IMPACT OF FAMILY COMPOSITION ON UNMET NEED FOR FAMILY PLANNING

Submitted by

Rubab Saleem

Registration No. PIDE2018FMPHILHE07

Supervised by

Dr.Rizwan-ul-Haq

Assistant professor at PIDE

Co-supervisor

Dr.Suad Ahmad Khan

Assistant professor at PIDE

PIDE SCHOOL OF Economics

Pakistan Institute of Development Economics Islamabad
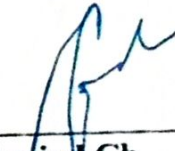
Year 2022

Pakistan Institute of Development Economics

CERTIFICATE

This is to certify that this thesis entitled: **"Impact of family composition on unmet need for family planning"** submitted by **Ms. Rubab Saleem** is accepted in its present form by the PIDE School of Economics, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree of **Master of Philosophy in Health Economics.**

External Examiner:

Dr. Amjad Ch.
Associate Professor
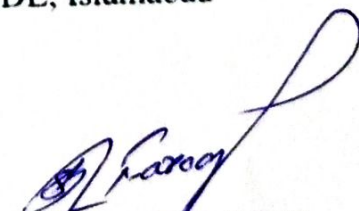Health Services Academy
Islamabad.

Supervisor:

Dr. Rizwan ul Haq
Assistant Professor
PIDE, Islamabad

Co-Supervisor:

Dr. Saud Ahmed Khan
Assistant Professor
PIDE, Islamabad

Head, PIDE School of Economics:

Dr. Shujaat Farooq
Assistant Professor/Head
PIDE School of Economics
PIDE, Islamabad

Declaration

I hereby solemnly declare that this thesis entitled " *impact of family composition on unmet need for family planning*", submitted by me for the partial fulfillment of Master of Philosophy in Health Economics, is my original work and has not been submitted concurrently or latterly to this or any other university for any other degree.

Date. 12-03-2022   Signature.

Acknowledgement

Allah never spoils any effort. Every piece of work is rewarded according to the devotion for it. All praise for Almighty Allah, the cherisher and sustainer of the world and all respect for Allah's Apostle (Peace be upon Him).My sincere gratitude to Almighty Allah, who made me able to do this work. I would like to thank my

Supervisor Dr. Rizwan-ul-haq, for his inspiring guidance, valuable suggestions, constructive criticism and sympathetic attitude during course work as well as research work. Dr. Rizwan is one of the professors who truly made a difference in my life. It was through his persistence, understanding and kindness that I completed my graduate level degree.

I also would like to thank my co-supervisor Dr. Saud Ahmad Khan for his consistent support, availability and encouraging suggestions, which were determinant for the accomplishment of the work presented in the thesis.

I would like to thank my friend Farah Nagar Kanwal for her guidance and her valuable suggestions throughout the research work.

 I reserved my special thanks to my family members especially my brother Mazher Fareed Taj and to my close friends, I expressed my gratitude, especially, Mehwish Kanwal Somoyo, Saif-ul-haq and Sadaf Masoom for their unconditional friendship, constant encouragement, endless prayers and continuous moral support throughout these years.

Rubab Saleem

Abstract

Family planning has become one of the fundamental pillars of development in recent years and as that is extremely important for ensuring decent life, which encompasses a number of things like welfare of the women, prosperous society, and well-being of the population anywhere across the globe. In developing countries like Pakistan, the unmet need for family planning methods is a major concern that affects development. The main objectives of the study are to investigate the socio-economic determinants, which keeps them from exercising that fundamental right, and explore the characteristics of the women leading them to the Unmet-need for Spacing & Limiting. This study uses the latest cross-sectional data (PDHS) 2017-18. One important feature of this study is obviously a value addition, which you may call added-value study, is the usage of Hackman Model. In the analysis we have applied the Multinomial Hackman Probit Model that can estimate the two probit equations simultaneously: One for socio-economic determinants and the second for characteristics of the women. The results suggested that the socio-economic determinants play a strong role in the characteristics of the women. The results of the multinomial Hackman probit model are more significant than normal multinomial probit models. Family planning initiatives should not solely or exclusively focus birth -controls or childbearing issues, it must also include Child rearing or bringing up issues within its mandate, as this would help curb the social evils like child abuse and underage child marriages. The child-bearing and child-rearing are two components that must walk in tandem under the umbrella of family planning initiatives in our country.

Key words: women Characteristics, SDG's, Hackman model,

TABLE OF CONTENTS

List of Abbreviations

UMN   Unmet need

UNFPA   Unmet need for family planning

UN   United Nations

UNFPA   United Nations Population Fund

W.H.O   World Health Organization

MDG   Millennium Development Goals

SDGS   Sustainable Development Goals

FP   Family Planning

TFR   Total Fertility Rate

PDHS   Pakistan Demographic and Health Survey

PR   Probit Regression

MNR   Multinomial Regression

CPR   Contraceptive Prevalence Rate

HSM   Heckman Selection Model

OLS   Ordinary Least squares

List of tables:

Chapter 1

1.1 Introduction:

According to the United Nations Population Fund (UNFPA), the percentage of women who are in reproductive age or married or in union failing to avail the facilities for family planning is facing the unmet need.

In other words, the unmet need is the unavailability of family planning services for the adult women in terms of the percentage of women being in reproductive age and married or in union.

It means the women with unmet need describes the category of women who being fecund or with sound reproductive capabilities could not use the contraceptive techniques to restrict their child-bearing burden (PDHS 201718 & UNFPA 2019 (Solanke, Oyinlola, Oyeleye, & Ilesanmi, 2019, Sedgh et al., 2016). So, family planning is the central need of generative health policies and research, especially in lower and middle income countries (Wulifan, Brenner, Jahn, & De Allegri, 2015).

The fundamental focus of family planning programs are women, as they are the most affected segment of the society. It also has an impact on individual, interpersonal and familial relations as well as for giving healthy births and babies. Women with unmet need raises the risk of under-five-year child mortality. The unmet need is usually the result of social, socioe-conomic and other proximate intervening factors which forbid women from taking benefits of the family planning services/initiatives (Getaneh, Negesse, Dessie, Desta, & Agazhe, 2021).

Population growth rate is also one of the important things in this context, especially in high population countries where high birth-rate burdens a society and acts as one of the impediments in development. The high growth-rate issue has been under focus for over the last half century. High population growth-rate impacts the development of the country significantly. The researchers have come up with an argument that there is a link between the decline of birth-

rate and economic growth of a country. Evidence from education, manufacturing and several other fields suggests that the link between increase in different human development indices and structural development of a country points to reduction in fertility rate (Khumayah, Siswoyo, & Vol, 2019).

According to some studies carried out globally, around 225 million women in 2014 had unmet need for contraceptive interventions during the years from 2005 to 2011. Around 45 percent of them were in Asia, North Africa, Eastern Europe and Central Asian States (like Albania, Armenia, Moldova, Ukraine and Azerbaijan) and the figures pertaining to Central Africa appeared incredibly high — 80 percent — during the same period, the studies suggested. They are mostly from the developing world. In Peru, the unmet need of women for family planning in 2008 accounted for 36 percent, in Guyana 31 percent in 2009, Pakistan 21 percent in 2012, Tanzania 32 percent in 2010, 31 percent in Ethiopia in year of 2011, Indonesia 17 percent in 2007, Bangladesh 25 percent in 2007, India 22 percent in 2006 and Nepal 37 percent in 2011 (Sedgh, Bearak, et al., 2016).

The above stated estimates suggest that a robust kind of family planning across the world needs to be designed as an intervention to ensure personal well-being of such vulnerable women as well as positively impact the economic development of these countries, mostly from the developing world (Sedgh, Ashford, & Hussain, 2016).

Despite being an important component of Pakistan's development planning, the family planning program, initiated in 1960 in the country, has been an intervention of modest progress, according to the Pakistan Demographic and Health Survey (PDHS). The ever married women of the reproductive age that require family planning intervention is estimated to be approximately 55.5 percent as they either want to exercise the decision of stopping child bearing or seeking a gap in child bearing. The figures that have access to and have chosen to

use contraceptive interventions accounts for 35.4 percent. Pakistan, despite having pledged in London Summit of Family Planning to eliminate the differential gap between the figures through different strategies aiming at increasing the Contraceptive Prevalence Rate (CPR) from 35.4 percent to 55 percent—later revised to be the 50 percent, by 2020— still appears far from the figures to target the unmet need of women in the country, which is evident from the latest findings of the PDHS 2017-18). According to PDHS, the following picture, emerging from the recent figures, shows poor performance of the country in meeting the unmet need of women and figures reflect that demand for family planning of the reproductive age women decreased in 2012-2013 by 4 percent, bringing it down from 55 percent to 51.4 percent, and the unmet need for family planning in the same years came down by 2.8 percent in points, from 20.1 percent to 17.3 percent. This has resulted from the decline in CPR and reduction in the family planning demand, as is evident from the fact that CPR fell down by 1.2 percent, from 35.4 percent in 2012-2013 to 34.2 percent in 2017-18 (PDHS).

The Sustainable Development Goals (SDGs), evolved out of eight Millennium Development Goals (MDGs) in 2015 against particular 17 targets, like financial imbalance, climate degradation, issues related to peace and human development etc, are closely interlinked as beneath the surface success in one goal impacts positively and helps progress in other targets too (Dockalova, Lau, Barclay, & Marshall, 2016). The SDG#3, for example, focuses well-being and development of the populace and SDG#5 tends to eliminate gender discrimination. The target 3.1 seeks to bring down the global maternal mortality ratio to less than 70 per 100,000 live births by the year of 2030.

According to target 3.7 of the SDGs, the state policies and programs of healthcare need to be designed in an integrated form to ensure universal access to sexual and reproductive healthcare services through family planning, information and education and target 5.6 calls upon the world to ensures universal access to sexual and reproductive health and reproductive rights, as

promised in the Program of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcomes resulting from their reviews (Dockalova et al., 2016).

Though the model adopted to achieve the SDGs has been under fire on various accounts as discrepancies in the development model could lead to failure of the ambitious world targets, which sometimes cut across one another, but the urgency and the dire need the world requires at the moment to ensure human well-being across the globe (Noreen, Khan, Khan, Khan, & Khalid, 2018).

Family planning could play a fundamental role in this context as decent life and prosperous society and development across the globe are inextricably interwoven and one could not be imagined in jettison from the other. World development is as organic as the global human society. No human well-being takes place in a country or society where child death-rate or maternal mortality is high. The connotations of the words of decent life, decent work and decent life appear insane in the presence of a high maternal death-rate and other issues related to mother and child health (T. S. Ali et al., 2020).

Quick human development models, which usually are designed to achieve certain goals through different short-cuts or in isolation from the world to paint a rosy picture of the individual countries, have failed to achieve the sustainability of such goals. The one reason, amid others, for this failure is that family planning, reproductive and maternal healthcare have not been an integral part of such population development models. This has compelled a number of countries to drift away from such development models and integrate family planning component within their different development models, strategies or interventions and avoid unplanned maternity (Whidden et al., 2021)

Being one of the poorest and sixth most populous nations in the world, Pakistan, along with other developing nations, contributes to 50% of the world maternal mortality rate. If Pakistan continues to have the present population growth rate, which is 2.1 percent, the country's population will double by 2050 (Abbasi, Shaikh, & Memon, 2020).

Family planning initiatives accrue the well-being of the population and women welfare and incrementally contributes to the overall development of a country. These services not only help reduce the number of unwanted pregnancies, immature births and maternal mortality rate, rather strengthen different health intervention programs and contribute to improving the child and maternal well-being (Asif & Pervaiz, 2019).

1.2 Background:

In a conference, held in 2012 in Brazil under the United Nations on SDGs, all the UN member states agreed to the document **"the future we demand"**, whereby the process of developing the SDGs was initiated. The global community pledged in that conference to revisit "sexual and reproductive health", strengthening the family practices interventions and raising the awareness regarding reproductive rights of all individuals and came up with a robust agenda for that purpose (Chandra-Mouli et al., 2015).

But Pakistan, at present, appears in mid-transition phase and unwanted pregnancies rate is still high and one of the reasons for that continuing trend is that sexual orientation and living-cum-social standards of the people have not changed so far. Women are still unlikely to exercise their reproductive rights. Though it is widely expected that with increase in education, financial transformation and legislative changes may support and help women achieve greater gender balance and help spousal tendencies to alter the current trend and reduce the rate of unwanted pregnancies to ensure women to exercise their reproductive rights. This does not mean that Pakistan's cultural and financial structural control would be wrested from the hands of males,

but it is believed that women's reproductive rights would be respected and that could be a good indicator (S. Bashir & K. J. S. i. F. P. Guzzo, 2021).

The FP2020 activity was a managed result of the London Summit on Family Arranging in 2012 (United Countries Establishment, 2015). At the summit, a few nations came together to discuss women and girls' reproductive health, sexual rights and well-being, relevant administrations of reproductive rights and well-being by 2030, in line with the objective of SDGs #3 and #5. More than twenty countries at that point secured a commitment to address financing, approach to address, benefit arrangement and sociocultural boundaries that women and young girls confront when utilizing and/or getting access to the contraceptive information, items and administrations. This number has since risen to 36 nations in consequent FP2020 gatherings (Brown et al., 2014; B. Dockalova, K. Lau, H. Barclay, & A. J. T. I. P. P. F. U. K. Marshall, 2016b). The main objective of FP2020 is to "expand family composing data, services and supplies to an extra 120 million women and younger age groups in 69 of the world's poorest nations by 2020" (Brown et al., 2014).

1.3 Rationale of the study:

You may find a number of studies in Pakistan related to the unmet need for family planning. In Asia there are several countries where the unmet need of women has declined with increase in use of contraceptives but the situation in Pakistan appears to be not very sanguine where the rate of contraceptive use is decreasing and the unmet need for family planning is increasing as a consequence. In Pakistan, the total demand for family planning is 52 percent, while 34 percent are using contraceptives in according to PDHS data 2012-13, while the use of contraceptives was 36 percent, hence, the unmet need for family-planning stands around 17 percent according to PDHS data of in 2017-18, which was 20 percent in 2012-13. The main contribution of this study is the use of the Heckman Sample selection model in women's health area. Hackman

model in this context helps establish relationships between the determinants of the unmet need and characteristics of the women respondents, which ultimately serves to separate their choices for spacing and limiting, according to their preference. This is the hallmark of this study that makes it unique, significant and different from other studies.

1.4 Objectives:
The proposed study aims to investigate;

1. Identify the determinants of unmet need for family planning.

2. Explore the socio-demographic characteristics of women which lead to unmet need for Spacing & Limiting.

1.5 Research Questions:
1. What are the determinants of unmet need for family planning?

2. What are the socio-demographic characteristics of the women which lead to unmet need for Limiting & Spacing?

1.6 Organization of the study:
This study is based on 6 chapters. The first chapter is an introduction that provides the nature of the idea and background, research questions, research objectives and rationale of the study. The second chapter is based on previous studies, known as literature review and research gap. The third chapter provides the proposed methodology set to arrive at the objective of the study. It also explains the definition of the variables; how the operationalization of the variables is achieved in the study along with their conceptual framework. In the fourth chapter, data, descriptive analysis and results of the regression, model explanations are presented. The fifth chapter provides the depth of the discussion which is based on previous studies. The last chapter is six chapters and provides the conclusion of the study and also presents the recommendations and limitations of the study.

