PREVALENCE AND FACTORS ASSOCIATED WITH ABORTION IN NEPAL: A NATIONAL CROSS-SECTIONAL STUDY

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Abstract

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YOGI ABINATH: PREVALENCE AND FACTORS ASSOCIATED WITH ABORTION IN NEPAL: A NATIONAL CROSS-SECTIONAL STUDY

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Background: Maternal health is one of the major indicators determining health status in the country. A large number of factors determine the maternal health and maternal mortality. Abortion is one of the major factor contributing to the high maternal mortality in the low- and middle-income countries. This study aims to identify the prevalence of abortion in Nepal and various factors associated with it in Nepal.

Methods: This study utilized nationally representative sample based on Nepal Demographic and Health Survey (NDHS) 2011 data. Women having at least one birth in the last five years (n=4148) were studied. Abortion was measured on the basis of the reason provided by the women for having their last abortion. Likewise, unsafe abortion was measured on the basis of provider providing the service to women. Knowledge on abortion legality, reason for having abortion, knowledge on place to have a safe abortion was measured using the response provided by the women. Prevalence of abortion and the association of abortion and unsafe abortion with various factors were assessed using Odds Ratio (OR) with their 95% Confidence Interval (CI) using binary logistic regression models.

Results: The prevalence of abortion was found to be 4.8 percent and of the total abortions 17.9 percent were conducted in an unsafe way. After adjusting for each other, various demographic factors were found to be associated with abortion. Women in the age group 30-34 were more likely (OR=4.59, 95% CI 1.83-11.50) to perform abortions compared to youngest age group (15-

19 yrs) of women. Women having a secondary level of education were more likely (OR=2.58, 95% CI 1.62-4.09) to conduct abortions compared to illiterate women. Women from the Far-Western Development Region were more likely (OR=2.56, 95% CI 1.56-4.21) to perform abortions compared to women from the Eastern Development Region. Similarly, richest women in the wealth index quantiles were more likely (OR=2.97, 95% CI 1.71-5.17) to have an abortion compared to the poorest women. Moreover from logistic regression models, women in the age group 30-34 years were less likely (OR=0.08, 95% CI 0.01-0.89) to have unsafe abortions compared to the youngest women (15-19). Also the women who were in middle class in the wealth index quantile had lesser (OR=0.25, 95% CI 0.07-0.89) likelihood of conducting unsafe abortion compared to poorest women.

Conclusion: Abortion among Nepalese women is still quite popular and among all the abortions performed many of them are unsafe. Various socio-demographic factors were found to be associated with prevalence of abortion and among them wealth of the women was one factor associated with both the total prevalence of abortion and unsafe abortion. Abortion service should be made accessible and safe in order to improve the maternal health of the Nepalese women.

Keywords: Abortion, Unsafe Abortions, Determinants, Nepal, DHS

List of Acronyms

ANM	:	Auxiliary Nurse Midwife
CAC	:	Comprehensive Abortion Care
CI	:	Confidence Interval
D&C	:	Dilation and Curettage
D& E	:	Dilation and Evacuation
DIC	:	Disseminated Intravascular Coagulopathy
EA	:	Enumeration Area
EDP	:	External Development Partner
FPAN	:	Family Planning Association of Nepal
GON	:	Government of Nepal
HP	:	Health Post
I/NGO	:	International / Non Governmental Organization
MA	:	Medical Abortion
MSI	:	Marie Stopes International
MVA	:	Manual Vacuum Aspiration
NDHS	:	Nepal Demographic and Health Survey
NHRC	:	Nepal Health Research Council
NPC	:	National Planning Commission
OR	:	Odds Ratio
PAC	:	Post Abortion Care
POC	:	Product of Conception
SN	:	Staff Nurse
WHO	:	World Health Organization

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1. INTRODUCTION

Maternal health is one of the most important indicators determining the health status of the country. The maternal mortality ratio (MMR) determines the overall health status of the women in the country. Globally a high number of women die due to birth and pregnancy related complications and of the total nearly 99 percent maternal death occurs in the low- and- middle income countries (WHO, 2015). The global maternal mortality decreased to 216 as of 2015 compared to 385 per 100,000 live births in 1990 but the rate is still high in low and middle-income countries 239 versus 12 per 100,000 live birth in the high-income countries (Alkema et al., 2015). Of the 95 countries categorized with having high (MMR> 100) MMR in 1990 only 10 countries had made a significant changes in MMR as of 2015 and the rest still have high MMR (Alkema et al., 2015). Of the numerous causes of high maternal mortality abortion is one of the leading cause. The recent research have identified that of the total maternal death occurred in 115 countries during the period of 2003 and 2009, 7.9% of the deaths occurred due to abortions (Say et al., 2014). The deaths due to abortion might be higher than mentioned here as the deaths due to abortions are highly underreported (Singh et al., 2009). One of the most important factors contributing to the maternal mortality and maternal death in low- and middle-income country is unsafe abortion (WHO, 2015). Therefore, abortion accounts directly and indirectly in the increase in maternal mortality in low- and middle- income countries.

Abortion means a procedure to drive out fetus inside women before the birth. Sometimes abortion occurs spontaneously where as sometimes it occurs intentionally also known as induced abortion. Induced abortion generally known as abortion is performed both safely and in unsafe manner. Abortion performed in an unsafe manner may lead to various consequences related to economy, society and health (Singh et al., 2009). Many women in the low income countries die due to unsafe abortion. Many health consequences are caused due to abortion such as hemorrhage, sepsis, infection perforation and even death (Diedrich & Steinauer, 2009). Most of the maternal deaths due to abortions are caused due to hemorrhage, infection and poisoning from infection (Grimes et al., 2006).

The rate of abortion has been almost constant during the period of 2003 to 2008 globally where the rate is 29 in 2003 and 28 in 2008 per 1000 women aged 15-44 and the rate is 29 per 1000 women in the low- and middle-income countries excluding China (Sedgh et al., 2012). Whereas the proportion of unsafe abortion was reported to be increased from 44% in 1995 to 49% in 2008 (Sedgh et al., 2012). It has also been estimated that five million women are admitted to the hospitals due to various complications resulting from abortions yearly in the low and middle-income countries (Singh, 2006) with 20 % to 50 % due to unsafe abortion (Grimes et al., 2006). South-Asia is leading with the highest abortion rate (one-third of the total abortion worldwide) mainly due to the strict anti- abortion law in countries such as Pakistan, Bangladesh and Srilanka (Whittaker, 2013). In Nepal, abortion is reported to be the third important cause of maternal death (Warriner et al., 2011).

Though abortion is one of the most important reproductive services for the women, there has always been a challenge associated with it. Many countries in the world have provided legal acceptance while some have not. Altogether 32 countries around the globe do not permit abortion in any conditions (Singh et al., 2009). In India abortion is legal upto 20 weeks of gestation and after 12 weeks need authorization from 2 registered medical practioners (Aggarwal et al., 2013). In South Asia countries like Afghanistan and Srilanka have very restrictive law, Pakistan have restrictive law and Nepal and India have least restrictive law for abortion (Dragoman et al., 2014). However in case of Nepal, abortion service has been legalized since 2002 and the services started in 2004 (NDHS, 2011). In Nepal both public and private sector have the equal importance in providing abortion services and have been providing both surgical and medical abortion throughout the country.

Earlier researches on various factors contributing to abortion have been studied mainly in high-income countries but very less is understood in the context of low- and middle-income countries. The reasons for performing abortion have also not been clearly understood. There are few earlier studies conducted in Nepal related to different aspects of abortion implementation and interventions. However, abortion services are still largely unknown in Nepal as it was implemented only after 2002. Moreover, most of the available research findings do not provide national figures. Nepal Demographic and Health Survey started abortion related questionnaires in the survey for the first time in 2011. This provides an opportunity to study abortion with

national coverage. This study aims to analyze the prevalence and various factors associated with abortion in Nepal.

