FACTORS INFLUENCING THE ACCESS TO ANTENATAL CARE UTILIZATION: EVIDENCE FROM DEMOGRAPHIC SURVEY OF PAKISTAN.

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CERTIFICATE

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Author's Declaration

I **Muhammad Tahir Yousaf** here by state that my MPhil thesis titled **Factors Influencing the Access to Antenatal Care Utilization: Evidence From Demographic Survey Of Pakistan** is my own work and has not been submitted previously by me for taking any degree from Pakistan Institute of Development Economics or anywhere else in the country/world.

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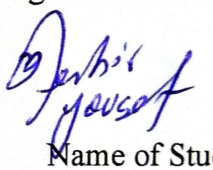

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Regards: M.Tahir Yousaf

Dedication

I dedicate this humble effort to my loveable & respectable Parents, who have always been a source of inspiration for me.

Abstract

The current study aimed to explore the role of demographic features of pregnant women influencing the antenatal care visits in Pakistan using the demographic household survey 2017-2018. The study considered the demographic features of age, education, income, regions, working status of women, gender of household head, and area of living as explanatory variables, which influence the likelihood of antenatal care visits. The study relied on a negative binomial regression model because of the count nature of the dependent variable. The study found that age, education, income, regions, working status of women, gender of household head, and area of living significantly influence the likelihood of making antenatal care visits. The study found that because of socioeconomic factors, antenatal care at both the provincial level and overall country varies. The public sector can improve the antenatal care visits through different channels such as awareness through media campaigns, reducing the cost of antenatal care visits, and encouraging women's employment in Pakistan.

Keywords: Antenatal Care Visits, Socioeconomic Factors, Demographic Household Survey, Negative Binomial Regression, Provincial Level Analysis

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CHAPTER 1:

Introduction

1.1 Introduction

The value of women's health can be understood through looking into the important role they have undertaken in society. Society is stronger if the health of the female population is taken good care of at every stage of life. Women play a developmental role in society in specific and on the planet earth in the broader sense. Healthy women are playing the most important role in society, which is the reproductive part they are playing in society Akowuah et al (2018). Antenatal care (ANC) is necessary for the pregnant woman to make an informed decision according to her needs and comfort for the long-term health of the baby and the objective of the care provider is to provide information to client in specific conditions National Collaborating Centre for Women's and Children's Health (the UK. (2008). Health care is one of the most important needs of human life and a basic requirement of mental stability Majrooh et al (2014).

Private organizations and Government officials, across all the countries, are struggling to overcome the health issues of the population by providing basic health care guidelines and practices. According to World Health Organization, Pakistan has achieved a landmark goal of antenatal care by reaching 51.4 percent of women with a minimum of four visits to the hospital during pregnancy. The world population is increasing over time and demand for health services is also increasing across the world. It is observable that supply-side factors are also improved over the years through investment in the health sector. These improvements include the construction of new hospitals, increasing the number of medical specialists and doctors, development of required medical technology and instruments in the field of medicine. Care for human health is important

for the growth of average life expectancy and the economic development of a country because healthy laborers are expected to be comparatively more productive.

Pakistan is facing issues and challenges to minimize the high burden of maternal and under five year child mortality. Globally the maternal mortality ratio has reduced to 47% over the last two decades but in developing economies the maternal deaths are recorded 14% higher than the developed nation. The antenatal care visit in 63% to 81% between the periods of 2000-2020. Some of the struggling countries like Pakistan have improved in the last ten years and region in Pakistan such as Islamabad have higher ANC visits as compare to other regions. A prenatal care card is presented to pregnant women at their initial antenatal visit to a healthcare provider. This card is the primary record of pregnancy at each visit to the ANC and it is completely refilled by the expecting woman throughout her pregnancy. The lady is deemed to have been reserved for future ANC visits after the initial visit, in order to detect problems like as preterm birth and to deal with these difficulties as soon as they arise. A woman's initial visit is essential since she receives an exhaustive evaluation of her gestational age and any risk factors for her pregnancy in this session. A full medical history of a pregnant woman needs to be obtained, including information on the current pregnancy, pregnancy, pregnancy history and complications, and the results, medical conditions including psychiatric problems and past operations; genetic and family disorders; allergies; use of medicine; use of alcoholic beverages

A physical examination is required in order to identify the lymphedema and this examination is divided into three regions. Weight and height are measured, and the heart rate and color of mucous membranes are checked. Blood pressure is also checked, and palpitations in the lymph nodes are felt to determine whether or not there is a problem. An additional component of a systematic examination is the examination of the teeth and gums as well as the breasts and thyroid, as well as

the functioning of the heart and lungs. An inspection and palpation of the pregnant woman's uterus, along with the measurement of symphysis-fundal height in cm, are all part of a comprehensive pregnancy related examination, which includes additional procedures as well. It is beneficial to get prenatal care (ANC) because it allows for the early identification of risk factors and the early diagnosis of pregnancy-related problems, such as preterm delivery, and the subsequent administration of necessary therapy. Pregnancy screening, risk assessment, treatment of problems that arise during the antenatal period, administration of medications that may improve pregnancy outcomes, education for pregnant women, physical and psychological preparation for birth, and parental involvement all have the potential to make a positive difference.

At their first antenatal appointment with a healthcare practitioner, expectant women are given a prenatal care card to take home with them. A full copy of this card is given to the expectant mother at each visit to the ANC and it is kept on her throughout her pregnancy as a main record of her pregnancies. After the first appointment, the woman is considered to have been reserved for future ANC checks in order to identify issues like as premature delivery and to address these challenges as soon as they occur. A woman's first visit is critical because she will get an in-depth assessment of her gestational age as well as any risk factors for pregnancy during this session, which is mandatory. Obtaining a complete medical history of a pregnant woman is necessary, including information on the current pregnancy, pregnancy history and complications, as well as the results of the pregnancy, medical conditions, including psychiatric problems and previous operations, genetic and family disorders, allergies, medication use, and alcohol consumption.

It is necessary to do a physical examination in order to diagnose lymphedema, and this examination is split into three sections. Use of services throughout pregnancy will result in increased use of extra maternal services such as institutional birth and seeking help for problems during delivery

and the postnatal period after the baby is delivered. Even while many individual studies have identified numerous variables that influence prenatal care use in a variety of settings, these results have not been integrated in a comprehensive manner. As a result, it was necessary to conduct a literature study in order to consolidate results related to the variables influencing the use of ANC in order to provide recommendations. It was thus necessary to conduct this evaluation of the literature in order to determine the factors that affect the utilization of antenatal care (ANC) among pregnant women. Consequently, the findings of this study may be helpful in the design and implementation of programs to encourage pregnant women to seek antenatal care (ANC).

Productive health can be developed over the long-time span from generation to generation through the provision of good health care from the time of pregnancy, to the time of adolescence age and further till the end of retirement age. It is important to mention that the health of a baby/fetus is even more sensitive before the birth inside the [1]womb or Uterus, where antenatal care is provided continuously to track the growing fetus inside the womb. Health care at this stage determines the life rate and death rate of newly born babies in the country. The care which is provided before the birth of a baby is not always for the baby but also for the mother to stay healthy and be able to give birth to the baby with normal treatment and procedure. This is also known as Antenatal care. Antenatal care is provided to women, during pregnancy, to avoid health uncertainties.

Tran et al (2011) reported, that at least four visits are compulsory during pregnancy. The first visit is for screening and treatment of anemia. It also helps to identify the risk factors, which may hurt both lives at any stage. The screening of these factors is important because it can be dealt with

[1] It is hollow pear shaped organ with temporary space inside lower abdomen of Women, where the new fetus develops into a baby.

easily at an earlier stage. This visit is often suggested in the fourth month of the pregnancy. The second visit is normally made at the 6th month of the pregnancy on the first movement of the baby indie Womb. 3rd visit is made normally for the health of the baby in the 8th month of pregnancy and finally, the last visit is required at the end of the 9th month, on which the delivery is expected and further care is suggested.

According to Jehan, et al (2009) antenatal mortality is alarming in Pakistan, which needs special policy-oriented attention. In Pakistan, the death rate of newborn babies is quite surfaced over the years and we are still trying to contend with it. Pakistan is among the three countries where the death rate for newly born babies or infant mortality rate is unavoidable and ignorable, besides weak record-keeping Pakistan has still marked the peaks of it with an estimated 298 000 neonatal deaths annually and a reported neonatal mortality rate of 49 per 1000 live births, Pakistan accounts for 7% of global neonatal deaths Manzar et al (2012). According to 2017-18 repot, Early childhood mortality (Neonatal, infant and U5 Child) reduced as compared to last five years, births assisted by a skilled provider has been improved from 52% to 69 % in and births delivered in a health facility (66%) in 2017-18.According to DHS 2017-18 repot, Neonatal Mortality Rate (42 per 1,000 live births) while it was 60 in 2000 and government required target is less than 12 till 2030, More than four antenatal care visits is (51.1%) in 2017-18 ,while it was 37% in 2014-15 and government required target is more than 90%,

According to Ziegler et al. (2020) socio-demographic and attitudinal factors can influence access to ANC service. These are the factors that we are lagging in. The serious problem of health has triggered the importance of this research to initiate or modify policy grounds to deal with the problem at priority. The provision of health services is quite improved over the last 30 years in Pakistan but the issue of use and utilization is still a barrier to achieve the objective of health care.

This study intends to explore the influencing factors of antenatal care and the barriers to access it at the household or township level.

Hospital visits are associated with health status, previous health issues before pregnancy, and other influencing factors at the household level. A rich family is expected to make frequent visits to the hospital and a poor family may not afford to only one visit. These variations in visits are often explained by the number of variables, which are, Age, Education, income, distance to hospital, charges per visit or visit expenditure, and the health status of the mother, food intake, and exercise. All the mentioned factors or variables can increase or decrease the demand for antenatal care services in Pakistan. It will be a well-intentioned policy-oriented research study to explore the policy-oriented factors for the improvement of health services utilization in Pakistan.

