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Multilevel factors influencing contraceptive use and childbearing among adolescent girls in Bara district of Nepal: a qualitative study using the socio-ecological model

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ABSTRACT:
Objectives: This study aimed to identify the multilevel factors that influence contraceptive use and childbearing decisions in Nepal and examine relationships among these factors.
Design: The study drew on qualitative data collected through in-depth interviews (IDIs) and key informant interviews (KIIs) and triangulated results.
Setting: An urban municipality and a rural municipality in Bara district, Nepal.
Participants: We recruited a total of 60 participants (e.g., 20 married adolescent girls aged 15 to 19, 20 husbands, 20 mothers-in-law) for IDIs and 10 (e.g., four health care providers, four health coordinators, three female community health volunteers) for KIIs.
Results: Married adolescent girls faced a range of barriers that are interacted across different levels. Patriarchal norms and power imbalances between spouses limited their decision-making power regarding contraception. Social pressures to give birth soon after marriage drove the fear of infertility, abandonment, and the stigmatization of childless married couples, which leads to lack of women's autonomy in making decisions about family planning. Mothers-in-law and religion exerted considerable influence over couples' decisions regarding contraceptive use. Limited access to information about the benefits and methods of family planning contributed to fear of the side effects of contraceptives and low awareness about the risks involved in adolescent pregnancies.
Conclusions: The convergent results from triangulation confirm that the decision to postpone childbearing is not merely the personal choice of an individual or a couple, highlighting the importance of targeting families and communities. The study underscores the need to challenge restrictive socio-cultural norms so that adolescent girls are empowered to exercise greater control over contraceptive use.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- The present study is one of the first qualitative studies to identify the multilevel, interacting factors that influence contraceptive use and childbearing among married adolescent girls.
- The study extended the evidence base by illustrating the multidimensionality and

interaction of the factors that limit women's family planning knowledge, undermine their autonomy in decision making, reduce contraceptive use, and increase the risk of adolescent pregnancy.

- Strengths of the study include a comprehensive approach guided by the socio-ecological model, and triangulation from a range of individuals and two data collection approaches.
- Limitations of the study include a convenience sample from a single district, the possibility of felling inhibited to candidly share their experiences and perspectives in the presence of an interviewer, and lack of respondent validation.

Keywords: Adolescents; contraceptive use; childbearing; qualitative study; socio-ecological model; Nepal

WORD COUNT
5,039

INTRODUCTION

Adolescent pregnancies and childbirths are a global concern. Each year, 21 million 15 to 19-year-old girls in low- and middle-income countries (LMIC) become pregnant, of which 12 million girls give birth [1]. Births to adolescents of this age group account for 11 % of all childbirths worldwide [2]. Approximately 5.6 million and 3 million pregnancies in the same population segment result in abortion and miscarriage, respectively. In LMIC, about half (49 %) of all pregnancies among 15 to 19-year-old girls are unintended, and more than half of them end in abortion or miscarriage [1]. Among adolescent girls who require family planning, 23 million have an unmet need for modern contraception [1]. Addressing this need might lower the rate of unintended pregnancies by six million annually [1].

Global and national policies often assume that the primary reason for contraceptive nonuse among adolescent girls is their personal choice (or the choice of couples). However, several other factors also prevent them from seeking family planning services and delaying childbearing in LMIC. Researchers have noted a number of barriers that hinder married adolescent girls from using contraceptive methods and postponing childbearing. These barriers can be classified into five categories: individual-level (e.g., limited knowledge, the fear of adverse side effects) [3-7], partner-related (e.g., refusal to use contraceptives) [3, 4, 6], family-related (e.g., influence of mothers-in-law and sisters-in-law) [3, 6], social acceptability (e.g., community expectations to prove one's fertility) [6, 7], and service delivery-related factors (e.g., confidentiality and privacy issues) [8]. However, a shortcoming of the previous qualitative research is narrow focuses on each level without examining interactions among factors at different levels. Few in-depth investigations have been conducted to promote the nuanced understanding of a complex interplay of multilayered barriers that hinder contraceptive use [9]. Therefore, it is necessary to identify a host of the factors that impede contraceptive use and promote early childbearing.

In Nepal, the adolescent birth rate remains high at 88 births per 1000 adolescent girls aged 15 to 19 in 2016 [10], and this figure is the second-highest in South Asia after Bangladesh [11]. A national survey showed that 17 % of 15 to 19-year-old adolescent girls were pregnant in the same year [10]. Among Nepali adolescents, pregnancies are related to a lower economic status, membership to a disadvantaged ethnic group, and unemployment [12]. The prevalent practice of child marriage also contributes to the high rate of adolescent pregnancies and is associated with contraceptive nonuse before the first childbirth in Nepal [13], India [13, 14], and Bangladesh [15]. In a nationally representative survey, 40 % of 20 to 24-year-old Nepali women were married before the age of 18 [10]. About one in two married adolescent girls aged 15 to 19 years give birth to her first child before turning 20, typically soon after marriage [10]. Although the Nepali government and its development partners have taken efforts to improve access to family planning services and information, contraceptive use remains disproportionately low among adolescent girls. Only 15 % of married adolescent girls use contraceptive methods; in contrast, the corresponding figure is 41 % among adult women aged 20 or above [10]. Therefore, this study aimed to identify the multilevel factors that influence contraceptive use and childbearing decisions in Nepal and to examine relationships among these factors.

METHODS

Study setting

We conducted this study in an urban municipality (Mahagadimai Nagarpalika) and a rural municipality (Prasauni Gaunpalika) in Bara district in Province 2 of Southern Nepal. The province has the highest child marriage prevalence rate (65 %) among women aged 20 to 24 years in 2016 [10]. We purposively selected these two municipalities from five urban municipalities and nine rural municipalities based on consultation with respective municipality officials. Then, we randomly selected one ward out of nine wards in each selected municipality.

Bara district is home to 108,655 households (i.e., an average of 6.33 people members per household) [16]. The most dominant religion is Hinduism, followed by Islam and Buddhism. The men who live in these areas were primarily farmers, laborers, and small-scale business owners or employees. Married women were mostly involved in household work and farming. Most households have electricity, but power outages are frequent. Few houses have a latrine [16]. Each municipality has at least one health post where only primary health care services are provided.

Study participants

This study relied on multiple sources to collect rich and diverse data and triangulated results. We recruited three different groups for in-depth interviews (IDIs) to cover a wide range of perspectives of household members. The first group was 15 to 19-year-old adolescent girls who had been married for at least six months and were living with their husbands (n=20) at the time of data collection. The second group was husbands of married adolescent girls (n=20). The last group was mothers-in-law of married adolescent girls (n=20). We did not match IDIs participants by family for recruitment or analysis. As a

complementary method, we also conducted key informant interviews (KIIs) with those who possessed first-hand knowledge about community perceptions of and barriers to adolescent pregnancies. Participants for KIIs were healthcare providers working in a government healthcare facility (n=4), health coordinators working in the district health office or municipality office (n=4), and female community health volunteers (FCHVs) working in the study areas (n=3). Table 1 shows the focuses of IDIs and KIIs.

We purposively recruited those who met the aforementioned inclusion criteria with the help of local research assistants (the details regarding the assistants are provided below). As sampling frames were not available in the study areas, we used convenience sampling (i.e., door-to-door visits) to recruit participants of the study. We included minors aged 15 to 17 years for this study because they were disproportionately underserved by family planning programs in Nepal. Vulnerabilities that are specific to this age group may account for the lower uptake of family planning services. We did not consider birth history or contraceptive use history for recruitment.

Data collection

From July 5-15, 2019, we conducted semi-structured IDIs and KIIs, using topic guides. These interviews focused on the knowledge, attitudes, beliefs, perceptions, and experiences that pertain to contraceptive use and childbearing (Table 1). We adopted these data collection methods because they afford greater flexibility in navigating the interview and depth of exploration in qualitative research [17]. We developed the topic guides based on the socio-ecological model (SEM) [18], literature reviews, and the research team's field observations to include previously identified key issues. The SEM offers a theoretical framework that can be used to examine the multilevel, interacting factors determining health behaviors [19]. McLeroy et al. [18] identified five levels of influence that are specific to health behaviors: intrapersonal factors, interpersonal factors, community factors, institutional factors, and policy factors. Based on literature reviews, we developed a conceptual framework (Figure 1), which was adapted from the SEM. We developed and used a separate topic guide for each group. Prior to data collection, we pretested one of the topic guides on two married adolescent girls to determine the feasibility of this strategy and refine the questions. The topic guides in English are available as a supplementary (S1).

Five Nepali research assistants (four women and one man) collected data. They speak the local language (i.e., Bhojpuri) and are experienced in qualitative research. We trained them for three days to avoid the biases that typically interfere with the collection of qualitative data (e.g., friendliness bias, social desirability, confirmation bias, question-order bias) and to address ethical considerations. All of the assistants have a bachelor's degree in public health or sociology. They conducted individual face-to-face IDIs and KIIs in a private space chosen by the participants and at a time convenient to them. The sex of the interviewer matched the sex of the participant. The interviewers established rapport with the participants before commencing the interviews. They began the interview with general questions and moved onto more specific questions, including open-ended questions about their experiences of and perceptions about contraceptive use. The interviews lasted for approximately one hour and were audio-recorded to help verify

descriptive data. The interviewers transcribed verbatim both the IDIs and KIIs within 24 hours of each interview. Subsequently, the second author (NK) translated the transcribed interviews into English. The interviewers checked the translated text for errors and omissions (including context and content accuracy).

Data analysis

We analyzed the data using a directed approach to content analysis, which is described by Graneheim and Lundman [20] and Hsieh and Shannon [21], and in accordance with the conceptual framework. Two authors (KS and NK) read English transcripts several times to immerse into the data and gained a sense of the whole. We coded and analyzed the meaning units, which were embedded within the transcripts. We also highlighted all texts, which, on the first impression, appear to represent factors influencing contraceptive use and adolescent childbearing. The next step in the analysis was to code all highlighted passages using predetermined codes based on the conceptual framework (Figure 1). We gave new codes to any texts that could not be categorized with the initial coding scheme, and then reviewed and revised these codes during the entire coding process. When inconsistencies emerged, we further refined the codes through discussion until we reached consensus. We grouped emergent codes into categories, and further classified into themes in accordance with the conceptual framework: intrapersonal, interpersonal, community, organizational, and policy-level factors. We translated relevant participant quotations and used them to illustrate themes. We adopted various measures to ensure that the publication of these responses does not violate the code of confidentiality. For instance, we used unique reference numbers to protect the identity of the participants. Finally, we constructed linkages among emergent categories and themes through axial coding. Respondent validation could not be conducted due to logistical constraints, and lack of personal information of the respondents. We used NVivo 9 (QSR International, Cambridge, MA) to facilitate coding, organization, searching for meaning units embedded within the English transcripts, and systematically compare the emergent categories and themes both within and across the cases. The qualitative methods and reporting of results in the present study adhered to the Consolidated Criteria for Reporting Qualitative Research (COREQ) [22] and Standards for Reporting Qualitative Research [23]. We filled and provided the COREQ as a supplementary file (S2).

Strategies to deal with validity threats

We employed various strategies for establishing three types of threats to validity that are pertinent to qualitative research [24]. The measures taken to reduce threats to descriptive and interpretative validity included using verbatim transcripts of the interviews, presenting participant quotations without shortening, asking open-ended questions, peer debriefing, collecting and analyzing rich data, and providing the thick description of the setting, participants, and themes. The research design of triangulation from a range of individuals and two data collection approaches helped handle threats to both interpretative and theoretical validity.

Ethical considerations

The present study was approved by the Research Ethics Committee of the Graduate School of Medicine, the University of Tokyo (2019030NI), and the Nepal Health Research Council (3001) in Kathmandu. We secured written informed consent from the participants after they were informed about the aim, objectives, and procedures of the study. For those who were younger than 18 years, we obtained written informed consent from their parents. If the parent was inaccessible, we obtained it from minor participants. Participation in the present study was voluntary, and the participants were free to skip interview questions or withdraw their participation at any time without penalty. They were not required to provide any personal information (e.g., name, address, phone number) during the interviews. We used unique reference numbers to protect the identity of the participants.

Patient and public involvement

Participants and the public were not involved in the study design or planning of the data analysis.

RESULTS

Participant characteristics

Table 2 summarizes participants' characteristics. The mean age of the participating adolescent girls was 17.8 years (interquartile range (IQR) 17.0 to 18.3). A majority of them were married before the age of 18. Approximately half of them had at least one child, and several others were pregnant. Almost all of them had become full-time housewives living with their in-laws after marriage. All the adolescent girls had already discontinued their education. The mean age of the husbands and mothers-in-law was 23.5 (IQR 21.0 to 25.3) and 48.4 (IQR 41.5 to 52.3), respectively. More than a half of the participants for IDIs were Hindu. Most of the husbands were farmers or casual laborers. The mothers-in-law had limited educational attainment. As providing the demographic characteristics of the KII participants might allow for their identification, we did not include such information in this article.