2. LITERATURE REVIEW

2.1 Abortion, and its type

Abortion is the termination of the fetus inside the women intentionally or unintentionally. In other word, abortion is defined as the removal or expulsion of embryo or fetus from the uterus intentionally or unintentionally. An abortion can occur spontaneously due to complications during pregnancy or can be induced. Induced abortion is the type of abortion in which external force or input is applied to perform abortion i.e. by using medicine or surgery to remove embryo or fetus from women's uterus (Mesce & Clifton, 2011). Abortions in most of the cases refer to induced abortion as the other form spontaneous abortion generally referred as miscarriage or still births. Also, abortion can be safe and unsafe in various settings and conditions that varies according to the religious and political condition of the nation. According to World Health Organization (WHO) " unsafe abortion is defined as the procedure for terminating an unwanted pregnancy either by the persons lacking the necessary skills or in an environment lacking the minimal medical standards, or both" (WHO, 2012).

Abortion is one of the most sensitive issues in health which have been related to different dimensions such as politics, religion, culture and moral values and beliefs (Whittaker, 2013). Abortion is both an opportunity and the threat to the society. Opportunity as it provides a chance in terminating unintended pregnancy and threat in the sense that it can be misunderstood as alternatives to family planning methods. Mostly in the low- and middle-income countries where the educational level is very low and most of the women are illiterate then the chance of the misconception is still high.

2.2 Methods of Abortion

There are different methods of performing induced safe abortion (WHO, 2012). Some are safe whereas some are unsafe and can be life threatening. It is believed that safe abortion is possible during the early pregnancy (Aggarwal et al., 2013). There are three different methods of safe abortion during the first trimester (within 12 weeks of pregnancy) which are Vacuum Aspiration,

Dilation and Curettage (D&C) and Medication Abortion (Mesce & Clifton, 2011). In vacuum aspiration method the content of the uterus is taken out with the tube called cannula and the pump. In Medical Abortion method, one or more drugs are used to drive out the content from the uterus. Generally, mifepristone and misoprostol are used for medical abortion (Mesce & Clifton, 2011). There are chances of failure around 2 to 5 percent and further can be completed using D&C and Vacuum methods (Mesce & Clifton, 2011). Similarly, in D&C methods the mechanical dilators are used to open the mouth of a cervix and the curates is used to cut the wall of the uterus. Among three methods D&C is less recommended than other two methods as it carries the risk of complication such as bleeding, infection and perforation (Mesce & Clifton, 2011).

Moreover, several unsafe methods of abortion which threaten the life of the women are also still in practice in many low- and middle-income countries (Grimes et al., 2006). Swallowing large amount of pills which are not meant for abortion, inserting sharp object in the uterus, giving harsh physical torment to one's body such as jumping or lifting heavy things or massaging for a long time to change uterus or repeated blows to the stomach are commonly practiced methods (Singh et al., 2009). Some other methods and route of unsafe abortion are using turpentine oil, bleach, acid, herbal products, excess Oral Contraceptive Pills (OCP), soap, stick sometimes dipped in oil, ball-pen point, jumping from the roof etc.(Grimes et al., 2006). Beside these as commonly used in unsafe abortions practices, there could be many more unreported unsafe practices mostly in rural areas of low- and middle-income countries.

2.3 Abortion incidence and rate

Based on the current literature on abortion, the rate of abortion has not been decreased to desired extent. According to Guttmatachor Institute, a leading organization involved in abortion research around the globe, the abortion rate decreased sharply during the period of 1995 and 2003 but it remained constant for the year 2003 to 2008 (Sedgh et al., 2012). During the period of 1995 and 2003 the incidence of abortion in the global context changed from 35 to 29 per 1000 women of reproductive age (Sedgh et al., 2012). And also among all the incidence of abortion

nearly 50 percent of them are done in an unsafe environment or by unsafe professionals. Further, abortion in African countries has been constant at 29 per 1000 women with the lowest in the Southern and highest in East Africa at 15 and 38 per 1000 women aged 15-44 respectively (Sedgh et al., 2012). A study in Senegal found that there were 51,500 abortions in the single year 2012 (Sedgh et al., 2015). In Tanzania 405,000 abortion took place in the year 2013, with the national abortion rate 36 per 1000 women aged 15-49 and the abortion ratio was 21 abortions per 100 live births (Keogh et al., 2015). Similarly, in Malawi, there were 67,300 abortions in the year 2009 resulting in the abortion rate of 23 per 1000 women aged 15-44 and the abortion ratio of 12 per 100 live birth (Levandowski et al., 2015). Abortion rate has declined in the recent years at a significant level from 35 to 29 per 1000 in woman of child bearing age in European countries (Sedgh et al., 2012). Europe has both the least and the highest abortion rate having 12 per 1000 and 43 per 1000 women aged 15-44 respectively in the Western and Eastern Europe (Sedgh et al., 2012). While in Asia, the abortion rate has been constant from 2003 to 2008 ranging from 26 per 1000 in both South Central and Western Asia and high in 36 per 1000 in South Eastern countries (Sedgh et al., 2012).

A research conducted in one of the states of India, Bihar found that the rate of induced abortion was 8.6 per 1000 pregnancies (Kochar et al., 2014). In Nepal, between the period January 2004 and June 2011, a total of 497,804 women were served abortion service since the implementation of safe abortion service in 2002 (Samandari et al., 2012). Although the abortion related complication burden at the health facilities in Nepal has decreased significantly from 54% to 28% in 2008/9 (Sedgh et al., 2012), but the coverage of health facilities is still not satisfactory and a large number of women are deprived of the services directly or indirectly. One earlier study conducted among 1172 women in Nepal reported that the incidence of repeat abortion was 32.3%,(95% Confidence Interval, 29.6-34.9) (Thapa & Neupane, 2013).

2.4 Legal provision for abortion

There are certain legal provisions around the world for providing abortion services to women. Some countries have very harsh laws to provide abortion services whereas some countries have

very liberal legal provisions. On the basis of analysis by Drogman et al. (2014), there are three types of laws around the world for providing abortion services. Drogman and colleagues have classified the countries into three groups on the basis of legal provision(Dragoman et al., 2014).

I. Very restrictive laws examples are Afghanistan, Angola, Srilanka, Philippines etc.
II. Restrictive laws examples are Argentina, Brazil, Kenya, Pakistan, Nigeria etc.
III. Least restrictive examples are Cambodia, Nepal, India, Vietnam etc.

Before the implementation of the abortion law in Nepal, women have found to be jailed for aborting their child (Whittaker, 2013). Legal acceptance of abortion came in Nepal only a few years back before which abortion was regarded as a crime. From the religious and cultural point of view abortion is still not fully accepted in Nepalese context. The parliament of Nepal passed the abortion law in 2002 and the policy was brought into effect in the year 2003.

Under abortion law 2002 of Nepal, abortion can be performed up to 12- week gestation with the request from the pregnant woman, up to 18 weeks in case of rape or incest, at any period during the pregnancy if the health of women and fetus is at threat recommended by authorized medical practitioners. Other conditions for abortion service include that the abortion service provider and the site must be listed and certified and sex-selective abortion is restricted under law (Samandari et al., 2012). There are 532 listed sites at three different levels viz. primary, secondary and tertiary in Nepal (Samandari et al., 2012). Although the abortion service was made legal in the year 2002 the abortion service started in the year 2004 with Manual Vacuum Aspiration (MVA) as the only safe method till 2009 (KC et al., 2010). Medical Abortion (MA) started in the year 2009 with the very limited accessibility (Samandari et al., 2012). Even the abortion services have started in all the district of the country the access to abortion service is still a challenge at the community level.

