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Factors influencing Indonesian women's use of maternal health care services

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ABSTRACT

Employing the 2012 Indonesia Demographic and Health Survey data, we aimed to examine factors influencing married women to use maternity services. Data of married women who had given birth in the last five years before the survey were included in the analysis ($n = 14,672$). Factors of education, employment, women's age at first marriage, age at first birth, spousal education difference, contraceptive use, place of residence, and woman's attitude toward wife beating were associated with the use of antenatal care, institutional delivery, and postnatal care services. The likelihood of women using those recommended maternal health care services increased along with the increased educational attainment among women and their spouses, and the older age at first birth. Higher schooling years may contribute to improving adequate maternal health care. Community awareness on maternal health issues should be promoted and include the prevention of early marriage, teenage pregnancies, and domestic violence.

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By the end of Millennium Development Goals (MDGs), the maternal mortality ratio (MMR) has been successfully reduced by almost half since 1990 (United Nations, 2015). Nevertheless, more than three hundred thousand women around the world died during pregnancy and childbirth in 2015, while millions of women experience risks of obstetric complications and other health problems (World Health Organization, 2015). Almost 59% of these maternal deaths were from 10 developing countries including Indonesia (World Health Organization, 2015). This country ranks the fourth highest MMR among Southeast Asian countries after Lao PDR, Myanmar, and Cambodia (ASEANstats, 2015). Based on the 2012

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Indonesian Demographic and Health Survey (the 2012 IDHS), the MMR fell slightly from 390 deaths per 100,000 live births in 1991 to 359 deaths per 100,000 live births in 2012 (Bappenas, 2015). Every year, about five million women give birth in this country bringing more concern on this persistent high mortality rate (MoH, 2015).

Utilization of maternal health care is central to reducing maternal mortality. Having a minimum of four antenatal care (ANC) visits and childbirth assistance from a skilled health worker are among major essential recommendations to prevent adverse pregnancy outcomes (World Health Organization, 2007). The United Nations (1999) set up the ultimate target of skilled birth attendance at 90% by 2015. Globally, the utilization of maternal health is lower than the expected target as indicated by 71% of births were assisted by health professionals and approximately 50% pregnant women in developing countries received recommended ANC services in 2014 (United Nations, 2015). Compared to this global situation, Indonesia shows a more remarkable achievement. Between 1991 and 2014, the percentage of Indonesian women having four or more ANC visits and skilled birth attendance increased from 56% to 86% and from 41% to 87%, respectively (Bappenas, 2015). However, the utilization rate of the facility-based delivery services was 63% in 2012 (Statistics Indonesia (Badan Pusat Statistik—BPS), National Population and Family Planning Board (BKKBN), Kementerian Kesehatan (Kemenkes-MOH), & ICF International, 2013), much lower than the national target of 90% (Pritasari, 2012). In addition, poor health service quality and inequity in accessing maternal health services between the poor and the wealthy people as well as urban and rural regions remain challenging (The National Academy of Sciences, 2013).

Various factors are considered attributing to the levels of utilization and pregnancy outcomes. Thaddeus & Maine (1994) suggested a theoretical framework explaining socioeconomic/cultural aspects, accessibility to a health service institution, and quality of care as the key factors determining the care-seeking decision and ultimately influencing the utilization and outcome of maternal health services. The socioeconomic/cultural factors emphasize especially on the status of women in the domestic and public sphere, which comprises of education, culture, wealth, and autonomy (Thaddeus & Maine, 1994). In line with this theory, many previous studies investigated factors affecting the use of maternity care services.

A systematic review incorporating studies from developing countries by Çalışkan, Kılıç, Öztürk, & Atılgan (2015) identified numerous determinants that correlated to the use of maternal health care services including wealth, educational attainment, race/ethnicity/religion, age, parity, place of living, household size, knowledge about maternal health, autonomy status of women, and health insurance. In Sub-Saharan Africa, maternal factors namely education, place of residence, parity, level of household income, and frequency of antenatal visits strongly associated with institutional delivery (Moyer & Mustafa, 2013). Other studies of the less developed world found that women with low income, residing in rural regions, and having a low level of education are less likely to take ANC services

(Abou-Zahr & Wardlaw, 2003) and to seek childbirth assistance from skilled attendants (Gabrysch & Campbell, 2009). At the individual level, variables of education, age at the last childbirth, and attitude towards family planning are the strongest predictors of the utilization of ANC services and postnatal care (PNC) in Nigeria (Babalola & Fatusi, 2009).

