

FACTORS INFLUENCING MODERN CONTRACEPTIVE USE AMONG MARRIED ADOLESCENT GIRLS IN NEPAL

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Master of Science in International Health

by

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Nepal

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List of Abbreviations

ASRH	Adolescent Sexual and Reproductive Health
CI	Confidence Interval
DALYs	Disability Adjusted Life Years
DHS	Demographic and Health Survey
DoHS	Department of Health Services
EPI	Extended Program on Immunization
FCHV	Female Community Health Volunteer
FP	Family Planning
HF	Health Facility
HP	Health Post
HW	Health Worker
ICC	Intra-Cluster Correlation Coefficient
IUD	Intra Uterine Device
LMIC	Low- and Middle-Income Countries
MMR	Maternal Mortality Ratio
MoHP	Ministry of Health and Population
NDHS	Nepal Demographic and Health Survey
NGO	Non-Governmental Organisation
NHRC	Nepal Health Research Council
NHSSIP	Nepal Health Sector Strategy Implementation Plan
OR	Odds Ratio
PCV	Proportional Change in Variance
PHCC	Primary Health Care Centre
PHC-ORC	Primary Health Care Outreach Clinic
PRACHAR	Promoting Change in Reproductive Behaviour of Adolescents
RH	Reproductive Health
RHMACP	Reproductive Health for Married Adolescent Couples Project
SGD	Sustainable Development Goals
SRH	Sexual and Reproductive Health
SRHR	Sexual and Reproductive Health Rights
TV	Television
VHP	Village Health Provider
WHO	World Health Organisation

Glossary

Adolescent: ‘World Health Organization (WHO) defines adolescents as individuals in the 10-19 years age group.’¹

Youth: ‘WHO defines Youth as individuals in the 15–24 years age group.’¹

Young people: ‘WHO defines Young People as individuals in the age range 10-24 years’¹

Currently married: ‘Women and men who report being married or living together with a partner as though married at the time of the survey.’²

Sexual and Reproductive Health: ‘Sexual and reproductive health is a state of complete physical, mental and social well-being in all matters relating to the reproductive system.’³

Adolescent fertility rate: ‘The adolescent birth/fertility rate measures the annual number of births to women 15 to 19 years of age per 1,000 women in that age group.’⁴

Abstract

Introduction

Nepal is still far from the target of reducing the adolescent fertility rate. Pregnancy among married adolescent girls was 61% in 2016. Modern contraceptive use among married girls is low and steady. The study aimed to analyse the factors influencing modern contraceptive use among married adolescent girls in Nepal.

Methodology:

Secondary data analysis of Nepal Health and Demographic Survey 2016 was the main study method. The study included a 704 weighted sample of married girls (15-19 years). Individual and contextual characteristics and their association with modern contraceptive use were conceptualized using Andersen Behaviour Model. The independent association was analysed using multilevel logistic regression.

Results:

Contextual and individual characteristics attributed to 71% of variations in modern contraceptive use among married adolescent girls in Nepal. Married adolescent girls with Terai non-Dalit & Terai Dalit ethnic groups; primary level spousal education; and exposure to Family Planning (FP) information through Health Workers (HWs) had significantly higher odds of modern contraceptive use. Similarly, married girls desiring a child within two years and living in Province 2 or Province 7 had significantly lower odds of modern contraceptive use.

Discussion:

Ethnicity, exposure to FP information through HWs, not desiring a child and province were the key factors associated with modern contraceptive use among married adolescent girls in Nepal. Mobilisation of local HWs for FP counselling is an appropriate intervention to increase modern contraceptive use. The environment that enables married adolescent couples to get FP counselling through health workers should be ensured by FP programs.

Key words: Adolescents, Contraception, Determinants, Nepal, Multilevel Analysis

Word Count: 12,531

Introduction:

I started working in public health programs in Nepal after completing my bachelor's in public health in 2012. I worked in a Women Reproductive Rights Program in a National Non-governmental Organisation (NGO) in Nepal. My work in that program sensitized me towards the Sexual and Reproductive Health (SRH) needs and rights for women throughout their lifecycle. The program targeted women from adolescent to elderly (beyond reproductive age). I realized women were suffering from reproductive health problems during their old, due to marrying and having children at a younger age. Women had to do heavy works even during pregnancy and after delivery with food and nutrition insufficiency. This scenario was leading to poor quality of life for women even after the reproductive age. They were suffering from Pelvic organ prolapse and other complications, but the care-seeking was low.

Marrying before 20 years is illegal in Nepal, though many boys and girls were marrying before 20 years either, arranged by parents, or eloped. After marriage, most pregnancies were either unwilling (due to non-reliable contraception) or led by socio-cultural norms. Simultaneously, they drop school to take care of household work and children. I noticed married adolescents - who needed to delay their pregnancies for physical and personal development (education and employment) - were using modern contraceptives much less than other reproductive age groups.² Modern contraceptive use among married adolescent women was 15%, satisfying only 25% of the contraceptive demand.² Study identifying the factors associated with modern contraceptive use among married adolescent girls was rare in Nepal.

This thesis provided me an opportunity to answer the questions about the determinants of modern contraceptive use among married girls that I was searching in literature but not found. Early pregnancies affect the health and wellbeing of adolescent girls throughout their life. The post-pregnancy complications and impacts could be reduced through increased use of modern contraceptives use. Understanding the contextual and individual-level factors analysing the nationally representative survey and further analysing some effective interventions addressing identified factors contribute one step further towards addressing the problem.

The thesis has six chapters. Chapter 1 contains some background information about Nepal. Chapter 2 explains the problem and justifies the need for this study with the objectives. Chapter 3 describes the methods used and the conceptual framework. Chapter 4 illustrates the findings from secondary data analysis for identifying factors associated with modern contraceptive use among married girls. Chapter 5 includes the literature review of the effective interventions in Nepal and India for improving modern contraceptive use among young married couples. Chapter 6 includes the discussion of findings, conclusion, and recommendations based on the findings and the discussion.

Chapter 1. Background information

1.1 Country profile:

Nepal, a landlocked country in South Asia, has boundaries with India (East, West, and South) and China (North) with 147,181 square km area.⁵ Topographically, Nepal is divided into Mountains, Hills, and Terai (flat land) and administratively, the country has seven provinces (Figure 1).²

According to World Bank's estimation, the population of Nepal was 29,136,808 in 2020. Fifty-four percent of the total population were females, and 10% of the females were of age 15-19 years in 2020.⁶ United Nations World Population Prospects estimated the life expectancy at birth in Nepal to be 70.8 years in 2019. The life expectancy was almost three years more among females compared to males.^{6,7}



Figure 1. Map of Nepal with seven provinces. Source: Nepal Demographic and Health Survey (NDHS) 2016 report²

1.2 Economy:

Nepal changed its position from a low-income group country to a lower-middle-income country in 2020.⁶ Nepal has Gross Domestic Product US\$ 36.66 billion in 2020.⁸ Global Poverty Working Group estimated that 25% of the total population were living below the national poverty line in 2010.⁶ Labour migration is very common in Nepal. Thirty-three percent of households in Nepal received remittance in 2010-2011. Seventy-two percent of the labour migrants in Nepal were youth (16-34 years), and 87% of them were male in 2010.^{9,10}

1.3 Education:

The adult (15 years and older) literacy rate in Nepal was 67.9%. It was 78.6% among males and 59.7% among females in 2018.¹¹ According to Nepal Demographic and Health Survey (NDHS) 2016, 33.3% of women had no education, which was 9.6% among men. The median completed school year was five years for women and eight years for men in 2016 among the age group 15-49 years.²

1.4 Socio-cultural and gender roles:

The major religion followed in Nepal was Hinduism (81.3%) in 2011. Among ethnicity, Chhetri was the largest with 16.6% population in 2011. Similarly, 13.6% of the population were Dalits (so-called lower castes) in Nepal.^{12,13}

According to the Human Development Report, the Gender Development Index of Nepal was 0.93 in 2019. The report also showed Gender Inequality Index was 0.45, ranking Nepal 110 out of 162 countries in the index.¹⁴

Total female-headed households in 2016 were 31.3%. Regarding the involvement of women in household decisions, only 38% of married women (age 15-49 years) participated in the key household decisions.² Fifty-seven percent of women age 15-49 years were currently working, whereas it was 78% among men (15-49 years) in 2016. Similarly, 90.9% of married men (age 15-49 years) and 58.9% of married women (15-49 years) were currently working in 2016.²

1.5 Health system and general health situation

The Ministry of Health and Population (MoHP) is leads in overall health policy management and coordination in Nepal. Department of Health Services (DoHS), one of the departments of MoHP, manages health services through its divisions and centres. At the province level, the health division under the provincial Ministry of Social Development provides overall technical support and supervision.^{15,16}

Health Posts (HP) are the first point for basic health service delivery in the community. It also supports and monitors the activities of Female Community Health Volunteers (FCHVs) and community outreach. HP carryout Primary Health Care Outreach Clinics (PHC-ORC) and Extended Program on Immunization (EPI) clinics as outreach services at the grass-root level. FCHVs promote healthy behaviour and practices for maternal, child, and reproductive health, and support in the management of childhood illnesses in the community. FCHVs establish a connection between HP and community people. Primary Health Care Centres (PHCCs) are the primary referral point for HPs. Referral points for PHCCs are primary or secondary level hospitals at the district, sub-regional or provincial level. There were 125 public hospitals, 196 PHCCs, 3806 HPs and 51420 FCHVs in Nepal in 2018-19.¹⁶ Regarding access to government health facilities, NDHS 2016 found that 11.3% of households had the nearest government health facility in more than 1-hour distance.²

Nepal made improvements in maternal and child health. Maternal Mortality Ratio (MMR) reduced from 305 (in 2010) to 186 (in 2017) per 100,000 live births.¹⁷ Similarly, infant and child (under 5 years) mortality also reduced from 46 and 54 (in 2011) to 32 and 39 (in 2016) per 1000 live births, respectively.² According to Global Burden of Diseases 2019, cardiovascular diseases, Maternal and Neonatal problems, and Chronic respiratory problems were the top 3 groups of health problems attributing to Disability Adjusted Life Years (DALYs) in Nepal.¹⁸

Family planning was protected as a fundamental right in the constitution of Nepal and included in the basic health service package since 2018.¹⁶ Availability and accessibility of Family Planning (FP) service as a right was emphasized by different health acts. Adolescent Sexual and Reproductive Health (ASRH) is also a priority program of the Government of Nepal.¹⁶ Nepal Health Sector Strategy Implementation Plan (NHSSIP) 2016-2021 aims to upgrade all health facilities with adolescents friendly services. Currently, 74 out of 77 districts of Nepal implemented the ASRH program.¹⁶

Chapter 2. Problem statement, Justification, and Objectives

2.1 Problem Statement and Justification

The Sustainable Development Goals (SDGs) in Nepal targeted for the reduction of adolescent fertility rate to 30 births per 1,000 women aged 15-19 years by 2030.¹⁹ However, the adolescent fertility rate increased from 81 in 2011 to 88 births per 1000 women in 2016.² More than 17% of all adolescent girl (15-19 years) already started childbearing.² Twenty percentage of the pregnancies were reported either mistimed or unwanted by mothers less than 20 years in 2016.² Birth spacing was also lowest among mothers of this age group. About 38% of mothers aged 15-19 years had childbirth spacing of fewer than 17 months in preceding birth.² Studies showed that pregnancy and childbirth-related complications are higher among girls aged 15-19 years. Complications like prolong labour, preterm birth, low birth weight, abortion, miscarriage, ectopic pregnancy, and major congenital malformation are more likely among adolescent mothers.²⁰⁻²² Teenage pregnancy and even less birth spacing not only leads to maternal or sexual and reproductive health (SRH) related complications but also affect girls' education and empowerment.²³

Low use of modern contraceptives among married adolescent girls is contributing to high teenage pregnancy.²⁴ Although marrying before 20 years is legally prohibited in Nepal, 27% of adolescent girls age 15-19 years are currently married.^{2,25} Similarly, 33% of women age 20-24 were married before the age of 18 years.²⁶ Pregnancy among married adolescents was 58% in 2011 and 61% in 2016.^{2,27} Nepal Demographic and Health Survey (NDHS) 2016 found the median age of first sexual intercourse and first marriage is the same (i.e. 17.9 years) among women in Nepal. Also, 99.2% of unmarried women never had sexual intercourse.² A study analysing NDHS 2016 found only 0.4% of unmarried adolescent girls (15-19 years) ever had sex.²⁸ The findings indicated higher need for modern contraceptives among married adolescent in Nepal.

