

**Digital access and Maternal Health: A Sociological
analysis of Mobile phone ownership and antenatal care
utilization among women in Punjab.**



**FORMAN
CHRISTIAN
COLLEGE**
(A CHARTERED UNIVERSITY)

By
Noor-Ul-Sehar
263184693

Supervised by
Dr. Vaqas Ali

Department of Sociology
**Forman Christian College (A Chartered
University)**

2024-2026

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ABSTRACT

This research study aimed to find how mobile phone ownership and mass media exposure influence ante-natal care utilization. Access to maternal health care remains a significant challenge despite the development and growth of the regions in Punjab. With increasing mobile phone access and usage among people, digital access is potentially a transformative factor for up-taking antenatal care utilization and improving health services utilization. This study has explored the relationship between ownership of mobile phone, exposure to mass media and utilization of ante natal care among women in Punjab using data from Pakistan Demographic Health Survey (PDHS 2017-18). Through the sociological lens, this study has further investigated on how mobile phone access, media exposure influence antenatal care utilization. This is a quantitative study and by using secondary data from the Pakistan Demographic and Health Survey PDHS 2017-18. SPSS (Statistical Package for Social Sciences) has been used to analyze the relationship of mobile phone ownership, mass media exposure and ante natal care utilization, by keeping the effect of sociodemographic variables into the account. The findings of the study revealed that mobile phone ownership and digital access mainly use of internet have found to be a significant determinant in improving the utilization of ante natal care among women in Punjab. Keeping this into account, the result also revealed that women`s education and wealth are the main predictor of better ante-natal care services utilization.

Keywords: ante natal care utilization, mobile phone ownership, mass media exposure, Pakistan Demographic & Health Survey (PDHS)

CHAPTER 1 INTRODUCTION

Over the past decade, with the emerging technologies and increased use of mobile phones, the communication patterns have changed so as the access to information and decision making have changed a lot, influenced by the information we consume through it. Maternal mortality continues to remain a significant challenge to the global health. In Pakistan, being a developing country, maternal health has been a major concern due to high mortality rates in women & infants. Using ante natal care services plays an important part in mitigating maternal morbidity, mortality, and neonatal mortality as well. Regular visits to Antenatal care reduce the risks of maternal mortality and neonatal mortality, leading to improved health outcomes for both mother and child. Despite all national programs nationwide, access to ANC services is unequal across various regions and communities in Pakistan (National Institute of Population Studies [NIPS] & ICF, 2019). As per World Health Organization (WHO), it is recommended that expecting women have to take 4 ante natal visits at least or more during their pregnancy (World Health Organization, n.d.).

Among all the factors that contribute to influencing women's utilization of antenatal care, digital access (mobile phone ownership) is considered an important factor. A mobile phone can help in various ways, from a reminder about appointments and doctor visits to watching awareness videos about how to take care of their selves in that condition, learning about pregnancy-related health concerns, or contacting the healthcare workers in case of any complications or emergencies. In the same way, it has been proven by

research studies that mass media exposure (i.e. watching television, radio or reading newspaper) can serve as an important mean to disseminate information related to maternal health care through advertisements, reports or various channels which can help improve well-being for the mother and infant as well. In the same way, mass media have the potential to spread awareness through broadcasting drama series, advertisements in far flung and rural areas where it can give awareness to the unprivileged and uneducated segment of women on how to take better care of themselves during pregnancy thus an improvement in maternal care (Fatema & Lariscy, 2020).

For women coming from rural areas or marginalized places, having a mobile phone is a place of empowerment for them in many ways. In Pakistan, due to traditional barriers, access to mobile technology is not equally distributed. Women, especially in rural areas, have less chances to own and use a mobile than men, which reflects the inequality, or we can say a digital divide, that is linked with wealth, education, and the place where one lives. By the literature review, it has been revealed that due to the patriarchal system persisting in Pakistani society, specifically in rural areas women either have no mobile phones or shared usage of mobile phone is there (MacQuarrie et al., 2022). This is not only about having a mobile phone, but it poses a serious question of structure inequalities here and how it leads to the inequality in accessing health care services as well. According to global studies, the role of digital access in enhancing maternal health is well-documented. According to Feroz et al. (2017) study conducted in Thatta, Sindh, found that women who have mobile phones ownership have more chances to engage in mobile-based health services (voice mails regarding awareness on maternal health). Women who were seen actively engaged in using media/ internet were most likely to

complete their ante natal care visits and were also reported to have higher odds of initiating their ante natal visits on the recommended time. Evidence from the studies have suggested that mass media have found to be playing a significant part in improving the maternal health care. Women through TV advertisements, informative programs get informed about various stuff related to their reproductive health. A research study by (McBride et al., 2016) indicated that mobile phones could significantly increase the antenatal care visits through timely reminders and information about maternal health.

1.1 Statement of problem

Despite the improvement in maternal health and growing awareness among people for using antenatal care services, a lot woman in Punjab are still at high risk of preventable maternal and child health risks. With the emerging access and usage of mobile phones, particularly by digitally literate, it has the potential to fill the gap in health services and using the maternal health care by making people aware. This research seeks to fill the gap by analyzing the secondary data from Pakistan Demographic Health Survey (PDHS) 2017-18 by adopting a sociological approach on how mobile phone ownership shapes the behavior about seeking antenatal care among women in Punjab.

1.2 Research Objectives of the study

The objective of the study is to explore the relationship between mobile phone ownership, media exposure and use of antenatal care services among women in Punjab using the Pakistan Demographic Health Survey 2017-18. This research study seeks to investigate whether owning mobile phone, exposure of mass media influences the decision of seeking health care along with other socioeconomic factors as well. These are three key research objective that will be explored in the study:

- To analyze the relationship between owning a mobile phone and using antenatal care services among women in Punjab.
- To explore whether media exposure influences the decision to seek antenatal care.
- To analyze how socioeconomic status (wealth and education) and place of residence (urban or rural) impacts digital access & Antenatal care utilization.

1.3 Hypothesis:

- H1: Women who have mobile phones ownership have higher probability of using ante natal care services compared to the women with no mobile phone.
- H2: Women having exposure to mass media have more chances to utilize ante natal care comparing to the women who are with less or no exposure.
- H3: If a woman has higher socio-economic status (education and wealth index) than she will have higher probability to use ante natal care services.
- H4: Women residing in urban places are more likely to access mobile phone and seek ante natal care services comparing to the women living in rural places.

1.4 Significance of the study

This research seeks to fill a gap by analyzing the secondary data from the Pakistan Demographic Health Survey (PDHS) 2017-18 by adopting sociological approach on how mobile phone ownership and media exposure shapes the behavior about seeking antenatal care among women in Punjab. Moreover, maternal health behavior will not only be determined by media exposure, mobile phone ownership but also by how they are shaped by education, wealth, and rural-urban residence. This research study aims to analyze these dynamics as well.

Chapter 2 LITERATURE REVIEW

2.1 Understanding Digital Inclusion in Maternal Health

Digital inclusion is understood as access and meaningful use and benefits from digital technology. In today's world, it means more than just having access to a mobile phone and digital tools. Ante natal care is considered as a vital component of maternal health as it is the entry point of using the maternal health care services, as advised by WHO (World Health Organization) that expecting lady should at least receive 4 ante natal care visits. These ante natal visits allow the woman to regularly monitor the mother and fetus's health or any complication if occurs in between during the pregnancy (Fatema & Lariscy, 2020). In the context of health care, digital inclusion refers to using a mobile phone to get knowledge and information about various concepts regarding maternal health care. Digital inclusion can improve communication between the patients and health care workers, empowering them enough so that they can make informed choices about their health (Baum et al., 2014).

In this way, access to digital tools can lead to better outcomes in maternal health, especially these mobile apps that help expectant women keep track of their appointments, seek any advice from professionals regarding their health, receive reminders, etc. With time as the world advances and becoming a global village, a growing number of people use internet as health information source as quoted by (Krishnatri & Vellakkal, 2024) in their research study. Digital inclusion is very closely linked to factors such as education and literacy as most of the times, more educated and aware expecting women do use mobile phone/ technology to cater their health related problems. In Punjab, disparities exist especially in rural and urban areas that further complicates the mobile phone

ownership & in general digital access (MacQuarrie et al., 2022).

