The smoking behavior of women of reproductive age in Nepal

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ABSTRACT
Smoking, the leading cause of preventable deaths worldwide, which is more detrimental to women not only increases the chances of infertility and miscarriage, but hastens the onset of menopause and causes women to be more susceptible to depression, decreased bone density, cataracts, and skin diseases. This paper investigates the smoking behavior and factors influencing smoking among women of reproductive age in Nepal. The study used secondary data from the 2016 Nepal Demographic and Health Survey. A total of 12,862 women of the reproductive age group were covered in the survey. The association between smoking and the explanatory variables was first assessed in bivariate analysis using the Chi-square test. The associations were further explored using multivariate logistic analysis. Nearly two-fifths (38%) of women were aged 15-24 years. Overall, 8% of women used tobacco products (smoking/chewing). Multivariate analysis showed that women aged 35 and above were almost seven times (aOR=6.52, CI=4.75-8.94) to be smokers than younger women. Separated/divorced/widowed women were nearly twice (aOR=1.86, CI=1.14-3.01) as likely to be smokers than their counterparts. Education is a significant predictor of smoking as women having primary (aOR=0.65, CI=0.54-0.78) and secondary/higher education (aOR=0.21, CI=0.16-0.26) were less likely to smoke than women with no education. Dalit women were nearly two times more likely to be smokers than higher caste Brahmin/Chhetri. Similarly, the richest and richer women were less likely to smoke than the poorest women. Age, education, marital status, caste/ethnicity, and wealth index were significant determinants of smoking among women. Hence, tobacco control interventions need to be focused on women of higher age groups and uneducated and poorer women.

Keywords: Education, married women, Nepal, smoking, wealth status

INTRODUCTION
Smoking, the leading cause of preventable morbidity and mortality worldwide, possesses serious health risks for everyone. Many diseases like cancers, bronchitis, and hypertension can lead to cardiovascular diseases linked to smoking. However, smoking is more detrimental to women, as their health risks are even more significant. Smoking not only decreases chances of
fertility but also increases miscarriage and hastens the onset of menopause. It also causes women to be more susceptible to depression, decreased bone density, cataracts, and skin diseases (WHO, 2015; Subedi, 2017). Traditionally more men used to smoke than women, but a study conducted in the U.K. showed that differences in smoking behavior between women and men have decreased over time (Peters, Huxley, & Woodward, 2014).

World Health Organization has estimated that about six million people worldwide each year die due to tobacco use (smoking and smokeless). Tobacco use is associated with ill-health, disability, and death from non-communicable chronic diseases, and tobacco smoking is also associated with an increased risk of death from communicable diseases (WHO, 2015). It is also estimated that the world’s one billion smokers are women. Most (75%) of these women live in low- and middle-income countries (WHO, 2010). Many more girls than boys had misconceptions about smoking as they think it is an excellent way to control weight. Research evidence shows that low self-esteem is associated with smoking, and studies also showed that girls from developed countries have lower self-esteem than boys. The findings from the research showed that women are more susceptible to smoking-related morbidity and mortality (Allen, Oncken, & Hatsukami, 2014).

In Nepal, about 16 billion NRs (Nepali Rupees) are spent annually on treating tobacco-induced diseases. In Nepal, smoking-related problems are being tackled in various ways. Tobacco-control and -regulation laws restrict people from smoking in public places or even in open spaces like parks, schools, gyms, and bus stops. In 2014, Nepal introduced a law that states that 90 percent of a cigarette pack should be covered with pictures depicting the harmful effects of smoking (Subedi, 2017).

This study investigates the smoking behavior and factors influencing smoking among women of reproductive age in Nepal. The findings of this study aim to guide program planners and policymakers to understand various factors influencing smoking behavior and assist in implementing the tobacco control program, decreasing tobacco consumption and reducing the risk of morbidity and mortality. Though there are very few papers/studies on smoking behavior in Nepal, this type of research that focuses on smoking behavior among women has not yet been undertaken.

**MATERIALS AND METHODS**

This paper is based on the secondary data analysis from the 2016 Nepal Demographic and Health Survey (Ministry of Health, Nepal; New ERA; & ICF, 2017) conducted under the Family Health Division, Department of Health Services, and the Ministry of Health and Population Nepal. The survey was implemented by New ERA, a local research organization with technical support from ORC Macro assistance through its MEASURE DHS+ program.

