Factors Influencing the Use of Reproductive Health Services Among Young Women in Nepal: Analysis of the 2016 Nepal Demographic and Health Survey

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Abstract

Background

About one fifth of the total population are young people aged 15-24 years in Nepal. Utilization of reproductive health services is a key component for preventing young women from different sexual and reproductive health problems. The objective of the study is to determine the factors influencing the use of reproductive health services among young women in Nepal.

Methods

Data is extracted from the 2016 Nepal Demographic and Health Survey (NDHS) datasets. The weighted sample population for modern contraceptive use is restricted to the 1593 young women, 1606 young women for the antenatal care and skilled birth attendant. Three reproductive health indicators were selected as outcome variables of reproductive health service utilization for the analysis- modern contraceptive use, at least four antenatal care visits and skilled birth attendant in delivery. All calculations were based on standard sample weight of Nepal DHS.

Results

The study found that 21% of young women used modern contraception, 71% attended at least four ANC visits, and 67% utilized a skilled birth attendant at delivery. Young women of Janajati, women who have 1-2, and 3 and more living children, women who participate household decision-making, and have exposure to media were more likely and women who want more children were less likely to use modern contraceptives. Higher education attainment, higher wealth status, and lower birth order were associated with higher level of receiving at least four ANC visits and skilled birth attendants among young women. Young women who want more children, and who have access to media have higher odds of receiving at least four ANC visits and women who attend four and more ANC visits have
higher odds of using skilled birth attendants.

Conclusion

To improve the use of reproductive health services among young women, efforts should be made targeting young women of low education level, low economic status, higher birth order, and low exposure to media. Further research is required to detect the barriers that affects use of reproductive health services among young women.

Background

In Nepal, about one fifth of the total population are young people aged 15–24 years [1]. Young people are one of the important sub-group of population from reproductive health concern. Young people are facing different sexual and reproductive health challenges like unintended pregnancy, pregnancy related health care and sexually transmitted infections including HIV infection [2, 3]. Young women (aged 15-24 years) including adolescents girls (aged 10-19 years) are at high risk of complication of pregnancy and death [4].

Reproductive health is the basic component of overall health [5]. It addresses all of the issues of health related to reproductive health for both women and men. Broader concept of reproductive health focus on contraceptive choice, maternal and newborn health care, sexually transmitted infections and sexual health [6]. Increasing use of reproductive health services help to reduce maternal mortality and to improve children's and women's health. To reduce global maternal mortality and ensure universal access to sexual and reproductive health-care services are the targets of Sustainable Development Goal 3 [7]. Achieving the targets of SDG 3 requires improving women's sexual and reproductive health care services.

The International Conference on Population and Development 1994 defines as reproductive health care is the constellation of methods, techniques and services that contribute to reproductive health and well-being by preventing and solving reproductive
health problems [8]. Reproductive health care service includes family planning
counselling, services for prenatal care, safe delivery and postnatal care; prevention and
appropriate care related to reproduction and sexually transmitted diseases [5].
Before the International Conference on Population and Development held in Cairo in 1994,
adolescent and youth specific reproductive health services were clearly not existent in
Nepal [9]. With the growing concern on reproductive health, Government of Nepal has
developed National Reproductive Health Strategy (1998) for providing integrated
reproductive health services. Besides this, National Adolescent Health and Development
Strategy (2000) was developed to improve the health and socioeconomic status of
adolescents and young.
Use of contraception can prevent unwanted pregnancy, early childbearing, and abortion
related death. Knowledge of family planning is almost universal among adolescent and
youth. However, use of modern contraceptive is low among young women. Antenatal Care
(ANC) is a key component to monitor and reduce the risk of mortality for young mother
during pregnancy and childbirth. Similarly, skilled birth attendant is an important factor of
reproductive health services in reducing maternal neonatal mortality. Only 21% of married
young women age 15–24 and about 72% had received four or more ANC visits [10].
Utilization of reproductive health services is an important component in preventing young
women from different sexual and reproductive health problems. The government of Nepal
has pointed young women as a vulnerable and underserved group requiring specific
services to meet their special problems and needs. Different studies that are conducted in
Ethiopia [11, 12], Bangladesh [13, 14] and Nepal [15] revealed that reproductive health
service utilization among young adolescents and youth were low and use of reproductive
health services were associated with different socio-demographic and economic factors. In
Nepal, there are limited study regarding use of reproductive health services among young
women. Thus, the objective of the study is to determine the factors influencing the use of reproductive health services among young women in Nepal.

