Trend and Factors Associated With Unintended Pregnancy Among Currently Married Women in Nepal

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Abstract

Unintended pregnancy, a critical concern in both human rights and public health, emphasizes women's fundamental right to make decisions about their fertility, which is vital for their reproductive choices. The study aimed at examining the trends and factors related to unintended pregnancy, an area that has received less focus in previous research. This study analyzed 15 years of data (2001–2016) from four national surveys in Nepal, focusing on currently married women aged 15–49 who were currently pregnant or had the last birth experienced within five years before the survey. The sample included 4,694, 4,006, 4,104, and 3,966 females from the 2001, 2006, 2011, and 2016 surveys respectively. This study used bivariate and multivariate logistic regression analysis to examine unintended pregnancy. In 2001, 39.4% of women experienced an unintended pregnancy, but over 15 years, this rate decreased by almost half, reaching 19.9% in 2016. Age, number of household members, wealth index, age at first birth, children ever born, fertility preference, unmet need for family planning, and husband's desire for children were significantly associated with unintended pregnancy in all the survey years. The results suggest a need for policies that ensure all pregnancies are intended, promoting reproductive rights and justice for women.

Keywords

Family planning; fertility preference; Nepal; unintended pregnancy

Background

Unintended pregnancy can happen to any fertile woman of reproductive age and is classified as either "unwanted" or "mistimed" (Centre for Disease Control and Prevention [CDC], 2023; Johnson et al., 2004; Santelli et al., 2003). It can have significant negative impacts on social, economic, and cultural life (Brown & Eisenberg, 1995), including unsafe abortion, delayed prenatal care, poor maternal mental health, and violence against women (Acharya et al., 2016; United Nations Population Fund [UNFPA], 2022) posing a serious threat to women's well-being and may be considered a human right crisis.

Unintended pregnancies contribute to unsafe abortions, a direct factor affecting maternal mortality and morbidity. An estimation revealed that half of Nepalese pregnant women had unintended pregnancies in 2014, either mistimed or unwanted, with nearly one-third (31%) resulting in abortion (Guttmacher Institute, 2017). As of the latest estimates, in 2021, there were 862,199 pregnancies, with 39% planned, 53% unintended, and around 73% unintended ones ending in induced abortion (Ipas Nepal & Ministry of Health and Population [MOHP], 2023). Moreover, the unmet need for modern contraception among them has not significantly decreased since 2006 (Ministry of Health [Nepal] et al., 2017). A recent study by Puri and Stone (2020) highlighted that a 10% increase in unsafe abortions in Nepal could lead to an annual rise of 14,500. This research also revealed that the lack of availability of contraceptive devices contributed to a yearly increase of 19,000 unintended pregnancies.

Similarly, women in Nepal want to delay seeking antenatal care (ANC) to hide unintended pregnancies, with early ANC initiation more negatively linked to unwanted pregnancies than mistimed ones (Paudel et al., 2017). A study analyzing Demographic Health Surveys (DHS) data across ten countries found a significant association between partner violence and unintended pregnancy, indicating that women experiencing intimate partner violence (IPV) were 1.48–1.75 times more likely to terminate pregnancies compared to those without IPV experiences (Hindin et al., 2008). A study conducted in Nepal further emphasized this link, reporting that nearly 23% of women experienced unintended pregnancies, with 9% facing sexual violence from their husbands (Acharya et al., 2019). It additionally explained that individuals facing sexual violence were 2.3 times more likely to report unintended pregnancies, which emphasizes a critical issue concerning reproductive health and rights.

Unintended pregnancy is a concern from both human rights and public health perspectives (Gipson et al., 2008). It was recognized at the International Conference on Population and Development 1994 (Shalev, 2000) and included in the United Nations Sustainable Development Goals (SDGs) 2030 agenda by ensuring universal access to sexual and reproductive health and reproductive rights. These rights are ensured by stating, "Achieve gender equality and empower all women and girls" (United Nations, 2015, p. 20). Nepal is also committed to being a part of all the mentioned agendas (National Planning Commission, 2017). Despite the implementation of policy agendas and institutional commitments, the United Nations Population Fund (UNFPA) (2022) highlighted a concerning trend: the rising number of unplanned and unwanted pregnancies. This trend prompts a critical examination of the extent to which women's rights and potential are genuinely prioritized and valued.

Reducing unintended pregnancy is a national priority in Nepal. The Nepal government has set a vision regarding the issue and stated that "every pregnancy is wanted, every birth celebrated, and women, babies, and children survive, thrive, and reach their full potential"

(Ministry of Health [Nepal], 2016, p. 5). Aligning with the vision, the government made the Right to Safe Motherhood and Reproductive Health Act in 2018 a fundamental human right, including various programs, such as safe abortion, family planning, and mother safety programs (Centre for Reproductive Rights, 2018; UNFPA, 2019). These agendas are also mentioned in the present constitution of Nepal, which states that "every woman shall have the right to safe motherhood and reproductive health" (Nepal Law Commission, 2015, Article 38, Clause 2). According to the constitution, women can exercise safe motherhood and reproductive health as fundamental rights. Recently, researchers have explicitly considered the reproductive sphere as a distinct empowerment dimension (van Eerdewijk et al., 2017). Reproductive empowerment can be regarded as a process of change in living better lives than in the past. It is an outcome of the degree of freedom individuals have in shaping their reproductive lives (Alkire et al., 2013; van Eerdewijk et al., 2017).

Multiple causes, such as coercing sexual relationships and problems of proper use of contraception (van Eerdewijk et al., 2017), avoiding contraception for fear of side effects (Bellizzia et al., 2019), creating unequal power because of the male-dominated cultures, socioeconomic status, and gender relation (Goicolea & San Sebastian, 2010; Logan et al., 2007; UNFPA, 2022; Vizheh et al., 2021) can lead to the unintended pregnancy. In this regard, several scholars (e.g., Glasier et al., 2006; Goicolea & San Sebastian, 2010; Gruskin, 2008; van Eerdewijk et al., 2017) mention that the ability to control their fertility is a prerequisite for women's reproductive empowerment and fundamental right issue as well.