2.2 Effectiveness of Mobile-Based Health Interventions

A research study by (Lemay et al., 2012) suggested that mobile phone-based health programs have been seen to increase both maternal awareness and visits to antenatal care completion. It has been identified in previous researches that there are better outcomes in term of ante natal care utilization and also in gaining improved health related knowledge through such apps i.e. Mom Connect etc. Mobile-Based health interventions have been found significant for strategic improvement in maternal health outcomes. By these intervention, different apps are there to help women especially the expectant women gain information related to health, services and reminders and this is how it enhances the access and utilization of health care (Krishnatri & Vellakkal, 2024). Research study by Pendse et al., 2022 states that mobile communication as in through SMS reminders about taking medicine or check-up (ante natal visits), through teleconsultations or by gaining information via different application, it is easier for one to monitor their health and be updated about various things regarding your health as it indicated to significantly improve maternal health behavior. And women with mobile phone access are more likely to receive their health related updates, reminder or able to gather information or guidance about pregnancy related stuff. A study on postpartum women in India, Punjab revealed that mobile ownership where significantly increase the likelihood of accessing maternal health care, along with that it also facilitates the communication with health care providers which means it get easier to talk to your doctor on phone or get any advice from them (Pendse et al., 2022).

Keeping in mind the social fabric of society, it is important to understand that not all

women enjoy these benefits equally. Socioeconomic status of women, the place where she is living, her digital literacy, all these factors influence how much she can benefit from digital tools. Many women in Pakistan do not have a phone and thus do not use it independently, relying on male family member`s mobile phone to search for health-related concerns, which limits their autonomy (Gibson et al., 2020). In a society, where most the places have patriarchal structure and beliefs, women access and use of these digital gadgets are often restricted or monitored by the male members of the family. Along with this, these disparities are further influenced by various factors i.e. education, age, wealth and place of residence. Rowntree et al. (2020) reported in their results that a significant amount of women in Pakistan who do not have a mobile phone and the main hindrance to their ownership of mobile was their family not approving for them to have one. Some of the hurdles identified in seeking maternal health care were a significant distance to the health care center, poor access to transportation, having no money. As a respondent (women) quoted in the study that men are the decision maker of our house and we cannot get out of the house alone so either we wait for our partners to come and take to delivery / health care centers for service utilization. While some of the men prefers Traditional Birth Attendants because of the affordability as they are available for the home delivery at a very low cost (Qureshi et al., 2016). Research shows that women generally follow their husband`s decision or elderly women in their family that is mother in law. It is revealed that similar patterns of decision making for seeking ante natal care utilization are seen in Bangladesh and Rural Haiti, where husbands and mother in laws are the decision makers. Afiq and Zafar (2025) theorize that there is a very clear difference between the rural and urban places, if we see in aspect of accessing resources and

opportunities. People from rural areas have less access to blogs, articles, magazines and healthcare specialties, comparing to those living in urban areas.

2.3 Structural Inequalities and the Gendered Digital Divide

By the report of Pakistan demographic health survey, it is stated that nationwide, there is nearly half of the women who were expecting were able to complete 4 ANC visits throughout their pregnancies as recommended by the World Health Organization (NIPS & ICF, 2019). In Punjab, due to better healthcare systems and relatively stronger infrastructure, the situation is comparatively better than in other places in Pakistan. In underdeveloped and less privileged areas, barriers such as low income, poor transportation, lack of infrastructure, and strong patriarchal beliefs seem as hurdles for women in receiving proper health care during pregnancy (Yasir et al., 2021). Evidence from Demographic Health Survey shows that there is an increase in ownership of mobile phone with the advancing age in low and middle income countries, yet these disparities exist by gender, place of residence, age or wealth quantiles. Usually in a household, it is more likely for a man to own a mobile phone or even if in some cases woman in the house have a mobile phone but she faces restriction upon usage due to social norms or the household dynamics (Pendse et al., 2022). Research revealed that it is very important to understand the distinction between owning and accessing the mobile phone. Studies shows that many women may have technically access to digital gadgets as mobile phone but with a shared usage, their ability to utilize it to get information about healthcare get constrained (Pendse et al., 2022).

Keeping in mind the gendered digital divide, reports show that there is less chances of women to own and access a mobile phone and the internet. It was quoted by Nie et al.

(2016) in their research study that in Timor-Leste females who belonged to well socio-economic backgrounds have more chances to access a mobile phone characterized by better education, income and living standard. A research study in Ghana quotes that women from highest wealth quantiles were more likely to have a significant positive association with up taking professional ante natal care services (Arthur, 2012). These finding revealed the broader picture of socio-economic inequalities of a population, where poor women are unable to own and use a mobile phone thus limiting their participation in mobile health initiatives which are eventually for their better healthcare outcomes. A research study on gender digital divide states that though evidence from Demographic Health survey reveals that mobile phone ownership has increased significantly but differences still exist between the women and men especially those living in rural areas and belonging poor households (MacQuarrie et al., 2022). A research study stated that in rural Sindh, health care utilization has to be sought with the permission of or they have to be accompanied by either a male member of family or any elder female of the house (Qureshi et al., 2016). Finding revealed that decision making regarding the use of health care services is mainly in the hands of husband or mother in law.

2.4 Contextualizing Digital Access in Punjab

Having a digital tool may seem neutral on the surface, but their use and lack are deeply influenced by social structures. In rural areas and less developed communities, this digital divide is more severe. Due to cultural norms and family structures sometimes women are not allowed to use mobile phones freely or even have one due to which from one public sphere they are excluded that is to be a part of digital space (Rowntree et al.,

2020). Accessing a mobile phone does not automatically empower women, but empowerment can only be exercised by using it freely to have knowledge about the desired context, making the right choices for their selves and taking their own decisions (Barboni et al., 2018). A study on postpartum women in Punjab, India revealed that although a significant proportion of women “own” mobile phone but their access is mediated by household dynamics that include a shared usage or imposed restriction by any member of family (Pendse et al., 2022). This implies in Pakistani Culture as well due to the similarities in culture and structural context of both places. This suggests that it is important to understand the whole picture beyond the technical access. In Punjab, digital access is not only about being connected but how that connection is being shaped by education, family dynamics, place of residence, and income. About how the digital access influences their decisions and actions to receive antenatal care. A research study in India stated that as per the latest National Family Health Survey, results revealed that increased use of household internet was positively with associated low cost of internet supply. Nationally represented cross sectional data was analyzed by the study in India to see the impact of internet access on using maternal health care that includes the using of ante natal care services, the deliveries at facility centers and post-delivery care services as the affordability of internet made it feasible for people especially women to access it (Krishnatri & Vellakkal, 2024).

2.5 Media Exposure and Healthcare Seeking Behavior

Mass media is seen to be playing a significant part in shaping healthcare seeking behaviour and decision making related to health. A research study in Uganda also revealed that women who have mass media access and usage of media have more chances of using antenatal care services comparing to those with no access and use of media (Bbaale, 2011). Mass media exposure that include the newspaper, internet, T.V and radio is found to be a significant key determinant for healthcare seeking behaviour. Media plays a great role in disseminating information and awareness about healthcare utilization through various channels. In terms of maternal health, media is found to be playing a positive role in increasing ante-natal care service utilization. Studies indicate the women who comparatively use more media have higher chances to be educated about the importance of ante natal care, taking care of their health in their pregnancy and post-natal check-ups (Aboagye et al., 2023). Media exposure is considered to be significant for the increase in health care seeking behaviour as in rural areas where women who might not have access to mobile phone but through television or radio as the advertisement about maternal health care, contraceptions & reproductive health disseminates knowledge and information in people (Fatema & Lariscy, 2020). Studies reveals that media not only provide information but also positively influence to shape or change the social norms by portraying the positive attributes related to health care behavior. In the same way, it educated about the importance of seeking health care during this time and give them needed information about the condition to those women and household with limited education. Television portrays great hidden or latent messages regarding these issues by telecasting advertisements, short films and dramas on these topic (Afiq & Zafar, 2025).