An analysis in 2015 indicated that regardless of the number of children, more than 50% of the married adolescent girls preferred to delay or limit childbearing.²⁹ The likelihood of delaying childbirth was less among married adolescents from poor households and with a lower education level. Similarly, married girls from socially disadvantaged ethnic groups and the Terai region of Nepal were less likely to delay their childbearing.²⁹ The modern contraceptives use among married adolescent girls (15-19 years) was constantly 14% from 2006 till 2011.³⁰ It slightly increased and became 15% in 2016. However, the demand for family planning among married women (15-19 years) was 58%, and only 25% of the demand was satisfied by modern contraceptive methods.² The recent situation of modern contraceptive use among the married adolescent girls was not much different. A recent survey in 2019 showed that modern contraceptive use was only 17% among married girls (15-19 years).²⁶

Modern Contraceptive use is a key for preventing SRH related complications by delaying pregnancy. Avoiding teenage pregnancy and increasing the birth spacing lead to good health, education, and empowerment of girls and women and make life more productive.^{20-24,31} Modern contraceptive use is the key to achieve SDG 3 (Good Health and wellbeing) and SDG 5 (attaining gender equality).^{32,33} Hence contraceptive use is essential for adolescents. Despite the health and social benefits, modern contraceptives use among married adolescent girls was the lowest compared to any other reproductive age group in Nepal.² Adolescent girls need more attention as they are more at risk for pregnancy-related complications and other long-term impacts.^{32,33}

Several studies analysed the determinants of modern contraceptive use among married young couple in Nepal.^{28,34,35} However, the studies did not assess determinants specifically for

married adolescent girls. The pooled analysis of NDHS 2006-2016 found that the increased education level of women, educated husbands, richest, *Janajati* ethnicity, and women living in urban had significantly higher modern contraceptives use among young married women (age 15-24 years).³⁵ Similarly, another study found that fertility preference, number of living children, exposure to media, caste/ethnicity, women's participation in decision making, and women's working status found significant determinants of modern contraceptive use among girls aged 15-24 years in Nepal.³⁴ A study analysing contextual influences on modern contraceptive use found women's participation in the decision for family planning use in the community and women's exposure to family planning information and services in the community significantly increased the modern contraceptive use among currently married women in rural Nepal.³⁶

Another gap in the previous studies is a lack analysis of contextual or community-level factors which have a significant role in determining individual service utilization. This gap hindered the comprehensive understanding of the influences and interactions of the factors for low modern contraceptive use among married adolescent girls. Knowledge of determinants considering both contextual and individual-level factors specific for married adolescent girls will be very supportive in developing potentially effective strategies and interventions for them. Such effective strategies/interventions are essential to reduce the adolescent fertility rate as targeted in SDG and other related goals in Nepal. This study aims to contribute to fulfil the knowledge gap by analysing the most recent nationwide survey (NDHS 2016) data to identify factors at an individual and contextual level in modern contraceptive use among married adolescent girls in Nepal.

2.2 Objectives:

2.2.1 General Objective:

To analyse the contextual and individual factors associated with modern contraceptive use among married adolescent girls (age 15-19 years) and propose evidence-based recommendations to improve the contraceptive use for MoHP and other organisations working in SRH in Nepal.

2.2.2 Specific Objectives:

1. To assess the factors (contextual & individual) associated with modern contraceptive use among married adolescent girls (age 15-19 years) in Nepal;
2. To identify and analyse effective interventions implemented at the national and international level to improve modern contraceptive use among married adolescent girls;
3. To propose evidence-based recommendations to increase the modern contraceptive use among married adolescent girls (age 15-19) for MoHP and other organisations working in SRH and FP in Nepal.

Chapter 3. Methods

The main method used for this thesis was secondary data analysis from Nepal Demographic and Health Survey (NDHS) 2016. Additionally, a literature review was done to identify and analyse the effective interventions for increasing modern contraceptive use at the national and international levels.

3.1 Secondary data analysis

Secondary Data Analysis was done to identify the individual and contextual factors associated with modern contraceptive use among married girls in Nepal.

3.1.1 Data Source

The latest Nepal Demographic Health Survey (NDHS) conducted in 2016 was the source of the dataset to conduct secondary analysis. NDHS was a cross-sectional type of study. Approval for the availability and authorized use of DHS data was received from the DHS program (<https://www.dhsprogram.com/>). “Individual Women's Data -Individual Recode (IR)” dataset was used for analysis. The dataset included the responses from all eligible women 15-49 years from every selected household in the survey.³⁷ The data collection of NDHS 2016 was conducted from 19-06-2016 to 31-01-2017.²

3.1.2 NDHS sample design:

NDHS 2016 sample was stratified according to the type of residence (urban and rural). The stratified sample was selected in two stages in rural and in three stages in urban. Wards were selected as primary sampling units (PSU) with the probability proportional to their population size. Total 383 clusters/PSUs were selected in the first stage. Additionally, one enumeration area (EA) was randomly selected within each PSU in urban areas. Then, 30 households were systematically (with equal probability) selected from each sampled PSUs in rural and EAs in urban areas. For the women's interview, all women of the reproductive age group (15-49) living in the selected households were eligible. Sample weight for each sample was calculated and accounted for to make the data nationally representative.²

3.1.3 Sample Size

In NDHS 2016, the total number of women of reproductive age (15-49 years) interviewed was 12862. Total married girls aged 15-19 years were 704 (weighted sample) in the survey dataset (**Figure 2**). This sample was included for analysing individual factors and modern contraceptive use. However, the contextual characteristics were defined by analysing responses from all 12862 women (15-49 years) aggregating at cluster level using sample weight. NDHS 2016 included 383 clusters in the survey.²

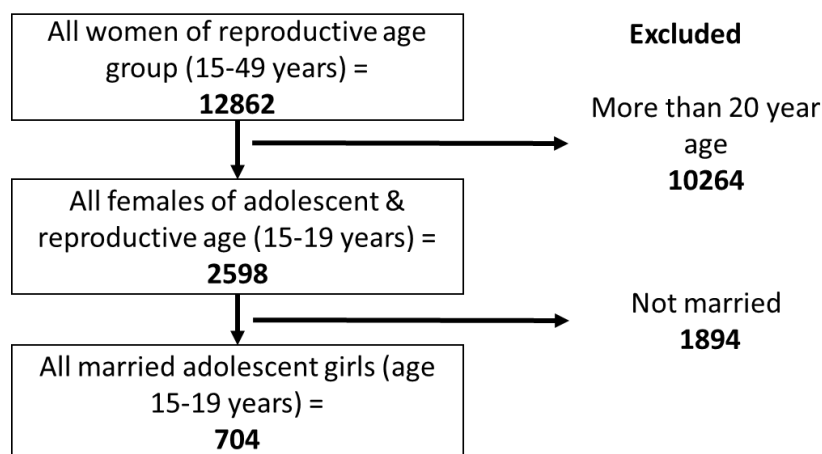


Figure 2. Sample derivation flow chart

3.1.4 Conceptual Framework

The conceptual framework used in the study was Andersen’s Behavioural Model of health service use.³⁸ This model has four components: Contextual characteristics, Individual characteristics, Health Behaviours, and Outcomes (**Annex 1**). As the dataset from NDHS did not include follow-up data, the outcome component of the model could not be included. Also, individual characteristics, contextual characteristics, and health behaviour were the most relevant components for this study. Hence, the study included only contextual characteristics, individual characteristics, and health behaviour (**Figure 3**). The model gives detailed interaction of factors within each category. Both contextual and individual characteristics were further divided into predisposing, enabling, and need factors. The conditions that influence people to use or not to use services, though, were not directly responsible, are predisposing factors; enabling factors are the conditions that facilitate or hinder the use of services; and need factors are those conditions when people sense the requirement of the service use.^{38,39}

Contextual predisposing factors include demographic, social, and belief factors in the community. Contextual enabling factors include health system factors, financing, and organizational contexts in the community. And contextual need factors include environmental needs and population health indices. Similarly, individual predisposing factors also include demographic, social, and beliefs but at the individual level. These factors can influence the need of the individuals for the use or non-use of services. Individual enabling factors include financing and organization at the individual level. These factors create either a supportive environment or a barrier to health behaviour. And individual need factors include perceived and evaluated need of services for self. In both contextual and individual characteristics, the predisposing factors influence the enabling factors, and the enabling factors influence need factors. At a broader level, both the individual and contextual characteristics influence each other also influence the health behaviour independently.^{38,39}

This model treated both individual and contextual factors in a balanced way. The categorisation is also appropriately defined as predisposing, enabling, and need at both levels. Moreover, the model focuses particularly on personal behaviour of health service use which was modern contraceptive use in this study.^{38,39} Effect of contextual and individual characteristics are well explained for the health service use (modern contraceptive use), which fitted very well to the study objectives.

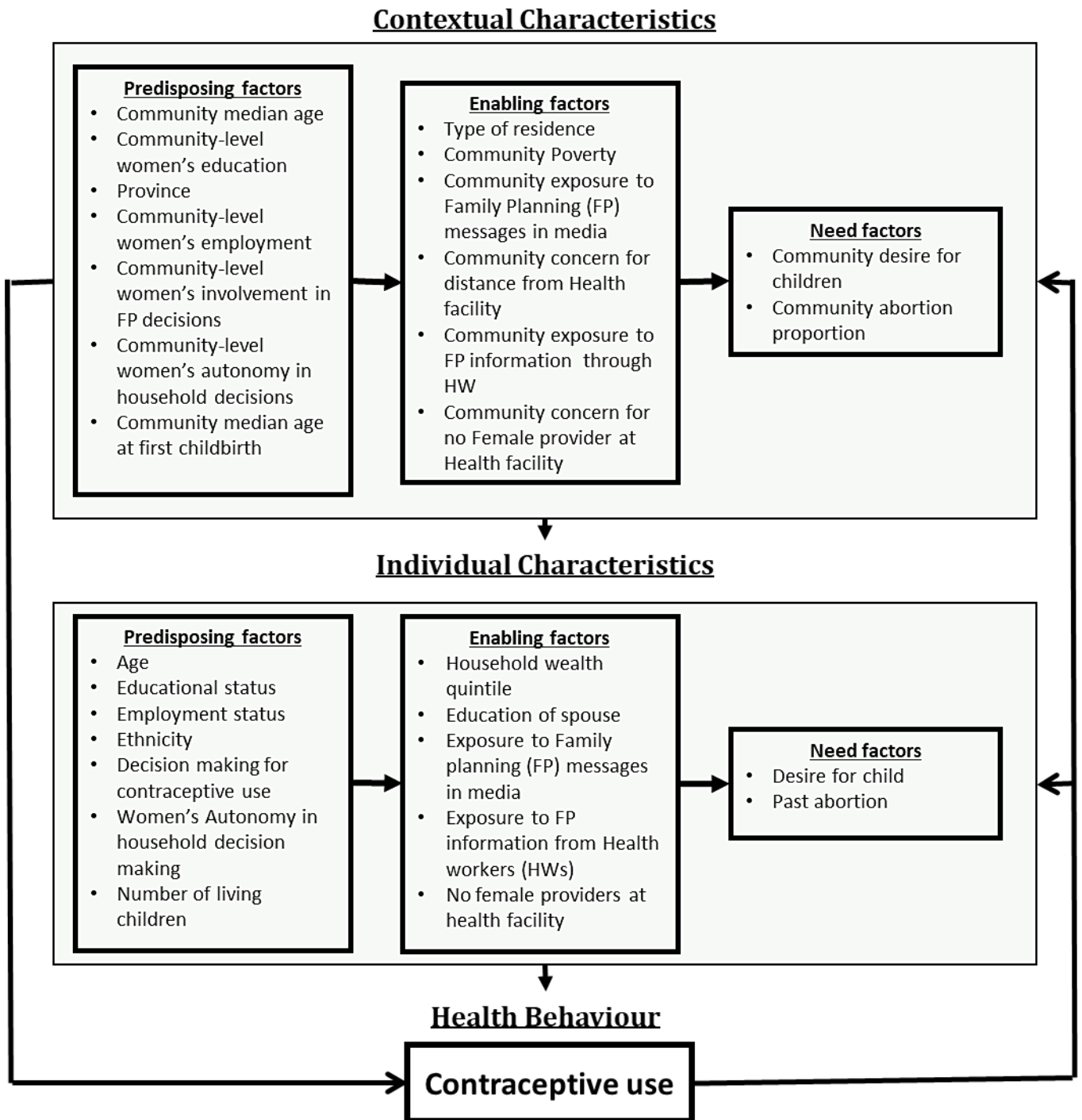


Figure 3. Conceptual framework based on Andersen's Behavioural Model of Health Service Use. The original model is attached to **Annex 1**.³⁸

3.1.5 Study Variables:

Dependent Variable:

Modern contraceptive use at the time of the survey by married adolescent girls (15-19 years) was considered as the current use of modern contraceptives. The current use of modern contraceptives (among married girls) was the dependent variable of the study. Further in the study, the modern contraceptive use denotes the current use of modern contraceptives among married adolescent girls unless otherwise specified. From the NDHS dataset, responses of current contraceptive use were categorized into “Yes” for current users of modern contraceptives and “No” for non-users. “No” included all respondents currently using either the traditional or none of the methods for birth control. Modern contraceptives included in the NDHS data were female sterilization, male sterilization, Intra-Uterine Device (IUD), injectables, pills, implants, and male condoms.

Independent Variables

The covariates were selected and defined based on several articles and availability of variables in the NDHS 2016 data.^{2,27,28,30,34–36,38,40–49} All the independent variables (covariates) were categorized into two major categories: individual and contextual characteristics. Each of the characteristics was further grouped as predisposing, enabling, and need factors. The categorization of the variables was done according to Andersen’s Behavioural Model for Health Service Use³⁸ (**Annex 1**) that is adapted as an analytical framework for the study (**Figure 3**).

