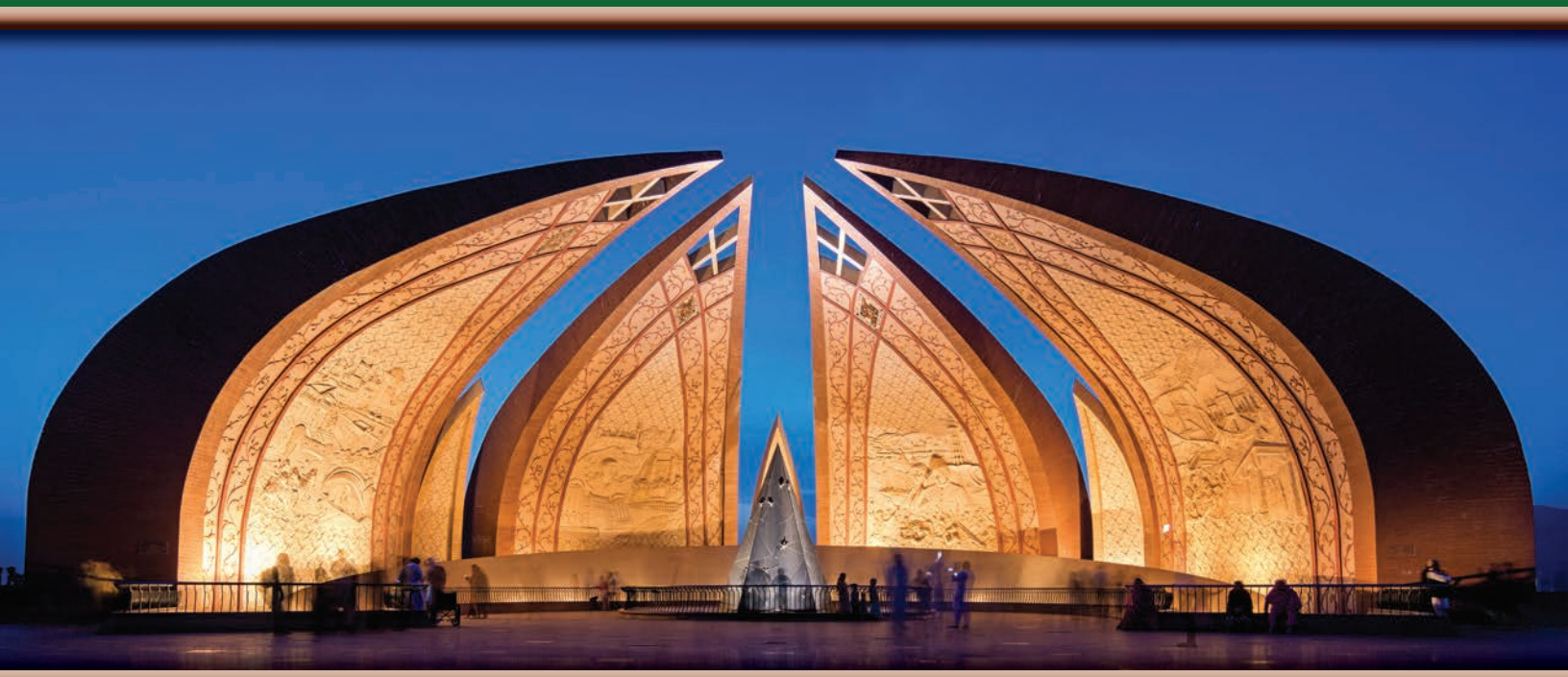
Trends, Differentials, and Determinants of Modern Contraceptive Use in Pakistan, 1990-2018



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Trends, Differentials, and Determinants of Modern Contraceptive Use in Pakistan, 1990-2018

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The DHS Program assists countries worldwide in the collection and use of data to monitor and evaluate population, health, and nutrition programs. Additional information about The DHS Program can be obtained from ICF, 530 Gaither Road, Suite 500, Rockville, MD 20850 USA; telephone: +1 301-407-6500, fax: +1 301-407-6501, email: info@DHSprogram.com, internet: www.DHSprogram.com.

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ABSTRACT

This study establishes trends in the use of contraception, describes regional, residence, education, and wealth-based differentials in contraceptive use over time, and identifies factors associated with contraceptive use. We use data on currently married women from four demographic and health surveys conducted in Pakistan between 1990-91 and 2017-18. We contrast patterns in modern contraception with traditional contraception, and examine specific modern contraceptive methods.

We find that gains in contraceptive use largely accrued before 2006-07 and stalled since 2012-13, with the modern method mix largely unchanged since 1990-91. Condoms (9%) and female sterilization (8%) dominate, with other modern methods lagging in prevalence (<3%).

This study also finds prominent differentials in contraceptive use. Modern contraceptive use is higher among urban women, more educated women, and women from wealthier households. Regional differentials have become more pronounced over time and are particularly sizable for female sterilization. Wealth and educational differentials have largely narrowed over time.

Region, education, and wealth remain important correlates of modern contraceptive use, even after controlling for other factors, as does the number of living children and, for female sterilization and IUDs only, women's working status. The husband's characteristics do not factor strongly in women's modern contraceptive use. Contraceptive decision-making is more pertinent to women's modern contraceptive use than household decision-making, and is inhibited when husbands are the primary decision maker of contraceptive decisions. In contrast, joint decision-making facilitates overall modern contraceptive use and the use of condoms in particular. Contraceptive use is reduced when the decision is made by someone other than the woman or her husband. Furthermore, modern contraceptive use (particularly condoms and female sterilization) is reduced when women live in an extended household. Our study finds that women's use of contraception increases with increasing intensity of desire to delay or avoid a birth. Nonetheless, more than half of women who want no more children and nearly three-quarters of women who want a delay of at least 2 years are not using any modern method of contraception. A sizable proportion of women who want no more children rely on short-acting, reversible methods.

This study finds support for expanding services population-wide, in combination with targeting disadvantaged population subgroups, expanding the range of available methods, and combining service improvements with promoting women's empowerment, gender equity, and social behavior change initiatives targeted to men and other family members.

Key words: modern contraceptive use, trends, differentials, inequality, decision making

ACRONYMS AND ABBREVIATIONS

AJK	Azad Jammu and Kashmir
CIP	costed implementation plan
CPR	contraceptive prevalence rate
CSO	civil society organization
DHMT	District Health Management Team
DHS	Demographic and Health Survey
EC	emergency contraception
FANA	Federally Administered Northern Areas
FATA	Federally Administered Tribal Areas
ICT	Islamabad Capital Territory
IUD	intrauterine device
LAM	lactational amenorrheic method
LARC	long-acting, reversible contraception
LSO	local support organization
MARVI	Marginalized Area Reproductive Health and Family Planning Viable Initiative
mCPR	modern contraceptive prevalence rate
NIPS	National Institute of Population Studies
NWFP	North West Frontier Province
PDHS	Pakistan Demographic and Health Survey
PLGO	Pakistan Local Government Ordinance
RRR	relative risk ratio
SDM	standard days method

1 INTRODUCTION

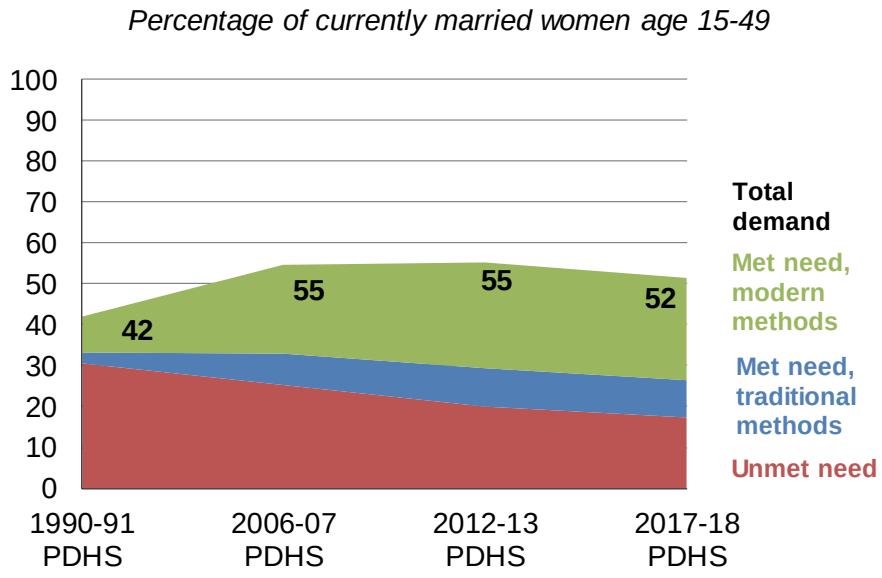
1.1 Background

Since the 1950s, Pakistan has had an active family planning program, which was initially borne of a concern with population growth and expressed through a series of 5-year plans. More recently, Pakistan was one of the early signatories that made commitments to the London Summit on Family Planning in 2012 (Family Planning 2020). Pakistan's current commitments toward the FP2020 initiative are increasing its contraceptive prevalence rate to 55% of currently married women and reaching an additional 6.7 million contraceptive users by 2030 (Family Planning 2020). The 18th constitutional amendment that was passed in April 2020 resulted in devolution of powers and responsibilities to the provinces for setting their own family planning goals in support of FP2020 commitments. Each of the four provinces—Punjab, Sindh, Balochistan, and Khyber Pakhtunkhwa—have developed Costed Implementation Plans (CIPs) (Family Planning 2020).

An opportunity assessment by Track20 notes that Pakistan is at a stage where, given improvements in contraceptive availability, there could be rapid growth in its modern contraceptive prevalence rate (mCPR) without increasing demand (Track20 2018a). As such, Pakistan is pursuing strategies such as strengthening public-private partnerships to compensate for public health delivery systems that do not have sufficient capacity to meet existing demand (Ahmed et al. 2019; Kamran et al. 2019).

Despite ambitious goals, data from successive Demographic and Health Surveys (DHS) in Pakistan indicate that early gains in the demand for family planning and contraceptive use have stalled. As shown in Figure 1, unmet need for family planning, which had been decreasing since 1990, plateaued between 2012-13 and 2017-18 (National Institute of Population Studies - NIPS/Pakistan and ICF 2019).

Figure 1 Trends in the demand for family planning



Note: Excludes Azad Jammu and Kashmir and Gilgit Baltistan

Source: Figure 7.7, NIPS/Pakistan and ICF 2019

Currently, approximately 49% of married women have no need for family planning, 34% have a met need, and 17% have unmet need. Met need that is for limiting (25%) is nearly threefold that for spacing (9%) (National Institute of Population Studies - NIPS/Pakistan and ICF 2019). In contrast, unmet need for spacing (10%) exceeds that for limiting (8%). Female sterilization (8.8% of currently married women) is one of the most common modern methods of contraception, exceeded only by the use of male condoms (9.2%). Use of other modern methods lags, with no more than 3% of currently married women using injectables, intrauterine devices (IUDs), or the pill. These data suggest the need to expand the use of short-term, modern methods in order to meet existing demand (Ross and Stover 2013; Ross and Hardee 2012).

1.2 Study Purpose

Given the need to expand the use of short-term, modern methods to meet demand, this study explores time trends, differentials, and determinants of the use of modern methods, both overall and by method. The specific objectives of this study are to:

1. Establish trends in the use of modern contraception and in specific modern methods from 1990-91 to 2017-18;

2. Describe differentials in modern contraceptive use based on region, residence, wealth, and education; and

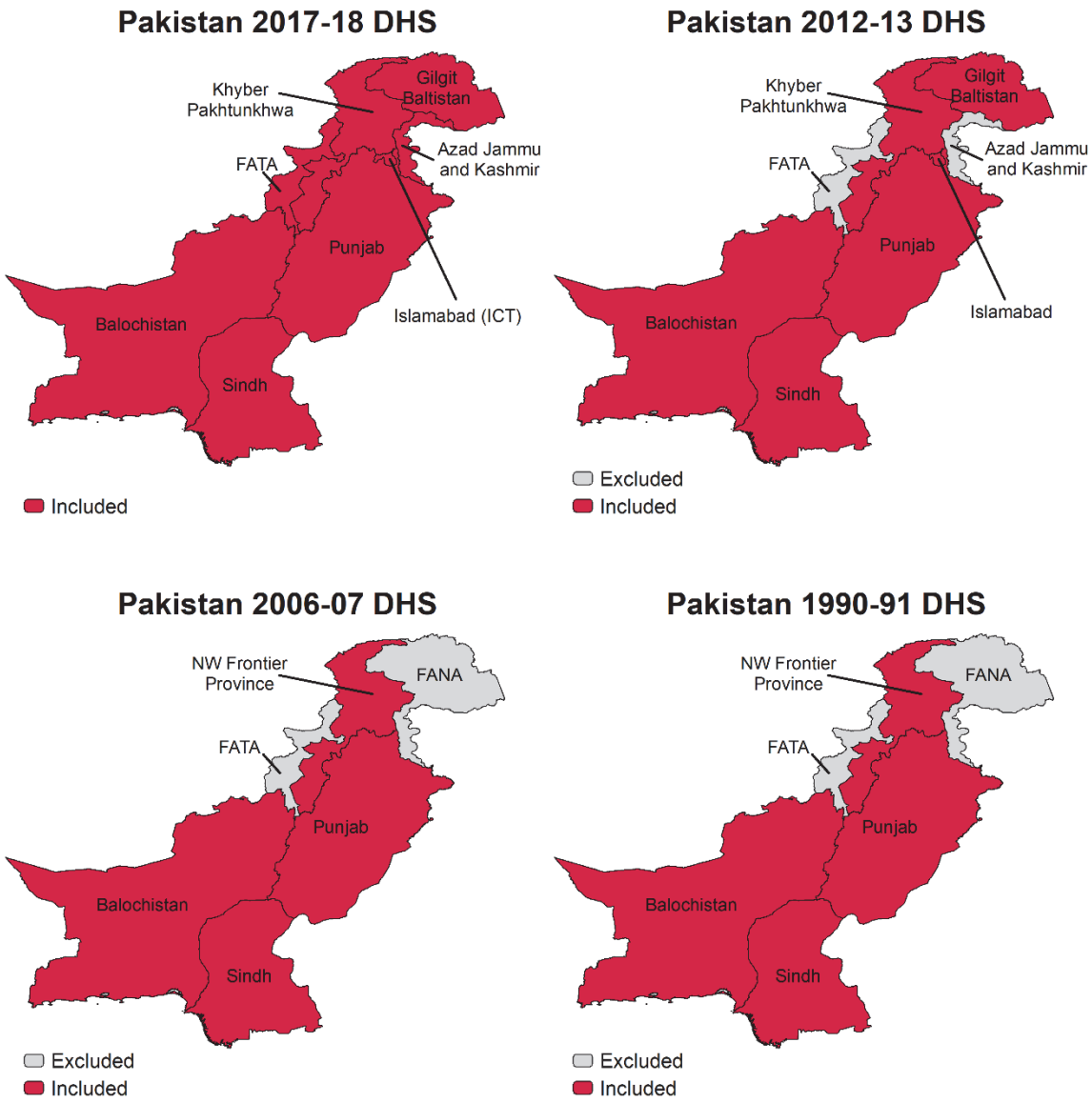
3. Determine factors associated with the use of modern contraception and specific modern methods.