CHAPTER 3 THEORETICAL FRAMEWORK

Drawing on the literature review, where explained how social structure, cultural, social and economic capital, along with cultural norms, influence the women's access and usage of mobile phones. Women's ownership of mobile phone and using ante natal care is just not depended upon individual's choice but it is shaped by culture, social structure and division of resources in the society. Here are the theoretical lenses on which this research study is grounded. Pierre Bourdieu's Theory of Capital, conflict theory by Karl Marx, and feminist theory. **Pierre Bourdieu's Theory of Capital** highlights how society is structured by different forms of capital that include social (support and network), economic (wealth, assets), and cultural capital (education, skills & literacy). Women with economic capital, i.e., with higher social status, can buy and own mobile phones and thus can access antenatal care information. Similarly, women with high social capital – support from family can influence digital access to make decision regarding health services. In the same way, women who are educated and aware of those with high cultural capital are more likely to use mobile phones to access antenatal care information and utilization. Education do empower a woman in order to be an informed person and an active decision maker for their own health. This explains that women who possess skills, education, support, and wealth are shaped by one's social environment. As a concept given by Bourdieu about **Habitus** that our way of acting and thinking are shaped by socialization so it elaborates on how women being raised in a set up where they are able to make their decisions on their own, education and their mobility will be confident in decisions making as in ante natal care utilization whereas women are socialized in a

restrictive environment, not given the chance for decision making alone or their mobility is restricted will not be confident enough or hesitate to use the ante natal services independently so this is how one`s way of living and doing things is shaped by social environment.

Feminist theory provides insight on understanding how gendered power structures influences the autonomy of women in accessing and using mobile phones. Living in a society where a patriarchal structure is embedded in the institutions of society as family and religion, limits women`s power of decision-making. Due to the power structure in the hands of male members of the family, women lack freedom and thus have less or no access to information and use independently. Due to the existing patriarchal belief in society, social norms and expectation shapes women`s behavior in society, thus restricting their use of digital tools. This implies that women are expected to behave and act in a certain way as in confined by their norms and social expectation that means using and owning a mobile phone is not important or considered good for female gender. Having a mobile alone does not give you the agency to use it freely and make your decision regarding your life, health care. So here agency matters in terms of using mobile phone for their health care decisions. Where women are seen degraded and judged for using mobile phone and internet, then it can be there underused despite having the ownership of mobile phone. Reflecting upon the literature review above, power struggles and inequalities make it worse for women living in a patriarchal society to have decision-making power without the interference of male counterparts.

Conflict theory by Karl Marx highlights that societies are structures in a way where there are competitions over power, resources. In a capitalist society, where the one with

power, control the ownership of mobile phones, financial resources, and thus the decision-making power, also shedding light on how women from good socio-economic backgrounds, can access mobile phones, internet access, and good quality maternal care, while those less privileged due to economic inequalities, are not able to enjoy these benefits equally. In a society where women are not a homogenous group and their experiences differs by social class, educational difference, and rural & urban difference. Women residing in urban areas are way more privileged in accessing facilities. So here is how a woman from upper class or having higher education have more likely high chances of ante natal care utilization then women residing in a rural area with no education and belonging to an under privileged family background. This conflict of power and resources allows us to see how mobile phone ownership, media exposure and antenatal care utilization are not just a matter of choice, but other factors involved that are cultural, social.

CHAPTER 4 RESEARCH METHODOLOGY

4.1 Nature of the study

This study employed a quantitative research design. By using the secondary data from Pakistan Demographic & Health Survey (PDHS) 2017–18, an analysis has been done. By using existing data from the Pakistan Demographic and Health Survey (PDHS) 2017–18, this study has explored the relationship between mobile phone ownership, exposure of mass media and utilization of antenatal care.

4.2 Conceptualization and Operationalization

4.2.1 Socio Economic Factors

Socio-economic factors are referred as those external factors that can influence the ante natal care utilization. These includes place of residence, wealth quantiles, respondent is working or not, age, education of the women. I have also included variables of autonomy classified into control variables that directs about decision making and patriarchal beliefs and husband`s education.

Variables of autonomy and patriarchal belief was computed into one single variable each after performing reliability and factor analysis for the variable.

Autonomy:**Reliability Statistics**

Cronbach's	
Alpha	N of Items
.861	4

Patriarchal belief**Reliability Statistics**

Cronbach's	
Alpha	N of Items
.821	5

4.2.3 Dependent Variable

Ante-natal care is defined as the utilization of maternal health care services during pregnancy. Ante natal care visits refers to health care that an expectant woman receives during her pregnancy. It includes the visit that an expecting lady do in order to get checkup on their health, it includes the number and frequency of visits to the antenatal care professionals as recommended by World Health Organization (WHO) (4 visits at least). Ante Natal care visits are coded as No Visits as 0 and visit taken or multiple visits are coded as 1.

Early initiation of Ante natal care refers to start of ante natal care visits within the first 3 months/ first trimester of pregnancy as recommended by WHO. For the analysis visit after first trimester is coded as 0 and whereas visit within the first three months is coded

as 1.

Complete ante natal care visits refer to the 4 visits completion or more during the pregnancy as recommended by WHO. As World Health Organization recommend at least 4 ante natal visits to the expectant ladies in their pregnancy. For the analysis three or less visits were coded as 0 and whereas 4 visit or more are coded as 1.

4.3 Data Collection

This study has utilized secondary data from the Pakistan Demographic Health Survey. PDHS 2017-18 has collected data by using a stratified two-stage cluster sampling design. In first stage, clusters (primary sampling units) were selected, and in the second stage, 28 households were systematically selected within each cluster. Fieldwork for collecting data was done between November 2017- April 2018 by trained enumerators under the supervision of team leaders and field editors to ensure accuracy and any interview bias. Data entry was managed by CSPro software that automatically checked for errors and inconsistencies during entry. The standardized DHS questionnaire was used by PDHS. The questionnaire was adapted to the Pakistani context by adding specific items as local family planning methods, health service structures, etc. The questions were subsequently translated into the local language (Urdu, Punjabi) to be understood easily by the respondent.

4.4 Sampling design

The study used Pakistan Demographic Health Survey (2017-18) dataset - a nationally representative cross-sectional survey of households. For the research study, as

it is based on secondary data, the sample is restricted to ever-married women aged 18-49, living in Punjab, Pakistan. Only those women were included in study who have given birth in the past year preceding the PDHS 2017-18. All of those women who were not meeting the criteria was excluded from the study. After accessing the PDHS data sets in SPSS format, data cleaning was done.

4.5 Data analysis

For the data analysis of this research study, the researcher has used Statistical Package for the Social Sciences (SPSS). Descriptive analysis is used to calculate percentages, frequencies and outcomes of the variables. Data cleaning was done to ensure the accuracy of data set. Coding of the all the variable that needed to be in the analysis were read and done carefully. Variables were recoded and computed after running the reliability and factor analysis test of variables, where needed. Firstly, after accessing the PDHS data sets in SPSS format, data cleaning was done. Data cleaning includes recoding the variables, excluding the missing responses and irrelevant variables not related to the objectives of the study. Variables were recoded where needed and computed into one single variable after applying validity and reliability tests. Bi variate logistics have been applied on dependent with independent and various socio demographic & control variables. This study carried out multivariate logistic regression analysis. Missing cases was not included in the data analysis.

CHAPTER 5 FINDINGS

Univariate analysis was performed to describe the characteristics of socio-demographic, dependent and independent variable.

Table 1: Univariate statistics of sociodemographic, dependent & independent variable.