I. Independent variables: individual characteristics

Data from married adolescent girls of the reproductive age group (15-19 years) were included for identifying individual characteristics. All the information represents the status at the time of the survey (NDHS 2016).

Individual Predisposing factors:

Age: The age variable refers to the completed age (in years) of respondents at the time of the survey. For a restricted sample of married adolescent girls of age 15- 19 years, the age was categorised into five groups for completed age in years from 15 to 19.

Educational status: Educational status refers to the completed educational level of respondents. It was categorised into four groups viz. “No Education” (without any formal education), “Primary” (who completed primary level of formal education), “Secondary” (who completed secondary level of formal education), and “Higher” (who completed higher than the secondary level of formal education).

Employment status: The employment status of the respondents at the time of the survey was categorised as “Working” for currently working women and “Not Working” for currently not working.

Ethnic group: The ethnicity of the respondents was broadly divided into five groups. “Hill non-Dalits” and “Terai non-Dalits” included so-called upper castes of the Hill and Terai region respectively. “Hill Dalits” and “Terai Dalits” included so-called lower castes of the Hill and Terai region respectively. “Muslim” was categorised as a separate group as mentioned in the NDHS dataset.

Decision making about Family Planning (FP) use: This variable represents the respondent's involvement in the decision-making for use or non-use of Family Planning (FP). The variable

was categorised into “Mainly self” (decided by respondent herself), “Jointly with spouse” (decided together with her spouse), “Mainly spouse” (mainly decided by spouse), and “Other” (decided by other family members).

Women’s autonomy in household decision-making: This variable represents the respondent's autonomy in specific household decisions. The responses from the person who usually decides on respondent’s health care; large household purchases; and regarding visits to family/relatives were grouped into a single variable. If the respondent herself decides in at least one of the decisions, then the variable was categorised as “Full autonomy”; if the decisions were not self but jointly with her spouse in at least one of the decisions, then the variable was categorised as “Joint Autonomy”; and if the respondents not involved in any of the decisions, then the variable was categorised as “No Autonomy”

Number of living children: Total number of living children of the respondent at the time of the survey was accounted for in this variable. The variable was categorised into three groups: “None” for no living child, “One child” for who had one living child, and “Two or more children” for those who had two or more living children.

Individual Enabling factors:

Household wealth index: This variable represents the wealth quintile of the respondent’s household. The wealth status was categorised as “Poorest”, “Poorer”, “Middle”, “Richer”, “Richest” in the NDHS dataset.

Education of spouse: Educational of spouse refers to the completed educational level of the respondent’s spouse. It was categorised into four groups: “No Education” (without any formal education), “Primary” (who completed primary level of formal education), “Secondary” (who completed secondary level of formal education), and “Higher” (who completed higher than the secondary level of formal education).

Exposure to Family Planning (FP) messages in Media: Exposure of the respondent to FP messages in any media (newspaper or radio or television) in last few months was included in this variable. This variable was categorised into “Yes” (with exposure to FP messages in any media) and “No” (no exposure to FP messages in any media).

Exposure to FP information through Health Workers (HWs): The respondent's exposure to family planning information at a Health Facility (HF) through a health worker in the last 12 months. This variable was categorised into “Yes” (got informed about FP by a health worker at HF), and “No” (did not get informed about FP by a health worker at HF).

No Female provider at Health facility: Respondent's concern for no female health providers at the local health facility for getting health care for self. This variable was categories as “Big problem” and “Not a big problem”.

Individual Need factors:

Desire for a child: This variable included responses from respondents about their desire for a child within two years at the time of the survey. The variable was categorised into “Yes” (who wanted a child within two years) and “No” (who didn’t want a child within two years).

Past abortion: This variable included responses from respondents whether they ever had terminated pregnancy or not. The variable was categorised into “Yes” (who had ever terminated pregnancy) and “No” (who had never terminated pregnancy).

II. Independent variables: contextual characteristics

The definition and generation/measurement of cluster-level variables (contextual characteristics) were similar to previously conducted studies.^{36,44,45,49} The NDHS 2016 dataset has coded each of the clusters, where each of the respondents was living at the time of the survey. Two of the contextual variables, Province and Type of residence, already exist in the dataset. Other contextual variables were generated from the dataset by aggregating the variables at the cluster level. The dataset used for analysis only included women aged 15-49 years, hence the cluster characteristics were also calculated by aggregating a set of the individual-level responses from all respondents (women aged 15-49 years) at the cluster level. The cluster characteristics were calculated either in form of proportion or median by using sample weight for each cluster. Then, the calculated median or proportion was further categorized into two groups through the overall median value. The values of cluster characteristics more than the overall median were grouped as “Higher”, and the value less than the median were grouped as “Lower” (**Annex 2**). The binary form of the cluster-level variables helped to identify a more reliable association with the dependent variable.

Contextual Predisposing factors:

Community median age: Median age of women (15-49 years) in the cluster.

Community-level women’s education: The proportion of women with at least secondary education in the cluster.

Province: The province where the respondent was living at the time of the survey. This variable had seven different categories as there are seven provinces in Nepal. Provinces were named as stated in the NDHS 2016: “Province 1”, “Province 2”, “Province 3”, “Province 4”, “Province 5”, “Province 6”, and “Province 7”.

Community-level women’s employment: The proportion of currently working women in the cluster.

Community-level women’s involvement in FP decisions: The proportion of women who participated (either full or joint decision) in decision making for contraceptive use or non-use in the cluster.

Community-level women’s autonomy in household decisions: The proportion of women who participated (either full or joint decision) in household decision making in the cluster.

Community-level median age at first childbirth: Median age at first childbirth in the cluster.

Contextual Enabling factors:

Type of residence: Type of residence where the respondent was living at the time of the survey. It was categorized as “Urban” and “Rural”.

Community poverty: The proportion of women living in poor households (include both poorer and poorest wealth quintile) in the cluster.

Community exposure to Family Planning (FP) messages in media: The proportion of women in the cluster who were exposed to family planning messages through any mass media (TV/radio/newspaper).

Community concern for distance to Health facility: The proportion of women perceiving "distance from health facility for getting medical help for self" is a big problem, in the cluster.

Community-level information about FP provided by HWs: The proportion of women who visited and get informed about Family Planning (FP) through HWs at a Health facility (HF) in the last 12 months, in the cluster.

Community concern for no female provider at a local health facility: The proportion of women perceiving "no female health providers for getting medical help for self" is a big problem in the cluster.

Contextual Need factors:

Community desire for children: The proportion of women who wanted a child within two years, in the cluster.

Community abortion proportion: The proportion of women who had ever terminated their pregnancy, in the cluster.

All contextual characteristics, except province and type of residence, were categorized into "Higher" and "Lower" categories. A more detailed description of each contextual characteristics is attached in **Annex 2**.

3.1.6 Data Analysis:

Univariate, bivariate, and multivariate analysis was performed and reported in the result section (Chapter 4). The analyses were performed accounting for the survey design (primary sampling unit, strata, and sample weight) of the dataset in Stata version 16.0.

At the univariate level, the distribution of married adolescent girls by each individual and contextual characteristic were analysed and presented with weighted frequency and weighted percentage.

At the bivariate level, the association of each independent variable with current modern contraceptive use among married adolescent girls was analysed and presented. The percentage of modern contraceptive use by each of the characteristics and its 95% Confidence Interval (CI) were generated and presented. The crude association of each independent variable with the dependent variable was tested using Pearson's chi-squared test with its p-value. The crude association with a p-value of less than five percent was considered statistically significant.

Multivariate analysis was performed to analyse the adjusted association of individual and contextual variables with modern contraceptive use. NDHS data allows for the application of multilevel logistic regression because of the nested structure of observations/data. In the data, individuals (level 1) were nested within the clusters (level 2). Therefore, a two-level mixed logistic regression model is considered most appropriate to assess the effects of both individual and contextual characteristics on modern contraceptive use.^{36,44,45,49} Four models were generated using the multilevel logistic regression analysis. The first model was run to estimate only the random effect of the clusters on the dependent variable. It was named as "Empty Model" as no independent variables were used. It gave total variance in modern contraceptive use among clusters. The second model, named "Model 1", was adjusted only for individual characteristics. Model 1 only measured the effect of individual characteristics on modern contraceptive use. The third model, named "Model 2", was adjusted only for contextual characteristics, and measured their effect on modern contraceptive use. And the last model, named "Model 3", was adjusted for all individual and contextual characteristics to measure the combined fixed and random effects on modern contraceptive use. All independent variables were used as control variables in the model to adjust for their possible confounding effect as indicated by the conceptual framework (**Figure 3**). Both fixed and random effects on the dependent variable were analysed using the *melogit* command and presented. The fixed effect of the independent variables was estimated and presented by Odds Ratio (OR) with the 95%

CI. The OR with a p-value of less than five percent was considered statistically significant and independently associated with modern contraceptive use. The random effect of clusters was measured by Intra-cluster Correlation Coefficient (ICC) in each of the models. ICC was used to determine the proportion of differences in modern contraceptive use that could be due to intra-cluster variation. Proportional Change in Variance (PCV) was used to calculate the variance in modern contraceptive use explained by the successive model.

Pairwise correlation of all independent variables was conducted to examine the collinearity of variables before accounting for regression analysis. None of the variables were highly correlated (with correlation coefficient <0.7), thus included in the analysis.

3.2 Literature Review

Literature Review was done to identify and analyse the effective interventions at the national and international level (objective 2). The effective interventions focus to improve modern contraceptive use among the married adolescent girls in Nepal.

Both, peer-reviewed and grey literature were reviewed. Only studies after 2005 were included to further review for relevance. Nepal shares major of its boundary and socio-cultural context with India.⁵⁰ Hence, the best practices/effective interventions in Nepal and India were considered. Snowball technique was also be used to identify relevant studies during the literature review. Effective interventions were considered if the study concluded with the fact that the interventions improved the situation of modern contraceptive use among married adolescent/young couples.

Table 1. Search Table

Source	Keywords used
PubMed, Google Scholar	“Effective intervention contraceptive use among married adolescent women in Nepal”, “Effective intervention contraceptive use among married adolescent women in India”, “Evidence-based intervention contraceptive use among married young women in Nepal”, “Evidence-based intervention contraceptive use among married young women in India”

Chapter 4. Results from secondary data analysis

4.1 Background Characteristics of married adolescent girls

The study analysed 704 (weighted sample) married adolescent girls (15-19 years) in Nepal from the dataset of NDHS 2016. Table 2 & Table 3 illustrates the distribution of the study population by individual and contextual characteristics in the sample respectively.

4.1.1 Distribution of married adolescent girls by Individual characteristics

Table 2 illustrates the distribution of 704 married adolescent girls by their individual characteristics. The number and percentage of study population according to the individual level predisposing, enabling, and need factors were listed in the table.

Table 2. Distribution of married adolescent girls by Individual characteristics (n=704)

Individual Characteristics	Weighted number (n)	Weighted percentage (%)
<u>Individual predisposing factors</u>		
Age (years)		
15	21	2.9
16	78	11.1
17	140	19.9
18	213	30.3
19	252	35.7
Educational level		
No education	87	12.4
Primary	159	22.6
Secondary	428	60.7
Higher	31	4.4
Employment status		
Not working	441	62.6
Working	264	37.4
Ethnic group		
Hill non-Dalit	283	40.1
Terai non-Dalit	216	30.6
Hill Dalit	78	11.1
Terai Dalit	70	10.0
Muslims	58	8.2
Decision about FP use/non-use		
Mainly Self	80	13.9
Mainly Husband	77	13.3
Jointly	422	72.5
Others	2	0.4
Women's Autonomy in household decisions		
No Autonomy	461	65.4
Full Autonomy	116	16.5
Joint Autonomy	127	18.1
No. of living children		
None	380	54.0
One child	278	39.5
Two or more children	46	6.5
<u>Individual enabling factors</u>		
Household Wealth		
Poorest	157	22.2
Poorer	157	22.2
Middle	188	26.7
Richer	155	21.9
Richest	49	6.9

Table 2- Continued

Individual Characteristics	Weighted number (n)	Weighted percentage (%)
Educational level of spouse		
No education	69	9.7
Primary	154	21.8
Secondary	373	53.0
Higher than secondary	107	15.2
Don't know	2	0.3
Exposure to Family Planning (FP) message in any media		
No	404	57.3
Yes	301	42.7
Exposure to FP information through Health Workers (HWs)		
No	617	87.6
Yes	87	12.4
Concern about no female provider at the health facility		
Big problem	579	82.2
Not a big problem	125	17.8
Individual need factors		
Desire for child within two years		
No	520	73.9
Yes	184	26.1
Ever terminated pregnancy		
No	633	89.8
Yes	72	10.2

By **individual predisposing characteristics**, slightly more than one-third of the girls were 19 years of age (35.7%) and only 3% of the respondents were of 15 years. Similarly, the majority of the married adolescent girls had completed secondary level (60.7%); no employment (62.6%); decided jointly with their spouse about Family Planning (FP) use or non-use (72.5%); no autonomy in household decisions (65%); and no living child (54%). Ethnic group-wise, more girls were from Hill non-Dalits (40%) and Terai non-Dalit (31%). Married adolescent girls from Hill Dalit (11%) and Terai Dalit (10%) ethnic groups were almost similar (**Table 2**).