One of the studies conducted in Nepal after the legalization of abortion services in Nepal to know the health care providers perspective of abortion services identified that most of the clients of the abortion services are positive of the service and opined that it has helped in the legal abortion services (Rocca et al., 2013). However, some of the health care providers have contradicting voice that abortion has increased sexual activity before marriage and hence

increasing the abortion clients. Some opined that still some patients still did not want to disclose the abortion due to stigma and wrong treatment towards them (Rocca et al., 2013).

2.5 Factors associated to abortion

Abortion takes place as a collective result of the various factors associated with it. There are various reasons for performing abortion ranging from economic condition to health issues of the mother. Sometimes abortions are obligatory in case of conditions such as rape and incest whereas sometimes they are not. Various researches conducted in different part of the world have revealed that there are various factors associated with abortion. Some demographic factors may also be associated with abortion. Abortion can be more prevalent in certain age group or in certain caste or ethnic group. Still a lot of women differ socio-demographically in receiving safe abortion services in some countries.

2.5.1 Demographic factors

Those at risk of not receiving safe abortion services are more often the backward and the poorer women of the community. Young women, economically deprived and without the support of male partner are also reported to have no safe abortion (Sundaram et al., 2012).

Earlier study from India, showed that women of older age group and higher education were more likely to have abortion in second-trimester (Aggarwal et al., 2013). Another study conducted in Peru (2009) also revealed that abortion is related to different factors such as older age (OR = 1.1, 95% CI = 1.07-1.15), region or place of residence of women, the number of children and numbers of sexual partner of women (having 2 and >3 sexual partners; odd ratios between 1.6 to 2.8). Similarly having more than one children reduces the likelihood of having an abortion (Bernabé-Ortiz et al., 2009). One of the recent study from rural China identified that age of women, education, the number of total birth, the number of pregnancy, income and contraceptive methods were significantly associated with having an abortion (Gao et al., 2015). The likelihood of abortion was reported to be less in illiterate women compared to higher

educated women (OR = 0.58, 95% CI=0.53-0.63). Similarly, the abortion was less likely among the women with low yearly family income compared to women with high income (OR = 0.73, 95% CI= 0.69–0.77) (Gao et al., 2015) .

2.5.2 Women's autonomy and other factor related to abortion

Various factors could play a role in having a safe abortion. For instances the delay in abortion may be associated with the women's family and her willingness but, it may also be associated with availability of health workers and facilities. In an earlier study among young couple in Nepal found that about half of the respondents had unintended pregnancy and the large proportion of them wanted to have an abortion. Many of them were deprived of abortion due to delay in decision making or ineffective decision making (Puri et al., 2007). These delays in decision were not only related with the women but also to the family, society and the health worker providing services. In many cases, abortion decisions are affected by culture. In a study, conducted in India identified that the decision for conducting abortion were taken by members of the joint family and the spouse (Sri & Ravindran, 2012). Non-consensual sex also resulted in abortion according to the findings of the research conducted in rural part of Tamil Nadu, India (Ravindran & Balasubramanian, 2004). In the same study, it was identified that the rate of abortion was high in both younger and the older women who were forced to have sex by their husband compared to those women having sex with their consent (Ravindran & Balasubramanian, 2004). A study from Ghana highlighted that women die due to unsafe abortion and the major causes for performing unsafe abortion were stigma, financial problem and confusion regarding the legality of abortion in the country (Payne et al., 2013). Similarly, in Nepal a study identified that of the total women receiving treatment for complications in the hospitals only 44% knew that abortion was legal in Nepal (Rocca et al., 2013). Another study in Nepal have identified that many women coming for performing abortion do not know the types of abortion service available in Nepal viz. medical and surgical (Tamang et al., 2012).

2.6 Sex- selective abortion as a major contributor for abortion

Despite the fact that sex selective abortion is prohibited in most of the countries but still it is common in many countries. There are various legal provisions in different Asian countries to restrict the sex-selective abortion and the preterm sex determination. The penalty for determining sex and sex-selective abortion may lead to actions ranging from cancelation of the license of the health provider to imprisonment in some countries (Ganatra, 2008). In countries like Vietnam there are certain fines for both determination of prenatal sex and sex-selective abortion and in countries like Nepal and India, may lead to jail imprisonments also (Ganatra, 2008).

In countries like Nepal where son are given more preferences than daughter, sex-selective abortion and sex-determinations are more evident. In Hindu ideology, many rituals could only be performed by a son, which accelerate sex- selective abortion. Another important reason for the sex-selective abortion may be the dowry system prevalent in some parts of India as well as Nepal.

Earlier studies conducted in Nepal and India have suggested that sex-selective abortion is highly prevalent in these countries (Lamichhane et al., 2011 ; Frost et al., 2013 ; Valente, 2014 ; Ganatra, 2008). One of the studies among the health care provider in Nepal suggested that although the sex-selective abortion has been prohibited in Nepal, they regarded it as an increasing phenomenon due to the easy availability of the services like ultrasonography and the preference for son heighten sex-selective abortion (Lamichhane et al., 2011).

Another study from Nepal also identified a growth in sex-selection after the implementation of the abortion law in Nepal in the year 2002 (Frost et al., 2013). The investigators also found that the sex ratio for the second and the third child was very low and was the clear indication of the sex- selective abortion (Frost et al., 2013). The sex ratio for the second born child where first born was female, had dropped down by 12.35% compared to 2001-2003 in the year 2004-2006 and again there was a drop of 10.61% in the year 2007-2010 compared to 2004-2006 (Frost et al., 2013) . The same study also identified that the women with rich, or high educational level or living in the urban areas were more likely to use sex-selective abortion (Frost et al., 2013).

Nepal being surrounded by India from three borders and having similar culture and cross border marriage and easy access without visa and documents many people from Nepal visit India for sex determination and abortion. Various methods have been documented for identifying the sex of the fetus in different country. A commonly used method in Nepal has been identified as ultrasonography (Lamichhane et al., 2011). Similarly, inside India method like Ultrasound have been used to identify sex (Ganatra, 2008) and the Indians residing in America have been found using methods like ultrasound, sperm insemination, pre-implantation genetic diagnosis etc.(Puri et al., 2011). Ganatra (2008) has mentioned that in some part of India sex ratio being soaring indicating the high prevalence of sex selective abortion. Sex- selective abortion is not only a concern in Indian people living in India but also a major concern among Indians immigrants living abroad in the different countries permanently or temporarily for various reasons. A qualitative study conducted among the Indians living in the United States has highlighted the fact that they still have preferences to boys over girls. Of the total participants, 78% of the women used the ultrasound method and selective abortion (Puri et al., 2011). Though little researches on abortion related topics has been conducted among Asian migrants, the most findings emphasize the fact that sex-selective abortion is still prevalent among them especially higher among Indians migrants than other Asian migrants (Puri et al., 2011).

2.7 Consequences of abortions

Although being the most important reproductive health services for saving lives of women it has always been a topic of debate around the world. Some people accept it easily while some do not. In present context abortions has been accepted in many countries and have been legalized whereas there are many countries where abortion is still a challenge for women. Many women around the world have to resort to an unsafe route of abortion where abortion laws have been very restrictive. Also, there are different consequences and effects of safe and unsafe abortion associated with it. Safe abortions are performed by the provider and within a health institution approved or listed by the government however in some cases abortions many not be successful. It may be due to the professional capacity of the health care provider or due to the

misinformation provided by the women using abortion services. Not all methods of abortion are suitable for all gestational ages and therefore it may result in incomplete abortion if the method used was inappropriate. On the other hand, women may have to choose different unsafe methods due to various reasons such as illiteracy, legal hindrances, stigma, economic reason etc. so both safe and unsafe abortion have their own consequences. Many studies conducted around the world have found various consequences of both the safe and unsafe methods of abortion.