Chapter 2

Literature Review

Literature can help us understand the different factors which are associated with the unmet need but here the first and most important thing is to understand the concept of the unmet need with trends and patterns across the world. The increase in population has now become a global threat, having some alarming outcomes for the near future, which in developing countries usually generates fear of "Population Explosion" (Potter & Mundigo, 2005). So, there is a need and urgency for the effective use of contraceptive methods and devising a better delivery system to help control the birth-rate and reduce the family size.

2.1 Theoretical foundation:

The unmet need for family planning means that women face barriers in contraception use, which could be personal, socio-economic, demographic or related to the partner. It means the concept of unmet need for spacing is different & unmet need limiting is different. So in this sense the women who are not using contraception and want space in their births are different and who want to limit their births and not use contraception are totally different. From a methodological point of view, there are two types of women (spacing and limiting) and their characteristics may vary from each other. Before the study we suppose that they may be facing barriers that's why not using contraception (Coale & Rives, 1973, (Bengtsson & Dribe).

The three preconditions contraception barriers are; readiness, willingness & ability. These three conditions support barriers of contraception use for spacing as well as limiting. Readiness totally refers to the need to postpone the next birth (spacing) & cease childbearing which is limiting. Willingness is towards the attitude of the contraception use or use of any specific

contraception method. Ability refers to the family planning methods, knowledge of contraceptive methods, services provision related to family planning, access to health care and exposure to the media. Readiness, willingness & ability are the preconditions of contraception use.

2.2 Relationship between fertility, contraceptive prevalence and unmet need in Pakistan:

The trends in fertility and in contraceptive prevalence rates in Pakistan between 1990-91 and 2017-18. The earlier trends— between 1990 and 2006— appeared unexceptional: a fairly substantial decline in fertility was matched by a substantial rise in contraceptive prevalence. Indeed, if Bongaarts' (2014) relationship, based on multi-country results is applied: that a 10 per cent increase in CPR is associated with a decline of 0.53 in the total fertility rate (TFR), then in Pakistan between 1991 and 2012-13, a 22 percentage point increase in contraceptive prevalence rate (CPR) should have brought TFR down by about 1.2 — which is almost exactly what happened. The TFR fell from 4.9 to 3.8 over that period. Then from 2006-07 to 2012-13, fertility continued to decline slowly, and contraceptive prevalence increased slowly. Again, the trend is unexceptional. But between 2012-13 and 2017-18, fertility declined slowly but prevalence of contraception —and of modern contraception — also declined slightly. This is a trend that is harder to explain.

Could the "elephant in the room" be induced abortion? When both the fertility rate and contraceptive prevalence rate are declining, as was the case in Pakistan between 2012-13 and 2017-18, it is very likely that induced abortion was playing a role. The PDHS unfortunately does not provide us with clear evidence about the prevalence of induced abortion. PDHS shows that in the five years prior to the survey, there was a pregnancy loss of 17 per cent, of which stillbirths were 2 per cent and miscarriage 13 per cent. Induced abortion was reported as only 1.7 per cent. This is not very different from the proportions of pregnancy loss reported in the

2012-13 PDHS (pregnancy loss 16.5 per cent, induced abortions 1.7 per cent) though total pregnancy loss was lower in the 2006-07 PDHS (12.4 per cent).

It is highly likely that a proportion of reported miscarriages were actually induced abortions. But even if all reported miscarriages were actually induced abortions, of the roughly 5.8 million births in 2017, 850,000 would be induced abortions, according to the figures of pregnancy loss in the 2017-18 PDHS. This is far below the figure of 2.2 million abortions in 2012 estimated in an earlier study (Sathar et al., 2014: 485). However, we cannot be certain that all pregnancies were reported in the pregnancy histories collected in the PDHS. It seems likely that a proportion of the pregnancies resulting in induced abortion were not reported at all. Therefore, the real uncertainty remains about the likely number of induced abortions in Pakistan.

The stalling of the rise in contraceptive prevalence between 2012-13 and 2017-18 certainly leads to a suspicion that induced abortion was playing a part in the continuing decline — albeit slow — in fertility. But getting a good fix on trends in induced abortion is impossible. Whatever its prevalence, however, abortion is a most undesirable alternative to effective contraception.

The trends in fertility and contraceptive prevalence need to be examined at the province level, and this is done in Table 3. This table focuses on the period since 2006-07, because in the period 1990-91 to 2006-07, there was nothing surprising to explain; for each province, fertility declined fairly sharply and contraceptive prevalence rose quite strongly. However, after 2006-07, trends changed.

Examining the Pakistan national figures first, between 2006-07 and 2012-13, fertility declined and contraceptive prevalence rose. There is nothing to explain there. At the provincial level, the trends were also not surprising, except in Punjab and Balochistan, the decline in total fertility rate was only slight despite a fairly substantial rise in contraceptive prevalence.

However, between 2012-13 and 2017-18, there is more to explain. At the national level, fertility declined slightly and contraceptive prevalence also.

2.3 Unmet need & contraception use in world:
Demand and Unmet Need for Means of Family Limitation in case of Rwanda. This study uses the data for the period of 2005, binary logistic regression was used to identify factors associated with desiring to stop childbearing and having unmet need. The results revealed that Unmet need was higher among women who did not approve of family planning, those who believed their partner did not approve of family planning or who did not know his attitude, and those who had never discussed family planning with their partner or had done so only once or twice (Ndaruhutse, Broekhuis, Hooimeijer, & health, 2009).

There is another important study about contraceptive use intentions and unmet need for family planning among reproductive aged women in the Upper East Region of Ghana. There were some women who used contraceptives for birth spacing while others adopted (Asif & Pervaiz, 2019) contraception for stopping child-bearing. Results showed that there is a latent demand for family planning and therefore if family planning programs are appropriately implemented, they can yield the desired impact. The study suggested policy-makers to promote contraceptive utilization among women in Ghana (Bawah et al., 2019).

There is another study about the contraceptive use and unmet need for family planning among married women with at least one child in rural Uttar Pradesh and it also contextualizes the role of wealth and gender composition of children. This study used primary data from 460 respondents in the rural areas of the Rae Bareli district of Uttar Pradesh from (September 2016 to February 2017). They used different techniques for determinants of the outcome variable, the different techniques are descriptive statistics, a concentration curve and index for inequality, and multivariate techniques are used to examine the association between predictor and outcome variable. The results of the study explains the strong and significant implications

of predictors on the unmet need for family planning. The study also explains that there is a need to remove the gender imbalance from society and there is also a need to remove the socio-economic inequalities (Chauhan & Nagarajan, 2019).

There is an important factor of contraceptive utilization is social context. The social context of adolescent women's use of modern contraceptives in Zimbabwe. Data from the year of 2010/11 Zimbabwe Demographic Health Survey (ZDHS), supplemented by additional data from the Measure DHS consultants were used. The univariate, bivariate and multilevel binary logistic regression analysis was performed using generalized linear mixed models (GLMM). The result shows that reproductive program interventions aimed at increasing adolescent contraceptive use should take into account both individual and community factors (Ngome & Odimegwu, 2014).

2.4 Determinants of unmet need for family planning:
Determinants play a crucial role in family planning services utilization. The multi-level determinants of modern contraceptive use among reproductive-age women living in six cities of Nigeria during 2010-2011. Result illustrates that individual level factors were found to have a positive association with modern contraceptives while perception of negative attitudes from community members about contraceptive use was negatively associated with modern contraceptive use (Okigbo et al., 2018). The community level practically and analyzed the unmet need for family planning remains high in Bangladesh and a community level analysis has been done. The study is used to examine the association between individual, household and community level covariates with the level of the unmet need for family planning in Bangladesh. The results showed that unmet needs for family planning has multiple advantages for both the individual and society. The study suggested it is necessary for the governments to come up with strategies, which can reduce unmet needs (Pradhan & Dwivedi, 2015). This study checked out different determinants of the unmet need for family planning in rural Burkina Faso. A

multilevel logistic regression analysis used to assess the association between unmet need for family planning and a selection of relevant demand-and supply-side factors. The study was conducted in 24 rural districts between October 2013 and March 2014. The results showed that there is a need to strengthen the system for contraception use, hence the unmet need for family planning can be decreased (Wulifan et al., 2017).

There are also family related determinants that are strongly associated with family planning methods utilization. The determinants of unmet need for family planning among women in urban Cameroon. The results suggest that prevalence of unmet need for family planning among women in the Biyem-Assi Health District remains high. Husband's approval of contraception and couples' discussion about family planning are two major factors to be considered when planning interventions to reduce unmet need for family planning. Family planning activities focused on couples or including men could be useful in reducing the rate of unmet need in Cameroon (Ajong et al., 2015).

A study, "Pakistan's contraception rate plateau" (a graduation study thesis at the University of Florida), finds out the main reasons for discontinuities of family planning methods and contraception utilization. A multi-level analysis is used to understand association interplay between community's contextual factors and modern contraception use. Pakistan has a low rate of contraception use, high rate of contraceptive discontinuation, high unmet need and high rate of unwanted fertility, according to the study. The discussion in the study moved from a focus on individual level factors, that impact contraceptives us, to community-level factors. This study bridges the gap by providing evidence for existing programs and policies, strengthening the call for more community-based initiatives and helping understand individual behavior as it relates to the community in which the person resides (Pasha, 2016).

In another study about family planning knowledge, attitudes, and practices among married men and women in rural areas of Pakistan, it is concluded that the need for qualified female

healthcare providers, especially for long-term family planning services at health facilities instead of camps, is arranged occasionally. Addressing issues around access, affordability, availability, and sociocultural barriers about modern contraception as well as involving men helps meet the needs and ensure that the women and couples fulfill their child-bearing and reproductive health goals (Mustafa et al., 2015).

In a study about determinants associated with the unmet need for family planning in Pakistan, it is traced out that determinants are associated with unmet need such as social and cultural constraints, geographical factors, economical and physical access to the health care facilities, gender biases, girl's education, women position in society, and limited access to the family planning services, and other factors related to larger society need to be explored. The study suggested that there is a need to make a more receptive and gender-sensitive health care system (Punjani, 2018).

The "Determinants of Unmet Need for Family Planning in Pakistan" concluded that the fear of side-effects for using contraceptives is identified as one of the major causes behind this thing despite the Government of Pakistan's efforts to convince the people about the usefulness of population control programs. (Asif & Pervaiz, 2019).

"The Impact of Social Franchising on Contraceptive Use When Complemented by Vouchers"— a Quasi-Experimental Study—pertains to the case of rural Pakistan. Family planning franchise model promotes awareness and uptake of contraceptives. Moreover, supplemented with vouchers, it may enhance the use of IUCDs, which have a significant cost-effectiveness. The results also support a multi-pronged approach-generating demand through counseling, overcoming financial constraints by offering vouchers, training, and accreditation and branding of the service providers, and ensuring uninterrupted contraceptive supplies (Khurram Azmat et al., 2013).

There is one other important study which reveals factors that affect unmet need for family planning in southern nations, nationalities and peoples region, Ethiopia. This study used data from 2000 & 2005 of demographic and health surveys. Total sample size was 2133, currently married among the reproductive age group 15-49. Multinomial and binary regression analysis were used in this study. The result suggested a strong association between the key socio-economic and demographic factors. Furthermore, the policy related to family planning methods is needed to address and ensure the increase in health related family planning awareness (Hailemariam & Haddis, 2011).

"Assessment of Modern Contraceptive Continuation, Switching and Discontinuation among Clients in Pakistan, an empirical study, analyzed the protocol of 24 months post-family planning voucher intervention follow-up. The study mixed both types of data that are Qualitative and Quantitative. The study assessed the behavior of women's discontinuous use of contraception in two districts of Punjab—Chakwal and Faisalabad. The results suggested that the demand-side financing or free subsidized vouchers have a long term impact on discontinuance of contraception (M. Ali, Azmat, & Hamza, 2018).

In the study, "Analysis of Trends, Determinants and Dynamics of Contraceptive Use—estimate of unmet need for family planning in Pakistan— used data from Pakistan's demographic and health survey. In the methodology, the frequency tables and multinomial regression were used. The results of the frequency tables show the trends of contraceptive use. In the regression the logistic regression is used to explore the covariates at the individual level which are the determinants of unmet need for family planning. Results suggested that one-third time contraception used is discontinuous within a year. The main reason for the discontinuation is fear of side-effects and lack of knowledge or awareness of the contraception used (AHMED, 2018).

Whereas, family planning vouchers effectively increase in improving equity and reaching the underserved in case of Pakistan. The quasi-interventional study with pre and post-phases was used to implement an intervention in Chakwal and control district of Bhakkar Punjab province from August 2012 to January 2015. The results from the baseline to outcome shows a significant increase in the contraceptive prevalence. It means that the vouchers are helpful to reduce the inequality in access to modern methods across different income quintiles. So that the awareness programs with little subsidies are beneficial to reduce the unmet need and increase the contraception prevalence (Bellows, Ali, & Mir, 2020).

The determinants of unmet need for family planning among married women aged 15-49 in Sumatera Utara province of Indonesia—analysis of 2017 regime—is also important. This study carried out the data from the national mid-term development plan. The ever-married sample set is used in the study for analysis. The result shows that strong cultural, educational and informational factors are helpful in the reduction of unmet need. Local communities and religious leaders also play an important role in the reduction of unmet need through their strong religious day-to-day interactions within the community (Mutiara, Sitorus, Novita, & Development, 2020).

The data, used from 2015-16 sets of demographic and health surveys in multilevel analysis of factors, is associated with the unmet need for family planning among Malawian women. Multinomial logistic regression model was used to analyze the associated factors with unmet need for family planning. The results suggested that both community and individual level factors influence the unmet need for family planning. The policy makers and health practitioners when designing the policy need to address the community and individual factors for family planning programs (Nkoka et al., 2020).

2.5 Son preference and Fertility Behavior:

Son preference is an important factor for family planning in the context of Pakistan. It is focused on son targeting fertility behavior, determinants and some consequences. The main two reasons behind the study were son targeting fertility behavior related to son preferences. They call them the "sibling effect "if the girls are born in large families. The second main idea was related to birth order, behind it the idea was the girls born in the families relatively early. Both ideas are important from a gender-based perspective. The study shows that there are significant implications related to girls. The birth order and siblings effect has a strong impact on families. The girls born in large families share many things with their siblings, which generate adverse impact on their personality usually called gender discrimination under son preference behavior (Basu & De Jong, 2010).