Intrapersonal factors

Fear of and misconceptions about side effects on health

Both the married adolescent girls and husbands considered their fear of the side effects of contraceptive methods to be a factor that influences their decisions about family planning. They were concerned that the use of such tools would adversely affect their physical health. They also held misconceptions about the side effects of contraceptives. The following characteristic responses illustrate this observation:

> *I have heard that if we use an implant, there will be a lot of bleeding. Pills will harm the body, and it will feel hot if you use them.* (Ref. #122, married adolescent girl, 18 years)

> *There is a chance of becoming infertile if contraceptives are used for a long time.*

(Ref. #992, husband, 21 years)

Lack of access to information

Several married adolescent girls were unaware that they could avail of family planning services free of charge at public healthcare facilities. All the three groups demonstrated poor knowledge about family planning services.

> *I think there is a need for family planning services and information. However, no one provided us with such information about free family planning services.* (Ref. #630, married adolescent girl, 17 years)

Shyness and embarrassment

Most of the married adolescent girls cited shyness and embarrassment as barriers that prevented them from discussing the timing of childbearing and contraceptive use with their husbands. Both the married adolescent girls and husbands were not inclined to seek family planning information and services, especially from healthcare providers of the opposite sex.

> *I will feel very shy to ask about family planning methods. It was only a year of my marriage, and they [healthcare providers] told me not to use contraceptives. If I must ask anybody about it, I will feel very shy.* (Ref. #460, married adolescent girl, 17 years)

Low awareness about the risks involved in adolescent or multiple pregnancies

Low awareness and misinformation about the risks involved in adolescent childbearing emerged as a contributor to contraceptive nonuse. While only a few married adolescent girls were aware that adolescent pregnancy was associated with an increased risk of obstetric complications, several respondents had low levels of knowledge about the risk.

> *If a woman gives birth before 18 years of age, she will suffer from weakness, stomachache, and vomiting and will not be able to work much and always feel sleepy.* (Ref. #122, married adolescent girl, 18 years)

Interpersonal factors

Limited autonomy in making decisions about family planning

The respondents were governed by strong cultural norms, which empower husbands to make all household decisions and disallow wives from making independent decisions. Such patriarchal values, wives' financial dependence, and power imbalances between spouses had restricted women's decisions about contraceptive use. A few married adolescent girls reported that their husbands had refused to access contraceptives. They also noted that defying their husband's decisions would lead to family feuds.

> *If I use it [contraceptives] and if I start having its side effects, then my husband will scold me. That is why he takes all the decisions. He makes major decisions because he earns and governs the family.* (Ref. #122, married adolescent girl, 18 years)

In our community, men make all decisions. I want to use contraceptives, but he does not want me to. He does not agree on the use of contraceptives. According to him, it will harm my body. (Ref. #335, married adolescent girl, 17 years)

We [young wives] must live on another person's income to live and have to do whatever the other person says. That is why we do not have the right to make decisions. (Ref. #460, married adolescent girl, 17 years)

Influence of mothers-in-law

The mothers-in-law undermined their daughter-in-law's autonomy in making decisions about contraception. Most of the married adolescent girls reported that their mothers-in-law had pressurized them into not using contraceptives until they had an ideal number of children.

My mother-in-law influenced my decision. She has the right to make decisions regarding my contraceptive use and childbearing. (Ref. #241, married adolescent girl, 16 years)

Limited mobility

Most of the Hindu and Muslim wives considered limited mobility to be a barrier that hindered them from accessing family planning information and services because their husbands and mothers-in-law restricted their rights to travel.

If I do not take permission to go out, there is a chance of fighting with my husband. (Ref. #241, married adolescent girl, 16 years)

Women must seek permission to go out not only from their husbands but also from their parents-in-law and other elders in the family. Only a few disobey such norms and go to a health facility for service. Discrimination and violence against women are a common consequence if they disobey family norms. (Ref. #587, FCHV, 35 years)

Community factors

Social pressure to give birth soon after marriage and fear of infertility

Most of the married adolescent girls, husbands, and mothers-in-law cited the extreme pressures to give birth soon after marriage as a reason for contraceptive nonuse and adolescent pregnancy. The married adolescent girls noted that, if a woman does not give birth within the first three years of her marriage, others will make fun of the woman and gossip about her infertility. They were afraid of abandonment and the stigmatization of childless married couples. Their family and community members had intimidated them into becoming pregnant. The married adolescent girls believed that their communities expected them to deliver their first child within the first year of marriage. In contrast, most of the husbands believed their community members expected couples to have their first child between the second and fifth year of marriage.

My community believes that women should give birth in the first year of their

marriage. If they do not, people will start gossiping about their infertility. (Ref. #29, married adolescent girl, 19 years)

If a couple does not have a child after 4-5 years of marriage, people have negative thoughts about it. They ask, "Why doesn't she have a child?" [and] "Is she having a problem with her reproductive capacity?" If she does not have a child after 3 to 4 years, parents will decide to arrange another marriage for the son. (Ref. #230, husband, 22 years)

Concerns about child health and development contribute to the pressures to which women are subjected.

They [my family] also think that giving birth soon after marriage will contribute to the early development of the baby. (Ref. #630, married adolescent girl, 17 years)

As illustrated by the following response provided by a mother-in-law, the fear of elopement can also exacerbate social pressures.

Community members think that getting pregnant soon after marriage is good as women cannot elope with another guy if they have a child. They can better take care of a child and give birth to a healthy baby. (Ref. #756, mother-in-law, 55 years)

Role of religious beliefs in contraceptive use

Religious beliefs were a major barrier that prevented Muslim women from seeking contraceptives. However, Hindu women did not share the same perspective.

Our religion [Islam] teaches that the use of contraceptives is a sinful act. (Ref. #930, married adolescent girl, 19 years)

In Islam, we believe that if we use contraceptives, God becomes unhappy and punishes us. (Ref. #241, married adolescent girl, 16 years)

Lack of engagement with FCHVs

FCHVs, who are responsible to disseminate reproductive health information, conduct family planning counseling and distribute condoms and oral pills in their communities, did not actively engage with married adolescent girls and involve them in family planning activities. Women's restricted mobility impeded their access to FCHVs and opportunities to learn about contraceptive methods.

I never met a female health volunteer since I never go out of my home. I do not think there is a discussion about this [family planning issues] in our community. (Ref. #892, married adolescent girl, 18 years)

I know that there are mothers' group meetings regularly in this municipality, but I haven't noticed or heard that FCHVs discuss with young couples about family planning issues. (Ref. #352, mother-in-law, 48 years)

Organizational factors

Lack of privacy and confidentiality

A few of the husbands and healthcare providers reported that concerns about confidentiality deterred married couples from visiting healthcare facilities to obtain contraceptives.

> *Confidentiality is not maintained in some private clinics because my single friend went to a private clinic to buy condoms, and, later, this information was spread among their professional network.* (Ref. #992, husband, 21 years)

> *Couples themselves do not feel comfortable going to government health facilities owing to a lack of privacy and confidentiality. This is because there is no separate space for family planning counseling and services in health facilities.* (Ref. #729, health care provider, 31 years)

Attitudes of healthcare providers

A few of the married adolescent girls complained about the attitudes of healthcare providers.

> *When seeking antenatal check-up during my pregnancy at a private clinic, the staff members were not friendly to me. They spoke only to my husband and asked him about my problem.* (Ref. #335, married adolescent girl, 17 years)

Healthcare providers reported other health systems-related barriers that prevented them from accessing family planning services, including (i) stockouts of contraceptives at healthcare facilities, (ii) the unavailability of female health workers who could provide family planning counseling and services to female clients, and (iii) overlap between the working hours (10 am to 3 pm) of healthcare facilities and the time at which the housewives tended to be busy with their household duties.

Policy-level factors

None of the participants reported policy-level factors.

DISCUSSION

This study is one of the first qualitative studies to identify the multilevel, interacting factors that influence contraceptive use and childbearing among married adolescent girls. It extends the evidence base by illustrating the multidimensionality and interaction of the factors that limit young married women's family planning knowledge, undermine their autonomy in decision making, reduce contraceptive use, and increase the risk of adolescent pregnancy. The barriers were intertwined and influenced each other across different levels of the SEM (Figure 2). The barriers were identified across the intrapersonal, interpersonal, community, and organizational levels. Barriers at the intrapersonal level were reluctance to seek family planning information and services, the fear of and misconceptions about side effects of contraceptives, low awareness

about the risks involved in adolescent pregnancies, and a lack of access to information. Barriers at the interpersonal level were limited autonomy in making decisions about family planning, restricted mobility, power imbalances between spouses, and mothers-in-law's influence. Barriers at the community level were the fear of infertility and abandonment, the stigmatization of childless married couples, normative gender roles, and social pressures to give birth soon after marriage, which emerged as root causes of contraceptive nonuse. Barriers at the organizational level were a lack of privacy and confidentiality, and the unfriendliness of healthcare providers. The hypothetical relationships in Figure 2 are depicted based on the findings from the present study.

The women who participated in this study were not empowered to make independent decisions about contraceptive use. Their husbands and mothers-in-law were deeply involved in this decision-making process. Adolescent married girls, their husbands, and mothers-in-law keenly felt the pressure to bear a child within the first few years of marriage. None of the participating husbands and in-laws supported the idea of delaying the first pregnancy. Disapproval of contraceptive use before having an ideal number of children in the family was prevalent among them. Newly married adolescent girls had often become pregnant before they were ready to fulfill familial expectations to bear a child and prove their fertility. Patriarchal norms and power imbalances between spouses made married adolescent girls hesitate or refrain from talking to their husbands about family planning and limited their decision-making power regarding contraception. The present findings corroborate with previous studies that have found social pressures to give birth soon after marriage in India [3, 5], Bangladesh [6, 7], and Iran [25] and limited autonomy in making decisions about family planning in Nepal [9], Bangladesh [6], and Iran [25] and among Syrian refugees in Lebanon [4].

The married adolescent girls felt insecure, presumably because newly married women are not considered to be a valuable member of their in-law's family until they prove their fertility. Similar to the findings of previous studies in Iran [25] and Bangladesh [7], delivering a healthy child soon after marriage was perceived as a means to establishing her identity and consolidating her position within her husband's family. Additionally, labor migration to India, Malaysia, and the Middle East was common in the study areas. As such, having a child may be perceived as a way to cement the bond between a husband and his wife before his departure [7].

The mothers-in-law exerted considerable influence over couples' decisions regarding contraceptive use as they were perceived as the most experienced household member in relation to family planning. Their pressure on daughters-in-law to prove fertility within the first few years of marriage was identified as a strong reason for contraceptive nonuse. Given the restricted mobility of married adolescent girls, mothers-in-law and sisters-in-law were their primary sources of information about contraception. Similar findings regarding the influence of mothers-in-law have been identified in Nepal [9], Bangladesh [6], and Lao People's Democratic Republic [8].

Social pressures to give birth soon after marriage, normative gender roles, and religious beliefs emerged as the root causes of contraceptive nonuse. Social pressures to have a child soon after marriage drove the fear of infertility, abandonment, and the

stigmatization of childless married couples, which impeded the married adolescent girls' access to family planning services. Mothers-in-law may amplify the social pressure to have a child soon after marriage. Normative gender roles were related to restricted mobility among married adolescent girls. Furthermore, religious beliefs substantially limited their autonomy in making decisions about contraceptive use. This finding of religious restrictions is in agreement with a previous study in Bangladesh [6]. In contrast, in another study conducted in Syria, religious beliefs did not emerge as a barrier to reproductive decisions [26].

Limited access to information about the benefits and methods of family planning had multiple intrapersonal-level effects. It contributed to fear of and misconception about the side effects of contraceptives. It also led to low awareness about the risks involved in adolescent pregnancies. Some married adolescent girls were unaware of the free family planning services, which were provided at government healthcare facilities. Fear of the side effects has been recognized as a barrier to contraceptive use in India [3], Bangladesh [6, 7, 27], and Iran [25]. Dropping out of school may have limited their opportunities to learn about sexual and reproductive health issues and expand their social networks. The findings of this study support existing evidence that shyness in discussing family planning with husbands and healthcare providers impedes access to family planning services in Asian countries [3, 6, 8, 28].

In addition to the intrapersonal-level factors, supply-side barriers (e.g., a lack of privacy and confidentiality, the unfriendliness of healthcare providers) may have rendered them reluctant to seek contraceptives. Issues related to commodity insecurity, distance, and transport did not seem to influence contraceptives-seeking behaviors. Health systems-level factors (e.g., a lack of privacy and confidentiality, the unfriendliness of health care providers) have been found to be contributing factors for contraceptive nonuse among married adolescent girls in Lao People's Democratic Republic [8].