2 DATA AND METHODS

2.1 Data

Four surveys have been conducted in Pakistan. This study uses data from standard women's recode (IR) files for the 1990-91, 2006-07, 2012-13, and 2017-2018 Pakistan DHS (PDHS) surveys to assess trends over time. Each of these surveys are representative at the national level, provincial level, and of urban and rural areas. However, the territory covered in each of these surveys is not equivalent, as illustrated in Figure 2 below.

Figure 2 Regional coverage in Pakistan Demographic and Health Surveys



Coverage has improved over successive surveys. The most recent, the 2017-18 PDHS, is the first survey to have complete coverage: its data represents the population of Pakistan including all four provinces and the regions of Azad Jammu and Kashmir (AJK), the former Federally Administrated Tribal Areas (FATA), and Gilgit Baltistan, which were not included in all prior surveys (National Institute of Population Studies - NIPS/Pakistan and ICF 2019). In contrast, the sample for the 2012-13 PDHS excluded AJK, FATA, and certain restricted military and protected areas (National Institute of Population Studies - NIPS/Pakistan and ICF International 2013). Its universe consists of all four provinces plus Gilgit Baltistan, which was formerly part of the Federally Administered Northern Areas (FANA).

The 2006-07 PDHS sample excluded all of FANA (consisting of both regions now known as Gilgit Baltistan and AJK) (National Institute of Population Studies - NIPS/Pakistan and Macro International 2008). Although FATA were initially intended to be included in the sample, it was not possible to complete the survey in this region due to security and political reasons, so it too was excluded. Like the 2006-07 PDHS, the universe of the first PDHS in 1990-91 consists of all four provinces of Pakistan but excluded FATA and FANA (both Gilgit Baltistan and AJK) (National Institute of Population Studies - NIPS/Pakistan and Institute for Resource Development - IRD/Macro International 1992). The population of excluded areas in 1990-91 was estimated to be about 4% of the total population.

All four PDHS surveys sampled the four provinces of Punjab, Sindh, Balochistan, and Khyber Pakhtunkhwa, which was known as the North West Frontier Province (NWFP) until it was renamed in 2010. All four surveys also included the Islamabad Capital Territory (ICT). In the earliest two surveys, Islamabad was subsumed within the Punjab region. In the 2012-13 and 2017-18 PDHS, ICT Islamabad formed its own region.

To arrive at total estimates in this study, data from all covered areas in each survey are included. The final report for the 2017-18 PDHS calculates total estimates excluding Gilgit Baltistan and AJK, and reports these regions separately (National Institute of Population Studies - NIPS/Pakistan and ICF 2019). Since this study includes these regions within its total estimates, the results presented here do not perfectly align with those published in the final report. The authors confirmed that estimates for each region separately and for a total excluding Gilgit Baltistan and AJK were consistent with those of the final report before including these regions in this study's total estimates.

In addition, we conducted sensitivity analysis to determine how discrepant 2017-18 estimates are when restricted to only those regions surveyed in all prior surveys (the four provinces of Punjab including ICT Islamabad, Sindh, Balochistan, and Khyber Pakhtunkhwa. In all cases, the differences were not large. To make the greatest use of all available data, we present total estimates for all surveyed regions in this study and not just those covered in all surveys.

2.2 Sample

DHS surveys apply a multi-stage, clustered sampling approach in which the number of clusters (with enumeration areas as the primary sampling units) per region are selected proportional to size of the region and a predetermined number of households per cluster are randomly selected. Details of the sample design for each of the four PDHS can be found in their final reports (National Institute of Population Studies - NIPS/Pakistan and ICF 2019; National Institute of Population Studies - NIPS/Pakistan and ICF International 2013; National Institute of Population Studies - NIPS/Pakistan and Institute for Resource

Development - IRD/Macro International 1992; National Institute of Population Studies - NIPS/Pakistan and Macro International 2008). All eligible women in selected households are selected for interview. The eligible woman response rate of surveys in this study range from 93% to 96%, as shown in Table 1.

All analyses in this study use currently married women age 15-49 as the analytic sample. Because most women eligible for interview are currently married, the restriction to currently married women results in a small attrition of sample size, such as an exclusion of 630 women in 2017-18. Analysis of determinants of modern contraceptive use is further restricted to women who are not pregnant at the time of the survey, excluding another 1,689 women in 2017-18. Multivariable regression analyses are further restricted to cases with complete data on all covariates in the model. This results in a final sample of 12,706 currently married, non-pregnant women for determinants analysis in 2017-18.

Table 1 Sample sizes

	PDHS 1990-91	PDHS 2006-07	PDHS 2012-13	PDHS 2017-18
Eligible women response rate	96.3	94.5	93.1	94.3
Women interviewed (weighted)	6,611	10,023	13,558	15,068
Currently married women (weighted)	6,365	9,556	12,937	14,438
Currently married, non-pregnant women (weighted)	5,376	8,365	11,479	12,749
Analytic sample for regression analyses (weighted)	na	na	na	12,706

All analyses in this study apply sampling weights that account for sampling probability and non-response. We estimate robust standard errors and use the *svy* suite of commands available in Stata 16 ME to adjust for the complex sampling design. Because Gilgit Baltistan was sampled separately from the other regions and has its own sample weight in 2017-18, it is possible that Gilgit Baltistan is overweighted relative to its population size in the pooled, all-Pakistan analysis, possibly producing biased estimates. However, sensitivity analysis that compares a model that excluded Gilgit Baltistan and AJK from the regression analysis produced no difference in the associations detected.

2.3 Analytical Strategy

In this study, we present trends, differentials, and determinants of contraceptive use among currently married women in Pakistan. We assess trends in traditional contraceptive use, modern contraceptive use, and several specific modern methods. We present trends in line graphs and bar charts that display the prevalence estimate and its 95% confidence interval. We assess if changes between survey years are statistically significant via a chi-square (χ^2) test of independence.

Next, we examine regional, residential, educational, and wealth differentials in modern contraceptive use and use of specific modern methods by assessing whether such differentials within each survey year are statistically significant with a χ^2 test of independence. We further analyze trends over time within each regional, residential, educational, and wealth population sub-group, applying a third χ^2 test of independence (within category and across surveys).

Finally, to identify factors associated with the use of contraception and specific modern methods, we estimate bivariate and multivariable multinomial logistic regression models for the current survey (2017-18 Pakistan DHS). First, we estimate a multinomial model using a three-category outcome variable: uses

any modern method of contraception, uses any traditional method, and uses no method of contraception. Uses no method of contraception serves as the reference category.

Next, a second multinomial regression is estimated to identify factors associated with specific modern methods, with “no modern method” as the reference outcome compared to the use of six specific methods of modern contraception. To ease interpretation of results for both multinomial regressions, we present relative risk ratios (RRRs), which, like odds ratios, are the exponentiated coefficient β. We present both unadjusted RRRs from separate bivariate models and adjusted RRRs from multivariable models that control for multiple factors simultaneously.

2.4 Measures

2.4.1 Contraceptive use

This study’s first outcome measure is a three category measure of contraceptive use, in which current use of modern methods and current use of traditional methods are each compared to no use of contraception. Modern methods in Pakistan are defined as male condoms, female sterilization, injectables, IUDs, pills, male sterilization, implants, lactational amenorrheic method (LAM), emergency contraception (EC), and standard days method (SDM). Traditional methods in Pakistan are defined as periodic abstinence, withdrawal, and other traditional methods.

2.4.2 Modern contraceptive methods

The second outcome more closely examines modern contraceptive use by examining specific modern methods. We use separate dichotomous measures for each of the following modern methods: use of male condoms, female sterilization, injectables, IUDs, pills, and “other” modern methods. Other modern methods combines all methods used by <1% of currently married women: male sterilization, implants, LAM, EC, SDM, and other modern methods not identified.

2.4.3 Covariates

Differentials in modern and traditional contraceptive use and in the use of specific modern methods are assessed by disaggregating these outcomes by four covariates: region, residence, education, and household wealth. Regression models to identify determinants of contraceptive outcomes include these four covariates and a number of additional covariates that include socio-economic, fertility and demographic, decision making and empowerment, health service access, and family type factors, each of which are described below.

Region

We examine the following regions available in the 2017-18 PDHS: Punjab (excluding ICT Islamabad), Sindh, Balochistan, Khyber Pakhtunkhwa, ICT Islamabad, FATA, Gilgit Baltistan, and AJK. Several of these regions are not available in prior surveys to allow for comparison of trends. In regression analyses, FATA serves as the reference category because this region has the lowest prevalence of modern contraceptive use.

Residence

Residence is a dichotomous variable that denotes whether women reside in a cluster designated as urban or rural. Rural residence is the reference in the regression analyses.

Education

Women's educational attainment is captured in a categorical variable that differentiates women with no education, primary education, secondary education, or higher education. No education is the reference category in the regression models.

Household wealth quintile

Household wealth quintile is a precoded variable in DHS standard recode data files. The variable is based on a wealth index calculated using household ownership of assets, livestock, and housing materials, with 20% of surveyed households in each quintile (Rutstein and Johnson 2004). The poorest wealth quintile serves as the reference in the regression models.

Woman's age

Women's age uses a precoded variable in DHS standard recode data files that groups completed age into seven intervals of 5 years, ranging from age 15-19 to 45-59. The youngest age group, age 15-19, is the reference category.

Work status

Respondent's work status is a dichotomous variable coded "yes" if she reports currently working by answering yes to the question, "Aside from your own housework, have you done any work in the last seven days?" The null category is the reference category.

Husband's age

Husband's age is coded similarly to women's age, although the 5-year age groups extend from age 15-19 to 55-59 and a final category for all husbands over age 60, which includes ages 60-84. The age 15-19 category again serves as the reference.

Husband's education

Husband's educational attainment is also coded the same as women's educational attainment. This variable is based on women's reports of her husband's education. Women (n=47) who reported that they did not know her husband's education level are treated as missing and excluded from the regression analysis. No education is the reference category.

Age at first marriage

Age at first marriage is captured through a survey question, *"In what month and year did you start living with your husband?"* and then calculated by subtracting the century month code for the woman's date of birth. In this study, we group age at first marriage into five categories, based on the distribution of ages reported in a continuous variable. The categories are age 10-14, 15-17, 18-20, 21-24, and all remaining ages, 25-47. Age 10-14 serves as the reference category.

Number of living children

Number of living children is retained as an ordinal variable.

Fertility desires

Fertility desires is a categorical variable based on if and when a woman would like to have a (or another) child. Categories are wants within 2 years, wants after 2 or more years, wants but is unsure of timing or undecided, wants no more, and declared infecund.

Participation in household decision-making

Decision making and other more comprehensive measures of empowerment have been shown to be associated with use of contraception (Edmeades et al. 2012; Jejeebhoy 1995; Kishor 2000; Loll et al. 2019; Upadhyay et al. 2014). In this study, we include a count variable of the number of household decisions that women participate in, either solely or jointly with her spouse. This index ranges from 0-4 and draws from the following four decisions: health care for oneself, making major household purchases, visits to family or relatives, and how to spend money that her husband earns. A higher value indicates participation in more household decisions.

Contraceptive decision-making

A second decision-making variable specifically related to contraceptive use is included. This variable is calculated for all women, regardless of current contraceptive status. Women who are currently using contraception are asked, *"Would you say that using contraception is mainly your decision, mainly your husband's decision, or did you both decide together?"* while women who are not using contraception are asked a nearly identically worded question, *"Would you say that not using contraception is…"*. Decisions made mainly the respondent is the reference category for this variable.

Permission to seek care

Women were asked if obtaining permission to go to the doctor is a big problem or not a big problem when they are sick and want to get medical advice or treatment. This variable is coded dichotomously with "not a big problem" used as the reference category versus women who report that permission is a "big problem."

Distance to health facility

Women were also asked if the distance to the health facility is a big problem or not a big problem when they are sick and want medical advice or treatment. Again, women who report that distance is a "big problem" are compared with women who report it is "not a big problem," which is the reference category.

Household type

Household type is measured as a categorical variable with three categories: nuclear household, extended household with in-laws present, and other extended household. Nuclear household is the reference category.

Household size

Household size is a continuous variable which is a count of the number of household members.

Before finalizing the specification of the final multinomial regression models, we first examined potential covariates for bivariate association with the outcomes and tested for collinearity. We detected several correlations among certain variables that we expected to be correlated. Namely, these were among education, husband's education, wealth, and residence; among age, number of living children, and fertility desires; and among husband's age, number of living children, and fertility desires. The degree of correlation was modest ($r \leq 0.5$) and so these variables were retained.

