

FACTORS INFLUENCING MISTIMED AND UNWANTED PREGNANCIES AMONG NEPALI WOMEN

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Summary. This paper assesses the factors influencing mistimed and unwanted pregnancies in Nepal separately using data from the 2011 Nepal Demographic and Health Survey. Women who had given birth within the five years before the survey were interviewed about the intendedness of their last pregnancy. The data were analysed with a chi-squared test, followed by multiple logistic regression analysis. Among the total 5391 participants, 11.29% and 13.13% reported their last pregnancy as mistimed and unwanted respectively. Logistic regression analysis showed that women from the hill region were more likely to report mistimed pregnancy, while women from the Western and Far-Western development regions were less likely to report mistimed pregnancy. Education status was positively correlated with the reporting of mistimed pregnancy. Women involved in agriculture, with full autonomy on household decision, with some exposure to mass media, belonging to higher age group and having third or higher parity were less likely to report mistimed pregnancy. Similarly, women from the Western development region had relatively higher odds of reporting unwanted pregnancy. Women with husbands involved in a paid job had lower odds of unwanted pregnancy. Women's autonomy was also positively correlated with unwanted pregnancy. Women with the intention to use contraceptive had lower odds of unwanted pregnancy. Interventions targeting the factors identified by this study could be useful in reduction of mistimed and unwanted pregnancies among Nepali women.

Introduction

A pregnancy that is either unwanted (i.e. occurred when no children, or no more children, were desired) or mistimed (i.e. occurred earlier than desired) at the time of conception is referred to as an unintended pregnancy (Abma *et al.*, 1997). Unintended pregnancies harm women and their families through consequences like unsafe abortion,

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delayed prenatal care, poor maternal mental health, reduced mother–child relationship quality, poor developmental outcomes for children, physical abuse and violence against women, increased risk of low birth weight as well as increased maternal morbidity and mortality (Santelli *et al.*, 2003; Singh *et al.*, 2010; US Department of Health and Human Services & Health Resources and Services Administration, 2011). Beyond the direct health consequences, unintended pregnancies also contribute to unwanted population growth, which consequently compromises provision of adequate social services (Bradley *et al.*, 2011). A study using data from the 2011 Nepal Demographic and Health Survey (NDHS 2011) showed that unintended pregnancy could have negative health consequences for mothers as well as newborns (Singh *et al.*, 2013b). Similarly, studies from India showed that the consequences of unintended pregnancy could go as far as resulting in stunting alongside the immediate negative effect on vaccination (Singh *et al.*, 2012; Singh *et al.*, 2013a), most probably as a result of the disadvantage the unwanted children face. The issue of disadvantage and neglect was explored in a multi-country study and the results in some of those countries suggested that not only were the unwanted children more likely to be stunted and less likely to be fully immunized, but the mothers were also less likely to receive antenatal care and supervised delivery (Marston & Cleland, 2003). A study from Bangladesh showed that the rates of neonatal and postnatal mortality were higher among unwanted children (Chalasanani *et al.*, 2007).

In 2008, 41% of the 208 million pregnancies estimated worldwide were unintended (Singh *et al.*, 2010). Among women aged 15–44 years in low- and middle-income countries, the rates of unintended pregnancies declined by 20% from 71 to 57 per 1000 from 1995 to 2008 (Singh *et al.*, 2010). However, the figures are still high. In Nepal, 26.0% of the births corresponding to the period 2006–2011 were reported to be unintended (Ministry of Health and Population [Nepal] *et al.*, 2012; Singh *et al.*, 2013b). However, evidence shows that the actual level of unintended pregnancy could be much higher as retrospectively collected data on unintended pregnancies are known to be biased downward by as much as 11.5 percentage points (Koenig *et al.*, 2006). Some authors have presented the estimate of total unintended pregnancies in Nepal to be between 230,000 and 342,000 in 2011 (Singh *et al.*, 2013b).

Some studies have explored the factors that are associated with unintended pregnancy. A study from Tanzania showed that young age (<20 years) was a significant predictor of both mistimed and unwanted pregnancies (Exavery *et al.*, 2014). A study conducted among low-income urban women in India showed that the risk of unintended pregnancy existed because of non-use of contraception resulting from the belief that they could not get pregnant (Kumar *et al.*, 2012).