The convergent results from triangulation across multiple sources (i.e., six different groups) and two data collection methods painted a complex and comprehensive portrait of the barriers to contraceptive use and causes of adolescent childbearing. However, the findings should be interpreted within the confines of several limitations of this study. First, a convenience sample was recruited from a single district in Nepal. Therefore, the findings may not be transferable to broader populations. Second, the participants may have felt inhibited to candidly share their experiences and perspectives, especially those that pertain to sensitive subjects, in the presence of an interviewer. For example, they may have felt uncomfortable reporting other prevalent, albeit extremely stigmatized experiences (e.g., abuse and neglect) that influence contraceptive use. In the present study, efforts were made to obtain in-depth data by interviewing in a private space, establishing rapport with the participants, and maintaining confidentiality. Third, due to lack of respondent validation, the possibility of misinterpreting the meaning of what the respondent says could not be ruled out. Fourth, the relationships shown in Figure 2 are intended to be an illustrative set of relationships, rather than an exhaustive set. Minor linkages are not necessarily reflected in the diagram. Finally, the meanings embedded within participants' responses might have been lost or distorted during translation from Nepali to English. To minimize this problem, the interviewers checked the accuracy of

the translated texts for errors and omissions. Despite these limitations, the strengths of this study include its comprehensive approach guided by the SEM, triangulation across multiple sources and methods, which enabled the collection of rich and detailed data, and other strategies for establishing validity.

CONCLUSIONS AND PROGRAMMATIC IMPLICATIONS

The present findings delineate the mechanism of contraceptive nonuse and adolescent pregnancy in the study setting. The rich qualitative data confirm that the decision to postpone childbearing is not merely the personal choice of an individual or a couple, highlighting the importance of targeting families and communities in addition to adolescent girls and couples. Expanding access to comprehensive sexuality education to enhance girls' knowledge and demand for sexual and reproductive health may not be enough to prevent adolescent pregnancy. Instead, the present findings underscore the need to challenge restrictive socio-cultural norms so that adolescent girls are empowered to exercise greater control over contraceptive use. Community support and collective actions are needed to address the root causes that have been identified in this study. Reproductive health programs and interventions should be culturally sensitive and context-specific and aim to reinforce women's reproductive rights and gender equality.

REFERENCES

1. The Guttmacher Institute. Adding it up: costs and benefits of meeting the contraceptive needs of adolescents. New York: The Guttmacher Institute; 2016.

2. World Health Organization. Why is giving special attention to adolescents important for achieving Millennium Development Goal 5? Geneva: World Health Organization; 2008.

3. Ghule M, Raj A, Palaye P, Dasgupta A, Nair S, Saggurti N, et al. Barriers to use contraceptive methods among rural young married couples in Maharashtra, India: qualitative findings. Asian J Res Soc Sci Humanit. 2015;5(6):18-33.

4. Cherri Z, Gil Cuesta J, Rodriguez-Llanes JM, Guha-Sapir D. Early marriage and barriers to contraception among Syrian refugee women in Lebanon: a qualitative study. Int J Environ Res Public Health. 2017;14(8):836.

5. McClendon KA, McDougal L, Ayyaluru S, Belayneh Y, Sinha A, Silverman JG, et al. Intersections of girl child marriage and family planning beliefs and use: qualitative findings from Ethiopia and India. Cult Health Sex. 2018;20(7):799-814.

6. Shahabuddin AS, Nostlinger C, Delvaux T, Sarker M, Bardaji A, Brouwere VD, et al. What influences adolescent girls' decision-making regarding contraceptive methods use and childbearing? A qualitative exploratory study in Rangpur District, Bangladesh. PLoS One. 2016;11(6):e0157664.

7. Henry EG, Lehnertz NB, Alam A, Ali NA, Williams EK, Rahman SM, et al.

606 Sociocultural factors perpetuating the practices of early marriage and childbirth in Sylhet
607 District, Bangladesh. Int Health. 2015;7(3):212-7.
608 8. Sychareun V, Vongxay V, Houaboun S, Thammavongsa V, Phummavongsa P,
609 Chaleunvong K, et al. Determinants of adolescent pregnancy and access to reproductive and
610 sexual health services for married and unmarried adolescents in rural Lao PDR: a qualitative
611 study. BMC Pregnancy Childbirth. 2018;18(1):219.
612 9. Maharjan B, Rishal P, Svanemyr J. Factors influencing the use of reproductive
613 health care services among married adolescent girls in Dang District, Nepal: a qualitative
614 study. BMC Pregnancy Childbirth. 2019;19(1):152.
615 10. Ministry of Health (Nepal), New ERA, Micro International Inc. Nepal Demographic
616 and Health Survey 2016. Kathmandu, Nepal: Ministry of Health, Nepal; 2017.
617 11. United Nations Department of Economic and Social Affairs. World Fertility
618 20192020 18 April 2020. Available from:
619 https://www.un.org/en/development/desa/population/publications/pdf/fertility/World_Fertilit
620 y_2019.pdf.
621 12. Poudel S, Upadhaya N, Khatri RB, Ghimire PR. Trends and factors associated with
622 pregnancies among adolescent women in Nepal: pooled analysis of Nepal Demographic and
623 Health Surveys (2006, 2011 and 2016). PLoS One. 2018;13(8):e0202107.
624 13. Godha D, Hotchkiss DR, Gage AJ. Association between child marriage and
625 reproductive health outcomes and service utilization: a multi-country study from South Asia.
626 J Adolesc Health. 2013;52(5):552-8.
627 14. Raj A, Saggurti N, Balaiah D, Silverman JG. Prevalence of child marriage and its
628 effect on fertility and fertility-control outcomes of young women in India: a cross-sectional,
629 observational study. Lancet. 2009;373(9678):1883-9.
630 15. Kamal SMM. Decline in child marriage and changes in its effect on reproductive
631 outcomes in Bangladesh. J Health Popul Nutr. 2012;30(3):317-30.
632 16. Central Bureau of Statistics (Nepal). National Population and Housing Census 2011.
633 Kathmandu, Nepal: 2012.
634 17. Marshall C, Rossman GB. Designing qualitative research. California, USA: SAGE
635 Publications; 2014.
636 18. McLeroy KR, Bibeau D, Steckler A, Glanz K. An ecological perspective on health
637 promotion programs. Health Educ Q. 1988;15(4):351-77.
638 19. Sallis JF, Owen N, Fisher EB. Ecological models of health behavior. In: Glanz K,
639 Rimer BK, Viswanath K, editors. Health Behavior and Health Education: Theory, Research,
640 and Practice. San Francisco, CA: Jossey-Bass; 2008. p. 465-85.
641 20. Graneheim UH, Lundman B. Qualitative content analysis in nursing research:

concepts, procedures and measures to achieve trustworthiness. Nurse Educ Today. 2004;24(2):105-12.

21. Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. Qual Health Res. 2005;15(9):1277-88.

22. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007;19(6):349-57.

23. O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting qualitative research: a synthesis of recommendations. Acad Med. 2014;89(9):1245-51.

24. Maxwell JA. A realist approach for qualitative research. Thousand Oaks, CA: SAGE Publications, Inc.; 2012.

25. Mardi A, Ebadi A, Shahbazi S, Esmaelzade Saeieh S, Behboodi Moghadam Z. Factors influencing the use of contraceptives through the lens of teenage women: a qualitative study in Iran. BMC Public Health. 2018;18(1):202.

26. Hessini L. Abortion and Islam: policies and practice in the Middle East and North Africa. Reprod Health Matters. 2007;15(29):75-84.

27. Schuler SR, Bates LM, Islam F, Islam MK. The timing of marriage and childbearing among rural families in Bangladesh: choosing between competing risks. Soc Sci Med,. 2006;62(11):2826-37.

28. Barua A, Kurz K. Reproductive health-seeking by married adolescent girls in Maharashtra, India. Reprod Health Matters. 2001;9(17):53-62.

Abbreviations

COREQ: criteria for reporting qualitative research; FCHVs: female community health volunteers; FP: family planning; IDIs: in-depth interviews; IQR: interquartile range; KIIs: key informant interviews; LMIC: low- and middle-income countries; SEM: socio-ecological model

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Consent for publication

Not applicable.

Conflicts of interests

The authors declare that they have no competing interests.

Data Availability Statement

The data generated during the present study are not publicly available due to restrictions (e.g., their containing information that could compromise the privacy of research participants) but are available from the corresponding author on reasonable request.

Authors' contributions

KS conceived and designed the study, analyzed the data, and wrote the draft manuscript. NJ jointly analyzed the data. NK, RCC, KO, AT, and MJ contributed to interpretation of the results and made critical suggestions for revisions to the manuscript. MJ supervised the study. All authors read and approved the final manuscript.

Table 1. Focuses of IDIs and KIIs

Type of participants	Focuses of IDIs and KIIs
Married adolescent girls	Knowledge about and access to FP information and services, perceived needs, decision-making power, influences of in-laws, social and gender norms, religious beliefs, privacy and confidentiality, attitude of healthcare providers, policy restrictions, and political priorities
Husbands	Knowledge about and access to FP information and services, perceived needs, decision-making power, influences of in-laws, social and gender norms, religious beliefs, privacy and confidentiality, attitude of healthcare providers, policy restrictions, and political priorities
Mothers-in-law	Knowledge about and access to FP information and services, perceived needs, decision-making power, influences of in-laws, social and gender norms, and religious beliefs
Healthcare providers/health coordinators/FCHVs	Access to FP information and services, social and gender norms, religious beliefs, challenges in providing FP services, policy restrictions, and political priorities

IDIs: in-depth interviews; KII: key informant interviews; FP: family planning; FCHVs: female community health volunteers

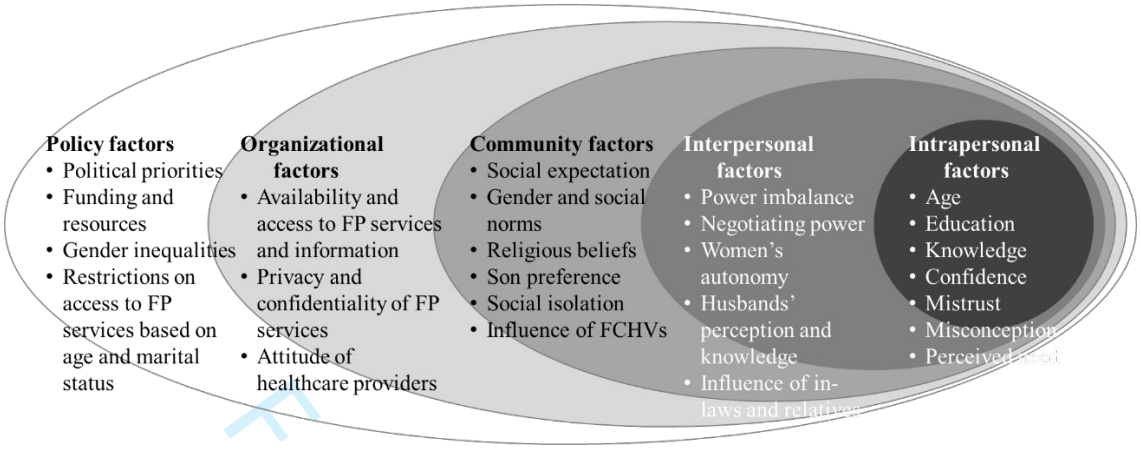

Figure 1. Conceptual framework adapted from on the socio-ecological model to identify the causes of contraceptive nonuse and adolescent pregnancy
Note: adapted from McLeroy et al. (1988) [18]
FP: family planning; FCHVs: female community health volunteers