1.2 Statement of the Problem

Pakistan is among the most vulnerable in terms of Climate change, health services demand, and education use. In Pakistan 49 out of 1000 kids die before birth, they never see the sunrise. The study of Jehan et al. (2009) also confirms the results of a high death ratio among prenatal lives. It looks like an issue for the successful step towards sustainable development goals. Pakistan contributes to 7 percent of the world's total Antenatal deaths, which is an enormous amount of loss to humanity due to lack of care and seriousness in the behavior of pregnant females in rural areas of Pakistan. It is quite hard for women to manage the household economy when they are pregnant but they never stop working in many cases. The level of care which is required is often never received due to many factors. The issue of access is triggered by socio-economic factors. To formulate a policy, which can improve the access and utilization of antenatal care services, it is important to conduct an empirical analysis of influencing factors at household level data.

1.3: Research Question

The current study aimed to examine the factors that significantly influence antenatal care utilization in Pakistan. The key research question that the current study will seek to answer is how socioeconomic factors significantly influence antenatal care. The sub-questions of the current study are given below.

- What are the influencing factors of Antenatal Care in Pakistan?
- Does the behavior of a woman matter for the utilization of antenatal care in Pakistan?

1.4: Aim and Objectives of the Study

The current study aims to explore the determinants of antenatal care in Pakistan. The key consideration of the study is to consider the socioeconomic factors that may significantly influence the antenatal visit to the hospital. The objectives of the study are given below.

- To empirically examine the influencing factors of Antenatal care visits to the hospital.
- To study the behavioral perspective of antenatal care in Pakistan at the household level.

1.5: Originality of the Study

There are a lot of studies published on antenatal care in developing countries such as (Edward, 2011; Abosse, Woldie, & Ololo 2010; Agus & Horiuchi, 2012; Ali et al. 2018) found different factors significantly influence antenatal care visits. There has been observed limited research work in the research topic in special reference to Pakistan such as Ali et al. (2018) made systematic literature review on the topic with some evidence about Pakistan, while Ghaffar et al. (2015) studied the research topic considering the antenatal care visit in Balochistan province analyzing the Multiple Indicator Cluster Survey (MICS) 2010. The current study is unique because the study is considering analyzing the research topic by considering the Demographic Health Survey Data,

which has been rarely used in literature and can help us to provide quite relevant and coherent policy suggestions.

1.6: Significance of the Study

Globally around 0.5 million women die as a result of birth complications and pregnancy. The World Health Organization (WHO) has recommended that women who are pregnant have to make at least four antenatal care visits to the hospitals. The current study briefly examined the socioeconomic factor, which in the case of Pakistan are very low as compare to other developed and advanced countries, can be used for comprehensive policymaking. The findings of the current study will help both policymakers in the health sector and those who are dealing with socioeconomic factors. The health sector policymaker will get to know that how can convince pregnant women to make regular hospital visits, while the policymakers at the socioeconomic level will get policy recommendations that how improvement in socioeconomic factors can be used to promote the antenatal care visits.

1.7: Organization of the Study

The first chapter of the study briefly outlined the background of the study with highlighting the problem statement, research objectives, originality of the study, and significance of the study. The second chapter of the study briefly elaborates the contribution of previous authors who have carried research work on the same research area. The third chapter of the current study briefly outlined the research methodology used in the current study. The author focused on the theoretical framework, research methods, variable description, data sources, and econometric modeling in chapter 3.

CHAPTER 2:

Review of the Literature

2.1: Chapter Overview

The literature review is an important part of research in social science because it provides a tribute to the contribution of researchers that have carried out research work related to the research issue that any researcher is discussing in the study (Randolph, 2009). The comprehensive and brief literature review provides a deep insight to the researcher in the research area and it becomes easier for them to identify research problems or research gaps, which they can fill through their research work (Knopf, 2006). Rumbold & Cunningham (2008) demonstrated that the literature is quite rich in terms of studies and concepts explored by the past researchers in the field of medical sciences and other health care sciences but very rare studies can be found on the economics side of health care and the developmental aspects of Antenatal health care. The current chapter has been divided into four sub-sections. After the introductory section, the next section sheds light on the research area with brief and concise literature. Section 2.3 summarizes the literature on the topic, while the last section gives a brief insight note to the research gap, which the current study is going to be filled. A brief discussion and elaboration of each section are given below.

2.2: Literature Review

The latest study on this topic of discussion is Ali et al (2020), which explored the Sindh side rural areas, through a control group and treated logit analysis. But the study has taken very few observations, which can be further explored through a different lens. It is possible to extend the study of Ali et al. 2020 for further improvements through available data, where the limitation of

previous work is very few numbers of respondents through questionnaire method. Our study will be updated and the data reliability issue can be also resolved by using already collected data.

The study of Akowuah, et al (2018) explored the determinants of antenatal healthcare utilization by pregnant women, on the philosophy that women's health care is important for the socio-economic development of society. Socioeconomic factors, which cover some of the demographic, social, operational, and attitudinal influences which intensify the probability of an individual seek ANC services during the pregnancy (Ziegler et al., 2020). The study also mentioned that education level and physical accessibility are the most dominant influencing factors of ANC. A study conducted in Ghana by Ntketiah-Amponsah, Bernardin, and Arthur (2013) shows that the age of the mother is negatively correlated with the demand for ANC services. Because higher age ladies are expected to have a second or third baby, which makes them experiences to certain medical advice, which can be followed without consulting the doctor. In Pakistan, this case is already different due to joint families and cooperative societies, which also believe in endogenous knowledge and formulas to cure certain health-related problems or some ladies are experienced enough to advise younger's and it reduces the number of visits to the hospital (Jehan et al., 2009).

On the other side, the literature also explores that Owili et al (2016) found a reduction in the proportion of women obtaining ANC services with increasing age in Kenya. This is mostly because of experiences gained during first pregnancy and ladies remember some of the advice for years. On the opposing side, Navaneetham & Dharmalingam (2002) confirm that older women were more likely to use antenatal care services than their younger counterparts. The reason may be because older women might have gathered immense knowledge on the need for antenatal care services, which may positively influence their use of ANC services. This argument indicates that age might have a non-linear association with ANC.

According to Ye et al. (2010), education, distance from a health-care facility, availability and cost of public transportation, income of the household, knowledge about maternal care, and the fee charged by the doctor or service provider all have a significant impact on the utilization of antenatal care services in the Chinese population. Singh et al. (2012) came to the conclusion that the economic status of the family is a very significant predictor of the utilization of prenatal care services in India, and they discovered that wealthy women are 2.5 times more likely than poor women to see physicians during pregnancy. Furthermore, a lack of knowledge about the need of prenatal checks, illness, a sense of embarrassment, and a long commute to the facility are all factors that contribute to poor use of antenatal care services. Conversely, in Pakistan, women with high wealth are twice as likely to use prenatal care facilities as women with low income (Nisar and White, 2003).

There are many kinds of health care provided during pregnancy and delivery in Nepal. Non-working women are around two-and-a-half times less likely to use health care facilities related to pregnancy and delivery, than working women. Educational and employment status of women have a substantial effect on the utilization of postnatal healthcare services in Nepal. For instance, Dhakal (2011) discovered that a woman's education, a husband's education, and a husband's employment in a skilled profession are all strongly linked to their use of maternity health care facilities. Another way to say this is, according to Baral et al (2012), there is a greater chance that women from metropolitan regions and welleducated individuals would utilize Nepal's maternity healthcare facilities. Also, there was a significant decline in the probability of utilizing maternal healthcare services following the delivery of the third child.

Iyaniwura and Yussuf (2009) found that among Nigerian women, one of the primary reasons for avoiding delivering infants at a health clinic was the perceived lengthy waiting time and negative

attitudes about clinics at health care facilities. According to the study by Tsegay et al. (2013), maternal health care facility selection in Ethiopia was positively influenced by education and age of the women and the occupations of their husbands. Mother and child health is strongly associated with women's decision-making autonomy.

According to Ahmed et al. (2010), women with basic education had a 5-fold increase in the probability of using competent birth attendants during childbirth. Women's empowerment has a substantial effect on maternal healthcare use and lack of education and income, as well as greater distance from health facilities, both cause poor use of postnatal healthcare services in Indonesia, according to a study by Titaley et al. (2009). The variables resulting in restricted maternal healthcare use were poor income, no healthcare facility, transportation difficulties, and an overall lack of knowledge. Although prenatal care is by far the most important factor in determining the use of postnatal care among Africans, Ruth et al. (2000) showed that it was just a moderate predictor.

Women who have control over their pregnancy are more likely to use prenatal care facilities in Bangladesh. Women with average levels of autonomy had about 1.4 times the probability of giving birth in the presence of a medical expert, according to research. Similarly, women who make decisions about their healthcare are 1.61 times more likely to use prenatal healthcare services than women who share that responsibility with someone else (Haque et all, 2012).

Women education, husband support, and older age of marriage have been shown to have a beneficial influence on the use of maternal healthcare facilities in Egypt by researchers (Chiang et al, 2012). However, research revealed that when it came to household choices around cooking, family planning, and children's education, there was no association between a woman's

involvement and the number of trained attendants or the frequency of prenatal visits. Despite substantial impacts that education and income have, autonomy does not have a major effect on childbirth location. To find out if women who have finished secondary school give birth in healthcare facilities, the findings showed that they are more likely to do so.

ANC is mostly dependent on the level of earning and money in hand in the time of need. It is a fact that the employment status of expectant women's husbands or any family member also influences their ANC use. Besides the earnings of family members, the involvement of women in employable ventures positively influences their use of quality medical care and services. It is a kind of empowerment and this empowers pregnant mothers to increase control over their income and household assets which affect their lives as far their healthcare needs are concerned (Chakraborty et al, 2003).

Prevention of potential health problems during pregnancy is the goal of prenatal care, which is a type of preventative care with goal of providing the regular check-ups that allow doctors as well as midwives to treat and prevent the potential health problems during pregnancy while also promoting healthy lifestyles that benefit both the mother and the child. ANC provides a woman with advice and information on the most suitable site of birth, taking into consideration the lady's health and circumstances. It also provides a chance to educate women about the warning signs and symptoms that should be addressed by a health-care professional as soon as they appear. A further benefit of ANC is that it may aid in reducing the severity of pregnancy-related complications by monitoring and treating conditions that become worse during pregnancy, such as pregnancy-induced hypertension (PIH), malaria, and anemia, which put both the mother and the unborn child's lives at risk (Banda, 2013)

An early start to prenatal care is recommended because receiving information about the complete range of screening tests available at an early stage in pregnancy (National Collaborating Centre for Women's and Children's Health (UK), 2008) allows women to make informed decisions about their pregnancy. Early detection of hypertension, anemia, and malaria during pregnancy, as well as the provision of tetanus toxoid vaccination, iron, and nutritional supplements, are all possible during antenatal visits.