It is important to understand unwanted and mistimed pregnancy as different aspects of unintended pregnancy and fertility as they have been found to have had differing effects on pregnancy outcomes. In general, mistimed pregnancies have been found to have better health outcomes for mothers and infants compared with unwanted pregnancies. It has been observed that women who carry a mistimed pregnancy to term are less likely to receive delayed prenatal care, to smoke and consequently to give birth to low-birth-weight infants compared with women who carry an unwanted pregnancy to term (D'Angelo *et al.*, 2004). However, a seriously mistimed pregnancy resulting in a live birth (more than 24 hours) has been found to have had more serious consequences than a slightly mistimed pregnancy resulting in a live birth (less than 24 hours) (Pulley *et al.*, 2002).

Despite these differences, the precursors and effects of unintended pregnancies have usually been studied by lumping the data for unwanted and mistimed pregnancies together (Eggleston, 1999; Beck *et al.*, 2002; Faye *et al.*, 2013; Ikamari *et al.*, 2013), with some exceptions (Adams *et al.*, 1993; Dye *et al.*, 1997; Hellerstedt *et al.*, 1998; Kost *et al.*, 1998; Joyce *et al.*, 2000). Doing this undermines the importance that unwanted and mistimed pregnancies have in their own right and also misses exploration of the conditions under which they occur. Since these two aspects differ from each other in many regards, their separate analysis is more likely to better reflect women's pregnancy intentions and thus be more useful in understanding the overall impact of unintended pregnancy (Santelli *et al.*, 2003).

Although an attempt has been made to explore the consequences of unintended pregnancies among Nepali women using NDHS 2011 data (Singh *et al.*, 2013b), evidence has yet to be generated on what factors are predisposing mistimed pregnancy and unintended pregnancy separately among Nepali women. The study thus aims to fill that knowledge gap. Additionally, since studies have reported that intendedness of pregnancy helps in predicting the utilization of maternity services (Fotso *et al.*, 2009; Wado *et al.*, 2013) and also significantly affects maternal and newborn health alongside childcare practices (Joyce *et al.*, 2000; Korenman *et al.*, 2002), knowledge about predictors of unintended pregnancy could be useful to health managers in designing interventions for child spacing and fertility limiting, targeting needy areas and population groups.

Methods

The NDHS 2011 (<http://dhsprogram.com/Data/>) was the sixth round of the nationally representative, comprehensive demographic and health survey in Nepal. The survey had a two-stage cluster sampling design. At the first stage, the country was divided into thirteen sample domains, and these were further divided into 25 sample strata. Secondly, 289 sampling units were created in sample strata as primary sampling units (PSUs). Households were selected randomly from the PSU according to the probability-proportionate-to-size technique. The overall response rate for the NDHS 2011 was 97.6%. Details of the survey and sampling procedure have been published elsewhere (Ministry of Health and Population [Nepal] *et al.*, 2012). This analysis is based on the child dataset of the NDHS 2011. A total of 5391 women of reproductive age (15–49 years) who had become pregnant within five years before the survey were included in the analysis. The analysis considered only the latest pregnancy experienced by women.

Definitions of variables

During the survey, participants were asked about their intention of becoming pregnant at the time when they became pregnant. The first question was: 'When you got pregnant, did you want to get pregnant at that time?' The response was coded as (1) yes or (2) no. If the answer was yes, it was labelled as an 'intended pregnancy'. If the answer was no, the participants were further asked: 'Did you want to have a baby later on or did you not want any [more] children?' The response was recorded as (1) later or (2) no more. The response 'later' was categorized as 'mistimed' and the response 'no more' was categorized as 'unwanted' pregnancy.

Independent variables were selected based on literature review (Scott & Binns, 1999; Adhikari *et al.*, 2009; Khanal *et al.*, 2013c; Singh *et al.*, 2013b). Three specific geographical variables were used: place of residence (urban, rural), ecological zone (mountain, hill, *terai*) and administrative regions (Eastern, Central, Western, Mid-Western and Far-Western development region). The development regions are the five north–south vertical divisions of the country. The Central development region is where the capital of the country is situated. Regions vary in their development status (Government of Nepal *et al.*, 2014)