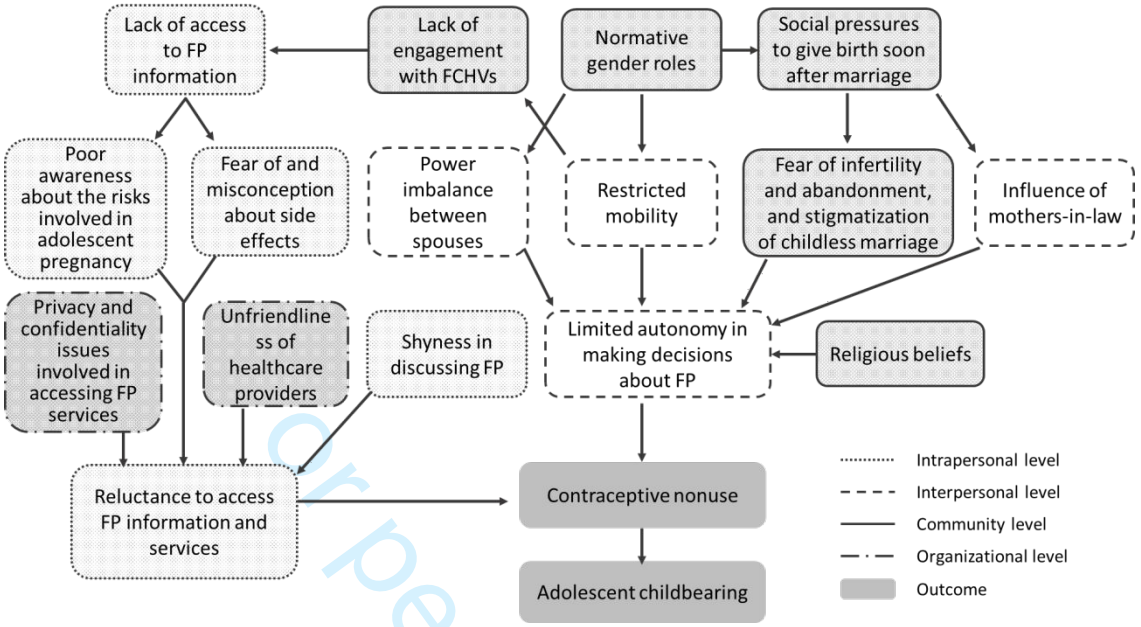

Figure 2. A diagram of hypothetical relationships among the emergent factors

Table 2. Demographic characteristics of the participants for in-depth interviews

	Married adolescent girls (n=20)			Husbands (n=20)			Mothers-in-law (n=20)	
	Mahagadimai	Prasauni		Mahagadimai	Prasauni		Mahagadimai	Prasauni
Age (years)			**Age (years)**			**Age (years)**		
15–17	1	5	15–19	3	0	30–39	2	0
18–19	9	5	20–24	3	8	40–49	4	5
Age at marriage (years)			25–29	2	3	50–59	3	3
12–14	3	3	30–34	1	0	60–69	1	2
15–17	5	7	**Religion**			**Religion**		
18–19	2	0	Hinduism	6	6	Hinduism	6	7
Religion			Islam	3	5	Islam	4	3
Hinduism	6	7	**Ethnicity**			**Ethnicity**		
Islam	4	3	Madhesi	1	2	Madhesi	4	4
Ethnicity			Muslim	3	5	Muslim	4	3
Madhesi	4	0	Terai Dalit	5	4	Terai Dalit	2	3
Muslim	4	4	**Educational level**			**Educational level**		
Terai Dalit	1	5	No education or some level of primary education	1	0	No education or some level of primary education	9	10
Teli	1	0	Completed primary school	1	2	Completed primary school	1	0
Unknown	0	1	Some level of secondary education	3	6	**Occupation**		
Educational attainment			Completed secondary school	0	0	Unemployed	2	4
No education or some level of primary education	4	4	Higher education	4	3	Farmer	3	6
Completed primary school	1	3	**Occupation**			Laborer	3	0
Some level of secondary education	2	3	Farmer	4	0	Community health volunteer	1	0

Completed secondary school	1	0	Laborer	3	4	Businessperson	1	0
Higher education	2	0	Businessperson	2	4			
Occupation			Teacher	0	1			
Unemployed	10	9	Helper	0	1			
Tailor	0	1	Tailor	0	1			
Number of children								
0	3	8						
1	4	2						
2	3	0						

S1 Topic guides (English)

Topic Guide for Married Adolescent Girls

Intrapersonal factors	• Do you know that free family planning services are available in your municipality? • Do you know where to access free family planning services? • Which contraceptive methods do you know? • How do you perceive family planning services? • Have you ever used any contraceptive method? • Do you perceive the need for family planning services and information? • Do you feel shy to seek family planning services and information? • What challenges do you face in seeking family planning services? • Do you fear side effects of contraceptive use?
Interpersonal factors	• Do you discuss with your husband when to have a child and how many children to have? • Do you feel comfortable to negotiate contraceptive use with your husband? • Who has the power to make decision regarding whether to use contraceptives? • Does your husband agree or disagree to use contraceptives? • Do you have a final say on contraceptive use? • Do you perceive that there is power imbalance in terms of decision-making regarding family planning between you and your husband? • Do your mother-in-law or sisters-in-law influence your decision-making about contraceptive use? • Have you heard of your mother-in-law's or sisters-in-law's experience of using family planning services?
Community factors	• Is there social consensus in your community that women should become pregnant soon after marriage? • Did you feel pressure to become pregnant soon after marriage? If so, who did you feel pressure from? • Has your religion something to do with non-use of contraceptives after marriage? • Do you sometimes exchange information about family planning with your friends? • Do FCHVs in this municipality discuss family planning services with young women like you?
Organizational factors	• Are local health care providers supportive of providing contraceptives to young women like you? • Are they friendly to young women like you? • Do you feel your privacy and confidentiality are maintained at a nearby health facility? • How long does it take to get to a nearby health facility providing family planning services?

	• Is there local transportation available to get to a nearby health facility providing family planning services? • Would you need a permission from your husband if you go out to a health facility?
Policy factors	• Is there any restriction of family planning services on age? • Is there any restriction of family planning services on marital status?

Topic Guide for Husbands of Married Adolescent Girls

Intrapersonal factors	• Do you know that free family planning services are available in your municipality? • Do you know where to access free family planning services? • Which contraceptive methods do you know? • How do they perceive family planning services? • Do you perceive the need for family planning services and information? • Do you feel shy to seek family planning commodity (condom) and information? • What challenges do you face in seeking family planning services? • Do you fear side effects of contraceptive use?
Interpersonal factors	• Do you discuss with your wife when to have a child and how many children to have? • Do you feel comfortable to discuss contraceptive use with your wife? • Who has the power to make decision regarding whether to use contraceptives? • Do you have a final say on contraceptive use? • Do you perceive that there is power imbalance between you and your wife? • Do your parents or anyone else influence your decision-making about contraceptive use? • Have you heard of anyone's experience of using family planning services?
Community factors	• Is there social consensus in your community that women should become pregnant soon after marriage? • Did you feel pressure to get your wife pregnant soon after marriage? If so, who did you feel pressure from? • Has your religion something to do with non-use of contraceptives after marriage? • Do you sometimes exchange information about family planning with your friends? • Do FCHVs in this municipality discuss family planning services with men like you?
Organizational factors	• Are local health care providers supportive of providing condoms? • Are they friendly to you when you go there to seek condoms? • Do you feel your privacy and confidentiality are maintained at a nearby health facility? • How long does it take to get to a nearby health facility providing condoms? • Is there local transportation available to get to a nearby health facility providing family planning services?

Topic Guide for Mothers-in-law of Married Adolescent Girls

Intrapersonal factors	• Do you know that free family planning services are available in your municipality? • Do you know where to access free family planning services? • Which contraceptive methods do you know? • How do they perceive family planning services? • What challenges do you think young couples face in seeking family planning services?
Interpersonal factors	• Do you think your daughter-in-law should discuss family planning with her husband? • Did you feel comfortable to negotiate contraceptive use with your husband? • In your opinion, who should decide when to have a child and how many children to have • In your opinion, who should decide whether to use contraceptives? • Do you think your daughter-in-law should use contraceptives? • Are you influential in decision making about contraceptive use of your daughter-in-law? • Have you ever shared with your daughter-in-law your experience of using family planning services?
Community factors	• Is there social consensus in your community that women should become pregnant soon after marriage? • When you were young, did you feel pressure to become pregnant soon after marriage? If so, who did you feel pressure from? • Do FCHVs in this municipality discuss family planning services with young couples?

Topic Guide for Health Care Providers, Health Coordinators and FCHVs

Community factors	• Is there social consensus in this community that women should become pregnant soon after marriage? • Has your religion something to do with non-use of contraceptives after marriage? • Do FCHVs in this municipality discuss family planning services with young couples?
Organizational factors	• What is a major challenge for local women especially when seeking family planning services in this municipality? • Do women in this municipality have to seek permission from their husband if they go out to a health facility? • What is a major challenge in providing family planning services in your municipality or health facility? (Availability of commodities and equipment, training for nurses/ANM) • What is your concern in family planning programme in this municipality? (budget, planning, leadership/governance, health information, supplies, availability and capacity of health workers) • Are there any other issues that one should be aware of when understanding access to family planning services in this municipality?
Policy factors	• Is there any restriction of family planning services on age? • Can young people below the age of 18 receive family planning services in this municipality or facility as they wish? • Is there any restriction of family planning services on marital status? • Can unmarried couples receive family planning services in this municipality or facility as they wish?

Supplementary 2: Consolidated criteria for reporting qualitative studies (COREQ): a 32-item checklist

Title: Multilevel factors influencing contraceptive use and childbearing among adolescent girls in Bara district of Nepal: A qualitative study using the social-ecological model

Authors: Kazutaka Sekine, Nirajan Khadka, Rogie Royce Carandang, Ken Ing Cherng Ong, Anand Tamang, and Masamine Jimba

Topic	Guide questions/description	Response
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Interviewer/facilitator	Which author/s conducted the interview or focus group?	Five research assistants (four women and one man) hired for this research conducted the interviews. KS and NK supervised the data collection process.
2. Credentials	What were the researcher's credentials? E.g., Ph.D., MD	Ph.D., MSc, MA, MD
3. Occupation	What was their occupation at the time of the study?	PhD student, Professor, Assistant Professor, and Director of an NGO
4. Gender	Was the researcher male or female?	All the concerned researchers are male. Four of the local research assistants involved in data collection are female and one male.
5. Experience and training	What experience or training did the researcher have?	KS, RRC, AT, and MJ have experiences in qualitative research.
Relationship with participants		
6. Relationship established	Was a relationship established before study commencement?	None of the concerned researchers had relationships with the participants until study commencement.
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g., personal goals, reasons for doing the research	None of the participants had contact with the concerned researchers before this study. The aim, objectives, and procedures of the study was explained to the participants before participation.
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g., bias, assumptions, reasons, and interests in the research topic	All of the assistants have a bachelor's degree in public health or sociology. They speak the local language (i.e., Bhojpuri) and are experienced in qualitative research. Before data collection, they were trained to avoid the biases that typically interfere with the collection of qualitative data and to address ethical considerations.

Domain 2: Study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g., grounded theory, discourse analysis, ethnography, phenomenology, content analysis	The socio-ecological model was adopted as the theoretical framework that guided the development of research tools. Also, a directed approach to content analysis was employed for data analysis in this study.
Participant selection		
10. Sampling	How were participants selected? e.g., purposive, convenience, consecutive, snowball	Convenience sampling
11. Method of approach	How were participants approached? e.g., face-to-face, telephone, mail, email	Door-to-door visits.
12. Sample size	How many participants were in the study?	70 participants (60 for IDIs and 10 for KIIs)
13. Non-participation	How many people refused to participate or dropped out? Reasons?	None of the participants refused to participate or dropped out in the study.
Setting		
14. The setting of data collection	Where was the data collected? e.g., home, clinic, workplace	IDIs and KIIs were conducted in a private space that was chosen by the participants and at a time that was convenient to them.
15. Presence of nonparticipants	Was anyone else present besides the participants and researchers?	Nobody
16. Description of sample	What are the important characteristics of the sample? e.g., demographic data, date	Characteristics of the IDI participants are provided in Table 2.
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Based on literature reviews, the authors developed the conceptual framework (Figure 1) that guided the development of research tools. For each group of the participants, a separate topic guide was developed and used. Prior to data collection, a topic guide was pretested on two married adolescent girls to determine the feasibility of the tool and refine the questions.
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	No.

19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	All the IDIs and KIIs were audio-recorded and transcribed verbatim.
20. Fieldnotes	Were field notes made during and/or after the interview or focus group?	Field notes were made during the interviews.
21. Duration	What was the duration of the interviews or focus group?	The interviews lasted for about one hour.
22. Data saturation	Was data saturation discussed?	Yes. The sample size allowed the researchers to reach thematic saturation that is when no new information emerges.
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No.
Domain 3: Analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	Two researchers (KS and NK) was responsible for coding.
25. Description of the coding tree	Did authors provide a description of the coding tree?	No.
26. Derivation of themes	Were themes identified in advance or derived from the data?	Themes were identified in advance based on the social-ecological model and literature reviews. However, new codes were given to any texts that could not be categorized with the initial coding scheme.
27. Software	What software, if applicable, was used to manage the data?	We used NVivo 9 (QSR International, Cambridge, MA) to facilitate coding, organization, searching for meaning units embedded within the English transcripts, and systematically compare the emergent categories and themes both within and across the cases.
28. Participant checking	Did participants provide feedback on the findings?	Respondent validation could not be conducted due to logistical constraints, and lack of personal information of the respondents.
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g., participant number	Participant quotations are presented to illustrate themes.
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Consistency between the data presented and the findings is ensured in the article.

31. Clarity of major themes	Were major themes clearly presented in the findings?	Yes, in the results section.
32. Clarity of minor themes	Is there a description of diverse cases or a discussion on minor themes?	Relatively minor themes that are supported by a few participant quotations are included in the result section.

Reference: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007;19(6):349-57.