Matsumura & Gubhaju, (2001) found that there is negative relationship between employment of women and utilization of maternal health care services. There are 43% less likelihood for working women to deliver their baby at health care facility in Nepal. However, study finds 2.2 times more likelihood for more empowered women to deliver their baby at health care facility in comparison to the less empowered women. Paudel & Pitakmanaket (2010) also supported these findings and concluded that working of the women reduces the chances of receiving antennal and delivery health care services in Nepal. It has been found that working women are 36% less likely to utilize antenatal health care facilities and 50% less likely to use the delivery healthcare services in comparison to non-working women.

Dhakal et al., (2007) finds that education and occupation of women have significant relationship with the use of postnatal healthcare services in Nepal. Later on Dhakal (2011) found that education of women, education of husband and husband having skilled job, having the first or second childbirth and history of illness are significantly related with the utilization of maternal health care facilities. Similarly, according to Baral et al (2012) there is more likelihood that educated and women belonging to urban areas will use maternal healthcare services in Nepal.

Iyaniwura & Yussuf, (2009) reported that in Nigeria, the women for not delivering the babies at health care center had given various reasons, the major reasons emerged as perception of long

waiting and attitude in the health care centers, unavailability of public health care facility and transportation related issues. According to the Tsegay et al., (2013) education and age of the women along with husband's occupation had a positive impact on the choice of maternal health care facility in Ethiopia.

Haque et al. (2012) finds that women having autonomy are more likely to utilize the antenatal healthcare services in Bangladesh. It has been estimated that women with medium level of autonomy have 1.4 times more chances to deliver their baby in assistance of skilled healthcare professional. Similarly, women who are the sole decision makers regarding their healthcare are 1.61 times more likely to utilize antenatal healthcare services. Fotso et al. (2009) found that education of women and wealth had significant impact, however, women's autonomy do not have any significant impact on the choice of place of delivery in Kenya. The results revealed that women having secondary school education are more likely to deliver their baby in healthcare facility. Violence against women has been shown to have detrimental effects on their physical, mental, reproductive, and sexual health, according to a review of the literature from Pakistan and other countries. Spousal violence is one of the major reasons for poor antenatal care of women in Pakistan.

The study of Ali et al (2020) argued that distance is also one of the important influencing factors that cause variation in the number of visits to the hospital during pregnancy. The study reported that there is a significant impact of distance on demand for health care services during pregnancy. This indicates hospitals' average distance can influence the ANC.

Some social factors, for example, a woman cannot travel alone in some remote areas, a woman has to wait for social events in certain ways and delays the ANC. There are some behavioral and

organizational aspects of ANC services access and utilization. Several studies in India have shown that providers have a preference for promoting ANC and institutional delivery but are less likely to provide advice on contraception. A recent study in Uttar Pradesh shows that when family planning advice is provided during an ANC visit, it leads to an increase in the current use of contraception Yadav and Dhillon (2015).

Another study of Do & Hotchkiss (2013) examined the effect of ANC use on the adoption of post-partum contraception in Kenya and Zambia. The study found that in both countries the intensity of ANC use was significantly associated with the adoption of post-partum contraception, which means that ladies who adopted certain changes in activities and health care concerning the situation and stopped giving birth to babies after a kid or two, are more sensitive towards health care and uses ANC services more frequently.

The ladies with intentions of not giving birth to a baby very soon can be at least 12 months after giving birth to a child, were actively visiting the hospital Do and Hotchkiss (2013). But in the case of Pakistan, ignorance, and illiteracy can push it on the other way around, where it is expected that ladies with adopting such measures may not visits frequently to the hospital because they are out of danger and not having any baby, so they do not need to follow anyone's life. This hypothesis can be tested by including one more variable in the econometric model, which is the adaptation of post-partum contraception.

2.3: Summary of Topic Review

Antenatal care provided before the birth of a baby is not always for the baby but also for the mother to stay healthy and be able to give birth to the baby with normal treatment and procedure. This is also known as Antenatal care. Antenatal care is provided to women, during pregnancy, to avoid

pregnancy complications and health uncertainties. According to World Health Organization (WHO 2019), every day in 2017 approximately 810 women died from preventable causes related to pregnancy and childbirth. And 94% of all maternal deaths occur in low and lower-middle-income countries. Sub-Saharan Africa and Southern Asia accounted for approximately 86% (254 000) of the estimated global maternal deaths in 2017. Skilled care before, during, and after childbirth can save the lives of women and newborns. There are some studies conducted on maternal health, Ali et al (2020), explored the Sindh side rural areas, through a control group and treated logit analysis. This study was based on primary data and found that the treated group has a comparatively high number of antenatal visits during pregnancy. Fatmiet al (2002), majority of the women in developing countries are unable to receive antenatal care for a variety of reasons and determines the factors affecting utilization of antenatal care by women of a rural area in Sind, the study was based on primary data. Health care is one of the most important needs of human life and a basic requirement of mental stability Majrooh et al (2014). The study was adopted a multi-stage sampling procedure to select the districts and primary level health facilities from each district in Punjab. According to Akowuah, et al (2018) the determinants of antenatal healthcare utilization among pregnant women, are important for the socio-economic development of society. Socioeconomic factors, which cover some of the demographic, social, operational, and attitudinal influences which intensify the probability of an individual seeking ANC services during the pregnancy. The study selected 200 pregnant women and structured questionnaires were used to collect data from the respondents. (Ziegler et al., 2020) mentioned that education level and physical accessibility are the most dominant influencing factors of ANC. While Owili et al (2016) found a reduction in the proportion of women obtaining ANC services with an increase in age. Only because of experiences gained during the first pregnancy, by using Demographic and Health

Surveys data of 12 countries in SSA. On the other side, Navaneetham & Dharmalingam (2002) confirm that older women were more likely to use antenatal care services than their younger counterparts because older women might have gathered immense knowledge on the need for antenatal care services, which may positively influence their use of ANC services, data used from the National Family Health Survey (NFHS) carried out during 1992-93 across most states in India. This shows that antenatal care service has been studied and investigated in different countries. This current research study is intended to conduct, provincial and district-wise analyses of antenatal care service demand ad its influencing factors. The influencing factors are personal traits, family factors, socio-economic factors, and other institutional factors. This study will be a contribution to the existing literature by adding up survey weights to DHS data and estimates for future policymaking.

Agus & Horiuchi (2012) studied the factors that influence antenatal care use in Indonesia by taking a sample of 145 married women who were of reproductive age and were pregnant. The study found that those women who were encouraged by their families have a statistically higher number of antenatal care visits to the hospitals as compared to traditional beliefs. The study also found that traditional believed families are mostly related with lower income and they do not receive antenatal care from the hospital rather they used to visit midwives. The study recommended that women's perception towards health services is a major and key role that significantly influences their perception towards antenatal care.

Ali & Abdullah (2016) confined that the majority of pregnant women have access to antenatal care services who can afford to pay the service charges, mature in their age, and most importantly their educational and awareness level about the importance of antenatal care. The study was carried out by taking cross-sectional data for 185 pregnant women in Sudan. The authors concluded that

access to antenatal care services directly depends on the number of children, distance to the health center, and access to antenatal care services mainly into the first trimester.

Ghaffar et al. (2015) investigated the factors affecting antenatal care utilization in Balochistan Pakistan by collecting data from the Multiple Indicator Cluster Survey for 2339 women who gave birth to a child in the last two years. The author found that household education, wealth, health condition, spouse violation, number of children, and age at first marriage found having a statistically significant impact on the antenatal care services among women in Balochistan. The authors stressed on reduction in wealth index, education disparity, and urban/rural living in the province.

Agha & Tappis (2016) analyzed the antenatal care time initiation and care content in Sindh Pakistan using a representative household survey of Sind by considering a sample of 4000 reproductive-aged women i.e. 15 to 49 years. The study found that the antenatal care visit varies by household health, education, and parity. The median time of making the first antenatal visits in the province was recorded at three months for rich women while seven months for rich women. Age at marriage, parity, education, and wealth was found as significant predictors of antenatal care visits. The author probed that women who made their antenatal care check-ups earlier were much more interested to receive world health organization recommended services as compare to those who visit later. The author recommended that it is important to provide adequate, trained, and motivated providers to provide a recommended standard of care.

Zakar et al. (2016) studied the association between maternal utilization and demographic features of reproductive women in Pakistan using demographic and health survey data of 2012-13. The author considered three dependent variables i.e. delivery in the healthcare facility, delivery

assistance by a skilled service provider, and antenatal care visits. The study found that education, wealth, birth order, and women's autonomy significantly affect the dependent variables. The study recommended that it is important to improve maternal health care utilization in Pakistan by encouraging the participation of uneducated and poor women.

2.3 Research Gap

There has been observed limited research work in the research topic in special reference to Pakistan such as Ali et al. (2018) made systematic literature review on the topic with some evidence about Pakistan, while Ghaffar et al. (2015) studied the research topic considering the antenatal care visit in Balochistan province analyzing the Multiple Indicator Cluster Survey (MICS) 2010. The current study is unique because the study is considering to analyze the research topic by considering the Demographic Health Survey Data, There are a lot of studies published on antenatal care in developing countries, but Demographic Health Survey's data has been very rarely utilized and it is comprehensive data, which can provide quite relevant policy suggestions. This study has used DHS data on household-level analysis, where the dependent variable is antenatal care visits to the hospital during pregnancy. This study is unique from other studies because survey data is coupled with weights attached to it to make it standardized for a smooth understanding of readers. The current study undertakes the estimation for both provincial level and overall country level. The provincial-level analysis will help the policymakers to know about the differences and influence of provincial socio-economic factors influencing the antenatal care services, while the country-level analysis helps the policymakers to design the policy at the grass-root level.

CHAPTEER 3:
Data & Methodology

3.1: Chapter Overview

The research methodology briefly outlines the tools and techniques that are been utilized to meet the respective research objectives. The current study aims to explore the socioeconomic determinants of antenatal care visits in Pakistan. The current chapter has been divided into six sub-sections. The second section of the current chapter summarizes the theoretical framework the current study followed. The data description used in the current study is discussed in section 3.3 followed by important variables of the study and hypothesis to be tested in the current study. Section 3.6 elaborates the selection of the econometric model followed by the methodology in brief detail. A brief discussion of each section is given below.

