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## Factors affecting menopause in Nepalese women

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### ABSTRACT

**Introductions:** Menopause is a physiological event that indicates the end of reproductive period in woman's life. It has many health issues and morbidity. There are multiple factors that influence age of onset of menopause and we aim to find these associated factors.

**Methods:** The 2011 'Nepal demographic and health survey' data was used in this study. Logistic regression was used to find the association between the dependent and independent variables using bi-variate and multi-variate analysis.

**Results:** The bivariate analysis showed the association of age, wealth index, education, marital status, employment, use of oral contraceptives and smoking with menopause. The multivariate analysis showed the independent association of age, education, employment and oral contraceptives.

**Conclusions:** The employment, marital status and use of oral contraceptives were found to be independently associated with the age of onset of menopause on multivariate analysis.

**Keywords:** menopause, Nepal demographic health survey NDHS, women

## INTRODUCTIONS

Menopause is the time in a woman's life when her menstruation cycles ceases and female sex hormones diminishes, during late 40s to early 50s.

Menopause at early age increases the risk of cardiovascular disease and osteoporosis,<sup>1</sup> while the late onset increases the risk of breast, endometrial, and ovarian cancer.<sup>2,3</sup> Therefore, paying attention to the factors affecting menopause are clinically important in order to prevent complication caused by menopause and promote women's health as well.

Studies from Western and East Asian population have established association of smoking, age at menarche, parity, use of oral contraceptives with the age of onset of menopause.<sup>4-8</sup> Data is scarce from Nepal. We aim to analyse the association of demographic and socio-economic factors with menopause among Nepalese women.

## METHODS

The 2011 Nepal Demographic and Health Survey (NDHS) data for reproductive age (15-49 years) women was used in this study to analyse onset of menopause. In this survey, women were considered menopausal if they were neither pregnant nor postpartum amenorrhoeic and had not have a menstrual period for at least six months preceding the survey.<sup>9</sup>

The age, socio-demographic and behavioural factors were evaluated. Logistic regression was used to find the association between the dependent and independent variables without controlling (bi-variate) and controlling (multi-variate) for other factors during analysis.

## RESULTS

### Univariate Analysis

The age, socio-economic and demographic status shows half of the population had no formal education, 2/3<sup>rd</sup> had worked throughout the year, nine out of ten had more than one child and one out of ten women had used oral contraceptives, Table 1.

### Bivariate Analysis

The probability of being menopausal was 95% lower for women of 30-34 age compared to women of 48-49 years, while women of age 46-47 had 55% less chance of being menopausal compared to women of age 48-49 years.

The uneducated women had 3.3 times higher chances of being menopausal compared to women with higher education. Similarly, women with middle wealth quintile had 1.3 times more chance to experience menopause compared to richest women. Single women had 81.6% and married women had 29.6% less chance of being menopausal compared to divorced or separated women.

The chance of being menopausal were 49.7% and 37.5% less among women working all year around and women working on seasonal basis respectively compared to occasional working women.

Women who smoke cigarettes had 32.2% more chance to experience menopause compared to non-smokers, while women who do not take oral contraceptive pills had 128 times higher chance of experiencing menopause than women who take pills.

### Multivariate Analysis

In this survey, the multivariate analysis showed that age, education, employment and use of oral contraceptives were independently significantly associated with menopause. Women of age 30-34 and 46-47 years had 95% and 62% less risk of attaining menopause respectively compared to the women of age

48-49 years old i.e. they had independent association even after controlling for other factors.

Wealth index had no independent association with the menopause in multivariate analysis. Yet, independent association was observed for women's education, employment and prior use of oral contraceptives. For instance, women

with no education had 2.93% higher chance of being menopausal compared to women with higher education and women working all year around had 54% less chance of experiencing menopause compared to occasional working women. Most importantly, the probability of being menopausal was 82.47 times higher in women using oral contraceptives compared to women who do not use oral contraceptives.

**Table 1. Demographic data of Women of age 30 to 49 years as per 2011 Nepal Demographic and Health Survey (NDHS)**

Background Variables	Number (N)	Percentage (%)	Background Variables	Number (N)	Percentage (%)
<b>Age</b>			<b>Education Level</b>		
30-34	1734	31.4	No education	3418	61.9
35-39	1557	28.2	Primary	875	15.8
40-41	541	9.8	Secondary	985	17.8
42-43	521	9.4	Higher	244	4.4
44-45	469	8.5	<b>Employment</b>		
46-47	372	6.7	All year	2803	60.9
48-49	329	6.0	Seasonal	1612	35.0
<b>Region</b>			<b>Marital status</b>		
Mountain	359	6.5	Single	86	1.6
Hill	2288	41.4	Married	5141	93.1
Terai	2876	52.1	Divorced/separated	295	5.3
<b>Ethnicity</b>			<b>Parity</b>		
Brahmin/Chhetri	2079	37.7	None	205	3.7
Dalit	723	13.1	1+	5318	96.3
Janjati	2149	38.9	<b>Oral Contraceptive</b>		
Other	570	10.3	No	5316	96.3
<b>Wealth index</b>			<b>Cigarette Smoking</b>		
Poorest	982	17.8	No	4597	83.2
Poorer	1015	18.4	Yes	926	16.8
Middle	1080	19.6			
Richer	1141	20.7			
Richest	1304	23.6			

## DISCUSSIONS

Our analysis shows independent relationship between lower education, unemployment and no use of oral contraceptives with early onset of menopause. In this study 6% of total women were from the age group 48-49 and the chance of being menopausal was gradually increasing with age, from 5% among women of age 30-34 to 38% among women of age 46-47 compared to women of age 48-49 years.