A recent report by the UNFPA (2022) revealed that globally, there are 331,000 unintended pregnancies per day, indicating a failure to uphold fundamental human rights. Regarding the same issue, the World Health Organization conducted a study across 36 countries and found that two-thirds of sexually active women who desired to delay or limit childbearing discontinued contraception due to the concerns of side effects, leading to one in four pregnancies being unintended (Bellizzia et al., 2019). Despite this, the rate of unintended pregnancy remains higher in developing regions compared to developed regions (Bearak et al., 2018).

Another study conducted in six South Asian countries (Bangladesh, Pakistan, Nepal, Afghanistan, India, and Maldives) revealed that approximately 19% of women of reproductive age experienced unintended pregnancies, with the highest incidence in Bangladesh (28%) and the lowest in India (12%). Nepal had the second-highest rate at 26.8% (Sarder et al., 2021). Despite the availability of family planning initiatives, unintended pregnancies remain a significant issue in Nepal (Paudel, 2021). The 2016 Nepal Demographic and Health Survey (NDHS) reported that 19% of pregnancies were unintended (Ministry of Health [Nepal] et al., 2017). Nepal has set explicit goals for the utilization of modern contraception among women aged 15–49 according to SDG 3.7.1 (a): 53% by 2022 and 60% by 2030 (National Planning Commission, 2017). However, despite the presence of family planning programs, the adoption of modern contraception has appeared to be stagnant, remaining at 43% since 2011 (Ministry of Health [Nepal] et al., 2022).

Various studies (e.g., Adhikari et al., 2009; Calvert et al., 2013; Dhakal et al., 2016; Islam et al., 2022; Johnson et al., 2004; Kassahun et al., 2019; Potter et al., 2019; Sarder et al., 2021) showed that there were different socio-demographic and behavioral characteristics associated with affecting the unintended pregnancy. Regarding this matter, research in Nepal has delved into various aspects of unintended pregnancy. Studies have examined factors influencing unintended pregnancy among currently pregnant women (Adhikari et al., 2009), as well as its consequences for maternal and child health (Singh et al., 2013). Additionally, investigations

have explored unintended pregnancies among adolescents (Poudel et al., 2018), abortion incidence in the context of unintended pregnancy (Puri et al., 2016), and the societal economic burden associated with unintended pregnancies (Sapkota et al., 2017).

The extant literature shows insufficient nationwide information regarding the patterns of and the factors associated with unintended pregnancies over 15 years. Therefore, this study, using the national representative data from the NDHSs of 2001, 2006, 2011, and 2016, assesses the prevalence and trend of unintended pregnancy among currently married women within the past five years and identifies associated factors with it. It also seeks to raise awareness about the importance of reproductive choices as a human right and social justice. The findings of this study can enlighten policymakers and program managers to (re)formulate policies and programs for improving reproductive health to empower women in Nepal.

Research methodology

Data source and sample

The study employed the data from four nationally representative comprehensive household surveys (i.e., NDHSs 2001, 2006, 2011, and 2016). The 2001 NDHS was conducted under the aegis of the Family Health Division of the Department of Health Services, Ministry of Health. Similarly, the 2006 and 2011 NDHSs were carried out by the Population Division of the Ministry of Health and Population (MOHP), and the 2016 NDHS was conducted by the Ministry of Health, Government of Nepal. The entire NDHS project obtained ethical approvals from the Nepal Health Research Council, Kathmandu, and they also received informed consent from all the study participants to provide the most comprehensive data on fundamental demographic and health indicators. The NDHS surveys utilized a selection process comprising two stages. Firstly, enumeration areas (clusters) were selected using the probability proportionate-to-size technique. Then, households were selected systematically with equal probability from each sampled cluster. The sampling details for these surveys have been documented in the full NDHSs report (MOHP et al., 2012; MOHP et al., 2007; Ministry of Health [Nepal] et al., 2017; Ministry of Health [Nepal] et al., 2002).

All the NDHS data have been downloaded and used, and permission was received from MEASURE DHS ICF International, USA, for this study. In 2001, 2006, 2011, and 2016, a comprehensive total of 8,726, 10,793, 12,674, and 12,862 women aged 15–49 participated in interviews drawn from households numbering 8602, 8707, 10826, and 11040, respectively. Specifically, focusing on currently married individuals, their numbers were 8,342, 8,257, 9,608, and 9,875 in the corresponding NDHS years. This study specifically focused on currently married women aged 15–49 who were either pregnant at the time of the survey or had experienced their last live birth within five years preceding the survey. After applying appropriate weights, the sample sizes for analysis were 4,694, 4,006, 4,104, and 3,966 females selected from the four NDHS surveys conducted in 2001, 2006, 2011, and 2016, respectively.

Study variables

Dependent variable

This study focuses on unintended pregnancy as the main outcome, specifically looking at whether respondents wanted to be pregnant at the time it happened. The study categorizes unintended pregnancies dichotomously to measure them as either intended or unintended. During the survey, respondents were asked about their intention of becoming pregnant: "When you got pregnant, did you want to get pregnant at that time?" "Did you want to have a baby later, or did you not want any more children?" The three response options for these questions were: (1) wanted then (planned); (2) wanted the pregnancy to happen later (mistimed); (3) did not want at all (unwanted). Those respondents who were pregnant at the time of the survey or had the last birth experienced either mistimed or unwanted were merged and considered as 'unintended pregnancy' and coded '1' and wanted then as intended pregnancy and coded '0' while analyzing the data.