The sample for the NDHS, 2016, was based on a two-stage, stratified sampling, a nationally representative household sample. Wards (the smallest administrative units of Village Development Committee) in the rural area and sub-ward in the urban area (municipality or metropolitan) were primary sampling units (PSU) for the NDHS. The survey was conducted in 11,040 residential households, 6978 in urban areas and 4062 in rural areas, about 12,862 women aged 15-49.

This paper analyzed all women of reproductive age in the sample (N=12,862). This study represents the country because the sample population is drawn from the national representative
survey. Details of the methodology used in the survey can be found in the published report of
the Nepal Demographic and Health Survey (MoH et al., 2017; Adhikari, 2018).

Initially, univariate or descriptive analysis was used to describe the percentage and number of
respondents according to sociodemographic characteristics. Association between smoking
behavior and the explanatory variables was assessed in bivariate analysis using Chi-square
tests. Furthermore, binary logistic regression was used to assess the effect of several
independent variables on smoking behavior. Before the multivariate analysis, multicollinearity
between the variables was assessed, and the least important variables were removed from the
logistic model. Statistical Package for Social Science (SPSS-26 version) was used for analysis
(IBM Corp. Released 2019).

RESULTS

Background characteristics

Thirty-eight percent of women were aged 15-24 years. More than three-fourth (77%) of women
were currently married at the time of the survey. Half of the women had completed secondary
or higher education. Similarly, more than a third were Janajatis (including Newar). The
majority of the women were Hindu, and more than two-fifths were from Bagmati Province.
Likewise, more than three-fifths (63%) of women resided in an urban area.

Similarly, more than two-fifths (44%) of women had no autonomy in their household decisions.
More than half of women of reproductive age were currently working. Sixty-nine percent of
households were headed by males (Table 1).

Table 1: Percentage distribution of the sample of respondents aged 15-49, by selected
background characteristics

| Background characteristics | %   | N    |
|----------------------------|-----|------|
| Age group                  |     |      |
| Below 25 (15-24)           | 37.7| 4849 |
| 25-34                      | 30.6| 3941 |
| 35 and above               | 31.7| 4072 |
| Marital status             |     |      |
| Never married              | 20.8| 2669 |
| Currently married          | 76.8| 9875 |
| Separated/divorced/widowed | 2.5 | 318  |
| Education                  |     |      |
| None                       | 33.3| 4281 |
| Primary                    | 16.7| 2150 |
| Secondary or higher        | 50.0| 6431 |
| Ethnicity                  |     |      |
| Brahmin & Chhetri          | 31.7| 4072 |
| Dalit                      | 12.4| 1596 |
| Indigenous nationalities (Janjati) | 35.8 | 4600 |
| Other Terai castes         | 20.2| 2594 |
| Religion                   |     |      |
| Hindu                      | 85.8| 11040|
| Buddhist                   | 5.1 | 652  |
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| Religion                                   |     |
| Hindu                                      | 85.8| 11040|
| Buddhist                                   | 5.1 | 652  |
| Muslim                                     | 5.0 | 644  |
| Kirat/Christian                            | 4.1 | 526  |
| Province                                   |     |
| Province 1                                 | 16.9| 2173 |
| Province 2                                 | 19.9| 2563 |
| Bagmati Province                           | 21.2| 2732 |
| Gandaki Province                           | 9.7 | 1249 |
| Lumbini Province                           | 17.7| 2274 |
| Karnali Province                           | 5.6 | 724  |
| Sudurpaschchim Province                    | 8.9 | 1145 |
| Place of residence                         |     |
| Urban                                      | 62.8| 8072 |
| Rural                                      | 37.2| 4790 |
| Household wealth index (quintiles)         |     |
| Poorest                                    | 16.9| 2176 |
| Poorer                                     | 19.6| 2525 |
| Middle                                     | 20.2| 2595 |
| Richer                                     | 21.5| 2765 |
| Richest                                    | 21.8| 2801 |
| Women's autonomy in household decision     |     |
| No autonomy                                | 44.3| 5700 |
| Moderate autonomy (involved in 1-2 issues) | 26.7| 3440 |
| High autonomy (involved in all three issues)| 28.9| 3722 |
| Currently working                          |     |
| No                                         | 43.1| 5540 |
| Yes                                        | 56.9| 7322 |
| Sex of household head                      |     |
| Male                                       | 68.9| 8866 |
| Female                                     | 31.1| 3996 |
| Total                                      | 100.0| 12862|