Variable	Frequency	Percentage
Demographic Variables		
Place of Residence (n=1733)		
Rural	1087	(62.7)
Urban	646	(37.3)
Women`s Age (n=1732)		
18-22	230	(13.3)
23-27	474	(27.4)
28-32	524	(30.2)
33-37	333	(19.2)
38-42	135	(7.8)
43-49	36	(2.1)
	Mean	SD
Women Education Level (n=1733)		
Range (No education – Higher Education)	1.29	(1.10)
Economic Variables		
Wealth Index (n=1733)		
Poorest	201	(11.9)
Poor	316	(18.2)
Middle	393	(22.7)
Rich	411	(23.7)
Richest	406	(23.4)
Women Currently Working (n=1733)		
Yes	291	(16.8)
No	1441	(83.2)
Autonomy & Patriarchal belief Variables		
	Frequency	Percentage

Autonomy (n=1574)

Healthcare Decision	895	(51.6)
Alone / Jointly with Husband	755	(43.6)
Husband / Someone else		
Household Purchase Decision	784	(45.2)
Alone / Jointly with Husband	833	(48.1)
Husband / Someone else		
Visiting Family / Relative Decision	811	(46.8)
Alone / Jointly with Husband	825	(47.6)
Husband / Someone else		
Decision on Husband Earning	852	(49.2)
Alone / Jointly with Husband	810	(46.7)
Husband / Someone else		

Patriarchy (n=1693)

Minimal Patriarchal belief	1112	(64.2)
Very low patriarchal	107	(6.2)
Low patriarchal belief	81	(4.7)
Moderate patriarchal belief	76	(4.4)
High patriarchal belief	111	(6.4)
Highest patriarchal belief	206	(11.9)

Independent Variable	Frequency	Percentage
Mobile Phone Ownership (n=1733)		
Yes	822	(47.4)
No	911	(52.6)
Use of Internet (n=1733)		
Yes	305	(17.6)
No	1428	(82.4)
Usage of Television (n=1645)		
Yes	1177	(71.6)
No	468	(28.4)

Dependent Variables

Ante Natal Care Visits (n=1733)

No Visits	102	(5.9)
1 or Multiple visits	1631	(94.1)

Completed 4 Ante Natal Visits (n=1631)

3 or less	652	(37.6)
4 or more	979	(56.5)

Timing of Ante Natal Care (n=1631)

Within 1 st trimester	1082	(62.4)
After 1 st trimester	549	(31.7)

*missing values are not included

The sample size of this study is 1733 females residing in Punjab, Pakistan. Out of those respondents, 1087 females were living in rural areas that is 62.7% and 646 respondents 37.3% were residing in urban areas. The economic status of respondent that is analyzed through wealth quantiles revealed that 11.9 % of the respondents were classified as poorest category and 316 females that is 18.2% of the females belongs to the to poor family, while 22.7% were categorized in to middle and 23.7 and 23.4 % fell into rich and richest categories simultaneously. Relating to the economic factor, about the employment status of respondents only 291 out of 1773 respondents reported that they were employed which means that very less ratio in total that is 16.8% were employed while 83.2% females were not working currently. Education of the respondents was measured as of the scale ranging from no education to higher education, the mean of this variable analyzed showed a value of 1.29 with a standard deviation of 1.10 which will be stated as that significant amount of women out of the total respondents have no or low exposure to educational attainment. The analysis of respondent age showed that the mean value of women`s age was 29.38 and standard deviation is 5.9 that shows most of the women falls around the most reproductive age and are young as the respondents age range was around 18-49 years.

Results showed that almost more than half of the women did not own mobile phones. 52.6 % respondents reported not having mobile phones, while 47.4% of the women own mobile phones. This distribution showed a significant proportion of women did not own mobile phones. The analysis revealed that 17.6% women were using internet while 82.4% person didn't use internet at all which means only 305 out of

1733 females were using internet. This reports that usage of internet among the respondents is relatively low. 1177, 71.6% of the respondents reported using Television while 28.4% women report no usage of television. The Univariate statistics showed that only few respondents were not able to visit ante natal care and a significant proportion of women were able to visit ante natal care service. Result from analysis demonstrated that almost 94.1% women have at least 1 or more visits to the ante natal care while only 102 women out of all the respondents were with 0 visits to the ante Natal care. Complete ante natal care is taking complete 4 or more ante natal visits as recommended by WHO. The results showed that 56.5% women were able to complete their 4 or more ante natal care visits while 37.6% women had less than 4 visits to the ante natal care in their last pregnancy. Analysis indicates that 62.4% women were able to ante natal care visit within the first three months of pregnancy, whereas 549 women that is 31.7% were late to their first visit to the ante natal care as recommended by World Health Organization WHO.

Univariate analysis presents a mixed level woman`s autonomy in household decision making, around half of the women were alone or jointly in the decision making while half of the respondent reported that decisions are mainly made by their husbands alone or someone else. Similarly, about taking decision on women health care 51.6% women reported that they were able to make decisions on their own or with their husbands jointly while 43.6% of the respondent`s health care decisions were made by husbands or someone else. Regarding household purchases or visiting family / relatives, the responses was almost equally divided between women`s decision making and husband/someone decides. Results reported that majority of the

respondents - 64.2% that is 1112 no of respondents from the total falls in the category of minimal patriarchal belief. While few of them were seen to be disbursed from moderate level of patriarchal belief and only 11.9% reported believing in patriarchy which mean that a man has right to beat his wife for neglecting kids, going out without informing husband, refuse intimacy or over arguing with husband.

Table 2: Binary Logistic Regression for Factors Associated with Ante Natal Care Utilization in Punjab

Variables Visit	Full Visits		Ante-Natal Care Utilization		First	
	OR	95% CI	OR	95% CI	OR	95% CI
Place of residence (n=1631a,c,1733b)						
Urban	-	-	-	-	-	-
Rural	.38*	.308-.474	.27*	.15-.47	.41*	.32-.51
Wealth index (n=1631a, c, 1733b)						
Poorest	-	-	-	-	-	-
Poorer	1.82	1.19-2.80	2.88**	1.72-4.84	1.73	1.16-2.56
Middle and Above	7.01*	4.82-10.21	10.26*	6.30-16.72	4.79*	3.40-6.75
Women's age (n=1630a,c, 1732b)						
18-22	-	-	-	-	-	-
23-27	1.24	.90-1.7	.92	.41-2.06	.99	.70-1.40
28-32	1.70	1.2-2.3	.81	.37-1.77	.96	.68-1.34
33-37	1.41	.99-2.0	.54	.24-1.20	.91	.63-1.32
38-42	1.26	.80-1.9	.32	.13-.76	.77	.48-1.23
43-49	1.23	.54-2.8	.10	.03-.28	.91	.38-2.14
TV- Usage (n= 1545a,1631c,1645b)						
No	-	-	-	-	-	-
Yes	2.66**	2.11-3.35	2.94**	1.95-4.42	2.00**	1.59-2.52
Internet Usage (n=1631a, c, 1733b)						
No	-	-	-	-	-	-
Yes	6.45*	4.48 -9.28	23.1	3.2-16.5	2.75**	2.01-3.77
Mobile Phone ownership (n=1631a,c 1733b)						
No	-	-	-	-	-	-
Yes	2.67**	2.18-3.29	3.11**	1.95-4.97	1.98*	1.61-2.45
Autonomy (n= 1484a, c, 1574b)						
Lowest Autonomy	-	-	-	-	-	-
Low Autonomy	.95	.67-1.35	.60	.30-1.19	.91	.64-1.31
Moderate Autonomy	.96	.66-1.39	1.77	.60-5.20	1.11	.75-1.65
High Autonomy	.62*	.44-.86	.98	.45-2.17	.63	.45-.89
Highest Autonomy	.60**	.46-.78	.49	.28-.83	.76	.58-1.00

OR	95% CI	OR	95% CI	OR	95% CI
Patriarchal Belief (n=1596a,c,1693b)					
Minimal Patriarchal Belief	-	-	-	-	-
Lowest Patriarchal Belief	.73	.48-1.12	.68	.30-1.55	.86 .55-1.34
Low Patriarchal Belief	.76	.47-1.23	.50	.22-1.15	.56 .34-.91
Moderate Patriarchal Belief	.40**	.24-.65	.47	.20-1.08	.56 .34-.92
High Patriarchal Belief	.49**	.32-.74	.43	.22-.86	.61 .40-.93
Highest Patriarchal Belief	.27*	.20-.38	.65	.35-1.21	.45* .33-.61

Notes

N a =size of full visits and their categories

N b=Ante natal care visits and their categories.

N c=Visits on time and their categories

OR = Odds ratio. CI = Confidence Interval

*= *Significant at 95%CI*

** = *Significant at 99% CI*

Some categories from wealth index were merged because estimates showed a wide range of interval and large odd ratio, this indicates an instability due to small sub group or sparse data.

The results for bivariate logistic regression showed a significant relationship between sociodemographic, economic and control variables that we included in the analysis with using the ante natal care services, initiating the visits to ante natal care on time & the likelihood of complete visits of ANC among women in Punjab, Pakistan.

Analyzing the place of living, urban residents showed a significant relation in comparison to women residing in rural areas with Odd ratio of .38, which indicates, women residing in rural areas are 62 times significantly less likely to complete their full visits of ante natal care. Result shows that women residing in the rural areas have significantly 59% lower odds of utilizing ante natal care services, comparing to the women residing in urban areas. This value signifies the odd ratio of .41 with significance over 95% CI .32-.51. This indicates that women residing in urban areas have more chances to utilize ante natal care services comparing to the women living in rural areas.