2.7.1 Health complications due to abortions

The major consequence of the abortion is obviously to the health of women. On the basis of estimate in the 13 different low- and middle- income countries rates of admission in health facilities varies differently and five million women are estimated to be admitted to hospitals due to different abortion complications each year (Singh, 2006). The overall rate of admission was 5.7 per 1000 in low -and middle- income countries. The rate varies from 3 per 1000 women in Bangladesh, 15 per 1000 in Egypt and Uganda, 4-7 per 1000 in Nigeria, Pakistan and the Philippines and 9 per 1000 in Latin American countries (Singh, 2006). The above however does not include the abortion provided by the private sector which results in underestimation of the problems faced by women in those 13 countries. A cross-sectional study conducted in Kenya among 2,625 women with complication resulting from abortion has found that most of the post-abortion complications ($3/4^{th}$) are of moderate and severe nature. And the severity of the complication has been found associated with whether the pregnancy was wanted or not (Ziraba et al., 2015).

One of the studies conducted in Nigeria showed that incomplete abortion and post-abortion sepsis is one of the major reasons for women to be admitted to the hospital. Of the total cases studied in that particular study 57.7% were provided by the medical doctors and nearly one-tenth was provided by nurses and midwives. But rests of the abortion services were provided by people unqualified or incompetent for services (Ikeanyi & Okonkwo, 2014). A study conducted in Taiwan have identified that out of 879 women studied, more than 9% had a failure in terminating a pregnancy. The study also highlighted the fact that medical abortion method had more likelihood of a failure after 42 days of gestational period (Chien et al., 2009). Moreover

Chien et al (2009) found that parous women (OR ≥ 3.94, 95% CI = 1.83-8.53) and women with previous birth using caesarean section delivery (OR=3.59, 95% CI = 4.30-21.39) are more likely to have failure in terminating pregnancy using medical abortion compared with women having no children. Not only medical abortion but the surgical method of abortion has also some sort of complication on the health of the women.

A meta-analysis of different studies on surgical abortion have highlighted that Dilation and Evacuation (D&E), a method used in surgical abortion has several health consequences on women (Diedrich & Steinauer, 2009). Use of Dilation and Evacuation (D&E) method resulted hemorrhage in 0.8 to 2.1 % of the total women and cervical laceration in 0.1 to 2.1 % of the women. Similarly, perforation was found in 0.09 to 15 per 1000 abortion and Disseminated Intravascular Coagulopathy (DIC) and Retained product of conception (POC) in 0.5 and 0.7 percent of all the abortion in women (Diedrich & Steinauer, 2009). The same study further highlighted that the rate of complication increases 3.8% with the increase of gestational age of women and also the mortality rate of women was also affected by the duration of pregnancy of women.

A study from Senegal found that in the year 2012 a total of 51,500 abortions occurred and 16,700 women were treated for different complications due to an unsafe method used. Further 12,200 of the total cases of abortion having different complications were not treated (Sedgh et al., 2015). A descriptive observational study conducted by Shaikh et al (2010) to identify mortality and morbidity due to unsafe abortion in Pakistan identified of the total, 22% of women performed unsafe abortion and were presented to the hospital for the management of complication. A total of 230 women were followed during the study. Out of 50 women enrolled in hospitals 15 (30%) had uterine perforation, 12 (24%) had gastrointestinal injury, 12 (24%) had acute renal failure, 8 (16%) had septicemia and 6 (12%) died of the abortion complication (Shaikh et al., 2010).

A study conducted by analyzing data over the period of 15 years in one of the tertiary hospital in India found 389 women with complication due to unsafe abortions. In total, 323 women were available for analysis of which major complications were peritonitis 222 (69%), injuries 169 (52%), shock 34 (11%), Disseminated Intravascular Coagulopathy (DIC) 14 (4.5%) etc. During

the period of 15 years, the maternal death at the very hospital was 545 among which 93 deaths were due to unsafe abortion complication (Jain et al., 2004). A cross sectional study conducted in Nepal after the legalization of abortion service in four different hospitals among the 527 women in hospital for post-abortion care identified different health consequences. Of the total participants, 90% women had pelvic or vaginal bleeding and 67% had abdominal pain. Other complication of women were identified as sepsis/septicemia 7%, high fever 2%, organ failure 1%, pelvic infection/endometritis <1%, hypovolemic shock <1% etc. (Rocca et al., 2013). A study in Nigerian hospital by Henshaw et al., (2003) identified that many women had serious complication that had attempted abortion outside a hospital. Among 491 women who had attempted outside and brought to hospital with complication (50.3%) had retained product of conception, (33.6%) had hemorrhage, 34.4% had fever, 23.5% had sepsis, 21.4% had pelvic infection, 11.4% had instrumental injury, 4.3% had shock etc. (Henshaw et al., 2003).

2.7.2 Mental health consequences due to abortions

Another important consequence associated with the post-abortion mental health consequences. Some of the studies have been able to exhibit linkage between abortion and psychological consequences afterward. A cross-sectional study conducted in Tunisia among 500 women seeking abortion service identified that 24% of the women having a first abortion and 31.3% women with repeat abortion had common mental disorders. Also, the study highlighted that 42.2% women undertaken repeat abortion among the participants (Mhamdi et al., 2015).

A study conducted in 8 different hospitals in Tehran, Iran among 261 women found that a majority had varied degree of psychological consequences from asymptomatic to very much (Pourreza & Batebi, 2011). Pourreza and Batebi (2011) further identified that 60.5% had certain level of depression, 53.6% women worried about not being able to have babies in future, 48.7% had eating disorder, 43.7% had decreased self-esteem, 39.5% had nightmare, 37.5% had guilt and 33.3% had regret having abortion. Of the total, 17.6% women were too much worried for not able to have babies and 16.5% of women had a considerable level of depression (Pourreza & Batebi, 2011). Similarly, one qualitative study conducted using in-depth interview in the United

Kingdom (UK) among the women who had performed abortion found out that there is still a stigma and taboo attached to the service. Also the participants in the study highlighted on the fact that even the health professionals had a negative attitude toward ending the pregnancy. And some of the participants even reported guilt of aborting the child. Many women even feared of secrecy and could not tell about abortion even to their close ones (Astbury-ward, Parry, & Carnwell, 2012).

2.7.3 Cost associated with abortions

Health complications are not the only consequences resulting from abortions either safe or unsafe. Abortions are linked with the costs at the different level personal, social and national level. Abortion cost not only affects the individual women but the entire health system of the country. In many countries cost of abortion service and post-abortion complications is a huge share of the total budget spent on the health system of the country. One such study conducted to estimate the average cost of post-abortion care (PAC) in Africa and Latin America. Post-abortion care in Africa and Latin America in 2006 was estimated by United States as $ 280 million but WHO estimated bit less $ 274 million (Vlassoff et al., 2009). Furthermore, the study also estimated that the average PAC cost for Africa is $ 171 million and Latin America as $ 108 million. Average cost per patient is estimated at $83 for Africa and $94 for Latin America on the basis of 2006 US model and $57 and $109 for Africa and Latin America respectively on the basis of WHO model (Vlassoff et al., 2009).

Other studies on cost expensed by the consumer of abortion services also highlight on the different range of expenses made by women in different countries and surrounding. A survey conducted in the US not only examines the cost of the expenses made by women while having the abortion but also on the aftermath of the services (Jones, Upadhyay, & Weitz, 2013). The very survey by Jones, Upadhyay & Weitz (2013) identified that 36% of the women did not have health insurance and 69% of the women paid out of pocket for abortion. Among the women without insurance, 52% found it difficult to pay for abortion service (Jones et al., 2013). A

minority of the women 14% delayed rent, 16% had to cut in food and 30% had to cut utilities and bills in order to pay abortion services.