Some other socio-demographic variables were also included. Women's education status was categorized into 'no education', 'primary education' and 'secondary/higher education', and husband's education was categorized in accordance with woman's education status. Participant's occupation was categorized as 'not working', 'agriculture' and 'other paid jobs' (Khanal *et al.*, 2013b). Likewise, husband's occupation was divided into three categories: 'agriculture', 'paid job' and 'other'. If a woman read newspapers or listened to radio or watched television more than once a week she was considered as having some exposure to mass media; otherwise she was labelled as having had no exposure (Singh *et al.*, 2013b). Women's autonomy represented women's involvement in the household-level decision-making process, including decisions about: own health care, large household purchases, visiting family and relatives and what to do with the money their husband earns. Women who said that they could make household-level decisions by themselves on all four areas were considered to have full autonomy, women having no involvement in any decision-making were coded as having no autonomy, and the rest were coded as having some autonomy (Singh *et al.*, 2013b). Ethnicity was first classified into seven groups according to the classification criteria used by the NDHS (Bennett *et al.*, 2008) and was further grouped into three categories (relatively advantaged ethnicities including Brahmin and Chhetri, relatively disadvantaged ethnicities including Newar, Janajati, Muslims, Madheshi and other unidentified ethnicities, and the disadvantaged including Dalits). Wealth quintile was calculated using principal component analysis (Vyas & Kumaranayake, 2006) and was divided into five equal categories (poorest, poorer, middle, richer and richest), each comprising 20% of the population. In this analysis the quintiles were re-coded into three categories to form an economic status variable: the lowest 40% (poorest and poor) as poor; the middle 40% (middle and rich) as middle; and the upper 20% (richest) as rich (see Agho *et al.*, 2011; Khanal *et al.*, 2013b).

Some fertility-related variables including women's age (<20 years, 20–34 years, ≥35 years) and parity (1, 2, 3 or more) were also included in the analysis. Women were classified into two groups on the basis of their knowledge about ovulation: knowledgeable and not knowledgeable. If the participants knew that the fertile period lies in the middle of the menstruation cycle they were considered knowledgeable; not knowledgeable otherwise. Participants were grouped into the categories of 'current user', 'intend to use in future' and 'do not intend to use in future' based on their intention to use family planning services. A visit to family planning workers within the past 12 months (yes, no) was also included in the analysis.

Statistical analysis

Analysis was performed using STATA 13.0 and using the survey analysis technique, considering sample weight assigned by the NDHS and cluster design. Explorative descriptive analysis was performed for sample distribution. The chi-squared test was

used to assess the association between background characteristics and mistimed and unwanted pregnancy. Adjusted odds ratios and 95% CI of adjusted odds ratios were calculated using multiple logistic regression for each dependent variable. Standard errors were calculated by the Taylor linearization method. Statistical significance was at $p < 0.05$.

Ethical clearance

The NDHS obtained ethical approval from the Nepal Health Research Council, Kathmandu, Nepal and Macro Institutional Review Board, MD, USA (Ministry of Health and Population [Nepal] *et al.*, 2012). Written consent was obtained from the participants before interview. The Measure DHS Program granted authorization to analyse the DHS dataset. Therefore, no separate ethical approval was needed for this study.

Results

Participant characteristics

The results are based on a total of 5391 weighted women of reproductive age who had experienced at least one pregnancy within the five years before the survey. More than nine in every ten participants were from rural areas (90.66%), and the majority of them (52.55%) were from the *terai* ecological zone. About half of the participant women (47.29%) and nearly a quarter (23.74%) of the participants' husbands had no school education. The majority of respondents (68.49%) were involved in agriculture and slightly more than half (54.42%) had some access to mass media. More than a quarter (26.76%) had no autonomy in decision-making at the household level. Nearly one in two (47.71%) belonged to the poor economic status group. About two-thirds (65.62%) were 20–34 years old, only 22.81% had knowledge about the ovulatory cycle and one-fifth (21.45%) had visited a family planning worker within the past 12 months (Table 1).

Characteristics of women experiencing mistimed and unwanted pregnancies

Of the total respondents, 75.41% intended to become pregnant, 13.30% said their last pregnancy was unwanted and 11.29% said their last pregnancy was mistimed (Table 2). Surprisingly, the percentage of women reporting mistimed pregnancy was greater among women with primary or secondary education compared with women with no education, and a similar trend was observed for partner's education status. The proportion of mistimed pregnancy was higher in the rich wealth quintile in comparison with middle and poor quintiles. Women less than 20 years of age were found to be more likely to report mistimed pregnancy in comparison with other age groups. The percentage of women reporting mistimed pregnancy was virtually equal, irrespective of whether they had visited a family planning worker (Table 3).

Unlike mistimed pregnancy, the proportion of women reporting unwanted pregnancy was found to decrease with an increase in women's education, their partner's education and in rich wealth quintile. Contrary to what was observed in the case of mistimed pregnancy, women from higher age groups experienced more unwanted pregnancy in comparison to the younger age group (Table 3).