Data And Methods

Data sources

This study used data extracted from the 2016 Nepal Demographic and Health Survey (NDHS) datasets. NDHS is nationally representative cross-sectional sample survey, which was conducted under the aegis of Ministry of Health of the Government of Nepal. The 2016 NDHS sample contained 11473 households, and 12862 women aged 15–49 years were interviewed; response rate was 98%. Stratified two-stage cluster sampling was used in rural areas and three-stage in urban areas to select household for the survey. In rural areas, wards were selected as primary sampling units (PSUs) in the first stage and households in second stage. In urban areas, wards were selected as PSUs in first stage, one enumeration area (EA) was selected from each PSU in second stage, and households were selected from sample EAs in third stage. Face-to-face interview of eligible women aged 15–49 in the sample households were conducted with structured questionnaires. Six questionnaires were administered in the 2016 NDHS [16]. This study used data collected through the women's questionnaire. The survey collected information related to reproductive health including women's characteristics, family planning and maternal health.

In this study, the analysis is limited to young women aged 15–24. The study uses a weighted sample population for modern contraceptive use is restricted to the 1593 young women who are currently married and non-pregnant. The sample population for the antenatal care and skilled birth attendant is 1606 young women for the most recent birth in the 5 year preceding the survey.
Variables

Dependent variables

Three reproductive health indicators are selected as dependent variables for the analysis. The first dependent variable is current use of modern contraceptive. This variable is dichotomous. Young women who were currently using modern contraceptive were coded as 1 and otherwise as 0. Modern contraceptive methods include male and female sterilization, injectables, intrauterine device, pill, implants, male condoms, locational amenorrhea, and emergency contraceptive.

The second dependent variable is ANC visits for most recent pregnancy in the 5 year preceding the survey. This variable is also dichotomous. The number of ANC visits is coded as 1 if women attained four or more ANC visits before their most recent birth and coded as 0 if there were fewer than four visits. The third dependent variable is assistance of skilled birth attendant (SBA) during delivery which is also dichotomous variable. Women who were delivered by skill birth attendant during most recent delivery is coded as 1 and otherwise as 0. The SBA includes doctor, nurses or midwives [16, 17].

Independent variables

The independent variables of this study are age of women, education, ethnicity, occupation, wealth quintile, birth order, number of living children, participation in household decision-making and exposure to media. Age group of women in this study are 15-19 and 20-24. Mother's age at birth is classified into two age groups- <20 and 20-25. Education level achieved by women is classified into four categories: no education, primary, some secondary, and SLC and above. Caste/Ethnicity variable is categorized into five groups-Brahman/Chhetri, Terai caste, Dalit, Janajati, and Muslim/other. Women's occupation is grouped in two categories- not working, and working. Wealth quintile
variable is recorded into five categories—poorest, poor, middle, richer, and richest. Birth order is measured in three categories—1, 2, and 3 or more. Similarly, number of living children is measured in three categories—0, 1-2, and 3 or more. Fertility preference of young women is categorized into three groups—wants no more children, wants more children, and undecided. Women's participation in household decision-making is measured by three decisions: women's own health care, large household purchases, and visit to family or relatives. For each of these three aspects of decision-making had five response option: respondent alone, respondent and husband/partner jointly, husband/partner, someone else and other. Responses are coded as 1 for yes (respondent alone, and respondent and husband/partner jointly) and 0 for no (husband/partner, someone else, and other). Then, a single composite variable is constructed by grouping women into two categories: women who participated in at least one decision is categorized as participate one or more decisions (= 1) otherwise as not participated (= 0). Media exposure is dichotomous variable. Women exposed to either radio, television or newspapers/magazines at least once a week is coded as exposed (= 1) and those exposed to none are coded as not exposed (= 0).

Methods of data analysis

This study employed three levels of data analysis. First, univariate analysis was carried out to analyze selected socio-demographic characteristic of young women aged 15-24. Second, chi-square test was used to examine the association between modern contraceptive uses, at least four ANC visits, and skilled birth attendant and explanatory variables (socio-demographic, economic, women's participation in household decision-making and media exposure). Third, multivariate analysis with logistic regression is performed to examine the factors influencing the use of reproductive health services among young women. Factors significantly associated with outcome variables at p < 0.05
were included in multivariate logistic regression. Multicollinearity assessment was employed prior to the multivariate analysis. The results are shown in adjusted odds ratios (OR) with 95% confidence interval (CI). Data was analyzed by using STATA version 15.1. All calculations were weighted using standard sample weight of NDHS. The STATA survey command 'svy' were applied to adjust for stratified sample design.