In the same vein, several studies in Southeast Asian countries with high maternal mortality also found that women's education, household wealth index, and residential place were among the major determinants for the utilization of ANC and PNC (Prusty, Buoy, Kumar, & Pradhan, 2015; Sein, 2012). In their previous study in Indonesia, Beegle, Frankenberg, & Thomas (2001) reported the significant association between variables of age and the husband–wife educational gap, and the use of prenatal and delivery care. Likewise, another study of Indonesia revealed that several factors, such as living in rural region, lower family income, poor maternal knowledge, and high birth orders with closely spaced births (less than two years), had significant associations with the low utilization of ANC (Titaley, Dibley, & Roberts, 2010).

As the reduction of maternal mortality remains significant in the next global development agenda, it is imperative to have a better understanding of the factors associated with the utilization of three aspects of maternity care – antenatal, delivery, and postnatal services using the most recent available nationwide data. In this study, therefore, authors aimed to examine factors that affect the use of maternal health care services among Indonesian women. We expect that the results of this study contribute to supporting effective policies and approaches as well as identifying further research for improving the utilization of maternal health care.

Methods

Study population

We utilized data from the 2012 Indonesia Demographic and Health Survey (IDHS). This population-based survey was conducted nationally aiming to present data on fertility, contraception, maternal and child health, maternal mortality, and knowledge of sexually transmitted infections (STIs) including HIV/AIDS for policy makers and health managers (Statistics Indonesia (Badan Pusat Statistik—BPS) et al., 2013). The survey respondents were men and women of reproductive age at the household level. Data of 46,024 households involving 45,607 married and unmarried women aged 15–49 (96% response rate) and 9,306 married men aged 15–54 (92% response rate) were successfully collected for this survey.

The sample used for this present study comprises of 14,672 married women who reported giving birth to at least one child in the last five years before the interview. This period allowed researchers to obtain information on demographic characteristics, their reproductive record, pregnancy, and postpartum care from their most recent experience.

Study variables

Based on previous literature, in this present study, we examined some variables that may affect the maternity service utilization using the children's dataset. Those independent variables included literacy and educational attainment, employment and occupation, maternal age at first marriage and first birth, contraceptive use, spousal age difference, spousal education difference, place of residence, women's participation in household decisions, and women's attitude toward wife beating. The participation of women in the household decision was based on respondent's answer upon their involvement in making decisions about their health care, large household purchases, and visits to family or relatives (Statistics Indonesia (Badan Pusat Statistik—BPS) et al., 2013). Women's attitude toward wife beating was measured based on their view that justified beatings for some reasons including (1) "burns the food," (2) "argues with him," (3) "goes out without telling him," (4) "neglects the children," and (5) "refuses to have sexual intercourse with him" (Statistics Indonesia (Badan Pusat Statistik—BPS) et al., 2013). In this variable, we categorized women as having a low self-esteem if they justify wife beating for at least one reason, while the women with high self-esteem were those with disagreement of wife beating for any reason.

We analyzed the dependent variables of three indicators of utilization of maternal health care: minimum four ANC visits, institutional delivery, and PNC services. Institutional delivery referred to childbirth assisted by trained health workers (doctor, midwife, or nurse) in health facilities such as hospitals, community health centers, medical centers, and village maternity posts. We defined the use of PNC service as respondent's check-up after delivery during the first week.