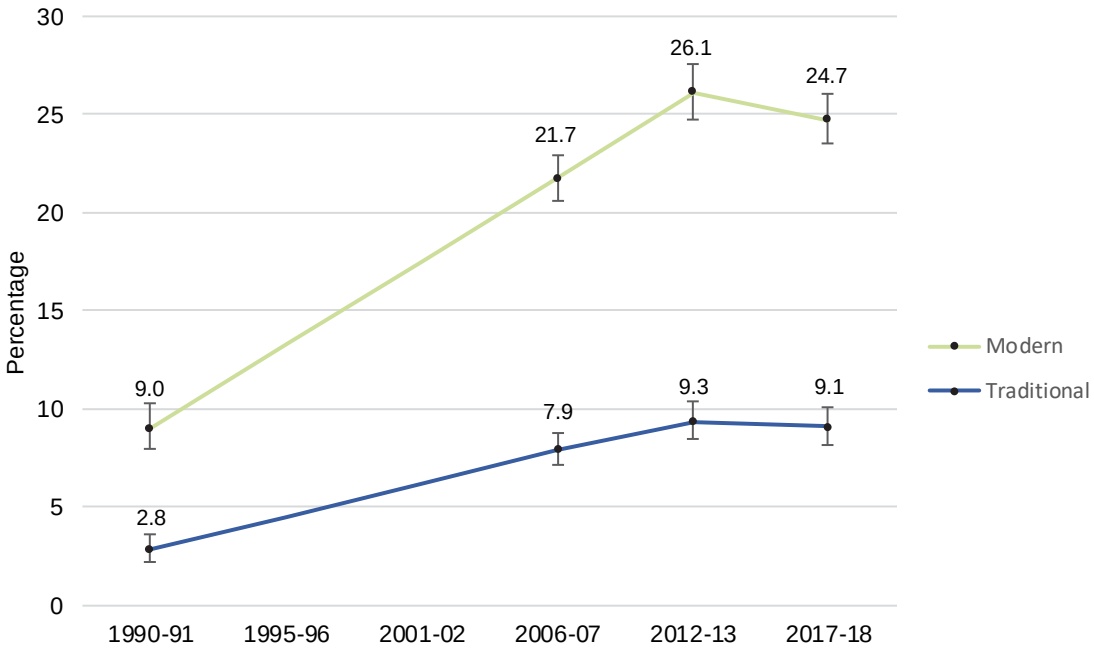
Fertility desires, however, was collinear with the outcome variables because all women who were sterilized wanted no more children. This variable was excluded from the final regression models and separate bivariate analyses are presented. The final regression models are specified with the following covariates: woman's age, woman's education, woman's work status, household wealth quintile, residence, region, husband's age, husband's educational attainment, age at first marriage, number of living children, participation in household decisions (count), contraceptive decision-making, whether permission to seek medical advice/treatment is a big problem, whether distance is a big problem, household type, and household size.

3 RESULTS

3.1 Trends in Modern and Traditional Contraceptive Use

Figure 2 displays the trends in modern contraceptive use since 1990 for all surveyed areas of Pakistan, including Gilgit Baltistan and AJK in 2017-18. Figure 2 shows that after a steep rise in the mCPR rate, modern contraceptive use has plateaued since 2012-13. The confidence intervals indicate that the increases in mCPR between 1990-91 and 2006-07 and between 2006-07 and 2012-13 are both statistically significant ($p \leq 0.001$). The apparent decline since 2012-13 is not. At the present time, about one in four currently married women age 15-49 are using a modern method of contraception.

Figure 2 Trends in current use of contraception among currently married women



Note: The total figure presented here for the 2017-18 survey include the regions of Azad Jammu and Kashmir and Gilgit Baltistan. These figures will not match those published in the final report for the survey, where these regions are excluded from the total.

The trend in the current use of traditional methods of contraception follows that of modern contraception, although at lower levels. The prevalence of traditional contraception also increased between 1990-91 and 2012-13 and has since plateaued. The increase from 3% in 1990-91 to 8% in 2006-07 is statistically significant ($p \leq 0.001$) as is the increase to 9% in 2012-13 ($p < 0.05$). There has been no change since 2012-13. Fewer than 1 in 10 currently married women use a traditional method of contraception.

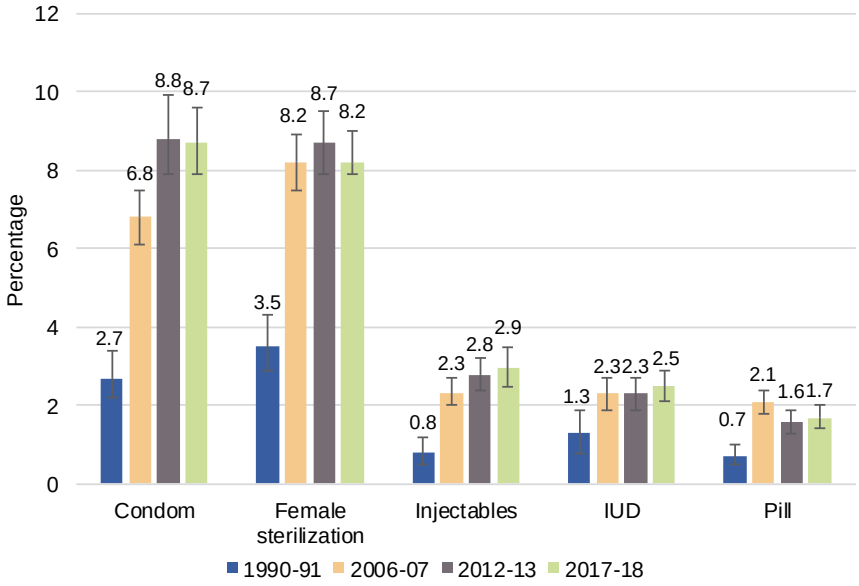
3.2 Trends in Contraceptive Methods

3.2.1 Trends in modern methods

All modern methods have seen a statistically significant increase in use since 1990-91, with the largest increases occurring between 1990-91 and 2006-07. Changes between more recent surveys are generally not

statistically significant, except in the case of male condoms, which again increased significantly but modestly from 7% in 2006-07 to 8% in 2012-13 (p≤0.001).

Figure 3 Trends in modern methods used among currently married women



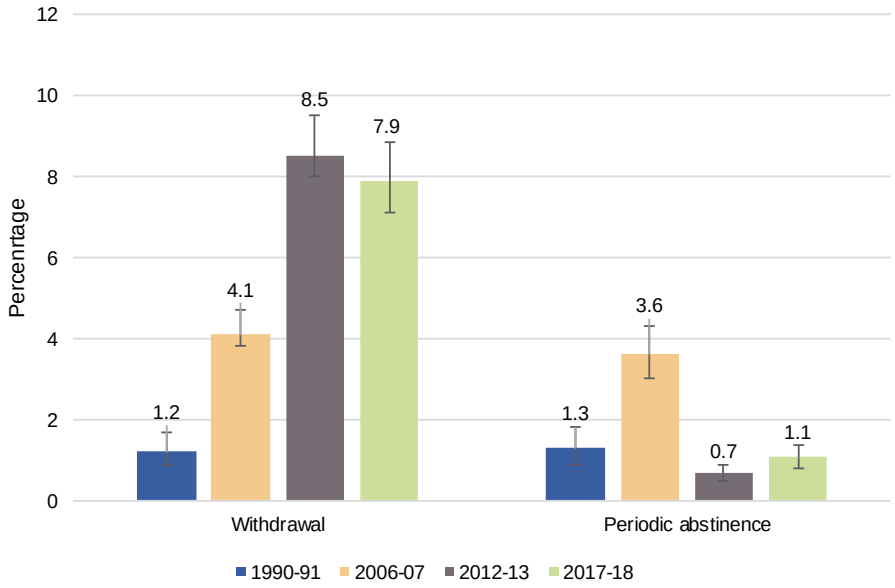
The total figure presented here for the 2017-18 survey include the regions of Azad Jammu and Kashmir and Gilgit Baltistan. These figures will not match those published in the final report for the survey, where these regions are excluded from the total.

The largest increases occurred in the use of the two most common methods, male condoms and female sterilization. Little has changed in the method mix. Condoms and female sterilization remain the most common two methods, greatly surpassing the use of all other modern methods. Meanwhile, pills remain the least common modern method. Between 1990-91 and 2006-07, injectables overtook IUDs as the third most common modern method used among currently married women. There are no statistically significant differences in the level of use of condoms and female sterilization, and there are no significant differences among injectables, IUDs, and pills.

3.2.2 Trends in traditional methods

Whereas modern methods showed a common trend across all methods, the two main traditional methods, periodic abstinence and withdrawal, reveal different trends, as shown in Figure 4. The prevalence of both withdrawal and periodic abstinence more than tripled between 1990-91 and 2006-07 (p≤0.001). While withdrawal continued to increase twofold to 9% in 2012-13 (p<0.001), periodic abstinence fell markedly to levels below 1990-91 levels (p≤0.001), where it has remained since. In the most recent survey, 8% of currently married women rely on withdrawal for contraception, as contrasted with about 1% of women who use periodic abstinence as their contraceptive method, which is a significant difference (p≤0.001).

Figure 4 Trends in traditional methods used among currently married women



The total figure presented here for the 2017-18 survey include the regions of Azad Jammu and Kashmir and Gilgit Baltistan. These figures will not match those published in the final report for the survey, where these regions are excluded from the total.

3.3 Differentials in Contraception across Surveys

3.3.1 Differentials in modern contraceptive use across surveys

In all survey years, the use of modern contraception varies significantly by all four factors we examine—region, residence, education, and wealth—as shown in Table 2. This indicates substantial differentials or inequities across socioeconomic groups.

Region and modern contraception

The use of modern contraception has increased ($p \leq 0.001$) in all four provinces that have been surveyed since 1990-91 (Punjab, Sindh, Khyber Pakhtunkhwa, and Balochistan), with the greatest increases occurring between the two earliest surveys. Most of the apparent declines in all regions since 2012-13 are not significant; the one exception is ICT Islamabad, where the percent of currently married women using modern contraception declined nearly 10 points ($p \leq 0.001$). There was no significant increase in Khyber Pakhtunkhwa between 2012-13 and 2017-18.

Increases in modern contraceptive use have accrued unequally across regions, with gains concentrated in regions with preexisting higher prevalence. This trend means that absolute differentials by region are larger in 2017-18 than they were in 1990-91. More than 20 percentage points separate the region with the highest prevalence (ICT Islamabad at 35%) and the lowest (FATA at 14%). Three regions have a below 20%: FATA, the province of Balochistan (14%), and AJK (19%). All other provinces and regions have a prevalence between 23% and 35%.

Table 2 Differentials and trends in modern contraceptive use among currently married women, by region, residence, level of education, and wealth quintile

	1990-91	2006-07	Difference 2006-07 - 1990-91	2012-13	Difference 2012-13 - 2006-07	2017-18	Difference 2017-18 - 2012-13	Difference 2017-18 - 1990-91
	Percent (p-value[1])	Percent (p-value[1])	p-value[2]	Percent (p-value[1])	p-value[2]	Percent (p-value[1])	p-value[2]	p-value[3]
Region	**	***		***		***		
Punjab[4]	9.82	23.05	***	28.99	***	27.18	ns	***
Sindh	9.05	21.98	***	24.46	ns	24.42	ns	***
Khyber Pakhtunkhwa	7.57	18.65	***	19.49	ns	23.17	ns	***
Balochistan	1.68	13.41	***	16.35	ns	14.01	ns	***
ICT Islamabad[4]				44.06	na	34.67	***	na
FATA[5]						13.70	na	na
Azad Jammu & Kashmir[5]						19.09	na	na
Gilgit Baltistan[6]				28.20	na	30.20	ns	na
Residence	***	***		***		***		
Urban	18.68	29.87	***	32.04	ns	28.46	*	**
Rural	4.81	17.67	***	23.14	***	22.81	ns	***
Education	***	***		***		***		
No education	6.18	18.87	***	23.41	***	21.74	ns	***
Primary	13.97	25.81	***	28.76	ns	27.38	ns	**
Secondary	23.23	26.10	ns	30.40	ns	26.17	*	ns
Higher	34.13	31.43	ns	29.67	ns	29.18	ns	ns
Wealth	***	***		***		***		
Poorest	1.20	12.39	***	18.12	ns	17.48	ns	***
Poorer	4.08	15.54	***	22.93	***	22.82	ns	***
Middle	6.12	21.94	**	26.92	*	26.59	ns	***
Richer	10.71	26.32	*	30.26	*	27.36	ns	***
Richest	23.20	31.58	ns	31.62	ns	29.10	ns	ns
Total[7]	9.01	21.75	***	26.10	***	24.69	ns	***

Notes:
p-values *<0.05, **<0.01, ***≤0.001, ns=not significant (p>0.05), na=not available (p-value cannot be calculated due to missing value)
[1] p-value of significance of chi-square test of independence of background characteristic and modern contraceptive use within each survey.
[2] p-value of significance of chi-square test of independence of modern contraceptive use within background characteristic between present and preceding surveys.
[3] p-value of significance of chi-square test of independence of modern contraceptive use within background characteristic between 2017-18 survey and 1990-91 survey.
[4] Punjab region included the ICT Islamabad region in the 1990-91 and 2006-07 surveys. ICT Islamabad is a separate region in the 2012-13 and 2017-18 surveys.
[5] The Federally Administered Tribal Areas (FATA) and Azad Jammu & Kashmir were not covered in the 1990-91, 2006-07, or 2012-13 surveys. They were covered in the 2017-18 survey.
[6] Gilgit Baltistan was not covered in the 1990-91 and 2006-07 surveys. It was covered in the 2012-13 and 2017-18 surveys.
[7] The total figure presented here for the 2017-18 survey include the regions of Azad Jammu and Kashmir and Gilgit Baltistan. These figures will not match those published in the final report for the survey, where these regions are excluded from the total.

Residence and modern contraception

Although residential differentials in modern contraceptive use are statistically significant at all time points, the differentials between urban and rural areas have narrowed over time. This is because modern contraceptive use has expanded more quickly in rural areas than in the urban areas. While 5% of currently married women living in rural areas used modern contraception in 1990-91, this increased to 23% in the most recent survey ($p \leq 0.001$). Over the same time period, modern contraception use in urban areas increased from 19% to 29% ($p \leq 0.001$). The gap between urban and rural prevalence narrowed from 14 points in 1990-91 to 6 points in 2017-18. A modest but significant ($p < 0.05$) decline in modern contraceptive use in urban areas since 2012-13 also contributed to this smaller differential in the most recent survey.

Education and modern contraception

There has not been equal growth in modern contraceptive use among all educational subgroups over time. The increase in modern contraceptive use has been concentrated among those with lower educational attainment. Women with no education experienced a sizable increase in modern contraceptive use of 13 percentage points between 1990-91 and 2006-07 ($p \leq 0.001$) and a 4 percentage point increase by 2012-13. Women with primary education had a significant 12 point increase in modern contraceptive use between 1990-91 and 2006-07 only ($p \leq 0.001$). Meanwhile, there were no significant changes among women with secondary or higher education before 2012-13. Women with secondary education even experienced a 4 point decline in contraceptive use between the two most recent surveys ($p < 0.05$), the only educational group to do so.

Educational differentials have persisted in each survey, but have narrowed over time. Modern contraceptive use increases with education. Whereas there was a 28 point difference between women with higher education and those with no education in 1990-91, there is only a 7 point difference between these groups in 2017-18.