Results

Background characteristics of young women

Table 1 shows that more than half of the young women were of age 15–19. Forty percent of young women have completed secondary level of education. About 43% of young women were not working and 57% were working. About 21% young women lived in Province 2 and 20% lived in Province 3. Janajati (36%) and Brahmain/Chhetri (29%) were dominant caste/ethnicity. Nearly 18% of young women were from the poorest economic category, 21% from middle, and 18% from the richest economic category. Thirty two percent young women have 1-2 living children and 68% of young women have exposed to media. Majority of young women were aged 15–19, educated, working, Janajati and Brahman/Chhetri and exposed to mass media.
Table 1

Percent distribution of young women age 15–24 by background characteristics, Nepal NDHS 2016

| Background characteristics | Percent | Number |
|----------------------------|---------|--------|
| **Age**                    |         |        |
| 15–19                      | 53.6    | 2598   |
| 20–24                      | 46.4    | 2251   |
| **Education level**        |         |        |
| No education               | 10.0    | 483    |
| Primary                    | 14.3    | 696    |
| Secondary                  | 40.3    | 1953   |
| SLC & above                | 35.4    | 1718   |
| **Working status**         |         |        |
| Not working                | 42.7    | 2070   |
| Working                    | 57.4    | 2779   |
| **Province**               |         |        |
| Province 1                 | 16.8    | 817    |
| Province 2                 | 20.5    | 996    |
| Province 3                 | 19.6    | 952    |
| Gandaki                    | 9.5     | 460    |
| Province 5                 | 18.4    | 892    |
| Karnali                    | 6.0     | 293    |
| Sudurpachim                | 9.1     | 440    |
| **Ethnicity**              |         |        |
| Brahman/Chhetri            | 29.3    | 1420   |
| Terai caste                | 15.2    | 737    |
| Dalit                      | 13.2    | 641    |
| Janajati                   | 36.2    | 1755   |
| Muslim                     | 6.1     | 296    |
| **Wealth quintile**        |         |        |
| Poorest                    | 17.5    | 847    |
| Poorer                     | 20.5    | 994    |
| Middle                     | 20.9    | 1015   |
| Richer                     | 22.8    | 1104   |
| Richest                    | 18.3    | 890    |
| **Number of living children** |     |        |
| 0                          | 66.0    | 3202   |
| 1–2                        | 31.8    | 1543   |
| 3+                         | 2.2     | 104    |
| **Exposure to media (at least once a week)** | | |
| Not exposed                | 31.9    | 1548   |
| Exposed                    | 68.1    | 3301   |
| **Total**                  | 100.0   | 4849   |

**Bivariate Analysis**

Table 2 presents the relationship between modern contraceptive use and selected background characteristics. Less than one quarter of young women have used modern contraception. Results revealed that age, working status, caste/ethnicity, number of living children, fertility preference, women's participation in decision-making, and exposure to media are significantly associated with modern contraceptive use at $p < 0.05$. Modern contraceptive use is positively associated with age group. Use of contraception is highest among women age 20–24. It is observed that young women's education and wealth status
are insignificantly related to modern contraceptive use. Young women who attained secondary and higher education, are working, are of Janajati, are wealthier, have three or more living children, who want no more children, participated household decision-making, and exposed to mass media have the highest level of contraceptive use. Moreover, use of modern contraception is lowest among young women who have no education, are not working, are of Muslim, are in the middle wealth status, have not participated household decision-making, and not exposed to media.
| Background characteristics | Percent | 95% CI   | Number | p-value \((\chi^2)\) |
|----------------------------|---------|---------|--------|--------------------------|
| **Age**                    |         |         |        |                          |
| 15–19                      | 14.5    | 11.5–18.1| 704    | 0.000                    |
| 20–24                      | 23.9    | 21.3–26.8| 1684   |                          |
| **Education**              |         |         |        |                          |
| No education               | 15.9    | 12.1–20.6| 396    | 0.085                    |
| Primary                    | 20.4    | 16.4–25.0| 486    |                          |
| Secondary                  | 23.0    | 19.6–26.7| 914    |                          |
| SLC & above                | 22.4    | 18.5–26.7| 593    |                          |
| **Working status**         |         |         |        |                          |
| Not working                | 17.8    | 14.8–21.2| 1041   | 0.006                    |
| Working                    | 23.7    | 21.0–26.7| 1347   |                          |
| **Caste/ethnicity**        |         |         |        |                          |
| Brahman/Chhetri            | 22.4    | 18.8–26.5| 608    | 0.000                    |
| Terai caste                | 13.5    | 9.6–18.7 | 463    |                          |
| Dalit                      | 17.4    | 12.9–23.0| 366    |                          |
| Janajati                   | 28.6    | 24.7–33.0| 795    |                          |
| Muslim                     | 9.3     | 5.4–15.6 | 157    |                          |
| **Wealth quintile**        |         |         |        |                          |
| Poorest                    | 22.5    | 18.8–26.7| 440    | 0.422                    |
| Poorer                     | 22.8    | 18.4–27.9| 526    |                          |
| Middle                     | 18.7    | 15.1–22.9| 589    |                          |
| Richer                     | 19.6    | 15.6–24.4| 548    |                          |
| Richest                    | 23.9    | 18.2–30.8| 286    |                          |
| **Number of living children** |     |         |        |                          |
| 0                          | 8.5     | 6.3–11.4 | 754    | 0.000                    |
| 1–2                        | 26.0    | 23.2–29.0| 1532   |                          |
| 3+                         | 42.0    | 30.4–54.6| 103    |                          |
| **Fertility preference**   |         |         |        |                          |
| Wants no more children     | 33.6    | 29.7–37.6| 745    | 0.000                    |
| Wants more children        | 15.1    | 12.9–17.8| 1540   |                          |
| Undecided                  | 20.9    | 13.4–31.0| 103    |                          |
| **Women's participation in decision-making** | | | |                          |
| Not participated           | 16.2    | 13.9–18.8| 1226   | 0.000                    |
| Participated one or more decisions | 26.4 | 23.2–29.7| 1162   |                          |
| **Exposure to media (at least once a week)** | | | |                          |
| Not exposed                | 17.7    | 14.8–21.0| 946    | 0.005                    |
| Exposed                    | 23.4    | 20.7–26.4| 1443   |                          |
| Total                      | 21.1    | 18.9–23.5| 2389   |                          |