Independent variables

For this study, Independent variables have been selected based on some literature works (e.g., Connery et al., 2014; Islam et al., 2022; Kotchick et al., 2001; MacAfee et al., 2019). The independent variables were categorized into different factors based on the NDHS report (Ministry of Health [Nepal] et al., 2017), such as demographic (age of respondents, age at first cohabitation, and number of household members), socioeconomic (caste and ethnicity, educational status, wealth index, media exposed and types of residence), fertility and its preference, (age at first birth, children ever born, experience of terminated pregnancy, fertility preference and desired number of children) and unmet need of family planning. Taking reference from previous studies (e.g., Acharya et al., 2016; Atteraya et al., 2017; Devkota et al., 2020), socioeconomic variables, such as ethnicity and wealth status of women, have been measured. The independent variables were recoded for a logical analysis (Table 1).

Table 1: Definition and Categorization of Study Variables

Variable	Description	Category
Age (years)	Complete age of women at the time of the survey	1 = 15–24 2 = 25–34 3 = 35–49
Age at first cohabitation (years)	Complete age of first cohabitation when she started to live together with her husband	1 = < 15 2 =15–20 3 = 21 and above
Number of HH members	Listed the total number of household members (number of usual residents plus the number of visitors who slept in the house the previous night that were listed)	1 = < 4 2 = 4 3 = 5 and more
Sex of the HH head	Sex of the household head	1 = male 2 = female
Caste/ethnicity	Ethnicity	1 = Non-marginalized caste: (Hill and Terai Brahmin/Chhetri, Newar, Other

Variable	Description	Category
		Marginalized caste: 2 = Dalit (Hill and Terai Dalit) 3 = Janajati (Hill and Terai Janajati) 4 = Muslim and Other Terai Castes (Bennett et al., 2008)
Educational status of respondents/husband	Completed level of education	1 = No education 2 = Primary and some secondary 3 = SLC and above
Wealth index	Wealth quintile in five categories (1 = Poorest, 2 = poorer, 3 = middle, 4 = richer, 5 = richest)	1 = poor (1, 2) 2 = middle (3) 3 = rich (4, 5)
Media exposure	Media exposed (Radio and Television)	0 = not exposed 1 = exposed (both Radio and Television)
Owns a mobile telephone	Owns a mobile telephone	0 = no 1 = yes
Use of Internet	Use of Internet	0 = never user 1 = ever user
Type of place of residence	Place of residence	1 = urban 2 = rural
Age at first birth (years)	Completed age at the time of first birth	1 = < 20 2 = 20 and above
CEB	Total number of children ever born	0 = no children 1 = 1–2 2 = three or more
Number of pregnancy loss	Experience of pregnancy loss	0 = no 1 = yes
Fertility preference	Fertility preference	1 = wants another 2 = no more 3 = undecided
Desired number of children	Respondent's desired number of children	0 = no one or one 1 = two 2 = three or more
Unmet need for family planning	Unmet need for family planning	1 = no unmet need 2 = unmet need for spacing 3 =unmet need for limiting 4 = using for limiting/spacing
Husband's desire for children	Husband's desire for children	1 = Both want same 2 = Husband desire

Note: SLC = School Living Certificate (Class 10); CEB = Children ever born

Methods of data analysis

This study analyzes the trends of unintended pregnancy when becoming pregnant during the fifteen years (2001, 2006, 2011, and 2016). Firstly, to analyze the dependent variable (unintended pregnancy when became pregnant prior to five years of the survey), the descriptive analysis technique (frequency, percentage, and cross-tabulation) was used to see the variation in each independent variable (demographic, socioeconomic, fertility preference and women's empowerment) on depend variable. Secondly, the bivariate analysis technique (Pearson Chi-Square test) was used to observe the degree of association between variables

(independent and dependent) and whether they were statistically significant. Thirdly, a statistical technique—multivariate analysis—was used to investigate the factors that affect unintended pregnancy using logistic regression. Variables found to be significant in the chi-square analysis over the span of 15 years (2001–2016) were exclusively incorporated into the logistic regression analysis.

The study also calculated the precise decrease in the average decrease per year (ADPY) to assess the reduction in unintended pregnancy rates based on women's individual information. The method involved computing the difference between the final value (2016) and the initial value (2001) and dividing it by the period year (i.e., 15). The study analyzed the variations and changes in the incidence of unintended pregnancies.

While analyzing data about the household wealth index, it is accessible from NDHSs 2006 to 2016, except for 2001, where the data is unavailable (NA). Likewise, information on mobile phone ownership and internet use is exclusively available for the 2016 NDHS and NA for 2001–2011. Consequently, the trend analysis for these variables was confined to the specific NDHS years mentioned.