Table 1. Background characteristics of study participants (NDHS 2011), $N = 5391$

Characteristic	% ^a	n^a
Context/geographic		
Place of residence		
Urban	9.34	504
Rural	90.66	4887
Ecological zone		
Mountain	7.93	428
Hill	39.52	2131
Terai	52.55	2833
Development region		
Eastern	23.54	1269
Central	31.85	1717
Western	18.68	1007
Mid-Western	14.71	793
Far-Western	11.22	605
Socioeconomic		
Women's education		
No education	47.29	2549
Primary	20.02	1079
Above secondary	32.69	1762
Husband's education		
No education	23.74	1280
Primary	24.32	1311
Above secondary	51.95	2801
Women's occupation		
Not working	28.8	1553
Agriculture	68.49	3692
Paid job	2.71	146
Husband's occupation		
Agriculture	25.23	1360
Paid job	71.58	3859
Other	3.19	172
Exposure to mass media		
No exposure	45.58	2457
Some exposure	54.42	2934
Women's autonomy		
No autonomy	26.76	1424
Some autonomy	37.27	1984
Full autonomy	35.98	1915
Ethnicity		
Advantaged	30.02	1618
Relatively disadvantaged	52.2	2814
Disadvantaged	17.78	959
Economic status		
Poor	47.71	2572
Middle	38.41	2071
Rich	13.88	748

Table 1. Continued

Characteristic	% ^a	n ^a
Women-specific demographic/behavioural		
Age of women		
15–19 years	7.06	381
20–34 years	65.62	3538
35–49 years	27.32	1473
Parity		
1	24.15	1302
2	30.56	1647
3 or more	45.28	2441
Knowledge about ovulatory cycle		
No knowledge	77.19	4161
Knowledgeable	22.81	1230
Family planning use		
Current user	37.77	2036
Not using/intend to use in future	57.15	3081
Do not intend to use	5.08	274
Visited family planning worker in past 12 months		
Yes	21.45	1156
No	78.55	4235

^aWeighted total.

Table 2. Intendedness of last pregnancy among the women who became pregnant within the five years before the survey (NDHS 2011), *N* = 5391

Pregnancy intendedness	n ^a	%	[95% CI]
Wanted then (intended)	4066	75.41	[72.79, 77.85]
Wanted later (mistimed)	608	11.29	[10.11, 12.60]
Wanted no more (unwanted)	717	13.30	[11.44, 15.41]

^aWeighted total.

Taylor linearization method was used to estimate the standard error.

CI: confidence interval.

Factors influencing mistimed pregnancies

The odds of mistimed pregnancy were higher in the hill ecological zone (OR: 1.40; 95% CI: 1.00, 1.95) in comparison with mountain and *terai* zones. Of the five development regions, the Western and Far-Western development regions (OR: 0.54; 95% CI: 0.39, 0.75) had significantly lower odds of mistimed pregnancy. The odds of mistimed pregnancy were higher among women with primary education (OR: 1.55; 95% CI: 1.11, 2.16) and those with above-secondary education (OR: 3.10; 95% CI: 2.16, 4.46) in comparison with women with no education. The odds of mistimed pregnancy were found to be lower among the women who had some exposure to mass media

Table 3. Percentage distribution of women who experienced mistimed or unwanted pregnancy within the five years before the survey (NDHS 2011), *N* = 5391

Characteristic	Mistimed pregnancies		Unwanted pregnancies	
	%	95% CI	%	95% CI
Context/geographic				
Place of residence				
Urban	14.55	[12.19, 17.29]	9.05	[7.33, 11.13]
Rural	10.96	[9.89, 12.12]	13.74	[12.58, 14.98]
Ecological zone				
Mountain	8.37	[6.83, 10.21]	15.58	[13.43, 18.00]
Hill	12.19	[10.72, 13.83]	15.36	[13.71, 17.17]
Terai	11.06	[9.59, 12.72]	11.4	[9.89, 13.11]
Development region				
Eastern	13.81	[11.59, 16.36]	10.69	[8.81, 12.91]
Central	11.47	[9.54, 13.73]	13.66	[11.50, 16.14]
Western	10.69	[8.56, 13.27]	15.85	[13.21, 18.91]
Mid-Western	10.48	[8.76, 12.49]	13.82	[11.89, 16.00]
Far-Western	7.57	[5.92, 9.65]	12.82	[10.70, 15.30]
Socioeconomic				
Women's education				
No education	5.94	[4.86, 7.24]	19.45	[17.64, 21.41]
Primary	11.26	[9.21, 13.70]	12.24	[10.03, 14.85]
Above secondary	19.05	[16.94, 21.36]	5.04	[3.97, 6.38]
Husband's education				
No education	6.42	[4.79, 8.56]	20.08	[17.42, 23.03]
Primary	10.24	[8.39, 12.43]	17.3	[15.01, 19.86]
Above secondary	14.01	[12.55, 15.60]	8.33	[7.18, 9.63]
Women's occupation				
Not working	14.74	[12.53, 17.27]	9.79	[7.96, 11.99]
Agriculture	9.59	[8.56, 10.73]	15.08	[13.78, 16.49]
Paid job	17.57	[11.29, 26.32]	5.48	[2.33, 12.37]
Husband's occupation				
Agriculture	9.25	[7.52, 11.32]	20.33	[17.79, 23.12]
Paid job	11.9	[10.72, 13.20]	10.93	[9.81, 12.15]
Other	13.72	[8.18, 22.12]	10.94	[6.01, 19.08]
Exposure to mass media				
No exposure	9.22	[7.87, 10.77]	17.59	[15.76, 19.57]
Some exposure	13.03	[11.64, 14.56]	9.71	[8.54, 11.01]
Women's autonomy				
No autonomy	11.87	[9.88, 14.19]	8.53	[6.94, 10.44]
Some autonomy	13.51	[11.79, 15.44]	12.5	[10.86, 14.34]
Full autonomy	8.79	[7.40, 10.42]	17.5	[15.48, 19.71]
Ethnicity				
Advantaged	12.78	[11.08, 14.70]	11.62	[10.13, 13.31]
Relatively disadvantaged	10.75	[9.37, 12.31]	13.39	[11.81, 15.14]
Disadvantaged	10.37	[8.19, 13.06]	15.85	[13.30, 18.79]
Economic status				
Poor	8.65	[7.47, 9.99]	18.01	[16.33, 19.81]