A study, "son preferences and family limitation in case of Pakistan ", used the main idea that son preferences have a strong impact on fertility related decisions. In Pakistan, one of the main reasons for low contraception and discontinuities in contraception is son preferences related fertility decisions. The study used the data from Pakistan Demographic and Health Survey. The results of the study suggest that parity of child related to sex composition of child are strongly associated to the use of contraception. In the absence of a son, the use of permanent contraception methods is extremely low. More than two children are using contraception for the purpose of spacing rather than stopping their child bearing decision (Channon & health, 2017).

Another exposition in "Estimating Progress towards Meeting Women's Contraceptive Needs in 185 Countries; A Bayesian Hierarchical Modeling Study," used the idea of SDG's related achievements to ensure the need for family planning and reproductive healthcare services. This study uses the harmonized estimates for unmarried people. The main focus was on marriage or in union of a reproductive age group (15-49). The study used nationally apprehensive data sets.

The Bayesian hierarchical model with country-specific time trends used to estimate the indicator. We used the 185 countries with uncertainty intervals. The use produced estimations from 1990 to 2019 and provided the projections from 2019 to 2030 related to contraception prevalence and unmet need for family planning among married, unmarried and in a union, but in the model the difference only related to sexually active and unmarried women in different countries. The study provided the projection that women with unmet needs are increasing rather than decreasing. This increasing number of women creates the challenges for the future to meet with family planning methods or programs. The study suggests that there is a need to expand the monitoring and evaluation at large scale to accurately progress towards the achievement of SDGs 2030 agenda (Kantorová, Wheldon, Ueffing, & Dasgupta, 2020).

The 'Predictors of unmet need for family planning in Ethiopia for the year of 2019" revealed the importance of the unintended pregnancies, mostly ending up with abortions, are the predictors of unmet need for family planning in Ethiopia. But the drawback is that no single study is found to provide the prevalence of the unmet need for family planning. The study uses the meta-analysis and systematic review methodology in the study. The reproductive age group of women was selected to perform the idea. In the study of Cochran's Q statistics, Egger's and Begg's test was used to check the heterogeneity and biases. The results suggested that unmet need for family planning in Ethiopia is high as compared to the United Nations sphere standards (Getaneh, Negesse, Dessie, Desta, & Moltot, 2020).

Another study in this regard is "The Impact of Mental Health on the Unmet Need for Family Planning and Fertility Rate in Rural Ethiopia. This study reveals the idea of poor mental health impact on women's reproductive behaviors being related to the unmet need for family planning. The methodology of population based cohort study among 1026 women of reproductive age group studied a self-reporting questionnaire-20 that was used to examine depression and anxiety. The women were followed for 6.5 years after pregnancy to find out the post-mental

depression. The study tested the association between the CMD, depression and anxiety symptoms and the unmet need for contraception and fertility rate. The result reveals the idea that high fertility and low contraceptive prevalence exist in rural Ethiopia (Catalao et al., 2020).

"The community-based integrated approach to changing women's family planning behavior in the case of Pakistan is also a research study that covered the time period from 2014 to 2016. The study suggests there is a strong association between door-to-door counseling and contraceptive use. Community based association helps in reducing the unmet need for family planning and enhances the contraception use, according to the study (Najmi et al., 2018).

2.6 Literature Gap in Case of Pakistan:
Pakistan is one of the pioneers in the family planning initiative, which was introduced in the late 1950s in the country. The family planning phenomenon presents a complex picture as there are several factors at present contributing to less contraceptive prevalence rate, which has either decreased or been almost stagnant over the last 10 years.

There are a number of determinants which are responsible for this state of affairs in the country. After recognizing family planning as a fundamental human right in the SDGs― whether they want to practice it or not, the freedom of choice has been enshrined for the individuals in Pakistan being a signatory to the SGDs. If individuals are given this freedom of choice, many of them would prefer to limit their families' size or have spacing in pregnancies to improve their families' living standards. The available literature or different studies related to the problem explain the determinants contributing to the unmet need of family planning, but seldom recognize it as a burning issue.

The present study offers different and unique context to study the issue. There are a lot of research studies that have focused on family planning issues and the unmet need of women.

Some of them highlight individual factors, some being community-based, discuss the issue in different perspectives of community practices and some focus on household reasons. What tells my study apart is that it explores the characteristics of women that have led them to the unmet need for spacing and limiting? Moreover, for the identification of the argument, Hackman Sample selection model has been selected, as this is the best method to bifurcate the characteristics of limiting and spacing in family planning.

2.7 Conclusion:

The available literature or studies provide ample evidence that there are a number of factors or a series of factors which contribute to the unmet need. Many studies support that only personal factors are attached with unmet need but others debate that community influence also has a significant relationship with the unmet need. Most of the studies provide lengthy discussions about different factors like social, cultural and religious factors that significantly impact the unmet need. Moreover, the problem is that all studies focus on factors and determinants but there is a need to study the issue from different angles.

In this study, an attempt has been made that instead of studying the factors, there is a need to explore the characteristics of women that contribute to the unmet need (limiting & spacing) in family planning. One of the significant features of the study that has been underlined here is that women mostly do not share the characteristics as persons facing an unmet need for spacing and limiting.

Chapter 3

Methodology

In the methodological portion, we use the methodology to evaluate the determinants of factors affecting women and cause the unmet need for family planning. The following is the discussion about different models and the Heckman Selection Model.

3.1 Probit Regression:

Probit regression is a type of probabilistic statistical classification technique used to predict the binary response. This technique is used in many disciplines and fields, including medical, social sciences. Probit regression measures the relationship between one dependent categorical variable and more than one independent variable that can be continuous or categorical. Binary probit model used to estimate the parameters of a qualitative response model, but when the categories are more than two, simply referred to as a multinomial probit regression. In our study we use the bivariate probit regression at first stage of the study, as a response variable is categorical and binary response (0, 1) and then multinomial probit regression at the second stage because at this stage response variable of the study categorized as (0, 1 &2).

The Hackman's sample selection model is used in this study as an applied econometric framework to analyze the data. The sample selection model is used to address the selection biases in the data. In the sample selection model two equations are involved. The mechanism of an appropriate model depends on outcome equation and selection equation. An appropriate show consideration of the components deciding the results of the variables and a determination equation consider a parcel of the test whose result is enquired and instruments will decide the choice handle. Most of the alterations of the "sample selection" model are possible to estimate. In this study the first equation is a bivariate probit model to predict the probability of mentioning of any particular reason for the determinants of unmet need for family planning and the second equation is the multinomial probit model to define the characteristics of the

women leading to the unmet need. The main reason for the multinomial probit model is to specify the characteristics of women for the unmet need for spacing and limiting. Furthermore, in the equation we assume that these parameters are independent from each other. The multinomial probit model estimates the probability of the parameters between the socio-demographic and living condition of a variable and the frequency of a woman to take them towards the unmet need.

In this section we also use the two stage Heckman Sample Selection Model to measure the objective of the study. Hackman probit model can estimate the two simultaneous multivariate models, as the determinants of the unmet need and characteristics of the women are a two-step process. In the two step probit model, the first step sets up the selection equation and then we include the observations of the 1st equation which we call the selection equation in the outcome equation. In the first stage of this step, we use the binomial probit model to estimate the determinants of the total unmet need. The total unmet is a dependent variable in the study for the selection equation which is categorized in 0 for "met need" and 1 for the "unmet need". In the second stage we use the multinomial probit model to estimate the characteristics of the women for the determinants of unmet need. In the second stage, the equation for the unmet need is categorized in three types. Zero '0' is for "the met need" which is the base category of the study, '1' is for the "unmet need for spacing" and '2' is for the "unmet need for limiting". The set of the equations of the study is different for both equations. In the selection equation we use the background characteristics, socio-economic status and birth order for the measurement of total unmet need for family planning. In the second equation, which is outcome equation of the study we include the exposure of the female respondents to mass media, their access in health care facility and couples desire for children, along the predictor of 1st equation to measure the characteristics of the female respondents which leads them to unmet need for spacing & limiting.

3.2 Bivariate Probit Model:

The Bivariate Probit model is a combination of 2 two binary outcomes. It is a generalization of two latent variables from one latent variable which can be correlated with each other. We can define the bivariate Probit model with unobserved latent variable as

$$Y_{1*} = x\_1\beta_1 + \varepsilon_1$$

$$Y_{2*} = x\_2\beta_2 + \varepsilon_2$$

Here in this model ε_1 and ε_2 are error terms which follow the normal distribution, where mean is 'zero' and variance in '1' the correlation between them is represented as 'ρ'. In the bivariate Probit model we can specify the observed outcomes as (1,2) which are consistent with the notation of mention equations rather than to take (0,1) notation. The Probit model breaks down in two separate ways if the correlation ρ of these error terms becomes zero. The model becomes separate models in $Y*_1$ and $Y*_2$. Now we explain the multinomial Probit model in the next section as follows.

3.3 Multinomial Probit:

There is an alternative way to introduce the correlation according to the choices of unobserved components. Where the error term follows the normal distribution $\varepsilon \sim N(0,1)$. As the estimation technique, Maximum Likelihood (ML) is difficult in most general cases when the (m-1) fold integral has to be computed.

3.3.1 Multinomial Probit Model:

The multinomial probit (MNP) model not strict to the binary probit model the choice of selection more than 2 and it reaches to m-choice multinomial model, with value of the j_{th} choice given by

$$X_j = Y_j + \varepsilon_j \quad , j = 1, 2. . . m,$$

Here the error term ε_j follows the normal distribution, the joint normality of errors defined as

$$\varepsilon \sim N [0, \Sigma],$$

Where the m × 1 vector $\varepsilon = [\varepsilon_1 \ldots \varepsilon_m]$. Usually $yV_j = x$

OR Jβ or $V_j = x\beta_j$.

Multinomial probit model specification changes according to change in covariance matrix of the error term after placing some restriction to the covariance matrix Σ. For this some of the off-diagonal entries restrict to be non-zero, so correlation across errors exists there for multinomial categories. If there is no correlation between the error terms and off-diagonal entries are zero in the Σ matrix, then the multinomial Probit model will not get close solutions to the probabilities and errors containing extreme values by using the model.

To impose the restriction on the Σ covariance matrix elements, we need to ensure identification of the error terms. It is very strongly recommended that, for any ARUM, choice is determined by the differences in utility or errors. Thus we consider the difference $U_j - U_i$ between utility of alternative j and that of alternative i, chosen to be the benchmark alternative. Bunch (1991) demonstrated that all but one of the parameters of the covariance matrix of the errors $\varepsilon_j - \varepsilon_i$ is identified. One way to achieve this identification is to normalize $\varepsilon_i = 0$, say, so it will be easy to restrict the one element of the matrix. For example,

If we restrict the bivariate Probit model as m = 2, then the covariance matrix be like so we need to set it as

$\varepsilon_1 = 0$ so $\sigma_{11} = 0$ and $\sigma_{12} = 0$, the restriction needed to impose is $\sigma_{22} = 1$.

Then

$\varepsilon_2 - \varepsilon_1$, $\varepsilon_2 \sim N\,[0, 1]$, which is for the bivariate probit model.

For the application of the Probit model the additional restriction needs to be imposed on β. Keane (1992) described that even to ensure the identification for the assumption of error covariance the parameter of multinomial Probit model can be highly imprecise as the regressor does not change with alternative.

Some other restrictions needed to be imposed on the multinomial Probit model. This estimation is almost qualitatively similar to high multicollinearity among regressors in a linear regression. Keane found that exclusion restrictions on the regressors (with one exclusion for each category) work well. Alternatively, and more commonly, further restrictions may be placed on the covariance parameters.

A popular parsimonious model for the errors is the factor model

$\varepsilon_j = v_j + L$ l=1

Cjl €l , j = 1, 2, . . . ,m,

Where vj and €1. . . €L are 2nd standard normal and c jl are weights called factor loadings to be estimated. It reduces the number of covariance parameters in this way, m (m + 1)/2 to L, and requires an (L + 1)-dimensional integral. Gaussian Quadrature, a numerical method, can be used for low values of L, whereas another method is simulation methods which need to be used for larger L."

3.4 Hackman sample selection model:
Hackman and Oldham performed the model in 1975 to correct the selection bias in data. This study uses the model to present the true picture of the women selected when they have more than two choices.

3.4.1 Selection equation
Y = βX + ε where Y is observed only if Y1' = 1

3.4.2 Outcome equation
Y1' = β1' Z1' + η where Y1' = 1 if (β1'X1' + η) > 0, and Y1' = 0 if (β1'X1' + η) ≤ 0 Correlation

(ε, n) = p Where:

- **Y1** is the dependent variable and X a set of independent

- Variables of the outcome equation (unmet need for limiting & spacing);

- **Y1'** is the dependent variable and X1' a set of independent

- Variables of selection equation (determinants of unmet need);

- **β** & **β1'** reflect the impact of independent variables;

- the residuals of the equations **ε** & **n** are ; and

- The coefficient of correlation **p** is between the errors of the two equations.

There will be a simultaneous examination for the sample where some conditions are necessary to see the biases of the sample. The correlation between the residuals on the selection stage; which is the first stage and the estimation stage; which is the second stage of selection of the sample process is considered as the first parameter. The second necessary condition is the independent variable in which we are interested in is X will influence the probability of the selection on the initial stage.to understand the sample selection biases these parameters in a better way will be varied. The model will be used to encircle the biases of the sample.

3.5 Variables:

3.5.1 Outcome variable:

The outcome variable of the study is unmet need for family planning in Pakistan. Family planning pertains to unmet needs which could be defined as the proportion of women who are neither pregnant nor having postpartum symptoms and are considered reproductive. They either want to hold over their next birth for 2 or more years or stop giving birth altogether without using a protective method. This concept also applies to those women who have a regular or unwanted current pregnancy or are postpartum symptom and their last birth in the last 2 years was regular or unwanted not using any method of contraception (PDHS 201718 & UNFPA 2019 (Sundaram et al., 2019),(Solanke, Oyinlola, Oyeleye, Ilesanmi, & medicine, 2019),(Sedgh, Ashford, et al., 2016), and (Bradley & Casterline, 2014).

According to DHS framing, the unmet need of family planning is a complex and ambiguous phenomenon. It is very difficult to understand the family planning status of women and their contraception choices in accordance with their fertility preferences. Some participants could

easily be classified according to DHS, as their answers are explicit, but the others, whose experiences of family planning are unanswered in the questionnaire (could be silence respondents) by the supreme static of binary choices of met & unmet need for family planning, will remain unexplained it means that in DHS framing, a high risk segment of the population who are not demanding any type of contraception, is being ignored. In the unmet need category if the female respondents wants current pregnancy then how in DHS do they consider contraception failures? But it means that they have no demand for family planning methods and their intentions are clear: they want to become pregnant. In DHS framing if a woman reports that their last birth or current pregnancy was unwanted they consider it spacing & limiting failure but if they were not using any type of contraception at the time of their current pregnancy/last birth then it is not a spacing or limiting failure. If they were demanding on their last birth/ current pregnancy they may have an unmet need for family planning. Women for whom the data on wantedness of current pregnancy & future birth is missing should be considered missing in DHS farming.