Wealth and modern contraception

Each wealth group except the richest wealth quintile has experienced significant increases in modern contraceptive use between the earliest two surveys. The poorer, middle, and richer wealth quintiles continued to experience increases between 2006-07 and 2012-13. Like total modern contraceptive use, however, there have been no significant changes for any quintiles since 2012-13. Because there has been no significant change in the levels of richest women using modern contraception, the wealth-based differentials have narrowed over time. While 22 percentage points separated women in the richest and poorest wealth quintiles in 1990-91, that difference decreased by half—11 percentage points—in 2017-18.

3.3.2 Differentials in traditional contraceptive use across surveys

Table 3 shows the differentials in traditional contraceptive use by region, residence, education, and wealth. Similar to Table 2 for modern contraception, this table shows differentials in use by all four factors at each survey.

Region and traditional contraception

Punjab ($p \leq 0.001$), Khyber Pakhtunkhwa ($p \leq 0.001$), and Balochistan ($p < 0.05$) each experienced a significant increase in traditional method use between the two earliest surveys, mimicking the patterns with modern contraceptive use. In contrast to modern contraceptive use, Sindh did not experience such an increase. Balochistan continued to experience an increase in traditional method use between 2006-07 and 2012-13 ($p < 0.01$), the only province to do so, although levels of traditional use remain low there. ICT Islamabad experienced a significant decrease between the last two surveys ($p < 0.05$). In no other region were such changes significant. In 1990-91, traditional method use was barely perceptible (<1%) in Balochistan and only 3% in Sindh. By 2017-18, traditional contraceptive use ranged from a low of 6% in Balochistan to a high of 11% in Punjab and ICT Islamabad.

Table 3 Differentials and trends in traditional contraceptive use among currently married women, by region, residence, level of education, and wealth quintile

	1990-91	2006-07	Difference 2006-07 - 1990-91	2012-13	Difference 2012-13 - 2006-07	2017-18	Difference 2017-18 - 2012-13	Difference 2017-18 - 1990-91
	Percent (p-value[1])	Percent (p-value[1])	p-value[2]	Percent (p-value[1])	p-value[2]	Percent (p-value[1])	p-value[2]	p-value[3]
Region	**	***		***		***		
Punjab[4]	3.20	10.14	***	11.70	ns	11.08	ns	***
Sindh	3.38	4.68	ns	5.02	ns	6.52	ns	**
Khyber Pakhtunkhwa	0.99	6.21	***	8.58	ns	7.70	ns	***
Balochistan	0.30	1.02	*	3.11	**	5.83	ns	***
ICT Islamabad[4]				15.37	na	10.98	*	na
FATA[5]						8.06	na	na
Azad Jammu & Kashmir[5]						8.53	na	na
Gilgit Baltistan[6]				5.43	na	8.78	ns	na
Residence	***	***		***		***		
Urban	7.07	11.19	**	12.77	ns	13.62	ns	**
Rural	0.98	6.18	***	7.58	ns	6.80	ns	***
Education	***	***		***		***		
No education	1.58	6.38	***	6.82	ns	6.89	ns	***
Primary	3.83	8.58	***	12.07	*	8.99	*	**
Secondary	10.19	12.21	ns	12.19	ns	11.14	ns	ns
Higher	13.09	11.13	ns	14.17	ns	13.18	ns	ns
Wealth	***	***		***		***		
Poorest	0.32	3.06	***	2.60	ns	3.50	ns	***
Poorer	0.78	5.00	***	6.37	ns	6.25	ns	***
Middle	1.28	7.70	***	10.61	*	9.89	ns	***
Richer	2.99	9.94	***	10.76	ns	11.14	ns	***
Richest	8.27	11.41	*	13.55	ns	14.68	ns	ns
Total[7]	2.83	7.86	***	9.31	*	9.06	ns	***

Notes: p-values *<0.05, **<0.01, ***≤0.001, ns=not significant (p>0.05), na=not available (p-value cannot be calculated due to missing value)

[1] p-value of significance of chi-square test of independence of background characteristic and modern contraceptive use within each survey.

[2] p-value of significance of chi-square test of independence of modern contraceptive use within background characteristic between present and preceding surveys.

[3] p-value of significance of chi-square test of independence of modern contraceptive use within background characteristic between 2017-18 survey and 1990-91 survey.

[4] Punjab region included the ICT Islamabad region in the 1990-91 and 2006-07 surveys. ICT Islamabad is a separate region in the 2012-13 and 2017-18 surveys.

[5] The Federally Administered Tribal Areas (FATA) and Azad Jammu & Kashmir were not covered in the 1990-91, 2006-07, or 2012-13 surveys. They were covered in the 2017-18 survey.

[6] Gilgit Baltistan was not covered in the 1990-91 and 2006-07 surveys. It was covered in the 2012-13 and 2017-18 surveys.

[7] The total figure presented here for the 2017-18 survey include the regions of Azad Jammu and Kashmir and Gilgit Baltistan. These figures will not match those published in the final report for the survey, where these regions are excluded from the total.

Residence and traditional contraception

Women living in urban areas use traditional methods of contraception at higher levels than do women in rural areas at each time point ($p \leq 0.001$). The increase between 1990-91 and 2017-18 (most of which occurred by 2006-07) is about the same in both groups. As a result, differentials have remained steady at about 6 percentage points.

Education and traditional contraception

In all surveys, traditional contraceptive use increases with education ($p \leq 0.001$). However, increases over time have been concentrated among women with less education. Women with no education experienced a significant 5 point increase ($p \leq 0.001$) between the earliest survey and 2006-07, while women with primary education sustained significant increases in traditional method use between each inter-survey interval

($p<0.05$) until the most recent survey, when it declines again ($p<0.05$). Meanwhile, there has been no discernible change among women with either secondary or higher education. These trends result in a more narrow differential by education now (about 6 points) than in 1990-91 (about 12 points).

Wealth and traditional contraception

There have been almost no significant changes in traditional method use within any wealth quintile since the two earliest surveys. Most increase in traditional use for each wealth quintile occurs between 1990-91 and 2006-07. The differentials remain similar, at about 11 points, in 2017-18 as they were in 1990-91 (8 points).

3.3.3 Differentials in condom use across surveys

Tables 4-8 in the following sections provide a more detailed examination of differentials and trends in those differentials, by region, residence, education, and wealth for each of the five most commonly used modern methods: condoms, female sterilization, injectables, IUDs, and pills. At this point we are dealing with rather small numbers when examining such method-specific differentials. Even the most commonly used methods have an average of 9%, while less common methods have an average use of 2-3% across population subgroups. We may be able to detect differentials in these methods that are statistically significant. However, we caution that the magnitude of such differentials may be quite small and the extent to which such small but statistically significant differentials are programmatically meaningful may be quite limited. Table 4 shows regional, residential, education-based, and wealth-based differentials for condom use.

As with all modern contraceptive use, condom use increased among all population subgroups between 1990-91 and 2017-18, with these increases concentrated in the period up to 2006-07. Condom use shows significant differentials by region, residence, education, and wealth in the 1990-91, 2006-07, and 2012-13 surveys, and by region and education in 2017-18. Apparent residential and wealth-based differentials are not significant in the most recent survey. Condom use ranges from a low of 3% in FATA to 19% in ICT Islamabad ($p\leq0.001$) and increases four-fold with education ($p\leq0.001$) from 4% among women with no education to 17% among women with higher education.

Table 4 Differentials and trends in condom use among currently married women, by region, residence, level of education, and wealth quintile

	1990-91	2006-07	Difference 2006-07 - 1990-91	2012-13	Difference 2012-13 - 2006-07	2017-18	Difference 2017-18 - 2012-13	Difference 2017-18 - 1990-91
	Percent (p-value[1])	Percent (p-value[1])	p-value[2]	Percent (p-value[1])	p-value[2]	Percent (p-value[1])	p-value[2]	p-value[3]
Region	***	**		***		***		
Punjab[4]	3.00	7.13	***	9.92	**	10.63	ns	***
Sindh	3.45	7.25	***	7.96	ns	6.81	ns	***
Khyber Pakhtunkhwa	0.84	6.08	***	7.04	ns	9.64	ns	***
Balochistan	0.15	1.56	***	3.74	*	5.40	ns	***
ICT Islamabad[4]				24.87	na	18.69	**	na
FATA[5]						2.95	na	na
Azad Jammu & Kashmir[5]						7.56	na	na
Gilgit Baltistan[6]				2.98	na	4.26	ns	na
Residence	***	***		***		ns		
Urban	6.69	11.87	***	14.78	**	12.54	*	**
Rural	0.96	4.19	***	5.83	**	6.81	ns	***
Education	***	***		***		***		
No education	1.09	4.10	***	4.95	ns	4.21	ns	***
Primary	4.47	8.42	***	10.54	ns	9.99	ns	**
Secondary	10.68	12.26	ns	14.62	ns	12.27	ns	ns
Higher	25.93	17.04	*	18.08	ns	16.90	ns	*
Wealth	***	***		***		ns		
Poorest	0.40	11.6	***	13.9	ns	18.50	ns	***
Poorer	0.82	3.58	***	4.82	ns	5.29	ns	***
Middle	0.51	5.64	***	8.37	**	9.52	ns	***
Richer	2.83	9.01	***	13.02	**	12.21	ns	***
Richest	9.10	13.73	***	15.72	ns	14.88	ns	ns
Total[7]	2.70	6.76	***	8.81	***	8.71	ns	***

Notes: p-values *<0.05, **<0.01, ***≤0.001, ns=not significant (p>0.05), na=not available (p-value cannot be calculated due to missing value)

[1] p-value of significance of chi-square test of independence of background characteristic and modern contraceptive use within each survey.

[2] p-value of significance of chi-square test of independence of modern contraceptive use within background characteristic between present and preceding surveys.

[3] p-value of significance of chi-square test of independence of modern contraceptive use within background characteristic between 2017-18 survey and 1990-91 survey.

[4] Punjab region included the ICT Islamabad region in the 1990-91 and 2006-07 surveys. ICT Islamabad is a separate region in the 2012-13 and 2017-18 surveys.

[5] The Federally Administered Tribal Areas (FATA) and Azad Jammu & Kashmir were not covered in the 1990-91, 2006-07, or 2012-13 surveys. They were covered in the 2017-18 survey.

[6] Gilgit Baltistan was not covered in the 1990-91 and 2006-07 surveys. It was covered in the 2012-13 and 2017-18 surveys.

[7] The total figure presented here for the 2017-18 survey include the regions of Azad Jammu and Kashmir and Gilgit Baltistan. These figures will not match those published in the final report for the survey, where these regions are excluded from the total.

3.3.4 Differentials in female sterilization across surveys

Table 5 indicates that significant increases in female sterilization, where they occur, occur between the first two surveys. In this way, trends in female sterilization are similar to those of other modern methods. In contrast to condom use, increases in female sterilization do not occur among all population subgroups.

Region and female sterilization

Among the four provinces with data at each survey, the prevalence of female sterilization increased in Punjab, Sindh, and Balochistan ($p \leq 0.001$), with these increases occurring before 2006-07. No significant changes are detected between 2012-13 and 2017-18 in the six regions for which trends data are available.

Although there were no significant regional differentials in 1990-91, female sterilization varies with region in 2017-18 ($p \leq 0.001$), and is lowest in FATA (1%) and highest in Punjab (11%).

Table 5 Differentials and trends in female sterilization among currently married women, by region, residence, level of education, and wealth quintile

	1990-91	2006-07	Difference 2006-07 - 1990-91	2012-13	Difference 2012-13 - 2006-07	2017-18	Difference 2017-18 - 2012-13	Difference 2017-18 - 1990-91
	Percent (p-value[1])	Percent (p-value[1])	p-value[2]	Percent (p-value[1])	p-value[2]	Percent (p-value[1])	p-value[2]	p-value[3]
Region	ns	***		***		***		
Punjab[4]	3.84	9.18	***	10.20	ns	10.54	ns	***
Sindh	3.50	9.01	***	9.69	ns	9.96	ns	***
Khyber Pakhtunkhwa	3.22	3.63	ns	2.37	ns	4.03	ns	ns
Balochistan	0.32	4.6	***	4.04	ns	2.36	ns	***
ICT Islamabad[4]				10.01	na	9.28	ns	na
FATA[5]						1.03	na	na
Azad Jammu & Kashmir[5]						6.17	na	na
Gilgit Baltistan[6]				4.57	na	4.49	ns	na
Residence	***	***		ns		*		
Urban	7.29	10.15	**	9.60	ns	9.34	ns	*
Rural	1.91	7.18	***	8.19	ns	7.16	ns	***
Education	**	*		***		**		
No education	3.03	8.63	*	9.62	ns	8.90	ns	***
Primary	5.07	8.97	*	9.14	ns	9.80	ns	**
Secondary	6.02	6.52	ns	7.14	ns	7.07	ns	ns
Higher	3.73	5.59	ns	4.90	ns	5.64	ns	ns
Wealth	***	**		ns		ns		
Poorest	0.34	7.04	***	7.47	ns	6.56	ns	***
Poorer	1.98	5.99	***	7.83	ns	7.67	ns	***
Middle	2.42	8.34	***	9.50	ns	8.65	ns	***
Richer	5.26	9.76	***	9.05	ns	9.30	ns	***
Richest	7.76	9.56	ns	9.34	ns	8.71	ns	ns
Total[7]	3.54	8.17	***	8.65	ns	8.18	ns	***

Notes: p-values *<0.05, **<0.01, ***≤0.001, ns=not significant (p>0.05), na=not available (p-value cannot be calculated due to missing value)

[1] p-value of significance of chi-square test of independence of background characteristic and modern contraceptive use within each survey.

[2] p-value of significance of chi-square test of independence of modern contraceptive use within background characteristic between present and preceding surveys.

[3] p-value of significance of chi-square test of independence of modern contraceptive use within background characteristic between 2017-18 survey and 1990-91 survey.

[4] Punjab region included the ICT Islamabad region in the 1990-91 and 2006-07 surveys. ICT Islamabad is a separate region in the 2012-13 and 2017-18 surveys.

[5] The Federally Administered Tribal Areas (FATA) and Azad Jammu & Kashmir were not covered in the 1990-91, 2006-07, or 2012-13 surveys. They were covered in the 2017-18 survey.

[6] Gilgit Baltistan was not covered in the 1990-91 and 2006-07 surveys. It was covered in the 2012-13 and 2017-18 surveys.

[7] The total figure presented here for the 2017-18 survey include the regions of Azad Jammu and Kashmir and Gilgit Baltistan. These figures will not match those published in the final report for the survey, where these regions are excluded from the total.

