

Changes in unintended pregnancy among adolescent girls and young women in Nepal: evidence from the Nepal demographic and health surveys, 2001–2022

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Abstract

Background

Unintended pregnancy remains an important reproductive health concern among adolescent girls and young women, with potential implications for health, education, employment, and socioeconomic opportunities. Evidence on changes in unintended pregnancy over time and its associated factors among married women aged 15–24 years in Nepal remains limited. This study examined changes in unintended pregnancy from 2001 to 2022 and factors associated with unintended pregnancy in the 2022 survey.

Methods

Data from the Nepal Demographic and Health Surveys (NDHS) conducted in 2001, 2006, 2011, 2016, and 2022 were analyzed among married women aged 15–24 years who had at least one child or were currently pregnant. Weighted frequencies and cross-tabulations were used to examine changes across surveys, and multivariable binary logistic regression was used to identify factors associated with unintended pregnancy in 2022.

Results

The prevalence of unintended pregnancy increased from 25.7% in 2001 to 27.5% in 2006, declined to 23.2% in 2011 and 20.3% in 2016, and increased again to 26.4% in 2022. In 2022, women with unmet need for spacing (AOR = 5.78, 95% CI: 3.68–9.08) or limiting (AOR = 5.46, 95% CI: 3.17–9.40) had higher odds of unintended pregnancy than those with no unmet need. Higher odds were also observed among women with basic education (AOR = 1.71, 95% CI: 1.07–2.73) and secondary or higher education (AOR = 2.61, 95% CI: 1.57–4.34). Pregnancy-related pressure from husbands or family was associated with higher odds, while mobile-phone ownership was associated with lower odds (AOR = 0.66, 95% CI: 0.46–0.94). Women in the Hill region had higher odds than those in the Mountain region (AOR = 2.05, 95% CI: 1.14–3.69).

Conclusion

Unintended pregnancy fluctuated between 2001 and 2022, declining through 2016 before increasing again in 2022. In 2022, unmet need for family planning, pregnancy-related pressure, education, and Hill residence were associated with higher odds, while mobile-phone ownership was associated with lower odds. These findings highlight the importance of accessible family planning services and support for women's participation in decisions regarding pregnancy and childbearing.

Background

Unintended pregnancy, comprising pregnancies that are either mistimed or unwanted [1, 2], is a major global public health and reproductive health concern. Approximately 121 million unintended pregnancies occurred annually worldwide between 2015 and 2019, accounting for nearly half of all pregnancies [3]. Unintended pregnancy is not only a reproductive health concern but also reflects challenges related to reproductive autonomy, as gender and interpersonal power dynamics may constrain women's ability to make and act on decisions about whether and when to become pregnant, including decisions regarding contraceptive use.

An unintended pregnancy can have consequences extending beyond maternal and child health, including disruptions to women's education, skill development, employment, economic security, and overall well-being [3, 4]. These consequences may be particularly significant during adolescence and young adulthood, when girls and young women aged 15–24 are in a critical life-course period for completing education, developing skills, entering the labour market, and shaping their future socioeconomic trajectories [5].

Health risks are particularly pronounced among adolescents, with girls aged 15–19 in low- and middle-income countries experiencing an estimated 21 million pregnancies annually, about half of which are unintended, while adolescent mothers aged 10–19 face higher risks of eclampsia, infections, preterm birth, low birth weight, and severe neonatal complications than women aged 20–24 [6]. For adolescent girls, an unintended pregnancy may further contribute to school discontinuation, early marriage, and constrained future opportunities, while highlighting the importance of reproductive autonomy and access to appropriate contraceptive information and services [3]. Thus, although unintended pregnancy affects women across the reproductive life course, examining its occurrence among adolescent girls and young women aged 15–24 is particularly important for understanding both its immediate health implications and its potential consequences for their longer-term life trajectories.

The International Conference on Population and Development (ICPD) envisions reproductive health in which every sexual act is free from coercion and infection, every pregnancy is intended, and every birth is safe and healthy [7]. This vision is also reflected in Nepal's national priorities, constitutional and legal commitments to safe motherhood and reproductive health, and programs promoting family planning and safe abortion [8]. Reducing unintended pregnancy is therefore essential to achieving Sustainable Development Goal (SDG) 3 (Good Health and Well-being), as universal access to sexual and reproductive health services, rights, and voluntary family planning can strengthen reproductive autonomy and help prevent maternal morbidity and mortality, particularly those associated with unsafe abortion [9].

However, early marriage and adolescent childbearing remain important social and reproductive health concerns in Nepal, with persistent inequalities in adolescent pregnancy by socioeconomic status, caste/ethnicity, education, and occupation [10, 11].). The Nepal Demographic and Health Survey 2022 indicates that women enter marriage and childbearing relatively early, with a median age at first marriage of 18.5 years and first birth of 20.8 years among women aged 20–49. Among girls aged 15–19, 14% have ever been pregnant, including 10% who have had a live birth and 2% who have experienced a pregnancy loss [12]. Moreover, Puri, Singh [13] estimated that half of all pregnancies in Nepal were unintended in 2014, underscoring the substantial burden of unintended pregnancy and the need to examine its extent and associated factors specifically among adolescent girls and young women aged 15–24. Evidence from other settings further suggests that unintended pregnancy among young women is shaped by individual, relationship, reproductive, and sociodemographic circumstances [14, 15]. Among young married women, covert contraceptive use has also been identified as a strategy for exercising reproductive agency when open negotiation of contraception is difficult [16].

Similar evidence from other settings indicates that sexual and interpersonal circumstances influence young women's reproductive outcomes. Calvert, Baisley [14], for example, identified individual, relationship, and reproductive factors associated with unplanned pregnancy among young women in Tanzania, while Izugbara [15] documented the importance of sociodemographic circumstances in unintended pregnancy among unmarried adolescent Nigerian girls. Covert contraceptive use has also been described as a strategy through which young married women exercise reproductive agency when open negotiation of contraception is difficult [16]. These

findings are particularly relevant to Nepal, where early marriage and socially prescribed childbearing may limit young women's ability to determine the timing and number of pregnancies independently.