By **individual enabling factors**, the percentage of married adolescent girls from the poorest, poorer, and richer households was equal (22% in each category). Slightly more than one-fourth (26.7%) of girls were from the middle household wealth index. The majority of girls had a spouse with at least a secondary level of education (68%); no exposure to FP messages in media (57.3%); no exposure to FP information through health workers (87.6%); and a big problem in seeking care because of no female provider at the health facility (82.2%) (**Table 2**).

By **individual need factors**, the majority of the married adolescent girls had no desire for a child within two years (73.9%) and never ever terminated their pregnancy (89.8%) (**Table 2**).

4.1.2 Distribution of married adolescent girls by Contextual characteristics

Table 3 illustrates the distribution of married adolescent girls by contextual characteristics. The distribution was calculated out of weighted total (n= 704) respondents who were married and 15-19 years of age. The contextual characteristics (except province and type of residence) were defined by aggregating the responses from all women (15-49 years) in the cluster. The “lower” and “higher” categories were grouped through the overall median.

Table 3. Distribution of married adolescent girls by contextual characteristics (n=704)

Contextual Characteristics	Weighted number (n)	Weighted percentage (%)
<u>Contextual predisposing factors</u>		
Community median age		
Lower	398	56.5
Higher	307	43.5
Community-level women's education		
Lower	484	68.7
Higher	220	31.3
Province		
Province 1	98	13.9
Province 2	240	34.0
Province 3	85	12.0
Province 4	52	7.4
Province 5	109	15.5
Province 6	61	8.6
Province 7	60	8.6
Community-level women's employment		
Lower	388	55.1
Higher	316	44.9
Community-level women's involvement in FP decisions		
Lower	326	46.3
Higher	379	53.7
Community-level women's autonomy in household decisions		
Lower	412	58.4
Higher	293	41.6
Community-level median age at first childbirth		
Lower	266	37.7
Higher	439	62.3
<u>Contextual enabling factors</u>		
Type of residence		
Urban	356	50.5
Rural	349	49.5
Community poverty		
Lower	338	47.9
Higher	367	52.1
Community exposure to Family Planning (FP) messages in media		
Lower	473	67.2
Higher	231	32.8
Community concern for distance to Health facility		
Lower	272	38.6
Higher	432	61.4
Community-level exposure to FP information through Health Worker (HW)		
Lower	326	46.2
Higher	379	53.8
Community concern for no Female provider at Health facility		
Lower	271	38.5
Higher	434	61.5
<u>Contextual need factors</u>		
Community desire for children		
Lower	246	34.9
Higher	458.5	65.1
Community abortion proportion		
Lower	364	51.6
Higher	340.9	48.4

With **contextual predisposing factors**, the majority of the married adolescent girls were living in the clusters with lower community median age (56.5%); lower community-level women's education (68.7%); lower community-level women's employment (55%); higher community-level women's involvement in FP decision (53.7%); lower community-level women's autonomy in household decisions (58.4%); and higher community-level median age at first childbirth (62.3%). Similarly, one-third of the married adolescent girls (34%) were living in Province-2 of Nepal, whereas only 7.4% of respondents were from Province-4 (**Table 3**).

With **contextual enabling factors**, the percentage of married adolescent girls living in urban (50.5%) and rural (49.5%) were almost equal. Similarly, the majority of the girls were living in the clusters with higher community poverty (52%); lower community exposure to FP messages in media (67.2%); higher community concern for distance to health facility (61.4%); higher community-level exposure to FP information through HWs (53.8%); and higher community concern for no female provider at local health facility (61.5%) (**Table 3**).

With **contextual need factors**, the majority of the married adolescent girls were living in the clusters with higher community desire for children within two years (61.5%) and higher abortion proportion (65.1%) (**Table 3**).

4.2 Modern contraceptive use by individual and contextual characteristics

NDHS 2016 data showed that only 14.5 % of married adolescent girls were using modern contraceptives. The rest of the 8.6% were using traditional methods and 76.9% were not using any contraceptives at the time of the survey (**Figure 4**). Among the modern contraceptive users, Injection (38.1%) was the most widely used type of modern contraceptive (**Figure 5**).

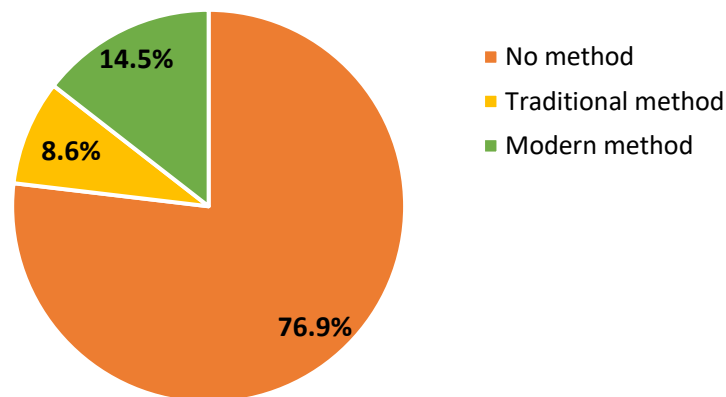


Figure 4. Percentage of married adolescent women currently using different methods of contraceptives (n=704)

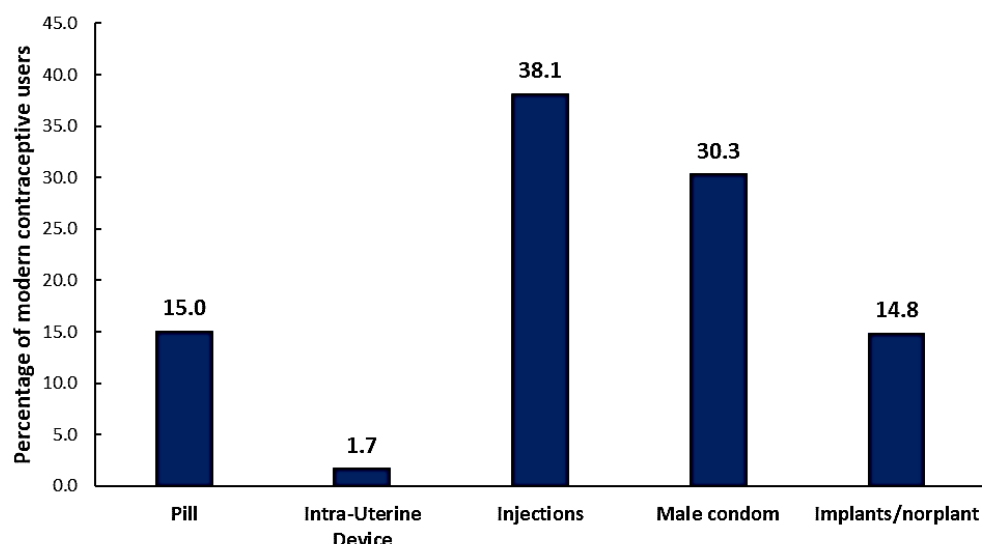


Figure 5. Distribution of modern contraceptive use by different types among married adolescent girls currently using modern contraceptives (n=102)

4.2.1 Associations between modern contraceptive use and individual characteristics of married adolescent girls

Table 4 illustrates the association between modern contraceptive use and individual characteristics. Individual-level predisposing factors like educational level, employment status, women's autonomy in household decisions, and the number of living children were significantly associated with modern contraceptive use. Similarly, among enabling factors, exposure to family planning messages in media and through Health Workers (HWs) significantly increased the modern contraceptive use among married adolescent girls. The desire of having or not having a child within two years (a need factor) was also significantly associated with modern contraceptive use.

Table 4. Associations between individual characteristics and modern contraceptive use among married adolescent girls with weighted percentage, 95% confidence interval, and Pearson's chi square test results

Individual characteristics	Modern Contraceptives use			Pearson's chi squared test	
	Weighted percentage	95% confidence interval		X ² Value	P- value
Individual predisposing factors				38.9798	0.065
Age (Years)					
15	17.48	3.47	31.49		
16	6.94	1.32	12.57		
17	9.39	3.85	14.93		
18	15.29	8.79	21.78		
19	18.73	13.43	24.04		
Educational Level				71.033	0.0008***
No education	5.21	-0.11	10.53		
Primary	9.31	4.63	13.99		
Secondary	17.05	12.70	21.40		
Higher	31.65	15.30	48.00		
Employment status				37.5272	0.013*
Not working	11.22	7.24	15.21		
Working	19.92	14.23	25.62		
Ethnic Group				44.1111	0.2042
Hill non-Dalit	18.46	13.33	23.60		
Terai non-Dalit	9.48	5.00	13.96		

Table 4- Continued

Individual characteristics	Modern Contraceptives use			Pearson's chi squared test	
	Weighted percentage	95% confidence interval		X ² Value	P- value
Hill Dalit	17.78	8.71	26.85		
Terai Dalit	15.15	-2.27	32.57		
Muslims	8.02	0.63	15.41		
Decision making for use/non-use of Family Planning				11.9498	0.4818
Mainly respondent	20.11	11.32	28.89		
Mainly spouse	22.70	12.95	32.45		
Jointly with spouse	16.19	11.36	21.02		
Women's Autonomy in household decisions				47.26	0.0289*
No Autonomy	11.05	8.04	14.05		
Full Autonomy	20.68	12.64	28.72		
Joint Autonomy	21.23	9.69	32.78		
Number of Living children				124.52	0.0000***
None	8.10	4.06	12.14		
One child	23.96	17.88	30.03		
Two or more children	9.87	1.25	18.49		
Individual enabling factors				31.5105	0.1823
Wealth Index					
Poorest	15.92	9.95	21.89		
Poorer	16.52	10.21	22.82		
Middle	8.18	4.07	12.29		
Richer	17.41	8.73	26.09		
Richest	18.33	5.59	31.06		
Educational Level of Spouse				45.4331	0.0848
No education	3.51	-1.45	8.46		
Primary	17.00	7.70	26.30		
Secondary	13.56	9.68	17.44		
Higher	21.4	13.11	29.69		
Exposure to Family Planning (FP) messages in media				64.3686	0.0003***
No	9.72	6.70	12.74		
Yes	20.87	14.88	26.85		
Exposure to FP information through health workers				47.2407	0.0008***
No	12.7	10	16		
Yes	27.04	16.7	37.38		
Concern for no female health provider				0.2811	0.7949
Big problem	14.31	10.65	17.97		
Not a big problem	15.26	8.83	21.69		
Individual need factors				104.0431	0.0000***
Desire of child within 2 years					
No	18.65	14.54	22.75		
Yes	2.70	0.42	4.97		
Ever had terminated pregnancy				1.3987	0.5767
No	14.75	11.31	18.19		
Yes	12.07	3.94	20.19		

Note: *p-value <0.05, ** p-value <0.01, *** p-value<0.001

Among **individual predisposing factors**, modern contraceptive use among married adolescent girls significantly increased with increased educational level (p-value=0.0008). The modern contraceptive use was lowest among married adolescent girls with no education (5%) and gradually increased and highest among the higher level of education (32%). Similarly, modern contraceptive use was found significantly higher among currently working (20%) than non-working (11.22%) married adolescent girls (p-value=0.013). Women's autonomy in household decision making was also significantly associated with modern contraceptive use among married adolescent girls. Modern contraceptives use among married girls with no autonomy in household decisions (11.05%) was lower than Full (20.68%) and Joint-autonomy with spouse

(21.23%) with p-value=0.0289. The association of modern contraceptive use with the number of living children was found significant (p-value=0.0000). The modern contraceptive use was highest among married adolescent girls with one living child (24%) but reduced with two or more living children (9.87%). Modern contraceptive use was found lowest among married adolescent girls without any living child (**Table 4**).

Among **individual enabling factors**, the exposure to Family Planning (FP) messages in media significantly increased modern contraceptive use (p-value=0.0003). The percentage of modern contraceptive use among married girls with exposure to FP messages in media was twice that of the girls who did not have such exposure. Similarly, the association of the exposure to FP information through Health Workers (HWs) was also significantly associated with modern contraceptive use (p-value=0.0008). The percentage of modern contraceptive use among married adolescent girls with exposure to FP information through HWs was twice that of the girls who did not get such exposure (**Table 4**).

Regarding the **individual need factor**, the desire of having a child within two years was significantly associated with modern contraceptive use (p-value=0.0000). The percentage of modern contraceptive use among girls who desired a child within two years was 6 times less compared to those who did not have the desire (**Table 4**).

4.2.2 Associations between Modern contraceptive use and contextual characteristics of married adolescent girls

Table 5 illustrates the association of each contextual variable with modern contraceptive use among married adolescent girls. The finding shows contextual predisposing factors such as community-level women’s education; province; community-level women’s employment; and community-level women’s autonomy were significantly associated with the modern contraceptive use among married adolescent girls. Similarly, one of the contextual enabling factors- community exposure to Family Planning (FP) messages in media - found significantly associated with modern contraceptive use. A contextual need factor, community-level desire for children, was also significantly associated with modern contraceptive use among married adolescent girls.