The association between ANC visits, and skilled birth attendant for most recent delivery according to selected background characteristics are shown in Table 3. About 72% of young women made at least four ANC visits for the most recent birth. Bivariate analysis shows that a number of variables- women's education, working status, caste/ethnicity, wealth, birth order, fertility preference women's participation in decision-making, and
exposure to media are statistically significant association (p < 0.05) with at least four ANC visits, while age of women is not significantly associated with at least four ANC visits. Births to mothers less than age 20 are more likely to make at least four ANC visits (73%). ANC visits is varied by women's education. Fifty-four percent of young women with no education made at least four ANC visits compared with 87% of young women who attained SLC and above education. A large proportion of young women who are working (78%) reported at least four ANC visits. There is significant association between caste/ethnicity and ANC visits. A greater proportion of Brahman/Chhetri young women made at least four ANC visits and Muslim young women have a small proportion. Young women in the richest wealth status (80%) are more likely to make at least four ANC visits than women in the poorest wealth status (65%). The percentage of young women making at least four ANC visits decreases as birth order increases. Level of ANC visits is higher among young women who want more children (77%), who participate in household decision-making (75%), and with exposure to media (79%).

Table 3 shows use of skilled birth attendant for most recent birth according to selected background variables. About 69% of young women used an SBA in delivery. It is found that all background variables except mother's age at birth and working status are statistically significant association (p < 0.05) with SBA during delivery. Mother's age at birth below 20 years used an SBA in delivery more often than mother's age at birth 20–24 years. The percentage of young women used SBA for delivery increases with increasing women's education level, from 52% among young women with no education to 80% among young women with SLC and above education. A large proportion of young women in Brahman/Chhetri (72%) used skilled birth attendants in delivery. It is found that use of an SBA for delivery and wealth status of young women was positively related and was inversely related to birth order. Young women who want more children, who participate in
household decision-making, and with exposure to media were more likely to use SBA in delivery.

Table 3
Percentage of young women age 15–24 who had at least four visits for antenatal care and skilled birth attendant for most recent birth in the five years preceding the survey according to background characteristics, Nepal DHS 2016