Types of smoking
It was found that overall, 8% of women used tobacco products, 6% of women smoked cigarettes, 3% chewed tobacco, and 0.5% smoked tobacco in a pipe (Table 2).

Table 2: Types of smoking by women of reproductive age

| Types of smoking                          | %   | N    |
|------------------------------------------|-----|------|
| Smokes cigarettes                        |     |
| No                                       | 94.5| 12153|
| Yes                                      | 5.5 | 709  |
| Smokes pipe full of tobacco              |     |
| No                                       | 99.5| 12793|
| Yes                                      | 0.5 | 69   |
Chews tobacco
No  97.5  12545
Yes  2.5  317

Snuffs by nose
No  100.0  12858
Yes  0.0  4

Smokes cigars, cheroots, or cigarillos
No  100.0  12858
Yes  0.0  4

Smokes water pipe
No  100.0  12860
Yes  0.0  2

Smoking (at least one behavior from the above)
No  91.6  11780
Yes  8.4  1082

Total  100.0  12862

Bivariate analysis

A bivariate analysis was conducted to find associations between women's smoking status and sociodemographic characteristics (Table 3). Smoking was significantly associated with age since more older women (35 and above) used tobacco than women aged 25-34 years and 15-24 years (19% versus 6% and 2% respectively). Moreover, significantly higher proportions of separated/divorced/widowed women (27%) used tobacco than those currently married (10%) or never married (2%). Smoking had an inverse relation with women's education, as smoking behavior was more common among uneducated women (18%) than their counterparts. Similarly, ethnicity also had a significant association with smoking in which Dalits (13%) smoked more frequently than their counterparts. Likewise, religion also had a significant association with smoking since more Buddhist (14%) and Christian (13%) women used tobacco than women of other religions. Furthermore, significantly higher proportions of women from Karnali Province (16%) and Sudurpaschchim Province (12%) were smokers than in other provinces.

Similarly, significantly higher proportions of rural (10%) and poorest (19%) women were smokers than their counterparts. Similarly, higher proportions of working women (11%) and women who were household heads (10%) had smoking behavior, and the association was statistically significant as well (Table 3).

Table 3: Background characteristics of women of reproductive age by smoking status