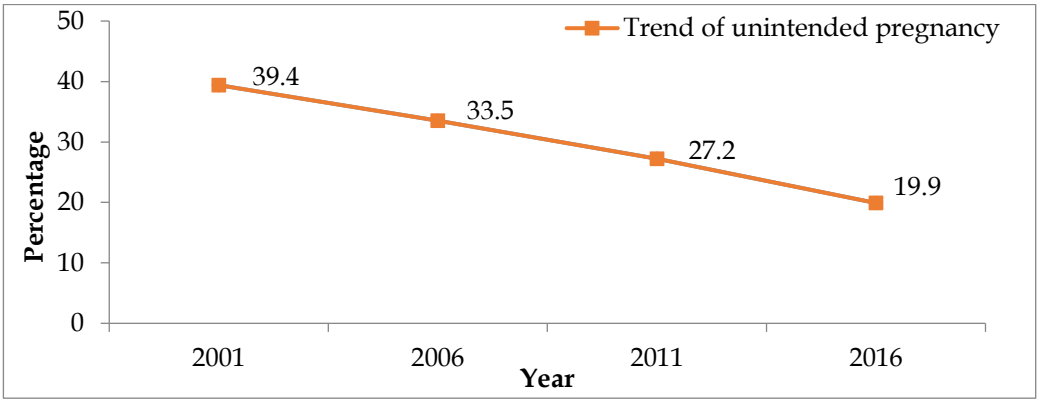
Results

Trend and prevalence of unintended pregnancy

The study analyzed the trend and prevalence of unintended pregnancies in Nepal from 2001 to 2016, as illustrated in Figure 1. The figure reveals a consistent decrease in unintended pregnancies over the 15 years. In 2001, approximately 39.4% of women reported unintended pregnancies, but by 2016, this figure had dropped significantly to 19.9%, marking a nearly 50% reduction. This declining trend persisted, with a six percentage point decrease between 2006 and 2011 and a similar decline between 2011 and 2016.

Additionally, the research revealed an average annual decrease of -1.3 percentage points (pp) in the rate of unintended pregnancies over the 15 years (not shown in the figure). However, despite this decline, the overall level of unintended pregnancies among currently married women remains relatively high at 20%. The decrease in the rate indicates progress, but the persistence of a significant proportion highlights the need for continued efforts to reduce unintended pregnancies further and address the reasons behind them.

Figure 1: Trend and Prevalence of Unintended Pregnancy



Association of demographic factors and unintended pregnancy

Table 2 below presents the association between selected demographic characteristics and unintended pregnancies among women in Nepal. There was a significant positive relationship ($p < .001$) between the age of respondents, household size, and unintended pregnancies across all NDHS years, with women aged 35 and above having a higher incidence of unintended pregnancies compared to younger women. Unintended pregnant women tended to belong to larger households, with an average family size of 6.12 members. In 2011 and 2016, there was a statistically significant association ($p < .001$) between unintended pregnancies and age at first cohabitation. Women marrying at an early age (< 15 years) had a significantly higher rate of unintended pregnancies than those marrying at 21 and above. While the percentage of unintended pregnancies was higher among female household heads in all NDHS years (except 2011), the association was not statistically significant.

In contrast to women aged 25–34, those aged 35 and above experienced a greater average annual reduction in unintended pregnancies, with a decrease of -2.3 pp. Likewise, women who initiated cohabitation at an older age (21 years and above) had a higher average annual decrease of -1.5 pp, along with those from households with five or more members (-1.4 pp) and female household heads (-1.5 pp). This trend was observed compared to their younger counterparts, who had smaller households or were male household heads.

Table 2: Association of Demographic Factors and Unintended Pregnancy in Nepal, NDHSs, 2001–2016

Demographic Factor	2001		2006		2011		2016		ADPY
Age of respondents (years)	$\chi^2 = 326.812$***		$\chi^2 = 185.307$***		$\chi^2 = 138.847$***		$\chi^2 = 20.832$***		
15–24	25.8	1,738	27.5	1,657	23.2	1,655	20.3	1,593	-0.4
25–34	41.6	2,176	31.4	1,804	25.0	1,962	18.0	2,018	-1.6
35 and above	63.3	779	58.7	545	49.4	487	28.6	355	-2.3
Age at first cohabitation	$\chi^2 = 1.715$		$\chi^2 = 3.194$		$\chi^2 = 26.135$***		$\chi^2 = 13.613$***		
< 15 years	41.0	927	36.8	568	32.4	654	22.5	438	-1.2
15–20 years	39.1	3,416	33.0	3,007	27.6	2,767	20.7	2,797	-1.2
21 and above	37.3	351	32.6	431	20.3	683	15.1	730	-1.5
Number of HH members	$\chi^2 = 107.380$***		$\chi^2 = 39.150$***		$\chi^2 = 78.320$***		$\chi^2 = 20.542$***		
< 4	19.3	355	21.1	447	13.6	554	13.5	591	-0.4
4	28.9	609	31.8	661	22.7	708	18.6	663	-0.7
5 and more	43.0	3,730	35.8	2,898	30.9	2,841	21.6	2,712	-1.4
Sex of the HH head	$\chi^2 = 1.668$		$\chi^2 = 1.352$		$\chi^2 = 5.664$**		$\chi^2 = .047$		
Male	39.0	4,125	33.1	3,199	28.1	3,033	19.8	2,780	-1.3
Female	41.9	569	35.3	806	24.4	1,071	20.1	1,185	-1.5
Total	39.4	4,694	33.5	4,006	27.2	4,104	19.9	3,966	-1.3

*Note: *p < .05; **p < .01; ***p < .001; ADPY = average decrease per year; HH = household*

Association of socioeconomic factors and unintended pregnancy

From 2006 to 2016, the unintended pregnancy rate was consistently higher among the Dalit caste. However, a significant association was observed only in 2006. Women whose husbands

had no education and those from poor households experienced more unintended pregnancies compared to those with educated husbands and middle to rich household wealth index, especially from 2011 to 2016 (Table 3).

Although there was no significant association between unintended pregnancy and caste, respondents' level of education, and media in all survey years, the percentage distribution of women unintended pregnancy showed a clear pattern of decline in all socioeconomic domains. In most years, surprisingly, women with education had a higher percentage of unintended pregnancies compared to those without, except in 2011. In 2011, there was a significantly negative relationship between education level and unintended pregnancy. In 2001, the results indicated a similar percentage of unintended pregnancies among women with no education (39.4%) and those with primary and some secondary education (39.0%). However, a higher percentage of women with SLC and above education (41.6%) experienced unintended pregnancies compared to those with no education and primary or some secondary education.

