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Exploring the Socioeconomic Drivers of Antenatal Care Utilization in Pakistan: An Empirical Insight

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Abstract

The aim of this study is to explore the determinants of Antenatal Care (ANC) in Pakistan, primarily by focusing on the Sustainable Development Goal 3 (SDG 3) targeting the equal access to health care for everyone. The study targeted specifically ANC visits as main outcome of the analysis. The data from Pakistan Demographic and Household Survey (PDHS) conducted in 2017-18, was used in the analysis, comprehends all four provinces of Pakistan. Logistic Regression Analysis was applied to assess in four distinct models for each outcome variable. The empirical model comprehensively analyzed socioeconomic and demographic circumstances to determine the practicing of ANC services. Model 1 indicates various factors (maternal age, educational attainment) influencing positively to the attainment of ANC services. Furthermore, the model also revealed that birth parity and past experience of terminated pregnancies have differing impacts on the maternal healthcare utilization. Model 2 includes more variables including employment status, gender of the household, and mass media exposure to provide the renewed perception to determine the maternal healthcare outcome. Model 3 highlighted the positive and significant role of parental education and wealth status on the ANC service utilization. Finally, Model 4 examines the role of province wise regional disparities and disparities between rural urban residences on the ANC outcomes. The findings of the study offer inclusive insights to understand the interplay of socio-demographic determinants to understand the disparities in access to maternal healthcare and its utilization in Pakistan. The research is also significantly important in the context of Pakistan to guide policy makers in order to address the disparities and to ensure the inclusive access to maternal healthcare services.

Keywords: Maternal Healthcare, Antenatal Care, Logistic Regression, Socioeconomic Circumstances, Healthcare Inequalities

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1. Introduction

Maternal health, a fundamental pillar of public health, encompasses the physical, emotional, and social well-being of women throughout their pregnancy, childbirth, and postpartum phases. Its significance extends beyond mere disease prevention, as it directly influences both a mother's survival and her child's growth and development. The critical nature of maternal health is profoundly intertwined with the daunting challenge of maternal mortality, a telling measure of a nation's healthcare system and socioeconomic progress. Addressing maternal health inequality is a critical concern for low- and middle-income countries (LMICs) because it is a significant contributor to mortality and morbidity rates. However, it is important to emphasize that mere addressing, without identifying and rectifying the root causes, cannot effectively mitigate mortality and morbidity in maternal health (Ali, 2015; Ali & Bibi, 2017; Ashraf & Ali, 2018; Adeel, 2019; Ali & Senturk, 2019; Rehman & Malik, 2020; Carlo, 2025). A comprehensive approach targeting the underlying issues is essential for sustainable improvement. It is essential to recognize that these disparities impact not only maternal health but also the broader mortality rate within communities. This research embarks on an exploration of the intricate landscape of maternal healthcare utilization in Pakistan, with the aim of unraveling existing inequalities and contributing to the design of evidence-based interventions. The ultimate goal is to narrow these gaps, leading to a decrease in maternal mortality and a healthier society as a whole.

According to World Health Organization (2006), maternal healthcare is a process to maintain the women's wellbeing during her pregnancy, birth, and postpartum phases. The presence of SBA during birth and utilization of Antenatal Care (ANC) services are two most important indicators to assess the maternal health of women. The presence of SBA at the time of birth is vital and critical factor for safe deliveries and to reduce the mortalities. In Pakistani context, around 67% of deliveries are supervised and overseen by the SBAs. Which is an encouraging increase and a great shift in the proportion of births assisted by SBA during the period of 1990-91 at 26% and to 2017-18 at 69% (Demographic, 2017). On the other hand, a substantial decrease was observed in the deliveries which are assisted by traditional birth attendants. A significant reduction was observed from 1990-91 41% to 24% in 2017-18 (Demographic, 2017). According to the findings from the 2017-18 PDHS, it is evident that a substantial 86% of women who had given birth within the five years prior to the survey sought antenatal care from a skilled provider for their most recent childbirth. Among these skilled providers, doctors were the primary service providers, accounting for 82% of cases. Moreover, the survey revealed that a noteworthy 85% of women expressed satisfaction with the quality of services they received during antenatal care. According to Shaeen et al., (2022), there has been a significant worldwide reduction of about 38% in the maternal mortality ratio (MMR) between 2000 and 2017. LMICs continue to account for approximately 94% of maternal deaths worldwide, with South Asia contributing nearly 20% to this figure. Maternal mortality rates in less developed countries are still 14 times higher than those in developed nations. Regrettably, around 303,000 women globally have succumbed to complications related to pregnancy and childbirth (Ali & Rehman, 2015; Dunn et al., 2017; Modibbo & Inuwa, 2020; Mehmood et al., 2022; Marc et al., 2025).

According to United Nations Population Funds (UNFPA), implementing a midwifery model of care can further reduce maternal mortality and enhance the quality of maternal healthcare. By reducing maternal mortality, we can help ensure that families are stronger, children have better prospects, and communities thrive. This is why reducing maternal mortality is a top priority in global health efforts (Khan, 2020; Marc, 2022; Russo, 2022; Abraha

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et al., 2024; Audi & Roussel, 2024). The Government of Pakistan, in collaboration with UNFPA and other donors, is committed to improving maternal healthcare by expanding midwifery services, enhancing the capabilities of frontline healthcare providers, and advocating for reproductive and sexual health rights. A comprehensive maternal, infant, and child health policy has been introduced to increase healthcare access, with a specific focus on disadvantaged populations and capacity-building for midwives. Lady Health Visitors (LHV) and Local Midwives play pivotal roles in Pakistan's healthcare system.

Several studies have found that nations with high ANC services utilization, had lower maternal mortality rates, while countries with low SBA rates have higher maternal death rates (Dunlop et al., 2026; Akbar & Hayat, 2020; Raja & Iqbal, 2019; Ronsmans & Graham, 2006). Thus, increasing the use of SBA is presently one of the most critical interventions for lowering maternal mortality to achieve SDG 3, mainly in developing nations. Most of the research are focused on determining the factors that influence maternal and child health in Pakistan, including as, Bhutta et al. (2011), Di Cesare et al. (2015), Tariq et al., (2018). There is hardly any study that measured the IOP in access to SBA across the districts of Punjab. Therefore, this study adds significant value to existing literature on subject matter. So, in the light of above discussion, the objectives of this study are to analyze the influence of socioeconomic factors on maternal healthcare utilization in Pakistan, examine the effects of individual, household, and community-level characteristics on the number of ANC visits, and evaluate regional and urban–rural disparities in maternal healthcare utilization across Pakistan.

2. Literature Review

A substantial body of both theoretical and empirical literature investigates the socioeconomic factors influencing maternal health-seeking behavior in developing countries. Numerous studies (Amin et al., 2010; Anarwat et al., 2021; Ali, 2015; Bhutta et al., 2011; Celik & Hotchkiss, 2000; Elo, 1992; Glewwe, 1999; Mumtaz & Salway, 2007; Shaeen et al., 2022) have explored these determinants. However, despite the pressing need to enhance maternal health in Pakistan, there's a surprising scarcity of empirical research in this specific context. This study aims to address this gap.

Misu and Alam (2023) investigated and make comparisons about the differences in the utilization of maternal healthcare services between Bangladesh and Pakistan. The study unveiled notable dissimilarities in service utilization of maternal healthcare between these two countries. Bangladesh established increasing tendencies of utilization for important features such as ANC visits, services of skilled birth attendance, utilization of postnatal care, and institutional deliveries as compared to Pakistan. Prominently, these inequalities were more noticeable among deprived groups in Pakistan as compared to Bangladesh. The results altogether point towards highly favorable setting for maternal healthcare services and its utilization in Bangladesh. Additionally, Zakar, Zakar, Aqil, Chaudhry, and Nasrullah (2017), did an in depth review of socioeconomic literature, they pinpoint the factors that inducing maternal healthcare utilization in Pakistan. The studies observed emphasized the essential role played by socioeconomic aspects, comprising income and healthcare, as well as access to education services, cultural customs, social inspirations, and women empowerment in determining the maternal healthcare outcomes.