3.2: Conceptual Framework

A women's decision or desire is not enough to seek antenatal care rather it also dependents on different socio-economic factors such as age, income, number of children, distance from the antenatal care center, etc. WHO outlined that physical availability of services, distance from the household, social factors, economic, cultural, and other costs are associated with the use of antenatal care services, and most importantly the quality of services matters. Among social factors, the region where a woman lives, her age at the time of marriage and pregnancy, information regarding contraceptive measures, gender of household head, occupation of husband, education of woman and her partner, etc are the key factors. Similarly, economic factors such as monthly income, expenditures on health services, cost of visiting antenatal care centers, number of eligible earning persons in-home, the profession of pregnant women, and wealth index play a critical role in the attainment of antenatal care services.

Andersen's behavioral model highlights three key components of healthcare service, which include predisposing factors (socio-cultural factors) that exist before treatment or illness. The second is enabling factors related to logistical aspects of getting care, and the last one is self-perception of health and medical condition or diagnosis. These three factors influence the utilization of healthcare services. Since, the current study is undertaking the antenatal care visits made by the female during pregnancy that depends on socioeconomic factors such as number of antenatal care visits, number of households, number of de-factor children, number of children, region, type of residence, number of total adults in the family, gender of household head, age of household head, age of woman, wealth index, etc. The considered theoretical framework is given in the below chart.

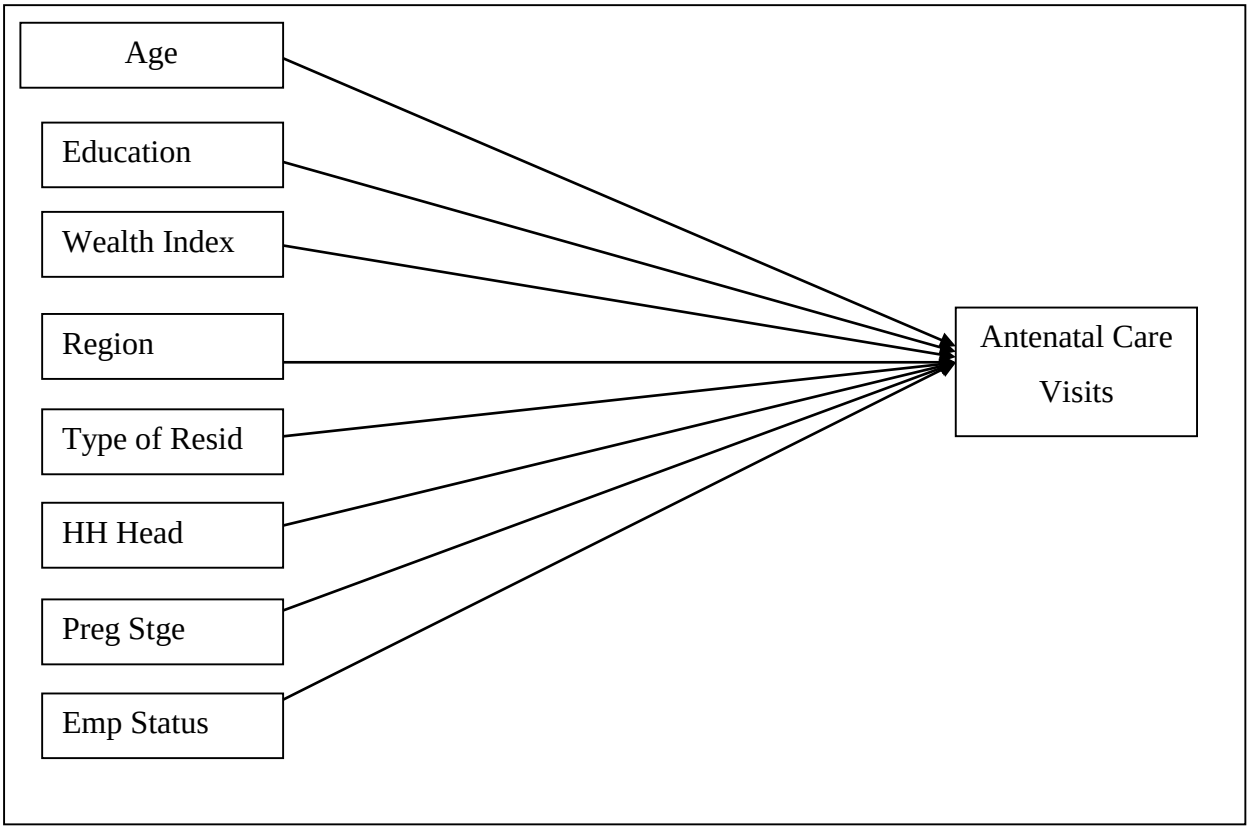

Figure 2.1:Conceptual Framework
(Sources: **Zakar et al., 2016; Adnan et al., 2017)**

Figure 1 presents the conceptual framework that has been used in this study. This framework has been derived by studying extensively the available literature. Based on this conceptual framework, the dependent variable is Antenatal care visits and which depends on many socio-economic and other personal factors. For instance, Age of women plays influential role in determining Antenatal care and has been used by Owili et al (2016) to determine Antenatal care visits. The role of education, income, and region, type of residents, household head, pregnancy stage and employment stage also play influential role in determining Antenatal care visits.

3.3: Data Description

The study is based on secondary data, collected from the DHS 2017-18. The data of the study is cross-sectional by type, which is collected at the household level. The study includes those household observations, which have at least one pregnant female. Among these households, the study is intended to examine, how changes in age, income education, and other socio-economic factors will cause changes in the number of visits to the hospital during pregnancy. The 2017-18 PDHS is the fourth Demographic and Health Survey conducted in Pakistan since 1990-91. The objective of the survey was to provide the latest estimates of basic demographic and health indicators. The 2017-18 PDHS represents the population of Pakistan, including Azad Jammu and Kashmir (AJK) and the former Federally Administrated Tribal Areas (FATA), which were not included in the 2012-13 PDHS.

3.4: Important variables of the study

Variable name	Measurement	Source

Antenatal care	It is measured in terms of visits made during the pregnancy, which is a count and dependent variable of the study.	Akowuah, et al (2018)
Age of the woman	It is measured as a continuous variable, which is recorded as the number of years at the current time.	Owili et al (2016)
Monthly income	It has been measured as the wealth Index dividing the women's background poorest, poorer, middle, richer, and richest categories.	Akowuah, et al (2018)
Education	It is taken as the number of years of schooling and counts as an independent variable of the study.	Akowuah, et al (2018)
Distance to hospital	It is measured in terms of kilometers	Ali et al (2020)
Illness history	If the person has previous illness history takes value one and zero otherwise	Author contribution
Stage of pregnancy	This is a count variable that starts from stage one and ends on stage 4	Do
Number of kids	It is measured in terms of count starts from 0 to a maximum of 9 in the data set.	Do
Employment status	If the household member is employed takes value one and zero otherwise	Ali et al (2020)
Physical accessibility	If the household has accessibility to health care service takes value one and zero otherwise.	Ali et al (2020)

Ghaffar et al. (2015) found that household education, wealth, health condition, spouse violation, number of children, and age at first marriage found having a statistically significant impact on the antenatal care services among women in Baluchistan. The authors stressed on reduction in wealth index, education disparity, and urban/rural living in the province. In similar instance, Ziegler et al (2020) mentioned that education level and physical accessibility are the most dominant influencing factors of ANC.

3.5: Hypothesis of the Study

The study undertakes a deep insight to investigate the factors that significantly influence antenatal care visits in Pakistan. Based on comprehensive literature and data outlook, the current study assumes that there is no significant impact of socioeconomic factors on the antennal care visits in Pakistan. Since we have different socioeconomic factors, therefore the null hypothesis illustrates the relationship for all socioeconomic factors with the dependent variable. The null hypothesis and alternative hypothesis statement that the current study is going to examine is given below.

H_0: The no statistical relationship between visits to the hospital for antenatal care and socioeconomic factors, including income, education, age, behavior, and access to service.

H_1: The exists a statistical relationship between visits to the hospital for antenatal care and socioeconomic factors, including income, education, age, behavior, and access to service.

3.6: Selection of the Econometric Model

The best fit model in the case will be Poisson regression because the dependent variable is a count variable, which counts the number of visits to the hospital during pregnancy. But it is important to understand and follow the econometric rules for specific models before application. Because

without understanding the rules behind the selection of a model, it may cause the underestimation or overestimation of results.

Following requirements must be full fill before the implication or use of Poisson regression analysis, even though the dependent variable is a count variable.

1. All observations are independent.
2. At every level of the covariate, the number of hospital visits has an equal variance to the average.

The dispersion of the data shows high variance than the mean, which directs the researcher to use negative binomial distribution. It is because the rule should be followed, which is high variance than the means is binomial distribution function. The over dispersion of results allows the researcher to use negative binomial estimates for further policy interpretation because the distribution of a data set is the basic indicator to choose certain models.

Negative Binomial Regression

$$(NOVTHi) = \alpha 0i + \alpha 1aAGi + \alpha 2INCi + \alpha 3EDi + \alpha 4SOPi + \alpha 5DSTHi \ldots + \alpha 6\text{NOKDS}i + \alpha 7\, ILNHS + \alpha 8EMPS + \alpha 9PHYACSS \quad \ldots\ldots (3.1)$$

The study has constructed two models to describe the behavior of utilization of ANC. In the first model, the researcher considered the women having ANC as primary response that was assumed to be associated with different factors such as age, income, education etc to be in nonlinear relation. The response is of numerical value such as number of ANC visits. In negative binomial regression model, the probability of women to ANC i.e. p=P (yt-1) can be modeled as below

$$p = \frac{e^{(\alpha + X\beta)}}{1 - e^{(\alpha + X\beta)}}$$

Where the parameter β= β1 + β2+ ……. βp is estimated by maximizing the log likelihood of

$$L\ (Yi, \beta) = \sum_{iv}^{t}[Y_{1i} \log(p_i) + (1 - y_{1i}) \log(1 - p_i)] \ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3.2)$$

In the second model, the current study relied on frequency of a woman having ANC utilization considered as response, which was assumed to be associated with different socio economic factors. The response here was the frequency of women availing themselves of ANC that is normally assumed to follow the negative binomial distribution with assuming homogeneity of response for the classes and found no significant difference.