A study linking the individual cost at the national level was conducted in Colombia. The Latin American country Colombia had to incur $14 million US dollar per year using the Post Abortion Care costing methodology for the health system (Prada, Maddow-Zimet, & Juarez, 2013). The study further estimated the cost of providing treatment to women with abortion complication at the range from $44 to $141 US Dollar. Also, the study identified the cost for treating those women with abortion complication at secondary and tertiary health facilities with $213 and $189 respectively (Prada et al., 2013). Further, they estimated the cost of Manual Vacuum Aspiration (MVA) and Medical Abortion (MA) at $45 (Prada et al., 2013).

A hospital-based study conducted in the African country Nigeria where 2093 women were studied had 666 spontaneous abortion and 1427 induced abortion. Of the total induced abortions, 682 women who aborted in the hospital and 254 women inducing abortion outside did not have any problem. But 491(32.6%) women having an abortion outside had serious complications. The average cost incurred by the women with serious complication attaining abortion outside was US $115.5 and the cost of the women attaining abortion in the hospital was US$ 32.03. (Henshaw et al., 2003) Similarly, a study conducted in another African country Uganda by Babigumira et al (2011) found out that the government had to spend $64 million on abortion at the national level for abortion services. The average societal cost for each abortion is $177 ($140-$223), direct medical cost was $65($49-$86), direct non-medical cost was $19 ($16-$23) and the average indirect cost was $92 ($57-$139) (Babigumira et al., 2011). On average patients had to incur $62 ($46-$83) and the government $14 ($10-$20) on each abortion performed. The cost incurred in abortion was significantly associated with the total cost in Uganda (Babigumira et al., 2011).

The cost of abortion service may not have an effect on the people living in the developed nation but have a huge impact in developing nations. Most of the time individuals have to borne the cost of abortion. So a large amount is spent by people for abortion service in low- and middle - income countries where a consumer, as well as the national expenses, is also affected by the

service. In the case of abortion complication, it increases both the cost for consumers as well as the government of the country eventually affecting the national budget.

3. STUDY AIMS AND OBJECTIVES

The overall aim of the study was to identify the prevalence and factors associated to abortions in Nepal.

The specific objective are

- To identify the prevalence of abortion and unsafe abortion in Nepal.
- To determine the various factors associated with abortion in Nepal
- To determine various factors associated with unsafe abortion in Nepal.

4. MATERIALS AND METHODS

4.1 Data Source

This study is based on the data of Nepal Demographic and Health Survey (NDHS) 2011 which is a nationally representative cross-sectional survey. The NDHS 2011 is a fourth in series of comprehensive survey conducted as a part of DHS Project worldwide. The main objective of the NDHS 2011 was to provide latest and reliable data on different topics related to health and demographics. The topic covered in the NDHS 2011 maternal health, child health, family planning, nutrition of child and mother, HIV and AIDS, domestic violence etc. The ethical clearance for study was obtained from Nepal Health Research Council (NHRC). Informed consent was obtained from all the participants of the study.

4.2 Sampling methods

Nepal has been divided into three regions on the basis of ecology Viz. Mountain, Hill and Terai. Similarly, it has been divided into five different development regions for the administrative purpose. Hence, the cross-section of the ecological and development region gives 15 eco-developmental region or domain but in the study three mountain region including Western, Mid-Western and Far-Western were combined into one domain because of the low population in these regions. In total, 13 domains were used in the sampling in NDHS study (NDHS, 2011). In the first stage of sampling, Enumeration Area (EA) was selected using proportional-to-size strategy. TO achieve target sample size in both the urban and rural areas, EA were in the ratio of roughly 1:2 i.e. 95 EA in urban and 194 EA in rural areas as most people live in the rural area of Nepal. Listing and mapping of all the household was undertaken in all the selected EAs. In the second stage, using random sampling 35 household each in every EAs of urban areas and 40 household each in every EAs of rural areas were selected. In NDHS 2011 two staged stratified cluster sampling method was used and the sampling weight calculated based on sampling probabilities separately.

4.3 Methods of data collection

Data were collected using structured questionnaire in an interview during the household visit. Three sets of questionnaire were designed viz. household questionnaire, men's questionnaire and women's questionnaire. Questionnaire were adapted from DHS six core questionnaire to reflect the population and health issues relevant to Nepal with the inputs from different stakeholders involved in health from the government authorities, Non-Government Organization(NGO), International Non-Government Organization (INGO) and External Development Partners (EDP). All the questionnaire were translated from English to major language Nepali, Maithili and Bhojpuri and were translated back to English. The questionnaires were first pretested in the field and were finalized for the survey.

Household questionnaire were used to list all the usual members and the visiting members in the selected household. Also the basic information of the person including age, sex, education and relationship to head of household were collected using household questionnaire. Moreover, the household questionnaire was used as a tool to spot women and men eligible for the individual interview.

4.4 Study population

This study is based on the women's questionnaire from NDHS 2011. However, few background variables have been used from household questionnaire. Interviews were completed for 12,674 women who gave birth in five years preceding to the survey. However, the study population in this study was limited to those women who had given birth in the last five years which resulted N=4148 subjects.

4.5 Measurements of Variables

4.5.1 Outcome variables

Abortion

The main outcome variables of this study is abortion which was calculated based on any of the reason mentioned by the women to terminate the last abortion. A dummy variable was created from the response of the question "What was the main reason you decided to have this (last) abortion?" with 'yes' if they had provided any reason for abortion and all others were categorized as 'No'.

Unsafe abortion

Unsafe abortion was defined in this study as the abortion performed by personnel other than doctor and nurse. The personnel were identified using the questionnaire "Who did you see to get this done?" with the responses (doctor, nurse/midwife, health assistant/ health worker, MCH worker, VHW, Other person, pharmacist/chemical seller, traditional birth attendant, FCHV, relative/friend, traditional practioners, other(specify) or no one. The new dummy variable was created as 'safe' if the abortion was performed by doctor and nurse and 'unsafe' for everyone else.

4.5.2 Measurement of independent variables:

Knowledge on abortion is legal in Nepal:

The knowledge on whether abortion is legal in Nepal was assessed using the questionnaire "Is abortion legal in Nepal?" using the responses yes/no and don't know.

*Knows place for safe abortion***:**

The knowledge of whether the women know about where safe abortion is provided was measured using the question "Do you know of a place where a woman can go to get a safe abortion?" and the responses were measured as yes/no and don't know.

Reason for doing abortion:

The reason for doing abortion was measured using the question "What was the main reason you decided to have this (last) abortion?". From the various reason provided in the responses, 8 categories were made for the analysis (health risk of mother and child, delaying child bearing, wanted to space child, child's sex, partner did not want child, did not want any more children, no money to take care of baby, others).

Place where abortion conducted:

Place of abortion was measured using a question "Where did you go to get this done?". The responses were categorized into four Governmental organization, NGO, Private sector and other places, based on the original responses.

4.5.3 Demographic variables

Demographic variables used in this analysis were age of women (in 5 years groups: 15-19, 20-24, 25-29, 30-34, 35 and above), type of residence (rural, urban), educational level of the women (no education, primary, secondary and higher), religion (Hindu, Buddhist, Muslim, Other), ethnicity of the women (Brahmin and Chhetri, Janajati, Dalit, Other caste), ecological region (Mountain, Hill and Terai) and the developmental region where the women belong to (Eastern, Central, Western, Mid-Western and Far-Western) and wealth index of the women (Poorest, Poorer, Middle, Richer and Richest) were measured.

4.6 Statistical analysis

Sampling weight was used for the non-proportional allocation of the sample to different domain and over sampling of the urban areas in each domain.
Frequency and percentage were used to describe the distribution of the study participants and the study variables. Similarly, distribution of outcome and major independent variables were also presented in frequency and percentage.

Chi-square test was used to test the association of the outcomes with independent variables and also the association of outcomes with demographic variables.