Women's empowerment significantly increases health-seeking behavior, particularly maternal healthcare utilization (Batool & Jadoon, 2018; Sajid & Ali, 2018). These factors employ a substantial effect on key gauges like maternal mortality rates, utilization of ANC services, services of skilled birth attendant, and postnatal care visits. Therefore, these outcomes underlined the perilous need for targeted interventions and devising such policies

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which are aimed at addressing these circumstances in Pakistan, and with the decisive objective of improving maternal healthcare results and alleviating inequalities. Gwatkin et al. (2007) did an extensive work by concentrating on nutrition, health, and disparities in terms of population in the context of developing countries, explaining that socioeconomic aspects play an essential role in affecting the utilization of ANC services. According to them financial constraint, lack of education, and gender related disparities were recognized as significant dynamics that needs to be address in order to increase ANC visits and maternal healthcare outcomes. Firdous et al. (2023) highlighted the role of structural factors in shaping health access while establishing the link between public health outcomes and economic conditions in Pakistan.

According to Sarwar, Jadoon, and Azeem (2017) education significantly improves an individual's decision-making capacity, thereby affecting healthcare utilization. He et al., (2021) recognized socio-demographic aspects which includes maternal education, household wealth status, and rural based residence, as critical aspects of ANC service utilization in Zambia. The study sheds light on the discrepancies in access to services of skilled birth attendant, utilization of postnatal care and ANC visits they further emphasized to address the socioeconomic inequalities.

Mumtaz et al., (2012) highlighted that women with low income backgrounds, particularly from rural areas, has to face significant obstacles in getting indispensable ANC and maternal healthcare services. These obstacles include financial limitations, lack of access to transportation possibilities, and scarce healthcare organization in their communities. Novignon et al., (2019), explored socioeconomic inequalities in the pregnancy related and reproductive health utilization services by using the data from Ghana Demographic and Health Survey. The study concentrated on the utilization of ANC services and utilization of skilled birth attendant assistance. It shown that women from wealthier backgrounds are more inclined get better access to the ANC services, but the data also shown decreasing inequality in terms of these indications over time. The findings emphasized on the role of National Health Insurance Scheme (NHIS) and increase the household income to reduce these disparities. Similarly, Gebre, Worku, and Bukola (2018) examined socioeconomic inequalities in ANC service utilization in Ethiopia, they emphasized on the targeted and innovative interventions to address these inequalities.

The societal beliefs, cultural standards, and local customs play an important role in determining the women's decisions about the utilization of ANC services. Sarfraz et al., (2015) studied the social and societal constraints in Punjab, Pakistan, which are related to the underutilization of maternal healthcare services. The quality of maternal healthcare and ANC visits emerged as a strong determinant of the women who have reproductive experienced. Utilizing Centered Community Discussions (FGD), is a qualitative analysis which involved, father with married women at the age of childbearing also having young children in the household, and mothers of infants was carried out in rural Attock. The results underlined dynamics such as lack of awareness of home remedies, social constraints, financial barriers, and the inclination towards traditional birth attendants, hinders the maternal healthcare service utilization. This emphasized on the need for targeted efforts in rural areas to uphold the use of ANC and professional childbirth services.

According to Fatima et al., (2020), higher education and greater household income exhibits higher rate of maternal healthcare utilization as compare to those of lower educational qualification and socioeconomic backgrounds. Simkhada, Teijlingen, Porter, and Simkhada (2008) also examined that the limited education, geographical inequality, and uneven cultural norms are responsible for disparities in the utilization of maternal health care.

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Sado et al., (2014) studied the linkage between women empowerment and maternal healthcare in Albania. They used data from the Albania Population and Health Analysis 2008-09 and applied indices to measure women's empowerment and developed its linkage with ANC and SBA utilization. The women's participation in household decision making is also important, it's not only prevents women from domestic violence but also important in determining good health. it is important to increase the women potential within the household. Yaya and Ghose (2019) used logistic regression to analyze the women behavior towards reproductive health and maternal healthcare utilization in Benin. They have taken a sample of 17,794 participants for the year 2006 from the age group of 15-49 women. They found maternal age, maternal education, geographical location, ethnic backgrounds and household income are important determinants in predicting the behavior of women towards reproductive and maternal health.

3. Conceptual Framework

In the light of the above literature review we have anticipated conceptual framework of this study is aimed at to classify and examine dynamics contributing to disparities in the utilizing the maternal healthcare among various socioeconomic groups with demographic differences and regional variations, mainly concentrating on main variable of the study: ANC service utilization. We have examined their linkages with various explanatory variables; such as maternal age, by considering that older and younger mothers may face different constraints to accessing ANC service utilization. Similarly, maternal education also significantly affects the awareness regarding the importance of maternal healthcare and their components the capability to navigate such system of essential healthcare effectively. Educated husband and women both initiate ANC visits earlier. As the awareness level of both of them have an impact on the utilization of maternal healthcare through their common support and family level decision-making

The women employment status also affects the financial independence and her access to resources which ultimately influenced the maternal healthcare seeking behavior. The places of residence, including urban and rural disparities are often results in inequality in the quality healthcare provision. Household wealth status is also a fundamental factor in the utilization of ANC, families with lower wealth status possibly faced more financial barriers. Mass media exposure such as radio, television, and newspapers can affect the women's awareness and knowledge about the components of maternal healthcare. Terminated pregnancy and previous experience of childbirth may impact women's decisions about the ANC and Safe Delivery for following pregnancies. Similarly, the size of the household is also having potential to impact maternal healthcare seeking behavior. In the conceptual framework we are systematically exploring these dynamics and their potential mediating influences; through this the healthcare practitioners and policymakers can be able to develop more targeted interventions to reduce these disparities and enhanced the maternal and child healthcare outcomes in Pakistan. The Figure 1 is the conceptual framework of this study.

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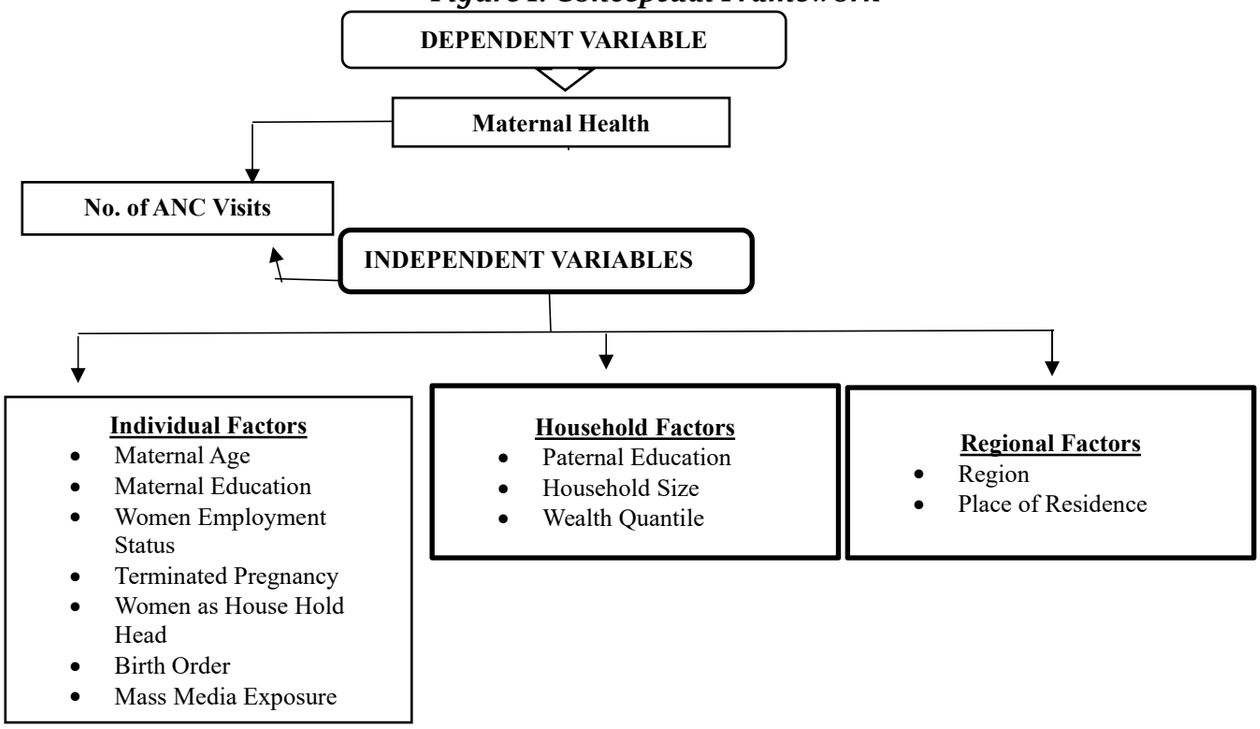
Figure 1: Conceptual Framework



4. Methodology

4.1 Data Sources

This study utilizes data from the PDHS conducted in 2017-18. The PDHS is a nationwide survey carried out by the NIPS and overseen by the Pakistan Planning and Development Division in Islamabad. Financial assistance for the survey is provided by the United States Agency for International Development (USAID), and technical support is offered by ICF International in Calverton, Maryland, USA. The survey offers comprehensive information on topics such as marriage, fertility preferences, and maternal healthcare utilization. It encompasses both urban and rural areas across all provinces of Pakistan, making it well-suited for nationwide analyses. Given the scarcity of datasets and information related to maternal care, the PDHS serves as a valuable resource for healthcare research studies.