For both models, the researcher was mostly interested in constructing a parsimonious classification model where noise and insignificant factors i.e. independent variables are removed from the model with targets to improve model classification performance and to increase the model interpretation. Notably, model classification performance is classified samples on tests data.

3.7: Methodology in detail

The study faced a limitation in that all the variables are not discrete to use a log-linear model, which is equal to Poisson distribution. This is one reason and second reason to choose negative binomial distribution is that the predictable outcomes of this regression exhibited over-dispersion in the model which means that the variance is greater than the mean, hence if an estimate is less than zero then it is under-dispersion which is also very rare. That's why we moved toward the negative binomial regression model which is more appropriate to model count variable in case of over-dispersion.

CHAPTER 4:

Data Analysis and Result Discussion

4.1: Overview

Society is stronger if the health of a female population is taken good care of at every stage of life (Marmot et al., 2012). Carroli et al. (2001) exclaimed that women play a developmental role in society in specific and on the planet earth in a broader sense. Healthy women are playing the most important role in society, which is the reproductive part they are playing in society (Gupta et al., 2014). Productive health can be developed over the long-time span from generation to generation through the provision of good health care from the time of pregnancy, to the time of adolescence age and further till the end of retirement age. Islam & Masud (2018) suggested that to formulate a policy, which can improve the access and utilization of antenatal care services; it is important to conduct an empirical analysis of influencing factors at household level data. The current study aims to explore the determinants of antenatal care in Pakistan.

To meet the respective research aim, the current study relies on the data collected from the "Demographic Household Survey of Pakistan: 2017-2018". The current chapter highlights the key findings that have been found through comprehensive descriptive and inferential statistics. The current chapter has been divided into four main sections. After the introductory section, the next section provides a summary overview of the frequency distribution of considered variables with special reference to seven different regions of Pakistan. Section 4.3 provides summary statistics of the considered variables showing the variation and standard deviation of variables concerning regions. The odd ratios have been calculated using a negative binomial regression model because it is expected higher variation in the data set and conditional variance is expected to exceed the conditional mean for the count dependent variable. The last section of the current chapter provides

a summary of the findings of the current study and making a comparison with the literature in both supportive and contradicting ways. The brief discussion of each section is now briefly explained step by step in the below sections.

4.2: Regional Distribution of the Data

The Demographic Household Survey (DHS) data has been extracted as the secondary data source, where the author used collected data available for the considered variables. The current study considered only the seven regions i.e. KPK, Punjab, Sindh, Balochistan, FATA, Islamabad Capital Territory (ICT), Gilgit Baltistan, and Azad Jammu & Kashmir (AJK). The below figure gives a birds-eye to the total number of observations distributed region-wise.

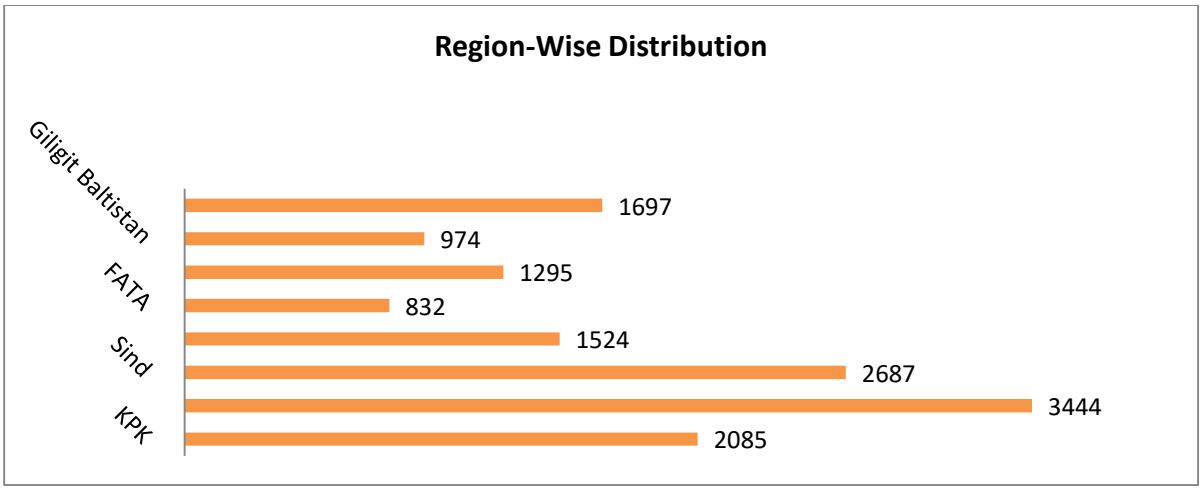

Figure 4.1:Regional Distribution of Number of Observations

The highest number of observations for antenatal visitors recorded in Punjab that have 3444 antenatal visitors visited antenatal care centers. The second-highest number of observations recorded for Sindh followed by KPK having 2687 and 2084 observations respectively FATA remained the lowest in terms of antenatal care visits having only 832 visitors during 2017-18. Since the total population plays a key role in the determination of visits, so we can conclude that

Islamabad Capital Territory (ICT) has a positive attitude of pregnant women to visits for antenatal care as the number of visits recorded 1295.

There may be certain reasons, why a woman visits antenatal care. The below figure depicts the number of antenatal care visits made by the women during 2017-18,

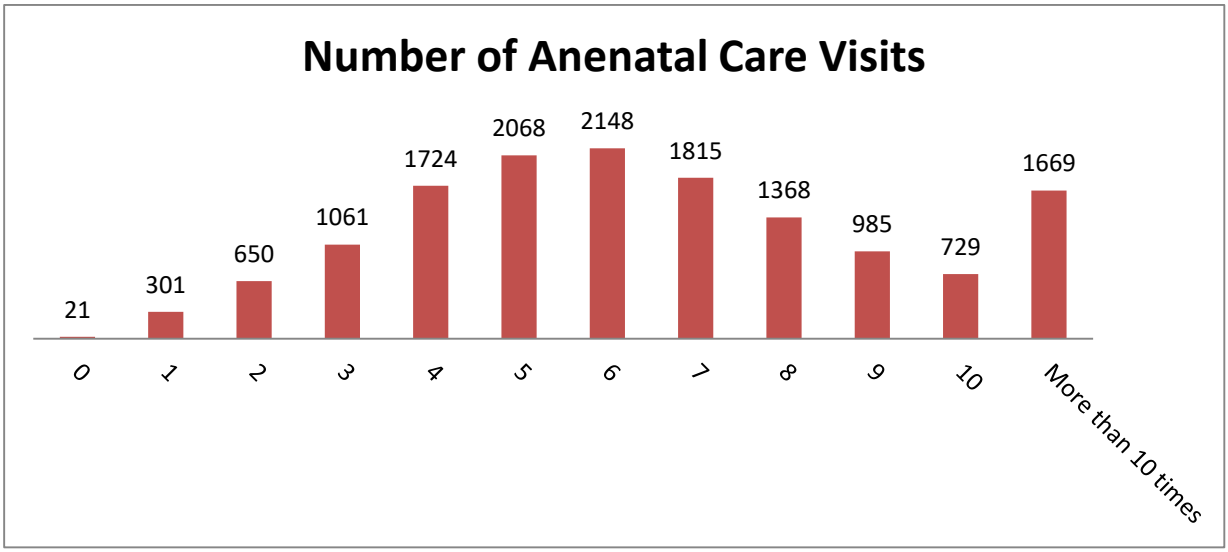

***Figure 4.2*:** Number of Antenatal Care Visits

The above-highlighted results of antenatal care visits suggest on average females made 5 to 7 antenatal care visits during their pregnancy. The highest frequency suggested that 2148 women on average made visits while only 21 females said reported not visited the antenatal care services. The number of antenatal care visits can be almost normally distributed, which means the average number of antenatal care visits made in Pakistani regions revolves around five to seven visits.

The antenatal care services depend on certain socio-economic factors and among which the wealth index and gender of household head play a key role in the determination of women antenatal visits to antenatal care services (Zakar et al., 2016). The below figure summarizes the average wealth index distribution and gender of the household heads.

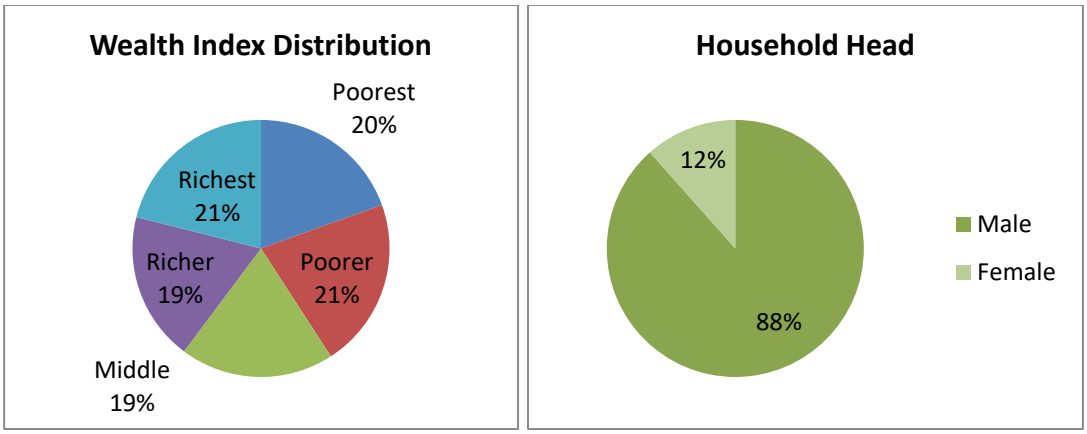

Figure 4.3: Wealth Index and Household Head Distribution

From the household head figure, it can be seen that around 88% of participants stated that the household head of their family is male while 12% stated that their household head is female. The wealth distribution index showed that around 41% of participants belong to poor family backgrounds while 40% have rich family backgrounds. 19% of the observations belong to middle family background. The results of wealth distribution are quite interesting that almost the same proportion of the observations belongs to poor and rich families, which indicates that wealth distribution does not play any key or significant role in the antenatal care visits (that we will be going to test inferentially in the later section).