Table 3. Continued

Characteristic	Mistimed pregnancies		Unwanted pregnancies	
	%	95% CI	%	95% CI
Middle	13.34	[11.56, 15.35]	10.08	[8.50, 11.92]
Rich	14.7	[11.93, 17.99]	6.03	[4.29, 8.40]
Women-specific demographic/behavioural				
Age of women				
15–19 years	28.26	[22.90, 34.32]	1.2	[0.36, 3.94]
20–34 years	12.35	[11.10, 13.73]	7.05	[6.11, 8.13]
35–49 years	4.36	[3.23, 5.85]	31.42	[28.60, 34.39]
Parity				
1	16.98	[14.63, 19.63]	0.22	[0.07, 0.74]
2	15.55	[13.53, 17.82]	2.6	[1.86, 3.62]
3 or more	5.38	[4.38, 6.59]	27.49	[25.38, 29.71]
Knowledge about ovulatory cycle				
No knowledge	10.2	[9.14, 11.37]	14.58	[13.31, 15.95]
Knowledgeable	14.97	[12.66, 17.63]	8.97	[7.30, 10.98]
Family planning use				
Current user	11.8	[10.23, 13.58]	15.42	[13.62, 17.41]
Not using/intend to use in future	11.57	[10.23, 13.05]	10.58	[9.33, 11.98]
Do not intend to use	4.4	[2.23, 8.47]	28.06	[21.86, 35.23]
Visited family planning worker				
Yes	11.8	[9.75, 14.21]	16.19	[13.87, 18.81]
No	11.15	[10.04, 12.38]	12.51	[11.33, 13.79]

CI: confidence interval.

(OR: 0.76; 95% CI: 0.60, 0.97) and women who worked in agriculture (OR: 0.70; 95% CI: 0.53, 0.93) compared with their counterparts. The odds of reporting mistimed pregnancy were lower among women with full autonomy (OR: 0.70; 95% CI: 0.51, 0.98). The odds of mistimed pregnancy were significantly lower among women aged 24–34 years (OR: 0.40; 95% CI: 0.28, 0.56) and further decreased for women aged 35–49 years (OR: 0.19; 95% CI: 0.12, 0.32) compared with young women (15–19 years). Women who had already given birth three or more times had lower odds of mistimed pregnancy (OR = 0.52; 95% CI 0.29, 0.92) compared with women who had given birth just once (Table 4).

Factors influencing unwanted pregnancies

Geographically speaking, the Western development region had the highest odds of unwanted pregnancy (OR: 1.94; 95% CI: 1.21, 3.13). Partner's occupation was found to be associated with unwanted pregnancy. The odds ratio was lower among women with husbands having paid jobs (OR: 0.71; 95% CI: 0.54, 0.93). Non-user women with an intention to use contraception in the future had lower odds of unwanted pregnancies (OR: 0.79; 95% CI: 0.63, 0.99) compared with current users (Table 4).