4.2. Empirical Methodology

To estimate the inequality in maternal healthcare utilization Logistic regression is employed to estimate the relationship between dependent dummy variables and continuous or dummy explanatory variables in this study. Numerous studies in the existing body of literature, including but not limited to Scott et al., (1996) for an Australian dataset, Yip et al., (1998) for research on China, and the works of Gertler and Gaag (1990) and Mwabu et al., (1993), have leveraged these models with diverse specifications to explore patterns of healthcare behavior.

In logistic regression, the dependent variable is binary, typically ranging from 0 to 1, where "1" signifies a perfect fit or presence of the variable of interest, while "0" indicates its absence or no predictive value. We aimed to investigate the determinants of SBA for Safe Delivery. We examine the influence of several independent variables on the likelihood of mothers receiving SBA for a safe delivery and estimate the effects of explanatory variables on dependent variables. The general form of the Logit-Probit model can be expressed as:

$$P(Y=1 \mid X) = \Phi\ (\quad \beta_o + \quad \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 ... + \ \beta_K X_K)$$

Here's a breakdown of the equation:

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$P(Y=1)$ represents the probability of the binary outcome Y being 1 (success). $\Phi(\cdot)$ is the cumulative distribution function of the standard normal distribution. It transforms the linear combination of predictors into a probability. $\beta_o, \beta_1, \beta_2, \beta_3 \ldots, \beta_K$ are the coefficients associated with the intercept and the predictor variables $X_1, X_2, X_3 \ldots, X_K$ The model estimates these coefficients to determine how each predictor variable influences the probability of success (i.e., the binary outcome being 1). It assumes that the errors in the model follow a standard normal distribution, which is why it uses the cumulative distribution function $\Phi(\cdot)$ to relate the predictors to the probability.

4.3. The goodness of Fit Test

For binary logistic regression models, the Hosmer-Lemeshow goodness of- fit test is often used. This evaluation comprises two essential components: calibration and discrimination. Calibration scrutinizes the precision with which the model estimates probabilities, while discrimination delves into how effectively the model categorizes observations. One general problem for logistic regression models is the low power of overall goodness-of-fit tests. When you use this test, it's important to know that its results can be influenced by how big our group of data is. Sometimes, in really big groups of data, the test might say there's a problem with the model even if the problem is very tiny. To make this test fair for different group sizes, we can adjust the results based on the number of groups in the test. This way, we can compare the test's results when we have big or small groups and get a better idea of how well the model is

In Model 1.1, the probability of utilizing a Skilled Birth Attendant (SBA) for safe delivery is analyzed as a function of maternal age, maternal education, birth parity, and history of terminated pregnancy, while holding other relevant factors constant. The functional specification of the SBA for safe delivery model is presented as follows:

$$ANC_i = \beta_o + \beta_1 MAGE_i + \beta_2 ME_i + \beta_3 BP_i + \beta_4 TP_i + \varepsilon_i \quad (1)$$

Where; ANC_i is a binary variable indicating whether the i-th individual had aat least four ANC visits (1 for visits , 0 for not). $MAGE_i$ is the maternal age in years for the i-th individual. ME_i is a categorical variable representing maternal education levels for the i-th individuals. BP_i , represents the birth parity (number of previous births) for the i-th individual. TP_i is a binary variable indicating whether the i-th individual has ever had a terminated pregnancy (1 for yes, 0 for no). β_o , $\beta_1, \beta_2, \beta_3, \beta_4$ are the coefficients to be estimated. ε_i represents the error term for the i-th individual.

$$ANC_i = \beta_o + \beta_1 MAGE_i + \beta_2 ME_i + \beta_3 BP_i + \beta_4 TP_i + \beta_5 WW_i + \beta_6 WHH_i + \beta_7 HHS_i + \beta_8 MME_i + \varepsilon_i \quad \ldots\ldots\ldots (2)$$

$$ANC_i = \beta_o + \beta_1 MAGE_i + \beta_2 ME_i + \beta_3 BP_i + \beta_4 TP_i + \beta_5 WW_i + \beta_6 WHH_i + \beta_7 HHS_i + \beta_8 MME_i + \beta_9 PE_i + \beta_{10} WI_i + \varepsilon_i \quad \ldots\ldots\ldots (3)$$

$$ANC_i = \beta_o + \beta_1 MAGE_i + \beta_2 ME_i + \beta_3 BP_i + \beta_4 TP_i + \beta_5 WW_i + \beta_6 WHH_i + \beta_7 HHS_i + \beta_8 MME_i + \beta_9 PE_i + \beta_{10} WI_i + \beta_{11} REG_i + \beta_{12} RES_i \; \varepsilon_i \quad \ldots\ldots\ldots (4)$$

Above models 1.2, 1.3 & 1.4 for likelihood of having SBA are same as the model 1.1 with inclusion various explanatory socioeconomic circumstances/determinants.

Here's a breakdown of the equation:

Table 1: ***Variables Description***

Variables	Categories
No. of Antenatal Visits	if woman has had at least four antenatal visits=1 ; otherwise 0
Maternal Education	No Education =1 otherwise 0, Primary =1 otherwise 0, Secondary =1 otherwise 0, Higher =1 otherwise 0
Paternal Education	No Education =1 otherwise 0, Primary =1 otherwise 0, Secondary =1 otherwise 0, Higher =1 otherwise 0

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Current Maternal Age in Years	Mage19 (15-19) =1 otherwise 0, Mage24 (20-24) =1 otherwise 0 Mage29 (25-29) =1 otherwise 0, Mage34 (30-34) =1 otherwise 0 Mage35above (35-49) =1 otherwise 0
Working Women	Yes =1 No = 0
Household Size	HH members5 = 1 when members are (2-5), otherwise 0, HH members10 = 1 when members are (6-10), otherwise 0, HH members 11above = 1 when members are (11-44), otherwise 0
Birth Parity	BP1 =1 when BP =1, otherwise 0, BP3 =1 when BP =2&3, otherwise 0 BP6 =1 when BP =4-6, otherwise 0, BP above6 =1 when BP > 6 births, otherwise 0
Terminated Pregnancy	Yes =1, No =0
Household Head	Female = 1, otherwise 0
Wealth Index	Poorest: Poorer + Poorest =1, otherwise 0, Middle:Middle = 1, otherwise 0, Richest: Richer + Richest =1, otherwise 0
Mass	Used 3 variables
Media Exposure	1: Heard FP on radio, Yes =1 , no =0, 2: Heard FP on TV Yes =1, no =0, 3: Heard FP on Newspaper, Yes =1, no =0
Region	Punjab = 1 otherwise 0, Sindh = 1 otherwise 0, KPK = 1 otherwise 0 Balochistan = 1 otherwise 0
Type of Residence	Urban = 1, otherwise 0, Rural = 1, otherwise 0

***BP = Birth Parity.**

4.4. Descriptive Analysis

As we know that ANC is one of the most important determinants of mother and infant health. It provides the learning opportunity of risks attached with the pregnancy and guide the paramedics to plan the precautionary measures regarding delivery and place of delivery in order to prevent maternal and infant mortality or morbidity. ANC from a skilled health care provider is important to monitor during pregnancy, at delivery, and during the postnatal period (42 days after delivery). Maternal healthcare is an important determinant of high mortality rate in the developing world (McCarthy & Maine, 1992). According to WHO, in the world 536000 women die every year from causes related to pregnancy, childbirth and postpartum. The inequality and inaccessibility of these health facilities are widely responsible for high proportion of maternal and infant deaths.