Similarly, though a clear relationship (i.e., positive or negative) could not be seen between media exposure (Radio and Television) and unintended pregnancy (except 2006 NDHS), interestingly, it was observed that the women who had own mobile or telephone (in general, currently highly access of media types in people) and Internet user significantly lower event of unintended pregnancy than who were not users. It indicates that using a mobile phone and the Internet are more robust information media than television and radio to reduce unintended pregnancy.

The study found that the average decrement in unintended pregnancies per year was higher among Muslim and Terai castes by -3 pp compared to other mentioned castes. Similarly, there was a similar decrease of -2.5 pp when women's husbands had no education and women were exposed to media compared to husbands who had education but women were not exposed to media. In addition, women living in poor household wealth index and residing in urban areas experienced a higher decrease of -2.3 pp in unintended pregnancies compared to those living in middle or rich households' wealth quintile and the rural regions. These results indicate that the persistence of unintended pregnancy leads to multiple causes with different identities.

Table 3: Association of Socioeconomic Factors and Unintended Pregnancy in Nepal, NDHSs, 2001–2016

Socioeconomic factor	2001		2006		2011		2016		AD PY
Caste ethnicity	χ^2 = 2.622		χ^2 = 55.469***		χ^2 = 5.249		χ^2 = 4.223		
Non-marginalized Caste	33.2	197	37.1	1,370	26.8	1,265	20.6	1,309	-2.2
Dalit	31.8	344	39.8	434	32.7	908	22.0	541	-0.7
Janajati	39.0	13	19.3	400	21.3	410	19.7	1,146	-1.3
Muslim and Other Terai caste	42.0	54	29.7	486	25.8	1,510	18.0	970	-2.9
Educational status of husband	χ^2 = 1.511		χ^2 = 3.229		χ^2 = 10.677***		χ^2 = 5.494*		
No education	40.3	1,727	33.4	952	31.0	878	23.5	548	-2.5
Primary and some secondary	38.6	2,685	34.1	2,737	26.6	2,767	19.1	2,147	-1.3
SLC and above	40.9	281	29.1	317	23.1	459	19.6	1,272	-1.4

Socioeconomic factor	2001		2006		2011		2016		ADPY
Educational status of women	χ^2 = .466		χ^2 = 1.608		χ^2 = 11.111***		χ^2 = 1.899		
No education	39.4	3,398	32.7	2,320	29.0	1,799	18.8	1,247	-1.4
Primary and some secondary	39.0	1,111	34.7	1,580	26.5	2,044	20.8	1,772	-1.2
SLC and above	41.6	185	34.1	106	19.7	260	19.5	947	-1.5
Wealth index		NA	χ^2 = 6.931**		χ^2 = 21.832***		χ^2 = 9.156***		
Poor			34.5	1,781	30.6	1,851	23.1	1,643	-2.3
Middle			29.6	807	26.1	867	18.4	859	-0.7
Rich			34.5	1,418	23.3	1,386	17.6	1,463	-1.1
Media exposed (Radio and Television)	χ^2 = .093		χ^2 = 20.450***		χ^2 = 1.763		χ^2 = .881		
Not exposed	39.5	2,651	22.9	412	25.4	889	20.6	1,666	-1.3
Exposed	39.1	2,043	34.2	2,404	27.7	3,215	19.4	2,300	-2.5
Owns a mobile telephone		NA		NA		NA		3.024*	
No							22.0	817	
Yes							19.3	3,149	
Use of internet		NA		NA		NA	χ^2 = 5.032**		
Never user							20.6	3,120	
Ever user							17.2	846	
Type of place of residence	χ^2 =1.884		χ^2 =1.100		χ^2 =.524		χ^2 =.040		
Urban	35.8	327	35.5	529	25.7	413	19.8	2,202	-2.3
Rural	39.6	4,366	33.2	3,476	27.3	3,691	20.0	1,764	-1.3
Total	39.4	4,694	33.5	4,006	27.2	4,104	19.9	3,966	-1.3

*Note: *p < .05; **p < .01; ***p < .001; NA = not available; ADPY = Average Decrease Per Year; SLC = School Leaving Certificate*

Association of fertility and its preference and unintended pregnancy

Across the 15 years, there was a strong association (p < .001) between unintended pregnancies and various factors, including fertility preference, age at first birth, children ever born, unmet need for family planning, and husband's desire for children. The findings consistently indicated that a younger age at first birth and having three or more children were linked to a higher chance of unintended pregnancy across all years of NDHS data. Furthermore, women who expressed a desire for no more children in 2006, 2011, and 2016 had a higher percentage of unintended pregnancies. When comparing the trends of unmet need for family planning and unintended pregnancy over time, the study indicates that the growing availability of family planning services in Nepal might be the reason for the reduction of unintended pregnancies. It was found that a significant number of women who had an unmet need for family planning for limiting faced unintended pregnancies from 2001 to 2016. However, there was a positive trend, with the percentage decreasing from 63% in 2001 to 28% in 2016. Women without unmet needs experience unintended pregnancies at a much lower rate compared with those having unmet needs. However, the trend is interesting, showing a slight increase from 4.8% in 2001 to 6.2% in 2016, with an annual increment of 0.1 pp.

From 2001 to 2016, unplanned pregnancies decreased each year by the smallest amount among women with one to two children (-0.4 pp). In contrast, the highest annual decline was approximately the same for those with unmet needs for limiting (-2.0 pp), spacing and using

for limiting/spacing (-1.9 pp), unable to decide on another child in fertility preference (-2.0 pp), and women with three or more children (-1.9 pp) (Table 4).