Unintended pregnancy among adolescent girls and young women should be considered within the marital and gender-power context in which reproductive decisions are negotiated. Women's pregnancy intentions may differ from those of their husbands, and disagreements over fertility preferences may constrain women's ability to determine whether and when to become pregnant. Previous studies in Nepal have identified women's autonomy, husbands' fertility preferences, contraceptive use before the last pregnancy, reproductive decision-making, and marital violence as important factors associated with unintended pregnancy [10, 11, 17–19]. However, much of the existing national evidence has examined women aged 15–49 as a single reproductive-age group or focused on specific populations and issues, such as currently pregnant women, adolescent pregnancy, contraceptive use, or sexual and marital violence. Evidence specifically examining unintended pregnancy among married adolescent girls and young women aged 15–24 remains limited, particularly using comparable nationally representative data across multiple Nepal Demographic and Health Surveys. Earlier research among young couples also identified age, parity, family-size preferences, education, mass-media exposure, and household economic status as associated factors and suggested that conventional DHS measures may underestimate unintended pregnancy because women may retrospectively reinterpret previous pregnancies [20]. Thus, nationally representative evidence is needed to assess changes in unintended pregnancy among married adolescent girls and young women over time and to identify factors associated with unintended pregnancy in the most recent survey. This study addresses these gaps by using Nepal Demographic and Health Survey (NDHS) data from 2001 to 2022 to describe changes in unintended pregnancy among currently married women aged 15–24, and by using the 2022 NDHS to examine factors currently associated with unintended pregnancy in this population.

Methodology

Data source and study population

This study used nationally representative data from the NDHSs conducted in 2001, 2006, 2011, 2016, and 2022, obtained from the Demographic and Health Survey (DHS) Program after registering as a DHS data user (The DHS Program - Nepal: Standard DHS, 2022 Dataset). The 2001 NDHS was conducted under the aegis of the Family Health Division of the Department of Health Services, Ministry of Health [21]. Similarly, the 2006 and 2011 NDHSs were carried out by the Population Division of the Ministry of Health and Population [22, 23]. The 2016 NDHS was implemented by New ERA under the aegis of the Ministry of Health [24], while the 2022 NDHS was implemented by New ERA under the aegis of the Ministry of Health and Population, with technical assistance from ICF [12]. All surveys employed a stratified, two-stage probability sampling design, in which enumeration areas were selected using probability proportional to size in the first stage, followed by systematic selection of households within sampled clusters. Detailed sampling procedures are described in the respective NDHS reports.

The NDHS provides nationally comparable information on fertility, marriage, pregnancy, contraceptive use, and reproductive health among women of reproductive age. The study population comprised currently married adolescent girls and young women aged 15–24 years. For the descriptive and cross-sectional analysis, data from all five survey rounds were used to examine changes in unintended pregnancy and its distribution across selected characteristics. The total number of women who have child or current pregnant, aged 15–24 years was 8,726 in 2001, 10,793 in 2006, 12,674 in 2011, 12,862 in 2016, and 14,845 in 2022, with 1,720, 1,657, 1,655, 1,593, and 1,383,

respectively, meeting the study selection criteria. For the analysis of factors associated with unintended pregnancy, the 2022 NDHS was used because it provides the most recent nationally representative data.

Study variables

The study included a range of demographic, reproductive, socioeconomic, and contextual variables as explanatory variables. Demographic and reproductive characteristics included age of the respondent, age at first marriage, age at first birth, birth order, and whether the respondent had experienced pressure from her husband or another family member to become pregnant. Reproductive health factors included unmet need for family planning. Socioeconomic and individual characteristics comprised educational attainment, caste/ethnicity, respondent’s occupation, household wealth index, and ownership of a mobile telephone. Contextual factors included time required to reach the nearest health facility, place of residence, ecological region, and province. Regarding relevance to pregnancy intention, these variables were selected based on a review of the literature [e.g., 11, 18, 19, 25, 26] and their availability in the NDHS.

The outcome variable was unintended pregnancy. Although unintended pregnancy is a complex and multidimensional concept, it is commonly classified according to whether a pregnancy was intended at the time of conception. In this study, pregnancy intention was measured using the respondent’s reported intention regarding the pregnancy and categorized into two groups. A pregnancy was classified as intended if it was wanted at that time, whereas pregnancies that were wanted later (mistimed) or wanted no more (unwanted) were combined and classified as unintended. Thus, the outcome variable was dichotomized as intended versus unintended pregnancy. The classification and coding of all variables are presented in Table 1 (see Appendix).

Place for Table 1

Table 1
Operational definitions of variables and their measurements

Study variables (NDHS data file code)	Description (recode of the study)	Responses	Variable Recoding	Type of variable and measurement Scale
Intention of pregnancy (outcome variable)				
Pregnancy intention (M10\$1)	Wanted pregnancy when became pregnant	1 = Then 2 = Later 3 = No more	0 = 1(Intended) 1 = 2, 3 (Unintended)	Dichotomous (Nominal Scale)
Explanatory variables				
Age (complete age in years) (V013)	Age 5-year groups	1 = 15–19 2 = 20–24 3 = 25–29 4 = 30–34 5 = 35–39 6 = 40–44 7 = 45–49	1 = 1 (15–19) 2 = 2 (20–24)	Categorical (Ordinal)
Educational status of respondents/husband (V106)	Completed level of education	0 = No education 1 = Basic/primary 2 = Secondary 3 = Higher	0 = No education 1 = Basic 2 = 2, 3 (Secondary and higher)	Categorical (Ordinal)
Caste/ethnic/ethnicity (V131)	Ethnicity group	1 = Hill Bramin/Chhetri 2 = Terai Bramin/Chhetri 3 = Newar 4 = Janajati 5 = Dalit 6 = Terai Caste and Other 7 = Muslim	1 = 1, 2 (Bramin/Chhetri) 2 = 3, 4 (Janajati) 3 = 5 (Dalit) 4 = 6 (Tarai/Madhesi Other Caste) 5 = 7 (Muslim)	Categorical (Nominal)
Having a mobile telephone (V169A)	Owens a mobile telephone	0 = No 1 = Yes	0 = No 1 = Yes	Dichotomous (Nominal Scale)
Occupation (V717)	Respondent's occupation	0 = Not working 1 = Teaching	0 = 0, 98 (Not working)	Categorical (Nominal)