| Background characteristics | 4 + ANC visits | Skilled birth attendant |
|---------------------------|----------------|-------------------------|
|                           | %              | 95% CI                  | p-value (χ²) | %              | 95% CI                  | p-value (χ²) | Number |
| Mother's age at birth     |                |                         |              |                |                         |              |        |
| < 20                      | 73.2           | [68.7–77.3]             | 0.268        | 68.6           | [64.0–72.8]             | 0.177        | 792    |
| 20–25                     | 70.2           | [65.7–74.4]             | 65.0         | [60.8–69.0]    | 0.000                   | 813          |        |
| Education                 |                |                         |              |                |                         |              |        |
| No education              | 54.1           | [45.7–62.2]             | 0.000        | 52.2           | [44.3–60.0]             | 0.000        | 307    |
| Primary                   | 63.0           | [56.5–69.0]             | 56.6         | [49.8–63.2]    | 0.104                   | 350          |        |
| Secondary                 | 76.9           | [72.4–80.9]             | 72.5         | [67.7–76.9]    |                         |              | 599    |
| SLC & above               | 86.9           | [82.9–90.1]             | 79.9         | [74.9–84.1]    |                         |              | 349    |
| Working status            |                |                         |              |                |                         |              |        |
| Not working               | 65.3           | [59.7–70.6]             | 0.000        | 69.3           | [64.7–73.5]             | 0.104        | 707    |
| Working                   | 76.7           | [73.1–80.0]             | 64.8         | [60.5–68.9]    |                         |              | 899    |
| Caste/ethnicity           |                |                         |              |                |                         |              |        |
| Brahman/Chhetri           | 82.2           | [77.6–86.0]             | 0.000        | 72.3           | [66.1–77.8]             | 0.033        | 399    |
| Terai caste               | 63.6           | [53.5–72.6]             | 62.9         | [55.4–69.8]    |                         |              | 334    |
| Dalit                     | 67.2           | [59.4–74.1]             | 57.9         | [51.1–64.3]    |                         |              | 241    |
| Janajati                  | 73.3           | [67.8–78.3]             | 68.2         | [61.7–74.1]    |                         |              | 517    |
| Muslim                    | 60.7           | [48.6–71.6]             | 70.9         | [59.7–80.0]    |                         |              | 114    |
| Wealth quintile           |                |                         |              |                |                         |              |        |
| Poorest                   | 64.6           | [57.9–70.8]             | 0.007        | 45.5           | [39.0–52.1]             | 0.000        | 314    |
| Poorer                    | 70.1           | [64.0–75.5]             | 58.5         | [52.1–64.6]    |                         |              | 371    |
| Middle                    | 69.9           | [62.9–76.0]             | 73.6         | [67.7–78.7]    |                         |              | 397    |
| Richer                    | 77.6           | [71.4–82.8]             | 76.2         | [70.7–80.9]    |                         |              | 355    |
| Richest                   | 80.2           | [71.5–86.8]             | 88.9         | [80.7–93.9]    |                         |              | 169    |
| Birth order               |                |                         |              |                |                         |              |        |
| 1                         | 78.7           | [75.3–81.8]             | 0.000        | 74.7           | [71.1–78.1]             | 0.000        | 1034   |
| 2                         | 61.3           | [55.1–67.2]             | 55.8         | [49.6–61.8]    |                         |              | 434    |
| 3+                        | 51.6           | [42.1–61.0]             | 41.5         | [31.8–51.8]    |                         |              | 138    |
| Fertility preference      |                |                         |              |                |                         |              |        |
| Category                          | Mean | 95% CI          | p    | Mean | 95% CI          | p     | N   |
|----------------------------------|------|----------------|------|------|----------------|-------|-----|
| Wants no more children           | 64.1 | [59.1–68.7]    | 0.000| 62.8 | [58.1–67.2]    | 0.005 | 685 |
| Wants more children              | 76.9 | [73.0–80.5]    |      | 69.1 | [65.1–72.9]    |      | 854 |
| Undecided                        | 82.7 | [70.2–90.6]    |      | 77.8 | [65.9–86.3]    |      | 67  |
| Women's participation in decision-making |      |                |      |      |                |      |     |
| No                               | 68.7 | [64.1–73.0]    | 0.021| 64.0 | [59.6–68.2]    | 0.045 | 783 |
| One or more decisions            | 74.6 | [70.4–78.4]    |      | 69.3 | [65.0–73.4]    |      | 810 |
| Exposure to media (at least once a week) |      |                |      |      |                |      |     |
| Not exposed                      | 62.5 | [56.7–68.0]    | 0.000| 56.9 | [52.2–61.4]    | 0.000 | 687 |
| Exposed                          | 78.5 | [75.0–81.7]    |      | 74.2 | [69.9–78.1]    |      | 919 |
| Total                            | 71.7 | [68.1–75.0]    |      | 66.8 | [63.3–70.1]    |      | 1606 |

**Multivariate Analysis**

Table 4 presents the factors associated with the use of modern contraceptives among currently married young women of age 15–24. In the multivariate analysis, women's education and wealth quintile are excluded because they were not found to be significant associations with modern contraceptive use in bivariate analysis. The results of multivariate logistic regression show young women of Janajati, number of living children, women's who participate one or more household decisions, and women who exposed to media are positively associated with the use of modern contraceptive. Young women of Janajati are 1.76 times more likely to use modern contraceptive than young women of Dalit. The odds of modern contraceptive use are 3.22 times and 9.07 times greater for women with 1–2, and 3 and more children, respectively, compared with young women having no living children. Young women who want more children are less likely to use modern contraceptive (OR = 0.57, p < 0.001), compared with young women who want no more children. The odds of modern contraceptive use are 1.34 times greater among young women who participate one or more household decisions, and 1.49 times greater among young women who had exposure to media, compared with young women who do not
participate in household decisions and who had no exposure to media respectively.