Table 4: Association of Fertility and Its Preference With Unintended Pregnancy in Nepal, NDHSs 2001–2016

Fertility and its preference	2001		2006		2011		2016		AD PY
Age at first birth	χ^2 = 4.302**		χ^2 = 3.839**		χ^2 = 59.918***		χ^2 = 25.738***		
< 20	40.6	2,822	34.8	2,336	32.3	2,168	23.0	2,009	-1.2
20 and above	37.6	1,872	31.8	1,670	21.5	1,936	16.6	1,957	-1.4
CEB	χ^2 = 48.097***		χ^2 = 48.884***		χ^2 = 01.973***		χ^2 = 67.415***		
1–2	22.1	2,036	22.7	2,175	19.0	2,446	16.3	2,685	-0.4
3 or more	52.6	2,658	46.3	1,831	39.2	1,658	24.4	1,281	-1.9
Ever had a terminated pregnancy	χ^2 = 8.614***		χ^2 =.031		χ^2 = 7.842***		χ^2 = 3.069*		
No	38.4	3,918	33.6	3,299	26.2	3,318	20.5	3,062	-1.2
Yes	44.0	776	33.3	707	31.1	786	17.9	904	-1.7
Fertility preference	χ^2 = 6.063***		χ^2 = 01.599***		χ^2 = 156.546***		χ^2 = 89.291***		
Wants another	18.9	1,476	17.5	1,179	13.9	1,174	11.6	1,310	-0.5
No more	48.4	2,610	41.5	2,243	33.7	2,419	24.7	2,255	-1.6
Undecided	50.2	608	35.2	583	26.9	511	19.6	401	-2.0
Desire number of children	χ^2 = 4.555		χ^2 =.066		χ^2 = 8.376**		χ^2 = 2.084		
No or one	43.1	172	34.1	295	29.4	449	22.4	457	-1.4
Two	37.8	2,158	33.5	2,277	25.6	2,536	19.4	2,624	-1.2
Three or more	40.5	2,364	33.4	1,433	29.8	1,119	19.9	885	-1.4
Total	39.4	4,694	33.5	4,006	27.2	4,104	19.9	3966	
Unmet need of family planning	χ^2 = 46.032***		χ^2 = 528.439***		χ^2 = 311.708***		χ^2 = 141.207***		
No unmet need	4.8	1,233	4.1	916	5.6	869	6.2	848	0.1
Unmet need for spacing	39.9	718	38.1	544	32.5	576	24.2	550	-1.0
Unmet need for limiting	62.8	1,176	53.0	904	39.0	969	28.0	784	-2.0
Using for limiting /spacing	48.9	1,513	37.7	1,603	29.5	1,634	21.4	1,742	-1.9
Total	39.3	4,640	33.5	3,968	27.1	4,048	19.8	3,923	-1.3
Husband's desire for children	χ^2 = 38.144***		χ^2 = 27.747***		χ^2 = 77.331***		χ^2 = 20.891***		
Both want same	34.3	2,943	30.2	2,403	22.3	2,465	17.8	2,672	-1.1
Husband desire	44.4	1,245	39.2	1,104	35.9	1,251	24.4	1,045	-1.3
Total	37.3	4,188	33.1	3,507	26.9	3,716	19.8	3,958	-1.2

*Note 1: *p < .05; **p < .01; ***p < .001; ADPY = average decrease per year*

Note 2: There is a variation of total cases in 'Unmet need of family planning' because questions were missing and infecund women.

Note 3: The variation of total cases in the 'husband desire of children' question was not asked of the women who were sterilized.

Multivariate logistic regression analysis

To confirm the association between unintentional pregnancies and all explanatory variables (only those significant in all NDHS years), both crude and net effects were employed before and after adjusting the impact of other analyzed variables. Table 5 exhibits the findings of a

two-variable logistic regression analysis. Before and after adjusting the influence of the predictor variables, CEB, unmet need for family planning, and husband's desire for children were positive and significantly associated with unintended pregnancies in all NDHS periods except the CEB in 2001. However, the pattern of effect varies for different periods. For instance, regarding CEB, women with three or more children had more experience of unintended pregnancy, excluding the 2001 NDHS period. It seemed three times higher in 2006 (Adjusted Odds Ratio [AOR] = 3.092; $p < .001$) and nearly two times higher in 2011 and 2016 (AOR = 1.883; $p < .001$ and 1.699; $p < .001$, respectively) than women having one or two children.

Similarly, women who had an unmet need for family planning showed notably high unintended pregnancies. Women with an unmet need for spacing were significantly more likely to experience unintended pregnancies (AOR = 19.785; $p < .001$ in 2001, AOR = 20.640; $p < .001$ in 2006, AOR = 15.035; $p < .001$ in 2011, and AOR = 7.464; $p < .001$ in 2016) compared to those with a met need for family planning and other mentioned unmet needs for family planning in 2016. However, the mentionable issue is that the trend of factors affecting unintended pregnancy seems to be decreasing. In 2016 NDHS, unintended pregnancies were about twice as likely for women with five or more household members and those with three or more children (AOR = 1.588; $p < .001$ and AOR = 1.699; $p < .001$, respectively), compared to those with fewer than four members and less than three children. The likelihood remains similar for women with four or fewer household members across 2001, 2006, and 2016.

However, in 2011 NDHS, the likelihood was about twice higher (AOR = 1.500; $p < .01$) for women with fewer than four household members. Likewise, in NDHSs 2016 and 2011, the likelihood of unintended pregnancy was about three times higher (AOR = 2.860; $p < .001$ and AOR = 2.788; $p < .001$, respectively) when women did not want more children. In 2001 and 2006, it was about two times higher (AOR = 1.672; $p < .001$ and AOR = 1.961; $p < .001$) compared to women who desired additional children.

When examining the wealth index, mobile phone ownership, Internet use, and unintended pregnancy likelihood, it was found that in 2016, both middle and rich households showed significantly similar odds of unintended pregnancy compared to the poor (AOR = 0.774; $p < .01$ and AOR = 0.793; $p < .01$, respectively). Similar odds were noted between the poor and rich in 2006 (AOR = 1.335, $p < .001$) but not significantly in the 2011 NDHS. Ownership of a mobile phone and being an Internet user did not significantly reduce the odds of unintended pregnancy. The results indicate that fertility preferences and family planning-related factors primarily contribute to women's unintended pregnancies.