ANC visits are very critical in the assessment of pregnancy complications. At the stage of ANC, the provision of iron/folic acid supplements and tetanus toxoid vaccinations are compulsory. In Punjab, the public health care facilities are the most accessible health care facilities for the major part of the population. Reportedly, the ANC coverage in Punjab is about 53% with wide range of inequalities in the provision of service delivery (PER 2017). According to the Fig 2 below, we can see the increasing trend of ANC visits in both rural and urban regions of Pakistan.

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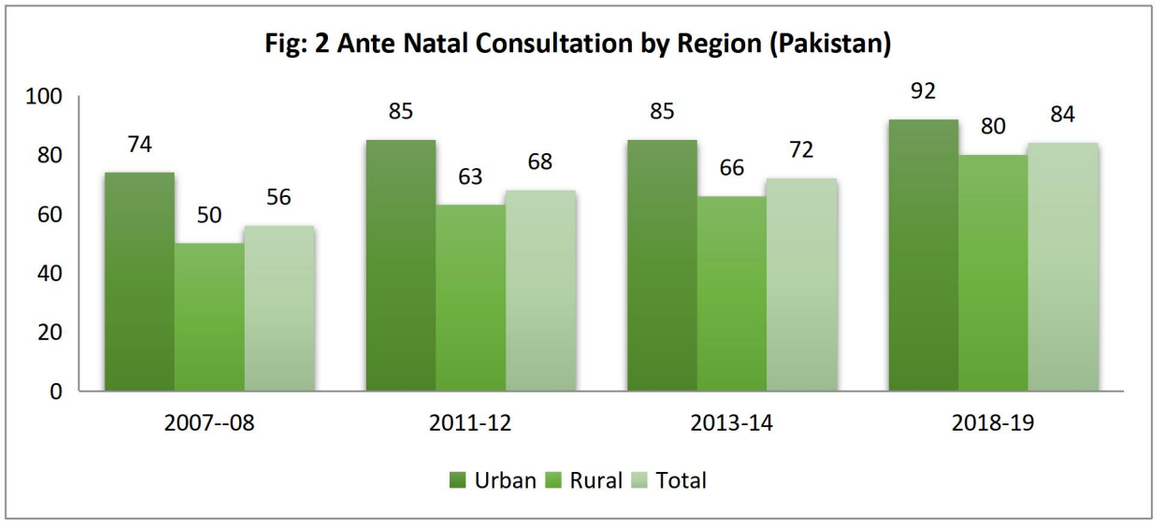
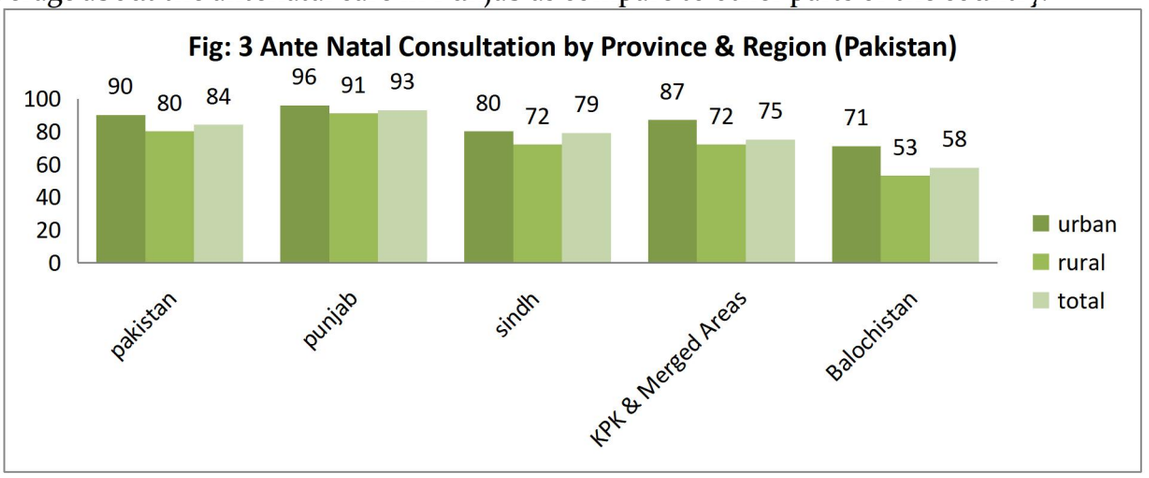


Source: PSLM various issues

Moreover, it can be seen from the figure below that most of the population visit for the antenatal health care, belongs to the province Punjab, which shows much more awareness and coverage about the antenatal care in Punjab as compare to other parts of the country.



Source: PSLM 2018-19

The Fig 3 shows the trends of antenatal care coverage in Punjab. According to MICS 2007-08 the antenatal care coverage in Punjab was 53%. In 2011 it reaches to 74%, in 2014 it increases to 78% and in 2017-18 it shows also an increasing trend with the value of 87.3%. The ANC coverage shows significant increment in the value which also helps to decrease the morbidity and certain complications at the time of pregnancy or after the pregnancy.

Table 2: ***Descriptive Statistics***

Variables	Number of Observations	Proportions
No. of Antenatal Visits		
No visits = 0	2,158	50.66 %
At least 4 visits =1	2,102	49.34%
By professional = 1	3034	71.22%
Maternal Education		
No Education	2,246	52.72%
Primary	593	13.925%
Secondary	856	20.09%

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Higher	565	13.26%
Paternal Education		
No Education	1,319	30.98%
Primary	609	14.29 %
Secondary	1,389	32.59%
Higher	943	22.14%
Maternal Current Age		
15- 19 years	224	5.26%
20 -24 years	975	22.89%
25-29 years	1,320	30.99%
30-34 years	974	22.86%
35 above years	767	18.00%
Working Women		
Yes =1	533	12.51%
No =0	3,727	87.49%
No. of HH Members		
2-5 members	839	19.69%
6-10 members	1,994	46.81%
11 above members	1,427	33.50%
Birth Parity		
First birth	898	21.08%
2-3 births	1,663	39.04%
4-6 births	1,269	29.79%
Above 6 births	430	10.09%
Terminated Pregnancy		
Yes =1	1,196	28.08%
No =0	3,064	71.92%
Sex of Household Head		
Male =0	3,884	91.17%
Female =1	376	8.83%
Wealth Index		
Poorest	1,782	41.83%
Middle	846	19.86%
Richest	1,632	38.31%
Mass Media Exposure		18.68%*
Region		
Punjab	1,332	31.27%
Sindh	1,142	26.81%
KPK	1,038	24.37%
Balochistan	748	17.56%
Type of Residence		
Rural	2,275	53.40%
Urban	1,985	46.60%

*shows the % of households who have any kind of exposure to media added to the index

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The table above presents summary statistics. It reveals that nearly half (49%) of Pakistani women sought medical attention for antenatal care on at least four visits during their most recent pregnancy, and a significant majority (71%) delivered their child in a healthcare facility or under the care of a healthcare professional. It's concerning, however, that a substantial portion (53%) of mothers is illiterate, while only a small fraction (13%) have higher education. Notably, a larger proportion of fathers (22%) have achieved higher education compared to mothers, and 32% of fathers have completed secondary education.

Many households comprise more than ten members, indicating a prevalent joint family structure. Encouragingly, only 28% of mothers fall into the category of those who have terminated a pregnancy. In terms of economic status, 42% of households are classified as poorer, with a limited 20% belonging to the middle class. The majority of households (32%) are located in the Punjab region, while the proportion from Balochistan is smaller at 17%. Additionally, 53% of households are situated in rural areas, and only 9% of women serve as household heads. A mere 13% of mothers are engaged in employment. On average, just 15% of households have a substantial exposure to media.

Regarding childbirth patterns, roughly 39% of children are born within the range of 2 to 3 births and a small fraction of children are born after six or more previous births, indicating relatively short birth intervals in these households.