Table 4
Odds ratios from logistic regression showing factors associated with use of modern contraception among young women age 15–24, Nepal DHS 2016

| Background variable          | Odds ratio | 95% confidence interval |
|-----------------------------|------------|-------------------------|
| **Age**                     |            |                         |
| 15–19                       | 1.00       |                         |
| 20–24                       | 0.98       | 0.71–1.34               |
| **Working status**          |            |                         |
| Not working                 | 1.00       |                         |
| Working                     | 1.12       | 0.85–1.48               |
| **Caste/ethnicity**         |            |                         |
| Dalit                       | 1.00       |                         |
| Brahman/Chhetri             | 1.30       | 0.84–2.02               |
| Terai caste                 | 0.64       | 0.36–1.16               |
| Janajati                    | 1.76**     | 1.15–2.70               |
| Muslim                      | 0.52       | 0.25–1.05               |
| **Number of living children** |           |                         |
| 0                           | 1.00       |                         |
| 1–2                         | 3.22***    | 2.31–4.49               |
| 3+                          | 9.07****   | 4.88–16.86              |
| **Fertility preference**    |            |                         |
| Wants no more children      | 1.00       |                         |
| Wants more children         | 0.57***    | 0.45–0.73               |
| Undecided                   | 0.71       | 0.41–1.24               |
| **Women’s participation in decision-making** | | |
| Not participate             | 1.00       |                         |
| Participate one or more decisions | 1.34* | 1.04–1.74             |
| **Exposure to media (at least once a week)** | | |
| Not exposed                 | 1.00       |                         |
| Exposed                     | 1.49**     | 1.15–1.92               |

Note: *** p < 0.001, ** p < 0.01, * p < 0.05

Table 5 illustrates factors associated with at least four ANC visits and skilled birth attendant in delivery for most recent birth among young married women age 15–24.

Mother's age at birth is excluded from multivariate analysis because this variable is insignificantly associated with ANC visits. The results of logistic regression shows that education (secondary, and SLC and above), working status, wealth quintile (middle, richer and richest), second birth order, young women who want more children, and exposure to media have significant association with attending at least 4 ANC visits. The analysis indicates that the odds of attending at least four ANC visits are 1.93 times greater among young women with secondary education, compared with young women with no education, and 2.91 times greater among young women with SLC and above education. Young women who working are 1.90 times more likely to attend at least four ANC visits, compared with
nonworking young women. Young women in the richer wealth quintile are 2.55 times more likely to attend at least four ANC visits than young women in the poorest wealth quintile whereas young women in richest and middle wealth quintile are 2.12 times and 1.85 times more likely to make at least four ANC visits than women in the poorest wealth quintile respectively. The odds of receiving ANC visits is 36% lower for women with second order birth compared to women with first order birth. Young women who want more children are 1.65 times more likely to make at least four ANC visits, compared with young women who want no more children. Young women with exposure to media are 48% more likely to receive at least four ANC visits, compared with young women with no exposure to media. Table 5 also depicts the results of the logistic regression of young women's use of skilled birth attendant in delivery for most recent birth. Mother's age at birth and women's working status are excluded from multivariate logistic analysis due to insignificant association with SBA. The analysis shows that the odds of receiving SBA for delivery are 1.59 times greater among young women with secondary education, compared with young women with no education, and 1.35 times greater among young women with SLC and above education. The odds of SBA increases as the level of wealth quintile increases. Young women in the richest wealth quintile have 9.16 times higher odds of receiving an SBA in delivery, compared with young women in the poorest wealth quintile. Birth order seems to be another one of the most important predictor of skilled birth attendant among young women. Higher order births have lower odds of SBA. The odds of receiving an SBA in delivery are 65% lower for three and more birth order, compared with first order birth, and 51% lower for second order birth. Young women who made at least four ANC visits have 2.59 times higher odds of receiving an SBA in delivery compared with young women who made less than four ANC visits.
### Table 5
Odds ratios from logistic regression showing factors associated with ANC visit (4 + ANC visits) and skilled birth attendant among young women age 15–24, Nepal DHS 2016