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Multilevel factors influencing contraceptive use and childbearing among adolescent girls in Bara district of Nepal: a qualitative study using the socio-ecological model

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Multilevel factors influencing contraceptive use and childbearing among adolescent girls in Bara district of Nepal: a qualitative study using the socio-ecological model

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ABSTRACT:
Objectives: This study aimed to identify the multilevel factors that influence contraceptive use and childbearing decisions in Nepal and examine relationships among these factors.
Design: The study drew on qualitative data collected through in-depth interviews (IDIs) and key informant interviews (KIIs) and triangulated results.
Setting: An urban municipality and a rural municipality in Bara district, Nepal.
Participants: We recruited a total of 60 participants (e.g., 20 married adolescent girls aged 15 to 19, 20 husbands, 20 mothers-in-law) for IDIs and 10 (e.g., four health care providers, three health coordinators, three female community health volunteers) for KIIs.
Results: Married adolescent girls faced a range of barriers that are interrelated across different levels. Patriarchal norms and power imbalances between spouses limited their decision-making power regarding contraception. Social pressures to give birth soon after marriage drove the fear of infertility, abandonment, and the stigmatization of childless married couples, which leads to lack of women's autonomy in making decisions about family planning. Mothers-in-law and religion exerted considerable influence over couples' decisions regarding contraception. Limited access to information about the benefits and methods of family planning contributed to fear of the side effects of contraceptives and low awareness about the risks involved in adolescent pregnancy.
Conclusions: The convergent results from triangulation confirm that the decision to postpone childbearing is not merely the personal choice of an individual or a couple, highlighting the importance of targeting families and communities. The study underscores the need to challenge restrictive socio-cultural norms so that adolescent girls become empowered to exercise greater control over contraceptive use.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- The present study is one of the first qualitative studies to identify the multilevel, interrelated factors that influence contraceptive use and childbearing among married adolescent girls.
- The study drew on multiple sources to collect rich and diverse data using a

convenience sample from a single district and triangulated results.

- The comprehensive approach guided by the socio-ecological model allowed us to analyze a complex interplay of multilayered factors that hinder contraceptive use.
- The study is limited in the possibility of respondents having felt inhibited to share their personal experiences candidly in the presence of an interviewer.
- It was not possible to conduct respondent validation due to logistical constraints and lack of personal information of the respondents.

Keywords: Adolescents; contraceptive use; childbearing; qualitative study; socio-ecological model; Nepal

WORD COUNT
5,172

INTRODUCTION

Adolescent pregnancies and childbirths are a global concern. Each year, 21 million 15 to 19-year-old girls in low- and middle-income countries (LMIC) become pregnant, of which 12 million girls give birth [1]. Births to adolescents of this age group account for 11 % of all childbirths worldwide [2]. Approximately 5.7 million pregnancies in the same population segment result in abortion [1]. In LMIC, 50 % of all pregnancies among 15 to 19-year-old girls are unintended [3]. Among adolescent girls who want to avoid pregnancy, 14 million have an unmet need for modern contraception [1]. Addressing this need might reduce unintended pregnancy and unplanned births by 6.2 million and 2.1 million annually, respectively [1].

Global and national policies often assume that the primary reason for contraceptive nonuse among adolescent girls is their personal choice (or the choice of couples). However, several other factors also prevent them from seeking family planning services and delaying childbearing in LMIC. Researchers have noted a number of factors that hinder married adolescent girls from using contraceptive methods and postponing childbearing. These factors can be classified into five categories: individuals (e.g., limited knowledge, the fear of adverse side effects) [4–8], interpersonal (e.g., partner's refusal to use contraceptives) [4,5,7], family-related (e.g., influence of mothers-in-law and sisters-in-law) [4,7], social acceptability (e.g., community expectations to prove one's fertility) [7,8], and service delivery-related (e.g., confidentiality and privacy issues) [9]. However, a shortcoming of the previous qualitative research is narrow focuses on each level without examining interactions or interrelations across different levels. Few in-depth investigations have been conducted to promote the nuanced understanding of a complex interplay of multilayered factors that hinder contraceptive use [10]. Therefore, it is necessary to identify a host of the factors that impede contraceptive use and promote early childbearing.

In Nepal, the adolescent birth rate remains high at 88 births per 1000 adolescent girls aged 15 to 19 in 2016 [11], and this figure is the second-highest in South Asia after Bangladesh [12]. A national survey showed that 17 % of 15 to 19-year-old adolescent girls were

pregnant in the same year [11]. Among Nepali adolescents, pregnancy is related to a lower economic status, membership to a disadvantaged ethnic group, and unemployment [13]. The prevalent practice of child marriage also contributes to the high rate of adolescent pregnancy and is associated with contraceptive nonuse before the first childbirth in Nepal [14], India [14,15], and Bangladesh [16]. In a nationally representative survey, 40 % of 20 to 24-year-old Nepali women were married before the age of 18 [11]. About one in two married adolescent girls aged 15 to 19 years give birth to her first child before turning 20, typically soon after marriage [11]. Although the Nepali government and its development partners have taken efforts to improve access to family planning services and information, contraceptive use remains disproportionately low among adolescent girls. Only 15 % of married adolescent girls aged 15 to 19 use any modern contraception; in contrast, the corresponding figure is 41 % among adult women aged 20 or above [11]. Therefore, this study aimed to identify the multilevel factors that influence contraceptive use and childbearing decisions in Nepal and to examine relationships among these factors.

METHODS

Study setting

We conducted this study in an urban municipality (Mahagadimai Nagarpalika composed of 12 wards) and a rural municipality (Prasauni Gaunpalika composed of six wards) in Bara district in Province 2 of Southern Nepal. The province has the highest child marriage prevalence rate (65 %) among women aged 20 to 24 years in 2016 [11]. We purposively selected these two municipalities from five urban municipalities and nine rural municipalities based on consultation with respective municipality officials. Then, we randomly selected one ward in each selected municipality.

Province 2 where Bara district is considered as least developed region in Nepal, with the lowest human development index value [17]. Gender disparity of the region in terms of education and income is the most pronounced, with the lowest gender development index value [17]. The district is home to 108,655 households (i.e., an average of 6.3 members per household) [18]. The most dominant religion is Hinduism, followed by Islam and Buddhism. The men who live in these areas were primarily farmers, laborers, and small-scale business owners or employees. Married women were mostly involved in household work and farming. Most households have electricity, but power outages are frequent. Few houses have a latrine [18]. Using solid fuel such as firewood and charcoal is common. Each municipality has at least one health post where only primary health care services are provided.

Study participants

This study relied on multiple sources to collect rich and diverse data and triangulated results. We recruited three different groups for in-depth interviews (IDIs) to cover a wide range of perspectives of household members. The first group was 15 to 19-year-old adolescent girls who had been married for at least six months and were living with their husbands (n=20) at the time of data collection. The second group was husbands of married adolescent girls (n=20). The last group was mothers-in-law of married adolescent girls

(n=20). We did not match IDIs participants by family for recruitment or analysis. As a complementary method, we also conducted key informant interviews (KIIs) with those who possessed first-hand knowledge about community perceptions of and barriers to adolescent pregnancy. Participants for KIIs were healthcare providers working in a government healthcare facility (n=4), health coordinators working in the district health office or municipality office (n=3), and female community health volunteers (FCHVs) working in the study areas (n=3). Table 1 shows the focuses of IDIs and KIIs.

Table 1. Focuses of IDIs and KIIs

Type of participants	Focuses of IDIs and KIIs
Married adolescent girls	Knowledge about and access to FP information and services, perceived needs, decision-making power, influences of in-laws, social and gender norms, religious beliefs, privacy and confidentiality, attitude of healthcare providers, policy restrictions, and political priorities
Husbands	Knowledge about and access to FP information and services, perceived needs, decision-making power, influences of in-laws, social and gender norms, religious beliefs, privacy and confidentiality, attitude of healthcare providers, policy restrictions, and political priorities
Mothers-in-law	Knowledge about and access to FP information and services, perceived needs, decision-making power, influences of in-laws, social and gender norms, and religious beliefs
Healthcare providers/health coordinators/FCHVs	Access to FP information and services, social and gender norms, religious beliefs, challenges in providing FP services, policy restrictions, and political priorities

IDIs: in-depth interviews; KII: key informant interviews; FP: family planning; FCHVs: female community health volunteers

In the selected two wards, we purposively recruited those who met the aforementioned inclusion criteria with the help of local research assistants (the details regarding the assistants are provided below). As sampling frames were not available in the study areas, we used convenience sampling (i.e., door-to-door visits) to recruit participants of the study. We included minors aged 15 to 17 years for the study as they were disproportionately underserved by family planning programs in Nepal. Vulnerabilities that are specific to this age group may account for the lower uptake of family planning services. We did not consider birth history or contraceptive use history for recruitment.

Data collection

From July 5-15, 2019, we conducted semi-structured IDIs and KIIs, using topic guides. These interviews focused on the knowledge, attitudes, beliefs, perceptions, and

experiences that pertain to contraceptive use and childbearing (Table 1). We adopted these data collection methods as they afford great flexibility in navigating the interview and depth of exploration in qualitative research [19]. We developed the topic guides based on the socio-ecological model (SEM) [20], literature reviews, and the research team's field observations to include previously identified key issues. The SEM is a theoretical framework to understand the dynamic interactions and interrelations of multilevel factors that determine health behaviors [21]. McLeroy et al. [20] identified five levels of influence that are specific to health behaviors: intrapersonal factors, interpersonal factors, community factors, institutional factors, and policy factors. Based on literature reviews, we developed a conceptual framework (Figure 1), which was adapted from the SEM. We developed and used a separate topic guide for each group. Prior to data collection, we pretested one of the topic guides on two married adolescent girls to determine the feasibility of this strategy and refine the questions. The topic guides in English are available as a supplementary (S1).

Five Nepali research assistants (four women and one man) collected data. They speak the local language (i.e., Bhojpuri) and are experienced in qualitative research. We trained them for three days to avoid the biases that typically interfere with the collection of qualitative data (e.g., friendliness bias, social desirability, confirmation bias, question-order bias) and to address ethical considerations. All of the assistants have a bachelor's degree in public health or sociology. They conducted individual face-to-face IDIs and KIIs in a private space chosen by the participants and at a time convenient to them. The sex of the interviewer matched the sex of the participant. The interviewers established rapport with the participants before commencing the interviews. They began the interview with general questions and moved onto more specific questions, including open-ended questions about their experiences of and perceptions about contraception. The interviews lasted for approximately one hour and were audio-recorded to help verify descriptive data. The interviewers transcribed verbatim both the IDIs and KIIs within 24 hours of each interview. Subsequently, the second author (NK) translated the transcribed interviews into English. The interviewers checked the translated text for errors and omissions (including context and content accuracy).

Data analysis

We analyzed the data using a directed approach to content analysis, which is described by Graneheim and Lundman [22] and Hsieh and Shannon [23], and in accordance with the conceptual framework. Two authors (KS and NK) read English transcripts several times to immerse into the data and gained a sense of the whole. We coded and analyzed the meaning units, which were embedded within the transcripts. We also highlighted all texts, which, on the first impression, appear to represent factors influencing contraceptive use and adolescent childbearing. The next step in the analysis was to code all highlighted passages using predetermined codes based on the conceptual framework (Figure 1). We gave new codes to any texts that could not be categorized with the initial coding scheme, and then reviewed and revised these codes during the entire coding process. When inconsistencies emerged, we further refined the codes through discussion until we reached consensus. We grouped emergent codes into categories, and further classified into themes in accordance with the conceptual framework: intrapersonal, interpersonal, community,

organizational, and policy-level factors. We translated relevant participant quotations and used them to illustrate themes. We adopted various measures to ensure that the publication of these responses does not violate the code of confidentiality. For instance, we used unique reference numbers to protect the identity of the participants. Finally, we constructed linkages among emergent categories and themes through axial coding. Respondent validation could not be conducted due to logistical constraints, and lack of personal information of the respondents. We used NVivo 9 (QSR International, Cambridge, MA) to facilitate coding, organization, searching for meaning units embedded within the English transcripts, and systematically compare the emergent categories and themes both within and across the cases. The qualitative methods and reporting of results in the present study adhered to the Consolidated Criteria for Reporting Qualitative Research (COREQ) [24] and Standards for Reporting Qualitative Research [25]. We filled and provided the COREQ as a supplementary file (S2).

Strategies to deal with validity threats

We employed various strategies for establishing three types of threats to validity that are pertinent to qualitative research [26]. The measures taken to reduce threats to descriptive and interpretative validity included using verbatim transcripts of the interviews, presenting participant quotations without shortening, asking open-ended questions, peer debriefing, collecting and analyzing rich data, and providing the thick description of the setting, participants, and themes. The research design of triangulation from a range of individuals and two data collection approaches helped handle threats to both interpretative and theoretical validity.

Ethical considerations

The present study was approved by the Research Ethics Committee of the Graduate School of Medicine, the University of Tokyo (2019030NI), and the Nepal Health Research Council (3001) in Kathmandu. We secured written informed consent from the participants after they were informed about the aim, objectives, and procedures of the study. For those who were younger than 18 years, we obtained written informed consent from their parents. If the parent or carer was inaccessible in the neighborhood, we obtained it from minor participants. Participation in the present study was voluntary, and the participants were free to skip interview questions or withdraw their participation at any time without penalty. They were not required to provide any personal information (e.g., name, address, phone number) during the interviews. We used unique reference numbers to protect the identity of the participants.

Patient and public involvement

Participants and the public were not involved in the study design or planning of the data analysis.