Table 5. Association between contextual characteristics and Modern Contraceptive use among married adolescent girls with weighted percentage, 95% confidence interval, and Pearson’s chi square test results

Contextual characteristics	Modern Contraceptives use			Pearson's chi square test	
	Weighted Percentage	95% confidence interval		X ² Value	P- value
<u>Contextual predisposing factors</u>				9.6132	0.2318
Community median age					
Lower	12.61	8.80	16.41		
Higher	16.91	11.12	22.69		
Community-level women’s education				30.5229	0.0298*
Lower	11.92	8.36	15.47		
Higher	20.11	12.97	27.25		
Province				169.238	0.0001***
Province 1	23.54	13.66	33.43		
Province 2	3.89	0.73	7.06		
Province 3	29.43	11.45	47.42		
Province 4	20.58	11.53	29.63		
Province 5	14.6	7.54	21.66		
Province 6	16.97	10.59	23.34		
Province 7	12.87	3.69	22.05		

Table 5- Continued

Contextual characteristics	Modern Contraceptives use			Pearson's chi square test	
	Weighted Percentage	95% confidence interval		X ² Value	P- value
Community-level women's employment				45.497	0.0093**
Lower	10.29	5.95	14.64		
Higher	19.61	14.64	24.59		
Community-level women's involvement in FP decisions				25.4759	0.0585
Lower	18.22	13.18	23.25		
Higher	11.26	6.68	15.84		
Community-level women's autonomy in household decisions				30.1287	0.0295*
Lower	11.3	7.91	14.69		
Higher	18.95	12.58	25.33		
Community-level median age at first childbirth				21.1687	0.0817
Lower	10.42	5.40	15.43		
Higher	16.94	12.42	21.46		
Contextual enabling factors				21.3322	0.0583
Type of residence					
Urban	17.62	12.06	23.18		
Rural	11.27	7.74	14.81		
Community poverty				4.9269	0.4043
Lower	12.89	7.80	17.97		
Higher	15.94	11.68	20.21		
Community exposure to Family Planning (FP) messages in media				62.3512	0.0012**
Lower	10.69	7.67	13.70		
Higher	22.24	14.93	29.55		
Community concern for distance to local health facility				2.9894	0.5069
Lower	15.98	10.31	21.64		
Higher	13.54	9.32	17.76		
Community-level exposure to FP information through health workers				0.0099	0.9702
Lower	14.41	9.11	19.71		
Higher	14.54	10.05	19.03		
Community concern for no female provider at local health facility				0.0212	0.9522
Lower	14.61	10.15	19.06		
Higher	14.4	9.69	19.11		
Contextual need factors				70.4834	0.0006***
Community desire for children					
Lower	22.36	15.46	29.26		
Higher	10.25	7.21	13.30		
Community abortion proportion				18.6078	0.0731
Lower	17.35	11.69	23.01		
Higher	11.42	8.12	14.72		

Note: *p-value <0.05, ** p-value <0.01, *** p-value<0.001

Among **contextual predisposing factors**, higher community-level women's education significantly increased the modern contraceptive use among married adolescent girls (p-value=0.0298). Modern contraceptive use among girls living in the clusters with higher community-level women's education was 20%. But it was only 12% among women living in the clusters with the lower community-level women's education. Similarly, modern contraceptive use was also significantly associated with the province (p-value=0.0001). The percentage of modern contraceptive use was lower (4%) among girls living in Province 2 and higher (29%) in Province 3 while comparing different provinces. Likewise, the higher community-level women's employment had significantly higher modern contraceptive use among married adolescent girls (p-value=0.0093). The percentage of modern contraceptive use among married adolescents living in clusters with higher women's employment was twice that of girls living in clusters with lower community-level women's employment. Higher

community-level women's autonomy in household decisions also significantly increased the modern contraceptive use among married adolescent girls (p-value=0.0295). The modern contraceptive use was 19% among girls living in the clusters with higher women's autonomy whereas, in clusters with lower women's autonomy, it was only 11% (**Table 5**).

One of the **contextual enabling factors** was also significantly associated with modern contraceptive use among married adolescent girls. The percentage of modern contraceptive use among girls living in the clusters with higher exposure to FP messages in media was twice that of those living in the clusters with lower community exposure to FP messages (**Table 5**).

Regarding the **contextual need factor**, higher community desire for children significantly reduced the percentage of modern contraceptive use among married adolescent girls (p-value=0.0006). Modern contraceptive use among married girls living in the clusters with higher community desire for a child was only 10%. It was significantly higher (22%) among girls living in the clusters with lower community desire for a child (**Table 5**).

4.3 Multilevel analysis of all predictors of modern contraceptive use among married adolescent girls

Table 6 illustrates the results for multilevel logistic analysis. The analysis examined the association of different independent variables with modern contraceptive use among married adolescent girls. The odds ratio was reported as the measure of association in the analysis. The odds ratio greater than one indicates positive association (increased modern contraceptive use) and less than one indicates the negative association (reduced modern contraceptive use). The Intra-cluster Correlation Coefficient (ICC) indicates the variability in modern contraceptive use due to clusters (clustering). The Proportional Change in Variance (PCV) assessed the impact of individual and contextual characteristics.

Four models were generated to assess the impact of the individual and contextual characteristics on modern contraceptive use. The ICC was decreased gradually in successive models (**Table 6**). It was 37% in the empty model, 21% in Model 1 (individual characteristics only), 17% in Model 2 (contextual characteristics only), and 14% in Model 3 (both individual and contextual variables). Between-cluster variation accounted for the least (14%) variance in modern contraceptive use in Model 3. PCV in Model 3 indicated that 71% of the variance in modern contraceptive use among married adolescent girls could be explained by both individual and contextual characteristics. Model 3 had the highest PCV among all other predicting models. Hence, Model 3 (with the least ICC and highest PCV) was considered better for predicting the effect of individual and contextual characteristics on modern contraceptive use. The final model (Model 3) found five of the covariates significantly associated with modern contraceptive use among married girls: ethnic group, educational level of the spouse, exposure to FP information through HWs, desire for a child, and province were significantly associated with modern contraceptive use of married adolescent girls (**Table 6**).

Table 6. Multilevel regression results assessing effects of individual and community characteristics on modern contraceptive use among married adolescent girls

Characteristics	Empty Model	Model 1 ^a		Model 2 ^b		Model 3 ^c	
		Individual Characteristics		Contextual Characteristics		Individual & Contextual Characteristics	
		Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
Fixed Effect							
Individual predisposing factors							
Educational level							
No education (Reference)							
Primary		1.21	0.25-5.86			0.77	0.18-3.32
Secondary		2.04	0.37-11.3			1.28	0.29-5.63
Higher		2.21	0.28-17.18			1.83	0.29-11.52
Employment status							
Not working (Reference)							
Working		2.00*	1.02-3.93			1.84	0.92-3.66
Ethnic group							
Hill non-Dalit (Reference)							
Terai non-Dalit		1.28	0.47-3.51			5.02**	1.8-14.0
Hill Dalit		1.38	0.56-3.39			1.74	0.74-4.08
Terai Dalit		4.05	0.89-18.39			12.97***	3.45-48.76
Muslims		1.83	0.37-9.11			4.01	0.93-17.18
Women's autonomy							
No Autonomy (Reference)							
Full Autonomy		1.00	0.48-2.09			0.88	0.41-1.91
Joint Autonomy		2.35*	1.04-5.33			1.47	0.7-3.09
Number of living children							
None (Reference)							
One child		1.61	0.71-3.69			1.78	0.8-3.96
Two or more children		0.47	0.11-2.03			0.55	0.15-2.03
Individual enabling factors							
Educational level of spouse							
No education (Reference)							
Primary		5.21*	1.43-18.94			3.38*	1.13-10.08
Secondary		3.29	0.94-11.51			2.19	0.73-6.59
Higher		4.06	0.94-17.48			3.57	0.95-13.44
Exposure to Family Planning (FP) messages in media							
No (Reference)							
Yes		1.33	0.7-2.51			0.78	0.4-1.55
Exposure to FP information through Health Workers (HW)							
No (Reference)							
Yes		3.20**	1.36-7.57			4.61**	1.86-11.4
Individual need factor							
Desire of child within two years							
No (Reference)							
Yes		0.08***	0.02-0.26			0.07***	0.02-0.26
Contextual predisposing factors							
Community-level women's education							
Lower (Reference)							
Higher				1.05	0.56-1.96	0.82	0.38-1.8
Province							
Province 1 (Reference)							
Province 2				0.12***	0.04-0.38	0.06***	0.01-0.24
Province 3				0.97	0.34-2.74	1.96	0.72-5.34
Province 4				0.69	0.26-1.87	0.67	0.23-1.94
Province 5				0.42	0.15-1.18	0.39	0.11-1.4
Province 6				0.66	0.23-1.9	0.95	0.28-3.29
Province 7				0.26*	0.07-0.93	0.18*	0.04-0.75

Table 6- Continued

Characteristics	Empty Model	Model 1 ^a		Model 2 ^b		Model 3 ^c	
		Individual Characteristics		Contextual Characteristics		Individual & Contextual Characteristics	
		Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
Community-level women's employment							
Lower (Reference)							
Higher				1.07	0.54-2.14	1.03	0.49-2.17
Community-level women's autonomy in household decisions							
Lower (Reference)							
Higher				0.93	0.49-1.75	0.74	0.36-1.53
<u>Contextual enabling factors</u>							
Community exposure to Family Planning (FP) messages in media							
Lower (Reference)							
Higher				1.22	0.65-2.29	1.09	0.53-2.24
Community-level exposure to FP information through HW							
Lower (Reference)							
Higher				1.02	0.53-1.97	0.87	0.43-1.75
<u>Contextual need factor</u>							
Community desire for children							
Lower (Reference)							
Higher				0.41**	0.22-0.75	0.59	0.31-1.15
<u>Random effects</u>							
ICC (%)	37%	21%		17%		14%	
PCV (%)	Ref.	54%		68%		71%	

Notes: *p-value <0.05, ** p-value <0.01, *** p-value<0.001

CI: Confidence Interval; ICC: Intra-cluster Correlation Coefficient; PCV: Proportional Change in Variance.

^a The analysis additionally adjusted for the other individual variables: age, decision making for use/non-use of FP, wealth index, concern for no female health provider, ever had terminated pregnancy.

^b The analysis additionally adjusted for the other contextual variables: community median age, community-level women's involvement in FP decisions, community-level median age at first childbirth, type of residence, community poverty, community concern for distance to the local health facility, community concern for no female provider at the local health facility, abortion proportion in the community.

^c The analysis additionally adjusted for all other individual and contextual variables mentioned above in "a" and "b".

4.3.1 Adjusted association of individual characteristics with modern contraceptive use

Four of the individual characteristics were found statistically significant after adjusting with all individual characteristics and contextual characteristics in Model 3. They were ethnic group, educational level of the spouse, FP information provided by Health Workers (HWs), and desire of a child within two years.

Among **individual predisposing factors**, ethnic group was only found independently associated with modern contraceptive use in the final model (Model 3). However, the employment status and women's autonomy were significantly associated with modern contraceptive use and were independent of all other individual characteristics in Model 1. The odds of modern contraceptive use among working married adolescent girls were twice the odds among girls who were not working (OR 2.00; 95% CI 1.02-3.9). Similarly, the odds of modern contraceptive use among individuals who were involved in household decisions jointly with spouse (Joint Autonomy) was 2.35 times the odds among individuals who didn't get involved in household decisions (No Autonomy). Only joint autonomy was found significantly higher than no Autonomy in Model 1 (OR 2.35; 95% CI 1.04-5.33). However, after adjusting for both

individual and contextual characteristics, both employment and autonomy lost their significance (Model 3). In Model 3, the ethnic group gained the significance of its association with modern contraceptive use. The odds of modern contraceptives use among married adolescent girls of the Terai Dalit ethnic group was 12.97 times the odds among girls of the Hill non-Dalits ethnic group (OR 12.97; 95% CI 3.45-48.76). Similarly, the odds of modern contraceptive use among married adolescent women of the Terai non-Dalit ethnic group was five times the odds among Hill non-Dalit ethnicity (OR 5.02; 95% CI 1.8-14). Hence, Terai non-Dalit and Terai Dalit ethnic groups had significantly higher modern contraceptive use among married adolescent girls (**Table 6**).

Among **individual enabling factors**, the educational level of the spouse and the exposure to FP information through HWs were independently associated with modern contraceptive use both in Model 1 and Model 3. The odds of modern contraceptive use among girls with the primary level educated spouse was 5.21 times compared to the odds among girls with not educated spouse after adjusting for all other individual characteristics (Model 1). After additionally adjusting for contextual characteristics, the odds of modern contraceptive use among married adolescent girls with primary level educated spouse was 3.38 times (OR 3.38; 95% CI 1.13-10.08) the odds among girls with not educated spouse (Model 3). The strength of association was slightly reduced but remained significant and positively associated with modern contraceptive use from Model 1 to Model 3. Similarly, the odds of modern contraceptive use among married adolescent girls who got exposure to Family Planning (FP) information through Health Workers (HWs) was 3.2 times the odds among girls who did not have such exposure. The strength of association of exposure to FP information through HWs slightly increased after adjusting with both individual and contextual characteristics in Model 3. In the final model, the odds of modern contraceptive use among married adolescent girls who got exposure to FP information through HWs was 4.6 times (OR 4.6; 95% CI 1.86-11.4) the odds among girls who did not have such exposure (**Table 6**).