Women who resides in rural areas have significantly 73 % less likelihood of initiating their ante natal within their first trimester. Place of residence showed a strong association with early initiation of Ante natal care. Bivariate analysis showed odd ratio for place of residence that is 0.27 with significance over 95% CI 0.15-0.47 as in women residing in urban areas would have more chances to visits ante natal care in their first trimester. This shows that women in rural areas are substantially less chances to visit for ante natal care in their first trimester.

Wealth index is seen to be a significant predictor of Ante Natal care health utilization, initiation of ante natal care on time and completion of visits to ante natal

care. For the bivariate analysis, wealth index categories are merged into 2 categories poorer and middle & above. So the variable was recoded putting rich and richest category in one single category that say middle and above. This was done because there were very few cases in both of these categories. Analysis indicated that women in poorer category have 1.82 times greater odds of completing their ante natal visits comparing to the women in poorest category. Comparing the poorest category, women from middle and above category have significantly 7.01 times higher odds of completing ante natal care visits on time.

Women from Poorer category has significantly 2.88 times higher odds of utilizing ante natal care comparing to the women in poorest category. Women from middle and above category have significantly 10.26% higher likelihood of ante natal care utilization with the odd ratio of 10.26. The statistical analysis suggests that women from economically challenged backgrounds have less chances to get adequate ante natal care compared to the women from a financially sound background.

About the early initiation of ante natal visits, wealth quantiles demonstrated a very significant relationship, as women from poor backgrounds have greater odds of Antenatal care visits within their first three month of expectancy with the odd ratio of 1.73. Women from Middle and above category showed a significant higher odds of initiating ante natal care on time as the odd ratio of 4.79 with significance over 95% confidence interval 3.40-6.75.

Women`s age demonstrated a mixed effect in term of in completing ante natal care visits comparing to the age group of 18-22 Women in age group 28-32 years have higher chances to complete ante natal care visits with the odd ratio of 1.70 comparing

to the reference category. Analysis showed moving towards the higher age group increases the likelihood of completing ante natal care visits. Women in age category of 43-49 years have 1,23 times higher odds of completing ante natal care visits.

With the odd ratio of 0.92 women in age group of 23-27 years, there are 8% lesser odds of women using the ante natal care services. While the data, reflects that women in higher age groups have lesser chances to take their ante natal care services. Women`s group in age category ranging from 33-37 years have 46% lower odds of using ante natal services with the odd ratio value of .54 with significance over 95% CI .24-1.20. Results reported that women in the age category of 43-49 have 90% less likelihood of using the ante natal services.

Analysis showed that women in the age category of 23-27 reveals that there is 1% less likelihood of initiating ante natal care visits on time with the odd ratio of .99. Women in age category of 28-32 years have 4 times less odd of initiating ante natal care within the first three months of pregnancy comparing to the women in reference category that is of younger age women. Result shows that women between 38-42 years have 23% lower chances to initiate their ante natal care on time with the odds ratio of .77. women in age category of 43- 49 years are 9% less likely to initiate their ante natal care within their first trimester comparing to the women in younger age. This demonstrated that women in younger have higher odds of starting their ante natal care on time, comparing to the women in older age.

Media exposure and ownership of mobile phone is seen to be having a significant association. TV, internet usage and mobile phone ownership have been a significant predictor of ante natal care utilization, initiation of ANC on time and

completing the ANC visits. Television usage has an odd ratio of 2.6 which means that there are 2.6 times higher odds of women using T.V to complete their ANC visits. Usage of internet have a very highly significant odd ratio which depicts that respondent who use internet are 6.4 times significantly more likely to complete full ante natal visits. Mobile phone ownership has significantly positive association with completing ANC visits as the result shows there is 2.6 % significant higher odds of completing ANC visits of women with mobile phone ownership. Women who watch television, uses internet indicated a higher likelihood of completing their ante natal care visits as they will have more access to information that will improve the health care health seeking behavior in term.

Analysis shows that women who use T.V are 2.94 times significantly have more probability to uptake ante natal care services comparing to the women who have no TV usage. By the bivariate logistic analysis, the variable of mobile phone ownership showed an odd ratio of 3.11 which demonstrated that women who own mobile phones are 3.1 times significantly more chances to utilize ante natal care services comparing to the women who do not own a mobile phone. Usage of internet have 23.1 times higher odds on ANC utilization, this variable showed a very high odd ratio because there were very few no of cases in people up taking ante natal care services with using internet, which is why there is a wide range of interval.

About the early up taking of ante natal care, variables of media exposure showed a significant positive association. Usage of television, increase the likelihood of initiation of ANC on time. The result shows that women with T.V usage have 2.0 times significantly higher chances to initiate ante natal care within the first trimester

of pregnancy, comparing to the women who do not use T.V. Internet use has a strong association with getting the ante natal visits on time as it showed a significant effect through the analysis. Women who use internet have 2.75 times significant higher likelihood of initiating ante natal care on time with the odd ratio of 2.75 with significance over 95% CI 2.01- 3.77. Ownership of mobile phone has a strong significant association with initiation of ANC on time. Women with mobile phone ownership have 1.98 significant higher odds of initiating ante natal care on time comparing to the women who do not own a mobile phone.

Variables related to autonomy demonstrated a significant association yet a mixed effect, women who participate in decision making related to household and healthcare have a higher probability of up taking health care services. Analysis showed that decision making power significantly increases the usage of ante natal care services & ANC initiation for the expecting women. Contrastingly the women with lowest autonomy of decision making is associated with in terms of completing ante natal care visits.

Women with low autonomy have 40% less probability to utilize ante natal care services having the odd ratio .60 with significance over 95% CI .30-1.19. Results indicated that women who hold moderate autonomy are 1.77 times higher chances to utilize ante natal care service comparing to the women having the lowest autonomy.

Women who hold low autonomy have 9% less probability to start their ante natal visits on time with the odd ratio of .91. Analysis showed that women who have moderate autonomy have 1.11 times higher likelihood of initiating their ANC visits within first three months of their pregnancy comparing to the women with lowest

autonomy. Women who have highest autonomy were less likely to initiate their ANC in time as the odd ratio is .76 with significance over 95% .58-1.00. Analysis showed a mixed effect yet there is some significant association with Ante natal care of women holding high autonomy.

Related to the patriarchal beliefs, statistical analysis signifies that women who didn't believe in patriarchy (were not justifying the beating behavior) have borderline yet significant association with complete Ante Natal Care Visits and initiation of early ANC. Result showed that women having lowest patriarchal belief are 27 times less chances to complete their ante natal visits whereas women with moderate patriarchal belief have 60 times significant lower odds of completing their ante natal visits. Women having highest patriarchal belief have significantly 70 % less likelihood of completing their ante natal care visits.

In terms of ante natal care utilization, patriarchal beliefs showed a mixed effect as well. Women who reported low patriarchal belief are 50% less likely to take ante natal care services comparing to the women holding minimal patriarchal belief with the odd ratio of .50 with significance over 95% CI .22-1.15. Women who hold High patriarchal belief have 57 times lower odds of using ante natal care services.

Analysis showed, women who have low patriarchal belief are 14 times less likely to initiate their ANC visit on time with the odd ratio of .86. Women holding low to moderate patriarchal belief reported that there is 44% less likelihood to initiating the ante natal care within the first three months of pregnancy, comparing to the women having minimal patriarchal belief. Women with highest patriarchal belief are significantly 55% less likely to initiate their ante natal care on time. Results revealed

that acceptance of patriarchal belief and justifying domestic violence are inversely related with the initiation of ante natal care visits.