In the coding of unmet meet need in DHS, women who are fecund and a postpartum amenorrhea period excluded from the DHS coding, these types of women are at a high risk of pregnancy. So they need family planning methods. So I need to keep them in a DHS coding with another additional category. The current definition assumes that all women using any type of contraceptive method do not have unmet need. The argument is that all the women, who are using a contraceptive method, if that method does not meet their preferences, it would mean they are having unmet need for family planning (Sarah D.Rominski & Rob Stephenson).

3.6 Independent variables:

The explanatory variables for the unmet need are based on previous literature and they do reflect in the 2017-18 PDHS data set. The study is designed to explore the difference in women characteristics which ultimately dichotomizes the unmet need into spacing and limiting.

3.6.1 Women's education level:

Women's education plays an important role in decision making. Education is a basic tool for women's empowerment and helps them to control their lives (Khan, Nawaz, Aleem, & Hamed, 2012). Education gives the exposure and provides the knowledge on family planning related practices, birth control and they can better communicate with their husbands about their desired family size and contraceptive use. Women's education levels is categorized into 4 categorize, as no education =0, primary education =1, secondary =2 or higher education =3

3.6.2 Wealth index:

The wealth index presents the economic status of the household. Wealth index serves as a good choice to account for regional differences in indicators of wealth, such as urban, rural, provincial, and national levels. Wealth is an important socio-economic indicator of demographic status of the population (PDHS, 2017-18). Wealthy households have more access to education and health than the poor ones. The wealth of a household is based on quintiles. The sample of the quintiles is based on detailed household ownership of assets and their use of services. These are categorized into 5 quintiles of wealth, according to the PDHS data set, 1st as the poor, 2nd as the poorest quintile, 3rd is the medium and 4th is the rich and final and 5th is the richest quintile. In this study we modify them into three quintiles: 1st is the poor=1, middle=2 and rich=3 (Jennings et al., 2014).

3.6.3 Place of residence:

The region or area of residence has been suggested as a possible cause, among other socio-economic factors, for an increase or decline in fertility preference or the unmet needs. There are differences in contraceptive use and fertility rates between rural and urban areas. Place of residents is the same as used in the PDHS data set. The place of residence is divided into two groups. The '1' is for the urban region and '2' for the rural (Asif & Pervaiz, 2019).

3.6.4 Work Status:

The many previous studies suggest that women's education and work status have a strong association with fertility in terms of negativity or positive with the contraceptive prevalence. There is a chance that women who are employed may result in more economic stability and independence and take the initiative to have access to healthcare and use of contraceptives. The current work status of respondents is used to measure that thing. If women are working, then it is coded by '1' otherwise it is categorized as '0' (Asif & Pervaiz, 2019).

3.6.5 Spousal Congruence:

This pertains to the mental state in which somebody has the individual aspiration to have a child. There are two categories in this regard. Both the categories have been taken from the PDHS. The respondents desiring a child is coded as '1' and those who either do not desire or don't answer are coded as '0'. (Faiz et al., 2012).

3.6.6 Media exposure:

The media exposure variable is generated on the basis of hearing and seeing the family planning messages on radio, television, internet and newspapers. The PDHS survey gathers the information on family planning messages disseminated through television, radio and print media and internet. The media exposure plays an important, and positive as well, role in contraceptive prevalence (Sehar-un-Nisa Hassan & Mahmood, 2015). Media access is a composite variable. It gets from the accompanying 3 choices/inquiries given to the respondents;

1) Do you read a newspaper or magazine regularly, once a week, more than once in a week or do you not read at all?

2) Do you listen to radio regularly, once a week, more than once a week or don not at all?,

3) Do you watch TV regularly, once a week, or do not watch at all?

Reactions to every one of the three inquiries were coded as follows: '0' for not by any means, '1' for less than once a week, '2' for more than once a week, '3' for almost every day. The

respondent score ranged 1 to 3 if they have the media access, otherwise '0' for not by any means (Asif & Pervaiz, 2019).

3.6.7 Decisions about women health:

In the DHS 2017-18 data, women asked questions about their decision regarding their health and their responses are used for constructing this variable. Here are individual level responses, ranging from 0 to 1. '1' is for the respondent who says the decision is made by herself alone, and '0' if the decision is made by someone else. (Jennings et al., 2014).

3.6.8 Women's age level:

The women's age level is also one of the significant predictors for the unmet need for family planning. Respondent's exact age, only in years. The category for the age group from 15-25 is '1', for 25-35 is '2' and for 35+ is '3' (S. Bashir & K. Guzzo, 2021).

3.6.9 Province:

The province level variable is also an important predictor. It helps understand the different types of availability of family planning programs at the provincial level. This variable also provides the idea of services utilization at the provincial level. It provides the idea of demand for family planning methods, availability and access to the services in the province. The provincial level variable is generated from the DHS's category of region. Here the region has been divided into 4 categories. 1st category is Punjab & ICT, 2nd is Sindh, 3rd is KPK &FATA, 4th is Baluchistan. Gilgit Baltistan, Azad Jammu& Kashmir are excluded from the data. The main reference category is Sindh.

3.6.10 Spousal communication:

The contraception-use decision index plays an important role in couples' understanding regarding the decision of using contraception. The contraception practices show couples fertility behavior towards the use of family planning services. This index also provides the idea of couples' control over their fertility. The lack of understanding causes low contraceptive prevalence which causes the phenomenon of unmet need for family planning (Chauhan &

Nagarajan, 2019). The index is generated from the two PDHS questionnaires: the decision of using contraception and the decision of not using the contraception. '1' if the couple jointly decide to use contraceptives and '0' if the decision is not made jointly.

3.6.11 Birth Order:
The birth order has a significant impact on women's health. The child-bearing decision causes the unmet need. The lack of knowledge about contraception use generates a high burden on families (Amoakoh-Coleman et al., 2015). In the study the birth order variable is divided into four categories. In the first category, we take the 1st birth order, in the second category we use the 2nd birth order, in the third category we use the 3rd birth order and in the fourth category we take all birth orders as 4+. (Alhainiah, Abdul Jabbar, & Bukhari, 2018; Pradhan & Dwivedi, 2015).

3.7 Conceptual Framework:
The conceptual framework is a path or the foundation of this study. The study has used a set of predictors with background characteristics and is also based on the established framework given below.

Figure 1.1: Maximum explanatory variables' impact

Conceptual Framework for unmet need for family planning
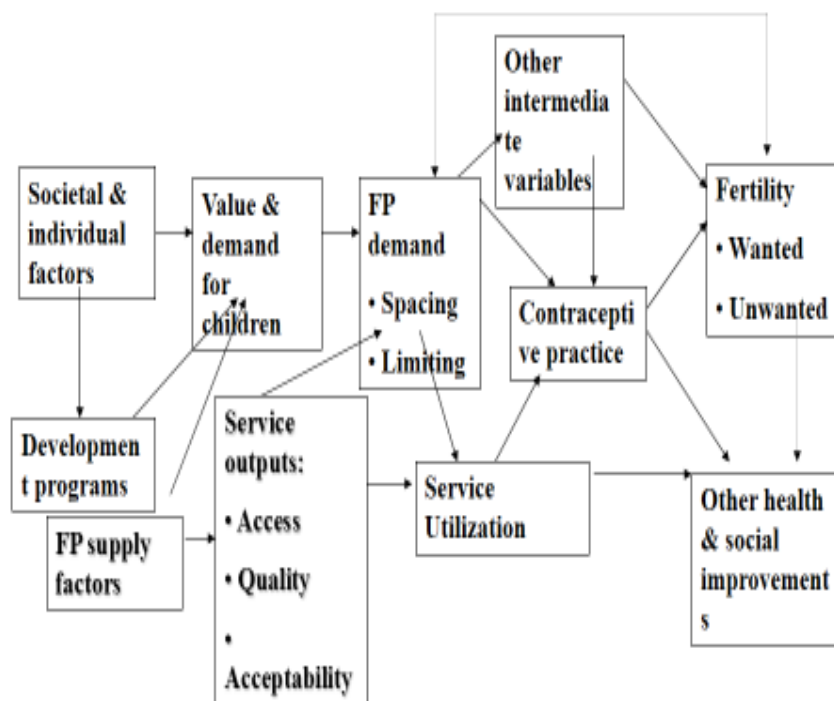
Source: Bertrand, Magnani, and Rutenberg, 1996.

3.8 Operational Definitions of the variables:

Table 1

Definitions of variables	
Unmet Need-for-Family-Planning	1, if Unmet Need for Family Planning – for Spacing or Limiting, otherwise 0 (zero). (excluding in fecund, menopausal, and no unmet need)
Unmet-Need-for-Family Planning – for-Spacing	1, if Unmet Need for Family Planning – for Spacing, 0 for using for Spacing (excluding in fecund, menopausal, using or unmet need for Limiting and no unmet need).
Unmet-Need-for-Family planning – for-Limiting	1, if Unmet (Stuart Gietel-Basten 2018) need for family planning – for limiting, 0 for limiting (excluding in fecund, menopausal, using or unmet need for spacing, and no unmet need)

"Coding of bivariate" Total unmet need for family planning	1, if have unmet need otherwise zero
Unmet Need for family planning	Coded as 1=unmet need for spacing, 2=unmet need for limiting all other met needs, using for spacing, limiting, spacing & limiting failure etc. Otherwise all are considered zero.
Spousal communication	1, if both jointly decide using or not using contraceptives, otherwise zero.
Spousal congruence	Parity and family composition provide the basic knowledge of ideal family size. According to PDHS if the couples' desire for children is the same then 1, otherwise zero.
Partner education	Coded as no formal education = 1, primary = 2, secondary = 3, and higher = 4
Exposure to media	Coded as 1, if the respondent heard/read about family planning using Radio, TV, News/Paper, or text message through mobile phone, zero otherwise.
Decision about women health	It's an individual level response, ranging from 0 to 1, if respondent answers alone, (1) person who usually decides on respondent's health care.
Women age	Respondent's current age in complete years. It is coded as middle age age group 1=15-25, age group 2=25-35 and age group 3=35+
women working status	Coded 1 if women currently working, otherwise zero (with a reference period of last 12 months)
women education	Coded as no formal education is= 1, primary is= 2, secondary is = 3, and higher is= 4
Wealth index	Coded as poor= 1, middle = 2, rich = 3.
Province	Sindh as the reference category
Area of residence	Coded as 1 if urban, and 0 if Rural

Chapter 4

Data and Results:
4.1 Data:
The data used in this study come from Pakistan Demographic and Health Survey 2017-18, conducted by National Institute of Population Studies (NIPS) with technical support from Inner City Fund (ICF) and Pakistan Bureau of Statistics (PBS). The PDHS 2018 is a nationally representative data collected from four provinces and Gilgit-Baltistan (GB), Azad Jammu and Kashmir (AJK), Islamabad Capital Territory (ICT) and Federally Administered Tribal Area (FATA) —now a part of Khyber-Pakhtunkhwa—using stratified two stage sample design. Sixteen sample strata were created by dividing each of the eight regions into urban and rural areas. In the first stage, 540 clusters were randomly selected. The second stage involved a systematic sampling of the households where 28 households per cluster were selected. By employing an equal probability systematic selection process, a sample size of 16240 is selected. However, due to some inherent challenges in data collection, 15661 households are included in the survey and around 13,118 of them were interviewed. The information of approximately 12,364 females was complete. The females were dropped as they had no birth history and those women whose birth history was found missing were also excluded. Resultantly, the total sample of the respondents is 12,364 which is a weighted sample.

4.2 Ethical Approval:
The secondary data taken from DHS is being used in this research. No ethical approval is needed at this stage as the DHS data has already been approved by the Government of Pakistan.

4.3 Population Characteristics:
According to the survey, the de-facto population is 12,364— 49 percent of this population are male and 51% are female. Similarly, 38 percent of the population is under age 15. Furthermore, 12364 ever married women and 3125 ever married men, ages 15-49 were successfully interviewed. Moreover, 63 percent of ever married women and 60 percent of ever married men are from rural areas. The survey further indicates that nearly 49 percent ever married women and 25percent ever married men are uneducated. The trend of attaining secondary or higher education is higher in men (39%), as compared to women (25%). It is just almost one-third (34%) of married women who are currently using any method of family planning, 25 percent using modern methods and 9 percent are using traditional methods. The total proportion of unmet need among married women is 17 percent, 10 percent using child-delaying and 8 percent

seeking to stop child births (PDHS 2017-18). The report shows that exposure to media, especially television, among urban men and women is much more than rural areas (71% and 68% respectively).

4.4 DHS questionnaire:

The PDHS questionnaire collects the three types of information. The first is for the household related questionnaire, second is women respondents' related questionnaire and the third is men's questionnaire. The main objective of this study is women, so we used the women questionnaire in this study mainly. Women questionnaire captured all the basic and necessary information related to variables which had been analyzed in the study. The men's questionnaire did not contain the basic information related to variables, response rate is very low in men's questionnaire and the number of men who were interviewed are not significant to carry the analysis.

4.5 Analysis Software:

Statistical software package (STATA 15) is used in this study to analyze the data.

4.6 Descriptive analysis of the data:

According to the reported data of PDHS 2017-18, the weighted total percentage of Unmet Need for Family Planning in the country is 17percent while 9percent for spacing and 8 percent for limiting. Socio-economic characteristics of the female respondents below in the table.

Table: 2 presents the total percentage of the women according to their socio-Economics Characteristics.		
Characteristics	**Frequency**	**Percentage (%)**
Family composition		
1st birth order	1687	13
2nd birth order	1840	15
3rd birth order	1909	16
4+ births	6926	56

Wealth index		
Poor	4687	38
Middle	2503	21
Rich	5172	41
Women age		
15-25	2488	21
25-35	4960	40
35+	4914	39
Women Education		
No formal education	6080	50
Primary	2036	16
Middle	2622	21
High	1625	13
Province		
Punjab	6737	54
Sindh	2850	23
KPK	2134	18
Balochistan	641	5
Place of Residence		
Rural	4550	37
Urban	7813	63
partner Education		
No Education	4048	33
Primary	1839	15
Secondary	4165	33
High	2310	19
Household Decision Making Index		

Jointly decided	4080	34
Partner/others decides	8277	66
Women working status		
Un-employed	10227	82
Employed	2136	18
Spousal Communication		
No	7990	65
Yes	4373	35
Exposure to media		
Yes exposed	6564	53
Not exposed	5799	47
Women own health care decisions		
Not male dominant	6384	52
Male dominant	5979	48
Spousal congruence		
No	7044	57
Yes	5319	43
Total	**12,364**	**100**

The results of the descriptive analysis explains the distribution of the data. Table 1 explains that 13 percent of female respondents have only 1 birth while 15 percent of the population have 2 births, 16 percent of women have 3 births, and 56 percent of women respondents have 4 or more than 4 births. Almost 41 percent of women belong to the rich-wealth quintile, 38 percent are from the poor households and 21 percent from the middle families. In the age group 15-25, female respondents are 20 percent. The highest number of respondents, almost 41 percent, falls in the 25-35 age group, in age 35+ women are almost 39 percent of the data. Almost 50 percent

of the women are uneducated, 16 percent have a primary education, 21 percent have primary to middle education and a very low percentage of the females have a high education which is 13 percent.