Residence and female sterilization

We identify significant increases in female sterilization among women living in both urban and in rural areas between 1990-91 and 2017-18. However, increases in rural areas ($p \leq 0.001$) have outpaced those in urban areas ($p < 0.05$), so that residence-based differentials have narrowed to fewer than 2 percentage points in 2017-18 ($p < 0.05$).

Education and female sterilization

Female sterilization has increased among women with no education and primary education, but not among women with secondary or higher education. While education-based differentials in female sterilization have existed in each survey, the distribution of female sterilization across educational groups has changed. In 1990-91, female sterilization increased with education, until women with higher education showed a lower prevalence of female sterilization ($p<0.01$), similar to that among women with no education. By 2017-18, it appears that there is a negative association with female sterilization generally declining as education increases ($p<0.01$).

Wealth and female sterilization

Female sterilization has increased among women in all wealth quintiles except the richest wealth quintile ($p\leq0.001$), with inter-survey changes being significant only between 1990-91 and 2006-07. Furthermore, the largest increases occurred among the poorer quintiles. As such, differentials narrowed in 2006-07 and disappeared by 2012-13. Female sterilization no longer increases with wealth.

3.3.5 Differentials in injectables use across surveys

With a total of 1-3% currently married women using injectables in any given survey, the magnitude of differentials across population subgroups is undoubtedly small. Nonetheless, there are currently statistically significant differentials in injectable use based on region, residence, education, and wealth ($p\leq0.001$).

Region and injectables use

Table 6 shows that injectable use increased between 1990-91 and 2006-07 in all four provinces, and that levels in the most recent survey are significantly higher than 1990-91 in each province except Punjab. Injectable use increased in Sindh through 2012-13, the only province where such increases continued. No significant changes in injectable use between 2012-13 and 2017-18 are detected in the regions where these comparisons can be made. No significant differentials by region existed in 1990-91, although such differentials emerged as use increased and have been detected in all surveys since 2006-07. As of the most recent survey, injectable use ranges from a low of <1% in ICT Islamabad to 9% of currently married women in Gilgit Baltistan.

Residence and injectables use

Residence-based differentials in the use of injectables only emerged in the 2017-18 survey. Although the differences are not statistically significant, in the earliest survey it appeared that injectables use was higher in urban areas than rural areas, a pattern that reversed by 2012-13. This pattern reversal is due to a six-fold increase in rural areas between 1990-91 and 2017-18 ($p\leq0.001$), with no appreciable increase in urban areas over the same period. In 2017-18, injectables use is twice as high among rural women than among urban women ($p\leq0.001$).

Education and injectables use

Significant educational differentials in the use of injectables have been detected within each survey since the earliest PDHS and are wider in 2017-18 than they were in 1990-91.

Table 6 Differentials and trends in injectables use among currently married women, by region, residence, level of education, and wealth quintile

	1990-91	2006-07	Difference 2006-07 - 1990-91	2012-13	Difference 2012-13 - 2006-07	2017-18	Difference 2017-18 - 2012-13	Difference 2017-18 - 1990-91
	Percent (p-value[1])	Percent (p-value[1])	p-value[2]	Percent (p-value[1])	p-value[2]	Percent (p-value[1])	p-value[2]	p-value[3]
Region	ns	***		***		***		
Punjab[4]	0.85	1.97	**	1.96	ns	1.56	ns	ns
Sindh	0.45	2.31	***	3.29	*	2.65	ns	***
Khyber Pakhtunkhwa	1.07	4.02	***	5.19	ns	5.34	ns	***
Balochistan	0.12	1.42	***	1.74	ns	2.33	ns	***
ICT Islamabad[4]				1.58	na	0.80	ns	na
FATA[5]						4.76	na	na
Azad Jammu & Kashmir[5]						2.54	na	na
Gilgit Baltistan[6]				6.59	na	9.11	ns	na
Residence	ns	ns		ns		***		
Urban	1.17	2.33	**	2.46	ns	1.72	ns	ns
Rural	0.57	2.30	***	2.90	ns	3.55	ns	***
Education	*	**				***		
No education	0.54	2.10	***	2.86	*	3.73	ns	***
Primary	1.19	3.69	*	3.18	ns	2.86	ns	ns
Secondary	2.06	2.39	ns	2.65	ns	2.06	ns	ns
Higher	0.00	1.15	ns	1.62	ns	1.79	ns	ns
Wealth	**	*		***		***		
Poorest	0.18	1.59	**	2.32	ns	4.11	*	***
Poorer	0.39	2.50	***	3.84	ns	4.57	ns	***
Middle	0.71	3.18	***	3.38	ns	3.45	ns	***
Richer	0.63	2.74	**	2.86	ns	1.67	*	*
Richest	1.86	1.56	ns	1.45	ns	0.71	*	**
Total[7]	0.75	2.31	***	2.76	ns	2.94	ns	***

Notes: p-values *<0.05, **<0.01, ***≤0.001, ns=not significant (p>0.05), na=not available (p-value cannot be calculated due to missing value)

[1] p-value of significance of chi-square test of independence of background characteristic and modern contraceptive use within each survey.

[2] p-value of significance of chi-square test of independence of modern contraceptive use within background characteristic between present and preceding surveys.

[3] p-value of significance of chi-square test of independence of modern contraceptive use within background characteristic between 2017-18 survey and 1990-91 survey.

[4] Punjab region included the ICT Islamabad region in the 1990-91 and 2006-07 surveys. ICT Islamabad is a separate region in the 2012-13 and 2017-18 surveys.

[5] The Federally Administered Tribal Areas (FATA) and Azad Jammu & Kashmir were not covered in the 1990-91, 2006-07, or 2012-13 surveys. They were covered in the 2017-18 survey.

[6] Gilgit Baltistan was not covered in the 1990-91 and 2006-07 surveys. It was covered in the 2012-13 and 2017-18 surveys.

[7] The total figure presented here for the 2017-18 survey include the regions of Azad Jammu and Kashmir and Gilgit Baltistan. These figures will not match those published in the final report for the survey, where these regions are excluded from the total.

The educational distribution of injectables use has also shifted over time, with injectables use increasing most among those with the least education. The concentrated use among women with no or little education has produced a negative association between injectables use and education most evident in 2017-18.

Wealth and injectables use

Wealth differentials in injectables use were present in the earliest survey and have strengthened over time. They have also changed distributional patterns from a generally positive association with wealth in 1990-91 ($p<0.01$) to a generally negative one today ($p\leq0.001$). Although all wealth groups experienced significant increases in injectables use between 1990-91 and 2006-07, this shift in the distributional pattern is driven by significant increases that continued among the poorest wealth quintile ($p<0.05$) and significant decreases among the richer and richest quintiles ($p<0.05$) between 2012-13 and 2017-18.

3.3.6 Differentials in IUD use across surveys

Regional differentials in IUD use have persisted since the 2006-07 PDHS. IUD use in Punjab doubled between 1990-91 and 2006-07 ($p<0.01$) and increased four-fold in Balochistan between 2006-07 and 2012-13 ($p<0.01$). As of the 2017-18 PDHS, IUD use ranges from a low of <1% in Balochistan and FATA to 8% in Gilgit Baltistan, which represents a significant difference across regions ($p\leq0.001$).

Residence, education, and wealth-based differentials in IUD use were detected in 1990-91 but have since vanished. While overall IUD use increased prior to 2006-07, IUD use has plateaued since then.

Table 7 Differentials and trends in IUD use among currently married women, by region, residence, level of education, and wealth quintile

	1990-91	2006-07	Difference 2006-07 - 1990-91	2012-13	Difference 2012-13 - 2006-07	2017-18	Difference 2017-18 - 2012-13	Difference 2017-18 - 1990-91
	Percent (p-value[1])	Percent (p-value[1])	p-value[2]	Percent (p-value[1])	p-value[2]	Percent (p-value[1])	p-value[2]	p-value[3]
Region	ns	***		***		***		
Punjab[4]	1.49	3.06	**	2.90	ns	2.88	ns	*
Sindh	0.92	1.00	ns	1.16	ns	1.17	ns	ns
Khyber Pakhtunkhwa	1.06	1.70	ns	1.53	ns	1.74	ns	ns
Balochistan	0.45	0.56	ns	2.12	**	0.57	ns	ns
ICT Islamabad[4]				4.58	na	3.61	ns	na
FATA[5]						0.62	na	na
Azad Jammu & Kashmir[5]						1.97	na	na
Gilgit Baltistan[6]				8.42	na	7.61	ns	na
Residence	*	ns		ns		ns		
Urban	1.99	2.58	ns	2.61	ns	2.47	ns	ns
Rural	0.94	2.09	*	2.16	ns	2.50	ns	**
Education	**	**		ns		ns		
No education	0.98	1.87	*	2.24	ns	2.14	ns	**
Primary	1.52	2.59	ns	1.98	ns	2.84	ns	ns
Secondary	2.98	2.63	ns	2.70	ns	3.05	ns	ns
Higher	2.41	4.50	ns	2.59	ns	2.35	ns	ns
Wealth	**	***		ns		ns		
Poorest	0.18	1.00	ns	1.22	ns	1.97	ns	**
Poorer	0.58	1.47	ns	2.31	ns	3.15	ns	**
Middle	1.70	2.80	ns	2.92	ns	2.35	ns	ns
Richer	1.17	1.70	ns	2.39	ns	2.45	ns	*
Richest	2.65	4.19	*	2.68	*	2.43	ns	ns
Total[7]	1.26	2.26	**	2.31	ns	2.49	ns	**

Notes: p-values *<0.05, **<0.01, ***≤0.001, ns=not significant (p>0.05), na=not available (p-value cannot be calculated due to missing value)

[1] p-value of significance of chi-square test of independence of background characteristic and modern contraceptive use within each survey.

[2] p-value of significance of chi-square test of independence of modern contraceptive use within background characteristic between present and preceding surveys.

[3] p-value of significance of chi-square test of independence of modern contraceptive use within background characteristic between 2017-18 survey and 1990-91 survey.

[4] Punjab region included the ICT Islamabad region in the 1990-91 and 2006-07 surveys. ICT Islamabad is a separate region in the 2012-13 and 2017-18 surveys.

[5] The Federally Administered Tribal Areas (FATA) and Azad Jammu & Kashmir were not covered in the 1990-91, 2006-07, or 2012-13 surveys. They were covered in the 2017-18 survey.

[6] Gilgit Baltistan was not covered in the 1990-91 and 2006-07 surveys. It was covered in the 2012-13 and 2017-18 surveys.

[7] The total figure presented here for the 2017-18 survey include the regions of Azad Jammu and Kashmir and Gilgit Baltistan. These figures will not match those published in the final report for the survey, where these regions are excluded from the total.

3.3.7 Differentials in pill use across surveys

Trends in differentials in pill use are similar to those for use of IUDs. While residential, education, and wealth-based differentials are noted in the 1990-91 PDHS, they cease to be detectable in any survey from 2012-13 onward. In contrast, regional differentials in pill use, undetectable in 1990-91, have emerged in each subsequent survey ($p \leq 0.001$). Overall pill use increased most between 1990-91 and 2006-07, before experiencing a small but significant decline by 2012-13 ($p < 0.05$) and no significant change since then. Early increases in pill use are most evident in Balochistan, followed by Sindh provinces (both $p \leq 0.001$). In 2017-18, pill use ranges from <1% in AJK to 4% in FATA and Gilgit Baltistan ($p \leq 0.001$), a narrow but nonetheless significant difference.

Table 8 Differentials and trends in pill use among currently married women, by region, residence, level of education, and wealth quintile

	1990-91	2006-07	Difference	2012-13	Difference	2017-18	Difference	Difference
	Percent (p-value[1])	Percent (p-value[1])	2006-07 - 1990-91 p-value[2]	Percent (p-value[1])	2012-13 - 2006-07 p-value[2]	Percent (p-value[1])	2017-18 - 2012-13 p-value[2]	2017-18 - 1990-91 p-value[3]
Region	ns	***		***		***		
Punjab[4]	0.57	1.42	**	1.11	ns	0.98	ns	ns
Sindh	0.71	2.34	***	1.81	ns	2.35	ns	**
Khyber Pakhtunkhwa	1.29	3.12	**	2.70	ns	2.28	ns	ns
Balochistan	0.68	5.27	***	2.40	**	2.75	ns	*
ICT Islamabad[4]				1.80	na	1.49	ns	na
FATA[5]						4.32	na	na
Azad Jammu & Kashmir[5]						0.44	na	na
Gilgit Baltistan[6]				3.68	na	4.22	ns	na
Residence	***	**		ns		ns		
Urban	1.37	2.63	**	1.50	**	1.56	ns	ns
Rural	0.41	1.77	***	1.61	ns	1.76	ns	***
Education	*	ns		ns		ns		
No education	0.53	1.99	***	1.51	ns	1.90	ns	***
Primary	1.52	2.01	ns	1.50	ns	1.41	ns	ns
Secondary	1.16	1.99	ns	2.04	ns	1.37	ns	ns
Higher	1.97	2.91	ns	1.27	*	1.84	ns	ns
Wealth	**	ns		ns		ns		
Poorest	0.09	1.47	***	1.60	ns	1.96	ns	***
Poorer	0.43	1.85	**	1.70	ns	1.62	ns	**
Middle	0.72	1.86	*	1.11	ns	1.85	ns	*
Richer	0.81	2.65	***	2.25	ns	1.18	*	ns
Richest	1.46	2.38	ns	1.21	**	1.86	ns	ns
Total[7]	0.70	2.05	***	1.58	*	1.69	ns	***

Notes: p-values *<0.05, **<0.01, ***≤0.001, ns=not significant (p>0.05), na=not available (p-value cannot be calculated due to missing value)

[1] p-value of significance of chi-square test of independence of background characteristic and modern contraceptive use within each survey.

[2] p-value of significance of chi-square test of independence of modern contraceptive use within background characteristic between present and preceding surveys.

[3] p-value of significance of chi-square test of independence of modern contraceptive use within background characteristic between 2017-18 survey and 1990-91 survey.

[4] Punjab region included the ICT Islamabad region in the 1990-91 and 2006-07 surveys. ICT Islamabad is a separate region in the 2012-13 and 2017-18 surveys.

[5] The Federally Administered Tribal Areas (FATA) and Azad Jammu & Kashmir were not covered in the 1990-91, 2006-07, or 2012-13 surveys. They were covered in the 2017-18 survey.

[6] Gilgit Baltistan was not covered in the 1990-91 and 2006-07 surveys. It was covered in the 2012-13 and 2017-18 surveys.