Study variables (NDHS data file code)	Description (recode of the study)	Responses	Variable Recoding	Type of variable and measurement Scale
Intention of pregnancy (outcome variable)				
		2 = Clerical 3 = Sales 4 = Agriculture-self-employed 5 = Agriculture employee 6 = Services 7 = Skilled manual 8 = Unskilled manual 98 = Don't know	1 = 4, 5 (Agriculture) 2 = 1 2 3 6 7 8 (Non-agriculture)	
Household wealth index (V190)	Wealth quintile in five categories	1 = Poorest 2 = Poorer 3 = Middle 5 = Richer 6 = Richest	1 = 1,2 (Poor) 2 = 3 (Middle) 3 = 5,6 (Rich)	Categorical (Ordinal)
Time to nearest visit to health facilities (V483A)	Minutes to nearest healthcare facility	1 = 0–30 2 = 31 and above	1 = Up to 30 minutes 2 = More than 30 minutes	Categorical (Ordinal)
Age at first marriage (V511)	Respondents' completed age at the time of marriage	Self-reported age at first marriage (single-year age)	1 = 1 (< 20 years) 2 = 2 (20 years and above)	Categorical (Ordinal)
Birth order (BORD\$01)	Birth order number	Number of children given by the respondents	1 = 1 (First) 2 = 2 (Second) 3 = 3 and higher (Third or higher)	Categorical (Ordinal)
Age at first birth	Age at which women give birth to their first child	Self-reported age at first birth (single-year age)	1 = 1 (< 20 years) 2 = 2 (20 years and above)	
Respondent pressured by husband or family to conceive (V636)	Husband or family member pressured respondent to become pregnant	0 = No 1 = Yes	0 = No 1 = Yes	Dichotomous (Nominal Scale)

Study variables (NDHS data file code)	Description (recode of the study)	Responses	Variable Recoding	Type of variable and measurement Scale
Intention of pregnancy (outcome variable)				
Unmet need for family planning (V624)	Unmet need for family planning	1 = Unmet need to space 2 = Unmet need to limit 3 = Using to space 4 = Using to limit 5 = Spacing failure 6 = Limiting failure 7 = Desire birth < 2 years	1 = 5, 6, 7 (no unmet need) 2 = 3 (Unmet need for spacing) 3 = 2 (Unmet need for limiting) 4 = 3, 4 (Using for limiting/spacing)	Categorical (Ordinal)
Place of residence (v025)	Type of place of residence	1 = Urban 2 = Rural	1 = 2 (Rural) 2 = 1 (Urban)	Categorical (Nominal)
Ecological region (SREG1)	Ecological zone	1 = Mountain 2 = Hill 3 = Terai	1 = 1 (Mountain) 2 = (Hill) 3 = 3 (Terai)	Categorical (Nominal)
Province (V101)	Women residing in a specific province	1 = Province 1 2 = Province 2 3 = Province 3 4 = Province 4 5 = Province 5 6 = Province 6 7 = Province 7	1 = 1 (Koshi), 2 = 2 (Madhesh), 3 = 3 (Bagmati), 4 = 4 (Gandaki), 5 = 5 (Lumbini), 6 = 6 (Karnali), 7 = 7 (Sudurpashchim)	Categorical (Nominal)

Data analysis

The NDHS datasets were reviewed and prepared according to the study objectives and eligibility criteria. Only women who met the study selection criteria and had complete information on the variables included in the respective analyses were retained. Sampling weights were applied to account for the survey sampling probabilities and to obtain nationally representative estimates. Frequencies and percentages were used to describe the characteristics of the study population. For each survey year from 2001 to 2022, cross-tabulations and Pearson's chi-square (χ^2) tests were used to assess the association between unintended pregnancy and the selected explanatory variables. Multicollinearity among the explanatory variables was assessed before regression analysis,

with VIF values below 8 considered indicative of no serious multicollinearity. For the 2022 NDHS, binary logistic regression was performed to examine factors associated with unintended pregnancy. Crude odds ratios (CORs) were first estimated for each explanatory variable, followed by multivariable logistic regression to obtain adjusted odds ratios (AORs). Both CORs and AORs were reported with 95% confidence intervals (CIs). All analyses were performed using IBM SPSS Statistics version 27.

Results

Characteristics of the study population

Young women aged 15–24 years in Nepal experienced substantial demographic, reproductive, socioeconomic, and geographic changes between 2001 and 2022, including later marriage and childbearing, improved educational attainment, increased contraceptive use, changing occupational and caste/ethnic composition, and a marked shift from rural to urban residence. Table 2 (see Appendix) shows substantial changes in the characteristics of married women aged 15–24 years across the NDHS rounds from 2001 to 2022. The proportion of women aged 15–19 declined slightly from 21.7% in 2001 to 18.6% in 2022, while those aged 20–24 increased from 78.3% to 81.4 percent. A notable shift occurred in age at first marriage: the proportion marrying before age 20 declined from 95.5% in 2001 to 84.8% in 2022, while marriage at age 20 or above increased from 4.5% to 15.2 percent. Similarly, first birth before age 20 declined markedly from 77.8% to 62.5%, whereas first birth at age 20 or above increased from 22.2% to 37.5%. These changes indicate a gradual shift toward later marriage and childbearing among young married women.

