy outcome and how we can use this relationship to improve perinatal outcome. Our study showed a paradoxical gap between the two. According to WHO recommendations, a pregnant women should have at least 4 ANC visits.[3] In our study, 72.9% (264) women had adequate antenatal visits (>4) and 27.10% (98) had < 4 antenatal visits. Live birth was significantly correlated with adequate ANC visits, age of mother, educational status of mother and supplements intake during pregnancy. We found only few studies done in Pakistan that compared the outcome of pregnancy with the adequate ANC utilization. Pakistan demographic health survey (PDHS 2017–2018) shows that 56.2% in Federal (lower than our result), 23.1% in Balochistan (lower than our result), 80.2% in Islamabad (high as compared to our result), 44.6% in KP (low as compared to our result),56.2%in Punjab (low as compared to our result), 54.1% in Sindh(low as compared to our result), 46.5% in Azad Jammu and Kashmir (low as compared to our result), 34.9% in Gilgit Baltistan (low as compared to our result) and 25.6% of the pregnant women in FATA (low as compared to our result) have 4 or more antenatal care visits(8). Pakistan demographic health survey (PDHS 2017–2018) also shows that 47.9% in rural Punjab and 72.5% of pregnant women in urban Punjab have 4 or more antenatal care visits.[8] The results of Pakistan demographic health survey (PDHS 2017 – 2018) related to urban Punjab are comparable to our results (72.9%).[8]

In a study conducted in Afghanistan, 25.1% women had adequate antenatal visits (quite low as compared to our results).[9] In a research conducted in India, the proportion of women seeking comprehensive antenatal care was 53%which is low as compared to our results.[10] In another research conducted in India 58.6% women had at least 4 antenatal visits.[11] In a research conducted in Nepal, 55%women utilized >4 antenatal care visits which is low as compared to our research.[12] A research conducted in Bangladesh shows that 47% of pregnant women utilize adequate ANC.[13] The overall prevalence of WHO recommended ANC visits was 46.64%. Among South Asian countries, Maldives showed the highest prevalence of utilizing WHO recommended ANC visits 97.4% followed by Nepal 69.49%, India 55.32% and Afghanistan 19.65%.[3] In Rwanda, A central eastern African country. 42.91% of the mothers had adequate ANC visits (low as compared to our results).[14] In the East African region, Pooled utilization adequate ANC visit was 52.44% (95% CI: 52.13, 52.74), with the highest in Zimbabwe (75.72%) which is little high than our results.[15] In a multi-center study done in Saudi Arabia, 64.5% women had > 8 ANC contacts while in our study > 8 ANC visits were among 37.5% women.[16] In another study done in Saudi Arabia 88.5 % women were booked for ANC visits.[17] In another study in South East Asia, 88.5% women living in Urban area of Philippine had >4antenatal visits (high as compared to our results).[18] In most of South Asian Countries, poor antenatal care utilization and lack of knowledge about adequate care utilization is because of certain socio-demographic factors. According to National Vital Statistics Reports, 74.8% of pregnant women utilize antenatal care 4 or more times in United States.[19] This is high as compared to the result of our study (72.9%). The result of our study about "utilization of ANC 4 or more times (72.9%)" is high as compared to Pakistan demographic health survey (PDHS 2017–2018) (64.4% in urban areas). This can be attributed to the fact that study area of our research was a tertiary healthcare unit. In another study done in Pakistan, Antenatal care utilization is 62%.[8]

Antenatal care utilization was low in context of national and WHO guidelines in Ethiopia and however significant impact of antenatal care utilization on pregnancy outcome was found in the meta analysis.[20] But in our study, antenatal care utilization is high in context of national and WHO guidelines and a substantial impact of antenatal care utilization on pregnancy outcomes is found (p<0.001). When we compared age of mother with perinatal outcome in the form of alive or dead baby, among young women 23.5 % babies born were alive. While in another study, Young mothers had 60% decreased odds of neonatal death (AOR:0.40; 95% CI: 0.20,0.81) compared to the adolescent mothers.[14] In this study, adolescents who received high quality of ANC had lower odd of adverse birth outcomes compare to those who had low quality ANC (AOR = 0.72, 95 % CI: 0.63, 0.83). Middle-aged adolescents (aged 15–17 years) were more likely to develop adverse birth

outcomes than late adolescent women aged 18–19 years .Having a higher level of education decreased the risk of adverse birth outcomes by 17%.[21] Education can influence a woman's knowledge about healthy pregnancy and childbirth practices, access to healthcare, and decision-making abilities related to their health and that of their baby. A study that was conducted in South Sudan concluded that maternal education was significantly associated with lower risk of unfavorable outcome and that this was primarily with the neo-natal death rate rather than the still birth rate.[22] According to UNICEF Data, 66% of the pregnant women have 4 or more antenatal care visits worldwide.[22] This is low as compared to the result of our study (72.85%). The UNICEF Data shows that 55% in South Asia (low as compared to our result), 88% in East Asia and Pacific (high as compared to our result), 54% in Eastern and South Africa (low as compared to our result), 53% in West and Central Africa (low as compared to our result) and 91% of pregnant women (high as compared to our result) in Latin America and Caribbean have 4 or more antenatal care visits.[22]

One of the primary strength of our study is its ability to highlight the complexity of the relationship between ANC utilization and pregnancy outcomes. Although the ANC utilization has increased over time, this has not necessarily translated into improved pregnancy outcome. This finding challenges the conventional wisdom. Our study has certain limitations. As our study only included two tertiary care centers, it cannot be generalized to BHUs and RHCs where more adverse pregnancy outcomes are expected. It was mainly focused on neonatal pregnancy outcomes and less focus was put on maternal pregnancy outcomes. It did not include APGAR score because it was neither written in medical chart of mother nor did the mother or the attendants had any idea about it. The implication of this study are significant. By simply increasing ANC utilization, may not be enough to improve pregnancy outcomes. Instead, policymakers and healthcare provider may need to focus on improving quality of ANC services to combat the disparities between care and pregnancy outcome. This may involve providing more targeted and persona-lize care plans, keeping in view the social needs.

Conclusion

The findings of our study emphasize the importance of prenatal care in making pregnancy a safe journey and ensuring optimal pregnancy outcomes. The number of antenatal care visits decreases the likelihood of unfavorable pregnancy outcomes. The number of antenatal care visits is also directly related to awareness of danger signs of pregnancy, family planning, iron and calcium supplementation, folic acid supplementation, and tetanus vaccination, all of which contribute to the mother and child's safety and health.

Ethical Approval: The Institutional Ethical Review Board, NMU Multan approved this study vide letter No. letter No.18958/NMU.

Conflict of Interest: The authors declare no conflict of interest.

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Author's Contribution:

AA: Conception & design, acquisition of data, analysis & interpretation of data, drafting of article

ST: Acquisition of data

SP: Critically revised it for important intellectual content, final approval of the version to be published

SN: Analysis & interpretation of data, drafting of article

ZA: Drafting of article

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