The below table provides a quick overview of the average antenatal care visits region-wise where it has been attempted to examine the mean visits concerning regions and overall country.

Table 4.1: Average Antenatal Care Visits

Measure	Mean	Std.Err	Median	Mode	Std. Dev	Min	Max	Count
AJK	6.28	0.07	6	6	2.875	1	26	1697
GILGIT	5.91	0.08	5	5	2.896	1	22	974
ICT	11.91	0.08	12	11	2.896	1	22	1295

FATA	3.24	0.14	4	3	4.093	1	35	832
Balochistan	5.35	0.13	5	6	4.646	1	40	1524
Sind	7.23	0.10	7	6	3.638	1	34	2687
Punjab	8.19	0.08	9	8	3.032	1	24	3444
KPK	4.45	0.11	5	5	3.950	1	44	2085
Overall Pakistan	7.27	0.10	7	6	3.690	1	29	14538

(Note: Std.Err represents a standard error, Std.Dev is standard deviation, Min is minimum and Max represents maximum)

From Average Antenatal Care Visits Table , the mean antenatal visits in Pakistan recorded 7.24 visits with an average standard deviation of 3.69. The maximum number of antenatal care visits made recorded was 44 while the minimum was recorded as 1. Among regions, the highest mean numbers of antenatal care visits are made in Islamabad having the average antenatal care visits 11.90 with an average standard deviation of 2.896. The lowest average antenatal care visits are made in FATA, which has a mean value of 3.24 visits having a standard deviation of 4.09.

Summing up the summary statistics of average antenatal care visits, it can be concluded that on average in Pakistan, pregnant women made moderate antenatal care visits. As the literature suggests, certain socio-economic factors significantly influence antenatal care visits. Therefore, it is important to examine the significant difference in the mean score of the considered socio-economic factors region-wise. The below section highlights the mean difference of considered variables w.r.t their mean difference and significance

4.3: Mean Difference among Demographic Features Associated with Antenatal Care Visits

The World Health Organization (WHO) recommends at least four necessary antenatal care visits to allow diagnostic and treatment for antenatal care issues like anemia and other pregnancy

problems. The below table summarizes the mean difference in the number of observations with the average visits to antenatal care visits by taking the regional visits comparison with average national antenatal care visits

Table 4.2: Mean Difference among Demographic Features Associated with Antenatal Care Visits.

Demographics	Characteristics	Fewer than 4 Visits	More than 4 Visits
Age	15-19 Years	180	890
	20-24 Years	1890	1124
	25-29 Years	1542	1203
	30-34 Years	1150	1487
	35-39 Years	817	1870
	40-44 Years	987	732
	45-49 Years	456	210
Highest Education Level	Illiterate	1250	752
	Primary	2100	1645
	Secondary	2498	2145
	Higher	1405	2743
Region	KPK	1120	965
	Punjab	1352	2092
	Sind	1260	1427
	Balochistan	1460	64
	FATA	460	372
	ICT	890	405

	Gilgit	620	354
	AJK	560	1137
Residence	Rural	4521	2160
	Urban	3218	4639
Wealth Index	Poorest	2103	733
	Poorer	2506	597
	Middle	1952	863
	Richer	1130	1590
	Richest	987	2077
Working Status	Yes	4623	5703
	No	2206	2006
Household Head	Male	7603	5253
	Female	1109	573

Among the age group, it can be seen that the highest number of females take antenatal care in the age of 20 to 24 years while the least antenatal care is received by the women in the age 45 to 49 years. The result suggests that with passing the age, the average antenatal care visits decreases, which means the age factor with increasing time reduces the attainment of antenatal care services. From the education perspective, it can be seen that the secondary and higher education level women make the maximum number of visits. Those who have no education make least antenatal care visits i.e. only 2002 women make antenatal care visits. Among regions, as we found earlier Punjab stood first followed by Sind and KPK. The least antenatal care visits are made in FAT where more than 70% of visited women make less than seven-time visits. Balochistan also has

been found very low because out of 1524 visited women, only 64 women have more than 7 times visits for antenatal care.

The type of residence suggests that those who are living in rural areas have on average less than 4 visits while those who are living in urban areas have on average more than 4 visits. The result indicates that on average rural women make fewer visits to antenatal care services as compared to urban women. The working status suggested those women who are unemployed or not working have less than 4 visits as compared to those who are employed. The results regarding household head suggest that women who are living in a house where the household head is male make less than seven visits while those families where the female is household head on average make more visits to antenatal care centers.

The above demographic characteristics highlighted the key differences in the demographic features of the variables concerning average antenatal care visits. The results depict the simple frequency distribution lacking the probabilistic occurrence of variables. The next section depicts the odd ratios of variables showing that how the respective variables act in the probabilistic perspective.

4.4: Odd Ratios of Demographic Features Associated with Antenatal Care Visits

The odd ratios are statistical measures of association between exposure variables and the outcome variables (Tekelab et al., 2019). Ousman et al. (2019) probed that the odd ratios represent that an outcome is occurring because of a given particular exposure, compared with the odds of the outcome variable occurring in the absence of the exposure variable. The odd ratios tell us about the likelihood chances of an outcome compared with the comparison group. Since, the current study is undertaking antenatal care visits as the dependent variable, which is count variable in nature and the exposure (independent variables) may have the possibility of both positive and

negative odd ratios (Tekelab et al., 2019; Ousman et al., 2019). Therefore, the current study relies on the negative binomial regression model.

The negative binomial regression model is the generalization and modification of Poisson regression that loosens the restrictive assumption that the variance is equal to the mean made by the Poisson model (Sroka &Nagaraja, 2018). This model represents son the regression as well as the goodness of fit, deviation, likelihood, and confidence limit. The independent variables in the study (age, education, region, residence, wealth index, working status, and gender of household head) are distributed in the respective groups. The current section is divided into three sub-sections. The first section highlights the odd ratios for antenatal care visits less than four times. The odd ratios of making more than four times visits are carried in section 4.4.2. The last section summarizes the findings of odd ratios and shows the hypothesis acceptance and rejection. The comprehensive and brief results of regions are given in the below section.

4.4.1: Odd Ratios of Demographic Features Associated with Antenatal Care Visits Less than Four Times

The World Health Organization (WHO) recommends at least four necessary antenatal care visits to allow diagnostic and treatment for antenatal care issues like anemia and other pregnancy problems. The average antenatal care visits in Pakistan during the 2017-18 household demographic survey represented an average visit of 7 times by pregnant women. Besides the results of the descriptive statistics, it is important to explore the likelihood ratios to find the difference between the average antenatal care visits in the country with higher and lower odd ratios. The below table summarizes the likelihood ratios of different demographic characteristics associated with antenatal care visits.

The results in the below table represent the odd ratios that have been calculated using the negative binomial regression model using Stata. The Chi-Square probability value suggests that the overall model is significant, while the value of Pseudo R-square depicts that the independent variables better explains the variations in the dependent variable. Since the Pseudo R-square represents the measure of goodness of the model but it can't be interpreted as like the normal R-square value, which depicts how good a model is represented by the independent variables.

Table 4.3: Odds Ratios of Demographic Features Associated with Antenatal Care Less than 4 Times

Negative Binomial Regression							
	Dispersion	Mean				No of Obs	6130
						Chi-Square	120.9
	Log-Likelihood	-281.1				Prob	0.000
						Pseudo R^2	0.214
Demographics	Variables	Coeff	Std.Er	Z	P>Z	95% C.I	
Age	15-19	0.102*	0.004	24.286	0.000	0.082	0.122
	20-24	0.325*	0.112	2.902	0.030	0.305	0.345
	25-29	0.078*	0.003	24.375	0.000	0.058	0.098
	30-34	-0.079*	0.007	-10.676	0.000	-0.099	-0.059
	35-39	0.098*	0.003	30.625	0.000	0.078	0.118
	40-44	0.197*	0.075	2.627	0.020	0.177	0.217
	45-49	-0.036*	0.002	-17.143	0.000	-0.056	-0.016
Highest Education Level	Illiterate	-0.065**	0.036	-1.806	0.070	-0.085	-0.045
	Primary	0.240*	0.016	15.000	0.000	0.220	0.260

	Secondary	0.523*	0.103	5.078	0.000	0.503	0.543
	Higher	0.542*	0.210	2.581	0.004	0.522	0.562
Residence	Rural	0.210*	0.032	6.563	0.000	0.190	0.230
	Urban	0.560*	0.140	4.000	0.000	0.540	0.580
Wealth Index	Poorest	-0.120*	0.013	-9.231	0.000	-0.140	-0.100
	Poorer	-0.023*	0.009	-2.706	0.001	-0.043	-0.003
	Middle	0.045*	0.003	15.000	0.000	0.025	0.065
	Richer	0.180*	0.065	2.769	0.001	0.160	0.200
	Richest	0.632*	0.170	3.718	0.000	0.612	0.652
Working Status	Yes	0.246*	0.090	2.733	0.001	0.226	0.266
	No	-0.098*	0.007	-15.077	0.000	-0.118	-0.078
Household Head	Male	0.014*	0.000	46.667	0.000	-0.006	0.034
	Female	0.264*	0.015	17.600	0.000	0.244	0.284

(Note: *,**, & *** represents the significance of variable at 1%, 5%, & 10% respectively)

The above results of demographic features affecting the antenatal care visits revealed mixed up results with an average of fewer than four visits. The odd ratios of age bracket suggest that among the age group, the likelihood of women to visits antenatal care is negative for 30 to 34 years and 45 to 49 years group. The result suggests that on average in these groups the women purpose of making antenatal care visits is around 7.9% and 3.6% less than the other women age group. The highest likelihood age group is recorded 20 to 24 years, age group, where the average likelihood of women making antenatal care visits four times is around 32.5%.

The odd ratios of education level reveal that illiterate women have an average of 6.5%less likelihood chances to make four or fewer antenatal care visits as compare to other education

groups. The highest likelihood ratios are recorded for higher and secondary education levels, where the likelihood ratios of visiting antenatal care are 54.2% and 52.3% respectively. The results revealed that on average illiterate women have lower antenatal care visits as compared to educated women. The type of residence of women living towards making four or less than four antenatal cares visits suggests that the likelihood ratios of rural women are around 35% less than that of urban women because the likelihood ratios for both categories are recorded at 21% and 56%.