An **individual need factor**, the desire of a child within two years, was found significantly associated with modern contraceptive use in the final model. In Model 1, the odds of modern contraceptive use among married girls who desired a child within two years was 92% less in comparison to the odds among girls who did not desire a child after adjusting for other individual characteristics. The strength of association slightly increased after adjusting for all individual and contextual characteristics (Model 3). In Model 3, the odds of modern contraceptive use among women who desired a child within two years was 93% less (OR 0.07; 95% CI 0.02-0.26) compared with the odds among women who did not desire a child within two years (**Table 6**).

4.3.2 Adjusted association of contextual characteristics with modern contraceptive use

After adjusting together with all other individual and contextual characteristics, only province, a contextual predisposing factor, was found significantly associated with modern contraceptive use among married adolescent girls.

Among **contextual predisposing factors**, married girls living in Province 2 and Province 7 had significantly lower modern contraceptive use compared with Province 1. However, other provinces did not have a significant difference in contraceptive use comparing with province 1. While adjusting for all other contextual characteristics, married adolescent women in Province 2 were 88% less likely to use modern contraceptives compared with province 1. Similarly, the likelihood of modern contraceptive use among married adolescent girls in

Province 7 was 74% less compared with Province 1. After adjusting with individual characteristics, the strength of association of both Province 2 and Province 7 increased in Model 3. The odds of modern contraceptive use among married adolescent girls living in Province 2 was 94% less (OR 0.06; 95% CI 0.01-0.24) compared to those living in Province 1. Similarly, the odds of modern contraceptive use were 82% less (OR 0.18; 95% CI 0.04-0.75) among married girls living in Province 7 compared to those living in Province 1 (**Table 6**).

None of the **contextual enabling factors** were significantly associated with modern contraceptive use after adjusting for other covariates in multivariate analysis (**Table 6**).

Among **contextual need factors**, community desire for a child lost its significance of association in the final model, after adjusting for all characteristics. In Model 2, the odds of modern contraceptives use were significantly reduced by 59% in the communities with a higher desire for a child (Model 2). However, in Model 3 after adjusting for individual characteristics, the significance of the association was lost (**Table 6**).

Chapter 5. Effective interventions to improve modern contraceptive use

A review of the evidence for effective interventions was done and presented in the chapter. India has socio-cultural and other contextual similarities with Nepal.⁵⁰ Hence, the interventions proven effective on modern contraceptive use among married young women in India were particularly considered while searching the literature. One study from Nepal and two studies from India were included in the review. All of the interventions reviewed were specifically targeted for married adolescents and young couples to address their RH needs including modern contraceptive use. The interventions were targeted at multiple levels from an individual, household to the community.

5.1 Reproductive Health for Married Adolescent Couples Project, Nepal

Reproductive Health for Married Adolescent Couples Project (RHMACP) was implemented from 2005-2007 in Dhanusha and Parsa districts of Province 2, Nepal. The project was based on the ecological model to improve the Reproductive Health (RH) of married adolescents. The project mobilized married adolescents (one male and one female), from the local community in each ward as peer educators. Peer educators (also known as “Change agents”) were trained and mobilized to educate their peers (married adolescents) in the ward about RH. For awareness and reinforcement, individual counselling by door-to-door visits and mass events in the community on RH and Family Planning (FP). Enabling environment in the community was developed by involving and sensitizing family members (parents and parents’ in-laws) and community leaders on Adolescents’ SRH needs and rights. The project also equipped the local health facilities with youth-friendly services to increase the quality and acceptability of the required RH services at the local level.⁵¹

Baseline and end-line household surveys were conducted to measure the impact in 2007. The findings of the study illustrated married adolescents visiting health facilities for seeking service increased from 36% to 42% during the two years. Joint family planning decisions increased significantly from 37% to 65% among married female adolescents. And the knowledge about at least two methods of contraceptives was almost universal among married adolescents at the end of the project. However, the use of contraception before first pregnancy was only 4.8% (in 2007) from 4.4% (in 2005) among adolescent females. But, government health data showed a 52% increase in the number of contraceptive users from 2005-2007.⁵¹

The project evaluation confirmed that the project was useful for increasing the health-seeking behaviour, joint decision-making for FP, and improving the knowledge about modern contraceptives. But modern contraceptive use among married adolescent girls was almost constant. However, the study explained that the implementation of the project for a longer period would improve modern contraceptive use among married adolescent couples. Hence, it further suggested to scale up the project in piloted and other districts of Nepal and other similar settings.⁵¹ Regarding the quality of the evaluation study, it only included baseline and end-line data for the evaluation of impact. Due to the lack of relevant comparison groups, the changes presented in the study could not be confirmed as project outcomes.

5.2 CHARM Intervention in Rural India

A cluster randomized controlled trial evaluated CHARM interventions implemented from March to December 2012 in Maharashtra, India. Participants for the trial were young married couples (husbands aged 18-30 years and their wives). Total 50 clusters and 1081 married couples were divided into two arms (intervention and control arm) and followed for 18 months after the intervention. Contraceptive use was one of the primary outcomes of the trial. Village

Health Providers (VHPs) were selected from existing local health care providers. VHPs were further trained for three days on family planning counselling, gender equity, and intimate partner violence along with the orientation about CHARM interventions. Its intervention included three counselling sessions on gender equity and family planning. Those sessions were tailored contextually for gender and cultural sensitiveness. The first two sessions were provided to married men and the third for the couple by the VHPs either in a clinical setting or near participants' homes. The first two sessions aimed to develop a good rapport and environment for sensitive talks. And the third session aimed to reinforce the couple to take the joint decision for contraceptive use. The VHPs also provided contraceptive pills or condoms to the participants during the contact. Those counselling sessions were conducted for three months according to the predefined module (**Annex 3**).⁵²

In the control group, the women were referred for free contraceptives at government health facilities. Home visits were also done by front-line health workers instead of VHPs. The engagement of the husband was also not considered in the control group.⁵²

Evaluation found that modern contraceptive use significantly increased from baseline among both intervention group (adjusted OR=2.61; 95% CI = 1.88, 3.61) and control group (adjusted OR 1.51; 95% CI = 1.12, 2.04) after 18 months follow-up. The results showed more increase in OR from baseline in the intervention group. The study concluded involvement of men with three gender equity and family planning counselling sessions through trained health workers can be effective in increasing modern contraceptive use.⁵²

5.3 “Promoting Change in Reproductive Behaviour of Adolescents” (PRACHAR) project in Bihar, India

Promoting Change in Reproductive Behaviour of Adolescents (PRACHAR) project was implemented from 2001 to 2012 in Bihar, India. A recent study synthesized multiple reports and project data to evaluate the project in 2018. The PRACHAR project had 5 intervention models and 3 phases. Phase I included a comprehensive Non-Governmental Organisation (NGO) Model implemented for 3 years. This Model was the found most effective in improving modern contraceptive use among young married women (age 15-24 years).⁵³ Hence, only this model was included as a relevant effective intervention.

The NGO-led PRACHAR model intervention targeted individuals, couples, and communities for behaviour change. The project provided SRH and life skills training for unmarried adolescents separately males and females. The intervention for married included home visits for counselling and referrals for FP services by female health workers; organize events to celebrate together with newlywed couples and discussion on RH/FP and referrals in small male and female groups of young married people. Awareness and sensitization of community through street theatres and orientation/training for formal and informal community leaders. Enabling environment also developed at household level by group meetings and awareness activities for parents and in-laws of young married women.⁵³ Details about the interventions at various level was included in **Annex 4**.

Comprehensive NGO Model after 3 years of implementation, the odds of contraceptive use among married young (15-24 years) women in the intervention area increased by 3.84 times compared to the comparison area (Adjusted OR=3.84; P-value<0.001). The contraceptive use among young married women significantly increased from 4.3% (baseline) to 20.7% (end-line) in the intervention area whereas in the control area the contraceptive use among the same target group was increased slightly from 2.8%(baseline) to 4.7%(end-line). The study also found the impact of the PRACHAR project sustained even years after the end of interventions.⁵³

Home visits from NGO change agents were found highly effective in increasing contraceptive use. The study found, 72% of users of zero parity and 59% users of first parity initiated the contraceptive use after 7-12 home visits.⁵³

The study also suggested the involvement of both husband and wife together in the intervention was associated with higher odds of contraceptive use. The odds ratio of contraceptive use by women while involving both couples in the project in comparison to the controls was highest (adjusted OR=3.69, p-value<0.001).⁵³

The author concluded that involvement of both couples; context-tailored contents FP counselling through health workers; and considering both individual and community-level change can effectively improve modern contraceptive use among married young. The NGO-led model was found highly effective for long-lasting impacts.⁵³

The RHMACH project found increased comprehensive knowledge regarding family planning in project-covered districts in Nepal. But the project could not increase the use of modern contraceptives. The RHMACH project involved married male and female adolescents as peer educators for home visits and counselling. Counselling by peer educators was not found much effective in behaviour change while comparing with the findings of the PRACHAR and the CHARM in India. Male (husband) engagement was also considered with high priority in both of the projects to enhance joint participation and couple communication. Also, the involvement of unmarried adolescents played a crucial role in increasing modern contraceptive use in the PRACHAR project. However, RHMACHP interventions lack intensive male participation and involvement of unmarried adolescents. The activities strengthening the health system (making youth-friendly health services) were very important made it different from the other two projects. Though the presence of youth-friendly services did not succeed to improve modern contraceptive use due to gaps in demand generation and behaviour change activities.

Chapter 6. Discussion, Conclusion, and Recommendations

6.1 Discussion

This study analysed NDHS 2016 data to identify the factors associated with modern contraceptive use among married adolescent girls in Nepal. This study found the following factors independently associated with modern contraceptive use: ethnic group; educational level of spouse; exposure to FP information through HWs; the desire of a child; and province. More individual characteristics were contributing independently to modern contraceptive use compared to contextual ones. However, all the characteristics were highly interlinked. The findings indicated the substantial influence of contextual characteristics on the independent association of individual characteristics with modern contraceptive use (comparing Model 1 and Model 3). Similarly, individual characteristics were also found to influence the association of contextual characteristics with modern contraceptive use (comparing Model 2 and Model 3). The influence of both contextual and individual characteristics was found as illustrated in the conceptual framework used in this study. Overall, the final model predicted 71% of variations in modern contraceptive use after considering all the observed characteristics. Hence, both contextual and individual characteristics when fitted together in multivariate analysis better predicted the association.

6.1.1 Influence of individual characteristics on modern contraceptive use

This study found four of the individual characteristics independently associated with modern contraceptive use: ethnic group; educational level of spouse; exposure to FP information through HWs; and the desire of a child within two years.

Most of **the individual predisposing factors** were associated with modern contraceptive use in the chi-square test. But all crude association of predisposing factors lost their significance after controlling for contextual characteristics. The ethnic group suddenly became significantly associated. The finding indicated the influence of other individual and contextual characteristics on the association of individual predisposing factors.

Ethnic group was the only individual predisposing factor found independently associated with modern contraceptive use in this study. The percentage of modern contraceptive use among married adolescent girls in Hill non-Dalit was the highest in comparison to all other ethnic groups (**Table 4**). However, while adjusting with individual and contextual characteristics, Terai non-Dalit and Terai Dalit ethnic groups had a significantly higher odds of modern contraceptive use compared with Hill non-Dalits (**Table 6**). The findings indicated Terai Dalit and Terai non-Dalit ethnic groups were independently associated with higher modern contraceptive use among married girls.

The studies in Nepal found mixed results regarding the association of ethnicity. One study found no significant difference among Dalits compared with Brahmin/Chhetri (non-Dalits).³⁵ Another study found higher contraceptive use among Dalit compared with Brahmin and *Janajati* (non-Dalits).⁵⁴ And the other study found Dalits had significantly lower modern contraceptive use compared with *Janajati* (non-Dalits).³⁴ However, the significantly higher modern contraceptive use among Dalit ethnic group in this study was a bit unexpected as the ethnic group is socially disadvantaged in Nepal.⁵⁵ Though, it might be possible that some other unobserved variables like exposure to targeted family planning programs for disadvantaged; or unobserved socio-cultural context might have affected the association. One study also showed less likelihood of contraceptive use among women living in the hills of Nepal.⁵⁶ Hence, there might also be the possible influence of geographical difficulties, as most of the people from hill-ethnic groups live in hills - possibly difficult in access to services - and most of the terai

ethnic groups living in flatland (Terai)- possibly more easy access to services- leading to the differences in modern contraceptive use among the ethnic groups. This study finding of an increased likelihood of modern contraceptive use among Terai non-Dalit and Terai Dalit ethnic groups compared to Hill non-Dalits was a bit unclear. Further study is needed to explore the possible influence of targeted programs, socio-cultural differences, and geographical aspects on the association.

Some of the **individual enabling factors** found facilitating the modern contraceptive use among married adolescent girls in Nepal. Individual enabling factors such as exposure to FP information through HWs and the education level of spouse were found significantly associated with modern contraceptive use (**Table 6**).