Punjab is the most populated province in Pakistan. Punjab represents the 54 percent population of Pakistan in the survey. Sindh contributes to 23 percent, KPK shares 18 percent, Balochistan represents 5 percent of the population. Around 37 percent of the women reside in urban areas while 63 percent are from rural areas. About 30 percent of the female partners are uneducated, only 16 percent have a primary education, 35 percent secondary, and only 19 percent are graduates. In the decisions related to women's own health, 48 percent are male dominant and 52 percent are not male dominant. According to women's employment status only 18 percent females are employed whereas 82 percent are unemployed. Around 65 percent of contraception use or not use decisions are taken by the husband while 35 percent are made jointly.

Mass media exposure is 53 percent while not exposure to mass media is 37 percent. Almost 43 percent of couple's congruence about have the same desire for children and 57 percent have a different desire for children.

4.7 The results of association between important variables:
In this section, we shall check the association among/between some important variables. The main purpose to check the association is to understand if the two variables (dependent & independent) are associated with each other or not. In other words, we shall see if they are independent or dependent on each other. In table 3, it is observed that there is strong association between unmet need & parity, wealth index, women education level, children desire, women employment status and place of residence. The main important variables of the study are significant at p-=0.00. This association between variables helps us draw conclusions from the statistical analysis from the data.

Table 3   association between different/important variables

Association between Birth Order & Unmet need

birth order	Unmet Need			
	Met Need	Unmet Spacing	Unmet Limiting	Total
1st	1359	270	14	1643
	13.20	22.37	1.63	13.29
2nd	1536	288	65	1889
	14.91	23.86	7.58	15.28
3rd	1633	197	134	1964
	15.86	16.32	15.62	15.88
4 or higher	5771	452	645	6868
	56.03	37.45	75.17	55.55
Total	10299	1207	858	12364
	100.00	100.00	100.00	100.00
Pearson Chi2 = 386.42 Prob = 0.0000				

Association between Unmet Need & place of residence

Place of residence	Unmet Need			
	Met Need	Unmet Spacing	Unmet Limiting	Total
rural	5187	527	384	6098
	50.36	43.66	44.76	49.32
urban	5112	680	474	6266
	49.64	56.34	55.24	50.68
Total	10299	1207	858	12364
	100.00	100.00	100.00	100.00
Pearson Chi2 = 27.10 Prob = 0.0000				

Association between Unmet Need & employment

Employment Status	Unmet Need			
	Met Need	Unmet Spacing	Unmet Limiting	Total
Unemployed	8779	1120	700	10599
	85.24	92.79	81.59	85.72
Employed	1520	87	158	1765
	14.76	7.21	18.41	14.28
Total	10299	1207	858	12364
	100.00	100.00	100.00	100.00
Pearson Chi2 = 63.25 Prob = 0.0000				

Association Between spousal congruence & Unmet need

Spousal congruence	Unmet Need			
	Met Need	Unmet Spacing	Unmet Limiting	Total
Yes	5340	398	398	6136
	51.85	32.97	46.39	49.63
no	4959	809	460	6228
	48.15	67.03	53.61	50.37
Total	10299	1207	858	12364

		100.00	100.00	100.00	100.00
Pearson Chi2 = 157.85 Prob = 0.0000					

Association Between wealth index & Unmet need

wealth	Unmet Need			
	Met Need	Unmet Spacing	Unmet Limiting	Total
poor	3895	582	380	4857
	37.82	48.22	44.29	39.28
middle	1928	211	171	2310
	18.72	17.48	19.93	18.68
Rich	4476	414	307	5197
	43.46	34.30	35.78	42.03
Total	10299	1207	858	12364
	100.00	100.00	100.00	100.00
Pearson Chi2 = 67.42 Prob = 0.0000				

Association Between women age group & Unmet need

Age Group	Unmet Need			
	Met Need	Unmet Spacing	Unmet Limiting	Total
15-25	2057	427	38	2522
	19.97	35.38	4.43	20.40
25-35	3955	611	335	4901
	38.40	50.62	39.04	39.64
35+	4287	169	485	4941
	41.63	14.00	56.53	39.96
Total	10299	1207	858	12364
	100.00	100.00	100.00	100.00
Pearson Chi2 = 551.32 Prob = 0.0000				

Association Between exposure to media & unmet need

Exposure to Mass Media	Unmet Need			
	Met Need	Unmet Spacing	Unmet Limiting	Total
Not Exposed	4983	681	453	6117
	48.38	56.42	52.80	49.47
Exposed	5316	526	405	6247
	51.62	43.58	47.20	50.53
Total	10299	1207	858	12364
	100.00	100.00	100.00	100.00
Pearson Chi2 = 31.99 Prob = 0.0000				

Association Between women own health care decisions & unmet need

Healthcare decision	Unmet Need			
	Met Need	Unmet Spacing	Unmet Limiting	Total
Not male dominated	5693	751	424	6868
	55.28	62.22	49.42	55.55
Male dominated	4606	456	434	5496
	44.72	37.78	50.58	44.45
Total	10299	1207	858	12364
	100.00	100.00	100.00	100.00
Pearson Chi2 = 35.13 Prob = 0.0000				

Association Between education level of the respondent & unmet need

education level of respondent	Unmet Need			
	Met Need	Unmet Spacing	Unmet Limiting	Total
no formal education	5433	715	534	6682
	52.75	59.24	62.24	54.04
primary education	1454	127	112	1693
	14.12	10.52	13.05	13.69
Secondary	1961	208	138	2307
	19.04	17.23	16.08	18.66
higher education	1451	157	74	1682
	14.09	13.01	8.62	13.60
Total	10299	1207	858	12364
	100.00	100.00	100.00	100.00
Pearson Chi2 = 53.24 Prob = 0.0000				

Association Between spousal communication & Unmet need

Spousal communication	Unmet Need			
	Met Need	Unmet Spacing	Unmet Limiting	Total
No	6585	637	458	7680
	63.94	52.78	53.38	62.12
Yes	3714	570	400	4684
	36.06	47.22	46.62	37.88
Total	10299	1207	858	12364
	100.00	100.00	100.00	100.00
Pearson Chi2 = 87.11 Prob = 0.0000				

First row has *frequencies* and second row has *column percentages*

4.8 Multivariate models Results and their explanation:

4.8.1 Multivariate Probit Model:

Table: 4 presents the determinants of total unmet need using bivariate Probit Model		
Characteristics	**Coefficient value**	**Confidence interval (CI) at 95%**
Family composition		
● 1st birth order RC	-	-
● 2nd birth order	0.040 (0.051)	-.059 , .139

● 3rd birth order	0.047 (0.052)	-.540 , .149
● 4+ births	-0.016 (0.044)	-.102 , .069
Wealth index		
● Poor RC	-	-
● Middle	-0.116*** (0.041)	-.195 , -.0362
● Rich	-0.258*** (0.046)	-.348 , -.167
Women age		
● 15-25 RC	-	-
● 25-35	0.089** (0.037)	0.161 , .162
● 35+	-0.192*** (0.041)	-.2717 , -.111
Women Education		
● No formal education RC	-	-
● Primary	-0.143*** (0.043)	-.228 , -.059
● Middle	-0.009 (0.044)	-.095 , .076
● High	-0.006 (0.056)	-.117 , .104
Province		

● Sindh [RC]	-	-
● Punjab	-0.053 (0.036)	-.124 , .0171
● KPK	0.042 (0.044)	-.045 , .129
● Balochistan	0.095 (0.064)	-.029 , .1080
Place of Residence		
● urban [RC]	-	-
● Rural	0.039 (0.035)	-.0298 , .1080
Partner Education		
● No formal Education [RC]	-	-
● Primary	0.141*** (0.043)	-.057 , .2246
● Secondary	0.105*** (0.037)	-.0320 , .178
● High	0.074 (0.048)	-.0204 , .168
Women working status		
● Un-employed [RC]	-	-
● Employed	-0.148*** (0.039)	-.224 , -.071
Exposure to Media		

● No [RC]	-	-
● Yes	-0.002 (0.031)	-.641 , .0592
Constant	**-0.850*** (0.060)**	**-0.967, -.7319**
Observations	**12, 364**	
Standard errors in parentheses	***** p<0.01, ** p<0.05, * p<0.1**	
RC is considered as a reference category of this study.		

The results of the bivariate probit model show the determinants of total unmet need for family planning. Socio-economic status of the female respondent is used to estimate the total unmet need for family planning. Birth order is used as a proxy to understand the family composition. The base/reference category is first birth order. The birth order shows that birth order has not any type of significant impact on the unmet need for family planning, but it highlights that increase in the birth order decreases the unmet need. Wealth status of the women respondents have a strong influence on the unmet need. As wealth status increases, the unmet need deceases (z-score= -0.116***, -0.258***), that is 2times probability of the unmet need.

It is statistically highly significant. Age of the female respondents also have a strong impact on the unmet need. The unmet need is high in the early years of the age. Increase in age decreases the probability of the unmet need. It means that the demand of the family planning/unmet need is high at an early age years (CO= 0.089**, -0.192***). After the age of 35+, women are less likely to use family planning. It is again statistically significant. Education at early years, like primary, have strong statistical significance, (CO= -0.143***) impact on unmet needs. Increase in the education level of the female respondents has no significant impact but shows the declining trend in the unmet need. The unmet need in Punjab is low if

that is compared with that of Sindh, but it is not statistically significant. In KPK and Balochistan, the unmet need is higher than that of Sindh but both also are not significant. So in other words, the demand for family planning in KPK and Balochistan is higher than that of Sindh. Place of residence is also an important variable as it shows that if women are living in urban areas, their demand for unmet need is higher than women living in rural areas. However, it also suggests that there is no statistical significant impact. Husband education too appears as having a significant impact on the unmet need. Early year's education, like primary and secondary, shows the probability is high for the unmet need. At the primary education level (CO= 0.141***) it is highly significant. At the secondary education level, the unmet need is high (CO= 0.105***) but it also shows a declining trend. At the higher education level of the respondents' partners, the trend appears decreasing without any significance. Employment status shows a strong declining impact, if the women are employed. Their probability of the unmet need decreases (CO= -0.148***) and it is highly significant. The mass media results are not significant as their impact on the unmet need appears of much less importance.

4.8.2 Multinomial Hackman Probit Model:

Table : 5 explains multinomial model for characteristics of the women by Hackman model					
Characteristics of women	**Unmet Need for spacing**		**Unmet Need for limiting**		
	β 's Coefficient values	95% CI	B 's Coefficient values	95% CI	
Family Composition					
● 1st birth order RC	-	-	-	-	

45

● 2nd birth order	-0.653** (0.310)	-1.260 , -.044	0.229 (0.287)	-.333, .790	
● 3rd birth order	-0.949*** (0.357)	-1.648 ,-.249	0.578* (0.317)	-.044, 1.200	
● 4+ births	-0.124 (0.139)	-.396, .147	1.068*** (0.162)	.749,1.39	
Wealth index					
● Poor RC	-	-	-	-	
● Middle	1.911** (0.856)	.233 , 3.388	0.543 (0.712)	-.853,1.94	
● Rich	4.325** (1.920)	.562, 8.087	1.405 (0.833)	-1.725,4.54	
Women age					
● 15-25 RC	-	-	-	-	
● 25-35	-1.668** (0.662)	-.2.964 , -.371	0.101 (0.551)	-.98, 1.180	
● 35+	2.536* (1.446)	-.297 , 5.370	2.107* (1.194)	-.232, 4.45	
Women education level					
● No formal education RC	-	-	-	-	
● Primary	2.407** (1.071)	.308 , 4.506	0.907 (0.893)	-.842, 2.66	
● Secondary	0.134 (0.099)	-.059, .327	0.116 (0.096)	-.070, .302	
● High	0.211*** (0.106)	.005, .4181	-0.102 (0.117)	-.331, .127	
Province					
● Sindh RC	-	-	-	-	
● Punjab	0.690* (0.403)	-.099, 1.48	0.620* (0.337)	-.040, 1.280	
● KPK	-0.854***	-1.473 , -.233	-0.047	-.569, .475	

	(0.316)		(0.267)	
● Balochistan	-1.562** (0.700)	-2.933 ,-.191	-0.507 (0.586)	-1.66, .640
Place of residence				
● Urban	-	-	-	-
● Rural	-0.631** (0.301)	-1.220 , -.042	-0.292 (0.253)	-.790,.204
Partners/husband education				
● No formal education RC	-	-	-	-
● Primary	-2.357** (1.040)	-4.396, -.318	-0.725 (0.865)	-2.42, .969
● Secondary	-1.649** (0.777)	-3.173 , -.126	-0.628 (0.648)	-1.897, .640
● High	-1.175** (0.549)	.2.25, -.098	-0.438 (0.162)	-1.340, .465
Women owns decisions health				
● Not male dominant RC	-	-	-	-
● Male Dominant	0.102** (0.051)	.002 , .203	0.211*** (0.053)	.108, .315
Employment status				
• Unemployed RC	-	-	-	-
• Employed	2.253** (1.106)	.086, 4.42	-1.021 (0.921)	-.784, 2.83
Spousal Communication				
• Yes RC	-	-	-	-
• No	0.598*** (0.100)	.402 , .793	0.708*** (0.106)	.500, .915
Exposure to Media				

• Yes [RC]	-	-	-	-
• No	0.014 (0.057)	-.980 , .127	0.048 (0.059)	-.068,.164
Spousal congruence				
• Same [RC]	-	-	-	-
• Different	0.386*** (0.050)	.0288 , .483	0.165*** (0.52)	.064, .267
Inverse Mills Ratios				
● Rho	-22.561** (9.413)	-41.00 ,-4.112	-8.831 (7.724)	-23.97, 6.31
Constant	29.369** (13.244)	3.410 , 55.32	7.580 (10.862)	-13.71, 28.87
Observations	**12,364**		**12,364**	
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1				
RC is a reference category.				

The results of the multinomial Hackman probit model suggested that the characteristics of the women for spacing and limiting vary according to their choices. The birth order is used as a proxy to understand the family composition for unmet needs. The base category is first birth order. If we compare the second birth order to the base category, results explain that increase in birth order decreases the probability of unmet need for spacing. At the second birth order unmet need for spacing is (CO= -0.653**) and it is declining, at the third birth order the unmet need for spacing is (CO= -0.949***) also on the decline, but at the stage of the 4+ birth order the unmet need for spacing shows no significant impact, but it also shows continuously negative impact on the unmet need for family planning. So, the probability of the unmet need for spacing is high at early births of the female respondents.