Analytical approach

In this study, the characteristics of respondents were described in the frequency tabulations. We employed bivariate and multiple logistic regression analyses to identify factors associated with the use of maternal health services. Bivariate analyses were performed to determine the associations between independent variables of literacy and educational attainment, employment and occupation, maternal age at the first marriage and at the first birth, contraceptive use, spousal age difference, spousal education difference, the place of residence, women's participation in household decisions, and women's attitude toward wife beating, and the dependent variables of the minimum of four ANC visits, institutional delivery, and PNC. We applied the multiple logistic regression to further analyze the relationships between those independent variables and the three variables of maternal health service utilization. The results were presented in estimated adjusted odds ratios with a 95% confidence interval. The data analyses were carried out by using SPSS version 17.0 (SPSS, Inc., Chicago, IL).

Limitations of the study

As we used the secondary data, selection of variables and the analysis were limited to the availability of the data collected, so the results of this study should be interpreted with caution. Our study employed the cross-sectional design so that a causal relationship between the independent and dependent variables could not be determined. Another limitation is that the interviewed women may not accurately provide information related to their reproduction experience due to recall bias which troubles them looking back to the event in the last five years before the interview.

Ethical considerations

The 2012 IDHS project was granted an ethical clearance by the National Institute for Health Research and Development (NIHRD) of the Ministry of Health. Before the interview, all respondents of the 2012 IDHS were given information about the survey and they agreed to participate by submitting written informed consents. Authors also obtained approval from the DHS to use and analyze the data (DHS, 2013).

Results

As displayed in [Table 1](#), of 14,672 married women interviewed in this study, about 53.5% completed the secondary level of education. Less than half of the total sample (45.6%) were unemployed. About half of the women (50.9%) firstly married at the age range of 20–29 years, while 62.5% of the women reported giving the first birth also within this range of age.

Regarding the family planning, a majority of the women (71.7%) informed that they used the modern method. About two-third of the women (65.4%) were about the same age with their partners, while 64.8% reported having the same level of education with their spouses. Over half of the sample population (54.3%) were rural residents. With respect to the women's participation in the household decision-making, most of the study respondents reported having been involved in making decisions for their own health care (84.5%), major household purchases (82.7%), and visits to family (84.9%). On women's attitude toward wife beating, majority of the women disagreed that a husband is justified to beat his wife if the wife burns food (95.5%), argues with husbands (90.3%), refuses to have sex (87.6%), goes out without husband's permission (70.2%), and neglects the children (67.8%).

[Table 2](#) shows that 85% of the sample women attended at least four ANC visits, 56% gave birth in a health facility, and 86% received PNC service. The bivariate analysis shows that eight out of ten factors examined in this study – including education, employment, women's ages at both first marriage and first birth, spousal education difference, use of contraceptive, their place of residence, and woman's attitude toward wife beating – had significant associations with all those three maternal health indicators. The utilization rate of maternal health care was higher

Table 1. Distribution of married women aged 15–49 years by background characteristics.

| Background characteristics | <i>n</i> | % |
|--|----------|-------|
| Literacy and educational attainment | | |
| Illiterate | 782 | 5.3 |
| Primary | 4,129 | 28.1 |
| Secondary | 7,843 | 53.5 |
| Higher | 1,918 | 13.1 |
| Employment and occupation | | |
| Not working | 6,695 | 45.6 |
| Agricultural workers | 1,858 | 12.7 |
| Paid job | 6,119 | 41.7 |
| Age at first marriage | | |
| < = 19 | 6,757 | 46.1 |
| 20–29 | 7,464 | 50.9 |
| > = 30 | 451 | 3.1 |
| Age at first birth | | |
| < = 19 | 4,709 | 32.1 |
| 20–29 | 9,174 | 62.5 |
| > = 30 | 789 | 5.4 |
| Contraceptive use | | |
| No | 4,147 | 28.3 |
| Yes | 10,525 | 71.7 |
| Spousal age differences | | |
| Spouse is younger | 182 | 1.2 |
| About the same | 9,602 | 65.4 |
| Spouse is older | 4,888 | 33.3 |
| Spousal education differences | | |
| Spouse's education level is lower | 2,528 | 17.2 |
| The same level | 9,507 | 64.8 |
| Spouse's education level is higher | 2,637 | 18.0 |
| Place of residence | | |
| Urban | 6,710 | 45.7 |
| Rural | 7,962 | 54.3 |
| Women's participation in household decisions | | |
| Decision on respondent's health care | | |
| No | 2,270 | 15.5 |
| Yes | 12,402 | 84.5 |
| Decision on large household purchases | | |
| No | 2,536 | 17.3 |
| Yes | 12,136 | 82.7 |
| Decision on visits to family or relatives | | |
| No | 2,210 | 15.1 |
| Yes | 12,462 | 84.9 |
| Women's attitudes toward wife beating | | |
| Beating justified if wife goes out without telling husband | | |
| No | 10,307 | 70.2 |
| Yes | 4,365 | 29.8 |
| Beating justified if wife neglects the children | | |
| No | 9,948 | 67.8 |
| Yes | 4,724 | 32.2 |
| Beating justified if wife argues with husband | | |
| No | 13,252 | 90.3 |
| Yes | 1,420 | 9.7 |
| Beating justified if wife refuses to have sex with husband | | |
| No | 12,852 | 87.6 |
| Yes | 1,820 | 12.4 |
| Beating justified if wife burns the food | | |
| No | 14,019 | 95.5 |
| Yes | 653 | 4.5 |
| Total | 14,672 | 100.0 |