[7] The total figure presented here for the 2017-18 survey include the regions of Azad Jammu and Kashmir and Gilgit Baltistan. These figures will not match those published in the final report for the survey, where these regions are excluded from the total.

3.3.8 Summary of trends in differentials

The following table summarizes the trends in differentials over time described above. The data show that residential differentials have increased over time, in traditional or modern contraceptive use and in the modern method used.

Table 9 Summary of regional, residential, educational, and wealth-based differentials in contraceptive use

	Modern contraception (all methods)	Traditional contraception (all methods)	Condoms	Female sterilization	Injectables	IUDs	Pills
Region	greater	greater	greater	greater	greater	greater	greater
Residence	lesser	steady	eliminated	lesser	greater	eliminated	eliminated
Education	lesser	lesser	steady	steady (new pattern)	steady (new pattern)	eliminated	eliminated
Wealth	lesser	steady	eliminated	eliminated	greater	eliminated	eliminated

Residential differentials have disappeared for condoms, IUDs, and pills and have lessened in strength or magnitude for female sterilization and modern contraception overall. However, these differentials have remained steady for traditional contraception and increased for injectables. Wealth-based differentials have followed this same pattern over time.

Educational differentials have disappeared for IUDs and pill use, and have lessened for modern and traditional contraception, overall. Educational differentials in condom use have remained steady, and have stayed of equal strength and magnitude for female sterilization and injectables use, but with a new pattern emerging. Both methods now show a negative association with education. Injectables also show a negative association with wealth. The prevalence of injectables use is higher among rural women than urban women, which contrasts with the patterns for all other methods.

3.4 Determinants of Modern and Traditional Contraceptive Use

Section 3.3 indicated that there are regional, residence, education, and wealth-based differentials in the use of modern contraception and traditional methods of contraception. To further explore the factors that may be associated with contraceptive use, we estimate a multinomial regression model with these and other factors. We first estimate separate models to produce unadjusted RRRs and then a final, multivariable model with all factors combined and present adjusted RRRs in Table 10. The reference category of the outcome is "no contraceptive use" against which we compare use of traditional and modern contraception.

In separate, bivariate multinomial regression models, nearly all covariates showed an association with either or both traditional or modern contraceptive use. Neither women's current work status nor age at first marriage showed a bivariate association with traditional contraceptive use, although there was some bivariate association with modern contraceptive use.

After controlling for other factors, women's age shows no association with traditional contraceptive use, although women age 40-44 have a 44% lower risk ($p<0.05$) and women age 45-49 a 68% lower risk ($p\leq0.001$) of using modern contraception, as compared to women age 15-19.

Table 10 Covariates associated with use of traditional or modern contraception. Results of multinomial logistic regression (n=12,706)

	Traditional contraception (ref: none)				Modern contraception (ref: none)			
	Unadjusted RRR	p-value	Adjusted RRR	p-value	Unadjusted RRR	p-value	Adjusted RRR	p-value
Age (ref: 15-19)								
20-24	4.13	***	1.80		2.52	***	1.12	
25-29	6.30	***	1.63		4.13	***	0.95	
30-34	11.31	***	1.75		6.74	***	0.86	
35-39	11.18	***	1.31		7.11	***	0.64	
40-44	11.76	***	1.12		7.63	***	0.56	*
45-49	7.76	***	0.70		4.67	***	0.32	***
Education (ref: none)								
Primary	1.45	**	1.14		1.40	***	1.39	***
Secondary	1.97	***	1.34	*	1.47	***	1.54	***
Higher	2.51	***	1.60	**	1.76	***	2.17	***
Working (ref: not working)								
Yes	1.04		1.13		1.24	**	1.22	*
Household wealth quintile (ref: poorest)								
Poorer	1.97	***	1.95	***	1.44	***	1.69	***
Middle	3.50	***	3.72	***	1.89	***	2.52	***
Richer	4.16	***	4.24	***	2.05	***	2.83	***
Richest	5.95	***	5.06	***	2.36	***	3.05	***
Residence (ref: rural)								
Urban	2.41	***	1.58	**	1.50	***	1.03	
Region (ref: FATA)								
Punjab	1.68	*	0.81		2.43	***	1.63	*
Sindh	0.86		0.45	**	1.90	**	1.49	
Khyber Pakhtunkhwa	1.04		0.71		1.85	**	1.63	*
Balochistan	0.70		0.44	*	0.99		0.80	
ICT Islamabad	1.83	*	0.71		3.41	***	2.11	**
Azad Jammu & Kashmir	1.07		0.55		1.41		0.90	
Gilgit Baltistan	1.43		1.25		2.89	***	2.61	***
Husband's age (ref: 15-19)								
20-24	6.31	**	1.89		4.57	*	1.90	
25-29	9.85	***	1.55		7.69	***	1.76	
30-34	15.55	***	1.62		11.85	***	1.88	
35-39	20.83	***	1.63		15.89	***	1.87	
40-44	26.08	***	1.73		21.21	***	2.06	
45-49	23.94	***	1.65		19.99	***	2.03	
50-54	22.40	***	1.48		14.98	***	1.38	
55-59	12.89	***	0.95		11.97	***	1.22	
60-84	16.06	***	1.52		10.59	***	1.36	
Husband's education (ref: none)								
Primary	1.16		0.78		1.25	*	0.96	
Secondary	1.55	***	0.93		1.16		0.92	
Higher	2.23	***	1.05		1.51	***	0.96	
Age at first marriage (cohabitation) (ref: 10-14)								
15-17	0.92		0.95		0.97		1.08	
18-20	1.23		1.12		0.89		1.00	
21-24	1.20		1.07		0.89		1.08	
25-47	1.11		1.17		0.62	***	1.01	
Number of living children	1.70	***	2.41	***	1.96	***	2.64	***

Table 10—*Continued*

	Traditional contraception (ref: none)				Modern contraception (ref: none)			
	Unadjusted RRR	p-value	Adjusted RRR	p-value	Unadjusted RRR	p-value	Adjusted RRR	p-value
Household decision-making								
# of decisions	1.15	***	0.99		1.13	***	0.99	
Contraceptive decision-making (ref: mainly respondent)								
Mainly husband	1.72		1.90	*	0.44	***	0.46	***
Joint decision	5.14	***	5.67	***	1.50	***	1.85	***
Other	0.00	***	0.00	***	0.03	***	0.03	***
Permission to go seek medical advice/treatment (ref: no problem)								
Big problem	0.67	***	0.86		0.71	***	0.83	
Distance to seek medical advice/treatment (ref: no problem)								
Big problem	0.65	***	1.01		0.72	***	0.98	
Household type (ref: nuclear)								
In-laws	0.60	***	0.77		0.48	***	0.60	***
Other extended	0.49	***	0.58	*	0.33	***	0.41	***
Household size								
# of household members	1.22	***	1.10		1.29	***	1.22	**

p-values *<0.05, **<0.01, ***≤0.001, ns=not significant (p>0.05).

Education is positively associated with both traditional and modern contraceptive use, although the magnitude of this relationship is stronger for modern contraceptive use. Women with higher education have two times the risk ($p \leq 0.001$) and women with secondary education have 1.5 times the risk ($p \leq 0.001$) of using modern contraception compared to women with no education. For traditional contraception, these RRRs are 1.6 and 1.4, respectively.

Wealth is similarly positively associated with both traditional and modern contraceptive use, with women in the richest household wealth quintile having 5 times the risk of traditional use and 3 times the risk of modern use compared with women in the poorest quintile.

Urban residence is positively associated with traditional contraceptive use (RRR 1.6, $p<0.01$), but is not associated with modern contraceptive use. The association detected with modern contraceptive use in bivariate model is eliminated when controlling for other factors.

Selected regions show a higher or lower risk of contraceptive use, although the results are not consistent across both types of contraception. Compared with FATA, Sindh and Balochistan show a lower risk of traditional contraceptive use, while Punjab, Khyber Pakhtunkhwa, and ICT Islamabad show a higher risk of modern contraceptive use.

The positive association between husband's age and both traditional and modern contraceptive use disappears after we control for other factors, as does the positive association with husband's education and these two outcomes.

The positive association between the number of living children and use of traditional and modern contraception remains robust—and increases in magnitude—in the multivariable, multinomial model. For

each additional living child, a woman's risk of using traditional contraception increases 2.4 times ($p \leq 0.001$), while her risk of using modern contraception increases 2.6 times ($p \leq 0.001$).

The number of household decisions in which a woman participates is unrelated to her risk of using either modern or traditional contraception, after we control for other factors. However, her contraceptive decision-making is related. Compared to women who make the decision to use or not use contraception entirely on her own, women who make the decision jointly with her husband have a higher risk of using traditional contraception (RRR 5.7, $p \leq 0.001$) or modern contraception (RRR=1.85 $p \leq 0.001$) rather than no contraception. In contrast, women for whom her husband mainly makes the decision whether or not to use contraception have nearly double the risk of using traditional contraception (RRR=1.9, $p < 0.05$) but nearly half the risk of using modern contraception (RRR=0.46, $p \leq 0.001$) compared to women who make the decision on their own. Women for whom the decision is made by someone else (such as another family member or a medical provider) have a greatly reduced risk of using either traditional or modern contraception.

Women who report that either getting permission to go or the distance to a facility is a big problem when they are sick and want medical advice or treatment appear to have a lower risk of using either traditional or modern contraception rather than no contraception, although this association disappears when controlling for other factors in the multivariable model.

In contrast, household variables strengthen or remain robust in the multivariable model. Women who live in an extended family household with their in-laws or other extended household have 40% and 59% reduced risk of using modern contraception ($p \leq 0.001$) compared to women in nuclear households. The relationship is similar but not as strong for traditional contraception. Women who live in other extended households have a reduced risk of traditional contraceptive use (RRR=0.6, $p < 0.05$), but there is no statistically significant association detected for women in extended households with their in-laws.

Household size has a positive association with contraceptive use with each additional person in the household increasing the risk of modern contraception by 22% ($p < 0.01$) but not traditional contraception.

3.5 Determinants of Contraceptive Methods Used

To provide a more detailed examination of which contraceptive method is used, Table 11 below shows the results of separate, unadjusted (bivariate) multinomial regressions, with factors associated with each of the five most commonly used modern methods and a combined "other modern method" category. The reference category of the outcome variable is no modern contraceptive use. Adjusted results from a multivariable multinomial model are shown in Table 12. This model uses the same covariates as in the model that compares all modern contraceptive use and traditional method use to no contraceptive use in Table 10.

All covariates are associated with at least one of the methods in the outcome variable in the bivariate multinomial model and most retain their associations in the multivariable multinomial model. Variables that are no longer associated with the use of any modern method after controlling for other factors include residence, husband's age, and household size.

Table 11 Covariates associated with use of selected modern methods of contraception. Results of unadjusted multinomial logistic regressions

	Condom (ref: no modern method)		Female sterilization (no modern method)		Injectables (no modern method)		IUD (no modern method)		Pill (no modern method)		Other (no modern method)	
	Unadjusted RRR	p-value	Unadjusted RRR	p-value	Unadjusted RRR	p-value	Unadjusted RRR	p-value	Unadjusted RRR	p-value	Unadjusted RRR	p-value
Age (ref: 15-24)												
25-29	1.53	***	19.07	***	1.60		2.26	**	1.63		1.14	
30-34	1.76	***	53.62	***	2.32	***	3.43	***	2.41	***	1.40	
35-39	1.62	***	79.67	***	1.73	*	3.93	***	1.88	*	1.27	
40-44	1.16		125.62	***	1.34		2.93	***	1.65		1.49	
45-49	0.43	***	101.63	***	1.11		1.21		0.98		0.31	
Education (ref: none)												
Primary	2.51	***	1.17		0.82		1.42		0.79		0.68	
Secondary	3.23	***	0.88		0.61	**	1.58	*	0.80		0.45	*
Higher	4.56	***	0.72		0.55	*	1.25		1.10		0.87	
Working (ref: not working)												
Yes	0.90	0.368	1.75	***	1.04		1.61	**	0.72		1.00	
Household wealth quintile (ref: poorest)												
Poorer	3.01	***	1.23		1.17		1.68	*	0.86		0.53	
Middle	5.67	***	1.45	*	0.92		1.31		1.04		0.81	
Richer	7.44	***	1.60	**	0.46	***	1.40		0.68		0.60	
Richest	9.13	***	1.50	*	0.20	***	1.40		1.07		0.55	
Residence (ref: rural)												
Urban	1.93	***	1.28	*	0.51	***	1.04		0.93		1.47	
Region (ref: FATA)												
Punjab	4.08	***	11.56	***	0.37	*	5.23	***	0.26	***	43.95	***
Sindh	2.49	***	10.41	***	0.60		2.02		0.59		105.75	***
Khyber Pakhtunkhwa	3.55	***	4.24	**	1.22		3.03	*	0.57		10.05	*
Balochistan	1.83	*	2.28		0.49		0.91		0.64		39.35	**
ICT Islamabad	7.78	***	11.02	***	0.21	**	7.11	***	0.42	*	64.60	***
Azad Jammu & Kashmir	2.58	***	6.01	***	0.54		3.18	**	0.10	***	27.06	**
Gilgit Baltistan	1.80		5.43	**	2.40	*	15.24	***	1.22		43.08	***
Husband's age (ref: 15-29)												
30-34	1.67	***	3.82	***	1.12		2.13	**	1.08		1.29	
35-39	1.83	***	6.15	***	1.71	*	3.06	***	1.50		1.22	
40-44	1.75	***	13.51	***	1.58	*	3.62	***	2.05	**	1.31	
45-49	1.29		17.31	***	1.05		2.96	***	1.93	*	1.21	
50-54	0.62	*	16.77	***	1.25		1.51		0.61		0.24	*
55-59	0.63		14.25	***	0.71		0.99		1.10		0.35	
60-84	0.17	***	14.81	***	0.73		0.89		0.14	**	1.38	
Husband's education (ref: none)												
Primary	1.92	***	1.18		0.86		1.21		1.03		0.82	
Secondary	2.53	***	0.82		0.60	**	0.96		0.95		0.48	*
Higher	3.68	***	0.80		0.52	***	0.97		1.87		0.46	*
Age at first marriage (cohabitation) (ref: 10-14)												
15-17	1.72	**	0.77		1.04		1.11		0.75		0.72	
18-20	2.22	***	0.61	***	0.54	*	1.07		0.61	*	0.33	**
21-24	2.56	***	0.50	***	0.77		0.87		0.43	**	0.44	*
25-47	2.36	***	0.33	***	0.21	***	0.33	**	0.37	**	0.28	*
Number of living children	1.31	***	2.58	***	2.02	***	2.08	***	1.79	***	1.90	***