Table 4. Factors associated with mistimed and unwanted pregnancies among women who became pregnant within five years before the survey (NDHS 2011), *N* = 5391

	Mistimed pregnancies		Unwanted pregnancies	
	OR	95% CI	OR	95% CI
Context/geographical				
Place of residence				
Urban	1.00		1.00	
Rural	0.91	[0.66, 1.26]	0.86	[0.57, 1.30]
Ecological zone				
Mountain	1.00			
Hill	1.40	[1.00, 1.95]*	1.08	[0.74, 1.56]
Terai	1.07	[0.73, 1.56]	0.88	[0.58, 1.32]
Development region				
Eastern	1.00		1.00	
Central	0.90	[0.64, 1.28]	1.26	[0.78, 2.04]
Western	0.59	[0.41, 0.85]**	1.94	[1.21, 3.13]**
Mid-Western	0.83	[0.60, 1.16]	1.08	[0.70, 1.66]
Far-Western	0.54	[0.38, 0.75]***	1.25	[0.79, 2.00]
Socioeconomic				
Women's education				
No education	1.00		1.00	
Primary	1.51	[1.08, 2.11]*	1.10	[0.77, 1.58]
Above secondary	3.03	[2.12, 4.32]***	1.06	[0.68, 1.63]
Exposure to mass media				
No exposure	1.00		1.00	
Some exposure	0.76	[0.60, 0.97]*	0.90	[0.69, 1.16]
Women's occupation				
Not working	1.00		1.00	
Agriculture	0.67	[0.51, 0.89]**	0.74	[0.54, 1.03]
Paid jobs	0.92	[0.52, 1.62]	0.92	[0.35, 2.45]
Women's autonomy				
No autonomy	1.00		1.00	
Some autonomy	1.08	[0.79, 1.46]	1.42	[1.06, 1.90]*
Full autonomy	0.70	[0.51, 0.98]*	1.65	[1.24, 2.20]**
Husband's education				
No education	1.00		1.00	
Primary	1.26	[0.83, 1.90]	1.15	[0.83, 1.59]
Above secondary	1.06	[0.68, 1.65]	1.03	[0.73, 1.47]
Husband's occupation				
Agriculture	1.00		1.00	
Paid jobs	1.03	[0.79, 1.35]	0.71	[0.54, 0.93]*
Other	1.09	[0.55, 2.13]	0.68	[0.28, 1.63]
Ethnicity				
Advantaged	1.00		1.00	
Relatively disadvantaged	0.76	[0.57, 1.02]	1.03	[0.70, 1.52]
Disadvantaged	1.07	[0.75, 1.54]	1.16	[0.77, 1.76]
Economic status				
Poor	1.00		1.00	
Middle	1.08	[0.74, 1.57]	1.01	[0.73, 1.41]
Rich	0.88	[0.55, 1.39]	0.71	[0.38, 1.34]

Table 4. Continued

	Mistimed pregnancies		Unwanted pregnancies	
	OR	95% CI	OR	95% CI
Women-specific demographic/behavioural				
Age of women				
15–19 years	1.00		1.00	
20–34 years	0.39	[0.28, 0.55]***	0.35	[0.08, 1.44]
35–49 years	0.19	[0.12, 0.30]***	0.71	[0.17, 3.02]
Parity				
1	1.00		1.00	
2	0.78	[0.53, 1.16]	0.91	[0.08, 10.98]
3 or more	0.51	[0.28, 0.91]*	0.40	[0.03, 5.84]
Knowledge about ovulatory cycle				
No knowledge	1.00		1.00	
Knowledgeable	1.22	[0.92, 1.62]	0.81	[0.59, 1.12]
Family planning use				
Current user	1.00		1.00	
Not using/intend to use in future	0.90	[0.70, 1.16]	0.79	[0.63, 0.99]*
Do not intend to use	0.51	[0.16, 1.62]	1.09	[0.72, 1.65]
Visited family planning worker				
Yes	1.00		1.00	
No	0.89	[0.68, 1.16]	0.90	[0.69, 1.17]

OR = odds ratio; CI = confidence interval.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Discussion

Because of many undesirable consequences for the health of women and children, along with several far-reaching social and economic consequences, unintended pregnancy qualifies as an important public health issue. Identification of the factors influencing unintended pregnancy can prove useful in developing policies and designing programmes aimed at women who are at high risk of such pregnancies. This study aimed to discern some of the factors influencing the two aspects of unintended pregnancy – unwanted and mistimed pregnancy – separately, by utilizing data from the nationally representative demographic and health survey of Nepal.