4.5. Empirical Analysis

This chapter encompasses all the empirical analyses conducted in this study. Within the context of this chapter, you will find the outcomes of the estimations for equations (1 to 4), which were discussed in Chapter 4. These results are presented in Table 6.1. Model 1 illustrates the findings derived from equation (1), while Model 2 highlights the outcomes of equation (2). Similarly, Model 3 and Model 4 present the results of equations (3) and (4), respectively.

Table 3: ***Results of Binary Logistic Regression for No. of Antenatal Visits***

Dep. Variable: No of Antenatal Visits					
Variables	**Categories**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
	RC: 15-19 years				
Maternal current Age in Years	20-24	0.1453 (0.1001)	0.1401 (0.1002)	0.1223 (0.1022)	0.0943 (0.1040)
	25-29	0.3325*** (0.1036)	0.3270*** (0.1037)	0.2737*** (0.1058)	0.2596*** (0.1076)
	30-34	0.4636*** (0.1108)	0.4622*** (0.1110)	0.3857*** (0.1132)	0.3687*** (0.1152)
	Above 35 years	0.4078*** (0.1177)	0.3968*** (0.1180)	0.3158*** (0.1204)	0.3175*** (0.1222)
	RC: No Education				
Maternal Education	Primary	0.5987*** (0.0592)	0.5628*** (0.0597)	0.3239*** (0.0631)	0.2657*** (0.0646)
	Secondary	0.9206*** (0.0541)	0.8498*** (0.0556)	0.4416*** (0.0632)	0.3895*** (0.0646)
	Higher	1.3879*** (0.0738)	1.3299*** (0.0749)	0.7784*** (0.0830)	0.7124*** (0.0890)
	RC: First Birth				
	2-3 births	-0.2923*** (0.0608)	-0.2957*** (0.06097)	-0.2975*** (0.0622)	-0.3030*** (0.630)

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Birth Parity	4-6 births	-0.5151***	-0.5327***	-0.4740***	-0.4835***
		(0.0726)	(0.0740)	(0.0755)	(0.0765)
	Above 6 Births	-0.8056***	-0.8127***	-0.6691***	-0.6565***
		(0.1010)	(0.1027)	(0.1052)	(0.1064)
Ever Had Terminated Pregnancy	RC: No				
	Yes	0.1609***	0.1663***	0.1559***	0.1286***
		(0.0464)	(0.0469)	(0.0478)	(0.0484)
Working Women	RC: No				
	Yes		-0.1547**	-0.0198	-0.0616
			(0.0640)	(0.0657)	(0.0666)
Women as HouseHold Head	RC: Male				
	Female		0.1148	0.1190	0.0908
			(0.0737)	(0.0747)	(0.0755)
HouseHold Size	RC: 2-5 members				
	6-10 members		0.0836	0.0118	0.0229
			(0.0587)	(0.0601)	(0.0607)
	11 Above		0.0681	-0.0795	-0.0381
			(0.0644)	(0.0624)	(0.0636)
Mass Media Exposure	RC: No Exposure				
	Any kind of Exposure		0.2404***	0.1847***	0.1696***
			(0.0491)	(0.0500)	(0.0505)
Paternal Education	RC: No Education				
	Primary			0.1758***	0.1274*
				(0.0671)	(0.0679)
	Secondary			0.2416***	0.2491***
				(0.0568)	(0.0576)
	Higher			0.3142***	0.3617***
				(0.0695)	(0.0710)
Wealth Index	RC: Poorest				
	Middle			0.3309***	0.2899***
				(0.0583)	(0.0610)
	Richest			0.7021***	0.5997***
				(0.0601)	(0.0678)
Region	RC: Punjab				
	Sindh				0.1251**
					(0.0595)
	KPK				-0.0805
					(0.0592)

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	Baluchistan				-0.5127*** (0.0728)
Type of Residence	RC: Rural				
	Urban				0.1504*** (0.0504)
No of Observations	4260				
x^2		877.62	910.95	1116.12	1210.39
P- value		0.00	0.00	0.00	0.00
Pseudo R^2		0.1486	0.1543	0.1890	0.2050
Goodness of Fit Test (prob> x^2)		0.9027	0.9604	0.1462	0.1714

Note: *** p < 0.01, ** p < 0.05, *p < 0.10 show the significance level at 1%, 5% and 10% respectively.

The results of the Hosmer Lemeshow test indicate the goodness of all four models as the p-value is greater than the 5% level of significance, indicates that the model is fitted well.

It is a rule of thumb that a McFadden's pseudoR^2 ranging from 0.2 to 0.4 indicates very good model fit. So, the 12 variable model mentioned above with a McFadden's pseudo R^2 of 0.20 indicate excellent model fit compared to the 4, 8 and 10 variable model (McFadden's pseudo R^2 = 0.1486, pseudo R^2= 0.1543 and pseudo R^2 = 0.189).

Overall model is good fit. However, the coefficients have no straight forward interpretation. These coefficients can be difficult to interpret as they are relative to base category. Another way to interpret the effects of covariates is to calculate the marginal effects.

Table 4: ***Estimation of the Marginal Effect for No. of ANC Visits***

Dep. Variable: No of Antenatal Visits					
Variables	**Categories**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Maternal current Age in Years	RC: 15-19 years				
	20-24	0.0487 (0.0336)	0.0466 (0.0333)	0.0388 (0.0324)	0.0293 (0.0323)
	25-29	0.1115*** (0.0346)	0.1088*** (0.0344)	0.0870** (0.0335)	0.0807** (0.0334)
	30-34	0.1554*** (0.0369)	0.1539*** (0.0367)	0.1226*** (0.0358)	0.1147*** (0.0357)
	Above 35 years	0.1367*** (0.0393)	0.1321*** (0.0391)	0.1004*** (0.0381)	0.0987*** (0.0379)
Maternal Education	RC: No Education				
	Primary	0.2007*** (0.0191)	0.1874*** (0.0192)	0.1029*** (0.0198)	0.0826*** (0.0199)
	Secondary	0.3086*** (0.0161)	0.2829*** (0.0168)	0.1404*** (0.0197)	0.1212*** (0.0198)

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	Higher	0.4653*** (0.0217)	0.4428*** (0.0222)	0.2474*** (0.0270)	0.2216*** (0.0271)
Birth Parity	RC: First Birth				
	2-3 births	-0.098*** (0.0202)	-0.0984*** (0.0201)	-0.0945*** (0.0196)	-0.0942*** (0.0194)
	4-6 births	-0.172*** (0.0239)	-0.1773*** (0.0242)	-0.1507*** (0.0237)	-0.1504*** (0.0235)
	Above 6 Births	-0.270*** (0.0331)	-0.2706*** (0.0335)	-0.2127*** (0.0330)	-0.2042*** (0.0327)
Ever Had Terminated Pregnancy	RC: No				
	Yes	0.0539*** (0.0155)	0.0553*** (0.0155)	0.0495*** (0.0151)	0.0400*** (0.0150)
Working Women	RC: No				
	Yes		-0.0515** (0.0212)	-0.0063 (0.0209)	-0.0191 (0.0207)
Women as HouseHold Head	RC: Male				
	Female		0.0382 (0.0245)	0.0378 (0.0237)	0.0282 (0.0234)
HouseHold Size	RC: 2-5 members				
	6-10 members		0.0278 (0.0195)	0.0037 (0.0191)	0.0071 (0.0189)
	11 Above		0.0227 (0.0201)	-0.0252 (0.0191)	-0.0118 (0.0197)
Mass Media Exposure	RC: No Exposure				
	Any kind of Exposure		0.0800*** (0.0162)	0.0587*** (0.0158)	0.0527*** (0.0156)
Paternal Education	RC: No Education				
	Primary			0.0558*** (0.0213)	0.0396* (0.0211)
	Secondary			0.0768*** (0.0179)	0.0775*** (0.0178)
	Higher			0.0999*** (0.0219)	0.1127*** (0.0219)
Wealth Index	RC: Poorest				
	Middle			0.1052*** (0.0183)	0.0902*** (0.0188)
	Richest			0.2232*** (0.0182)	0.1866*** (0.0205)

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Region	RC: Punjab	
	Sindh	0.0389** (0.0185)
	KPK	-0.0250 (0.0184)
	Baluchistan	-0.1595*** (0.0223)
Type of Residence	RC: Rural	
	Urban	0.0468*** (0.0156)

Note: *** p < 0.01, ** p < 0.05, *p < 0.10 show the significance level at 1%, 5% and 10% respectively.