Table 5: Effect of Socio-Demographic and Economic Factors on Unintended Pregnancy of Women, 2001–2016

Factor	2001		2006		2011		2016	
	COR	AOR	COR	AOR	COR	AOR	COR	AOR
Age of respondents								
15–24[r]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
25–34	2.050***	.824*	1.203**	.514***	1.101ns	.759**	0.867*	.544***
35 and above	4.966***	1.402**	3.743***	.986 ns	3.221***	1.445**	1.576***	.641**
Number of HH members								
< 4[r]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
4	1.696***	1.366*	1.748***	1.341*	1.862***	1.500**	1.455**	1.296
5 and more	3.144***	1.496**	2.093***	1.182 ns	2.839***	1.847**	1.756***	1.588***

Factor	2001		2006		2011		2016	
Age at first birth								
< 20[r]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
20 and above	.881**	.843**	.876*	.902	.574***	.666***	.666***	0.836*
CEB								
1–2[r]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
3 or more	3.903***	.506***	2.937***	3.092***	2.738***	1.883***	1.942***	1.699***
Ever had a terminated pregnancy								
No[r]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Yes	1.261***	1.060	.986	.826*	1.271***	.988	0.845*	0.882
Fertility preference								
Wants another[r]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
No more	4.010***	1.672***	3.352***	1.961***	3.146***	2.788***	2.497***	2.860***
Undecided	4.320***	.678	2.558***	1.007	2.283***	.768	1.857***	1.212
Unmet need for family planning								
No unmet need[r]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Unmet need for spacing	13.273***	19.785***	14.395***	20.640***	8.095***	15.035***	4.828***	7.464***
Unmet need for limiting	33.725***	18.393***	26.465***	15.586***	10.745***	6.368***	5.891***	4.133***
Using for limiting/spacing	19.168***	13.775***	14.186***	12.321***	7.041***	6.045***	4.121***	3.589***
Husband's desire for children								
Both want same[r]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Husband desire	1.527***	1.283***	1.492***	1.272***	1.947***	1.626***	1.255***	1.300***
Wealth index								
Poor[r]	NA	NA	1.0	1.0	1.0	1.0	1.0	1.0
Middle	NA	NA	.800**	.884	.802**	1.033	.751***	0.774**
Rich	NA	NA	1.002	1.335***	.688***	.997	.687***	0.793**
Owns a mobile telephone								
No[r]	NA	NA	NA	NA	NA	NA	1.0	1.0
Yes	NA	NA	NA	NA	NA	NA	.848*	.997
Use of Internet								
Never user[r]	NA	NA	NA	NA	NA	NA	1.0	1.0
Ever user	NA	NA	NA	NA	NA	NA	.799**	1.083

*Note: *p < .05; **p < .01; ***p < .001; NA = Not Available; COR = Crude Odds Ratio; AOR = Adjusted Odds Ratio; [r] = Reference factor*

Discussion

The increasing trend of desired pregnancy indicates an improved reproductive choice as planned, which is aligned with world trends (Bearak et al., 2020). This trend suggests that individuals and couples increasingly make conscious decisions about when to start a family, aligning with their personal, social, and economic circumstances. However, despite the Nepal government's policy that "every pregnancy should be intended" (Ministry of Health [Nepal], 2016), the existing level of unintended pregnancy is still high (19.9%) in Nepal. The government's policies may not be fully met due to factors such as inadequate availability of contraceptives, inconsistent and incorrect condom use, contraceptive failure (Karki, 2017; Sarder et al., 2021), cultural and social norms specific to certain communities (Khan et al., 2022), insufficient awareness and education (Sarder et al., 2021), disparities in gender roles, and challenges within the healthcare system.

The findings of this study show that multiple factors cause unintended pregnancy. Some key leading factors found were family planning, CEB, fertility preference, and wealth status, consistent with the study conducted by Islam et al. (2022). Concerning the status of these factors, the Ministry of Health [Nepal] et al. (2017) reported an increasing trend of age at first marriage and knowledge and use of family planning. The decreasing trend of CEB, fertility preference, and wealth status is improving in Nepal. The condition of these factors may lead to a decrease in the state of unintended pregnancy in Nepal. Implementing the mother safety programs (Centre for Reproductive Rights, 2018; UNFPA, 2019) could also increase the intended pregnancy rate.

The study showed a significant positive relationship between the age of respondents and unintended pregnancy, as well as between the number of HH (household) members and unintended pregnancy, which aligns with the study by Yaya et al. (2018) in Nigeria. Women of high age (35 years and above) seemed to have more experience of unintended pregnancy compared to young women. This result is informed by the research conducted in Bangladesh, Malawi, Africa, and Nigeria (Palamuleni & Adebowale, 2014; Rahman, 2012; Yaya et al., 2018). Older women may have more unintended pregnancies due to a mistaken belief in lower fertility, while younger women are often diligent in preventing pregnancies due to career and education priorities. Additionally, challenges in contraception access and awareness may contribute to the higher incidence of unintended pregnancies in older women.

Furthermore, the women married at an early age (< 15 years) had a significantly higher rate of unintended pregnancy compared to the women who got married while aged 21 and above during the 15 years while examining with bivariate analysis. This result is consistent with the previous study by Palamuleni and Adebowale (2014). Concerning the sex of the HH head, the percentage rate of unintended pregnancy seemed to have been higher among the female HH heads in all NDHS years (excluding 2011) than among the male HH heads, though there was no significant association. This finding contrasts with the unintended pregnancy rates among adolescent girls in Nigeria, as observed in the study by Izugbara (2015). Marrying before the age of 15 can lead to higher rates of unintended pregnancies among young girls, possibly due to limited knowledge of contraception, a lack of decision-making power within their marriages, early sexual activity, and limited healthcare access in this age group.