Table 11—*Continued*

	Condom (ref: no modern method)		Female sterilization (no modern method)		Injectables (no modern method)		IUD (no modern method)		Pill (no modern method)		Other (no modern method)	
	Unadjusted RRR	p-value	Unadjusted RRR	p-value	Unadjusted RRR	p-value	Unadjusted RRR	p-value	Unadjusted RRR	p-value	Unadjusted RRR	p-value
Household decision-making												
# of decisions	1.09	***	1.29	***	0.97		1.08		0.85	***	1.00	
Contraceptive decision-making (ref: mainly respondent)												
Mainly husband	1.37		0.39	***	0.18	*	0.18	***	0.26	**	0.16	**
Joint decision	3.39	***	1.14		0.72		1.06		0.86		0.44	**
Other	0.00	***	0.08	***	0.00	***	0.00	***	0.00	***	0.00	***
Permission to go seek medical advice/treatment (ref: no problem)												
Big problem	0.52	***	0.66	**	1.45		0.99		1.15		0.59	
Distance to seek medical advice/treatment (ref: no problem)												
Big problem	0.61	***	0.63	***	1.73	***	1.00		0.85		0.93	
Household type (ref: nuclear)												
In-laws	0.85	*	0.17	***	0.66	**	0.48	***	0.82		0.69	
Other extended	0.54	*	0.17	***	0.24	***	0.44	*	0.80		0.61	
Household size												
# of household members	1.24	**	1.08		1.53	***	1.29	*	1.78	***	1.67	**

p-values *<0.05, **<0.01, ***≤0.001, ns=not significant (p>0.05)

Women's age has a positive bivariate association with each modern method with the exception of "other modern method," although for injectables and pills, this association exists only for certain age groups. The magnitude of the bivariate association is largest for female sterilization, where women age 25-29 have 20 times the risk and women over age 40 have over 100 times the risk of female sterilization than do women age 15-24 ($p \leq 0.001$). After controlling for other factors in the multivariable model, age has a negative association with each modern method, with the exception of female sterilization. Female sterilization is the only method for which increasing age raises the adjusted risk. Women above age 25 have between 9 and 17.6 times the relative risk of female sterilization compared with women age 15-24, while controlling for the other factors in the model.

Education has a positive bivariate association with condom use and IUD use (secondary education only), a negative bivariate association with injectables use and use of other modern methods, and no association with female sterilization or pill use. After controlling for other factors in the multivariable model, only education is associated with a higher relative risk of condom and IUD use.

Women who currently work have a 33-64% heightened risk of female sterilization and IUD use ($p<0.05$), even after controlling for other factors. There is no association between work status and any other modern method, even in the bivariate model.

Wealth appears to be positively associated with condom use and female sterilization and negatively associated with injectables in the bivariate model. However, in the multivariable model, all associations with use of these methods and IUDs are positive, although weaker for injectables and IUDs.

Urban residence, which like wealth appeared to be positively associated with condom use and female sterilization and negatively associated with injectables, shows no association with any method after other factors are controlled in the multivariable model.

After controlling for multiple factors in the model, regional variation in the use of modern methods remains. Compared to the FATA region, women in every region have a higher relative risk of using "other" modern methods, and women in every region except Balochistan have a higher risk of female sterilization. Women in Punjab, Khyber Pakhtunkhwa, and ICT Islamabad have a higher relative risk of using condoms and IUDs. Women in Gilgit Baltistan also have a higher adjusted risk of using IUDs (RRR=14.8, $p \leq 0.001$) and using injectables (RRR=2.8, $p < 0.05$)—the only region to differ from FATA in injectable use. Two regions—Punjab and AJK—have significantly lower adjusted risks of using pills than FATA.

Like women's age, husband's age appears positively associated with female sterilization, with the unadjusted RRRs large in the bivariate model. In contrast to women's age, however, men's age appears positively associated with condom, IUD, or pill use only through about age 40-44 before the relationship becomes negative or non-significant in the bivariate model. In the multivariable model, however, husband's age loses all significant associations with modern method use, except that men's age above age 60 have a lower adjusted risk of condom and pill use compared to men's age 15-29 ($p < 0.05$).

Men's education appears positively associated with increased risk of condom use ($p \leq 0.001$), but the negative bivariate associations with injectables and other modern methods are weaker. These observed associations weaken in the adjusted model, although husbands with higher education have a higher adjusted relative risk of using condoms and pills and lower adjusted risk of using injectables ($p < 0.05$).

Age at first marriage is positively associated with condom use, but shows negative association with female sterilization even after controlling for factors in the multivariable model. Women who married between age 21-24 (but at no other age) have a relative risk of using injectables that is more than double that for women married between age 10-14 ($p \leq 0.001$). Negative bivariate associations that we detected with each of the other modern methods (although only at older marriage ages for some outcomes) in the unadjusted model cease to be detectable in the multivariable model.

The number of living children has a strong and positive bivariate association with each of the modern methods in the model. This association remains strong after we control for other factors, with adjusted relative risks ranging from 2.05 for female sterilization ($p \leq 0.001$) to 3.24 for "other" modern methods ($p \leq 0.001$).

The number of household decisions in which a woman participates has a negative association with pill use even after controlling for other factors. The adjusted relative risk falls by 21% with each additional decision in which women are involved. The observed positive bivariate association with use of condoms and female sterilization disappears in the multivariable model.

Table 12 Covariates associated with use of selected modern methods of contraception. Results of a multivariable multinomial logistic regression (n=12,706)

	Condom (ref: no modern method)		Female sterilization (no modern method)		Injectables (no modern method)		IUD (no modern method)		Pill (no modern method)		Other (no modern method)	
	Adjusted RRR	p-value	Adjusted RRR	p-value	Adjusted RRR	p-value	Adjusted RRR	p-value	Adjusted RRR	p-value	Adjusted RRR	p-value
Age (ref: 15-24)												
25-29	0.68	**	9.10	***	0.75		0.89		1.01		0.49	
30-34	0.44	***	14.86	***	0.65		0.70		0.93		0.33	
35-39	0.34	***	14.78	***	0.34	***	0.60		0.43	*	0.17	**
40-44	0.23	***	17.64	***	0.23	***	0.43		0.32	*	0.20	*
45-49	0.09	***	12.80	***	0.17	***	0.18	***	0.21	**	0.04	**
Education (ref: none)												
Primary	1.74	***	1.24		1.27		1.56		1.03		0.39	
Secondary	1.85	***	1.27		1.18		1.87	**	0.93		0.59	
Higher	2.65	***	1.31		1.66		2.03	*	1.34		1.78	
Working (ref: not working)												
Yes	1.00		1.33	*	1.17		1.64	*	0.86		0.78	
Household wealth quintile (ref: poorest)												
Poorer	2.58	***	1.53	*	1.45		1.84	*	1.12		1.03	
Middle	4.29	***	1.83	***	1.61	*	1.78		1.65		2.00	
Richer	4.89	***	2.18	***	1.10		2.36	**	1.31		0.92	
Richest	4.96	***	2.20	***	0.54		2.53	*	2.04		1.41	
Residence (ref: rural)												
Urban	1.04		0.83		0.86		0.95		0.65		1.40	
Region (ref: FATA)												
Punjab	1.73	*	8.85	***	0.50		4.13	***	0.34	**	66.57	***
Sindh	1.36		9.27	***	1.00		2.03		0.95		176.55	***
Khyber Pakhtunkhwa	2.30	***	3.71	**	1.79		3.06	*	0.64		14.83	*
Balochistan	1.50		1.92		0.52		0.79		0.67		43.79	***
ICT Islamabad	2.74	***	8.42	***	0.51		6.35	***	0.57		140.76	***
Azad Jammu & Kashmir	1.13		4.09	**	0.67		2.53		0.13	***	55.86	***
Gilgit Baltistan	1.28		4.43	**	2.88	*	14.84	***	1.46		65.43	***
Husband's age (ref: 15-29)												
30-34	1.21		1.19		0.71		1.26		0.77		0.81	
35-39	1.19		1.01		0.87		1.44		0.91		0.55	
40-44	1.11		1.48		0.81		1.34		1.42		0.75	
45-49	1.10		1.56		0.57		1.19		1.72		0.76	
50-54	0.62		1.18		0.69		0.65		0.54		0.14	
55-59	0.79		1.04		0.44		0.55		1.13		0.28	
60-84	0.27	*	1.24		0.47		0.51		0.17	*	0.97	
Husband's education (ref: none)												
Primary	1.19		1.05		0.90		0.88		1.25		0.66	
Secondary	1.26		0.86		0.73		0.72		1.27		0.63	
Higher	1.37	*	0.80		0.59	*	0.63		1.98	*	0.42	
Age at first marriage (cohabitation) (ref: 10-14)												
15-17	1.51	*	0.86		1.45		1.38		0.99		1.07	
18-20	1.65	**	0.71	*	0.96		1.35		0.98		0.58	
21-24	1.92	***	0.59	**	2.40	***	1.35		0.83		1.39	
25-47	2.42	***	0.49	**	1.13		0.72		0.98		1.47	
Number of living children	2.17	***	2.05	***	2.70	***	2.77	***	2.29	***	3.24	***

Table 12—*Continued*

	Condom (ref: no modern method)		Female sterilization (no modern method)		Injectables (no modern method)		IUD (no modern method)		Pill (no modern method)		Other (no modern method)	
	Adjusted RRR	p-value	Adjusted RRR	p-value	Adjusted RRR	p-value	Adjusted RRR	p-value	Adjusted RRR	p-value	Adjusted RRR	p-value
Household decision-making												
# of decisions	1.00		1.05		0.98		0.96		0.79	***	0.92	
Contraceptive decision-making (ref: mainly respondent)												
Mainly husband	1.28		0.58	*	0.13	***	0.18	**	0.16	***	0.11	***
Joint decision	2.94	***	1.50		1.00		1.28		1.08		0.51	*
Other	0.00	***	0.11	***	0.00	***	0.00	***	0.00	***	0.00	***
Permission to go seek medical advice/treatment (ref: no problem)												
Big problem	0.67	**	0.89		1.09		1.04		1.18		0.42	*
Distance to seek medical advice/treatment (ref: no problem)												
Big problem	1.06		0.90		1.21		0.95		0.68		1.31	
Household type (ref: nuclear)												
In-laws	0.60	***	0.48	***	0.78		0.66		0.84		0.73	
Other extended	0.40	***	0.40	**	0.33	**	0.60		1.15		0.66	
Household size												
# of household members	1.19		1.17		1.20		1.14		1.19		1.42	

p-values *<0.05, **<0.01, ***≤0.001, ns=not significant (p>0.05).

Contraceptive decision-making is variably associated with use of modern methods. Joint decision-making has a higher adjusted risk of using condoms (RRR=2.9, p≤0.001) than do women who make the decision to use or not use contraception independently. Women for whom the decision to use contraception or not rests mainly with her husband have a lower adjusted risk of using each of the other methods: female sterilization (42% lower, p<0.05), injectables (87% lower, p≤0.001), IUDs (82% lower, p<0.01), pills (84% lower, p<0.01), and other modern methods (89% lower, p≤0.001). When the decision is made by someone other than the woman or her husband, the adjusted risk is significantly and greatly reduced for each of the methods in the outcome variable. For female sterilization, the risk is 89% lower for these women than women who make contraceptive decisions independently (p≤0.001). For the other methods, it is lower by >99%.

Permission to go to a health facility has a negative association with condom use that remains when additional factors are entered into the model (RRR=0.7, p<0.01). Distance to the health facility has a negative bivariate association with condom use and female sterilization and a positive bivariate association with injectables, although these associations disappear with other factors in the model.

Women in extended households (either with in-laws or other extended household forms) have a 40-60% lower adjusted risk of using condoms and female sterilization, while women in other extended households have a 66% lower relative risk of using injectables compared to women in nuclear households. Women in households with more residents have a positive bivariate association with use of every modern method

except female sterilization, but there is no such association when controlling for other factors in the multivariable multinomial regression model.

3.6 Contraceptive Use and Fertility Desires

Bivariate analysis indicates that women's fertility desires are important correlates of contraceptive use. However, a variable that characterizes fertility desires cannot be included in the multinomial regression models presented in Section 3.5 due to collinearity. Figure 5 presents levels of contraceptive use—no use, traditional, and modern contraceptive use—by category of fertility desires.