The association of abortion as an outcome with independent variables and other demographic variables were further examined by calculating odds ratio (OR) with their 95% confidence interval (CI) using binary logistic regression models. Three different models were constructed. Model I, was the bivariate crude association of the outcomes with the exposure (independent) variables. In the second model (Model II), all the variables were entered into the model simultaneously to adjust the effect of each other variables. And in the final model (Model III) only the variables which were statistically significant at the level 0.05 in Model II were entered together. Therefore the Model III presents the independent associations of the outcomes with independent variables. All the analysis were performed in Statistical package for Social Sciences (SPSS) version 21 for windows.

5. RESULTS

5.1 Demographic characteristics of study population

Table 1 describes the demographic characteristics of the study population. Almost one-third of the women were in the young age group (20-24 year) and only 8% were in the youngest (15-19 year) age group. Fourty four percent of the women had no education, while only 6% had the higher educational background. The majority of the women were Hindus (83%) followed by Buddhist (8.7%). Similarly, more than one-third belonged to 'Janajati' ethnic group and Brahmin/Chhetri comprised another one-third. More than half of the women were the resident of Terai and only 7% were from Mountain region. Nearly one third (31%) of the women resided in the Central development Region and the least (10.6%) from the Far-Western Development Region. The majority of the women (90 %) reside in the rural areas of Nepal. According to wealth index quintile nearly one-fourth (24%) belonged to poorest quintile and about 16% belonged to the richest quintile.

Table 1 : Demographic characteristics of study population

Characteristics	N=4148	Percentage(%)
Age		
15-19	333	8.0
20-24	1329	32.0
25-29	1310	31.6
30-34	670	16.1
35 and above	507	12.2
Types of residence		
Urban	418	10.1
Rural	3730	89.9
Education		
No education	1822	43.9
Primary	835	20.1
Secondary	1229	29.6
Higher	263	6.3
Religion		
Hindu	3444	83.0
Buddhist	360	8.7
Muslim	235	5.7
Others	109	2.6
Ethnicity		

Brahmin/Chhetri	1283	30.9
Janajati	1523	36.7
Dalit	918	22.1
Others	424	10.2
Region		
Mountain	306	7.4
Hill	1669	40.2
Terai	2174	52.4
Development region		
Eastern	999	24.1
Central	1293	31.2
Western	818	19.7
Mid-Western	598	14.4
Far-Western	440	10.6
Wealth Index		
Poorest	979	23.6
Poorer	899	21.7
Middle	873	21.0
Richer	748	18.0
Richest	649	15.7

5.2 Abortion related factors among women who had abortion

Table 2 describes the distribution of the major independent variables (factors related to abortion) among women who had an abortion. More than two third (70%) of the women had known that abortion was legal in Nepal. Most of the women (93%) who recently had abortion had known the place for safe abortion. Similarly, of the varied reason for performing abortions, child spacing was reported by highest number of women (20%), whereas the least was reported due to child's sex (4.5%). A little more than one third of the abortion were conducted in the private sector (35.5%) followed by NGO (31.0%) and in other places (16.5%).

Table 2: Distribution of abortion related factors among women who had abortion

Characteristics	**N=200**	**(%)**
Knowledge on abortion is legal		
Yes	142	70.6
No	39	19.4

Don't know	20	10.0
Knows place for safe abortion		
Yes	186	93.0
No	4	2.0
Don't know	10	5.0
Reason for doing abortion		
Health risk of mother and child	28	14.1
Delaying child bearing	30	15.1
Wanted to space child	40	20.1
Child's sex	9	4.5
Partner did not want child	18	9.0
Did not want any more children	28	14.1
No money to take care of baby	23	11.6
Others	23	11.6
Place where abortion was conducted		
Government sector	36	18.0
Private	62	31.0
NGO	71	35.5
Others	33	16.5

5.3 Prevalence of abortion by demographic characteristics of women

The prevalence of abortion by demographic characteristics of the women are presented in Table 3. The overall prevalence of abortion was 4.8% in this study population. The prevalence of abortion was significantly different (<0.001) in different age group of women with the highest prevalence (6.5%) in the young (20-24 years) age group of women followed by 30-34 age group (6.3%). The youngest age group of women (15-19 years) had the least abortion prevalence (1.5%). Abortion prevalence also significantly ($p<0.01$) differed by educational status of women. Women with higher education had the highest prevalence of abortion (9.5%) and the women with no education had the least prevalence (2.3%). Prevalence of abortion was significantly higher among urban residents (7.9%). Although no significant different in abortion prevalence by the religion of the women but the prevalence of abortion was comparatively high among the

women of other religion (6.4%). Among ethnic groups, the highest prevalence was reported among Brahmin and Chhetri women (7.2%). On the basis of ecological region, prevalence of abortions was highest among the hill women (5%) although it was not statistically significant. Similarly, the abortion prevalence according to the development region was statistically significant with the highest prevalence in the Far-Western Development region (7%) and the lowest in Central Development region (4.5%). According to the wealth index quantiles, the significantly highest prevalence was reported among the richest women (10.5%) and the lowest among the poorest women (3%).

Table 3: Prevalence of abortion by demographic characteristics of women

Characteristics	**Abortion Prevalence**		**P-value**
	Yes (N=200, %)	No (N =3948, %)	
Age			<0.01
15-19	5(1.5%)	328(98.5%)	
20-24	51(3.8%)	1277(96.2%)	
25-29	85 (6.5%)	1225(93.5%)	
30-34	42 (6.3%)	628(93.7%)	
35 and above	16(3.2%)	490(96.8%)	
Types of residence			0.002
Urban	33(7.9%)	385(92.1%)	
Rural	167(4.5%)	3563(95.5%)	
Education			<0.01
No Education	41(2.3%)	1780(97.7%)	
Primary	49(5.9%)	786(94.1%)	
Secondary	85(6.9%)	1144(93.1%)	
Higher	25(9.5%)	238(90.5%)	
Religion			0.197
Hindu	173(5.0%)	3272(95.0%)	
Buddhist	16(4.4%)	344(95.6%)	
Muslim	5(2.1%)	230(97.9%)	
Others	7(6.4%)	103(93.6%)	
Ethnicity			<0.01
Brahmin and Chhetri	93(7.2%)	1190(92.8%)	
Janajati	70(4.0%)	1689(96.0%)	
Dalit	28(4.1%)	655(95.9%)	
Other caste	9(2.1%)	415(97.9%)	
Region			0.577

Mountain	11(3.6%)	295(96.4%)	
Hill	83(5.0%)	1586(95%)	
Terai	106(4.9%)	2068(95.1%)	
Developmental Region			0.001
Eastern	45(4.5%)	954(95.5%)	
Central	39(3.0%)	1255(97.0%)	
Western	50(6.1%)	768(93.9%)	
Mid-western	35(5.9%)	563(94.1%)	
Far-western	31(7.1%)	409(93.0%)	
Wealth Index			<0.01
Poorest	29(3.0%)	950(97.0%)	
Poorer	30(3.3%)	869(96.7%	
Middle	31(3.6%)	842(96.4%)	
Richer	41(5.5%)	707(94.5%)	
Richest	68(10.5%)	582(89.5%)	

5.4 Prevalence of safe and unsafe abortion among the women who had abortion by demographic characteristics

Table 4 describes the distribution of Safe and Unsafe abortion by demographic characteristics of the women.

The overall prevalence of unsafe abortion among the women who had abortions was 17.9%. Unsafe abortion was the highest in the youngest (15-19 years) age groups (60%) although no significant age difference in unsafe abortion was found. The prevalence of unsafe abortion in both rural and urban area was the same (18%). The prevalence of unsafe abortion was not significantly different according to the educational level of women but the highest prevalence was reported among women with no education (26.8%) and the least in women with higher education (12.5%). Unsafe abortion was highest (25%) among the women of Muslim religion and the least in Buddhist which was statistically not significant. Although not statistically significantly different, unsafe abortion was highest in Dalit women (35.7%) and the least in women of other castes (11%). Unsafe abortion was reported to be the highest (27%) among the women of Mountain region and the least (13.2%) in the Terai region. Women from Mid-Western

development region had the highest (33.3%) unsafe abortion and the least (14%) in Western development region. The prevalence of unsafe abortion differed significantly according to wealth index quantiles of women and it was reported highest (43%) in the poorest and the least in the richest (16%) wealth quintile group.