Table 2

Percentage distribution of married women aged 15–24 years by selected characteristics, NDHS 2001–2022

Characteristics	2001		2006		2011		2016		2022	
	%	N	%	N	%	N	%	N	%	N
Age of respondents (years)										
15–19	21.7	373	19.5	323	20.1	333	20.8	331	18.6	257
20–24	78.3	1347	80.5	1334	79.9	1322	79.2	1262	81.4	1126
Age at first marriage										
< 20 years	95.5	1642	92.5	1533	89.1	1474	89.5	1426	84.8	1173
20 and above	4.5	78	7.5	124	10.9	181	10.5	167	15.2	210
Age at first birth (years)										
< 20 years	77.8	1339	74.1	1228	69.9	1156	70.8	1129	62.5	864
20 and above	22.2	381	25.9	430	30.1	499	29.2	464	37.5	519
Birth order										
None									4.3	59
First	48.6	836	52.6	872	57.7	954	64.1	1021	59.7	825
Second	34.6	595	35.4	587	30.4	504	27.2	433	28.0	387
Third or higher	16.8	288	12.0	198	11.9	197	8.8	140	8.1	112
Total	100.0	1720	100.0	1657	100.0	1655	100.0	1593	100.0	1383
Husband or family member pressured respondent to become pregnant										
No	-	-	-	-	-	-	-	-	92.5	1280
Yes	-	-	-	-	-	-	-	-	7.5	103
Total	-	-	-	-	-	-	-	-	100.0	1383
Unmet need for family planning #										
No unmet need	37.4	643	31.0	511	26.7	437	28.4	449	26.7	365
Unmet need for spacing	28.4	488	23.3	384	25.2	412	24.2	383	22.8	312
Unmet need for limiting	10.0	172	13.4	221	15.8	259	11.9	189	9.3	128
Used for limiting/spacing	24.2	417	32.2	530	32.2	527	35.5	562	41.1	563
Level of education										
# refers to there is a variation in total cases in 'unmet need of family planning' because questions were missing and infecund women; - refers to data are not available; totals may not equal the sum of category values due to the use of weighted data.										

Characteristics	2001		2006		2011			2016		2022	
	%	N	%	N	%	N	%	N	%	N	
Age of respondents (years)											
No education	60.3	1037	43.0	713	31.6	522	19.1	304	13.9	192	
Basic	19.2	330	24.2	401	23.8	394	21.8	348	41.1	569	
Secondary and higher	20.5	353	32.7	542	44.6	738	59.1	941	45.0	622	
Caste/ethnicity											
Bramin/Chhetri	28.4	488	31.0	514	26.6	440	24.5	390	21.3	294	
Janajati	21.3	366	35.1	582	35.2	582	43.2	689	50.4	698	
Dalit	33.8	581	13.3	220	10.6	176	9.6	152	9.4	130	
Tarai/Madhesi Other Caste	11.1	191	16.5	273	25.7	425	20.2	321	17.4	241	
Muslim	5.5	94	4.1	68	1.9	32	2.6	41	1.4	20	
Total	100.0	1720	100.0	1657	100.0	1655	100.0	1593	100.0	1383	
Owns a mobile telephone											
No	-	-	-	-	-	-	-	-	17.9	248	
Yes	-	-	-	-	-	-	-	-	82.1	1135	
Time to nearest health facilities											
30 minutes	-	-	-	-	-	-	-	-	85.2	1178	
More than 30 minutes	-	-	-	-	-	-	-	-	14.8	205	
Total	-	-	-	-	-	-	-	-	100.0	1383	
Respondent's occupation											
Not working	25.2	434	27.5	456	34.0	563	44.3	705	44.0	608	
Agriculture	68.7	1181	64.7	1071	54.5	902	43.4	692	45.5	629	
Non-agriculture	6.1	105	7.9	130	11.5	190	12.3	196	10.5	146	
Wealth index											
Poorest	-	-	38.5	637	40.9	677	42.5	677	50.1	693	
Poorer	-	-	22.0	364	24.7	409	24.9	396	20.8	287	
Middle	-	-	39.6	656	34.4	568	32.6	520	29.1	403	
# refers to there is a variation in total cases in ‘unmet need of family planning’ because questions were missing and infecund women; - refers to data are not available; totals may not equal the sum of category values due to the use of weighted data.											

Characteristics	2001		2006		2011			2016		2022	
	%	N	%	N	%	N	%	N	%	N	
Age of respondents (years)											
Place of residence											
Rural	91.5	1574	86.3	1431	91.2	1510	47.6	758	36.8	508	
Urban	8.5	146	13.7	226	8.8	145	52.4	835	63.2	875	
Ecological region											
Mountain	6.3	108	7.4	122	114	5.8	93	7.2	100	6.9	
Hill	38.6	664	39.0	647	608	38.7	617	31.3	434	36.7	
Terai	55.1	947	53.6	889	933	55.5	884	61.4	849	56.4	
Total	100.0	1720	100.0	1657	1655	100.0	1593	100.0	1383	100.0	
Province											
Koshi	-	-	-	-	-	-	16.8	267	16.0	222	
Madhesh	-	-	-	-	-	-	28.1	447	31.9	441	
Bagmati	-	-	-	-	-	-	13.1	208	10.6	146	
Gandaki	-	-	-	-	-	-	9.3	148	6.1	84	
Lumbini	-	-	-	-	-	-	18.0	286	15.9	220	
Karnali	-	-	-	-	-	-	6.8	109	9.1	125	
Sudurpachim	-	-	-	-	-	-	8.0	128	10.4	144	
Total	-	-	-	-	-	-	100.0	1593	100.0	1383	
# refers to there is a variation in total cases in ‘unmet need of family planning’ because questions were missing and infecund women; - refers to data are not available; totals may not equal the sum of category values due to the use of weighted data.											

There were also considerable changes in reproductive and socioeconomic characteristics. The proportion reporting no unmet need for family planning declined from 37.4% in 2001 to 26.7% in 2022, while the proportion using contraception for spacing or limiting increased substantially from 24.2% to 41.1%. Unmet need for spacing declined from 28.4% to 22.8%, and unmet need for limiting decreased slightly from 10.0% to 9.3%. Educational attainment improved markedly: the proportion with no education fell from 60.3% in 2001 to 13.9% in 2022, while those with secondary or higher education increased from 20.5% to 45.0%. The occupational distribution also shifted, with women not working increasing from 25.2% to 44.0%, while agricultural employment declined from 68.7% to 45.5%.