Figure 5 Contraceptive use by fertility desires

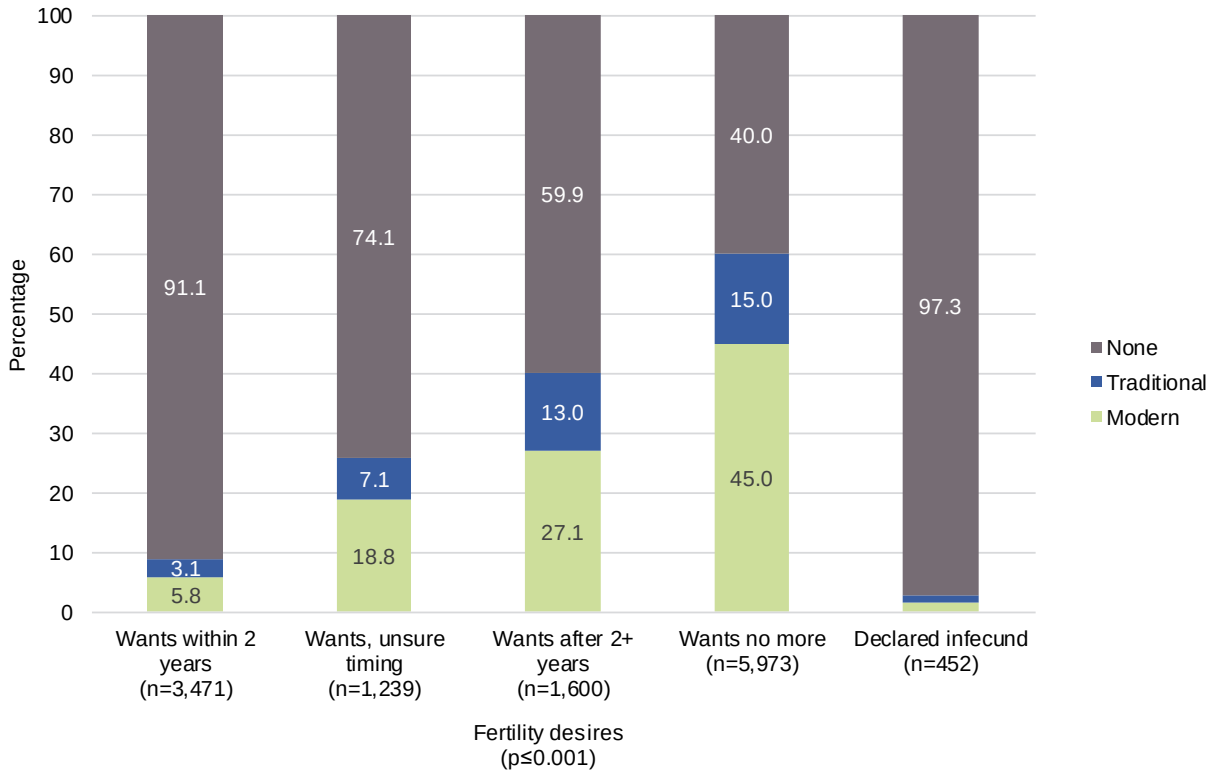
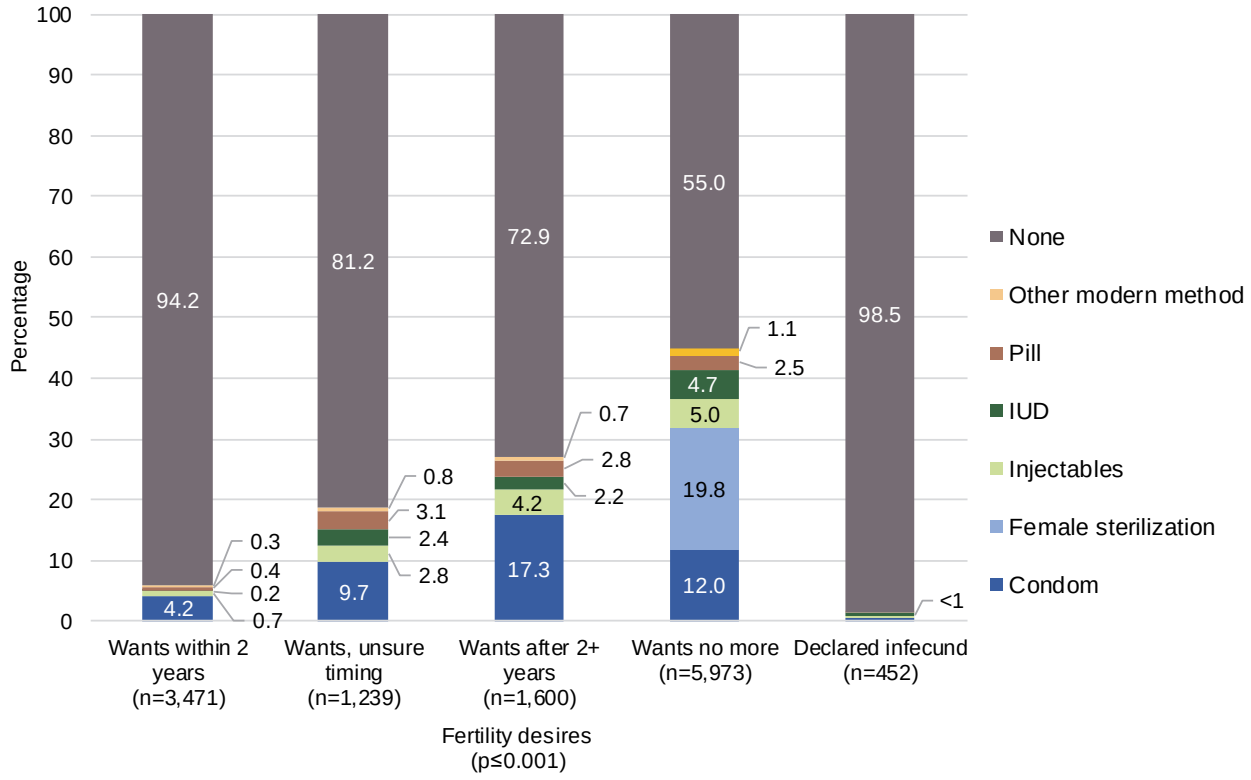


Figure 5 indicates that traditional and modern contraceptive use increases steadily with the length of time a woman wants before having another child, with modern contraceptive use outpacing traditional use ($p \leq 0.001$). Less than 6% of women who want a child within 2 years use modern contraception and 3% use traditional contraception, compared to 45% and 15%, respectively, among women who want no more children. The use of contraception, either modern or traditional, is nearly non-existent among women who report that they are infecund, which is a relatively smaller group of women.

That few women wanting a child within 2 years use any method of contraception perhaps aligns with their fertility intentions, although some women in this group may be at risk of experiencing a pregnancy before they desire it. Strikingly, 60% of women who want to wait 2 or more years and 40% of women who want no more children are using no method of contraception, either modern or traditional.

Figure 6 shows the prevalence of each modern method of contraception by categories of fertility desires and shows that these factors are significantly associated (p≤0.001). Female sterilization does not occur among any group other than women who want no more children. This is the source of the collinearity that occurs in the multinomial regressions. Twenty percent of women who want no more children use this method of contraception. This is the most commonly used modern method among this group.

Figure 6 Methods of contraception used by fertility desires



The use of condoms, injectables, and IUDs each increase with the amount of time women want (within 2 years, unsure, and after 2 years or more) before another child. While injectables and IUD use is even higher among women who want no more children, condom use falls 5 points to 12% in this group. Pill use is highest among women who are unsure of when they want their next child and those who want a child after 2 or more years. Even among women who want no more children, a substantial proportion (21%) are using short-acting, reversible methods, which is greater than the proportion who use permanent methods (20%) or long-acting, reversible contraception (LARCs) (5%).

4 DISCUSSION AND CONCLUSION

4.1 Discussion

This study aimed to establish trends in the use of modern contraceptive methods in Pakistan since 1990, describe differentials, and identify factors associated with the use of modern contraception. This study builds on prior empirical work that examined contraceptive trends in Pakistan (Carton and Agha 2011). Some earlier work examined periods before 2006-07 and noted a period of striking increases in the use of modern contraception. Our study, which examines a longer period of time, finds that gains in modern contraceptive use largely accrued before 2006-07 and have stalled since 2012-13. We find that trends in traditional contraceptive use follow the same overall pattern as modern contraception.

The modern method mix has largely remained the same since 1990-91. Condoms and female sterilization still dominate the method mix. Injectables, IUDs, and pills still lag behind these two methods. In 1990-91, IUDs were the third mostly commonly used modern method. Injectables slightly overtook IUDs in rank after 2006-07, although there are no statistical differences in the prevalence of their use.

This study also found prominent differentials in contraceptive use by region, residence, education, and household wealth. Regional differentials have become more pronounced over time. Regional differentials are particularly sizable for female sterilization, but also evident in IUD and condom use. In Timothy Evans and Hilary Brown's PROGRESS framework on health inequity[1], place—most often measured by region—is a prominent aspect of inequalities (Gwatkin 2007). This finding suggests that promotion of contraceptive services is warranted in those provinces and regions where modern contraceptive use is low, particularly if they coincide with regions where the need is high.

Modern contraceptive use is higher among urban women, more educated women, and women in wealthier households. The mCPR among women with no education lags behind that of all other educational subgroups, in spite of the increase in prevalence being concentrated among women with no education or primary education. Similarly, women in the poorer and poorest wealth quintile lag behind the three higher wealth quintiles. These educational and wealth differentials demonstrate a pattern of inequality that the World Health Organization (WHO) terms "marginal exclusion" and for which the WHO recommends programmatic intervention targeted to the most disadvantaged subgroup (WHO 2013).

Wealth differentials in the use of injectables show a different pattern than that of other modern methods. In contrast to most modern methods where use increases with wealth, injectables use decreases with wealth. Further, injectables use decreases with each increasing wealth quintile in a step-wise manner that the WHO calls "queueing" and for which population-wide programmatic action should accompany targeted interventions (WHO 2013). Trends in injectables use show another exception. While most residential, education, and wealth-based differentials have lessened over time, these differentials in injectables use have intensified over time.

[1] PROGRESS stands for Place, Race, Occupation, Gender, Religion, Education, Socioeconomic status, and Social capital.

Like modern contraception, traditional contraceptive use is also higher among urban women, more educated women, and women in wealthier households. Traditional contraceptive use increases with each level of education and each wealth quintile, also in a queueing pattern.

Our multivariate analysis confirms that region, education, and wealth remain important correlates of modern contraceptive use, even after controlling for other factors. The number of living children that women have is another important correlate whose magnitude rivals that of attaining higher education or being in the richest quintile. This finding is consistent across all methods, with the risk of contraceptive use increasing between 2 times (female sterilization) to 3 times (other modern methods) with each additional child. Women's working status is associated with use of modern contraception in general and particularly with the use of female sterilization and IUDs.

The husband's characteristics do not factor strongly in women's modern contraceptive use after controlling for other factors, except as they relate to decision making. Further, our study found that the form of contraceptive decision-making is more pertinent to women's modern contraceptive use than is the number of household decisions in which women participate. Modern contraceptive use is inhibited when husbands are the primary decision maker of contraceptive decisions. Husband's decision making is particularly inhibiting to use of injectables, IUDs, pills, and other modern methods. In contrast, joint decision-making facilitates overall modern contraceptive use and use of condoms in particular. This finding provides further justification for a focus on promoting women's empowerment and gender equity as a strategy for increasing mCPR and the likelihood that women's reproductive needs are met. This finding also suggests that social behavior change initiatives target married men in Pakistan.

This study also finds that use of any modern method is greatly inhibited when the decision to use or not use contraception is made by someone other than the woman or her husband. Furthermore, modern contraceptive use in general and use of the two most common methods, condoms and female sterilization, in particular, is substantially reduced when women live in an extended household. This finding reinforces findings in other studies in South Asia that, in addition to husbands, other family members such as in-laws may exert influence over reproductive behaviors (Edmeades et al. 2012; Khan et al. 2015; MacQuarrie and Edmeades 2015).

Our study finds that women's use of contraception increases with increasing intensity of desire to delay or avoid a birth. Nonetheless, more than half of women who want no more children and nearly three quarters of women who want a delay of at least 2 years are not using any modern method of contraception. This finding reiterates the persistently high levels of unmet need (Jain et al. 2014; Sathar et al. 2005; Tappis et al. 2015). It indicates that there is room for mCPR to increase without expanding demand for family planning (Track20 2018a). Instead, a broad-based effort to increase the availability of range of methods at low or no cost could be sufficient to increase prevalence. Given fertility levels in Pakistan, providing quality counseling and services during antenatal care, delivery, and the post-partum period may be an effective way to reach women who are interested in using contraception (Tappis et al. 2015; Track20 2018b).

The dominance of just two methods—condoms and female sterilization—in the method mix suggests that expanding the availability of numerous methods, including injectables, IUDs, and pills, is warranted to expand method choice in Pakistan. This is particularly the case because expanding the method mix has been shown to increase overall use of modern contraception and reduce unmet need (Ross and Stover 2013; Ross

and Hardee 2012). However, we find that a large proportion of women who want to limit and are using contraception nonetheless rely on a short-acting method. This suggests that there is scope for increasing the availability of long-acting methods like IUDs for these women. Several studies suggest that the promotion of these methods along with initiatives to reduce or remove their costs may be effective ways to increase contraceptive prevalence (Azmat et al. 2013; Boddam-Whetham et al. 2016).

4.2 Policy Recommendations

Pakistan has repositioned family planning from a population issue, as it was in the early days of family planning programming, to a maternal and child health issue. This repositioning facilitates the health sector to take an active role in promoting and delivering quality family planning services. Current health sector priorities related to family planning include:

- Engaging the private sector to improve service readiness and facilitate innovative interventions in health facilities so as to
    - increase contraceptive prevalence rate to 55%,
    - decrease fertility rate to 2.1 births,
    - reduce annual population growth rate to 1.3% by 2030, and
    - encourage increased investment for acceleration of female education and empowerment.

- Ensuring universal access to safe and quality reproductive health and family planning services by 2030.

- Reaching youth through print and electronic media to increase awareness and knowledge of contraceptive options and services.

- Engaging religious leaders with social behavior change interventions to spread awareness among communities.

- Monitoring contraceptive service delivery through e-technology to track stock-outs of contraceptive supplies.

- Strengthening cooperation in the district management system.

The Pakistan Local Government Ordinance 2001 (PLGO) was passed by the four provinces with effect from August 14, 2001 and replaced the old system of provincial administration with a district-based, decentralized system. The intent of this initiative was to devolve political powers and decentralize administrative and financial authority to accountable local governments for improved governance, effective delivery of social services and transparent decision-making through institutionalized participation of the people at the grassroots level (Anjum and Ahmad 2001; Shaikh and Rabbani 2004). It provides opportunities for quick decision-making closer to the implementation levels.

This ordinance allowed for District Health Management Teams (DHMTs) to be established to monitor their progress by every quarter. Yet there is acknowledgement that the DHMT system should be strengthened (Anjum and Ahmad 2001; Shaikh and Rabbani 2004). Within Pakistan’s health system, it is recognized that strengthening of the existing setup of service delivery outlets including human resource management,

capacity building, purchasing of equipment, contraceptives and medicines may lessen the unmet need in Pakistan. Similarly, the cluster approach for reproductive health and family planning, in which private partners, civil society organizations (CSOs) and local support organizations (LSOs) partner at the community level to spread awareness and to ensure the provision of reproductive health services, is recommended.

One initiative, the Marginalized Area Reproductive Health and Family Planning Viable Initiatives (MARVI) intervention has helped improve critical health indicators in Umer Kot in Sindh province Pakistan by creating a new cadre of health workers from women with limited literacy in rural areas (Mustaghis ur and Ahmed 2012). These interventions, along with voucher schemes to reduce costs associated with accessing an expanded method mix (e.g., Azmat et al. 2013; Boddam-Whetham et al. 2016) may be scaled up to other provinces and marginalized areas to reduce regional, wealth, and educational inequalities in modern contraceptive use.

4.3 Conclusion

In summary, our findings suggest that there is ample opportunity for contraceptive prevalence to increase under the right conditions. Expanding the availability of a mixture of methods, including but not limited to LARCs, would both increase use and expand method choice. Meanwhile, a combination of targeted and population-wide efforts may reduce inequalities while also increasing use. Finally, a combination of efforts to expand services with social behavior change efforts directed at not only women but men and other family members could reduce women’s barriers to using modern contraceptive methods of their choice.

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