From the wealth index vault, the odd ratios suggest that those women who belong to the poorest and poor categories have negative likelihood ratios, which means on average poorest women have 12% fewer chances to visit antenatal care while 2.3% fewer chances for the poor women. The women who are living in middle families have a 4.5% higher likelihood chance while for richer women it increases up to 18% and for the richest, it reaches 63.2%. The results reveal that the wealth index plays a key role in the determination of antenatal care visits.

The working status of women visiting antenatal care is also an important demographic feature. The results reveal that those women who are not working have on average 9.8% fewer likelihood chances for the visits while those who are working have on average 24.6% higher chances of the visits. The gender of the household head also showed significant likelihood odd ratios in the determination of antenatal care visits. The result suggests that those women whose household heads are male have around 24.6% lower chances of visiting antenatal care as compare to those where the household head is female.

Besides the illiterate group at the education level, the rest of the variables and groups have a probability value of less than 5%. The result suggests that the findings are statistically significant at 5%. The findings related to illiterate groups are significant at 10% because the probability value

recorded .07. Hence, it can be concluded that the demographic features significantly influence the antenatal care visits less than four times.

4.4.2: Odd Ratios of Demographic Features Associated with Antenatal Care Visits More than Four Times

The above section highlighted the odd ratios featuring the demographic variables affecting the antenatal care visits. As the WHO has recommended at least four visits during pregnancy for better antenatal care, the above result showed the response of demographic variable to the minimum visit level. The below table summarizes the odd ratios of demographic features associated with antenatal care visits more than four times.

Table 4.4: Odds Ratios of Demographic Features Associated with Antenatal Care Visits More than Four Times

Negative Binomial Regression						No of Obs	8408
	Dispersion	Mean				Chi-Square	217.12
		-					
	Log-Likelihood	1021.23				Prob	0.000
						Pseudo R2	0.268
Demographics	Variables	Coef	Std.Err	Z	P>Z	95%CI.	
Age	15-19 Years	0.010**	0.004	2.333	0.035	-0.010	0.030
	20-24 Years	0.120**	0.012	10.000	0.030	0.100	0.140
	25-29 Years	0.021*	0.003	6.563	0.000	0.001	0.041
	30-34 Years	-0.108*	0.007	-14.568	0.000	-0.128	-0.088
	35-39 Years	0.001	0.003	0.375	0.654	-0.019	0.021
	40-44 Years	0.006	0.075	0.083	0.969	-0.014	0.026

	45-49 Years	0.015*	0.002	6.905	0.000	-0.006	0.035
Highest Education Level	Illetrate	-0.07**	0.036	-2.069	0.040	-0.095	-0.055
	Primary	0.015*	0.001	12.250	0.000	-0.005	0.035
	Secondary	0.017*	0.002	8.500	0.000	-0.003	0.037
	Higher	0.345*	0.132	2.614	0.000	0.325	0.365
Residence	Rural	0.018	0.032	0.550	0.658	-0.002	0.038
	Urban	0.345*	0.140	2.464	0.000	0.325	0.365
Wealth Index	Poorest	-0.098*	0.013	-7.538	0.000	-0.118	-0.078
	Poorer	-0.050*	0.009	-5.847	0.001	-0.070	-0.030
	Middle	-0.033*	0.003	-10.833	0.000	-0.053	-0.013
	Richer	0.017*	0.002	8.250	0.001	-0.004	0.037
	Richest	0.169**	0.078	2.167	0.030	0.149	0.189
Working Status	Yes	0.012	0.090	0.138	0.845	-0.008	0.032
	No	-0.067*	0.007	-10.308	0.000	-0.087	-0.047
Household Head	Male	0.132*	0.046	2.870	0.000	0.112	0.152
	Female	0.014*	0.005	2.800	0.000	-0.006	0.034

(Note: *,**, & *** represents the significance of variable at 1%, 5%, & 10% respectively)

From the above table, the maximum likelihood estimation value recorded for the antenatal care visits made more than four times is -1021.23 where the probability value of Chi-Square suggests that the overall model is significant. The Pseudo R-square value indicates that the independent variables and groups explain the variations in the model in a better way.

From the vault of age group, the odds ratio of the age group 15 to 19 years suggest that on average in this age women have a 1.5% higher likelihood chance to make antenatal care visits as compared to other age groups. The age group 20 to 24 and 25 to 29 years suggest that at this age the chances

of visiting antenatal care service are 12% and 2.1% higher as compared to other ages. The age group 30 to 34 years have a negative odd ratio, indicating that the chances of making antenatal care visit in this age group are 10.8% lower. The age group 35 to 39 shows no significant results. While the women in the age group 40 to 49 have 0.6% to 1.5% higher chances of making antenatal care visits more than 4 times.

The education result suggests that in illiterate women, the antenatal care visit more than four times is 7.5% less than the other groups. The primary and secondary literate women have on average 1.5% and 1.7% more chances of making more than four antenatal care visits. Females having higher education have on average 34.5% more chances to make more than four antenatal care visits. The odd ratios of residence suggest that on average rural women have 1.8% higher chances to make more than four visits while for urban women the likelihood chances increase to 34.5%

Among the wealth index group, poorest, poor, and middle family background women have on average 9.8%, 55, and 3.3% lower chances respectively to make more than four antenatal care visits. Those families where the household head is male have on average 13.2% likelihood chances, while where female is household head have on average 1.4% higher chances. Those females who are working have on average 1.2% chances to make more than four antenatal care visits while those who are not working have on average 6.7% fewer chances to make antenatal care visits.

4.4.3: Odd Ratios of Demographic Features Associated with Antenatal Care Visits for All Participants

The above highlighted both sections elaborated the results showing the average antenatal care visits less than or more than the standard WHO target. The below table summarizes the overall

performance of the women visiting for antenatal care depending on the demographic features of the participants.

Table 4.5: Odds Ratios of Demographic Features Associated with Antenatal Care Visits for All Participants

Negative Binomial Regression						No of Obs	14538
	Dispersion	Mean				Chi Squ	423.2
	Log-Likelihood	-2432.14				Prob	0.000
						Pseudo R2	0.214
Demographics	Variables	Coef	Std.Err	Z	P>Z	95% C.I	
Age	15-19 Years	0.013	0.079	0.167	0.98	-0.007	0.033
	20-24 Years	0.002	0.012	0.167	0.98	-0.018	0.022
	25-29 Years	0.197**	0.089	2.213	0.021	0.177	0.217
	30-34 Years	0.032*	0.007	4.338	0.000	0.012	0.052
	35-39 Years	0.001	0.003	0.438	0.645	-0.019	0.021
	40-44 Years	0.036	0.075	0.485	0.554	0.016	0.056
	45-49 Years	0.124***	0.073	1.692	0.094	0.104	0.144
Highest Education Level	Illetrate	-0.080*	0.035	-2.299	0.010	-0.100	-0.060
	Primary	-0.018*	0.008	-2.250	0.012	-0.038	0.002
	Secondary	0.173***	0.092	1.889	0.072	0.153	0.193
	Higher	0.297*	0.132	2.250	0.004	0.277	0.317
Residence	Rural	-0.198*	0.032	-6.188	0.000	-0.218	-0.178
	Urban	0.249***	0.140	1.779	0.068	0.229	0.269
Wealth Index	Poorest	-0.064*	0.013	-4.923	0.000	-0.084	-0.044
	Poorer	-0.099*	0.009	-11.612	0.000	-0.119	-0.079
	Middle	0.006*	0.003	2.133	0.016	-0.014	0.026

	Richer	0.142*	0.002	71.000	0.000	0.122	0.162
	Richest	0.294*	0.078	3.769	0.000	0.274	0.314
Working Status	Yes	0.198**	0.090	2.200	0.011	0.178	0.218
	No	-0.005	0.007	-0.715	0.412	-0.025	0.015
Household Head	Male	0.054	0.046	1.180	0.213	0.034	0.074
	Female	0.105*	0.005	20.920	0.000	0.085	0.125

(Note: *,**, & *** represents the significance of variable at 1%, 5%, & 10% respectively)

From the given odd ratios table, the odds ratios for the age groups 15 to 19 years, 20 to 24 years, 35 to 39 years, and 40 to 44 years have probability values greater than 10%, which means the respective groups have insignificant results. In the education odd ratios table, besides secondary education, the rest of the variables give significant results at 1%. In the case of residence, the rural odd ratios are significant at 5%, while the urban odd ratio is significant at 10%. The odd ratios of the wealth index for all groups are significant at 1%. Working status has odd ratios significant for working women while the insignificant odd ratio for not working women. Similarly, the women whose family household head is male have an insignificant odd ratio while the female household head has significant odd ratios at 1%.

The maximum log-likelihood estimation value for all visits recorded was -2432.14 for 14538 observations. The Chi-square value recorded 432.2 having a probability value of 0.000, which suggests that the overall model is significant. The Pseudo R-square value for all observations recorded 0.214, which means the independent variables are responsible for a fair sum of variations in the dependent variable.

4.5: Findings of the Study and Result Discussion

The current study was unique because the study is considering to analyze the research topic by considering the Demographic Health Survey Data, There are a lot of studies published on antenatal

care in developing countries such as Fatmi et al. 2002; Majrooh et al., 2014; Yadav & Dhillion, 2015; Akowuah et al., 2018; & Ali et al., 2020; but Demographic Health Survey's data has been very rarely utilized and it is comprehensive data, which can provide quite relevant policy suggestions. The current study considered the demographic features of women making antenatal care visits such as age, education, wealth index, and distance to hospital, number of kids, employment status, household head, physical accessibility, etc. The current study was inspired by the study of Zakar et al., (2016), who also investigated the antenatal care visits and the factors influencing the visits. The author found that socio-economic factors significantly influence antenatal care visits. For example, Jalil et al., (2016) probed that Balochistan province has the lowest delivery use while Islamabad has the highest.

In the current study, we found that FATA recently merged with KPK have on the average lowest number of antenatal care visits of 3.24 followed by KPK, where the average antenatal care visits were recorded at 4.4. Islamabad has been observed to have the highest average antenatal care visits followed by Punjab and Sindh having average antenatal care visits of 11.9, 8.2, and 7.2 visits. The previous studies of Kalsen et al., 2011; Singh et al., 2012; and Mazmbani et al., 2012 found significant differences in the antenatal care visit behavior of educated and uneducated women. The current study also found that the average antenatal care visits of women depend on their education level. Women having higher education levels on average have higher antenatal care visits as compared to those who have lower education levels.