On the other hand, results of the unmet need of family planning for limiting shows that women respondents have no interest in limiting their family size till the 3rd birth order. The second

birth order for limiting the impact is positive but not statistically significant. At the stage of the third birth order the unmet need for limiting goes higher (CO= 0.578*). At the stage of the four plus (4+) births, the unmet need for limiting is higher, almost 50% than the third birth order. The coefficient value shows it (CO= 1.068***) highly significant.

The wealth index shows that increase in the wealth increases the unmet need for spacing. The base category is the poor wealth index. Co-efficient value of the middle wealth quintiles (CO= 1.911**) shows the higher probability of the unmet need for spacing. The higher wealth index shows that higher probability of the unmet need for spacing. The unmet need for spacing (CO= 4.325**), according to coefficient value, is 2 times higher at the richest quintile of the wealth. Increase in wealth increases the unmet need for family planning and it is statistically very significant as it provides the idea that increase in wealth also increases the probability of the unmet need for limiting.

Another characteristic is the women 's age group. Age plays an important role in understanding the unmet need status of women respondents. The results of the age of the female show that increase in age increases the probability of the unmet need for spacing. In the age group of 25-35, the coefficient value (-1.668**) shows that the probability of the unmet need is decreasing which is highly significant. Whereas at the level of the 35+ the unmet need for spacing is increasing as the coefficient values (2.536*) shows that it is two times higher than the age group of 25-35. The results of the unmet need for limiting also shows that the high demand for family planning and high probability of the unmet need. At the age of 25-35, the coefficient value shows (0.101) positive impact but it is not significant. The probability of unmet need for limiting at the age 35+ is high and its impact is positive. According to the coefficient value (CO=2.107*), the probability of the unmet need for limiting is two-times higher and it is statistically significant.

Education of the respondents is also of significance as it is a good indicator to understand respondents' choices, according to their desired status of family planning. At the primary education level, the probability of unmet need for spacing is two-times higher (2.407**) and that is significant. At secondary education, the unmet need for spacing is increasing but with a declining trend. Its coefficient value (0.134) shows that it is not statistically significant. At the higher education level of the respondents, the probability of the unmet need for spacing is increasing but with a declining trend. According to coefficient value (CO=0.211**), the unmet need for spacing is higher and statistically important. The unmet need for limiting in its overall sense shows a declining trend. Increase in education level decreases the probability of the unmet need for limiting. It is not as such statistically significant at any level.

Province-wise results explain that in Punjab the probability of the unmet need for spacing and limiting both are higher. It is statistically significant in the case of Punjab. If we compare Sindh to KPK, the probability of the unmet need for spacing is decreasing. According to coefficient value (-0.854***) it is highly significant. In case of the unmet need for limiting, probability is decreasing but not significantly at any level. In Balochistan, the unmet need for spacing is decreasing (-1.562**) it is significant and in case of limiting it decreasing without significant impact.

In the context of the place of residence, the findings show that if the respondents belong to urban areas, the unmet need for spacing is decreasing and statistically it is significant, but in case of the unmet need for limiting, it is declining, again without significant impact.

The education level of the partner also appears of significance as increase in education level decreases the probability of the unmet need for spacing. At primary level of the education, the unmet need for spacing (-2.357**) shows a significant decline. At secondary level of the partner education, it again shows significant declining impact (-1.649**). At the higher level

of education, the unmet need for spacing is also low (-1.175**) and it is statistically significant. In case of the unmet need for limiting, the partners' education shows no significant impact. It only shows a decreasing impact on the unmet need for limiting.

The results of the unmet need for spacing, if the woman is employed, shows a different picture. It explains that if women respondents are employed their unmet need for spacing is higher (2.253**) which is a very significant thing. In case of unmet need for limiting, there is no significance but it shows higher demand for limiting.

The results regarding spousal communication, our findings show that less spousal communication leads to higher demand for unmet need of spacing. The unmet need for spacing (CO=0.598***) shows a strong impact. In case of unmet need for limiting, if there is a lack of communication between the couples for contraceptive use or no use decision, the unmet need for limiting is also high (CO=0.708***). It means both are significant as the demand for both, spacing and limiting, in less communicative couples is high.

Moreover, our study shows exposure to media in both the cases— spacing and limiting —has no significant impact on the unmet need.

Spousal congruence is also an important indicator to understand the characteristics of the women in study on hand. It shows that if the respondent and the partner have a different desire for a child, their probability of unmet need for both — spacing & limiting— is high. According to the coefficient value (CO=0.386***, CI=.0288, .483), probability of unmet need for spacing is almost six times high. Spousal congruence in case of limiting is also high. The results shows that the probability (0.165***) of different couples' desires explains the higher unmet need for limiting.

4.8.3 Simple Multinomial Probit Model:

Table: 5 explains the characteristics by simple multinomial probit model.

Characteristics of women	Unmet Need for spacing		Unmet Need for limiting	
	β 's Coefficient values	95% CI	B 's Coefficient values	95% CI
Family Composition				
• 1st birth order RC	-	-	-	-
• 2nd birth order	0.068 (0.076)	-1.260 , -.044	0.512*** (0.144)	-.333, .790
• 3rd birth order	-0.116 (0.083)	-1.648 ,-.249	0.906*** (0.136)	-.044, 1.200
• 4+ births	-0.413*** (0.069)	-.396, .147	0.952*** (0.127)	.749,1.39
Wealth index				
• Poor RC	-	-	-	-
• Middle	-0.134* (0.072)	.233 , 3.388	-0.267*** (0.073)	-.853,1.94
• Rich	-0.276*** (0.081)	.562, 8.087	-0.417*** (0.083)	-1.725,4.54
Women age				
• 15-25 RC	-	-	-	-
• 25-35	-0.087 (0.058)	-.2.964 , -.371	0.723*** (0.093)	-.98, 1.180
• 35+	-0.929*** (0.074)	-.297 , 5.370	0.747*** (0.095)	-.232, 4.45

Women education level					
• No formal education [RC]	-	-	-	-	
• Primary	-0.157** (0.076)	.308 , 4.506	-0.110 (0.077)	-.842, 2.66	
• Secondary	-0.014 (0.077)	-.059, .327	0.058 (0.081)	-.070, .302	
• High	0.110 (0.096)	.005, .4181	-0.141 (0.111)	-.331, .127	
Province					
• Sindh [RC]	-	-	-	-	
• Punjab	-0.265*** (0.062)	-.099, 1.48	0.243*** (0.067)	-.040, 1.280	
• KPK	-0.118 (0.076)	-1.473 , -.233	0.242*** (0.084)	-.569, .475	
• Balochistan	0.096 (0.105)	-2.933 ,-.191	0.147 (0.121)	-1.66, .640	
Place of residence					
• Urban	-	-	-	-	
• Rural	0.075 (0.062)	-1.220 , -.042	-0.012 (0.064)	-.790,.204	
Partners/husband education					
• No formal education [RC]	-	-	-	-	
• Primary	0.132* (0.077)	-4.396, -.318	0.260*** (0.074)	-2.42, .969	

• Secondary	0.208*** (0.066)	-3.173 , -.126	0.109 (0.067)	-1.897, .640	
• High	0.128 (0.083)	.2.25, -.098	0.079 (0.090)	-1.340, .465	
Women owns decisions health					
• Not male dominant [RC]	-	-	-	-	
• Male Dominant	0.100** (0.051)	.002 , .203	0.211*** (0.053)	.108, .315	
Employment status					
• Unemployed [RC]	-	-	-	-	
• Employed	-0.395*** (0.076)	.086, 4.42	-0.029 (0.066)	-.157, .098	
Spousal Communication					
• Yes [RC]	-	-	-	-	
• No	0.590*** (0.100)	.402 , .793	0.703*** (0.106)	.496, .910	
Exposure to Media					
• Yes [RC]	-	-	-	-	
• No	0.014 (0.057)	-.980 , .127	0.048 (0.059)	-.080,.144	
Spousal congruence					
• Same [RC]	-	-	-	-	
• Different	0.386*** (0.050)	.0288 , .483	0.165*** (0.52)	.062, .267	
Constant	-2.370*** (0.207)	-5.34 ,-4.33	-4.835*** (0.256)	-5.34, -4.33	
Observations	**12,364**		**12,364**		

The results of the multinomial regression analysis explains a slightly different scenario of the unmet need for family planning. The results explain that increase in birth order increases the probability of the unmet need for limiting. In case of spacing, results shows that no significant impact at second and third birth order but at four-plus birth order the probability of the unmet need for spacing is decreasing (CO=-0.413***; CI=-.396, .147), and this thing is highly significant. Birth order shows strong impact in case of unmet need for limiting family planning. Increase in births increase the probability of the unmet need for limiting. At second birth (CO=0.512***; -.333, .790), the probability is more than fifty percent higher than the base category. At the second birth order, the unmet need for limiting is (CO=0.906***; -.044, 1.200) which shows an increase in the demand.

At four plus births unmet need for limiting is high (0.952***; .749, 1.39) it shows a little bit of decline in unmet need for limiting. It is statistically significant.

The second indicator is the wealth index. The poor wealth index is used as the base category in this study. If we have a look at the results of the wealth index, their coefficient values explain that an increase in the wealth status decreases the probability of having unmet need for spacing as well as unmet need for limiting. Therefore, wealth index has a slightly different explanation increase in the wealth (poor to middle), the probability of unmet need for spacing decreases (CO=-0.134*) and it is significant at p<0.01. The unmet need for limiting at middle wealth index also shows the decrease in the unmet need (CO=-0.267***), which again is highly significant.

The next index is the rich-wealth quintile. The increase in wealth status decrease the probability of the unmet need for spacing (-0.276***), which is highly significant. In rich-wealth index, the unmet need for limiting is declining (-0.417***), again a significant outcome.

The results of the women's age suggest that an increase in age decreases the overall probability of having unmet need for spacing. The base category is yearly reproductive years (15-25). If we compare early reproductive years (15-25) with the age group (25-35), their coefficient value explains that decrease in the unmet need for spacing (-0.087) and it is not significant, the unmet need for limiting at this stage increasing (0.723***) and its value is also highly significant.

The third age group is age group (35plus) its coefficient value determines that increase in age decrease the unmet need for spacing (-0.929***) which is a very significant result. The unmet need for limiting shows that increase (0.747***), again a significant thing.

Education plays an important role in the understating of the female. The results of the education are not as significant. Only primary level education shows a significant (-0.157**) impact on unmet need for spacing.

Province-wise demand for unmet need in terms of spacing is decreasing in Punjab and it is highly significant and, on the other side the unmet need for limiting is increasing, which again appears a thing of significant impact. The unmet need for spacing in KPK is decreasing and in Balochistan it is on the rise but both do not appear significant. For limiting, the demand in KPK is higher (0.242***) and that is very significant. In the case of Balochistan, it shows a positive impact, but shows no significance.

If the respondent belongs to rural areas, the unmet need for spacing is higher and unmet need for liming declines, but it does not show any significance.

Partners' education plays an important role in the basic understanding of the couples. Results suggest that if partners have a primary level education, their unmet need for spacing and

limiting both are increasing and here unmet need for limiting is highly significant. The middle education appears to show a significant impact on the unmet need for spacing but in case of limiting it does not show a statistically significant impact. Higher education level is also not significant in this context.

The decisions of the women respondents explains that if the decisions about women's health are taken by the men, as happens in a male dominated culture, that increases the probability of the unmet need for spacing & limiting. According to the coefficient value, the unmet need for spacing is (CO=0.100**; CI=.002, .203) and it is highly significant regarding the choice of the female respondents. In case of the unmet need for limiting, it appears to affect the respondent's decisions/choices. The coefficient value (CO=0.211***; CI=.108, .315) explains this as a positive impact on decision making that influences the unmet need for spacing.

If the respondent is employed than their demand for unmet need for spacing is decreasing (CO=-0.395***; CI=.086, 4.42) and it shows highly significant impact. In the case of unmet need for limiting the employment status of the female respondents have no significant impact.

In the context of the spousal communication, results explain that their unmet need for spacing is high if the decisions are not taken jointly. The unmet need for spacing (CO=0.598***) shows a strong impact on the unmet need for spacing. In case of limiting, if there is lack of communication between couples for decision about using or not using contraceptives, the unmet need for limiting is also higher (CO=0.703***) and this probability is highly significant in both cases.

The case of exposure to media again shows no significant impact on the unmet need for spacing and limiting.

Spousal congruence, being an important indicator to understand the characteristics of the women, shows that if the respondent and their partners have a different desire for a child, their

probability of the unmet need for & limiting both appears higher. According to coefficient value (CO=0.386***, CI=.0288, .483), probability of the unmet need for spacing is almost six times higher. Spousal congruence in case of limiting also appears high. The results show that the probability (0.165***) of different couples' desire for limiting is higher.

Chapter 5

Discussion:

There are numerous studies which have been conducted to explain the unmet need for family planning. However, the approach of this study is very different from them and comparing its results with those of other studies may seem an arduous task.

Though we, while reviewing the literature, have found that there are similar variables and results owing to the similar nature of determinants, a huge difference emerges in the results Hackman model is applied as an explanatory model. Let's discuss this thing below.

The determinants take into account important variables to determine if respondent women do face the unmet need for family planning or not. The most important of the independent variables **Birth Order**, and other independent variables like **women age**, **wealth index**, **region/area of residence (urban/rural)**, **women education, education of the partner, women employment status, exposure to mass media** too play an important part as determinants of the total unmet need for family planning. The birth order variable, used as a proxy for family composition, appears a strong predictor of the total unmet need. Increase in children almost doubles the unmet need (Crissman et al., 2012; Johnson & Madise, 2009, as our results transpire. Similarly, increase in wealth lowers the coefficient value of the unmet need, if it is referred to the poor wealth index category. In other words, if a person is affluent, the probability of her unmet need does go down. The unmet need for family planning is high in early reproductive years because growing old decreases the probability of the unmet need. The study has also transpired the bigger the education level of women, the greater the probability of the unmet need. The unmet need appears high in Punjab, KPK, and Balochistan but it appears lower, as you will come across in the findings, than Sindh which is our reference category in the study. If a respondent is from a rural area, then her unmet need is likely to be greater than those living in the urban areas. Education level of a spouse also exhibits similar results. The greater the education level of the respondent's husband, the less is the unmet need

of the respondent. Likewise, in case of respondents' having employment or an independent source of income, women's unmet need remains low. Mass media too plays an important role in this regard, but in this study respondents having bigger exposure to media have no significant probability of having the unmet need (Asif & Pervaiz, 2019).

The study further transpires that unmet need for spacing and limiting varies according to the characteristics of the respondents. The coefficient value (2nd, 3rd) shows that as the unmet need for spacing goes down, the unmet need for limiting goes up. The women having 4+ children are found likely to avoid spacing as they prefer to limit the family size.

In other words, the more the children, the unmet need for spacing is less two times than the reference category of the study and for limiting is three times higher. The women of affluent households face high unmet need for spacing, the coefficient value transpires that if a women is from an affluent family, it does not mean she doesn't have the unmet need for spacing (Crissman, Adanu, & Harlow, 2012; Johnson & Madise, 2009).