The composition of young married women changed substantially across social and geographic characteristics. The share of women belonging to the Janajati group increased from 21.3% in 2001 to 50.4% in 2022, while the

shares belonging to the Brahmin/Chhetri, Dalit, and Muslim groups declined. The proportion of women residing in urban areas increased markedly from 8.5% to 63.2%, while that in rural areas declined from 91.5% to 36.8%. Similarly, the share of women residing in the Terai increased from 55.1% to 61.4%, whereas the share residing in the Hill region declined from 38.6% to 31.3%. In 2022, 82.1% of women reported owning a mobile phone, and 85.2% reported living within 30 minutes of a health facility.

Association between selected characteristics and unintended pregnancy

Table 3 (see Appendix) presents the association between selected characteristics and unintended pregnancy among married women aged 15–24 years across NDHS rounds from 2001 to 2022. The overall prevalence of unintended pregnancy was 25.7% in 2001, increased to 27.5% in 2006, declined to 23.5% in 2011 and 20.4% in 2016, and increased again to 26.5% in 2022. Age at first birth was significantly associated with unintended pregnancy across all survey years ($p = .017$ in 2001, $p = .028$ in 2006, $p < .001$ in 2011, $p = .008$ in 2016, and $p = .006$ in 2022), with prevalence generally higher among women whose first birth occurred before age 20. Birth order also showed a strong and consistent association across all survey rounds ($p < .001$), with unintended pregnancy generally increasing with higher birth order. Age at first marriage was significantly associated with unintended pregnancy in 2011 ($p = .015$) and 2022 ($p = .022$), while respondent age was significant in 2011 ($p < .001$) and 2016 ($p = .015$), but not in the other survey years.

Table 3: Association between selected characteristics and unintended pregnancy among married women aged 15–24 years, NDHS 2001–2022

Variable	2001		2006		2011		2016		2022	
			%	N	%	N	%	N	%	N
Age of respondents (years)										
15-19	24.9	373	31.2	323	31.1	333	24.9	331	31.0	257
20-24	26.0	1347	26.7	1334	21.2	1322	19.0	1262	25.4	1126
χ2 (p-value)	0.681		0.097		0.000		0.015		0.065	
Age at first marriage										
<20 years	25.9	1642	27.9	1533	24.1	1474	20.3	1426	27.5	1173
20 and above	22.5	78	23.6	124	16.2	181	19.5	167	20.0	210
χ2 (p-value)	0.536		0.284		0.015		0.861		0.022	
Age at first birth										
<20 years	27.1	1339	29.0	1228	26.5	1156	22.0	1129	28.9	864
20 and above	21.1	381	23.4	430	15.6	499	16.1	464	22.2	519
χ2 (p-value)	0.017		0.028		0.000		0.008		0.006	
Birth order										
None									20.8	59
First	18.0	836	21.5	872	19.7	954	16.2	1021	19.7	825
Second	32.0	595	30.1	587	26.9	504	24.4	433	26.9	387
Third or higher	35.2	288	46.4	198	30.8	197	36.	140	30.8	112
χ2 (p-value)	0.000		0.000		0.000		0.000		0.000	
Husband or family member pressured respondent to become pregnant										
No	-	-	-	-	-	-	-	-	24.8	1280
Yes	-	-	-	-	-	-	-	-	45.8	103
χ2 (p-value)	-		-		-		-		0.000	
Unmet need of family planning#										
No unmet need	4.9	643	4.6	511	5.7	437	8.0	449	10.4	365
Unmet need for spacing	38.3	488	38.7	384	34.0	412	26.8	383	34.5	312
Unmet need for limiting	44.1	172	43.5	221	31.6	259	31.4	189	36.5	128
Using for limiting/spacing	35.7	417	35.3	530	26.0	527	22.2	562	30.3	563
χ2 (p-value)	0.000		0.000		0.000		0.000		0.000	
Level of education level										
No education	19.6	1037	19.4	713	15.6	522	14.7	304	20.0	192

Basic	31.8	330	33.6	401	21.4	394	17.5	348	26.2	569
Secondary and higher	38.0	353	33.7	542	29.6	738	23.1	941	28.6	622
χ^2 (p-value)	0.000		0.000		0.000		0.003		0.052	
Caste/ethnicity										
Bramin/Chhetri	30.8	488	32.8	514	22.8	440	21.5	390	26.6	294
Janajati	24.5	366	27.3	582	26.7	582	18.7	689	26.7	698
Terai/Madhesi Other Caste,	22.6	581	17.3	220	18.5	176	20.7	152	18.3	130
Dalit	29.2	191	30.6	273	20.7	425	20.2	321	29.0	241
Muslim	16.5	94	10.4	68	25.7	32	33.6	41	34.8	20
χ^2 (p-value)	0.005		0.000		0.096		0.177		0.209	
Owns a mobile telephone										
No	-	-	-	-	-	-	-	-	30.8	248
Yes	-	-	-	-	-	-	-	-	25.4	1135
χ^2 (p-value)	-		-		-		-		-	
Time to nearest health facilities										
Up to 30 minutes	-	-	-	-	-	-	-	-	25.5	1178
> 30 minutes	-	-	-	-	-	-	-	-	31.5	205
χ^2 (p-value)	-		-		-		-		0.072	
Respondent's occupation										
Not working	28.4	434	25.5	456	26.6	563	20.4	705	25.9	608
Agriculture	24.2	1181	28.3	1071	20.2	902	18.9	692	25.8	629
Non-agriculture	31.9	105	28.4	130	27.6	190	24.5	196	31.1	146
χ^2 (p-value)	0.074		0.519		0.006		0.230		0.406	
Wealth index										
Poor	-	-	25.0	637	22.4	677	21.9	677	27.5	693
Middle	-	-	21.7	364	22.7	409	17.4	396	23.9	287
Rich	-	-	33.2	656	24.6	568	20.2	520	26.4	403
χ^2 (p-value)	-	-	0.000		0.635		0.201		0.534	
Place of residence										
Rural	25.2	1574	26.8	1431	22.8	1510	18.6	758	26.4	508
Urban	32.1	146	32.3	226	27.7	145	21.8	835	26.4	875
χ^2 (p-value)	0.063		0.083		0.192		0.113		0.993	

Ecological zone										
Mountain	23.7	108	31.6	122	21.1	114	26.7	93	19.2	100
Hill	27.5	664	36.8	647	23.7	608	20.6	617	33.2	434
Terai	24.8	947	20.2	889	23.2	933	19.3	884	23.8	849
χ^2 (p-value)	0.455		0.000		0.829		0.220		0.000	
Total	25.7	1720	27.5	1657	23.2	1655	20.3	1593	26.4	1383

refers to there is a variation in total cases in 'unmet need of family planning' because questions were missing and infecund women; - refers to data are not available; totals may not equal the sum of category values due to the use of weighted data.