There was no significant association between the geographical region and menopause in our study, consistent to a study done in Nigeria.<sup>10</sup> In

contrast, a study done in Upper Mustang, Nepal by CM Beall<sup>11</sup> showed high altitudes can influence the menopause. However, the lack of comparable low altitude data, obviates attributing this to any particular factor associated with altitude or some aspects of biological or socio-environment or to population characteristics.

Wealth index did not show any significant association with the menopause in this study. However, this is in contrary to findings of other studies where wealth index had significant correlation with menopause.<sup>5,12-13</sup>

**Table 2. Bivariate and multivariate analysis of factors associated with menopause in women of age 30 to 49 years as per 2011 Nepal Demographic and Health Survey (NDHS)**

Background Variables	Unadjusted Models (Bivariate)			Adjusted Model (Multivariate)		
	OR	95% of OR	p-value	AOR	95% of AOR	p-value
<b>Age</b>						
48-49	Reference			Reference		
32-34	0.049	0.39-0.67	0.000	0.052	0.037-0.074	0.000
35-39	0.080	0.60-0.107	0.000	0.081	0.059-0.111	0.000
40-41	0.114	0.80-0.63	0.000	0.097	0.065-0.144	0.000
42-43	0.192	0.140-0.264	0.000	0.164	0.115-0.234	0.000
44-45	0.243	0.177-0.333	0.000	0.212	0.149-0.302	0.000
46-47	0.446	0.327-0.607	0.000	0.380	0.270-0.539	0.000
<b>Wealth Index</b>						
Richest	Reference			Reference		
Poorest	1.063	0.821-1.378	0.643	0.905	0.629-1.300	0.588
Poorest	1.182	0.920-1.520	0.192	0.872	0.612-1.242	0.448
Middle	1.313	1.031-1.674	0.028	1.037	0.739-1.453	0.834
Rich	1.279	1.006-1.626	0.045	0.894	0.639-1.252	0.514
<b>Education</b>						
Higher Education	Reference			Reference		
None	3.397	1.910-6.043	0.000	2.930	1.247-6.883	0.014
Primary	2.204	1.201-4.048	0.011	2.301	0.964-5.493	0.060
Secondary	1.418	0.764-2.630	0.269	2.034	0.850-4.866	0.111
<b>Employment</b>						
Occasional	Reference			Reference		
All year	0.503	0.302-0.693	0.000	0.457	0.302-0.693	0.000
Seasonal	0.626	0.332-0.781	0.016	0.510	0.332-0.781	0.002
<b>Marital Status</b>						
Divorced/separated	Reference			Reference		
Single	0.184	0.057-0.588	0.004	0.379	0.95-1.513	0.170
Married	0.704	0.514-0.963	0.028	1.158	0.806-1.665	0.427
<b>Oral Contraceptive Used</b>						
Yes	Reference			Reference		
No	128.809	2.453-6764.019	0.016	88.471	1.561-4357.347	0.029
<b>Cigarette Smoking</b>						
Yes	Reference			Reference		
No	0.678	0.558-0.823	0.000	0.990	0.783-1.251	0.932

We found that educational attainment was significantly, independently associated with menopause, which is consistent with other studies.<sup>5,8,13</sup> Lower education was associated with early menopause compared to women with higher education. Similarly, the occasional workers were more likely to become menopausal compared to women who work all year around. Social or physical stress is also associated with amenorrhoea and reproductive dysfunction.<sup>14-16</sup> Vermeulen<sup>17</sup> reported that stress, via the release of corticotropin-releasing hormone, triggered by interleukin-1, inhibits the production of gonadotrophin releasing hormone resulting in anovulation or amenorrhoea.

Women who were married and living with their partners had less chance to become menopausal compared to divorced or separated women, although this relationship status did not show significant association with menopause when adjusted for other variables. Previous studies have reported a positive association of marital status with menopause as married women had early menopause compared to divorced or separated women. This has been explained by the association of divorce/separation with social and psychological troubles, which can affect the gonadal function.<sup>14,18</sup> However, some other studies showed no relation.<sup>6,8</sup>

The lack of an association between parity and age at menopause in this study is inconsistent with other studies.<sup>4,7,13</sup> A statistically strong association between use of oral contraceptives and menopause was seen in this study, which is also reported in previous studies.<sup>14,19</sup> Hidayat et al.<sup>14</sup> explains the use of oral contraceptives causes suppression of ovulation, which might postpone menopause.

One of the most studied and reported factors that might have association with menopause is smoking. Many studies have shown a positive correlation of smoking with menopause.<sup>5,13,18</sup> Similar to these studies, we found that women who smoke had high chance of experiencing menopause compared to women who had never smoked. However, this relationship did not persist after adjustment for other variables in multivariable analysis.

The limitations of this study could be the definition of Menopause in NDHS data which do not differentiate natural menopause and hysterectomy. Because of this, the women who may have hysterectomy were also included in analysis for natural menopause. Furthermore, this study has included women of age 30-49 only, and do not include the women who could still be menstruating. In addition, due to lack of data regarding the exact age of onset of menopause, our study could not reflect on early or late menopause. Further study is warranted to determine the age of onset of menopause in Nepalese women.

## CONCLUSIONS

Women with lower education, unemployment and no use of oral contraceptives were independent factors associated with early onset of menopause.

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