Table 3: Multivariate Logistic Regression of Factors Associated with Antenatal Care Utilization in Punjab (PDHS 2017–18)

Variable	Category	Full visits (aOR)	95% CI	Early ANC (aOR)	95% CI	ANC Utilization (aOR)	95% CI
Place of Residence Urban =0 Rural =1	Rural	1.04	.77-1.40	.81	0.60-1.08	0.70	0.33- 1.65
Women's Education	No education (Ref)	1.00	—	1.00	—	—	—
	Primary	1.54	1.10-2.15	1.33	.95-1.87	1.67	0.83-3.30
	Secondary	1.85*	1.29-2.65	1.37	.95-1.99	2.46	1.03-5.87.
	Higher education	2.8**	1.60-4.56	1.17	.71-1.94	-	-
Mobile Phone Ownership No/Yes	Yes	1.19	.91-1.57	1.18	0.90-1.56	1.17	0.65-2.09
	No/Yes						
TV Use No /Yes	Yes	1.10	.80-1.52	.78	0.57-1.08	1.01	0.56-1.82
	No /Yes						
Radio Use No/ Yes	Yes	1.06	.52-2.16	.93	.47-1.83	0.87	0.18-4.08
	No/ Yes						
Internet Use No /Yes	Yes	2.01*	1.23-3.28	1.13	.72-1.78	3.74	0.47-29.61
	No /Yes						
Wealth Index	Poorest (Ref)	1.00	-	1.00	-	1.00	-
	Poorer	1.60	.97-2.63	1.81	1.15-2.87	1.95	1.03-3.69

	Middle	2.02*	1.20-3.41	2.47**	1.50-4.07	3.67**	1.62-8.27
	Richer	3.17**	1.77-5.66	4.23**	2.40-.743	-	-
	Richest	5.50**	2.81-10.74	7.14 **	3.69-13.8	-	-
Autonomy	Lowest Autonomy (Ref)	1.00	—	1.00	—	1.00	—
	Low Autonomy	.85	.56-1.30	.78	.51-1.17	0.52	.24–1.10
	Moderate autonomy	1.12	.71-1.72	1.04	.67–1.62	1.64	0.51–5.15
	High autonomy	.65	.43-.97	.59	.39-.87	1.34	0.52–3.38
	Highest autonomy	.79	.57-1.10	.85	.61–1.17	0.65	0.35–1.20
Patriarchy	Minimal Patriarchal belief (Ref)	1.00	—	1.00	—	1.00	—
	Lowest Patriarchal belief	.91	.55-1.51	1.13	0.67-1.90	0.78	0.29-2.07
	Low Patriarchal belief	1.30	.74-2.28	.72	0.42-1.24	0.64	0.25-1.60
	Moderate Patriarchal belief	.87	.48-1.57	1.11	0.62-1.99	0.69	0.27-1.72
Patriarchy	High Patriarchal belief	.98	.60-1.64	1.03	.63–1.69	0.74	0.33-1.63
	Highest Patriarchal belief	.62	.42-.92	.88	.60–1.28	1.73	0.81-3.66
Husband's Education	No education (Ref)	1.00	—	1.00	—	1.00	—

	Primary	1.01	.68-1.47	.89	0.61–1.29	2.28	1.10-4.72
	Secondary	1.35	.95-1.88	1.17	0.84–1.65	2.02	1.09-3.75
Age	18-22	1.00	—	1.00	—	1.00	—
	23-27	.75	.50-1.14	.74	.48-1.12	0.89	0.32-2.45
	28-32	1.07	.71-1.61	.68	.45-1.03	0.64	0.24-1.68
	33-37	.85	.54-1.32	.64	0.41–1.01	0.44	0.16-1.18
	38-42	.82	.47-1.42	.57	.33–.99	0.22*	0.080–.63
	43-49	1.10	.40–3.00	.80	0.30–2.15	0.12**	0.03-0.41

aOR = adjusted odds ratio

CI = confidence interval

Ref. = reference category

** = Significant at 95%CI*

*** = Significant at 99%*

If some estimates showed a wide range of interval and large odd ratio, this indicates an instability due to small sub group or sparse data.

We have reported the values with wide range of interval and large odd ratio in our analysis as it shows the no of respondent in that category was very small, or the cell for respondent in that category is equal to none.

The multivariate regression analysis was run on the data to check the association and significance of various variables. In the model reference categories were kept and referred as first class of variables as in (lowest education level, lowest wealth quantile, urban place of residence, youngest age group, minimal patriarchal belief) to estimate the adjusted odds ratios (aOR) and significance over 95% confidence intervals were kept. The multivariate regression model indicated that some of the variables that showed significant results might not have significant effect when we run analysis on socio economic and controlled variables. While against some dependent variable, mobile phone ownership and exposure to mass media showed significant effect with various control variable whereas some of them posits a non-significant relationship.

5.1 Place of Residence

Results indicated that women residing in rural places do have higher probability of completing full ante natal care visits. The data showed an odd ratio of 1.04 with significance over 95% Confidence interval of .77-1.40 which signified that in rural places there is 1.04 times higher odds of women for completing their ante natal care visits.

Analysis revealed that women in rural areas have 30% less chances to utilize ante natal care services, with the odds ratio of .70. Women in rural areas, have 19% less probability to initiate ANC within the first trimester compared to the women residing in urban areas with the odd ratio .81 with over significance 95% CI .60-1.08.

5.2 Education

Women`s education is found to be seen as an important predictor of ante natal care visits completion as the analysis showed that comparing to the women having no education. Women who have attained primary education have 1.54 times higher odds of completing their 4 ante natal visits with the odd ratio of 1.54 with significance over 95% CI ranging from 1.10-2.15. Women with secondary education have 1.85 times significantly higher chances to complete their 4 ante natal care visits with the odds ratio of 1.85 and confidence interval of 1.29-2.65. Analysis showed that it is a significant association between education and completing ante natal care visits. Comparing to the women with no education, women had highest education attained have 2.8 times significantly more probability to complete their ante natal care visits as recommended by WHO. This indicated a statistically significant positive association. Analysis showed with primary education have 1.67 times less chances to utilize ante natal care than women with no education. This indicates women`s education demonstrates a significant impact in up taking ante natal care services and complete ante natal visits. Women who attained secondary education or higher have 2.46 times high chances to utilize ante natal care services comparing to the uneducated women, with the odd ratio value of 1.03-5.87. About the last category in utilization of ANC is kept empty because, larger odd ratio has been observed in highest education category this indicates a sparse data, that would not have been meaningful for interpretation in the results. So the variable was recoded putting secondary and higher education in one single category. This was done because there were very few cases in higher education category.

About initiating the ante natal care on time, analysis showed a mixed effect.

Women who have completed the primary education have 1.33 times high probability to visit the ante natal care within their first trimester. Women with secondary education have 1.37 times greater odds of early initiation of ante natal care with the odd ratio of 1.37 with significance over 95% CI .95-1.99. Women who has highest education have 1.17 times more chances to initiate early Ante natal care visits comparing to the uneducated women.

5.3 Husband/Partner`s education

Analysis showed that women whose husband`s were educated demonstrated a positive association with using the ANC services, initiating the ante natal care on time and completing the ante natal visits as recommend by WHO. Husband/ partner who had primary education, their wives have 1.01 times higher probability to use ante natal care services as this category indicates the odd ratio of 1.01 with significance over 95% CI values ranging .68-1.47. Women whose husband who had attained secondary/ higher education, were 1.35 times more likely to complete the ANC visits. Analysis reported the that women whose husband have acquired education have shown a significantly positive relation with using ante natal care. Women whose husband have primary education have 2.28 times higher chance to utilize ante natal care with the odd ratio of 2.28. Husband who have secondary/ higher education, their wives had 2.02 times higher odds of utilizing ante natal care services.

Regarding visits of ante natal care on time, husband who had attained primary education, the wives had lower odds that is 11% less likely to initiate ante natal care within the first trimester. Those women whose husbands have attained secondary/ higher education are 1.17 times more likely to initiate their ante natal care within the

first trimester of pregnancy with the odd ratio of 1.17 with significance over 95%CI .48-1.12.

5.4 Wealth Index

Wealth index has demonstrated a statistically strong association with ante natal care utilization and completing full ante natal visits. Results signified as women who from wealthier background have higher chances to take their full ante natal visits. Contrastingly women from poor background have less odds for completing their ante natal visits or even utilizing ante natal care services. Women from poor category have 1.60% times higher probability to complete full ante natal care visits comparing to the poorest category with the odd ratio of 1.60. In the same way, women in Middle category of wealth index have 2.02 times significant higher odds to utilizing ante natal care services, with the odd ratio of 2.02, with significance over 95%CI values ranging from .97-2.63. Result indicated from the analysis, there is a significant association. Results shows that women from richer category of wealth indicates that there have 3.17 times significantly more chances to complete their full ante natal visits comparing to the women in poorest category. The results indicate that women from richest category of wealth are 5.50 times significantly more likely to complete their full visits by indicating odd ratio of 5.50. Wealth showed a statistically significant positive association with completion of ante natal care visits.