RESULTS

Participant characteristics

Table 2 summarizes participants' characteristics. The mean age of the participating adolescent girls was 17.8 years (interquartile range (IQR) 17.0 to 18.3). A majority of them were married before the age of 18. Approximately half of them had at least one child, and several others were pregnant. Almost all of them had become full-time housewives living with their in-laws after marriage. All the adolescent girls had discontinued their education. The mean age of the husbands and mothers-in-law was 23.5 (IQR 21.0 to 25.3) and 48.4 (IQR 41.5 to 52.3), respectively. More than a half of the participants for IDIs were Hindu. Most of the husbands were farmers or casual laborers. The mothers-in-law had limited educational attainment. As providing the demographic characteristics of the KII participants might allow for their identification, we did not include such information in this article.

Table 2. Demographic characteristics of the participants for in-depth interviews

Married adolescent girls (n=20)			Husbands (n=20)			Mothers-in-law (n=20)		
	M	P		M	P		M	P
Age (years)			**Age (years)**			**Age (years)**		
15–17	1	5	15–19	3	0	30–39	2	0
18–19	9	5	20–24	3	8	40–49	4	5
Age at marriage (years)			25–29	2	3	50–59	3	3
12–14	3	3	30–34	1	0	60–69	1	2
15–17	5	7						
18–19	2	0						
Religion			**Religion**			**Religion**		
Hinduism	6	7	Hinduism	6	6	Hinduism	6	7
Islam	4	3	Islam	3	5	Islam	4	3
Ethnicity			**Ethnicity**			**Ethnicity**		
Madhesi	4	0	Madhesi	1	2	Madhesi	4	4
Muslim	4	4	Muslim	3	5	Muslim	4	3
Terai Dalit	1	5	Terai Dalit	5	4	Terai Dalit	2	3
Others (Teli or unknown)	1	1						
Educational attainment			**Educational level**			**Educational level**		
No education or some level of primary education	4	4	No education or some level of primary education	1	0	No education or some level of primary education	9	10
Completed primary school	1	3	Completed primary school	1	2	Completed primary school	1	0
Some level of secondary education	2	3	Some level of secondary education	3	6			
Completed secondary school	1	0	Completed secondary school	0	0			
Higher education	2	0	Higher education	4	3			
Occupation			**Occupation**			**Occupation**		
Unemployed	10	9	Farmer	4	0	Unemployed	2	4
Tailor	0	1	Laborer	3	4	Farmer	3	6
Number of children			Businessperson	2	4	Laborer	3	0

	0	3	8	Teacher	0	1	CHV	1	0
	1	4	2	Helper	0	1	Businessperson	1	0
	2	3	0	Tailor	0	1			

M: Mahagadimai Nagarpalika; P: Prasauni Gaunpalika; CHV: Community health volunteer

Intrapersonal factors

Fear of and misconceptions about side effects on health

Both the married adolescent girls and husbands considered their fear of the side effects of contraceptive methods to be a factor that influences their decisions about family planning. They were concerned that the use of such tools would adversely affect their physical health. They also held misconceptions about the side effects of contraceptives. The following characteristic responses illustrate this observation:

> *I have heard that if we use an implant, there will be a lot of bleeding. Pills will harm the body, and it will feel hot if you use them.* (Ref. #122, married adolescent girl, 18 years)

> *There is a chance of becoming infertile if contraceptives are used for a long time.* (Ref. #992, husband, 21 years)

Lack of access to information

Several married adolescent girls were unaware that they could avail of family planning services free of charge at public healthcare facilities. All the three groups demonstrated poor knowledge about family planning services.

> *I think there is a need for family planning services and information. However, no one provided us with such information about free family planning services.* (Ref. #630, married adolescent girl, 17 years)

Shyness and embarrassment

Most of the married adolescent girls cited shyness and embarrassment as barriers that prevented them from discussing the timing of childbearing and contraceptive use with their husbands. Both the married adolescent girls and husbands were not inclined to seek family planning information and services, especially from healthcare providers of the opposite sex.

> *I will feel very shy to ask about family planning methods. It was only a year of my marriage, and they [healthcare providers] told me not to use contraceptives. If I must ask anybody about it, I will feel very shy.* (Ref. #460, married adolescent girl, 17 years)

Low awareness about the risks involved in adolescent or multiple pregnancies

Low awareness and misinformation about the risks involved in adolescent childbearing emerged as a contributor to contraceptive nonuse. While only a few married adolescent girls were aware that adolescent pregnancy was associated with an increased risk of obstetric complications, several respondents had low levels of knowledge about the risk.

> *If a woman gives birth before 18 years of age, she will suffer from weakness, stomachache, and vomiting and will not be able to work much and always feel sleepy.* (Ref. #122, married adolescent girl, 18 years)

Limited autonomy in making decisions about family planning

The respondents were governed by strong cultural norms, which empower husbands to make all household decisions and disallow wives from making independent decisions. Such patriarchal values, wives' financial dependence, and power imbalances between spouses had restricted women's decisions about contraceptive use. A few married adolescent girls reported that their husbands had refused to use contraceptives. They also noted that defying their husband's decisions would lead to family feuds.

> *If I use it [contraceptives] and if I start having its side effects, then my husband will scold me. That is why he takes all the decisions. He makes major decisions because he earns and governs the family.* (Ref. #122, married adolescent girl, 18 years)

> *In our community, men make all decisions. I want to use contraceptives, but he does not want me to. He does not agree on the use of contraceptives. According to him, it will harm my body.* (Ref. #335, married adolescent girl, 17 years)

> *We [young wives] must live on another person's income to live and have to do whatever the other person says. That is why we do not have the right to make decisions.* (Ref. #460, married adolescent girl, 17 years)

Interpersonal factors

Influence of mothers-in-law

The mothers-in-law undermined their daughter-in-law's autonomy in making decisions about contraception. Most of the married adolescent girls reported that their mothers-in-law had pressurized them into not using contraceptives until they had an ideal number of children.

> *My mother-in-law influenced my decision. She has the right to make decisions regarding my contraception and childbearing.* (Ref. #241, married adolescent girl, 16 years)

Limited mobility

Most of the Hindu and Muslim wives considered limited mobility to be a barrier that hindered them from accessing family planning information and services as their husbands and mothers-in-law restricted their rights to travel.

> *If I do not take permission to go out, there is a chance of fighting with my husband.* (Ref. #241, married adolescent girl, 16 years)

> *Women must seek permission to go out not only from their husbands but also from their parents-in-law and other elders in the family. Only a few disobey such norms and go to a health facility for service. Exclusion and violence against women are a common consequence if they disobey family norms.* (Ref. #587, FCHV, 35 years)

Community factors

Social pressure to give birth soon after marriage and fear of infertility

Most of the married adolescent girls, husbands, and mothers-in-law cited the extreme pressures to give birth soon after marriage as a reason for contraceptive nonuse and early childbearing. The married adolescent girls noted that, if a woman does not give birth within the first three years of her marriage, others will make fun of the woman and gossip about her infertility. They were afraid of abandonment and the stigmatization of childless married couples. Their family and community members had intimidated them into becoming pregnant. The married adolescent girls believed that their communities expected them to deliver their first child within the first year of marriage. In contrast, most of the husbands thought their community members expected couples to have their first child between the second and fifth year of marriage.

> *My community believes that women should give birth in the first year of their marriage. If they do not, people will start suspecting and gossiping about their infertility.* (Ref. #29, married adolescent girl, 19 years)

> *If a couple does not have a child after 4-5 years of marriage, people have negative thoughts about it. They would ask, "Why doesn't she have a child?" [and] "Is she having a problem with her reproductive capacity?" If she does not have a child after 3 to 4 years, parents may decide to arrange another marriage for the son.* (Ref. #230, husband, 22 years)

As illustrated by the following response provided by a mother-in-law, the fear of elopement can exacerbate such social pressures.

> *Community members think that getting pregnant soon after marriage is good as women cannot elope with another guy if they have a child. They can better take care of their child and give birth to a healthy baby.* (Ref. #756, mother-in-law, 55 years)

Concerns about child health and development also contribute to the pressures to which women are subjected.

> *They [my family] also think that giving birth soon after marriage will contribute to the early development of the baby.* (Ref. #630, married adolescent girl, 17 years)

Role of religious beliefs in contraceptive use

Religious beliefs were a major barrier that prevented Muslim women from seeking contraceptives. However, Hindu women did not share the same perspective.

> *Our religion [Islam] teaches that the use of contraceptives is a sinful act.* (Ref. #930, married adolescent girl, 19 years)

> *In Islam, we believe that if we use contraceptives, God becomes unhappy and punishes us.* (Ref. #241, married adolescent girl, 16 years)

Lack of engagement with FCHVs

FCHVs, who are responsible for disseminating reproductive health information,

conducting family planning counseling and distributing condoms and oral pills in their communities, did not actively engage with married adolescent girls and involve them in family planning activities. Women's restricted mobility impeded their access to FCHVs and opportunities to learn about contraceptive methods.

> *I have never met a female health volunteer since I never go out of my home. I do not think there is a discussion about this [family planning issues] in our community.* (Ref. #892, married adolescent girl, 18 years)

> *I know that there are mothers' group meetings regularly in this municipality, but I haven't noticed or heard that FCHVs discuss with young couples about family planning issues.* (Ref. #352, mother-in-law, 48 years)

Organizational factors

Lack of privacy and confidentiality

A few of the husbands and healthcare providers reported that concerns about confidentiality deterred married couples from visiting healthcare facilities to obtain contraceptives.

> *Confidentiality is not maintained in some private clinics because my single friend went to a private clinic to buy condoms, and, later, this information was spread among their professional network.* (Ref. #992, husband, 21 years)

> *Couples themselves do not feel comfortable with going to government health facilities owing to a lack of privacy and confidentiality. There is no separate space for family planning counseling and services in health facilities.* (Ref. #729, health care provider, 31 years)

Attitudes of healthcare providers

A few of the married adolescent girls complained about the attitudes of healthcare providers.

> *When seeking antenatal check-up during my pregnancy at a private clinic, the staff members were not friendly to me. They spoke only to my husband and asked him about my problem.* (Ref. #335, married adolescent girl, 17 years)

Healthcare providers reported other health systems-related barriers that prevented them from accessing family planning services, including (i) stockouts of contraceptives at healthcare facilities, (ii) the unavailability of female health workers who could provide family planning counseling and services to female clients, and (iii) overlap between the working hours (10 am to 3 pm) of healthcare facilities and the time at which the housewives tended to be busy with their household duties.

Policy-level factors

None of the participants reported policy-level factors.

DISCUSSION

This study is one of the first qualitative studies to identify the multilevel, interrelated factors that influence contraceptive use and childbearing among married adolescent girls. It extends the evidence base by illustrating the multidimensionality and interaction of the factors that limit young married women's family planning knowledge, undermine their autonomy in decision making, reduce contraceptive use, and increase the risk of adolescent pregnancy. The barriers were intertwined and influenced each other across different levels of the SEM (Figure 2). The barriers were identified across the intrapersonal, interpersonal, community, and organizational levels. Barriers at the intrapersonal level were reluctance to seek family planning information and services, the fear of and misconceptions about side effects of contraceptives, low awareness about the risks involved in adolescent pregnancy, a lack of access to information, and limited autonomy in making decisions about family planning. Barriers at the interpersonal level were restricted mobility, power imbalances between spouses, and mothers-in-law's influence. Barriers at the community level were the fear of infertility and abandonment, the stigmatization of childless married couples, normative gender roles, and social pressures to give birth soon after marriage, which emerged as root causes of contraceptive nonuse. Barriers at the organizational level were a lack of privacy and confidentiality, and the unfriendliness of healthcare providers. The hypothetical relationships in Figure 2 are depicted based on the findings from the present study.

The women who participated in this study were not empowered to make independent decisions about contraception. Their husbands and mothers-in-law were deeply involved in this decision-making process. Adolescent married girls, their husbands, and mothers-in-law keenly felt the pressure to bear a child within the first few years of marriage. None of the participating husbands and in-laws supported the idea of delaying the first pregnancy. Disapproval of contraceptive use before having an ideal number of children in the family was prevalent among them. Newly married adolescent girls had often become pregnant before they were ready to fulfill familial expectations to bear a child and prove their fertility. Patriarchal norms and power imbalances between spouses made married adolescent girls hesitate or refrain from talking to their husbands about family planning and limited their decision-making power regarding contraception. The present findings corroborate with previous studies that have found social pressures to give birth soon after marriage in India [4,6], Bangladesh [7,8], and Iran [27] and limited autonomy in making decisions about family planning in Nepal [10], Bangladesh [7], and Iran [27] and among Syrian refugees in Lebanon [5].

The married adolescent girls felt insecure, presumably because newly married women are not considered to be a valuable member of their in-law's family until they prove their fertility. Similar to the findings of previous studies in Iran [27] and Bangladesh [8], delivering a healthy child soon after marriage was perceived as a means to establishing her identity and consolidating her position within her husband's family. Additionally, labor migration to India, Malaysia, and the Middle East was common in the study areas.