| Background characteristics | Smoking (%) | Total N |
|---------------------------|-------------|---------|
|                           | No  Yes     |         |
| Age group **             |             |         |
| 15-24                     | 98.5  1.5  | 4849   |
| 25-34                     | 93.6  6.4  | 3941   |
| 35 and above              | 81.4  18.6 | 4072   |
| Marital status ***       |             |         |
| Never married             | 98.4  1.6  | 2669   |
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| Age group                  |     |     |         |
| 15-24                      | 98.5| 1.5 | 4849    |
| 25-34                      | 93.6| 6.4 | 3941    |
| 35 and above               | 81.4| 18.6| 4072    |
| Marital status             |     |     |         |
| Never married              | 98.4| 1.6 | 2669    |
| Currently married          | 90.3| 9.7 | 9875    |
| Separated/divorced/widowed | 73.1| 26.9| 318     |
| Education                  |     |     |         |
| None                       | 82.0| 18.0| 4281    |
| Primary                    | 90.6| 9.4 | 2150    |
| Secondary or higher        | 98.3| 1.7 | 6431    |
| Ethnicity                  |     |     |         |
| Brahman & Chhetri          | 93.0| 7.0 | 4072    |
| Dalit                      | 86.7| 13.3| 1596    |
| Indigenous nationalities (Janjati) | 89.1| 10.9| 4600    |
| Other terai castes         | 96.8| 3.2 | 2594    |
| Religion                   |     |     |         |
| Hindu                      | 91.9| 8.1 | 11040   |
| Buddhist                   | 86.2| 13.8| 652     |
| Muslim                     | 95.1| 4.9 | 644     |
| Kirat/Christian            | 87.3| 12.7| 526     |
| Religion                   |     |     |         |
| Hindu                      | 91.9| 8.1 | 11040   |
| Buddhist                   | 86.2| 13.8| 652     |
| Muslim                     | 95.1| 4.9 | 644     |
| Kirat/Christian            | 87.3| 12.7| 526     |
| Province                   |     |     |         |
| Province 1                 | 89.7| 10.3| 2173    |
| Province 2                 | 97.1| 2.9 | 2563    |
| Bagmati Province           | 91.0| 9.0 | 2732    |
| Gandaki Province           | 89.4| 10.6| 1249    |
| Lumbini Province           | 93.3| 6.7 | 2274    |
| Karnali Province           | 84.3| 15.7| 724     |
| Sudurpaschchim Province    | 87.6| 12.4| 1145    |
| Place of residence         |     |     |         |
| Urban                      | 92.4| 7.6 | 8072    |
| Rural                      | 90.3| 9.7 | 4790    |
| Household wealth index     |     |     |         |
| (quintiles)                |     |     |         |
| Poorest                    | 81.1| 18.9| 2176    |
| Poorer                     | 89.4| 10.6| 2525    |
| Middle                     | 93.7| 6.3 | 2595    |
| Richer                     | 94.1| 5.9 | 2765    |
| Richest                    | 97.3| 2.7 | 2801    |
| Women's autonomy in         |     |     |         |
| household decision         |     |     |         |
| No autonomy                 | 94.6| 5.4 | 5700    |
| Moderate autonomy (involved in 1-2 issues) | 89.5| 10.5| 3440    |
| High autonomy (involved in all three issues) | 89.0| 11.0| 3722    |
| Currently working          |     |     |         |
| No                         | 95.2| 4.8 | 5540    |
| Yes                        | 88.9| 11.1| 7322    |
| Sex of household head      |     |     |         |
| Male                       | 92.4| 7.6 | 8866    |
| Female                     | 89.7| 10.3| 3996    |
| Total                      | 91.6| 8.4 | 12862   |

Note: *** Significant at chi-square test $p < 0.001$
Multivariate analysis

The results from the multivariate analysis showed that women aged 35-49 years were almost seven times (aOR=6.52, CI=4.75-8.94) more likely to be smokers than women aged 15-24 years. Similarly, separated/divorced/widowed women were nearly two times (aOR=1.86, CI=1.14-3.01) more likely to smoke than never married, keeping all other variables constant in a logistic model. Furthermore, education is a significant predictor of smoking as women having primary (aOR=0.65, CI=0.54-0.78) and secondary/higher education (aOR=0.21, CI=0.16-0.26) were less likely to smoke than women with no education. Regarding caste/ethnicity, Dalit women were nearly two times more likely to be smokers than Brahmin/Chhetri. Similarly, the richest and richer women were less likely to smoke than the poorest women. Likewise, working women and women who were also household heads were more likely to smoke than their counterparts (Table 4).

Table 4: Adjusted odds ratios (aOR) and 95% confidence interval (CI) of smoking by predictors among women of reproductive ages in Nepal