| Background variable | 4 + ANC Visit | Skilled birth attendant |
|---------------------|---------------|-------------------------|
|                     | Odds ratios   | 95% CI                  | Odds ratio       | 95% CI                  |
| Education           |               |                         |                  |                         |
| No education        | 1.00          | 1.00                    | 1.00             | 1.00                    |
| Primary             | 1.25          | 0.85–1.83               | 1.14             | 0.77–1.68               |
| Secondary           | 1.93***       | 1.31–2.84               | 1.59*            | 1.03–2.44               |
| SLC & above         | 2.91***       | 1.79–4.76               | 1.35             | 0.84–2.16               |
| Working status      |               |                         |                  |                         |
| Not working         | 1.00          |                         |                  |                         |
| Working             | 1.90***       | 1.43–2.53               |                  |                         |
| Caste/ethnicity     |               |                         |                  |                         |
| Dalit               | 1.00          |                         | 1.00             |                         |
| Brahman/Chhetri     | 1.29          | 0.81–2.07               | 1.22             | 0.77–1.93               |
| Terai caste         | 0.78          | 0.45–1.36               | 0.76             | 0.45–1.28               |
| Janajati            | 0.83          | 0.53–1.31               | 1.04             | 0.73–1.48               |
| Muslim              | 0.69          | 0.37–1.29               | 1.18             | 0.59–2.37               |
| Wealth quintile     |               |                         |                  |                         |
| Poorest             | 1.00          |                         | 1.00             |                         |
| Poorer              | 1.30          | 0.88–1.91               | 1.69**           | 1.19–2.40               |
| Middle              | 1.85*         | 1.16–2.97               | 4.46***          | 2.70–7.38               |
| Richer              | 2.55***       | 1.54–4.21               | 4.01***          | 2.56–6.27               |
| Richest             | 2.12*         | 1.14–3.93               | 9.16***          | 4.47–18.76              |
| Birth order         |               |                         |                  |                         |
| 1                   | 1.00          |                         | 1.00             |                         |
| 2                   | 0.64**        | 0.46–0.88               | 0.49***          | 0.35–0.67               |
| 3+                  | 0.70          | 0.45–1.08               | 0.35***          | 0.21–0.58               |
| Fertility preference|               |                         |                  |                         |
| Wants no more children | 1.00     |                         | 1.00             |                         |
| Wants more children | 1.65***       | 1.25–2.18               | 0.86             | 0.65–1.12               |
| Undecided           | 1.89          | 0.92–3.89               | 1.01             | 0.50–2.07               |
| Women's participation in decision-making |       |                         |                  |                         |
| Not participate     | 1.00          |                         | 1.00             |                         |
| Participate one or more decisions | 1.12       | 0.87–1.44               | 1.16             | 0.89–1.52               |
| Exposure to media (at least once a week) |       |                         |                  |                         |
| Not exposed         | 1.00          |                         | 1.00             |                         |
| Exposed             | 1.48*         | 1.09–2.02               | 1.21             | 0.90–1.63               |
| ANC visits          |               |                         |                  |                         |
| Less than four visits | 1.00       |                         | 1.00             |                         |
| Four or more visits | 2.59***       | 1.95–3.43               |                  |                         |

Note: *** p < 0.001, ** p < 0.01, * p < 0.05

### Discussion
Young women's modern contraceptive use (21%) is lower than currently married women in the 15–49 age (43%). The proportion of young women who received at least four ANC visits (72%) are higher among young women compared with women in the 15–49 age
Similarly, the proportion of young women who assistance by skilled birth attendant in delivery for most recent birth (69%) are higher than national average (61%). This study showed that inequalities in contraceptive use among young women by caste/ethnicity. Young women of Jananati have higher odds of modern contraceptive use compared with young women of Dalit. Studies conducted in Nepal revealed that an odds of using modern contraceptive is higher for Janajati women compared to other caste/ethnic groups [10, 18]. It is argued that disparities in religious faith, and cultural belief and values between caste/ethnic groups may be possible reason for disparities in use of contraception. There is a significant positive association between number of living children and use of modern contraceptive. Young women with more living children are more likely to use modern contraceptive. This finding is in line with the previous studies form Ghana [19], Malawi [20], and Ethiopia [21]. This may be women with more children may reach the desired family size so that they are more likely to use contraceptive than women with no or less living children. Fertility preference has been identified an important factor to influence the use of modern contraceptive among young women. That is, young women who want more children are less likely to use modern contraceptives than women who want no more children. This finding is consistent with different studies conducted in Ethiopia [22], Bangladesh [23], Nepal (Khatiwada, Silwal, Bhadra, & Tamang, 2013; Lamichhane, 2018) and Nigeria [25]. This study found that young women who participate in household decision-making have higher odds of using modern contraceptives than women who do not participate in household decision-making. This findings is consistent with previous studies that have shown strong association between women's participation in household decision-making and use of modern contraceptives [21, 25, 26]. Reasons might be that educated and employed women are primarily involved in household decision-making, so that they may have more concern to use contraceptive
Exposure to media was found to be a positive association with modern contraceptive use [19, 27, 28]. This study found that young women who are exposed to media are more likely to use modern contraceptives. It might be that women who exposed to mass media have good knowledge on reproductive health problems and reproductive health services, which helps to improve their knowledge and build confidence to use modern contraceptives. However, television, radio and newspapers were most commonly used source of information about contraceptives in Nepal [29].

The results from this study revealed that higher educational level of mothers, higher wealth quintile, and exposure to media are positively associated with at least four ANC visits and higher birth order is negatively associated with at least four ANC visits. These findings are consistent with studies conducted in Indonesia (Efendi, Chen, Kurniati, & Berliana, 2017), India [31], and Nepal (Khatiwada, Silwal, Bhadra, & Tamang, 2013). The study also found that young women who want more children are more likely to receive ANC than women who want no more children. This finding is consistent with study undertaken in Benin [32]. Women’s working status is found to be a significant predictor of use of ANC as young women who are working more likely to attain at least four ANC visits than women who are not working. This finding is supported by previous studies conducted in Ethiopia [34].