Model 1 examines the effects of maternal age, maternal education, birth parity, and terminated pregnancy on antenatal care (ANC) utilization. The results indicate that maternal age has a positive and statistically significant relationship with ANC visits, except for women aged 20–24, whose effect is insignificant. Compared to the reference group (15–19 years), women aged 25–29, 30–34, and above 35 are more likely to attain at least four ANC visits, suggesting that older mothers tend to be more conscious of maternal health, possibly due to greater awareness and perceived risks. Maternal education emerges as a strong and consistent predictor, with women having primary, secondary, and higher education progressively more likely to utilize adequate ANC compared to those with no education. This reflects the role of education in enhancing awareness and promoting positive health-seeking behavior. In contrast, birth parity shows a negative association, as women with higher numbers of births are less likely to complete the recommended visits, possibly due to increased confidence or reduced perceived need among experienced mothers. Additionally, women with a history of terminated pregnancy are slightly more likely to seek adequate ANC, indicating that previous adverse experiences may encourage more cautious health behavior.

Model 2 builds upon the first model by incorporating working status, female headship, household size, and mass media exposure. Although the marginal effects of the variables from Model 1 decline slightly, their significance largely remains intact. Employment status shows a negative association with ANC utilization, as working women are less likely to attend at least four visits, likely due to time constraints and competing responsibilities. Meanwhile, female headship and household size do not show statistically significant effects, suggesting that these factors do not independently influence ANC utilization when other variables are considered. In contrast, mass media exposure demonstrates a positive and significant relationship, with women exposed to media being more likely to achieve adequate ANC visits. This highlights the importance of access to information in shaping health-related behavior, as media can play a key role in increasing awareness about the benefits and necessity of antenatal care.

In Model 3, paternal education and household wealth are introduced to capture broader socioeconomic influences. The findings reveal that paternal education positively affects ANC utilization, with increasing levels of education associated with a higher likelihood of mothers attending the recommended number of visits. This suggests that educated fathers may contribute to better healthcare decision-making and support. Similarly, household wealth exhibits a strong positive relationship, as women from middle- and higher-income households are significantly more likely to utilize adequate ANC compared to those from poorer

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households. This underscores the importance of financial capacity in accessing healthcare services. With the inclusion of these variables, the marginal effects of maternal education decrease, indicating that its impact is partly mediated through household economic conditions and paternal characteristics. Additionally, the effect of women's employment becomes statistically insignificant, suggesting that improved economic status may offset the constraints associated with employment.

Model 4 further extends the analysis by incorporating regional and residential factors, revealing important spatial disparities in ANC utilization. Women residing in Sindh show a slightly higher likelihood of attending at least four ANC visits compared to those in Punjab, while no significant difference is observed for Khyber Pakhtunkhwa. In contrast, women in Balochistan are significantly less likely to utilize ANC services, reflecting challenges such as limited healthcare infrastructure, shortages of skilled providers, and socioeconomic constraints. Furthermore, place of residence plays a crucial role, as urban women are more likely to achieve adequate ANC visits compared to rural women, likely due to better access to healthcare facilities and information. Although the inclusion of additional variables leads to a reduction in marginal effects across models, the overall direction and significance of key determinants remain consistent, emphasizing the importance of education, socioeconomic status, information access, and geographic location in influencing antenatal care utilization.

5. Discussion

Maternal mortality is a major concern for global health agendas, around half of the million women die every year due to complications during pregnancy which is equivalent to more than one death per minute. According to Black, Morris, and Bryce (2003) 34% deaths of children occurred just because of non-availability of adequate healthcare facilities. This situation is more alarming in Pakistan as Siddiqi, Haq, Ghaffar, Akhtar, and Mahaini (2004) observed that 40,000 deaths of infants and 16500 deaths of mothers yearly occur in the country and nearly 1 in 38 women have to face such risk before even the time of birth. The situation is in contrast with other countries of south Asia where the risk is much lower than Pakistan. Moreover, the risk of maternal deaths is more compounded due to the high prevalence of anemia among half of the pregnant women in Pakistan. the regional disparities further heightened the issue, as rural Balochistan reports 785 deaths per 100,000 live births, which is far exceeding than that of the national average which is around 340 per 100,000 live births (NIPS, 2001). The absence of any effective policy regarding the maternal healthcare has also been the key cause of poor outcomes.

Other demographic factors, such as age also play an important in shaping the utilization of maternal healthcare services. Women of the age interval 35-49 experienced greater reproductive health experience; they also faced greater risks to their health, so the need for proactive behavior of health seeking is required. So, they are likely to avail ANC services as compare to younger women specifically below the age of 25. The empirical findings also consistent and support that the women from the age groups of 35 to 49 are more likely to receive recommended ANC visits, while the women from 15 to 25 are less likely to get these visits. The result is attributed with the awareness level, past pregnancy experience and heightened perception of risks among the aged women particularly. According to Elo (1992) observed in the context of Peru, where older women has higher probability of getting ANC services. the situation also reflects age based disparity of maternal healthcare utilization.

Both the maternal and paternal; education emerges as fundamental factors in predicting the ANC service prevalence among women. Educated women have higher probability of decision making autonomy, more awareness, and better understanding about

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the complications of pregnancy all of which increase the probability of getting ANC services. it is also evident from the literature, that higher attainment of education within society shows greater acceptability of health seeking and improved knowledge of healthcare staff and also high accuracy in the perception about the potential complications (Mezmur, Navaneetham, Letamo, & Bariagaber, 2017; Rai, 2015). Subsequently, women with good levels of formal education are more likely to attain full treatment of ANC than that of those with no formal education. Even the women with partial education also more inclined to seek ANC than those of no educational backgrounds. The findings are consistent with broad set of socioeconomic literature (Amin et al., 2010; Elo, 1992; Singh, Rai, Alagarajan, & Singh, 2012), so, we can say that the education is a key component for seeking healthcare by the women.

Similarly, paternal education also plays an important role in shaping the behavior of women towards ANC services. The education of the household head is also an indicator of household socioeconomic status; often reflect higher earnings of the household head and more awareness regarding healthcare requirements. The primary education for both paternal and maternal is not sufficient for accessing the ANC services. Higher education of husbands shows increased likelihood of getting maternal healthcare services. This highlights the importance of husband's education in those households where the primary decision making is up to men and women have limited autonomy. Evidence shows that the literate spouses contributes highly in the financial stability and have more supportive behavior for healthcare utilization (Dar & Afzal, 2015). Therefore, the disparities of spousal education can further acerbate the inequalities in maternal healthcare utilization.

The reproductive history with fetal loss and terminated pregnancies also influences the health seeking behavior. The women with such experiences are more cautious and keen to get ultra ANC services in the subsequent pregnancies. Midhet, Becker, and Berendes (1998) observed that women are more likely to seek maternal healthcare, immunization services and also engrossed themselves in the activities related to those measures which are crucial for better pregnancy experience. So, it highlights that the negative experiences related to pregnancy increased the probability of precautionary behavior among women and encourage them to be consistent with the maternal healthcare engagements.

Household economic status is also most significant determinant of maternal healthcare services. Women with wealthier backgrounds are in a better position to afford healthcare services, including the expenses related to transpiration, consultation and medical treatments. Whereas women from poor backgrounds have to face barrier related to finance and limited access. Out of pocket expenditures are burdensome for low income households which discourage adequate treatment and care seeking. These disparities show structural barriers embedded with healthcare system, where access is closely related with the financial stability. Similar patterns observed in the various developing economies (Gwatkin et al., 2007), all emphasizing on the wealth based inequalities of maternal healthcare.

In Pakistan's context, ANC services utilization are sturdily related with the demographic, socioeconomic and regional factors. Significant gaps have been observed across different education levels, household wealth and geographic locations. A great deal of literature is available particularly on this issue, including countries like Ethiopia, Zambia, Mali, Nigeria, and Ghana, where all such pattern of inequality were observed and reported (Anarwat et al., 2021; Gebre et al., 2018; He et al., 2021; Nghargbu & Olaniyan, 2017; Tounkara et al., 2022). These disparities should be address through targeted policy interventions which aimed at improving quality education, removing financial barriers, expanding infrastructure of healthcare, and increasing awareness through the effective use of media including information

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communication technology. These measures are indispensable for getting equitable access to ANC services and to improve over wellbeing related to maternal healthcare outcomes.