About the using of ante natal care services, women from poor income

backgrounds have greater odds of their ante natal utilization with the odd ratio of 1.95 which signifies women from poor category of wealth index have 1.95 times greater likelihood of utilizing ante natal care services. Comparing from the women in poor category, women in middle category have 3.67 times significantly higher likelihood of using the ante natal care services. Results indicates that women from lower economic background have less odds to utilize ante natal care services and complete visits compared to the women coming from wealthy background. Richer/ richest category of wealth index is kept empty because, larger odd ratio has been observed in second last and last, wealth category this indicates a sparse data, that would not have been meaningful for interpretation in the results. So the variable was recoded putting richer and richest in middle. This was done because there were very few cases in higher education category.

Results showed that women who from poorer category has 1.81 times higher odd of initiating their ante natal care visits after first three month of pregnancy comparing to the women in higher category. Women from middle category, have 2.47 times significantly higher odds of initiating their ante natal care after first trimester with the odds ratio of 2.47 with significance over 1.50-4.07. Comparing to the women in poorest category, women from richer background has significantly 4.23 times higher odds of early initiation of ante natal care that is within the first trimester. This indicates a significant positive association with early ante natal care visits.

5.5 Age

Analysis showed that women in age of is 23-27 years have 25% less chances to complete their ante natal care visits comparing to the reference category that is 18-22 years with the odd ratio of 0.75. Women who are in age range of 33-37 have 15 times lesser odds of completing their ante natal care visits comparing to the women in younger age. Results showed that women in age category of 38-42 are 18% less likely to complete their ante natal visits with the odd ratio of .82 with significance over 95% CI .47-1.42. Results demonstrates that women in older age are less likely to complete their ante natal care visits.

Women from 23-27 year has 11% less odds to use ante natal care services comparing to the women in younger age. Analysis indicates that women in age category of 28-32 have 36 % lower odds of completing their ante natal visits, showing the odd ratio of 0.64 with significance over 95% CI (0.24–1.68). Analysis shows that women in the age category of 33-37 have 56% less times likely chance to utilize ante natal care services. The analysis showed that women aged 38-42 years have odd ratio of 0.22 which demonstrates that these women are 78% significantly less likely to utilize ante natal care comparing to the women in younger age category that is 18-22 years.

Showing the odd ratio of 0.12 with significance over 95% CI (0.03–0.41, $p < 0.05$), women aged 43-49 years are 88% significantly less likely to up take ante natal care service comparing to the reference category. This indicates that women in older age have significantly less chances to take anti natal care services comparing to the

women in younger age.

Results showed that women in age category of 23-27 have 26 times less probability to initiate their ante natal care on time. Comparing to the females in younger age, women from 33-37 years have 32 times lower odds of initiating their ante natal visits in their first trimester with the odd ratio of .68 with significance over 95% .45-1.03. Women from 38-42 year are 43 times less likely to initiate their ante natal care services on time. Analysis showed there is positive association of age with early initiation of ante natal care services on time, as in women in older age are less likely to initiate their ANC on time.

5.6 Mobile phone ownership and Mass media

Variable related to mass media as T.V usage, use of internet, radio. Results indicates that women who use T.V i.e. watching or so have 1.10 times higher odds of completing full ante natal care visits showing the odds ratio of 1.10, with significance over 95% CI = .80-1.52, comparing to the women who do not use T.V. Mobile phone ownership of women showed 1.19 times higher likelihood of completing ante natal care visits. About radio, women who use radio were having 1.06% higher odds of completing full ante natal care visits with the odds ratio of 1.06. Results reported that Internet usage emerges as statistically significant predictor of ante natal care service utilization indicating the odd ratio of 2.01. It demonstrates that women who with internet usage have 2.01 times significantly more chances to complete their ante natal care visits compared to the women who do not use internet.

Analysis showed that women who owns mobile phone are 1.17 times more likely to utilize ante natal care comparing to the women with no mobile phone

ownership, signifying the value of 1.17 with significance over 95%CI ranging from .65-2.09. Women who use internet have 3.74 times more probability to use ante natal care services comparing to the women who do not use internet. Usage of internet have a very wide range of interval on ANC utilization, because there were very few no of cases in people up taking ante natal care services with using internet, which is why there is a wide range of interval. Results showed that women who use TV are 22 times less likely to initiate their ante natal visits on time with the odd ratio of .78.

Results indicated that women who owns mobile phone are 1.18 times more likely to initiate their ante natal visits on time with the odd ratio of 1.18. Women who use radio have 7 times lower odd of initiating their ante natal visits in their first three months of pregnancy. Women who use internet have 1.13% higher odds of initiating the ante natal care within the first trimester. Women who use TV have 22% lower odds of initiating their ante natal visits on time.

5.7 Autonomy

Variable related to autonomy explains about the power in decision making of women in the house hold and health care related stuff. The result of analysis for this variable has showed a mixed effect.

Women from lowest category of autonomy are taken as reference category to compare with. Results shows that women from the category of low autonomy has 15% less likelihood of completing full ante natal care visits with the odd ratio of .85, with significance over 95% CI = .56-1.30. Women with moderate autonomy have 1.12 times higher odd ratio of completing their ante natal visits. This demonstrates, women with decision making power have higher odds of completing

their ante natal care visits as recommend by World Health Organization.

Results indicate that women in low autonomy category have 48% less likelihood of using the ante natal care services. Analysis showed that women with moderate autonomy has 1.64 times higher odds for utilization of ante natal care services comparing to the women with lowest autonomy signifying the odd ratio of 1.64. Women with high autonomy signifies the odd ratio of 1.34, indicating that women with high autonomy have 1.34 times more chances to use ante natal care services comparing to the women with no autonomy.

Autonomy depicts a mixed effect with respect to initiating ante natal care on time. Results showed that women with low autonomy have 22% lower odds of initiating their ante natal care within the first trimester with the odd ratio of .78. Analysis shows that women with moderate autonomy has 1.04 times more probability to initiate their ante natal care visits on time. Women who hold highest autonomy have 15 % less likelihood to initiate their ante natal care visits in their first three months of pregnancy with significance

5.8 Patriarchal beliefs

Patriarchal belief was measure by variable that consisted of items included justifying beating behavior of husband over domestic stuff. Analysis demonstrate that women with low patriarchal beliefs has higher odds of completing their ante natal care visits with the odd ratio value showing 1.30, which demonstrates that women with low patriarchal belief have 1.30 times more chances to complete their full ante natal visits. Results indicates that women who have moderate patriarchal belief are 13% less likely to complete their ante natal care visits with the odd ratio of .87 with

significance over 95% Confidence Interval ranging from .48-1.57. Analysis shows that women with highest patriarchal belief have 38% less likelihood of completing their ante natal care visits comparing to the women with minimal patriarchal belief.

Analysis showed that women who hold moderate patriarchal belief have 31% less chance to utilize ante natal care services. Results indicate that women who have high patriarchal belief have 26% less chance to utilize ante natal care services comparing to the women holding minimal patriarchal belief, having the odd ratio of .74 with significance over 95% CI .33-1.63.

Results showed that women who hold lowest patriarchal belief are 1.13 times more likely to initiate their ante natal visits on time with the odd ratio of 1.13 with significance over 95% CI .67-1.90. Women with moderate patriarchal belief have 1.11 % higher odds of initiating their ante natal visits in their first three month of expecting comparing to the women who hold minimal patriarchal belief. Analysis showed that women who hold highest patriarchal belief have 12% less chances to visit ante natal care on time. The results indicate that comparing the women who have minimal patriarchal beliefs have more likely greater odds of utilizing ante natal care services, initiating the ante natal care on time and completing the ante natal visits comparing to the women hold high patriarchal beliefs.

CHAPTER 6 DISCUSSION & CONCLUSION

6.1 Discussion

This study aims to provide a sociological analysis of mobile phone ownership, exposure to mass media and using of ante natal care among women in Punjab, Pakistan. In addition to this, mass media was also seen if it does impact using of ante natal care or not among expectant women. The research study was done using secondary data from Pakistan Demographic Health survey PDHS 2017-18. This study presumed some hypothesis by reviewing the literature that are listed below; as **H1** quoting women with mobile phones ownership have more chances to seek ante natal care services compared to the women with no mobile phone. **H2** says women who have exposure to mass media will have high probability to utilize ante natal care comparing to the women having less or no exposure. **H3**, if a woman has higher socio-economic status (education and wealth index) than she will be having higher chances to use ante natal care services and **H4** quoted as women who reside in urban areas are more likely to access mobile phone and seek ante natal care utilization comparing to the women residing in rural areas.