As such, having a child may be perceived as a way to cement the bond between a husband and his wife before his departure [8].

Married adolescent girls' views on family planning were shaped by their mothers-in-law. They exerted considerable influence over couples' decisions regarding contraception as they were perceived as the most experienced household member in relation to family planning. Their pressure on daughters-in-law to prove fertility within the first few years of marriage was identified as a strong driver of contraceptive nonuse. Given the restricted mobility of married adolescent girls, mothers-in-law and sisters-in-law were their primary sources of information about contraception. Similar results regarding the influence of mothers-in-law have been reported in Nepal [10], Bangladesh [7], and Lao People's Democratic Republic [9].

Social pressures to give birth soon after marriage, normative gender roles, and religious beliefs emerged as the root causes of contraceptive nonuse. Social pressures to have a child soon after marriage drove the fear of infertility, abandonment, and the stigmatization of childless married couples, which impeded the married adolescent girls' access to family planning services. Mothers-in-law may amplify the social pressure to have a child soon after marriage. Normative gender roles were related to restricted mobility among married adolescent girls. Furthermore, religious beliefs substantially limited their autonomy in making decisions about contraceptive use. This finding of religious restrictions is in agreement with a previous study in Bangladesh [7]. In contrast, in another study conducted in Syria, religious beliefs did not emerge as a barrier to reproductive decisions [28].

Limited access to information about the benefits and methods of family planning had multiple intrapersonal-level effects. It contributed to fear of and misconception about the side effects of contraceptives. It also led to low awareness about the risks involved in adolescent pregnancy. Some married adolescent girls were unaware of free family planning services provided at government healthcare facilities. Fear of the side effects has been recognized as a barrier to contraceptive use in India [4], Bangladesh [7,8,29], and Iran [27]. Dropping out of school may have limited their opportunities to learn about sexual and reproductive health issues and to expand their social networks. The findings of this study support existing evidence that shyness in discussing family planning with husbands and healthcare providers impedes access to family planning services in Asian countries [4,7,9,30].

In addition to the intrapersonal-level factors, supply-side barriers (e.g., a lack of privacy and confidentiality, the unfriendliness of healthcare providers) may have rendered them reluctant to seek contraceptives. Issues related to commodity insecurity, distance, and transport did not seem to influence contraceptives-seeking behaviors in this study. Health systems-level factors (e.g., a lack of privacy and confidentiality, the unfriendliness of health care providers) have been found to be contributing factors for contraceptive nonuse among married adolescent girls in Lao People's Democratic Republic [9].

The convergent results from triangulation across multiple sources (i.e., six different groups) and two data collection methods painted a complex and comprehensive portrait of the barriers to contraceptive use and causes of adolescent childbearing. However, the findings should be interpreted within the confines of several limitations of this study. First, a convenience sample was recruited from a single district in Nepal. Therefore, the findings may not be transferable to broader populations. Second, the participants may have felt inhibited to share their personal experiences candidly, especially those that pertain to sensitive subjects, in the presence of an interviewer. For example, they may have felt uncomfortable reporting other prevalent, albeit extremely stigmatized experiences (e.g., abuse and neglect) that influence contraceptive use. In the present study, efforts were made to obtain in-depth data by interviewing in a private space, establishing rapport with the participants, and maintaining confidentiality. Third, due to lack of respondent validation, the possibility of misinterpreting the meaning of what the respondent said could not be ruled out. Fourth, the relationships shown in Figure 2 are intended to be an illustrative set of relationships, rather than an exhaustive set. Minor linkages are not necessarily reflected in the diagram. Finally, the meanings embedded within participants' responses might have been lost or distorted during translation from Nepali to English. To minimize this problem, the interviewers checked the accuracy of the translated texts for errors and omissions. Despite these limitations, the strengths of this study include its comprehensive approach guided by the SEM, triangulation across multiple sources and methods, which enabled the collection of rich and detailed data, and other strategies for establishing validity.

CONCLUSIONS AND PROGRAMMATIC IMPLICATIONS

The present findings delineate the mechanism of contraceptive nonuse and adolescent pregnancy in the study setting. In-depth accounts of a range of individuals demonstrated that the decision to postpone childbearing is not merely the personal choice of an individual or a couple, highlighting the importance of targeting families and communities in addition to adolescent girls and couples. Expanding access to comprehensive sexuality education to enhance girls' knowledge and demand for sexual and reproductive health may not be enough to prevent adolescent pregnancy. Instead, the present findings underscore the need to challenge restrictive socio-cultural norms so that adolescent girls become empowered to exercise greater control over contraceptive use. Community support and collective actions are needed to address the root causes that have been identified in this study. Men and boys must be engaged to challenge and transform gender norms and stereotypes relating to childbearing and family planning and to address negative effects that these norms and stereotypes can have on women, girls, family, and communities. Reproductive health programs and interventions should be culturally sensitive and context-specific and aim to reinforce women's reproductive rights and gender equality. Adopting human rights-based approaches to adolescent sexual and reproductive health is essential to ensure women's autonomy in exercising their reproductive rights by determining when to have a child and how many children to have.

REFERENCES

1. Guttmacher Institute. Investing in Adolescents' Sexual and Reproductive Health in

Low- and Middle-Income Countries. New York: Guttmacher Institute; 2020.

2. World Health Organization (WHO). Why is giving special attention to adolescents important for achieving Millennium Development Goal 5? Geneva: WHO; 2008. Available: https://www.who.int/maternal_child_adolescent/events/2008/mdg5/adolescent_preg.pdf?ua=1

3. Sully E, Biddlecom A, Darroch JE, Riley T, Ashford LS, Lince-Deroche N, et al. Adding It Up: Investing in Sexual and Reproductive Health 2019. New York: Guttmacher Institute; 2020.

4. Ghule M, Raj A, Palaye P, Dasgupta A, Nair S, Saggurti N, et al. Barriers to use contraceptive methods among rural young married couples in Maharashtra, India: Qualitative findings. Asian J Res Soc Sci Humanit. 2015;5: 18–33.

5. Cherri Z, Cuesta JG, Rodriguez-Llanes J, Guha-Sapir D. Early marriage and barriers to contraception among Syrian refugee women in Lebanon: a qualitative study. International Journal of Environmental Research and Public Health. 2017;14: 836.

6. McClendon KA, McDougal L, Ayyaluru S, Belayneh Y, Sinha A, Silverman JG, et al. Intersections of girl child marriage and family planning beliefs and use: qualitative findings from Ethiopia and India. Cult Health Sex. 2018;20: 799–814.

7. Shahabuddin ASM, Nöstlinger C, Delvaux T, Sarker M, Bardají A, Brouwere VD, et al. What influences adolescent girls' decision-making regarding contraceptive methods use and childbearing? A qualitative exploratory study in Rangpur district, Bangladesh. PLoS One. 2016;11: e0157664.

8. Henry EG, Lehnertz NB, Alam A, Ali NA, Williams EK, Rahman SM, et al. Sociocultural factors perpetuating the practices of early marriage and childbirth in Sylhet District, Bangladesh. Int Health. 2015;7: 212–217.

9. Sychareun V, Vongxay V, Houaboun S, Thammavongsa V, Phummavongsa P, Chaleunvong K, et al. Determinants of adolescent pregnancy and access to reproductive and sexual health services for married and unmarried adolescents in rural Lao PDR: a qualitative study. BMC Pregnancy Childbirth. 2018;18: 219.

10. Maharjan B, Rishal P, Svanemyr J. Factors influencing the use of reproductive health care services among married adolescent girls in Dang District, Nepal: a qualitative study. BMC Pregnancy and Childbirth. 2019;19.

11. Ministry of Health (Nepal), New ERA, Micro International Inc. Nepal Demographic and Health Survey 2016. Kathmandu, Nepal: Ministry of Health, Nepal; 2017.

12. United Nations Department of Economic and Social Affairs. World Fertility 2019. New York; 2020. Available:

https://www.un.org/en/development/desa/population/publications/pdf/fertility/World_Fertility_2019.pdf

13. Poudel S, Upadhaya N, Khatri RB, Ghimire PR. Trends and factors associated with pregnancies among adolescent women in Nepal: pooled analysis of Nepal Demographic and Health Surveys (2006, 2011 and 2016). PLoS One. 2018;13: e0202107.

14. Godha D, Hotchkiss DR, Gage AJ. Association between child marriage and reproductive health outcomes and service utilization: a multi-country study from South Asia. J Adolesc Health. 2013;52: 552–558.

15. Raj A, Saggurti N, Balaiah D, Silverman JG. Prevalence of child marriage and its effect on fertility and fertility-control outcomes of young women in India: a cross-sectional, observational study. Lancet. 2009;373: 1883–1889.

16. Kamal SMM. Decline in child marriage and changes in its effect on reproductive outcomes in Bangladesh. J Health Popul Nutr. 2012;30: 317–330.

17. Khanal DR, Pandey PR, Sharma B. Nepal Human Development Report 2020. Kathmandu, Nepal: Government of Nepal and United Nations Development Programme; 2020.

18. Central Bureau of Statistics (Nepal). National Population and Housing Census 2011. Kathmandu, Nepal: Central Bureau of Statistics; 2012.

19. Marshall C, Rossman GB. Designing Qualitative Research. Thousand Oaks: SAGE Publications; 2016.

20. McLeroy KR, Bibeau D, Steckler A, Glanz K. An ecological perspective on health promotion programs. Health Educ Q. 1988;15: 351–377.

21. Sallis JF, Owen N, Fisher EB. Ecological models of health behavior. In: Glanz K, Rimer BK, Viswanath K, editors. Health Behavior and Health Education: Theory, Research, and Practice. San Francisco, CA, US: Jossey-Bass, xxxiii; 2008. pp. 465–485.

22. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. Nurse Educ Today. 2004;24: 105–112.

23. Hsieh H-F, Shannon SE. Three approaches to qualitative content analysis. Qual Health Res. 2005;15: 1277–1288.

24. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007;19: 349–357.

25. O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. Standards for reporting

qualitative research: a synthesis of recommendations. Acad Med. 2014;89: 1245–1251.

26. Maxwell JA. A realist approach to qualitative research. Thousand Oaks: SAGE Publications; 2012. pp. 585–586.

27. Mardi A, Ebadi A, Shahbazi S, Esmaelzade Saeieh S, Behboodi Moghadam Z. Factors influencing the use of contraceptives through the lens of teenage women: a qualitative study in Iran. BMC Public Health. 2018;18: 202.

28. Hessini L. Abortion and Islam: policies and practice in the Middle East and North Africa. Reprod Health Matters. 2007;15: 75–84.

29. Schuler SR, Bates LM, Islam F, Islam MK. The timing of marriage and childbearing among rural families in Bangladesh: choosing between competing risks. Soc Sci Med. 2006;62: 2826–2837.

30. Barua A, Kurz K. Reproductive health-seeking by married adolescent girls in Maharashtra, India. Reprod Health Matters. 2001;9: 53–62.

Abbreviations

COREQ: criteria for reporting qualitative research; FCHVs: female community health volunteers; FP: family planning; IDIs: in-depth interviews; IQR: interquartile range; KIIs: key informant interviews; LMIC: low- and middle-income countries; SEM: socio-ecological model

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Consent for publication

Not applicable.

Conflicts of interests

The authors declare that they have no competing interests.

Data Availability Statement

The data generated during the present study are not publicly available due to restrictions

(e.g., their containing information that could compromise the privacy of research participants) but are available from the corresponding author on reasonable request.

Authors' contributions

KS conceived and designed the study, analyzed the data, and wrote the draft manuscript. NK jointly analyzed the data. NK, RRC, KICO, AT, and MJ contributed to interpretation of the results and made critical suggestions for revisions to the manuscript. MJ supervised the study. All authors read and approved the final manuscript.