6. Conclusion

The study used data from Pakistan Demographic and Health Survey and examined socioeconomic disparities in ANC utilization in Pakistan. it underscores that the ANC services are not only a public health issue but a fundamental right critical for the wellbeing of women and children. The study reveals substantial disparities in access to ANC services. Despite of the progress made during last few years, Pakistan is still far behind SDG targets of mitigating maternal mortality. In Pakistan, the maternal mortality is higher as compare to other countries of the region. So, the significance and importance of this issue encouraged us to investigate the comprehensive pattern in determining the behavior of maternal healthcare. The empirical analysis suggested a strong combination of policy options to enhance the ANC service utilization in the country. Firstly, the study advocated a strong policy implementation for women's education which increases the awareness level among the masses. The girl's education must be priorities in the regions with less access to schools and colleges. Reproductive health programs must be launched to educate women about the family planning and complications in the way of childbirth. The awareness campaign can also be executed through mass media exposure. Through expansion of mass media campaigns, the message and awareness will be delivered easily and more strongly to those women who are actually the housewives and have very less interaction with the society. Women empowerment, whether it comes from educating the female of from the employment of the female is also an important factor that can improves women autonomy in decision making regarding her health. Most of the households are headed by the male, so it is crucial to engage men in the matters of awareness about reproductive and maternal healthcare as they were also sometimes the sole decision makers in the households.

Moreover, Pakistan is the country where majority of the population resides in the rural areas. So, the government should treat both areas equally in terms of ANC provision. In fact, rural areas are highly disadvantaged in terms of quality healthcare facilities and services. So, an effective mechanism must be launched to cater these disparities in terms of health and education. The study advocates for a cohesive and comprehensive approach by comprising awareness, economic wellbeing, affordability and quality of service delivery. The economic constraints are the most significant barrier in the way of attaining good health and education. This can be only addressed when the government focused on agendas where health and education are at the priority. Undertaking these inequalities demands a inclusive policy approach that assimilates education, financial empowerment, and healthcare system solidification. Escalating social protection initiatives such as the Benazir Income Support Programme and the Ehsaas Kafaalat Program can help to diminish financial restraints and expand access to healthcare services. At the same time, targeted intrusions in underserved constituencies, predominantly in Balochistan and Khyber Pakhtunkhwa, are essential to guarantee evenhanded distribution of healthcare resources and to expand ANC utilization across all segments of the population.

6.1. Limitations of the Study

This study is limited to the women who gave at least one birth in three years preceding the surveys. It also used data for four provinces to make it simple; other administrative states can also be included for further analysis. Variable for the fathers' working status is not included since all fathers are working and this variable has no variations. Distance to nearest health facility is not included because DHS does not have the data for this variable. The number of

living children is not incorporated because this study takes the number of household members living in the same household.

References

Abraha, H. E., Teka, H., Legesse, A. Y., Ebrahim, M. M., Tsadik, M., Fisseha, G., . . . Gebremeskel, T. (2024). Causes of death among women of reproductive age during the war in Tigray, Ethiopia. *PloS one, 19*(3), e0299650.

Adeel, U. (2019). Analyzing the impact of government expenditure on the health sector: evidence from Pakistan. *Journal of Business and Economic Options, 2*(2), 54-66.

Akbar, R., & Hayat, A. (2020). Psychological Health of Children Engaged in Hazardous Labor: A Study in Lahore, Pakistan. *Journal of Policy Options, 3*(2), 70-74.

Ali, A. (2015). *The Impact of Macroeconomic Instability on Social Progress: An Empirical Analysis of Pakistan.* Ph.D Dissertation. NCBA&E, Lahore, Pakistan., 1-152.

Ali, A., & Bibi, C. (2017). Determinants of social progress and its scenarios under the role of macroeconomic instability. *Pakistan Economic and Social Review, 55*(2), 533-568.

Ali, A., & Rehman, H. U. (2015). Macroeconomic instability and its impact on gross domestic product: an empirical analysis of Pakistan. *Pakistan Economic and Social Review*, 285-316.

Ali, A., & Şenturk, İ. (2019). Justifying the impact of economic deprivation, maternal status and health infrastructure on under-five child mortality in Pakistan: An empirical analysis. *Bulletin of Business and Economics (BBE), 8*(3), 140-154.

Amin, R., Shah, N. M., & Becker, S. (2010). Socioeconomic factors differentiating maternal and child health-seeking behavior in rural Bangladesh: A cross-sectional analysis. *International journal for equity in health, 9*(1), 9.

Anarwat, S. G., Salifu, M., & Akuriba, M. A. (2021). Equity and access to maternal and child health services in Ghana a cross-sectional study. *BMC Health Services Research, 21*(1), 864.

Anees, M., & Yan, W. (2019). An overview about the challenges of urban expansion on environmental health in Pakistan. *Journal of Energy and Environmental Policy Options, 2*(3), 64-71.

Ashraf, I., & Ali, A. (2018). Socio-Economic Well-Being and Women Status in Pakistan: An Empirical Analysis. *Bulletin of Business and Economics (BBE), 7*(2), 46-58.

Audi, M., & Roussel, Y. (2024). Exploring the link between public health and external debt in Saudi Arabia. *Journal of Business and Economic Options, 7*(4), 1-12.

Batool, S. A., & Jadoon, A. K. (2018). Women's empowerment and associated age-related factors. *Pakistan Journal of Social and Clinical Psychology, 16*(2), 52-57.

Bhutta, Z. A., Soofi, S., Cousens, S., Mohammad, S., Memon, Z. A., Ali, I., . . . Wall, S. (2011). Improvement of perinatal and newborn care in rural Pakistan through community-based strategies: a cluster-randomised effectiveness trial. *The Lancet, 377*(9763), 403-412.

Black, R. E., Morris, S. S., & Bryce, J. (2003). Where and why are 10 million children dying every year? *The Lancet, 361*(9376), 2226-2234.

Carlo, D. (2025). Economic Activity, Carbon Emissions, and Health Outcomes: A Cross-National Study of OIC and Non-OIC Countries. *Journal of Business and Economic Options, 8*(4), 47-57.

Celik, Y., & Hotchkiss, D. R. (2000). The socio-economic determinants of maternal health care utilization in Turkey. *Social Science & Medicine, 50*(12), 1797-1806.

Dar, S., & Afzal, U. (2015). Education and Maternal Health in Pakistan: The Pathways of Influence. *The Lahore Journal of Economics, 20*(2), 1.

Demographic, P. (2017). Health Survey (PDHS).(2017-2018). *Pakistan Demographic and Health Survey (PDHS). National Institute of Population Studies and Macro International Inc. publication*.

Di Cesare, M., Bhatti, Z., Soofi, S. B., Fortunato, L., Ezzati, M., & Bhutta, Z. A. (2015). Geographical and socioeconomic inequalities in women and children's nutritional status in Pakistan in 2011: an analysis of data from a nationally representative survey. *The Lancet Global Health, 3*(4), e229-e239.

Dunlop, A. L., Coloske, M. J., Stanhope, K. K., Kramer, M. R., Joski, P. J., & Adams, E. K. (2026). Early postpartum severe maternal morbidity among mothers of very low and low birthweight infants: a population-based retrospective cohort study in Georgia, USA, 2016-2020. *The Journal of Maternal-Fetal & Neonatal Medicine, 39*(1), 2625550.

Dunn, J. T., Lesyna, K., & Zaret, A. (2017). The role of human rights litigation in improving access to reproductive health care and achieving reductions in maternal mortality. *BMC pregnancy and childbirth, 17*(Suppl 2), 367.

Elo, I. T. (1992). Utilization of maternal health-care services in Peru: the role of women's education. *Health transition review*, 49-69.

Fatima, A., Mushtaq, R., Begum, S., Ellahi, A., & Shaheen, W. A. (2020). Investigation of Socio-Economic Factors Affecting Women's Work Satisfaction and Earning: A Case Study of Southern Punjab City DG Khan. *Elementary Education Online, 19*(4), 3203-3211.