Trends in unintended pregnancies

About a quarter of the pregnant women reported that their last pregnancy was unintended. The proportion of women that reported mistimed pregnancy (11.2%) was slightly less than that of women who reported unwanted pregnancy (13.4%). Previous demographic surveys showed fairly unchanged proportions of mistimed pregnancy: 13.8% and 14.4% in 2001 and 2006 respectively. However, the proportion of reported unwanted pregnancy was 26.1% in 2001, and it further reduced to 16.4% in 2006 (Ministry of Health [Nepal] *et al.*, 2002; Ministry of Health and Population [Nepal] *et al.*, 2007). The reduced reporting of unwanted pregnancies between the three

consecutive NDHSs might be because of the decline in total fertility rate (TFR), from 4.1 in 2001 to 2.6 in 2011, i.e. reduction in the number of total births per woman. It could be further explained by an increase in the contraceptive prevalence rate (CPR) of modern methods from 35.5% in 2001 to 43.2% in 2011 (Karki & Krishna, 2008; Kumar *et al.*, 2012; Ministry of Health [Nepal] *et al.*, 2002; Ministry of Health and Population *et al.*, 2007).

Geographical area and unintended pregnancies

Whether the women were from rural or urban areas had no significant association with either mistimed or unwanted pregnancy. A separate analysis among currently pregnant women from the NDHS 2001 also reported no significant difference in the likelihood of unintended pregnancy according to the urban/rural distribution (Adhikari *et al.*, 2009).

Women from the hill region had higher odds of mistimed pregnancy. This finding could potentially be related to a finding from the NDHS 2011, that the use of traditional contraceptive methods (such as withdrawal) in the hill region was higher (6.2%) than in the mountains (3.8%) and *terai* (4.9%). Furthermore, the lower level of demand satisfaction with the use of modern methods in this region (51.7%) compared with the mountain (58.4%) and *terai* regions (58.8%) over the same period also adds to the argument (Ministry of Health and Population [Nepal] *et al.*, 2012). Significantly lower odds of mistimed pregnancies were observed in the Western and Far-Western development regions. For the Far-Western region, this finding is in agreement with a sharp decline in TFR in the region between 2006 and 2011, alongside a fairly high CPR compared with the national standard. On the other hand, this analysis showed significantly higher odds of unwanted pregnancy in the Western development region. However, a decent decline in TFR in the Western development region, alongside a 6% increase in CPR between 2006 and 2011 (Khanal *et al.*, 2013a), makes these findings of effects in opposite directions for mistimed and unwanted pregnancies in the same region difficult to explain. The reason behind it could be a separate topic of enquiry and the results should be interpreted with caution.

Education level and unintended pregnancies

The high likelihood of mistimed pregnancy among women with primary or above secondary education was unexpected but similar to the findings of studies from adjoining states in India (Sebastian *et al.*, 2014), Jordan (Kiersten *et al.*, 2004) and Ecuador (Odimegwu, 1999). High but not differential relative risk was observed in Tanzania (Exavery *et al.*, 2014). It can potentially be explained by the high percentage of unmet need for family planning among educated women (Sebastian *et al.*, 2014) and also because educated women might have more modest expectations of their ability to control the timing of their pregnancies (Odimegwu, 1999). This could also be simply because more educated women are more likely to be candid in reporting their last pregnancy as mistimed. On the other hand, no significant association was seen between the education level of the respondent women's husbands and the likelihood of either mistimed or unwanted pregnancy. No significant difference was observed between the ethnicity and economic status of the respondent and the odds of either mistimed or unwanted pregnancy.

Employment and unintended pregnancies

Women involved in agriculture (both employed and self-employed) were less likely to report mistimed pregnancy. This could, in general, be because women working in agriculture might be less likely to label a given pregnancy as mistimed due to having higher fertility aspirations as more children could possibly mean more helping-hands. But at the same time, that might contradict the argument that women contributing to the labour force tend to have fewer children (Siegel, 2012) and are more likely to use contraceptives (World Health Organization & UNICEF, 1993; Shapiro & Tambashe, 1994; Miles-Doan & Brewster, 1998). Contrary to expectation, no significant difference was found in the odds of mistimed pregnancy between women with no occupation and those with paid jobs.

In this study, a woman whose husband was in a paid job was found to be less likely to experience unwanted pregnancy compared with her counterparts. Economic deprivation, having an unemployed husband and being in an inappropriate job have been found to be associated with increased likelihood of unwanted pregnancy (Naravage *et al.*, 2005; Todd *et al.*, 2005; Ayoola *et al.*, 2006). A Zimbabwean study has shown that women whose husbands earned no income were at higher risk of unwanted pregnancy (Mbizvo *et al.*, 1997). A similar result was found by a study in Egypt (Shaheen *et al.*, 2007). Husband's involvement in a paid job could contribute towards preventing unwanted pregnancy, either as a proxy for better education and/or in attempting to maintain a stable family under given financial limits.