Exposure to FP information through HWs, was conceptualized to be associated for enabling modern contraceptive use. This study found that the exposure to FP information through HWs had an independent association with modern contraceptive use among married adolescent girls. The likelihood of modern contraceptive use was almost five times compared to the girls who were not exposed to FP information through HWs (**Table 6**). A previous study in Nepal also found a similar association of this individual-level factor.⁵⁷ A similar study in Ethiopia found, visit health facilities increased the likelihood of modern contraceptive use among married women.⁵⁸ Some of the studies in Nepal showed married women visited by FP workers increased the modern contraceptives.^{35,36} Both visits by FP workers and exposure to FP information through HWs could be considered as similar characteristics. In both conditions, there is contact with Health workers and informed about FP to women. The information about FP by HWs might help married adolescent girls to get rid of the possible misconceptions and fear regarding modern contraceptive use. Reduced misconception/fear from the trusted health worker might lead to increased modern contraceptive use among married adolescent girls.

The education of the spouse was considered as enabling factor with the assumption that that the educated husband would be more supportive of modern contraceptive use than husbands without education. This study resulted indistinct results as only primary level spousal education was significantly associated with increased use of modern contraceptives compared to no spousal education. The modern contraceptive use among girls with a secondary or higher level of spousal education was not found different from not educated spouse (**Table 6**). In contrast, higher education of the spouse has significantly increased the modern contraceptive use among young married women in a pooled analysis of NDHS 2001-2016.³⁵ Another study in Nepal found the husband's educational level did not have any association with modern contraceptive use.³⁶ However, a study in Bangladesh found similar results adjusted against context, where primary education of spouse was significantly associated.⁵⁹ The study, with the finding that spousal education was not significant, had adjusted the husband's residency status in the analysis.³⁶ But, this study did not have the husband's residency status studied or adjusted. Hence, it might be possible that the increased modern contraceptive use among girls with primary level spousal education was mediated by husband's residency. Primary level educated husbands might have more possibility to stay with wife in compared to secondary or higher level educated husbands, leading to increased modern contraceptive use. Though, no further information was found to support this argument.

As an **individual need factor**, a desire of having or not having a child within two years significantly influenced the modern contraceptive use of married adolescent girls in Nepal. The association remained significant even after adjusting with other individual and contextual characteristics. Though the strength of association was also slightly increased after adjusting with contextual variables (**Table 6**). It indicates the desire of the child was also influenced by contextual characteristics. Previous studies in Nepal found a similar association for the non-

use of modern contraceptives.^{35,60} Similarly, a study in sub-Saharan Africa found the likelihood of contraceptive use reduced among young women who were undecided about their desire of child compared with those who wanted no more child.⁶¹ As a direct need factor, it was clear to have higher odds of modern contraceptive use among married girls not desiring a child within two years.

This study also showed 74% of married adolescents did not desire of child within two years and indicates the need for modern contraception among most of them (**Table 2**). However, the modern contraceptive use was only 19% among them (**Table 4**). This might be due to either lack of access to the services or due to lack of comprehensive knowledge about modern contraception among married adolescent girls. The health system factors might also be associated with the non-use of modern contraceptives among married adolescent girls not desiring a child within two years. The factors like the distance of health facility, quality of care, and availability of contraception were not included in this study, hence their possible influence remained unexplained.

6.1.2 Influence of contextual characteristics on modern contraceptive use

Most of the contextual factors were not independently associated with modern contraceptive use among married adolescent girls. Though, they attributed to influence individual factors to determine modern contraceptive use as shown by the adjusted results. Province was the only contextual characteristic with independent association with modern contraceptive use among married adolescent girls in the study. The percentage of modern contraceptive use among married adolescents in Province 2 and Province 7 was lower than the national average (**Table 3**). After adjusting for all individual and contextual characteristics, the married adolescent girls in these two provinces had significantly lower odds of modern contraceptive use compared with Province 1 (**Table 6**). There might be some additional contextual and individual factors associated with significantly reduced modern contraceptive use in these two provinces. No other studies were found in Nepal further exploring the contextual similarities or differences of Province 2 and Province 7.

The result from a study in India appeared relevant to compare the results of provinces under this study. The study in India found married young women in the “North Zone” had significantly less contraceptive use to delay first pregnancy compared with the “East zone”.⁶² Province 1 of Nepal share most of its border with the “East Zone” region and Province 2 and Province 7 share its international border with the “North Zone” region of the study in India.^{2,62} The open border and shared socio-cultural context, may indicate comparable findings with the study in India. Studies exploring the factors associated with modern contraceptive use/non-use in Province 2 and Province 7 found migration of husbands, and fear/misconceptions about modern contraceptives reduced its use among women.^{63,64} These studies might not be representative of the whole province, but they indicate the possibilities of several unobserved variables affecting modern contraceptive use in these provinces. Further study is needed to explore the unobserved factors associated with low modern contraceptive use in Province 2 and Province 7.

6.1.3 Appropriateness of the interventions for improving modern contraceptive use

The interventions reaching married adolescent girls for transferring the FP information mobilising local health workers would be appropriate in Nepal. Additional interventions to make the interventions socially acceptable and culturally sensitive might further increase the effectiveness and feasibility of implementation in Province 2 and Province 7. Findings from secondary data analysis (factors associated with modern contraceptive use) and literature

review (effective interventions in India and Nepal) favours the possibility of the effectiveness of the interventions in Nepal.

Involvement of HWs for FP counselling

Exposure to FP information through HWs was independently enabling the modern contraceptive use among married adolescent girls in this study. Mobilisation of the local health workers for FP counselling was also highly effective in increasing modern contraceptive use among young couples in India.

The involvement of health workers in both PRACHAR and CHARM interventions was highly effective in increasing modern contraceptive use. The mobilization of health workers was missing in RHMACP interventions in Nepal. Peer education was only considered for home visits and counselling of married couples. Lack of HWs engagement in the RHMACP interventions might lead to a lack of behaviour change in couples in terms of modern contraceptive use. HWs trained on couple counselling about family planning would be very important to clear the misconceptions and fear about contraceptive use among adolescent couples. And the involvement of local health workers would increase the trust of the local community and couples. The involvement of local HWs already proven effective in increasing contraceptive use among married young couples in CHARM intervention.

Consideration of socio-cultural aspects

This study found Province 2 and Province 7 of Nepal were independently associated with significantly low modern contraceptive use among married adolescent girls. The socio-cultural context in Province 2 and Province 7 is similar to that in India where the interventions were proven effective and feasible to implement. Involvement of husband, parents-in-law, and community leaders and considering the socio-cultural sensitiveness might make the interventions effective and feasible to implement in the provinces in Nepal.

The social acceptability of the interventions was considered and made them more culturally sensitive. Separate SRH training sessions for unmarried male and female adolescents were conducted (PRACHAR Project). It might increase the participation of adolescents as more parents might allow their adolescent children for the training. In addition, adolescent boys and girls also might have more ease to clear their curiosities regarding SRH, which may lead to better comprehensive SRH understanding. The involvement of unmarried adolescents might support improving modern contraceptive use among married in two ways. First, peers of unmarried adolescents would also be married adolescents and they might counsel their married peers regarding SRH and contraception. Second, more comprehensive knowledge about SRH and contraception among unmarried would enable them to make decisions for contraceptive use even after their marriage.

Celebration events for newlyweds might increase the effectiveness of health education and counselling on RH and FP for young couples. The involvement of male/husbands also increased in a friendly manner due to such events. The involvement and sensitization of local leaders, parents, and in-laws made them more responsible and enhanced the enabling environment for contraceptive use. In a patriarchal context, the involvement of husbands would be very helpful in behaviour change particularly regarding contraceptive use. The CHARM interventions in India included husbands as a primary target for rapport building and behaviour change.

RHMACP interventions only involved a peer education approach for counselling, and its interventions increased the knowledge about contraceptives. The lack of modern contraceptive use might be associated with the sustained misconceptions and fear of side effects as the counselling might not be effective as provided by HWs. RHMACP interventions had already

been found feasible to implement among married adolescents in Nepal. Some modifications in RHMACP by engaging unmarried adolescents, husband's involvement, and FP counselling by HWs to young couples might increase the effectiveness.

The intervention engaging health workers to inform and counsel more married adolescents about FP and comprehensive SRH would be very effective to increase modern contraceptive use among them. The comprehensive understanding of modern contraceptive use and SRH also might lead adolescents desiring to delay their pregnancy. As not desiring a child within two years was also a highly significant factor, modern contraceptive use would increase considering these interventions. Hence, the interventions reaching married adolescent girls for transferring the FP information mobilising local health workers would be appropriate and feasible to implement in Nepal.

6.1.4 Relevance of the conceptual framework

The Andersen's Behavioural Model of Health Service Use was very useful in meeting research objectives. It helped to conceptualise the possible variables both at individual and contextual level factors that might influence modern contraceptive use. The link shown in the model helped to understand the possible relation of the variables in the study. The results of the study also found similar linkage as most characteristics associated with modern contraceptive use lost their significance after adjusting for each other. However, most of the observed contextual factors (except provinces) were not independently associated with modern contraceptive use. Health system and socio-cultural aspects of contextual characteristics might have an independent effect on contraceptive use among married girls. Due to limited possibilities for the variable's selection in this study, such important contextual variables remained unobserved.

6.1.5 Strengths and Limitations of the study

Strengths:

- Use of a latest nationally representative survey dataset increased the generalisability of the study in Nepalese context;
- Use of multilevel analysis adjusted for the hierarchical nature of NDHS dataset better predicted the association of the independent variables with the dependent variable.

Limitations:

- The study excluded unmarried adolescents as no information about contraception was available for them in NDHS 2016. However, the study analysing the need, use, and influencing factors for contraceptive use among unmarried adolescents is essential for addressing their needs through evidence based ASRH programs;
- As the NDHS data was from 2016, it might not represent the current scenario in Nepal;
- As the study was based on secondary data, there was less flexibility in terms of variables selection. Broader context like policy, plans, socio-cultural context, etc. could not be included in the study. Additionally, the outcome component of the Andersen's Behavioural Model of Health Service Use could not be included due to the nature of available data;
- Cross-sectional nature of data could not prove the causal association of independent variables and dependent variables;
- Some of the independent associations in the results were unexplained and assumed affected by unobserved variables.

6.2 Conclusion

More individual characteristics were associated independently in modern contraceptive use compared to contextual ones. Individual and contextual characteristics were interrelated and influencing the association with modern contraceptive use among married adolescent girls. Hence, all observed characteristics were important as control variables to explore the independent association. None of the observed contextual enabling and need factors had an independent association with modern contraceptive use among married girls. And at least a variable from each individual-level characteristic (individual predisposing, enabling, and need factors) was independently associated with modern contraceptive use among married adolescent girls in Nepal.

The major individual characteristics like ethnic group (predisposing), education of spouse, exposure to family planning information through HWs (enabling), and desire of child within in two years (need) were influencing modern contraceptive use among married adolescent girls. Similarly, the province was also found as a key contextual predisposing factor associated with modern contraceptive use among married girls in Nepal. Several unobserved characteristics influenced the modern contraceptive use among married adolescent girls in Province 2 and Province 7. Contextual characteristics highly influenced the association of individual characteristics such as education, employment, autonomy, and ethnicity with modern contraceptive use among married adolescent girls in Nepal.

In ethnicity, the independent likelihood of modern contraceptive use among Terai Dalit and Terai non-Dalit ethnic groups was higher. The higher use of modern contraceptives among Terai ethnic groups needs additional research for explaining the reasons. Exposure to FP information through HWs increased the possibilities of modern contraceptive use among married adolescent girls. Similarly, primary-level education of the spouse also increased the modern contraceptive use among married girls. Though the insignificant association with secondary and higher-level education of the spouse was remained unanswered. The study further concludes that desiring a child within two years was contributing to the reduction of modern contraceptives use among married adolescent girls.

Among provinces, Province 2 and Province 7 had significantly less modern contraceptive use among married adolescent girls. However, the specific characteristics leading to such influence of these provinces remained unobserved. Using multilevel modelling, both individual and contextual characteristics were significant in predicting modern contraceptive use among married adolescent girls.

The interventions like counselling sessions by health workers; peer education; involvement of husbands; sensitization of family members; and influencers in the community had already proven effective in similar settings. Though, these interventions need to be tailored contextually and be delivered considering cultural sensitiveness for improved social acceptability and effectiveness. The identified factors associated with modern contraceptive use were also linked to the interventions that indicated possibilities of effectiveness in the Nepalese context.

6.3 Recommendations

6.3.1 Research

MoHP in collaboration with Nepal Health Research Council (NHRC) should conduct the following research to further improve the evidence:

- Research to explore the need and factors associated with modern contraceptive use among unmarried adolescents in Nepal. As sex before marriage was considered taboo in the Nepalese socio-cultural context, qualitative studies in a culturally sensitive manner would better explore the need and influencing factors for contraception among unmarried adolescents.
- Further research to explore the factors associated with higher use of modern contraceptives among Terai ethnic groups. Ethnic differentials in contraceptive use and the effect of exposure to various family planning programs also need to explore. The research should consider the factors like husband's residency status, geographical difficulties, access to family planning services, etc. which were not studied in this study. The research findings would be very helpful to identify the highly effective influence of contexts or interventions which led to significantly higher use of modern contraceptives among Terai Dalits and Terai non-Dalits ethnic groups among others.
- Further research to identify the association of factors in Province 2 and Province 7 exploring unobserved individual and contextual characteristics for low contraceptive use.