Firdous, R., Chatrath, S. K., Jadoon, A. K., Iqbal, M., Batool, S. A., & Ul Hasan, Z. (2023). Exploring dynamic nexus between economic growth, environmental degradation, and public health in Pakistan: A moderated mediation approach. *International Journal of Energy Economics and Policy, 13*(1), 241-249.

Gebre, E., Worku, A., & Bukola, F. (2018). Inequities in maternal health services utilization in Ethiopia 2000–2016: magnitude, trends, and determinants. *Reproductive health, 15*(1), 119.

Gertler, P., & Gaag, J. v. d. (1990). *The willingness to pay for medical care: evidence from two developing countries*.

Glewwe, P. (1999). Why does mother's schooling raise child health in developing countries? Evidence from Morocco. *Journal of human resources*, 124-159.

Gwatkin, D. R., Rutstein, S., Johnson, K., Suliman, E., Wagstaff, A., & Amouzou, A. (2007). Socio-economic differences in health, nutrition, and population within developing countries. *Washington, DC: World Bank, 287*.

He, Z., Zhang, C., Wang, S., Bishwajit, G., & Yang, X. (2021). Socioeconomic determinants of maternal healthcare utilisation in Zambia: 1997-2014. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing, 58*, 00469580211067480.

Khan, K. K. (2020). Assessing the Impact of Climate Change on Women's Health: A Case Study in Lahore, Punjab, Pakistan. *Journal of Policy Options, 3*(3), 82-89.

Marc, A. (2022). Income inequality and health across the Mediterranean: A panel data analysis. *Journal of Business and Economic Options, 5*(2), 23-28.

Marc, A., Poulin, M., Ahmad, K., & Ali, A. (2025). CO_2 emissions, globalization, and health: A dynamic panel analysis of life expectancy in BRICS. *Environment, Development and Sustainability*, 1-33.

McCarthy, J., & Maine, D. (1992). A framework for analyzing the determinants of maternal mortality. *Studies in family planning, 23*(1), 23-33.

Mehmood, A., Siddique, H. M. A., & Ali, A. (2022). *Impact of Health on Worker Productivity: Evidence from South Asia*. University Library of Munich, Germany.

Mezmur, M., Navaneetham, K., Letamo, G., & Bariagaber, H. (2017). Socioeconomic inequalities in the uptake of maternal healthcare services in Ethiopia. *BMC Health Services Research, 17*(1), 367.

Midhet, F., Becker, S., & Berendes, H. W. (1998). Contextual determinants of maternal mortality in rural Pakistan. *Social Science & Medicine, 46*(12), 1587-1598.

Misu, F., & Alam, K. (2023). Comparison of inequality in utilization of maternal healthcare services between Bangladesh and Pakistan: evidence from the demographic health survey 2017–2018. *Reproductive health, 20*(1), 43.

Modibbo, H., & Inuwa, N. (2020). Health outcomes and economic growth nexus: Evidence from Nigeria. *Journal of Business and Economic Options*, *3*(2), 46-55.

Mumtaz, Z., & Salway, S. M. (2007). Gender, pregnancy and the uptake of antenatal care services in Pakistan. *Sociology of health & illness, 29*(1), 1-26.

Mumtaz, Z., Salway, S., Shanner, L., Zaman, S., & Laing, L. (2012). Addressing disparities in maternal health care in Pakistan: gender, class and exclusion. *BMC pregnancy and childbirth, 12*(1), 80.

Mwabu, G., Ainsworth, M., & Nyamete, A. (1993). Quality of medical care and choice of medical treatment in Kenya: an empirical analysis. *Journal of human resources*, 838-862.

Nghargbu, R., & Olaniyan, O. (2017). Inequity in maternal and child health care utilization in Nigeria. *African Development Review, 29*(4), 630-647.

Novignon, J., Ofori, B., Tabiri, K. G., & Pulok, M. H. (2019). Socioeconomic inequalities in maternal health care utilization in Ghana. *International journal for equity in health, 18*(1), 141.

Organization, W. H. (2006). *The world health report 2006: working together for health*: World Health Organization.

Paul, P., Pennell, M. L., & Lemeshow, S. (2013). Standardizing the power of the Hosmer–Lemeshow goodness of fit test in large data sets. *Statistics in medicine, 32*(1), 67-80.

Rai, R. K. (2015). Utilization of maternal health-care services by Muslim women in India, Bangladesh, and Pakistan, 2005–2007. *Journal of Public Health, 23*(1), 37-48.

Raja, U., & Iqbal, N. (2019). Ensuring worker safety in Lahore's large industries: a study on occupational health, safety, and risk management. *Journal of Energy and Environmental Policy Options*, *2*(4), 117-124.

Rehman, A. U., & Malik, S. (2020). Environmental and Health Hazards of Pakistan's Leather Industry. *Journal of Energy and Environmental Policy Options*, *3*(3), 96-103.

Ronsmans, C., & Graham, W. J. (2006). Maternal mortality: who, when, where, and why. *The Lancet, 368*(9542), 1189-1200.

Russo, L. (2022). The impact of slow productivity on healthcare costs in a no-growth: An empirical analysis. *Journal of Policy Options*, *5*(4), 22-28.

Sado, L., Spaho, A., & Hotchkiss, D. R. (2014). The influence of women's empowerment on maternal health care utilization: evidence from Albania. *Social Science & Medicine, 114*, 169-177.

Sajid, A., & Ali, A. (2018). Inclusive growth and macroeconomic situations in south asia: an empirical analysis. *Bulletin of Business and Economics (BBE), 7*(3), 97-109.

Sarfraz, M., Tariq, S., Hamid, S., & Iqbal, N. (2015). Social and societal barriers in utilization of maternal health care services in rural Punjab, Pakistan. *Journal of Ayub Medical College Abbottabad, 27*(4), 843-849.

Sarwar, A., Jadoon, A. K., & Azeem, A. (2017). Education, employment and economic growth nexus: A case study of Pakistan. *JISR management and social sciences & economics, 15*(1), 15-30.

Scott, A., Shiell, A., & King, M. (1996). Is general practitioner decision making associated with patient socio-economic status? *Social Science & Medicine, 42*(1), 35-46.

Shaeen, S. K., Tharwani, Z. H., Bilal, W., Islam, Z., & Essar, M. Y. (2022). Maternal mortality in Pakistan: Challenges, efforts, and recommendations. *Annals of medicine and surgery (2012), 81*, 104380.

Siddiqi, S., Haq, I., Ghaffar, A., Akhtar, T., & Mahaini, R. (2004). Pakistan's maternal and child health policy: analysis, lessons and the way forward. *Health policy, 69*(1), 117-130.

Simkhada, B., Teijlingen, E. R. v., Porter, M., & Simkhada, P. (2008). Factors affecting the utilization of antenatal care in developing countries: systematic review of the literature. *Journal of advanced nursing, 61*(3), 244-260.

Singh, P. K., Rai, R. K., Alagarajan, M., & Singh, L. (2012). Determinants of maternity care services utilization among married adolescents in rural India. *PloS one, 7*(2), e31666.

Tariq, J., Sajjad, A., Zakar, R., Zakar, M. Z., & Fischer, F. (2018). Factors associated with undernutrition in children under the age of two years: secondary data analysis based on the Pakistan demographic and health survey 2012–2013. *Nutrients, 10*(6), 676.

Tounkara, M., Sangho, O., Beebe, M., Whiting-Collins, L. J., Goins, R. R., Marker, H. C., . . . Doumbia, S. (2022). Geographic access and maternal health services utilization in Sélingué health district, Mali. *Maternal and child health journal, 26*(3), 649-657.

Yaya, S., & Ghose, B. (2019). Global inequality in maternal health care service utilization: implications for sustainable development goals. *Health equity, 3*(1), heq. 2018.0082.

Yip, W. C., Wang, H., & Liu, Y. (1998). Determinants of patient choice of medical provider: a case study in rural China. *Health policy and planning, 13*(3), 311-322.

Zakar, R., Zakar, M. Z., Aqil, N., Chaudhry, A., & Nasrullah, M. (2017). Determinants of maternal health care services utilization in Pakistan: evidence from Pakistan demographic and health survey, 2012–13. *Journal of Obstetrics and Gynaecology, 37*(3), 330-337.