| Background characteristics                          | aOR  | 95% CI     |
|-----------------------------------------------------|------|------------|
|                                                     |      | Lower      | Upper      |
| **Age group**                                       |      |            |            |
| 15-24 (ref.)                                        | 1.00 |            |            |
| 25-34                                               | 2.63*** | 1.918 | 3.595 |
| 35 and above                                        | 6.52*** | 4.755 | 8.941 |
| **Marital status**                                  |      |            |            |
| Never married (ref.)                                | 1.00 |            |            |
| Currently married                                   | 1.01 | 0.672      | 1.514      |
| Separated/divorced/widowed                          | 1.86* | 1.148 | 3.010 |
| **Education**                                       |      |            |            |
| None (ref.)                                         | 1.00 |            |            |
| Primary                                             | 0.65*** | 0.543 | 0.787 |
| Secondary or higher                                 | 0.21*** | 0.160 | 0.265 |
| **Ethnicity**                                       |      |            |            |
| Brahman & Chhetri (ref.)                            | 1.00 |            |            |
| Dalit                                               | 1.79*** | 1.432 | 2.227 |
| Indigenous nationalities (Janjati)                  | 1.42*** | 1.179 | 1.717 |
| Other terai castes                                  | 0.808 | 0.560      | 1.167      |
| **Religion**                                        |      |            |            |
| Hindu (ref.)                                        | 1.00 |            |            |
| Buddhist                                            | 1.40* | 1.055      | 1.864      |
| Muslim                                              | 1.40 | 0.869      | 2.256      |
| Kirat/Christian                                     | 1.47* | 1.083 | 1.996 |
| **Province**                                        |      |            |            |
| Province 1 (ref.)                                   | 1.00 |            |            |
| Province 2                                           | 0.25*** | 0.184 | 0.350 |
| Bagmati Province                                    | 0.96 | 0.776      | 1.212      |
| Gandaki Province                                    | 1.02 | 0.787      | 1.320      |
| Lumbini Province                                    | 0.64*** | 0.505 | 0.819 |
| Karnali Province                                    | 1.11 | 0.826      | 1.500      |
| Sudurpaschchim Province                             | 0.97 | 0.742      | 1.259      |
| **Place of residence**                              |      |            |            |


**DISCUSSION**

Our study shows that almost one in ten married women of reproductive age used tobacco. However, the prevalence of smoking is low compared with women in the USA (Nighbor Doogan, Roberts, Cepeda-Benito, & Higgins, 2018) and South America (Mendoza-Romero, Urbina, Cristancho-Montenegro, & Rombaldi 2019) and almost double than the women of Pakistan (Khan et al., 2015) and the prevalence was equal with the women of Iran (Mirahmadizadeh & Nakhaee, 2008). Our study investigated socioeconomic and demographic factors associated with smoking behavior among women. The findings showed an inverse relationship between education and smoking behavior; many studies showed similar findings, for example, studies conducted in Sri Lanka (Fernando, Wimaladasa, Sathkoralage, Ariyadasa, & Kumarasinghe 2019), Turkey (Sahan et al., 2018), China (Cai, Wu, Goyal, Han, & Jiao 2012) and India (Rani et al., 2003). A similar finding was observed in another study on gender roles, and smoking behavior also had a lower prevalence of smoking among highly educated women than low-educated women (Flandorfer, Wegner, & Buber, 2010). Showing similarities and differences with our study is another secondary data analysis of NDHS 2006, which showed that women's smoking status had an inverse relation with education, age, and employment status (Pandey & Lin, 2013). This could be because less educated people had less knowledge of the health effects of smoking.

Similar to our study findings, a study by Sahan and others showed that working women were more likely to be smokers than non-working women (Sahan et al., 2018), but conversely, another study revealed that unemployed people had the highest rates of smoking (Ponniah & Bloomfield, 2008). Similarly, our study found an inverse relationship between household wealth
quintile and smoking, which is supported by a study in India (Rani, Bonu, Jha, Nguyen, & Jamjoum 2003). Likewise, a study in New Zealand showed the highest smoking rate among females in 20–24 years old, decreasing gradually with increasing age (Ponniah & Bloomfield, 2008). Nevertheless, our study showed inverse findings in which older women were more likely to smoke than younger women. No significant differences were seen in smoking prevalence among Hindus, Muslims, and Christians in another similar study (Rani et al., 2003), but our research showed Christians were more likely to smoke than Hindus. Similar findings were found that Muslims smoke substantially less than Christians (Hussain, Walker, & Moon 2019; Anthony, Chowdary, Dyson, & Thankappan 2013). Most Nepalese are not aware of risk factors leading to cancers and other diseases. Therefore, the fight against tobacco use becomes challenging, difficult, and complex because of socio-cultural and economic factors (Sharma Subedi, & Sharma, 2013).

CONCLUSION

The study found that the prevalence of tobacco use among women in Nepal was not uncommon. In addition, age, education, marital status, caste/ethnicity, wealth index, and employment were significant predictors of smoking behavior among women. Hence, tobacco control interventions should mainly focus on women of higher age groups, uneducated, poorer, and separated/divorced/widowed.

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