Table 4: Prevalence of safe and unsafe abortion among the women who had abortion by demographic characteristics

Demographic Characteristics	**Abortion**		**P-value**
	Safe N (%=82.1)	Unsafe N (%=17.9)	
Age			0.060
15-19	2(40.0%)	3 (60.0%)	
20-24	42(82.4%)	9(17.6%)	
25-29	71(83.5%)	14(16.5%)	
30-34	37(88.1%)	5(11.9%)	
35 and above	11(68.8%)	5(31.3%)	
Types of residence			0.976
Urban	27(81.8%)	6(18.2%)	
Rural	137(82.0%)	30(18.0%)	
Education			0.350
No Education	30(73.2%)	11(26.8%)	
Primary	42(85.7%)	7(14.3%)	
Secondary	71(83.5%)	14(16.5%)	
Higher	21(87.5%)	3(12.5%)	
Religion			0.148
Hindu	139(80.3%)	34(97.1%)	
Buddhist	16(100.0%)	0(0.0%)	
Muslim	3(75.0%)	1(2.9%)	
Others	6(100.0%)	0(0.0%)	
Ethnicity			0.057
Brahmin and Chhetri	77(82.8%)	16(17.2%)	
Janajati	61(87.1%)	9(12.9%)	
Dalit	18(64.3%)	10(35.7%)	
Other caste	8(88.9%)	1(11.1%)	
Region			0.162
Mountain	8(72.7%)	3(27.3%)	
Hill	64(77.1%)	19(22.9%)	
Terai	92(86.8%)	14(13.2%)	
Development Region			0.108

Eastern	39(86.7%)	6(13.3%)	
Central	33(86.8%)	5(13.2%)	
Western	43(86.0%)	7(14.0%)	
Mid-western	24(85.7%)	12(33.3%)	
Far-western	25(91.2%)	6(19.4%)	
Wealth Index			0.002
Poorest	17(56.7%)	13(43.3%)	
Poorer	25(80.6%)	6(19.4%)	
Middle	25(80.6%)	6(19.4%)	
Richer	36(85.7%)	6(14.3%)	
Richest	62(91.2%)	6(8.8%)	

5.5 Relationship between place of abortion and demographic characteristics

Table 5 describes the relationship of the place for the most recent abortion performed to the demographic characteristics. Among the women performing an abortion (44%) from age group 35 and above years performed abortions in government institutions and 10% of the women from age group 30-34 years performed abortions in government institutions. Similarly, 38% of the women aged 30-34 years and the 6% of 35 and above aged women performed abortions in NGO. Forty five percent of the women aged 30-34 years and the 25% of 35 and above aged women performed abortions in private institutions. Among the women using other places for abortion,60 % of the women belonged to age group 15-19 years and 7 % of them 30-34 years.

On the basis of residence, 19 % of the rural population used government institutions whereas 12.5% of urban women used government institutions. One-third urban women and 30.5% rural women performed abortions in NGO. Forty two percent of the urban women and 34% of rural women performed abortions in private institutions. Seventeen percent of the urban women and 15% rural women performed abortion in other places.

Twenty two percent of the women having primary education used government institutions. Likewise, 40% of the women having secondary education and 21% women having primary

education performed abortions in NGO. Among the user of private institutions, 52% of the women had higher education and 29.3% of them were uneducated. Moreover, nearly one-fourth of the women without education and 8% with higher education performed abortions in other places.

On the basis of religion, one-fourth of the Buddhist and none of the Muslim used government institutions. Sixty seven percent of the women from "Other religion" and none from Muslim women performed abortions in NGOs. Three quarter of Muslim women and 16.7% of women from other religion perform abortion in private institutions. One fourth of the Muslim women and 12.5% Buddhist women performed abortion in other places.

Among different ethnicities in Nepal, 21.5% of the Brahmin/Chhetri and none from other caste used the government institutions. Likewise, 87.5% of the women from 'Other ethnic' group and 11% Dalit performed abortion in NGO. Among the women using private institution, 40% of them were from Brahmin/Chhetri and 11% from other caste. Nearly one third (32%) Dalit women and 11% other caste women performed abortion in other places.

Among the ecological region 36.4% of the Mountain women used government institutions and 15.7% of Hilly women used government institutions. Likewise, 35% of the Terai women and only 10% of the mountain women performed abortions in NGO. Thirty eight percent of the hill women and 30% mountain women performed abortion in private institutions. Among the women using other places, 27% of them were from mountain and 14% of them were from Terai.

On the basis of development region in Nepal, 29% of the Far-Western women performed abortions in government institutions. Similarly, 38.5% of the women from Central Development region and 18.8 % from Far-Western development region performed abortions in NGO. Likewise, half of the women from Western development region and 17% from Mid-Western development region performed abortion in private institutions. Similarly, 31% of the Mid-Western women and 13 % Eastern women performed abortion in other place

On the basis of wealth index quantiles, 23% of the poorest women and the 13% of the richest women performed abortion in government institutions. Moreover, 44% of the richer women whereas 13% from middle- class women performed abortion in NGO. Among the women using private institutions, 45% of them were from middle class family and 22% from richer family.

Finally, one third of the poorest women and 8.8 % richest women performed abortion in other places.

Table 5: Relationship between place of abortion and demographic characteristics

Demographic Variables	Government N=(%)	p-value	NGO N=(%)	p-value	Private N=(%)	p-value	Others N=(%)	p-value
Age		0.021		0.07		0.250		0.016
15-19	2(40.0)		0(0.0)		0(0.0)		3(60.0)	
20-24	7(13.7)		16(31.4)		19(37.3)		9(17.0)	
25-29	15(17.6)		29(33.7)		29(34.1)		13(15.1)	
30-34	4(9.8)		16(38.1)		19(45.2)		3(7.1)	
35 and above	7(43.8)		1(5.9)		4(25)		5(31.3)	
Types of residence		0.377		0.75		0.363		0.819
Urban	4(12.5)		11(33.3)		14(42.4)		5(15.2)	
Rural	32(19.0)		51(30.5)		57(34.1)		28(16.8)	
Education		0.650		0.08		0.220		0.247
No Education	8(19.5)		10(24.4)		12(29.3)		10(24.4)	
Primary	11(22.4)		10(20.8)		19(38.8)		9(18.4)	
Secondary	13(15.3)		34(40.0)		27(31.8)		11(12.9)	
Higher	3(12.5)		7(28.0)		13(52.0)		2(8.0)	
Religion		0.361		0.065		0.214		0.940
Hindu	32(18.5)		51(29.5)		63(36.4)		29(16.8)	
Buddhist	4(25.0)		7(43.8)		4(25.0)		2(12.5)	
Muslim	0(0.0)		0(0.0)		3(75.0)		1(25.0)	
Others	0(0.0)		4(66.7)		1(16.7)		1(16.7)	
Ethnicity		0.434		<0.01		0.288		0.083
Brahmin and Chhetri	20(21.5)		26(28.0)		37(39.8)		11(12.0)	
Janajati	12(16.9)		25(35.7)		22(31.4)		11(15.7)	
Dalit	5(17.9)		3(10.7)		11(39.3)		9(32.1)	
Other caste	0(0.0)		7(87.5)		1(11.1)		1(11.1)	
Region		0.242		0.174		0.688		0.405
Mountain	4(36.4)		1(10.0)		3(30.0)		3(27.3)	
Hill	13 (15.7)		23(27.7)		32(38.6)		16(19.3)	
Terai	19(17.8)		38(35.5)		35(33.0)		15(14.0)	
Developmental Region		0.393		0.324		0.029		0.121
Eastern	9(20.0)		15(34.1)		15(33.3)		6(13.3)	
Central	6(15.4)		15(38.5)		12(30.8)		6(15.4)	
Western	6(12.0)		13(26.0)		25(50.0)		7(14.0)	