From the age group perspective, the current study found that females in the age group between 20 to 35 years have an average higher number of visits as compared to other groups. Jalil et al. (2020) claimed that during the age 15 to 24 most of the women have their first birth or are newly married, so they do have not so much information regarding the importance of antenatal care visits.

Therefore, the antenatal care visit in this age is quite lower than the other age group. Similarly, women after the age of 40 have the least desire or looking for baby birth, therefore they make the least antenatal care visits. The current study found significant positive odd ratios consistent with the results of (Farooq & Kayani, 2014; and Mumtaz et al., 2021).

In the current study, education and age of women are indicators of women behavior for utilization of antenatal care services at household level that is second objective of current research. In this study we found that a better education was associated with the behavior of higher utilization of antenatal care. This implies that odds ratio for utilizing antenatal care increases along with the increase in maternal education level. For instance, in this study, it has been found that as compare to the women with below primary or no education, the women with secondary and tertiary education were found to be more likely to avail antenatal care services. Therefore, based on aforementioned finding it can be implied that maternal education level was positively associated with behavior of prenatal care utilization.

Furthermore, the age brackets of 15-19 years as well as 45-49 years have manifested lesser antenatal care behaviors. If we look at female first age bracket (15-19), it can be argued that the female who fall in this bracket are relatively less matured or less experienced as compared to the rest of the sample, therefore, possibly showing less intend towards antenatal care services. On the other hand, the females related 45-49 years bracket are more likely to be illiterate, therefore, more likely to believe in conservative belief. Other factor behind there lesser utilization could the experience they have gain during pervious pregnancies, therefore, they are feeling the urge to gain further consultation on antenatal care. Based on these reasons, we can conclude that, age is also factor which is associated with the behavior of antenatal care utilization services.

WHO (2014) reported claimed that in Pakistan the affordability of health services is important because around 92% of private expenditure is out of pocket as compared to the global average of 45%, which means the antenatal care visits in Pakistan are normally higher than that of global average expenditures. It means wealth index or the income of pregnant woman play an important and key role in the determination of antenatal care visits (Mumtaz et al., 2012). The current study

found negative odd ratios for both the poorest and poorer women. The result suggested that on average those women make higher antenatal care visit who can afford the antenatal care expenditures which are consistent with the study of (Jalil et al., 2016).

The working status of women is also an important factor that can significantly influence antenatal care visits because working women have on average more resources than those who do not work. The current study found significant positive odd ratios for women who are working, which means those women who are working on average have more likelihood chances to make antenatal care visits as compared to those who are not working. The findings of the current study towards the working status of the visitors are consistent with that of (Mumtaz et al., 2012; Zakar et al., 2016, and Ali et al., 2020). The current study also found a significant impact of household head gender on antenatal care visits. As Zakar et al., 2016 argued that women's autonomy is an important factor that significantly influences the decision-making of women. The antenatal care visit is the key decision for a woman because it is do and die situation for most cases. The current study found that on average women who are living in a family, where the household head is male average have a lower likelihood of making antenatal care visits as compare to those where the household head is female. The female household head has higher odds ratios indicating a significant positive impact on antenatal care visits supports the argument that women's autonomy is an important factor promoting antenatal care visits.

CHAPTER 5:

Conclusion and Policy Recommendations

5.1: Conclusion

The current study aimed to examine the factors that significantly influence antenatal care utilization in Pakistan. The key research question that the current study will seek to answer is how socioeconomic factors significantly influence antenatal care. To meet the respective research objective, the study relied on Demographic Household Survey 2017-2018. There are a lot of studies published on antenatal care in developing countries such as (Edward, 2011; Abosse, Woldie, & Ololo 2010; Agus & Horiuchi, 2012; Ali et al. 2018) found different factors significantly influence antenatal care visits. The current study briefly examined the socioeconomic factor, which in the case of Pakistan are very low as compare to other developed and advanced countries, can be used for comprehensive policymaking. The current study undertakes the estimation for both provincial level and overall country level.

The findings of the current study revealed that FATA recently merged with KPK have on the average lowest number of antenatal care visits of 3.24 followed by KPK, where the average antenatal care visits were recorded at 4.4. Islamabad has been observed to have the highest average antenatal care visits followed by Punjab and Sindh having average antenatal care visits of 11.9, 8.2, and 7.2 visits. The current study findings w.r.t age group suggest that the women in the age bracket 15 to 24 have on average lower antenatal care visits as compared to other age groups. The odd ratios of women making antenatal care visits decrease after the age of 40, which means getting aged reduces the likelihood of visiting for antenatal care purposes.

The current study also found that the average antenatal care visits of women depend on their education level. Women having higher education levels on average have higher antenatal care visits as compared to those who have lower education levels. The current study found negative odd ratios for both the poorest and poorer women. The result suggested that on average those women make higher antenatal care visits who can afford the antenatal care expenditures. The current study found significant positive odd ratios for women who are working, which means those women who are working on average have more likelihood chances to make antenatal care visits as compared to those who are not working.

The antenatal care visit is the key decision for a woman because it is do and die situation for most cases. The current study found that on average women who are living in a family, where the household head is male average have a lower likelihood of making antenatal care visits as compare to those where the household head is female. The female household head has higher odds ratios indicating a significant positive impact on antenatal care visits supports the argument that women's autonomy is an important factor promoting antenatal care visits.

Apart from health related implication, antenatal care also associated with economics. Globally, the economic growth of a country has been assessed using its health outcomes. The increased national wealth has been related to improved health (Fagbamigbe et al., 2015). Health is central to overall well-being and wealth (Arthur, 2012).According to Smith, 1999, the level of public health and wealth are closely related and this relationship is bidirectional, which implies that both these factors reinforce one another. Availing of antenatal care services is a source of good health provision amongst infants and mothers thus increase antenatal care is related to increase in gross national human capital by increasing ratio healthy population, as it has been justified by the literature of human capital growth that higher gross national health is positively link with higher

productivity and output. Another positive economic impact of availing of antenatal care services can be understood in terms of reduction potential cost associated to child and mother health risks. In other words, when a mother avails antenatal care services she is reducing future health risk, thus, in a sense, saving potential cost on household health in the future.

5.2: Policy Recommendations

The present study investigated the role of demographic features influencing antenatal care visits in Pakistan. The study found that age, education, income, regions, working status of women, gender of household head, and area of living significantly influence the likelihood of making antenatal care visits. Based on the findings of the current study, the following recommendations are made to further improve antenatal care visits.

- The antenatal care visits in the age 15 to 19 years and 45 to 49 years have been found lower in Pakistan as compare to other age groups. While this age group is an important factor to make antenatal care visits. As Zakar et al. (2016) exclaimed that during age 15-19 year bracket most women are passing through their first pregnancy, On the other hand, the females related 45-49 years bracket are more likely to be illiterate or conservative belief or may gain experience during pervious pregnancies, therefore it is very important to be aware of the importance of antenatal care visits. Through electronic, print, and social media the awareness of antenatal care visits can significantly improve the number of antenatal care visits.
- The current study found negative odd ratios for both the poorest and poorer women. The result suggested that on average those women make higher antenatal care visits who can

afford the antenatal care expenditures. Ali et al. (2020) highlighted that the antenatal care expenditures in Pakistan are much higher as compared to other neighboring and developing economies. Therefore, women hesitate to visit antenatal care centers. Hence, by providing cheaper antenatal care services, the number of antenatal care visits can be improved in Pakistan.

- Since more than 95% of the Pakistani population comprises Muslim families and Islamic believers. Therefore, a very limited number of families use contraceptive measures. The continuous pregnancy of women significantly influences their health and they avoid making a continuous visit. Hence, it is important to highlight the benefits of contraceptive measures such as family planning, the antenatal care visits can be improved.
- In Pakistan, very few employment opportunities are available for females. An independent and employed woman can make her decision according to study. Therefore, the public sector needs to promote female employment in Pakistan to improve antenatal care visits.
- The female education in Pakistan especially in rural areas have been found very vicious and more than 75% of the population are living below the primary education. Policy should also encourage women to complete at least a secondary education and launch a campaign to promote the use of maternal health care, particularly the free provision of the service. This could be done through the mainstream media (television, radio, etc.) and community announcements, especially in rural areas where access to the mass media is likely to be limited and spreading awareness about how to deal with ANC issues through consulting higher officials.
- The income sources in rural areas especially in Pakistan need to be consider seriously. Because more than 85% of female in rural areas are with no income or revenue generation

sources and they are always stuck with household chores. Therefore, promoting income sources and revenue generation sources in rural areas can significantly be improved to encourage women participation in better health care services.

These measures can be done alongside the policy, and hence would help in reducing the rate of maternal deaths due to child birth, achieve the targets of WHO antenatal car model and help to achieve the Millennium Development Goal (Goal 5) of reducing maternal mortality.

5.3: Limitations of the Study

Although the present study contributed a good sum of knowledge in the literature and results of the current study are consistent with that of the study of Zakar et al., 2016; Adnan et al., 2017; Tara et al., 2019; Ali et al., 2020; and Belete et al., 2021. But the current study has some limitations, which can be flourished to get more specific and meaningful information. The current study relied on provincial and overall country-level data analysis from the demographic household survey that comprises thousands of variables and factors used for measuring different variables. Through focusing on antenatal care visits in a specific locality or specific province can provide more detailed and comprehensive findings towards the regions. It means the findings of the current study cannot be generalized for a specific region or specific area.

Secondly, the study relied on only a few socioeconomic factors influencing the antenatal care visits. Yadav et al. (2021) probed that the digital era has significantly improved the awareness level of women and availabilities of basic amenities such as media exposure, use of mobile phones, holding of bank accounts, etc significantly improve the antenatal care utilization. Therefore, those researchers who are interested in the same study area can use these variables and study the behavior of women towards antenatal care visits.

5.4: Summary of the Study

The present study investigated the role of demographic features influencing the antenatal care visits in Pakistan using demographic household survey data from 2017-2018. The study found that age, education, income, regions, working status of women, gender of household head, and area of living significantly influence the likelihood of making antenatal care visits. The public sector can improve the antenatal care visits through different channels such as awareness through media campaigns, reducing the cost of antenatal care visits, and encouraging women's employment in Pakistan.

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