Significant associations were also observed for unmet need for family planning and education. Unintended pregnancy varied significantly by family-planning status in every survey year ($p < .001$), with the highest prevalence generally among women with unmet need for limiting. Caste/ethnicity was significantly associated in 2001 ($p < .01$) and 2006 ($p < .001$), but not in the subsequent surveys. Respondent occupation was significantly associated only in 2011 ($p < .01$), while wealth index was significant only in 2006 ($p < .001$).

In 2022, unintended pregnancy was also significantly higher among women who reported pressure from a husband or family member to become pregnant than among those who did not (45.8% vs. 24.8%, $p < .001$). However, ownership of a mobile telephone ($p = .085$), time to the nearest health facility ($p = .072$), place of residence ($p = .993$), and wealth index ($p = .534$) were not significantly associated with unintended pregnancy in 2022. Ecological zone showed significant associations in 2006 and 2022 ($p < .001$), whereas no significant association was observed in 2001, 2011, or 2016. Overall, the table indicates that reproductive characteristics—particularly birth order, age at first birth, and family-planning status—showed more consistent associations with unintended pregnancy than socioeconomic and geographic characteristics.

Factors associated with unintended pregnancy: evidence from the 2022 NDHS

Table 4 (see Appendix) presents the multivariable associations between selected demographic, reproductive, socioeconomic, and geographic characteristics and unintended pregnancy among married women aged 15–24 years in Nepal in 2022. After adjustment for other variables, age, pregnancy pressure, unmet need for family planning, education, mobile-phone ownership, and ecological region remained statistically associated with unintended pregnancy. Women aged 20–24 had significantly lower odds of unintended pregnancy than those aged 15–19 (AOR = 0.55, 95% CI: 0.35–0.81, $p = 0.002$). In contrast, age at first marriage, age at first birth, and birth order were not statistically significant in the adjusted model. Women who reported that their husband or another family member had pressured them to become pregnant had more than twice the odds of unintended pregnancy compared with those who reported no such pressure (AOR = 2.36, 95% CI: 1.49–3.74, $p < 0.001$).

Table 4. Factors associated with unintended pregnancy among married women aged 15–24 years: binary logistic regression, NDHS 2022

Variable	COR (95% CI)	AOR (95% CI)	P value
Age of Respondents (years)			
15-19 (R)	1.00	1.00	
20-24	0.758 (0.563-1.020)*	0.550(0.347-0.810)	0.002
Age at first marriage			
<20 years (R)	1.00	1.00	
20 and above	0.659(0.459-0.946)**	0.935(0.595-1.470)	0.772
Age at first birth (years)			
<20 (R)	1.00	1.00	
20 and above	0.704(0.546-0.907)***	1.035(0.714-1.500)	0.857
Birth order			
None (R)	1.00	1.00	
First	1.100(0.575-2.103)	0.496(0.230-1.071)	0.074
Second	1.801(0.929-3.494)*	1.067(0.464-2.457)	0.878
Third or higher	2.451(1.177-5.103)**	2.000(0.793-5.045)	0.142
Husband or family member pressured respondent to become pregnant			
No (R)	1.00		
Yes	2.560(1.704-3.847)	2.356(1.485-3.737)	0.000
Unmet need for family planning			
No unmet need (R)	1.00	1.00	
Unmet need for spacing	4.519(3.003-6.801)	5.783(3.684-9.076)	0.000
Unmet need for limiting	4.939(3.019-8.080)	5.455(3.165-9.400)	0.000
Using for limiting/spacing	3.734(2.552-5.464)	4.131(2.692-6.340)	0.000
Level of education			
No education (R)	1.00	1.00	
Basic	1.416(0.949-2.111)*	1.707(1.066-2.731)	0.026
Secondary and higher	1.602(1.080-2.375)	2.613(1.572-4.344)	0.000
Caste/ethnicity			
Bramin/Chhetri (R)	1.00	1.00	
Janajati	1.002(0.736-1.364)	1.320(0.847-2.058)	0.220
Tarai/Madhesi Other	0.615(0.368-1.029)	1.021(0.552-1.887)	0.947
Dalit	1.127(0.771-1.648)	1.350(0.849-2.145)	0.204

Muslim	1.469(0.564-3.826)	1.844(0.655-5.190)	0.247
Owns a mobile telephone			
No (R)	1.00	1.00	
Yes	0.765(0.566-1.034)*	0.658(0.462-0.937)	0.020
Time to nearest health facilities			
30 minutes (R)			
More than 30 minutes	1.342(0.972-1.852)*	1.207(0.808-1.804)	0.358
Occupation			
Not working (R)	1.00	1.00	
Agriculture	0.993(0.770-1.281)	0.809(0.587-1.114)	0.194
Non-agriculture	1.289(0.868-1.913)	1.164(0.746-1.817)	0.502
Wealth index			
Poor (R)	1.00	1.00	
Middle	0.828(0.602-1.139)	1.100(0.748-1.619)	0.627
Rich	0.948(0.718-1.250)	1.167(0.801-1.700)	0.421
Rural urban residence			
Rural (R)	1.00		
Urban	1 (0.781-1.282)	1.098(0.824-1.464)	0.523
Ecological region			
Mountain (R)	1.00	1.00	
Hill	2.091(1.224-3.573)	2.052(1.142-3.688)	0.016
Terai	1.314(0.780-2.213)	1.165(0.578-2.352)	0.669
Province			
Koshi (R)	1.00	1.00	
Madhesh	0.932(0.644-1.348)	1.108(0.689-1.782)	0.672
Bagmati	0.995(0.618-1.601)	0.896(0.517-1.552)	0.695
Gandaki	1.152(0.659-2.014)	1.014(0.532-1.934)	0.965
Lumbini	0.924(0.602-1.419)	1.104(0.684-1.782)	0.684
Karnali	1.532(0.954-2.460)*	1.465(0.806-2.662)	0.210
Sudurpachim	1.017(0.632-1.637)	1.348(0.771-2.357)	0.672