Table 2. Distribution of women who utilized maternal health care based on background characteristics.

| Background characteristics | ≥ 4 ANC visits <i>n</i> (%) χ^2 | Institutional delivery <i>n</i> (%) χ^2 | PNC <i>n</i> (%) χ^2 |
|---|---|---|---------------------------------|
| Literacy and educational attainment | | | |
| Illiterate | 411 (3.3) | 178 (2.1) | 467 (3.7) |
| Primary | 3,193 (26) | 1,595 (19.2) | 3,307 (25.9) |
| Secondary | 6,934 (56) | 4,992 (60.0) | 7,125 (55.9) |
| Higher | 1,821 (14.7) | 1,553 (18.7) | 1,847 (14.5) |
| | 1007.669*** | 1530.28*** | 930.00*** |
| Employment and occupation | | | |
| Not working | 5,658 (46) | 3,885 (46.7) | 5,878 (46) |
| Agricultural worker | 1,287 (10) | 475 (5.7) | 1,314 (10) |
| Paid job | 5,414 (44) | 3,958 (47.6) | 5,554 (44) |
| | 396.784*** | 897.258*** | 511.396*** |
| Age at first marriage | | | |
| ≤ 19 | 5,358 (43) | 3,004 (36) | 5,599 (44) |
| 20–29 | 6,592 (53) | 4,962 (60) | 6,722 (53) |
| > 30 | 409 (4) | 352 (4) | 425 (3) |
| | 231.953*** | 786.922*** | 183.185*** |
| Age at first birth | | | |
| ≤ 19 | 3,637 (29) | 1,946 (23) | 3,837 (30) |
| 20–29 | 8,002 (65) | 5,744 (69) | 8,168 (64) |
| > 30 | 720 (6) | 628 (8) | 741 (6) |
| | 264.784*** | 752.411*** | 191.896*** |
| Contraceptive use | | | |
| No | 3,224 (26) | 2,256 (27) | 3,366 (26) |
| Yes | 9,135 (74) | 6,062 (73) | 9,380 (74) |
| | 183.494*** | 12.372*** | 165.040*** |
| Spousal age differences | | | |
| Spouse is younger | 157 (1.3) | 110 (1.3) | 157 (1.2) |
| About the same | 8,099 (65.5) | 5,567 (67) | 8,356 (65.6) |
| Spouse is older | 4,103 (33.2) | 2,641 (31.7) | 4,233 (33.2) |
| | 0.975 | 21.609*** | 0.570 |
| Spousal education differences | | | |
| Spouse's education level is lower | 2,149 (17) | 1,444 (17) | 2,242 (18) |
| The same level | 8,097 (66) | 5,566 (67) | 8,337 (65) |
| Spouse's education level is higher | 2,113 (17) | 1,308 (16) | 2,167 (17) |
| | 40.860*** | 67.497*** | 63.901*** |
| Place of residence (urban/rural) | | | |
| Urban | 6,146 (49.7) | 5,243 (63) | 6,258 (49) |
| Rural | 6,213 (50.3) | 3,075 (37) | 6,488 (51) |
| | 504.300*** | 2,315.887*** | 442.846*** |
| Women's participation in household decisions | | | |
| None or one decision | 1,575 (13) | 1,089 (13) | 1,671 (13) |
| Two or more decisions | 10,784 (87) | 7,229 (87) | 11,075 (87) |
| | 22.219*** | 0.156 | 0.521 |
| Women's attitudes toward wife beating | | | |
| Low self-esteem | 4,832 (39) | 2,945 (35) | 5,009 (31) |
| High self-esteem | 7,527 (61) | 5,373 (65) | 7,737 (61) |
| | 28.343*** | 171.035*** | 21.556*** |
| Total | 12,539 (85) | 8,318 (56) | 12,746 (86) |