6.3.2 Interventions

This study purposes the following recommendations for MoHP and NGOs working in Family Planning programs in Nepal:

- MoHP and NGOs working in FP programs should increase the exposure of married adolescents to FP information mobilizing local health workers. This study recommends the increased exposure of married adolescent girls (couples) to FP information through Health Workers (HWs) as an effective intervention for improving modern contraceptive use. Either public or private HWs could also be mobilized for FP counselling sessions. However, the HWs mobilized in the counselling should have training on effective counselling and gender equity. A structured module for the contents of each counselling session should be followed as it had been found effective in CHARM intervention (**Annex 3**).
- Peer education programs involving both unmarried and married adolescents with life skills training on ASRH should be implemented to increase comprehensive SRH knowledge among adolescents and increasing health-seeking behaviour including contraceptive use. All activities should be tailored considering cultural sensitiveness to increase the social acceptability and effectiveness of the programs. Enabling environment should be ensured by sensitization and engagement of family members and other influencing people in the community.

6.3.3 Policy

- Province 2 and Province 7 should be given high priority particularly to address low modern contraceptive use among married adolescent girls. MoHP in coordination with provincial governments from Province 2 and Province 7 should focus to intensify the efforts on ASRH and adolescent contraception. Province specific studies as recommended above should be considered before formulating and implementing comprehensive ASRH policy.

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Annexes

1. The original Andersen's Behavioural Model of Health Service Use

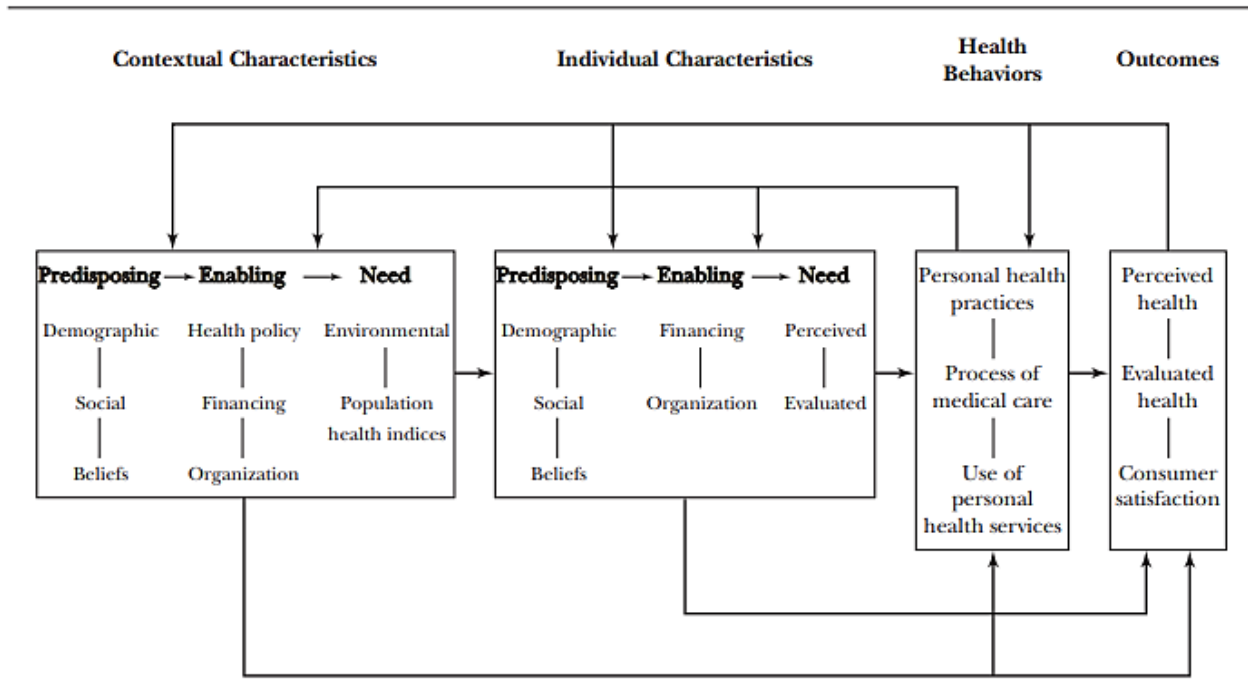


Fig. The original **Behavioural Model of Health Service Use** including contextual and individual characters developed by Andersen. The conceptual framework used in this study is based on the model.(Source: Andersen, R.M. and Davidson, P.L. 2014)³⁸

2. Detailed description of the contextual characteristics included in the study

CONTEXTUAL CHARACTERISTICS

1. **Community median age:** Median age of women 15-49 years living in the cluster was taken as proxy for age composition of the cluster. Median age in clusters ranged from 21 years to 40 years and median value was 28 years. The variable was grouped into “Higher” and “Lower” through the median value.
2. **Community-level women’s education:** The proportion of women with at least secondary education in the cluster. The variable was not directly available in the dataset so, was generated from respondents’ (women 15-49 years) education through method of aggregation at the cluster level. It had a range from 0-1 and the median value was 0.52. The variable was grouped into “Higher” and “Lower” through the median value.
3. **Province:** The Province of the cluster where the respondent was living at the time of survey. This variable had seven different categories as there are seven provinces in Nepal.
4. **Community-level women’s employment:** The proportion of women currently working in the cluster. The variable was not directly available in the dataset so, was generated from currently working respondents’ (women 15-49 years) through method of aggregation at the cluster level. It had a range from 0.05-1 and the median value was 0.57. The variable was grouped into “Higher” and “Lower” through the median value.
5. **Community-level women’s involvement in FP decisions:** The proportion of women participated (either full or joint decision) in decision making for contraceptive use or non-use in the cluster. The variable was not directly available in the data but was generated from respondents’ (women 15-49 years) participation in decision making about contraceptive use or non-use through method of aggregation at the cluster level. It had a range from 0.42-1 and the median value was 0.87. The variable was grouped into “Higher” and “Lower” through the median value.
6. **Community-level women’s autonomy in household decisions:** The proportion of women participated (either full or joint decision) in household decision making in the cluster. Not directly available in data but was generated from respondents (women 15-49 years) participation in household decision making through method of aggregation at the cluster level. It had a range from 0.13-0.9 and the median value was 0.56. The variable was grouped into “Higher” and “Lower” through the median value.
7. **Community-level median age at first childbirth:** Median age at first childbirth among women (15-49 years) in the cluster was generated at cluster level. It had a range from 16-24 years and the median value was 19 years. The variable was grouped into “Higher” and “Lower” through the median value.
8. **Type of residence:** Type of residence of the cluster where the respondent was living at the time of survey. It was categorised as “Urban” and “Rural”.
9. **Community poverty:** The proportion of women (15-19 years) in living in poor households (include both poorer and poorest) household wealth quintile in the cluster. The variable was not directly available in data but was generated from household wealth quintile through method of aggregation at the cluster level. It had a range from 0-1 and the median value was 0.32. The variable was grouped into “Higher” and “Lower” through the median value.
10. **Community exposure to Family Planning (FP) messages in media:** The proportion of women in the cluster who were exposed to family planning messages through any mass media (i.e. TV/radio/newspaper). Not directly available in data but was generated from the exposure of respondents (women

continued.

age 15-49 years) to FP messages through method of aggregation at the cluster level. It had a range from 0-1 and the median value was 0.56. The variable was grouped into “Higher” and “Lower” through the median value.

- 11. Community concern for distance to Health facility:** The proportion of women perceiving "distance from health facility for getting medical help for self" a big problem, in the cluster. Not directly available in data but was generated from the respondents (women age 15-49 years) responding "distance from health facility for getting medical help for self" as “Big problem” through method of aggregation at the cluster level. It had a range from 0-1 and the median value was 0.57. The variable was grouped into “Higher” and “Lower” through the median value.
 - 12. Community-level information about FP provided by HWs:** The proportion of women visited and get informed about Family Planning (FP) from health workers (HWs) at Health facility (HF) in last 12 months, in the cluster. Not directly available in data but was generated from the respondents (women age 15-49 years) visited and get informed about FP from HWs through method of aggregation at the cluster level. It had a range from 0-0.38 and the median value was 0.09. The variable was grouped into “Higher” and “Lower” through the median value.
 - 13. Community concern for no Female provider at Health facility:** The proportion of women perceiving "no female health providers for getting medical help for self" a big problem in the cluster. Not directly available in data but was generated from the respondents (women age 15-49 years) responding "no female provider at HF" as a big problem for getting medical help through method of aggregation at the cluster level. It had a range from 0.06-1 and the median value was 0.68. The variable was grouped into “Higher” and “Lower” through the median value.
 - 14. Community desire for children:** The proportion of women wanted child within two years, in the cluster. Not directly available in the data but was generated from the respondents (women age 15-49 years) who wanted child within two years through method of aggregation at the cluster level. It had a range from 0-0.30 and the median value was 0.06. The variable was grouped into “Higher” and “Lower” through the median value.
 - 15. Community abortion proportion:** The proportion of women who had ever terminated their pregnancy, in the cluster. Not directly available in the data but was generated from the respondents (women age 15-49 years) who had ever terminated their pregnancy, through method of aggregation at the cluster level. It had range from 0-0.53 and the median value was 0.2. The variable was grouped into “Higher” and “Lower” through the median value.
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3. CHARM Intervention module

Session	Content focus	Strategies
Individual Session 1 (Male)	Assess client's FP* knowledge and goals; provide overview of FP options and their availability.	Assessment
	Assess man's fertility goals- desire for more children, planned timing for (more) children, expectations of children early in marriage or sons; consider role and expectations of parents	Dialogue
20–40 min	Provide info on maternal and child health benefits of contraception and birth spacing, as well as delayed first childbirth, particularly for adolescent wives	Education
	Assess sex risk of man: extramarital sex; provide basic HIV/STI prevention information	FP Goal Setting & Action Plan
	Briefly assess if man has discussed FP with wife; assess & encourage joint FP decision-making	Provision of Condoms and/or Pill
	Highlight importance of male involvement in FP, safe motherhood and happy family life.	
	Review again client's FP goals; offer condoms, encourage consideration of pill	
Individual Session 2 (Male)	Assess client's FP goals; review FP options to support these goals	Assessment
	Review previously identified barriers to FP uptake- desire for more children or for sons, expectations of parents, negative attitudes toward contraception; Process barriers with client	Dialogue
20 min	Assess if man has discussed FP with wife; practice how to communicate about FP with wife	Education
	Assess marital violence and sexual communication; reinforce non-use of violence and respectful communication; encourage joint FP decision making with wife	FP Goal Setting & Action Plan
	Highlight importance of male involvement in FP, safe motherhood and happy family life.	Provision of Condoms and/or Pill
	Review again client's FP goals; offer condoms, encourage consideration of pill	
Couple Session 3	Assess couple's FP goals; review FP options to support these goals	Assessment
	Discuss barriers to FP uptake- desire for more children or for son (son preference), expectations of parents, negative attitudes toward contraception; Process barriers with couple	Dialogue
20 min	Assess joint decision-making on FP; support joint communication on FP; respect for wives	Education
	Highlight importance of male involvement in FP, safe motherhood and happy family life.	FP Goal Setting & Action Plan
	Review again couple's FP goals; offer condoms and pill	Provision of Condoms and/or Pill

*FP = Family Planning

Note: To be delivered in a three month timeframe, ideally.

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Source: Raj et al., 2016.⁵²

4. PRACHAR Project Interventions and Strategies during Phase I

PRACHAR Strategies and Interventions during Phase I (Comprehensive 3-year model)	Target
Interventions with adolescents, young couples, key influencers, and communities to increase support for RH practices and use of services	
Small-group education on RH with adolescent girls (aged 12–14 years), and unmarried girls and boys aged 15–19 years	Individual
Counseling on RH/FP and referrals to FP services through regularly scheduled home visits to married young women with no children, married young women with first pregnancy, married postpartum young women who delivered their first child, married young women with 1 child	Individual
Newlywed couple ceremony/ infotainment parties	Young couples, Group
Small-group discussion and dialogue on RH and contraception, and referrals to health services, separately to young married women and married men	Group
Orientation and training of community leaders and influencers on RH for young people	Community
Group meetings and infotainment programs for mothers and fathers of young married men (the mothers-in-law and fathers-in-law of young married women)	Community
Street theater performances	Community
Wall paintings	Community
Improving access to RH services	
Support to monthly MCH clinics by providing government ANMs with training and support, essential instruments, and recordkeeping tools.	Community
Training of rural health practitioners on RH and FP issues	Community
Training of TBAs on safe delivery, counseling on postpartum contraceptives, and referral of pregnant women with complications	Community
Training of chemist outlets and village convenience shops on FP and connecting them with social marketing agencies to encourage regular stocks of condoms and pills	Community

Source: Subramanian et al., 2018.⁵³