The results of multivariate logistic regression demonstrated some variable as significant determinant of using ante natal care, full visits of ante natal and on time. Wealth and Education has seen to be a significant predictor of ante natal care utilization. According to a study by (Mumtaz et al., 2012) women who have attained primary education, are 5 times more likely to take birth from skill birth attendance comparing to the women having no formal education. Education do improve the chances of seeking

improved maternal care and be more aware about your reproductive choices (Qadri et al., 2019). In the same way, as mentioned in the literature review - digital inclusion is also closely related to literacy, as in women who are educated are able and more aware of how to use mobile phone or internet to seek information about the maternal health.

It is consistent with the previous researches that with education women are more empowered to make informed choice and get to play a part in the decision making thus enabling them to complete their ante natal visits and make better choices regarding their reproductive health. Research evidence shows that a study conducted by Qadri et al. (2019), reported that literate women were prone toward seeking ante natal care utilization. Similarly, a research study conducted in Ethiopia by Muluwas Amentie et al. (2015) reported that the between the women who attended secondary school and women who haven't gone through any formal schooling there were 7.6 time higher odds of utilizing Ante Natal care in literate women.

The results of multi variate regression model indicates wealth as one of the significant predictor of ANC utilization and showed a positive association between these variables. Results showed a clear gradient that women from richest category of wealth to take care of their ante natal visits, not only about the utilization of ante natal care but those women have higher odds to initiate their ante natal care on time and completing their ante natal visits as recommend by World Health Organization. This indicates that financial capacity plays a significant role in this regard as women who belong to good economic background will be able to take care of their health better than women coming for poor wealth category. Evidence from a study suggested that wealthier mother have more chances of attending ante-natal visits and uptake ante natal

care services as household wealth is found positively associated with ante natal care utilization as reported by (Arthur, 2012). By the study, we have conducted, money is seen as barrier to seek ante natal care as this argument supported by previous literature, suggested a women quoted in her interview that *“There are many problems; sometimes we have money sometimes we don’t. [...] If husband is home he will take us otherwise we stay at home.”* (Qureshi et al., 2016).

As discussed in literature quoted by Nie et al. (2016) that women who belonged to higher socio-economic backgrounds were more likely to access a mobile phone characterized by better education, income and living standard. Referring to the demographic characteristics, age showed a significance though but the tilt was toward negative association with higher age category. Women in higher age reported very less uptake of ante natal care services or completing ante natal visits on time. This can be seen as women in older age, coming from experiences of giving birth or relying on their experience of previous child births. Husband`s education is seen as somehow as an important factor pressing a little significance over the utilization of ante natal care. It is found from the study that women whose husband was educated were more likely to utilize ante natal care services. This also reflects since in patriarchal society like Pakistan, where most of the major household decision are in the male counterpart/partner`s hand, so men with education would make decision about whether their women will take antenatal care services or not. Finding from a research study quoted as *“The majority of the respondents agreed that the principal decision-maker for health care is the husband: “Obviously my husband decides” [mother]. Some men preferred Traditional birth attendants when their wives accessed services, because they believed that TBAs were readily available to deliver care at home at a decreased cost. These preferences influenced*

women's care seeking due to the influential role of the husband." (Qureshi et al., 2016).

Women's autonomy and patriarchal beliefs posited a slightly mixed but important pattern. Finding revealed that women with higher autonomy are associated with ante natal care utilization. This implies that empowerment do facilitates the ante natal care access. A research study stated that in rural Sindh, women are allowed to go to the health care centers with the permission of a male family member or elderly female in the house (Qureshi et al., 2016). Though finding suggest that patriarchal beliefs shows a borderline significance with ante natal care but result reported that women with higher patriarchal belief will play a role in reducing the chances of using the ante natal care.

Results reported that women who owned a mobile phone were seen to have higher odds of taking ante natal care visits, but here mobile phone ownership alone didn't signify the independence of women's decision making. Ownership of mobile phone may seem neutral on the surface but its usage is deeply influenced and even restricted by cultural and societal norms (Rowntree et al., 2020). Owning the mobile phone only does not imply that they have the independence to use it and use it for health care related purposes using internet. It also employs that not all the women who reported owning mobile phone, we cannot really determine if they were smart phone user or feature phone users. As reported in a study conducted in Bangladesh Kibria et al. (2023), quoted by BDHS (Bangladesh Demographic Health Survey - 2014) that women who are mobile phone user had higher proportion of their 4 ante natal visits completed with the ratio of 43.3% and 57.0% among mobile phone users, compared to non-users signifying values of 26.4% and 31.2%. From this study we can

analyze by the results that the usage of mobile phones, the likelihood of up taking ante natal care services increases and hence expecting women can seek information about their health and various updates by using mobile phone. Bangal et al. (2017) in their article stated that their results reported that women from the category of mobile phone ownership had significantly higher number of antenatal visits comparing to the category of control group (in this study, control group is referred as those women who did not have mobile phones).

The study also found that mass media usage especially TV significantly play a role in improving the attendance of ante natal care visits. Internet usage have been reported as significant determinant of high ante natal visits. internet usage has been found out as significant determinant of Ante natal care utilization and completion of ante natal visits on time. Results reported that women who were actively engage in using internet, have higher likelihood of completing adequate ante natal visits to health care providers. As discussed by a study conducted in India about how affordable internet promote Maternal Care Health services, the findings revealed that internet usage is significantly and positively linked with ante natal care, post-natal care and services regarding institutional delivery (Krishnatri & Vellakkal, 2024). Prior evidence from the literature suggests internet access can increase the use of ANC services. A very recent and similar study was conducted in Togo, reported that internet usage was found as a strong determinant in ante natal care utilization as well as post-natal care services as well (Kandjoni et al., 2026). By the multi regression model analysis, mass media showed a very positive significant association with ante natal care collectively.

6.2 Ethics:

This study has used publicly available secondary data from PDHS, which is ethically approved by relevant national and international bodies. The PDHS data set is fully anonymized, so no names, addresses, or any identifying details of the respondent are accessible to the researcher, thus ensuring the confidentiality and anonymity of the participants are protected. All the information and data that is collected was treated as confidential and strictly be used only for the research purpose. All sources have been cited properly, and acknowledgment have been given to the original data producers.

6.3 Ethical Approval:

Ethical approval for this study was not required as this research involved secondary analysis and PDHS data was publically available. So the data set was access directly from the DHS repository.

6.4 Limitations:

This research study is based on quantitative secondary data analysis and thus was not be able to explore in depth the experiences of women experiencing cultural restraints, their experiences. Focusing only on Punjab will potentially limit the generalizability of findings and therefore cannot extend the findings to the other provinces of Pakistan. The cross-sectional design precludes casual inferences. Few variables in multi variate regression model, signify large odd ratios and wide confidence interval, due to which it might impact the significance of some variables.

6.5 Conclusion

This study explored the ante natal care utilization and the impact of digital access, media exposure in ante natal care seeking behavior. Wealth index and education of women emerged as influential determinant for the ante natal care utilization and complete and on time visits of ante natal care. Place of residence is found as somewhat contributing to the ante care utilization, completion of ANC visits and Early ante natal care. Husband`s education and women`s autonomy is found as having a borderline positive association with improved ante natal care utilization, completion of ante natal visits. Finding concluded as use of internet is significantly associated with all three dependent variables. Whereas mass media exposure as, T.V usage and mobile phone ownership has a significant association but was not found as independently improving ante natal care utilization once the variables are controlled. Over all the findings suggest that access to digital support can significantly support and improve the use of ante natal care services.

6.6 Recommendation and Implication

The finding suggests that many gap are there in accessing ante natal care that are related to wealth, education and awareness. These finding suggest TV usage and Internet usage is seen as significant predictor, so therefore policy intervention should not only focus on enhancing digital access but also improving health and digital literacy among women from unprivileged background. Public health strategies can integrate awareness program, campaigns or advertisement related to the importance of utilizing ante natal care, completion of ANC visits and initiation of ante natal care within the first trimester.

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