Women’s education level is an important variable affecting the use of skilled birth attendants in delivery in this study, as young women with secondary and higher education are more likely to assist an skilled birth attendants in delivery. This finding is consistent with previous studies conducted in Nepal [35] and Ghana [36]. This study found that use of skilled birth attendant is inequitable in Nepal. Women with low wealth quintile are less likely to use skilled birth attendants in delivery. This is in line with result of previous
studies conducted in the South Asian Region [37] and Bangladesh [38]. The finding on birth order and skilled birth attendants is consistent with the result of a study conducted in the South Asian Region [37] and India [39], as young women with high birth order are less likely to seek skilled birth attendants in delivery. The finding of this study revealed that use of ANC is strongly associated with skilled birth attendants among young women. Young women who attend at least four ANC visits are more likely to have skilled birth attendants in delivery. This findings is consistent with previous studies in Nepal [35], and Ghana [36].

The possible explanation of this relationship is that educated women may have acquired more knowledge about reproductive health and better understanding of benefits of ANC and skilled birth attendant, so that they have higher level of ANC and skilled birth attendants utilization. Women in the richest wealth quintile are more likely to be more educated and have the financial capacity to afford the ANC visits and to seek skilled birth attendants in delivery. Women with first birth order birth have no experience of childbirth, they fear from the possible complication of childbirth. Thus they are more likely to receive ANC and use skilled birth attendants. Meanwhile, this practice declined subsequent births due to the experience of pregnancy and childbirth. Exposure to media may increase women's knowledge or awareness and positive attitudes towards antenatal care and skilled birth attendants. As a result, young women who read newspapers, listen to radio and watch television are likely to use reproductive health services. In relation to women's working status, women who are working are more likely to be educated, involved in household decision-making and exposed to reproductive health services than those who are not working. ANC visits helps young women to have better understanding of risk of complication of pregnancy and childbirth, and enables young women to make a decision regarding use of skilled birth attendants [40].
Limitations And Strengths

The study is based on the data from Nepal Demographic and Health Survey 2016, a cross-sectional survey. Therefore, this study is limited in establishing causal relationships between variables. Efforts were made to examine the association between explanatory variable and outcome variables. This study included those variables which are available for analysis of DHS. Another limitation of the study is that this study used a quantitative method to analysis data. The main strength of the study include the use of a nationally representative data and multivariate methods to identify factors influencing the use of reproductive health services among young women.

Conclusion

There have been significant improvement in reproductive health indicators among the young women. The finding of this study revealed that number of living children, fertility preference, women's participation in household decision-making and exposure to media are the important predictors of modern contraceptive use among young women in Nepal. This study identified women's education, working status, wealth quintile, birth order, fertility preference and exposure to media as factors influencing of ANC visits. The study also showed that women's education, wealth quintile, birth order, and ANC visits are significantly influenced use of skilled birth attendants in delivery among young women. The study concluded that improving women's education level, generating employment opportunities, improving household economic status, proper media campaigns and encouraging young women to attend at least four ANC visits are important steps to improve young women's use of reproductive health services in Nepal. In order to improve use of reproductive health services among young women, efforts should be made to target young women of low education level, low economic status, higher birth order, and low
exposure to media. The study results indicated that further research is required to understand the perspective of young women towards reproductive health service and explore the barriers that effects use of reproductive health services.

**Abbreviations**

ANC  
Antenatal care

CI  
Confidence interval

DHS  
Demographic and Health Survey

EA  
Enumeration area

NDHS  
Nepal Demographic and Health Survey

OR  
Odds ratio

PSU  
Primary sampling unit

SBA  
Skilled birth attendant

SDG  
Sustainable development goal

SLC  
School living certificate

**Declarations**

**Ethics approval and consent to participate**

Data from the 2016 Nepal Demographic and Health Survey was use for this study. The DHS Program accessed the data after reviewing research proposal. The ethical approval for the survey was obtained by ICF International Institutional Review Board (IRB). Further
approval for this study was not required since data are freely available in public domain.

**Consent for publication**

This study does not include data from any individual person therefore consent to publish is not applicable.

**Availability of data**

The data used in this study are freely available from The DHS Program website (https://www.dhsprogram.com/data/available-datasets.cfm). The study was carried out specifically using 2016 Nepal Demographic and Health Survey dataset.

**Competing interests**

The author have no competing interests.

**Founding**

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**Authors' contributions**

Naba Raj Thapa conducted data analysis, review literature, interpretation and drafted the paper.

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