* $p < .05$, ** $p < .01$, *** $p < .001$.

among women with the secondary level of education than other women groups. The utilization rates of ANC and PNC services were slightly higher among unemployed respondents than those with paid jobs, but the institutional delivery rate was a little higher among employed respondents than other groups. Higher utilization level of ANC, institutional delivery, and PNC were also shown by groups of

women who first married and gave birth at the age between 20 and 29 years old, used modern contraception, and had no difference in level of education with their husbands. Compared to women with low self-esteem, women with high self-esteem showed a larger proportion of the use of all maternal health care services. While the proportion of women attending at least four ANC visits was higher among the rural residents, a larger percentage of institutional delivery and PNC contacts were observed among the urban women group.

Other remaining factors also presented significant associations, but each was with only one dependent variable. Spousal age difference factor was associated with institutional delivery, while women's participation in the household decision was linked to the uptake of ANC. The utilization level of all maternal health care was seen higher among respondents who were of the same age with husbands and participated in making two or more decisions.

Further statistical analysis was performed, with the findings as presented in [Table 3](#). The likelihood of utilizing maternal health services increased with the level of education. In comparison to women with lower education, the women with higher education were almost 11 times more likely to receive the recommended ANC, six times to give birth in a health institution, and nearly 10 times to obtain PNC services within the first week of childbirth. Possessing a paid job is a strong predictor in using ANC services. Women who work as professionals, technicians, managers, clerks, salespersons, service staff, industrial workers, or have other salaried employment have a higher probability of accessing the recommended ANC services than those who are unemployed or work in the agricultural sector. On the other hand, working in agriculture showed negative associations with all maternal health care utilization. Female farm workers were less likely to receive the minimum four of ANC visits, deliver in a health facility, and receive PNC services by 0.7, 0.5, and 0.6 times, respectively.

Having the first marriage between the ages of 20 and 29 years also increased the likelihood of women to receive institutional delivery by 1.3 times. The chance of receiving maternal health services also tended to increase as the women grew older. Women who gave the first birth at their 30 or more years were two times more likely to use the ANC and PNC services, and three times more likely to undergo institutional delivery than the younger ones. Moreover, the use of modern contraceptive methods also increased the probability of women by 1.9 times in receiving both ANC and PNC services. Although not statistically significant, women whose husbands were older were more likely to receive minimum four ANC (AOR = 1.07, 95%CI = 0.68–1.69), deliver at health institution (AOR = 1.16, 95%CI = 0.82–1.66), and have a PNC check-up (AOR = 1.44, 95%CI = 0.91–2.28) than the women with the same age or younger age husbands.