Although the correlation was not significant, a finding showed that women with higher education levels had a higher percentage of reporting unintended pregnancy compared to those with no education, except for the 2011 NDHS, which was not expected. This result contradicts the previous studies (e.g., Islam et al., 2022; Palamuleni & Adebowale, 2014). However, in the 2011 and 2016 NDHSs, it was statistically significant that women with husbands who had higher education had fewer unplanned pregnancies. This highlights the importance of the husband's education in reducing unintended pregnancy. However, due to the male-dominated and subordinate status of women in families, higher education levels may not always result in planned pregnancy.

It was also found that rural women were more likely to have an unwanted pregnancy than urban women, which contrasted with the previous studies (e.g., Islam et al., 2022; Izugbara, 2015; Palamuleni & Adebowale, 2014). However, in contrast with these studies, it was found that the same percentage (20% in 2016) was in Nepal's rural and urban residences. The rate of unintended pregnancy fluctuated and had an insignificant association with the urban and rural areas in different DHS years. Thus, the study recommended prioritizing the intentionality of every pregnancy to address the issue comprehensively across both rural and urban areas. Multiple factors, such as limited healthcare access, lower education levels,

traditional values in the societies, economic challenges, transportation barriers, and shortages of healthcare providers, collectively can contribute to the higher rates of unwanted pregnancies among rural women in comparison to urban women.

The results indicated a consistent trend across all NDHS years: women who gave birth at a younger age (< 20 years) tended to have more children (three or more) than those who gave birth at 20 years or older. Additionally, those with three or more children experienced a higher prevalence of unintended pregnancies. This finding is consistent with studies conducted in Ethiopia and India (Islam et al., 2022; Tsegaye et al., 2018). Likewise, women who indicated that they did not want any more children or were undecided about having more children were more likely to experience an unintended pregnancy. Mothers who start their families early often encounter barriers in accessing contraception, and social norms can push them towards having more children. Furthermore, initiating motherhood at a young age can impede educational and career prospects, giving rise to financial difficulties and contributing to emotional and psychological strains, consequently heightening the chances of unintended pregnancies in this group of women.

Women experienced a higher rate of unintended pregnancy in husbands' desire for children than both husband and wife wanted in all NDHS years. This result is similar to the study of Ethiopia (Tsegaye et al., 2018). The result suggests that women might not have the autonomy to decide about their fertility. Significantly, women reported higher rates of unintended pregnancy when their husbands desired more children than when both partners wanted the same in all NDHS years. This result is also consistent with the study by Tsegaye et al. (2018), which suggests that women may not have autonomy in making decisions about their fertility. In situations where husbands strongly desire children, compared to their wives, women may face challenges related to limited communication and decision-making power in family planning, potentially feeling pressured to conform to their husbands' wishes and reducing their ability to make informed choices about contraception. This, combined with socio-cultural norms that prioritize the husband's desires, can contribute to a higher likelihood of unintended pregnancies among women in such relationships.

As expected, family planning is one of the proxy determinants factors of unintended pregnancy (Tsegaye et al., 2018; Yaya et al., 2018). The study found a considerably high unmet need for limiting (28.0% in 2016) event of unintended pregnancy compared with no unmet need (6.2%). It seemed slightly increasing (1.4 percentage points from 2001 to 2016) while observing the trend regarding no unmet family planning and unintended pregnancy. This is a remarkable result, as the growing availability of family planning services could explain Nepal's lower rate of unintended pregnancies.

The current study makes significant contributions by addressing multiple gaps in research. Firstly, it provides a thorough analysis of a 15-year trend in unintended pregnancy rates, including the average decrease per year and the factors influencing it. Utilizing nationally representative data from a population-based sample enhances the generalizability of the findings to the entire county. Secondly, the study highlights the disproportionately low decrease in unintended pregnancy rates among marginalized groups, including Dalit women, those in the young age bracket (15–24 years), households headed by males, women with primary and secondary education levels, individuals with limited exposure to media, rural residents, and those categorized within the middle wealth index. This disparity sheds light on the challenges to reproductive autonomy these groups face. Thirdly, the research identifies demographic, fertility, and family planning-related factors as more significantly associated with unplanned pregnancy over extended periods compared to socioeconomic indicators.

These variables serve as proxy determinants of desired pregnancy, indicating the complex interplay of various factors influencing reproductive decisions. Overall, the study's outcomes hold relevance and applicability nationally, offering valuable insights into the dynamics of unintended pregnancy and its determinants across the county.

Conclusion

Indeed, the incidence of unintended pregnancy in Nepal has shown a decreasing trend from 2001 to 2016. Across all survey years during this period, variables such as current age, household size, wealth index, age at first birth, CEB, fertility preference, unmet family planning needs, and husband's desire for children exhibited consistent and significant associations with unintended pregnancies. These factors emerge as robust influencers contributing to the occurrence of unintended pregnancies. Unintended pregnancy highlights a vital aspect of women's reproductive choice, allowing them the freedom to decide when and if they have children.

To ensure that each pregnancy is intentional, the government needs primarily to emphasize the careful selection and use of effective contraception methods that align with individuals' needs and preferences. Initiatives to enhance family planning services include increasing accessibility through diverse media channels, providing various contraceptive options, comprehensive counseling, and advocating for supportive national policies. Collaborations with international organizations and the private sector strengthen resources for effective implementation. Additionally, in government policy, there is a need to discourage early marriage, young age at first birth, and husband domination in family planning decisions, targeting specific affected areas and groups of women. The study suggests further research to explore regional variations in unintended pregnancies using an intersectional approach for a more nuanced understanding.

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