Women's autonomy and unintended pregnancies

Lower odds of mistimed pregnancies among women with full autonomy can be explained by empowered women having strong participation in their household decisions and are also more likely to have a strong role in planning their pregnancy. A study based on the Bangladesh DHS observed that autonomous women were more likely to discuss contraceptive methods with their spouses, and more likely to use modern family planning services or intend to do so in the future (Rahman *et al.*, 2014). Women with autonomy can decide themselves or jointly with their partners about the timing of a pregnancy, reducing the probability of having mistimed pregnancies.

This study found women's autonomy to be a significant predictor of unwanted pregnancy. But contrary to what might be expected, and what has been suggested in the literature (Mason, 1987) about the direction of association, the likelihood of unwanted pregnancy was found to increase with an increase in the level of autonomy. However, a similar finding was found in a previous study that employed NDHS data (Adhikari *et al.*, 2009). This is potentially a reflection of the fact that women with increased autonomy might be more likely to label a past pregnancy as unwanted (because of lower fertility aspirations) and not necessarily that more autonomous women are at increased risk of unwanted pregnancy (D'Angelo *et al.*, 2004).

Age, parity, mass media exposure, knowledge about ovulation, contraceptive use and unintended pregnancies

Young women were more likely to report mistimed pregnancies and this finding is in line with the findings of previous studies (D'Angelo *et al.*, 2004; Kiersten *et al.*, 2004; Takahashi *et al.*, 2012). This could potentially be explained by the argument that for

young women, the purpose of sexual intercourse might be other than childbearing, and pregnancy could represent the undesired consequence of such sexual relationships (Exavery *et al.*, 2014).

The odds of mistimed pregnancy among women who had already given birth three times or more were lower. Similar results were obtained from an earlier study in the United States (D'Angelo *et al.*, 2004). After having a desired number of children, women want to limit their fertility and succeeding pregnancies are more likely to be perceived as unwanted pregnancies rather than mistimed pregnancies (D'Angelo *et al.*, 2004). However, this study does not confirm the higher likelihood of reporting unwanted pregnancies compared with reporting mistimed pregnancies among women who have had three or more previous childbirths. Although the finding was not statistically significant, this study found that the number of children the women previously had has a strong predictive effect on whether the index pregnancy was wanted or not. A similar finding was observed in a previous study by Kiersten *et al.* (2004).

The lower odds of mistimed pregnancies among women who had access to mass media can be explained by the role these have in the promotion of family planning services. Radio and television are the most widely accessed forms of mass media in Nepal, and women's access to these has been found to be associated with a high rate of contraceptive method use elsewhere (Westoff & Rodriguez, 1995; Odimegwu, 1999). This study found no significant association between women's knowledge about the ovulatory cycle and the reporting of mistimed and unwanted pregnancies. However, women who were not using any contraceptive device at present but who had an intention to use one in the future were significantly less likely to have had an unwanted pregnancy. Intention to use family planning measures among current non-users is a summary indicator of attitude towards contraception and thus could reflect women's awareness about unwanted pregnancy and preparedness to avoid it (Kiersten *et al.*, 2004). However, this finding contradicts what was found in an analysis of Morocco DHS data, which argued that when fertility preferences are weakly held, even the intentions shown at a point in time do not necessarily get reflected in action in the future (Curtis & Westoff, 1996). Although not statistically significant, women's visit to a family planning worker in the past 12 months showed no difference in their having had mistimed or unwanted pregnancies.

Strengths and limitations of this study

This is a population-based study using nationwide survey data with a relatively large sample size, thus promising better precision and external validity. The findings represent the intendedness of the last pregnancy of women who became pregnant within the five years before the survey, not only currently pregnant women. Therefore, the findings are comparable with studies conducted elsewhere. Unlike previous research, segregated analysis for mistimed and unwanted pregnancies was done, which means that the findings could be useful in designing interventions for child spacing and fertility limiting, targeting needy areas and population groups. It should be noted that this is a cross-sectional study; therefore a causal inference to any of the factors is not possible. Similarly, the chances of some recall bias cannot be overruled because women who became pregnant within the five years before the survey were interviewed for the purpose of this study. The magnitude of mistimed and unwanted pregnancies may

therefore be underestimated, a suggestion also made by other researchers (Koenig *et al.*, 2006; Singh *et al.*, 2013b).

Conclusion

Separate analysis for mistimed and unwanted pregnancies was done in this study. This can be justified since the effect on mistimed and unwanted pregnancies was seen to be different for variables like development region, women's education status and women's autonomy. However, due to the overall pervasiveness of unintended pregnancies in the study populations, differences became significant only between certain sub-populations. Addressing the factors identified in this study through a nationwide integrated approach could help reduce mistimed and unwanted pregnancies among Nepali women.

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