With regard to the educational gap between spouses, our study shows that the odds of using maternal health care increased when the husbands had the education level higher than their wives did. Wives whose husbands' education was higher were almost two times more likely to receive the three maternal care interventions

Table 3. Multiple logistic regression of the determinants associated with the utilization of minimum four ANC visits, institutional delivery and PNC service among married women in Indonesia.

| Background characteristic | ≥ 4 ANC visits AOR (95% CI) | Institutional delivery AOR (95% CI) | PNC AOR (95% CI) |
|--|--------------------------------|--|----------------------|
| Literacy and educational attainment | | | |
| Illiterate | 1 | 1 | 1 |
| Primary | 2.54 (2.15–2.99)*** | 1.76 (1.46–2.13)*** | 2.14 (1.81–2.54)*** |
| Secondary | 5.23 (4.37–6.24)*** | 3.90 (3.22–4.73)*** | 4.66 (3.87–5.61)*** |
| Higher | 10.90 (8.14–14.34)*** | 6.67 (5.28–8.43)*** | 9.96 (7.28–13.62)*** |
| Employment and occupation | | | |
| Not working | 1 | 1 | 1 |
| Agricultural worker | 0.72 (0.64–0.82)*** | 0.52 (0.46–0.59)*** | 0.57 (0.50–0.65)*** |
| Paid job | 1.20 (1.07–1.34)*** | 1.07 (0.98–1.16) | 1.15 (1.02–1.30) |
| Age at first marriage | | | |
| < = 19 | 1 | 1 | 1 |
| 20–29 | 1.07 (0.93–1.23) | 1.27 (1.15–1.41)*** | 1.07 (0.93–1.24) |
| > = 30 | 0.86 (0.53–1.40) | 0.94 (0.65–1.36) | 1.21 (0.69–2.11) |
| Age at first birth | | | |
| < = 19 | 1 | 1 | 1 |
| 20–29 | 1.37 (1.20–1.57)*** | 1.38 (1.24–1.55)*** | 1.23 (1.06–1.42)** |
| > = 30 | 2.09 (1.43–3.07)*** | 3.07 (2.29–4.12)*** | 2.02 (1.32–3.09)*** |
| Contraceptive use | | | |
| No | 1 | 1 | 1 |
| Yes | 1.89 (1.71–2.08)*** | 1.18 (1.08–1.28) | 1.89 (1.70–2.11)*** |
| Spousal age differences | | | |
| Spouse is younger | 1 | 1 | 1 |
| About the same | 0.91 (0.58–1.44) | 1.08 (0.76–1.54) | 1.26 (0.80–1.99) |
| Spouse is older | 1.07 (0.68–1.69) | 1.16 (0.82–1.66) | 1.44 (0.91–2.28) |
| Spousal education differences | | | |
| Spouse's education level is lower | 1 | 1 | 1 |
| The same level | 1.51 (1.31–1.73)*** | 1.38 (1.24–1.54)*** | 1.36 (1.17–1.59)*** |
| Spouse's education level is higher | 1.85 (1.54–2.21)*** | 1.74 (1.50–2.01)*** | 1.53 (1.26–1.85)*** |
| Place of residence (urban/rural) | | | |
| Rural | 1 | 1 | 1 |
| Urban | 1.90 (1.70–2.12)*** | 3.72 (3.44–4.03) | 1.83 (1.62–2.07)*** |
| Women's participation in household decisions | | | |
| None or one decision | 1 | 1 | 1 |
| Two or more decisions | 1.11 (0.98–1.27) | 0.86 (0.77–0.96)*** | 0.91 (0.78–1.05) |
| Women's attitudes toward wife beating | | | |
| Low Self Esteem | 1 | 1 | 1 |
| High Self Esteem | 1.06 (0.97–1.17) | 1.24 (1.14–1.33)*** | 1.04 (0.94–1.15) |

AOR (Adjusted odds-ratio), * $p < .05$, ** $p < .01$, *** $p < .001$.

than those whose husbands were equally educated or lower. Urban residents were, respectively, 1.9 times and 1.8 times also more likely to receive ANC and PNC services than rural dwellers. Women with high self-esteem had 1.2 times higher probability to experience institutional delivery than those with low self-esteem. Meanwhile, this study generated an interesting finding that women's involvement in the household decision-making showed a negative association with the institutional delivery.