Moreover, the findings also suggest that unmet need for limiting is less even in the women of high-income families. If the results are compared with the reference category, we arrive at a striking conclusion that increase in age among women leads to bigger demand for spacing and less for limiting (Wulifan et al., 2019). It means that increase in women's age compels them to decide for spacing or delay their child-bearing decision for the next two years or more, but not for limiting the family size.

Education variable of women exhibits the unmet need for spacing as a declining trend in high education levels and unmet need for limiting appears to be on the higher side. It means that women with higher education are less likely to space their child-bearing decisions and more likely to limit the family size. Regarding findings at the provincial level, the unmet need for spacing is found on the declining side in Sindh (not significant), KPK (significant) Balochistan

(highly significant). The limiting side is higher in Punjab, KPK and Balochistan than that of Sindh. This appears highly significant in the case of Punjab while in all other provinces not very significant (Worku, Yalew, & Afework, 2013).

The results regarding rural/urban, the findings are very surprising. The respondents living in rural areas are facing less unmet need for spacing but their unmet need for limiting is higher. It may be due to the fact that the less educated, poor and rural women's use of family planning methods is greater than the educated or high income women, perhaps due to the availability of the family planning methods via family healthcare workers at their doorstep (Johnson & Madise, 2009).

The findings concerning partner's education, it appears that if a respondent's husband is educated, unmet need for spacing is on the higher side and the coefficient values appear to be decreasing for limiting the family size. It is because education provides a better understanding of contraception use (Crissman et al., 2012; Elfstrom & Stephenson, 2012; Tadele, Abebaw, & Ali, 2019) and has a great influence on the decision-making of contraception use. If the husband is more educated, his partner may have a greater purchasing power and greater access to family planning methods.

Women's autonomy or independence regarding healthcare decisions is of very importance. We have observed that if the decision-maker in the family is the husband or others, then the coefficient value of the unmet need for spacing & limiting appears to be on the higher side and both are statistically significant.

It means that if a husband is an educated person and makes household decisions himself, he may prefer large family sizes or may not agree to his partner's choice of the family size (Worku et al., 2013).

The couples lacking communication are usually dominated by the male partners who make household decisions which impacts the unmet need significantly in both the cases —spacing and limiting. The reason could be that Pakistan is a male dominated society and findings are aligned to that of previous studies (Ndaruhuye et al., 2009) perhaps because of lack of trust and confidence between couples, a la male dominated culture, sharing ideas is less common. In such circumstances, impact on unmet need for spacing & limiting could be significant (Jones & Gubhaju, 2009).

Regarding the respondents having employment, the unmet need for spacing & limiting appears high. The reason could be that employed women are likely to be more concerned about their family size, than the unemployed respondents. This findings is aligned to the previous study (Ndaruhuye et al., 2009).

The respondents' exposure to media shows significant increase in the probability of having unmet need for spacing and less for limiting the family size but that does not appear significant (Nishtar, Sami, Faruqi, & Khowaja, 2013).

Regarding couples' congruence approach, our study shows their desire for children also increases the probability of spacing & limiting of the family planning. It indicates that women's decisions are influenced by men (Elfstrom & Stephenson, 2012) and women's intention to utilize family planning services may be compromised because the decisions made by men usually prevail in male dominated culture/households (Tadele et al., 2019).

5.1 Inverse mills ratios:
Inverse mills ratio explains that there could be biases of the respondents in answering questions, which resultantly could affect the objectivity of the data and impact scientific spirit of the study. Our results from the Hackman model confirms that there are respondents' selection biases regarding demand of the unmet need for family planning.

So, there is a possibility in the data that women's demand for spacing could be confused for limiting the family size and vice versa due to ambiguous responses of the unmet need versus the met need. The coefficient rho (-22.561**) of the test for independence for the unmet need of spacing is statistically significant at $p<0.05$. It means that the sign of the coefficient indicates that error terms in the determinants equation are negatively correlated to the unmet need for spacing. The coefficient rho (-8.831) of the test of independence for the unmet need of limiting is statistically not significant but it does not affect the validity of the respondent choices. It means that the sign of the coefficient indicates that error terms in the determinant equations are positively correlated to the unmet need for limiting. So it means that those who have selected their unmet need for spacing & limiting both are decreasing.

The characteristics of the female respondents differ whereby their choices/demands of the unmet need for spacing and limiting vary. But this difference in demands, presumably resulting from the different characteristics of the respondents, could be an outcome of their (respondents) individual biases who, either mistakenly or owing to cultural taboos, may blur the distinction, knowingly or unknowingly, between the two choices/demands of limiting and spacing. The impact may be that one choice is confused with the other or one (spacing) may be identified as the other (limiting) or vice versa. So understanding the women respondents, who could not express their demand (or no demand) is very important. A respondent may not be able to clearly express herself, owing to different factors like social norms, cultural taboos, religious practices etc. despite having a higher demand for her unmet need, which could be either of the two---spacing & limiting. The selection equation of the determinants of the unmet need equation tends to express such factors characteristics of the women equation that divides them into two categories---with lower probability of being with the unmet need for spacing, as compared to those who are not selected and are on higher probability of being with the unmet need for limiting. It means that the women not demanding or expressing in clear terms may

have a higher level of unmet need for spacing and low level of for limiting (Hooimeijer, Broekhuis, & Muhoza Ndaruhuye, 2015).

Chapter 6

6.1 Summary and Conclusions:

The Unmet need for family planning methods is a major issue for the developing countries. This was of paramount importance in the MDGS and now in the SDGS. In SDGS, the sexual and reproductive health has been recognized as a basic human right. Pakistan is one of the pioneers of the family planning and reproductive health initiative. But Pakistan, like several other developing nations, has failed to successfully deal with this challenge.

One of the objectives of this study is to explore the reasons that have held Pakistan back in achieving the desired results. Investigating the characteristics of women to explain the unmet need for spacing and limiting may help us understand the factors and our findings may feed in the policy-making process for future to strengthen the family planning initiative. We have used different socio-demographic predictors to identify the characteristics.

The use of Multivariate and Multinomial regression has been in practice since long in biological and medical fields but we have used the Hackman sample selection model in this study to explore the characteristics of the respondent women. The use of the Hackman model makes this study significant because there is none of the studies available that used these techniques to fill the research gap. The women whose need is met in family planning is obviously observable but there is a huge number that remains unnoticed, being a large number whose need is unmet. This consequently results as a research gap being the data is unobtainable. In this study, an attempt has been made to fill that gap because the Hackman sample selection model helps us deepen our understanding, exposing the underlying features of the women having unmet need. This data visibility exemplifies the features like their choices, intentions, and behavioral patterns involved in the unmet need and consequently impacting the family

planning. Whereas the simple normal multinomial probit model only explains the characteristics of the observed women.

In this study, an attempt has been made to explore the effects of different exposure related variables on the unmet need for family planning, like parity, exposure to media, and access to healthcare facilities. There is strong association between the unmet need for spacing and limiting and different variables like birth order, decisions of women's own health, spousal communication and spousal congruence. The impact of family composition on the unmet need for family planning was also explored with help of two models. The birth order is used for the family composition.

In the model 1, we estimate the determinants of total unmet need by using the Bivariate Probit Model. The second model is Multinomial Probit because the dependent variable of the second stage is in three categories, then we have applied the Hackman technique on a sample selection model. We generated the inverse mills ratios as an independent variable from the 1st equation which is the selection equation and bivariate model to control the selection bias in their choices included in the second model which is the outcome equation at this stage and for that we have used multinomial probit model.

By analyzing the different models and techniques, the study suggests that the characteristics of the women respondents' for the unmet need for spacing and unmet need for limiting are different.

According to the co-efficient value of the (rho) form of the Hackman model, characteristics of the female respondents—which leads to the unmet need for spacing and limiting— are different. By analyzing the different models, the study also suggests that the results of the Hackman model are more significant, so the value addition of the study is that Hackman goes beyond the limitation of the Multinomial Model and applies to the whole data, so sub-division

of the data is not required. Now the unobserved or hidden attributes of the data, like female characteristics—largely unobserved in other models—are visible which makes this study more significant because the total sample in a single model, instead of dividing them into different sub-set, groups or subgroups, adds to deepen the understanding of the issue on hand. Which means that the Hackman model provides the best solution to understand the characteristics of the women leading them to the unmet need for spacing and limiting. The Hackman is more significant in the case of each predictor.

In all three models of the study, increase in family composition, the unmet need for spacing is decreasing and for limiting is increasing. The wealth index explains a different picture. The unmet need for spacing is high in the richest wealth quintiles, which indicates that being in a high wealth index does not guarantee met the need of family planning. High ratio of women are unemployed, which has a strong influence on the unmet need for family planning because employed women are likely to be more empowered and can make a better decision in use of the family planning methods. The government should take stringent measures in public policy initiatives to remove the socio-economic and cultural barriers to decrease the unemployment level of women.

Media role in reproductive health and awareness is very crucial. The family planning interventions and upcoming economic development initiatives need to be integrated like an organic whole. At present gaps could be identified and minimized developing different media strategies.

6.2 Recommendations:
  ➢ This study provides insight into the women's family planning status. This illustrates that women's family planning status is complex and trajectory in measurement. There are ambiguities in classifications of the unmet need. The whole issue revolves around two categories, classified as met need and unmet need but those having no demand are

ignored or found missing. The women not demanding any type of family planning methods are at high risk. This could be a huge number of women. The women who have discontinued any method and currently are not practicing any method are also included in no-demand category). So this could turn out a considerable part of our women and there is no any mechanism within the family planning initiatives to target that portion and this thing consequently may adversely impact our different family planning initiatives. The government must come up with a new strategy to break this silence of the missing numbers. What it transpires is that definition of demographic and health survey, regarding unmet need and met need, needs to be revised. And **no-demand,** along with met need & unmet need, category too needs to be incorporated.

➢ The government must revise its present media strategies. There is a need to analyze the present and past media strategies as they have failed to bring about the desired result. One of the reasons is that present and past media campaigns/strategies primarily focus on arresting the trend of increase in population from the angle of convincing people to curtail family size. In most public forum debates, this focus is criticized as being in conflict with fundamental rights of the people. The critic says that the decision about the size of the family rests with the couples and the government strategies appear here as an attempt to compromise the rights of the people. Here our recommendation in this regard is that focus from curtailing the size of the family, the desired results could be achieved from diverting resources from curtailing family size to human development sectors like quality education, economic empowerment of women and healthcare provision. The raising awareness about the issue through educational contents, to be taught at institutions, and empowering women economically would help bring about more positive results and deepen social understanding about the gravity of the issue.

6.2.1 Sideline recommendation

➢ One more thing that needs additionally to be recommended is that family planning initiatives should not solely or exclusively focus birth controls or childbearing issues, it must also include Child rearing or bringing up children within its mandate, as this would help curb the social evils like child abuse. The family planning initiatives could also provide different interventions to educate women about upbringing of their children. The child-bearing and child-rearing as two components should walk in tandem under the umbrella of family planning initiative. Pakistan is signatory to several international conventions and commitments that promise to ensure protection of the child rights and welfare. Despite having the commitment, Pakistan's track record is not very envious and lacks progress in this direction. Thousands of children are still out of schools and begging in streets and roads exemplifies that child-friendly society is a distant dream. The Article 25-A demands that free education is the right of every child and Article 37-A says that no child could be subjected to torture, any cruel, inhuman or degrading treatment. Children as street beggars are the worst example of degrading treatment and this development of children is nauseating. The government must come up with necessary legislation and redesign family planning initiatives to include child upbringing component within the mechanism from national level to the grass root level, The National Commission on the Rights of Child, Human Rights Ministry, Social Welfare departments, provincial population and demographic wings, schools education departments all must devise a mechanism to have good coordination so the state policies may be implemented at the provincial and district level in letter and spirit to eliminate different forms of child abuse.

6.3 Limitations of the study:

➢ One of the main limitations this study comes with is the cross-sectional nature of the DHS data. This type does not allow researchers to establish a cause-and-effect

relationship between dependent and exposure variables. The best this type of data can

provide is the correlation among variables that may exist at a particular point in time.

REFERENCES:

Abbasi, Y., Shaikh, S. R., & Memon, K. N. (2020). Barriers and missed opportunities towards immediate and early postpartum family planning methods in Pakistan. *The Professional Medical Journal, 27*(07), 1448-1453.

AHMED, F. (2018). Analysıs of The Prevalence, Trends, Determınants and Dynamıcs of Contraceptıve Use and Estımate of Unmet Need For Famıly Plannıng in Pakıstan. *openaccess.hacettepe.edu.tr, 9*.

Ajong, A. B., Njotang, P. N., Yakum, M. N., Essi, M. J., Essiben, F., Eko, F. E., . . . Mbu, E. R. (2015). Determinants of unmet need for family planning among women in Urban Cameroon: a cross sectional survey in the Biyem-Assi Health District, Yaoundé. *BMC women's health, 16*(1), 1-8.

Alhainiah, M. H., Abdulljabbar, H. S., & Bukhari, Y. A. (2018). The prevalence, the fetal and maternal outcomes in grand multiparous women. *Materia socio-medica, 30*(2), 118.

Amoakoh-Coleman, M., Ansah, E. K., Agyepong, I. A., Grobbee, D. E., Kayode, G. A., & Klipstein-Grobusch, K. (2015). Predictors of skilled attendance at delivery among antenatal clinic attendants in Ghana: a cross-sectional study of population data. *BMJ open*, *5*(5), e007810. https://doi.org/10.1136/bmjopen-2015-007810

https://doi.org/10.1111/sifp.12084

Ali, M., Azmat, S. K., & Hamza, H. B. (2018). Assessment of modern contraceptives continuation, switching and discontinuation among clients in Pakistan: study protocol of 24-months post family planning voucher intervention follow up. *BMC health services research, 18*(1), 1-7.

Ali, T. S., Karmaliani, R., Shah, N. Z., Bhamani, S. S., Khuwaja, H. M. A., McFarlane, J., . . . Kulane, A. (2020). Community stakeholders' perspectives regarding acceptability of a life skills building intervention to empower women in Pakistan. *Research in Nursing & Health, 43*(6), 579-589.

Asif, M. F., & Pervaiz, Z. (2019). Socio-demographic determinants of unmet need for family planning among married women in Pakistan. *BMC public health, 19*(1), 1-8.

Bashir, S., & Guzzo, K. (2021). Women's Education, Spousal Agreement on Future Fertility Intentions, and Contraceptive Use in Pakistan. *Studies in Family Planning*.