The strongest associations were observed for unmet need for family planning. Compared with women with no unmet need, those with unmet need for spacing had nearly six times higher odds of unintended pregnancy (AOR =

5.78, 95% CI: 3.68–9.08), while those with unmet need for limiting had more than five times higher odds (AOR = 5.46, 95% CI: 3.17–9.40). Women who were using family planning for spacing or limiting also had higher odds (AOR = 4.13, 95% CI: 2.69–6.34). Education showed a positive association: women with basic education had higher odds than those with no education (AOR = 1.71, 95% CI: 1.07–2.73), while those with secondary or higher education had more than twice the odds (AOR = 2.61, 95% CI: 1.57–4.34). Conversely, owning a mobile telephone was associated with lower odds of unintended pregnancy (AOR = 0.66, 95% CI: 0.46–0.94).

Geographically, women residing in the Hill ecological region had approximately twice the odds of unintended pregnancy compared with those in the Mountain region (AOR = 2.05, 95% CI: 1.14–3.69, $p = 0.016$), whereas the difference for women in the Terai was not statistically significant. No significant adjusted associations were observed for caste/ethnicity, time to the nearest health facility, occupation, wealth index, rural–urban residence, or province. Overall, the adjusted findings indicate that unintended pregnancy among married women aged 15–24 in 2022 was particularly associated with younger age, pregnancy pressure, family planning need/use status, educational attainment, mobile-phone ownership, and ecological region, while several socioeconomic and geographic characteristics did not show independent statistical associations.

Discussion

The findings show that unintended pregnancy among young married women in Nepal declined from 27.5% in 2006 to 23.5% in 2011 and 20.4% in 2016, but increased to 26.5% in 2022, indicating that the earlier improvement was not sustained. This reversal is important because Nepal has experienced substantial improvements in contraceptive use, education, age at marriage, and reproductive health services, yet unintended pregnancy remains a persistent concern among young women. Previous evidence from Nepal similarly demonstrates substantial levels of unintended pregnancy and variation across socioeconomic and fertility-related characteristics, with particularly strong associations for family planning need and pregnancy-related pressure [11, 17].

The finding that women who reported pressure from their husband or family member to become pregnant had more than twice the odds of unintended pregnancy is consistent with evidence from Nepal showing the importance of gendered power and reproductive decision-making. Acharya, Paudel [10], using the 2016 NDHS among married women aged 15–24 years, found that women who had experienced sexual violence from their husbands had 2.3 times higher odds of unintended pregnancy. Although sexual violence and pregnancy pressure are different measures, both findings suggest that limited ability to negotiate sexual and reproductive decisions within marriage may increase the likelihood of a pregnancy that women did not intend. This interpretation is also consistent with research emphasizing reproductive autonomy and young women's ability to participate in pregnancy and contraceptive decisions [27, 28]. Among young married women, early marriage and prevailing expectations regarding childbearing may constrain their ability to postpone pregnancy, particularly when husbands or family members have greater authority over reproductive decisions [29, 30]. Thus, unintended pregnancy should be understood not only as a contraceptive-use issue but also as a matter of reproductive agency and negotiation within marital and family relationships. Moreover, the persistence of unintended pregnancy despite improvements in contraceptive prevalence may reflect continuing gaps in access to suitable contraceptive methods, method continuation, and women's ability to make and act upon their reproductive choices [25, 31, 32].

Some evidence similarly indicates that age and reproductive circumstances are important correlates of unplanned pregnancy among young women [14, 15, 33]. In the present study, women aged 15–19 had higher odds of unintended pregnancy than women aged 20–24 (AOR = 0.55, 95% CI: 0.35–0.81), which is consistent with evidence

that younger women may face greater vulnerability to unintended pregnancy. However, age at first marriage and birth order were not independently associated with unintended pregnancy after adjustment, suggesting that the relationship between early marriage, parity, and unintended pregnancy may be influenced by other reproductive and socioeconomic circumstances.

Family planning need showed the strongest associations with unintended pregnancy in the present study. Compared with women with no unmet need, those with unmet need for spacing had nearly six times higher odds of unintended pregnancy (AOR = 5.78, 95% CI: 3.68–9.08), while those with unmet need for limiting had more than five times higher odds (AOR = 5.46, 95% CI: 3.17–9.40). Women using family planning for spacing or limiting also had higher odds (AOR = 4.13, 95% CI: 2.69–6.34). These findings are consistent with previous evidence from Angola [26], Bangladesh [25], Zimbabwe [34], and the Democratic Republic of the Congo [35], as well as a recent analysis of the 2022 NDHS, which reported a strong association between unmet need and unintended pregnancy among married women. However, because unmet need is conceptually related to pregnancy intention, this strong association should be interpreted cautiously; notably, the recent national analysis excluded unmet need from its multivariable model because of this overlap. Although the present study did not directly examine contraceptive discontinuation or method-related barriers, previous research suggests that difficulties with method choice, continuation, side effects, inconsistent use, and partner negotiation may contribute to unintended pregnancy.