Discussion

In this study, except institutional delivery, women's use of maternal health care showed a major improvement. The utilization rate of the ANC visits in Indonesia is considered the highest among other developing countries in the South and

Southeast Asia region (Wang, Alva, Wang, & Fort, 2011). A part of this achievement is attributable to the expansion of village midwife program in integration with *Posyandu*, a regular outreach primary health care program (The National Academy of Sciences, 2013). Similarly, the PNC utilization among the women in this study reached 86%, which is higher than the average proportion of PNC among other low and middle-income countries at 58% in 2016 (World Health Organization, 2016). However, despite the steady growth of institutional delivery, Indonesia achieved a lower proportion than its neighboring country, Vietnam, which reached 80% in 2002 (Wang et al., 2011). From the statistical analysis, all factors assessed in this study appeared having significant associations with the uptake of maternal health care services. Despite some enabling factors found in this study, there were also some barriers that needed to be addressed, especially if this country wants to increase the use of institutional delivery.

Confirming many previous studies (Birmeta, Dibaba, & Woldeyohannes, 2013; Celik & Hotchkiss, 2000; Regassa, 2011; Tsawe et al., 2015; Tsegay et al., 2013), education factor was a strong predictor in the utilization of maternal health services in this study. The level of education was significantly associated with the use of ANC services, skilled birth attendants at a health facility and PNC check-ups. A multi-country study by Ahmed, Creanga, Gillespie, & Tsui (2010) found that women who completed a primary education were more than two times likely to access ANC services than uneducated women. In the Philippines, women of a higher educational level had an increased probability of selecting the facility-based delivery than women with a lower level of education (OR 5.9, 95% C.I. 2.7–12.9) (Shimazaki, Honda, Dulnuan, Chunanon, & Matsuyama, 2013). Empowering women with formal education enhance women's capacity in recognizing their rights to health and making proper decisions for their health (Achia & Mageto, 2015). Women with a proper education also have capability to seek and obtain health care information and use it accordingly (Rai, Singh, & Singh, 2012).

This is also similarly true for the spousal education difference factor, which signifies that if husbands' education level is higher than their wives, the chance for having four or more ANC services, institutional delivery, and the PNC services increases as well. This concurs with findings from previous studies in various countries in which the education background of women and their spouses significantly influenced the usage of ANC, trained delivery attendants, and PNC services (Chakraborty, Islam, Chowdhury, Bari, & Akhter, 2003; Furuta & Salway, 2006; Rai et al., 2012; Tarekegn, Lieberman, & Giedraitis, 2014). In Nepal, the high educational level of husbands associated with their involvement in birth preparedness (Thapa & Niehof, 2013). Higher educated husbands might be more well-informed about maternal health issues and become aware of the importance of providing the wives with access to care. This finding suggests that gender equality in education should become a priority in this country as well as other less developed countries. Increasing years of schooling for both male and female through various educational programs is crucial in improving the maternal health care utilization.

Our study also showed the significance of employment factor in influencing women to utilize maternal health care. Employed women are more likely to have ANC, and tend to undergo institutional delivery and PNC confirming the findings of previous studies (Chakraborty et al., 2003; Chama-Chiliba & Koch, 2015; Furuta & Salway, 2006). Employment, along with the control over earning, prevents women from having financial constraint and increases their freedom to seek care (Chama-Chiliba & Koch, 2015). Correspondingly, in our study, female agricultural workers are less likely to use any maternity care. Extensive work in the field may hinder these women from attending maternity care services. Public health services are mostly provided during the daytime. Attending maternity care takes a considerable time off from work, which could cost female agricultural workers the loss of income (Titaley, Hunter, Dibley, & Heywood, 2010). Providing flexible service hours and maternity health insurance would help agricultural workers removing their barriers in accessing health services.

Maternal age is also a significant influence in the maternal health care utilization in this study. Women married at over 19 years old were more likely to use health facilities for child delivery. Giving birth to the first child at over 19 years old increased the odds of using all recommended maternal health care services. Some studies reported that maternal age has a pivotal role in influencing the use of maternal health care (Birmeta et al., 2013; Tran, Gottvall, Nguyen, Ascher, & Petzold, 2012). Knowledge and experience accumulate along with the women's age which can affect their decision to get maternity and childbirth care (Chakraborty et al., 2003). These findings imply that delaying marriage and childbearing of young women would be beneficial in improving maternal health care. Extending the period of formal education and providing sexual reproductive health education should be promoted to prevent adolescent marriage and childbearing.