Bashir, S., & Guzzo, K. J. S. i. F. P. (2021). Women's Education, Spousal Agreement on Future Fertility Intentions, and Contraceptive Use in Pakistan. *Studies in Family Planning*

Basu, D., & de Jong, R. (2010). Son targeting fertility behavior: some consequences and determinants. *Demography, 47*(2), 521-536. doi:10.1353/dem.0.0110

Bawah, A. A., Assuming, P., Achana, S. F., Kanmiki, E. W., Awoonor-Williams, J. K., & Phillips, J. F. (2019). Contraceptive use intentions and unmet need for family planning among reproductive-aged women in the Upper East Region of Ghana. *Reproductive health, 16*(1), 1-9.

Bellows, B., Ali, M., & Mir, A. M. (2020). Best Bets: Vouchers for Rights-based, Voluntary Family Planning—International evidence on financing of family planning. *knowledge commons.popcouncil.org, 7.*

Bengtsson, T., & Dribe, M. The Historical Fertility Transition at the Micro Level: Why some are so early and some so late.

Brown, W., Druce, N., Bunting, J., Radloff, S., Koroma, D., Gupta, S., . . . Darmstadt, G. L. J. S. i. f. P. (2014). Developing the "120 by 20" goal for the Global FP2020 Initiative. *The International Planned Parenthood Federation (IPPF). United Kingdom,. 45*(1), 73-84.

Catalao, R., Medhin, G., Alem, A., Dewey, M., Prince, M., & Hanlon, C. (2020). Mental health impact on the unmet need for family planning and fertility rate in rural Ethiopia: a population-based cohort study. *Epidemiology and Psychiatric Sciences, 29*.

Chandra-Mouli, V., Svanemyr, J., Amin, A., Fogstad, H., Say, L., Girard, F., & Temmerman, M. (2015). Twenty years after International Conference on

Population and Development: where are we with adolescent sexual and reproductive health and rights? *Journal of Adolescent Health, 56*(1), S1-S6.

Channon, M. D. (2017). Son preference and family limitation in Pakistan: a parity-and contraceptive method–specific analysis. *International perspectives on sexual and reproductive health, 43*(3), 99-110.

Chauhan, B. G., & Nagarajan, R. (2019). Contraceptive use and unmet need for family planning among women with at least one child in rural Uttar Pradesh: the role of wealth and gender composition of children. *Journal of Public Health, 27*(5), 637-648.

Coale, A. J., & Rives, N. W. (1973). A statistical reconstruction of the black population of the United States 1880-1970: estimates of true numbers by age and sex, birth rates, and total fertility. *Population Index*, 3-36.

Crissman, H. P., Adanu, R. M., & Harlow, S. D. (2012). Women's sexual empowerment and contraceptive use in Ghana. *Studies in Family Planning, 43*(3), 201-212.

Dockalova, B., Lau, K., Barclay, H., & Marshall, A. (2016a). Sustainable development goals and family planning 2020. *The International Planned Parenthood Federation (IPPF). United Kingdom*, 1-12.

Dockalova, B., Lau, K., Barclay, H., & Marshall, A. J. T. I. P. P. F. U. K. (2016b). Sustainable development goals and family planning 2020. *The International Planned Parenthood Federation . United Kingdom.*, 1-12.

Elfstrom, K. M., & Stephenson, R. (2012). The role of place in shaping contraceptive use among women in Africa. *PloS one, 7*(7), e40670.

Faiz, A. S., Rhoads, G. G., Demissie, K., Kruse, L., Lin, Y., & Rich, D. Q. (2012). Ambient air pollution and the risk of stillbirth. *American journal of epidemiology, 176*(4), 308-316.

Getaneh, T., Negesse, A., Dessie, G., Desta, M., & Moltot, T. (2020). Predictors of unmet need for family planning in Ethiopia 2019: a systematic review and meta analysis. *Archives of Public Health, 78*(1), 1-11.

Hailemariam, A., & Haddis, F. (2011). Factors affecting unmet need for family planning in southern nations, nationalities and peoples region, Ethiopia. *Ethiopian journal of health sciences, 21*(2), 77-90.

Hooimeijer, P., Broekhuis, E., & Muhoza Ndaruhuye, D. (2015). Demand and unmet need to space births in Rwanda: A two-step analysis of determinants. *Journal of Population and Social Studies, 23*(1), 57-72.

Jennings, L., Na, M., Cherewick, M., Hindin, M., Mullany, B., & Ahmed, S. (2014). Women's empowerment and male involvement in antenatal care: analyses of Demographic and Health Surveys (DHS) in selected African countries. *BMC pregnancy and childbirth, 14*(1), 1-11.

Johnson, F. A., & Madise, N. J. (2009). Examining the geographical heterogeneity associated with risk of mistimed and unwanted pregnancy in Ghana. *Journal of biosocial science, 41*(2), 249-267.

Jones, G. W., & Gubhaju, B. (2009). Factors influencing changes in mean age at first marriage and proportions never marrying in the low-fertility countries of East and Southeast Asia. *Asian Population Studies, 5*(3), 237-265.

Kantorová, V., Wheldon, M. C., Ueffing, P., & Dasgupta, A. N. (2020). Estimating progress towards meeting women's contraceptive needs in 185 countries: A Bayesian hierarchical modeling study. *PLoS medicine, 17*(2), e1003026.

Khan, A. H., Nawaz, M. M., Aleem, M., & Hamed, W. J. A. j. o. b. m. (2012). Impact of job satisfaction on employee performance: An empirical study of autonomous Medical Institutions of Pakistan. *6*(7), 2697-2705.

Khumayah, S., & Siswoyo, M. (2019). Male family planning program as an effort to suppress population growth in Indonesia. *Asian Journal of Social Sciences & Humanities Vol, 8*, 3.

Khurram Azmat, S., Tasneem Shaikh, B., Hameed, W., Mustafa, G., Hussain, W., Asghar, J., . . . Bilgrami, M. (2013). Impact of social franchising on contraceptive use when complemented by vouchers: a quasi-experimental study in rural Pakistan. *PloS one, 8*(9), e74260.

Lompo, M. L., & Bago, J.-L. (2018). Estimating the Impact of School Education on Contraception Use among Adolescents Aged 15-19 in Burkina Faso and Nigeria Using a Heckman Correction Model. *Journal of Education and Learning, 7*(5), 31-41.

Mustafa, G., Azmat, S. K., Hameed, W., Ali, S., Ishaque, M., Hussain, W., . . . Munroe, E. (2015). Family planning knowledge, attitudes, and practices among married men and women in rural areas of Pakistan: Findings from a qualitative need assessment study. *International journal of reproductive medicine, 2015*.

Mutiara, E., Sitorus, A., & Novita, S. R. (2020). Determinants of Unmet Need for Family Planning among Married Women Age 15-49 in Sumatera Utara Province (Analysis of 2017 RPJMN Data). *Indian Journal of Public Health Research & Development, 11*(3).

Najmi, H., Ahmed, H., Halepota, G., Fatima, R., Yaqoob, A., Latif, A., . . . Khursheed, A. (2018). Community-based integrated approach to changing women's family planning behavior in Pakistan, 2014–2016. *Public Health Action, 8*(2), 85-90.

Ndaruhuye, D. M., Broekhuis, A., & Hooimeijer, P. (2009). Demand and unmet need for means of family limitation in Rwanda. *International perspectives on sexual and reproductive health, 9*, 122-130.

Ngome, E., & Odimegwu, C. (2014). The social context of adolescent women's use of modern contraceptives in Zimbabwe: a multilevel analysis. *Reproductive health, 11*(1), 1-14.

Nishtar, N., Sami, N., Faruqi, A., & Khowaja, S. (2013). Myths and fallacies about male contraceptive methods: a qualitative study amongst married

youth in slums of Karachi, Pakistan. *Global journal of health science, 5*(2), 84.

Nkoka, O., Mphande, W. M., Ntenda, P. A., Milanzi, E. B., Kanje, V., & Guo, S. J. (2020). Multilevel analysis of factors associated with unmet need for family planning among Malawian women. *BMC public health, 20*, 1-12.

Noreen, K., Khan, K. A., Khan, N., Khan, S. A., & Khalid, N. (2018). Contraceptive Prevalence Rate, Unmet Need for Family Planning and Its Associated Factors among Women of Reproductive Age Group. *Pakistan Journal of Public Health, 8*(2), 63-69.

Okigbo, C. C., Speizer, I. S., Domino, M. E., Curtis, S. L., Halpern, C. T., & Fotso, J. C. (2018). Gender norms and modern contraceptive use in urban Nigeria: a multilevel longitudinal study. *BMC women's health, 18*(1), 1-17.

Pasha, M. K. (2016). *Investigating Pakistan's Contraception Rate Plateau: A Multilevel Analysis to Understand the Association between Community Contextual Factors and Modern Contraception Use.* University of South Florida,

Potter, J. E., & Mundigo, A. I. (2005). Fertility planning. In *Handbook of Population* (pp. 733-759): Springer.

Pradhan, J., & Dwivedi, R. (2015). Why unmet need for family planning remains high in Bangladesh: a community level analysis. *Journal of women's health care, 4*, 1-7.

Punjani, N. (2018). Determinants associated with unmet need for family planning in Pakistan. *J Womens Health, Issues Care 7, 1*, 2.

Sedgh, G., Ashford, L. S., & Hussain, R. (2016). Unmet need for contraception in developing countries: examining women's reasons for not using a method.

Sehar-un-Nisa Hassan, S. S., & Mahmood, A. J. P. J. o. M. S. (2015). Achieving fertility control through women's autonomy and access to maternal healthcare: Are we on track? In-depth analysis of PDHS-2012-13. *31*(6), 1355.

Solanke, B. L., Oyinlola, F. F., Oyeleye, O. J., & Ilesanmi, B. B. (2019). Maternal and community factors associated with unmet contraceptive need among childbearing women in Northern Nigeria. *Contraception and reproductive medicine, 4*(1), 1-12.

Tadele, A., Abebaw, D., & Ali, R. (2019). Predictors of unmet need for family planning among all women of reproductive age in Ethiopia. *Contraception and reproductive medicine, 4*(1), 1-9.

Whidden, C., Keita, Y., Treleaven, E., Beckerman, J., Johnson, A., Cissé, A., . . . Kayentao, K. (2021). Women's empowerment, intrahousehold influences, and health system design on modern contraceptive use in rural Mali: a multilevel analysis of cross-sectional survey data. *Reproductive health, 18*(1), 1-16.

Worku, A. G., Yalew, A. W., & Afework, M. F. (2013). Factors affecting utilization of skilled maternal care in Northwest Ethiopia: a multilevel analysis. *BMC international health and human rights, 13*(1), 1-11.

Wulifan, J. K., Jahn, A., Hien, H., Ilboudo, P. C., Meda, N., Robyn, P. J., . . . De Allegri, M. (2017). Determinants of unmet need for family planning in rural Burkina Faso: a multilevel logistic regression analysis. *BMC pregnancy and childbirth, 17*(1), 1-11.

Wulifan, J. K., Mazalale, J., Kambala, C., Angko, W., Asante, J., Kpinpuo, S., & Kalolo, A. (2019). Prevalence and determinants of unmet need for family planning among married women in Ghana-a multinomial logistic regression analysis of the GDHS, 2014. *Contraception and reproductive medicine, 4*(1), 1-14.

APPENDIX-A

Variable measurements and their respective expected sign on unmet need.			
Characteristics	**N=12, 364**	**Percentage (%)**	**Hypothesized/ expected coefficient**
Family composition			
1st birth order	1687	13	+
2nd birth order	1840	15	
3rd birth order	1909	16	
4+ births	6926	56	
Wealth index			
Poor	4086	38	+
Middle	2178	21	
Rich	4437	41	
Women age			
15-25	1581	15	+
25-35	4422	41	
35-44	3191	29	
44-49	1507	15	
Women Education			
No education	5401	50	+
Primary	1744	17	
Middle	2205	20	
High	1349	13	

Province			
Punjab	5716	53	-
Sindh	2490	24	
KPK	1633	15	
Balochistan	556	5	

Place of Residence			
Urban	6702	62	-
Rural	4000	38	

partner Education			
No Education	3055	30	+
Primary	1424	16	
Secondary	3568	34	
High	1971	19	

Women working status			
Un-employed	8780	82	+
Employed	1922	18	

Spousal Communication			
No	7990	65	+
Yes	4373	35	

Exposure to media			
Yes exposed	6564	53	-
Not exposed	5799	47	

Women own health care decisions			
Not male dominant	6384	52	-
Male dominant	5979	48	+

Spousal congruence			
No	7044	57	+
Yes	5319	43	
Total	**12,364**	**100**	

APPENDIX B

Univariate analysis:

a.

birth order	Freq.	Percent	Cum.
1	1687.595	13.65	13.65
2	1840.377	14.88	28.53
3	1909.352	15.44	43.98
4 or higher	6926.676	56.02	100.00
Total	12364	100.00	

b.

Wealth	Freq.	Percent	Cum.
1	4687.351	37.91	37.91
2	2503.904	20.25	58.16
3	5172.745	41.84	100.00
Total	12364	100.00	

c.

Age Group	Freq.	Percent	Cum.
15-25	2488.726	20.13	20.13
25-35	4960.502	40.12	60.25
35+	4914.773	39.75	100.00

Total	12364	100.00

d.

education level of respondent	Freq.	Percent	Cum.
no formal education	6080.407	49.18	49.18
primary education	2036.584	16.47	65.65
Secondary	2622.848	21.21	86.86
higher education	1624.161	13.14	100.00
Total	12364	100.00	

e.

Province	Freq.	Percent	Cum.
Sindh	2850.471	23.05	23.05
Punjab	6737.238	54.49	77.55
KPK	2134.714	17.27	94.81
Balochistan	641.5768	5.19	100.00
Total	12364	100.00	

f.

przd	Freq.	Percent	Cum.
1	4550.375	36.80	36.80
2	7813.625	63.20	100.00
Total	12364	100.00	

g.

	Freq.	Percent	Cum.
no formal education	4048.462	32.74	32.74
primary education	1839.96	14.88	47.63
secondary education	4165.165	33.69	81.31
higher education	2310.413	18.69	100.00
Total	12364	100.00	

h.

Employment Status	Freq.	Percent	Cum.
Un employed	10227.58	82.72	82.72
Employed	2136.417	17.28	100.00
Total	12364	100.00	

i.

Tabulation of Spousal communication

	Freq.	Percent	Cum.
No	7990.494	64.63	64.63
Yes	4373.506	35.37	100.00
Total	12364	100.00	

j.

Tabulation of exposure _media

Exposure to Mass Media	Freq.	Percent	Cum.
Not Exposed	5799.321	46.90	46.90
Exposed	6564.679	53.10	100.00
Total	12364	100.00	

k.

Tabulation of women health care decisions

Healthcare decision	Freq.	Percent	Cum.
Not male dominated	6384.567	51.64	51.64
Male dominated	5979.434	48.36	100.00
Total	12364	100.00	

l.

Tabulation of Spousal Congruence

Spousal congruenc	Freq.	Percent	Cum.

e			
yes	6900.5 35	55.81	55.81
no	5463.4 65	44.19	100.00
Total	12364	100.00	

…………………………....**THE END**………………………………