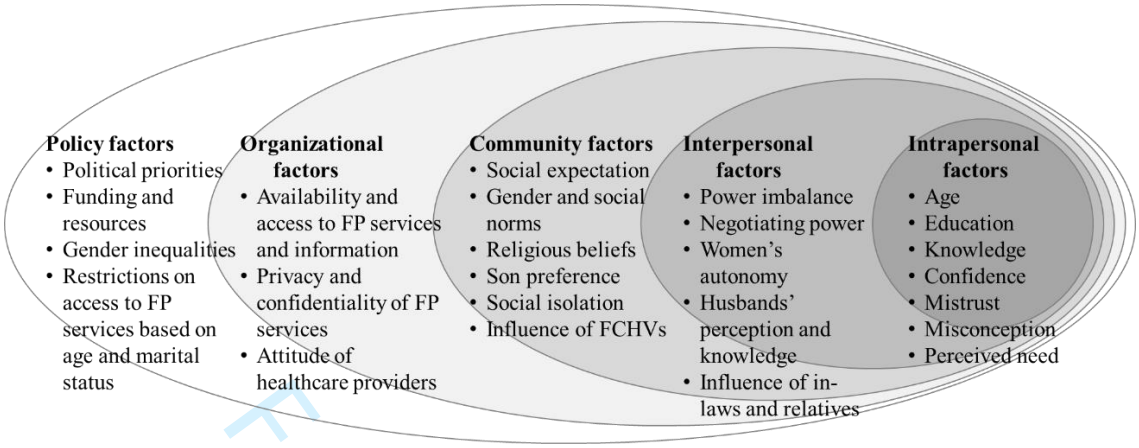

Figure 1. Conceptual framework adapted from on the socio-ecological model to identify the causes of contraceptive nonuse and adolescent pregnancy
Note: adapted from McLeroy et al. (1988) [20]
FP: family planning; FCHVs: female community health volunteers

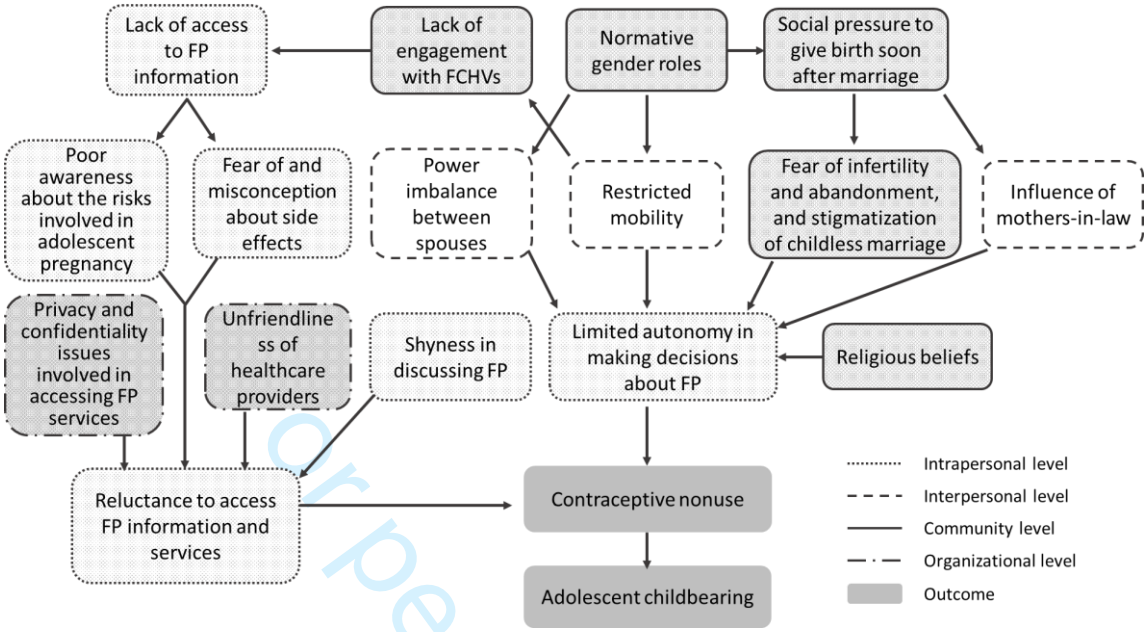

Figure 2. A diagram of hypothetical relationships among the emergent factors
Note: There was no relevant findings on policy-level factors.

S1 Topic guides (English)

Topic Guide for Married Adolescent Girls

Intrapersonal factors	• Do you know that free family planning services are available in your municipality? • Do you know where to access free family planning services? • Which contraceptive methods do you know? • How do you perceive family planning services? • Have you ever used any contraceptive method? • Do you perceive the need for family planning services and information? • Do you feel shy to seek family planning services and information? • What challenges do you face in seeking family planning services? • Do you fear side effects of contraceptive use?
Interpersonal factors	• Do you discuss with your husband when to have a child and how many children to have? • Do you feel comfortable to negotiate contraceptive use with your husband? • Who has the power to make decision regarding whether to use contraceptives? • Does your husband agree or disagree to use contraceptives? • Do you have a final say on contraceptive use? • Do you perceive that there is power imbalance in terms of decision-making regarding family planning between you and your husband? • Do your mother-in-law or sisters-in-law influence your decision-making about contraceptive use? • Have you heard of your mother-in-law's or sisters-in-law's experience of using family planning services?
Community factors	• Is there social consensus in your community that women should become pregnant soon after marriage? • Did you feel pressure to become pregnant soon after marriage? If so, who did you feel pressure from? • Has your religion something to do with non-use of contraceptives after marriage? • Do you sometimes exchange information about family planning with your friends? • Do FCHVs in this municipality discuss family planning services with young women like you?
Organizational factors	• Are local health care providers supportive of providing contraceptives to young women like you? • Are they friendly to young women like you? • Do you feel your privacy and confidentiality are maintained at a nearby health facility? • How long does it take to get to a nearby health facility providing family planning services?

	• Is there local transportation available to get to a nearby health facility providing family planning services? • Would you need a permission from your husband if you go out to a health facility?
Policy factors	• Is there any restriction of family planning services on age? • Is there any restriction of family planning services on marital status?

Topic Guide for Husbands of Married Adolescent Girls

Intrapersonal factors	• Do you know that free family planning services are available in your municipality? • Do you know where to access free family planning services? • Which contraceptive methods do you know? • How do they perceive family planning services? • Do you perceive the need for family planning services and information? • Do you feel shy to seek family planning commodity (condom) and information? • What challenges do you face in seeking family planning services? • Do you fear side effects of contraceptive use?
Interpersonal factors	• Do you discuss with your wife when to have a child and how many children to have? • Do you feel comfortable to discuss contraceptive use with your wife? • Who has the power to make decision regarding whether to use contraceptives? • Do you have a final say on contraceptive use? • Do you perceive that there is power imbalance between you and your wife? • Do your parents or anyone else influence your decision-making about contraceptive use? • Have you heard of anyone's experience of using family planning services?
Community factors	• Is there social consensus in your community that women should become pregnant soon after marriage? • Did you feel pressure to get your wife pregnant soon after marriage? If so, who did you feel pressure from? • Has your religion something to do with non-use of contraceptives after marriage? • Do you sometimes exchange information about family planning with your friends? • Do FCHVs in this municipality discuss family planning services with men like you?
Organizational factors	• Are local health care providers supportive of providing condoms? • Are they friendly to you when you go there to seek condoms? • Do you feel your privacy and confidentiality are maintained at a nearby health facility? • How long does it take to get to a nearby health facility providing condoms? • Is there local transportation available to get to a nearby health facility providing family planning services?

Topic Guide for Mothers-in-law of Married Adolescent Girls

Intrapersonal factors	• Do you know that free family planning services are available in your municipality? • Do you know where to access free family planning services? • Which contraceptive methods do you know? • How do they perceive family planning services? • What challenges do you think young couples face in seeking family planning services?
Interpersonal factors	• Do you think your daughter-in-law should discuss family planning with her husband? • Did you feel comfortable to negotiate contraceptive use with your husband? • In your opinion, who should decide when to have a child and how many children to have • In your opinion, who should decide whether to use contraceptives? • Do you think your daughter-in-law should use contraceptives? • Are you influential in decision making about contraceptive use of your daughter-in-law? • Have you ever shared with your daughter-in-law your experience of using family planning services?
Community factors	• Is there social consensus in your community that women should become pregnant soon after marriage? • When you were young, did you feel pressure to become pregnant soon after marriage? If so, who did you feel pressure from? • Do FCHVs in this municipality discuss family planning services with young couples?

Topic Guide for Health Care Providers, Health Coordinators and FCHVs

Community factors	• Is there social consensus in this community that women should become pregnant soon after marriage? • Has your religion something to do with non-use of contraceptives after marriage? • Do FCHVs in this municipality discuss family planning services with young couples?
Organizational factors	• What is a major challenge for local women especially when seeking family planning services in this municipality? • Do women in this municipality have to seek permission from their husband if they go out to a health facility? • What is a major challenge in providing family planning services in your municipality or health facility? (Availability of commodities and equipment, training for nurses/ANM) • What is your concern in family planning programme in this municipality? (budget, planning, leadership/governance, health information, supplies, availability and capacity of health workers) • Are there any other issues that one should be aware of when understanding access to family planning services in this municipality?
Policy factors	• Is there any restriction of family planning services on age? • Can young people below the age of 18 receive family planning services in this municipality or facility as they wish? • Is there any restriction of family planning services on marital status? • Can unmarried couples receive family planning services in this municipality or facility as they wish?

Supplementary 2: Consolidated criteria for reporting qualitative studies (COREQ): a 32-item checklist

Title: Multilevel factors influencing contraceptive use and childbearing among adolescent girls in Bara district of Nepal: A qualitative study using the social-ecological model

Authors: Kazutaka Sekine, Nirajan Khadka, Rogie Royce Carandang, Ken Ing Cherng Ong, Anand Tamang, and Masamine Jimba

Topic	Guide questions/description	Response
Domain 1: Research team and reflexivity		
Personal Characteristics		
1. Interviewer/facilitator	Which author/s conducted the interview or focus group?	Five research assistants (four women and one man) hired for this research conducted the interviews. KS and NK supervised the data collection process.
2. Credentials	What were the researcher's credentials? E.g., Ph.D., MD	Ph.D., MSc, MA, MD
3. Occupation	What was their occupation at the time of the study?	PhD student, Professor, Assistant Professor, and Director of an NGO
4. Gender	Was the researcher male or female?	All the concerned researchers are male. Four of the local research assistants involved in data collection are female and one male.
5. Experience and training	What experience or training did the researcher have?	KS, RRC, AT, and MJ have experiences in qualitative research.
Relationship with participants		
6. Relationship established	Was a relationship established before study commencement?	None of the concerned researchers had relationships with the participants until study commencement.
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g., personal goals, reasons for doing the research	None of the participants had contact with the concerned researchers before this study. The aim, objectives, and procedures of the study was explained to the participants before participation.
8. Interviewer characteristics	What characteristics were reported about the interviewer/facilitator? e.g., bias, assumptions, reasons, and interests in the research topic	All of the assistants have a bachelor's degree in public health or sociology. They speak the local language (i.e., Bhojpuri) and are experienced in qualitative research. Before data collection, they were trained to avoid the biases that typically interfere with the collection of qualitative data and to address ethical considerations.

Domain 2: Study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g., grounded theory, discourse analysis, ethnography, phenomenology, content analysis	The socio-ecological model was adopted as the theoretical framework that guided the development of research tools. Also, a directed approach to content analysis was employed for data analysis in this study.
Participant selection		
10. Sampling	How were participants selected? e.g., purposive, convenience, consecutive, snowball	Convenience sampling
11. Method of approach	How were participants approached? e.g., face-to-face, telephone, mail, email	Door-to-door visits.
12. Sample size	How many participants were in the study?	70 participants (60 for IDIs and 10 for KIIs)
13. Non-participation	How many people refused to participate or dropped out? Reasons?	None of the participants refused to participate or dropped out in the study.
Setting		
14. The setting of data collection	Where was the data collected? e.g., home, clinic, workplace	IDIs and KIIs were conducted in a private space that was chosen by the participants and at a time that was convenient to them.
15. Presence of nonparticipants	Was anyone else present besides the participants and researchers?	Nobody
16. Description of sample	What are the important characteristics of the sample? e.g., demographic data, date	Characteristics of the IDI participants are provided in Table 2.
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Based on literature reviews, the authors developed the conceptual framework (Figure 1) that guided the development of research tools. For each group of the participants, a separate topic guide was developed and used. Prior to data collection, a topic guide was pretested on two married adolescent girls to determine the feasibility of the tool and refine the questions.
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	No.

19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	All the IDIs and KIIs were audio-recorded and transcribed verbatim.
20. Fieldnotes	Were field notes made during and/or after the interview or focus group?	Field notes were made during the interviews.
21. Duration	What was the duration of the interviews or focus group?	The interviews lasted for about one hour.
22. Data saturation	Was data saturation discussed?	Yes. The sample size allowed the researchers to reach thematic saturation that is when no new information emerges.
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No.
Domain 3: Analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	Two researchers (KS and NK) were responsible for coding.
25. Description of the coding tree	Did authors provide a description of the coding tree?	No.
26. Derivation of themes	Were themes identified in advance or derived from the data?	Themes were identified in advance based on the social-ecological model and literature reviews. However, new codes were given to any texts that could not be categorized with the initial coding scheme.
27. Software	What software, if applicable, was used to manage the data?	We used NVivo 9 (QSR International, Cambridge, MA) to facilitate coding, organization, searching for meaning units embedded within the English transcripts, and systematically compare the emergent categories and themes both within and across the cases.
28. Participant checking	Did participants provide feedback on the findings?	Respondent validation could not be conducted due to logistical constraints, and lack of personal information of the respondents.
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g., participant number	Participant quotations are presented to illustrate themes.
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Consistency between the data presented and the findings is ensured in the article.

31. Clarity of major themes	Were major themes clearly presented in the findings?	Yes, in the results section.
32. Clarity of minor themes	Is there a description of diverse cases or a discussion on minor themes?	Relatively minor themes that are supported by a few participant quotations are included in the result section.

Reference: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007;19(6):349-57.