Education was significantly associated with unintended pregnancy among adolescent girls and young women in Nepal. Compared with women with no education, the adjusted odds were higher among those with basic education (AOR = 1.71, 95% CI: 1.07–2.73) and secondary or higher education (AOR = 2.61, 95% CI: 1.57–4.34). This pattern contrasts with some previous evidence. Using NDHS 2022, Siddique and Nasrin [19], reported a lower prevalence of unintended pregnancy among women aged 15–49 with higher education, although education was not significant in their multivariable model; Karki, Thapa [17] likewise did not find education to be a consistent determinant across earlier NDHS rounds. Dutta, Shekhar [36] found lower likelihoods of mistimed and unwanted pregnancy among more educated women in India, whereas Calvert, Baisley [14] reported higher odds of unplanned pregnancy among less-educated young women in Tanzania. These differences may reflect variations in age, marital and reproductive circumstances, fertility preferences, contraceptive use, and sociocultural context. In particular, the present association may reflect the distinctive reproductive experiences of adolescent and young married women, for whom education may be intertwined with changing fertility aspirations and the timing of marriage and childbearing, and recognition of pregnancy intentions. Therefore, the present finding should be interpreted as an association specific to this young population and the 2022 context rather than as evidence that higher education itself increases unintended pregnancy.

Women who owned a mobile telephone had lower odds of unintended pregnancy (AOR = 0.66, 95% CI: 0.46–0.94), which may reflect greater opportunities to access reproductive-health information and communicate about reproductive decisions. However, given the cross-sectional design, this association should not be interpreted as causal. The finding is consistent with the broader concept of reproductive autonomy, which emphasizes women's ability to participate in decisions and communicate with partners about contraception, pregnancy, and childbearing [27]. Geographically, women residing in the Hill region had higher adjusted odds of unintended pregnancy than those in the Mountain region (AOR = 2.05, 95% CI: 1.14–3.69), whereas caste/ethnicity, wealth, occupation, urban–rural residence, proximity to health facilities, and province were not significant after adjustment. This geographic difference may reflect variation in fertility preferences, marriage patterns, contraceptive practices, and partner or family expectations rather than service access alone. For example, evidence among young married women in India shows that fertility preferences, number of surviving children, and spouses' desire for children are associated with

unintended pregnancy [33], while evidence from Tanzania also highlights the role of demographic, educational, and sexual-behavioural factors among young women [14].

These findings, together with the present results, suggest that unintended pregnancy among young married women is shaped by interacting reproductive and social circumstances rather than by geographic access alone. This is particularly important because adolescent pregnancy is associated with greater risks of pregnancy-related complications and adverse neonatal outcomes than pregnancy among women aged 20–24 years [6]. Beyond maternal and child health, unintended pregnancy may also have implications for education, skill development, employment, economic security, and overall well-being [3, 4]. These concerns are especially relevant during adolescence and young adulthood, a critical life-course period for completing education, developing skills, entering the labour market, and shaping future socioeconomic trajectories [5]. Therefore, the persistence and recent increase in unintended pregnancy among young married women in Nepal highlight the need for interventions that extend beyond contraceptive provision to strengthen access to reproductive-health information, contraceptive choice and continuity, and women's ability to participate in decisions about pregnancy and childbearing.

This study has some strengths, including the use of nationally representative NDHS data across multiple survey rounds to examine changes in unintended pregnancy among adolescent girls and young women aged 15–24 years, together with multivariable analysis to identify factors associated with unintended pregnancy in the most recent survey. However, some limitations should be considered. The cross-sectional design of the NDHS data precludes causal interpretation of the observed associations. In addition, the multivariable regression analysis was restricted to the 2022 survey; therefore, the identified factors represent correlates of unintended pregnancy in 2022 and should not be interpreted as explaining the changes observed across survey years. Information on some potentially important factors relevant to young women, including contraceptive discontinuation and method failure, partner communication, and detailed reproductive decision-making, was also limited. In addition, self-reported pregnancy intentions and reproductive experiences may be subject to recall or social-desirability bias. Future research should use longitudinal or mixed-methods approaches to examine the mechanisms underlying unintended pregnancy among adolescent girls and young women, particularly the roles of contraceptive continuation and method choice, partner and family influence, reproductive autonomy, and changing fertility preferences.

Conclusions

Unintended pregnancy among married adolescent girls and young women in Nepal declined between 2006 and 2016 but increased again in 2022, indicating that earlier progress has not been sustained. The 2022 findings show that unintended pregnancy is associated with family planning need, pregnancy-related pressure, education, mobile-phone ownership, and geographic residence, highlighting the importance of both reproductive and social determinants. The findings underscore the need for youth-responsive reproductive-health services that ensure access to appropriate and continuous contraception while strengthening reproductive-health information, communication, and young women's participation in decisions about pregnancy and childbearing. Given the potential consequences of unintended pregnancy for health, education, employment, and future socioeconomic opportunities, policies and programmes should address not only contraceptive access but also the social and relational conditions that shape young women's reproductive autonomy.

Abbreviations

AOR
Adjusted Odds Ratio
COR
Crude Odds Ratio
DHS
Demographic and Health Survey
ICPD
International Conference on Population and Development
NDHS
Nepal Demographic and Health Survey
SDG
Sustainable Development Goal
UNFPA
United Nations Population Fund
WHO
World Health Organization

Declarations

Ethics approval and consent to participate

The Nepal NDHS data used in this study were available to researchers through the DHS Program upon request. Permission to access and use the NDHS dataset was obtained through online registration with the DHS Program at <https://dhsprogram.com/data/available-datasets.cfm?ctryid=13> and approval via the DHS Program data access system.

Consent for publication

Not Applicable.

Competing interests

The authors declare that they have no competing interests.

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Author Contribution

RDK conceptualized the study, developed the methodology, conducted the data analysis, interpreted the findings, and drafted the manuscript. GS contributed to the review and revision of the manuscript. Both authors read and approved the final manuscript.

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Data Availability

The datasets analyzed in this study are available from the DHS Program upon reasonable request and registration through the DHS data-access procedure. The datasets are subject to the terms and conditions of DHS data use. The datasets are available at <https://dhsprogram.com/data/available-datasets.cfm?ctryid=13>

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