In this study, the use of contraception associated with both ANC and PNC contacts. Family planning practice reflects women's autonomy in accessing reproductive health service that may also encourage the increased use of other maternal care services (Fotso, Ezeh, & Essendi, 2009; Woldemicael, 2010). Conversely, women may adopt the family planning because of the information received from the health providers during their ANC and PNC contacts. Likewise, place of residence is an influential factor to the ANC and PNC uptakes in our study which is consistent with studies elsewhere (Tarekegn et al., 2014; Tsawe et al., 2015). With easier access to health care services, urban women are more benefited in receiving ANC, institution-based delivery, and PNC services than rural women. Increasing availability and accessibility of maternal health care services in rural areas would be a significant strategy to promote the utilization.

In the multiple logistic regression analysis, our results showed that women who jointly made at least two household decisions were less likely to use institutional delivery, contradicting some other previous studies (Hou & Ma, 2013; Matsumura & Gubhaju, 2001; Sado, Spaho, & Hotchkiss, 2014). A study by Tey & Lai (2013) found that women's participation in decision-making had no significant influence

on institutional delivery in five of six countries studied. Barriers of distance, transportation and cost of health services were cited as the most crucial reasons for women not to deliver in a health facility (Tey & Lai, 2013). In other studies, women's decision for not using institutional delivery and other maternal health care could be influenced by their previous experience with non-complication pregnancy (Titaley et al., 2010) or incompetent health providers (Birmeta et al., 2013). While women who are involved in the household decision-making are considered as having a high autonomy status, promoting women's awareness on birth preparedness would be a fundamental effort. Women need to be informed about the risk of complications in pregnancy and childbirth. Training to improve the competency of skilled birth attendants should also become one of the strategic interventions for strengthening the quality of maternal health care.

In this present study, almost two-third of the women had a high self-esteem for their disagreement with any reason of wife's beating. High self-esteem women were more likely to deliver child at a health institution than the low self-esteem women. This finding is in line with other studies that women with a strong opinion against partner's violence show a significant likelihood to receive delivery care (Fawole & Adeoye, 2015; Singh, Bloom, & Brodish, 2015; Woldemicael, 2010). In some communities, partner's violence is considered as a domestic issue rather than a form of violence because of a cultural belief that places women as men's subordinate (UNFPA, UNIFEM, & OSAGI, 2005). Therefore, policies and cultural norms against domestic violence need to be reinforced and promoted. Raising women's awareness on zero tolerance toward domestic violence can be included in the strategy of the improvement of maternal health care utilization.

Conclusion

Despite the notable progress made in the recent decades, the utilization of maternal health care, especially the institutional delivery still needs further improvement. The key factors associated to the recommended maternal health care services were education, employment, age at first birth, contraceptive use, and the place of residence. With regard to institutional delivery, age at first marriage, participation in the household decision-making, and attitudes toward wife beating were also significant factors. Increasing participation of women in higher education and economic activities as well as community awareness on maternal health issues may contribute to the improved utilization of maternal health care. Girls should be encouraged and facilitated to extend their years of schooling to prevent early marriage and childbearing. Interventions to promote women's employment and agricultural productivity will ensure their self-sustenance and ease their financial constraints in accessing health care. Maternal health education program should include sexual and reproductive health issues aiming at both men and women. This program should accommodate the prevention of domestic violence as well. The diverse

cultural norms and belief in the society, however, should be taken into consideration. Finally, improvement quality of maternal health care should receive a higher priority in the health development of any nation. Aligned with the universal health care policy, adequate infrastructure, supplies, and qualified health workforce should be made available and accessible for all women, especially in rural areas. Incorporating these evidence into the policy context would contribute to meeting the target of maternal health within the Sustainable Development Goals. Further research on women empowerment status and how it relates to the maternal health care utilization may be tested.

Declaration

The authors declare that this manuscript has not been published elsewhere and has not been submitted simultaneously for publication elsewhere.

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