Mid-western	6(17.1)	13(37.1)	6(17.1)	11(31.4)
Far-western	9(29.0)	6(18.8)	13(41.9)	3(9.7)
Wealth Index	0.703	0.013	0.187	0.033
Poorest	7(23.3)	5(17.2)	8(27.6)	10(33.3)
Poorer	6 (19.4)	8(25.8)	12(38.7)	5(16.7)
Middle	5(16.1)	4(12.9)	14(45.2)	7(22.6)
Richer	9(22.0)	18(43.9)	9(22.0)	5(12.2)
Richest	9(13.2)	26(38.2)	27(40.3)	6(8.8)

5.6 Relationship between knowledge on abortion and demographic characteristics

Table 6 describes the relationship between knowledge on whether abortion is legal in Nepal and demographic characteristics. Knowledge on whether abortion is legal in Nepal differed significantly ($p<0.01$) with age of women. Knowledge on abortion legality was highest (37.5%) in the age group 20-24 years and the least (24%) in the age group 35 and above. It differed significantly ($p<0.01$) with the types of residence of the people and was high (45.7%) among the urban residents compared to rural residents. Knowledge on legality of abortion differed significantly ($p<0.01$) with education of women with highest (76%) among the women with higher education level and the least (17%) among the women without education. Knowledge on abortion legality also differed significantly ($p<0.01$) with religion and ethnicity of the women. Women who followed other religion had the highest (46%) whereas the women from Muslim religion had the least (9.8%) knowledge on the legality of abortion in Nepal. Women from Brahmin and Chhetri had the highest (50%) and the other caste women had least (14.6%) knowledge on legality of abortion in Nepal. Knowledge on abortion legality was significantly ($p<0.01$) highest among the women of Mountain region and the least among the Terai women. Similarly, knowledge on the legality of abortion was highest (52%) in the women of Far-Western region and the least (29%) in women of Central Development region and was statistically significant ($p<0.01$). Knowledge on the legality of abortion was highest (59%) in the richest group of women and lowest (20%) in the poorest group of women and it was statistically significant ($p<0.01$).

Table 6: Relationship between knowledge on abortion and demographic characteristics

Demographic Characteristics	**Knowledge on Abortion is legal in Nepal**			**P-value**
	Yes N(%)	No N (%)	Don't Know N(%)	
Age				<0.01
15-19	102(30.5%)	117(35%)	115(34.4%)	
20-24	498(37.5%)	440(33.1%)	390(29.4%)	
25-29	486(37.1%)	455(34.7%)	369(28.2%)	
30-34	225(33.6%)	255(38.1%)	189(28.3%)	
35 and above	121(23.9%)	206(40.6%)	180(35.5%)	
Types of residence				<0.01
Urban	191(45.7%)	129(30.9%)	98(23.4%)	
Rural	1241(33.3%)	1344(36.0%)	1145(30.7%)	
Education				
No Education	323(17.7%)	720(39.5%)	778(42.7%)	<0.01
Primary	263(31.5%)	322(38.6%)	249(29.9%)	
Secondary	646(52.6%)	385(31.3%)	198(16.1%)	
Higher	201(76.4%)	45(17.1%)	17(6.5%)	
Religion				<0.01
Hindu	1247(36.2%)	1174(34.1%)	1023(29.7%)	
Buddhist	111(30.9%)	134(37.3%)	114(31.8%)	
Muslim	23(9.8%)	118(50.2%)	94(40.0%)	
Others	51(46.4%)	47(42.7%)	12(10.9%)	
Ethnicity				<0.01
Brahmin and Chhetri	647(50.4%)	412(32.1%)	224(17.5%)	
Janajati	554(31.5%)	673(38.3%)	532(30.2%)	
Dalit	169(24.8%)	243(35.6%)	270(39.6%)	
Other caste	62(14.6%)	146(34.4%)	216(50.9%)	
Region				<0.01
Mountain	116(37.9%)	125(40.8%)	65(21.2%)	
Hill	577(34.6%)	642(38.5%)	449(26.9%)	
Terai	739(34.0%)	706(32.5%)	729(33.5%)	
Development Region				<0.01
Eastern	356(35.6%)	481(48.1%)	162(16.2%)	
Central	379(29.3%)	362(28.0%)	553(42.7%)	
Western	258(31.5%)	279(34.1%)	281(34.4%)	
Mid-western	208(34.8%)	208(34.8%)	182(30.4%)	
Far-western	232(52.6%)	144(32.7%)	65(14.7%)	

Wealth Index				<0.01
Poorest	199(20.3%)	429(43.8%)	351(35.9%)	
Poorer	243(27.0%)	327(36.4%)	329(36.6%)	
Middle	258(29.6%)	317(36.4%)	297(34.1%)	
Richer	349(46.7%)	225(30.1%)	174(23.3%)	
Richest	384(59.1%)	175(26.9%)	91(14.0%)	

5.7 Relationship between knowledge on place for safe abortion and demographic characteristics

Table 7 describes the relationship between knowledge on the place to perform safe abortion and demographic characteristics among the study population. Knowledge of a place to perform safe abortion differed significantly with age and was the highest (64%) among the age group 25-29 years and the least (44%) in age group 35 and above years.

Women residing in urban areas (68%) had significantly (p=0.002) high level of knowledge on place to perform safe abortion compared to rural women. Women with higher education (87%) had significantly more knowledge about safe abortion place compared to women without education(49%). Knowledge differed significantly with religion of women and was the highest (67%) in Muslim and the least (48%) in Buddhist. Among the ethnic group, knowledge about safe abortion place was highest among the Brahmin/Chhetri(67%) and least in Janajati(56%). Knowledge of a place to perform safe abortion differed significantly with the ecological region was highest (69%) of the Terai women and the least (49%) in hill women. Similarly, it differed significantly with development region and was highest (65%) in the mid-western development region and least (54.5%) in the eastern development region. Knowledge of a place to perform safe abortion differed significantly with wealth index quintiles and was highest (78%) of the richest women and the least (42%) in the poorest women.

Table 7: Relationship between knowledge on place for safe abortion and demographic characteristics

Demographic Characteristics	Knows place for safe abortion			P-value
	Yes N(%)	No N (%)	Don't Know N(%)	
Age				<0.01
15-19	198(59.5%)	79(23.7%)	56(16.8%)	
20-24	830(62.5%)	274(20.6%)	225(16.9%)	
25-29	842(64.3%)	268(20.5%)	200(15.3%)	
30-34	419(62.5%)	145(21.6%)	106(15.8%)	
35 and above	226(44.7%)	175(34.6%)	105(20.8%)	
Types of residence				0.002
Urban	287(68.5%)	76(18.1%)	56(13.4%)	
Rural	2228(59.7%)	865(23.2%)	637(17.1%)	
Education				<0.01
No Education	900(49.4%)	508(27.9%)	413(22.7%)	
Primary	476(57.0%)	206(24.7%)	153(18.3%)	
Secondary	911(74.1%)	205(16.7%)	114(9.3%)	
Higher	228(87.0%)	22(8.4%)	12(4.6%)	
Religion				<0.01
Hindu	2121(61.6%)	749(21.7%)	575(16.7%)	
Buddhist	173(48.1%)	109(30.3%)	78(21.7%)	
Muslim	158(67.2%)	42(17.9%)	35(14.9%)	
Others	63(57.8%)	41(37.6%)	5(4.6%)	
Ethnicity				<0.01
Brahmin and Chhetri	866(67.6%)	286(22.3%)	130(10.1%)	
Janajati	985(56.0%)	429(24.4%)	344(19.6%)	
Dalit	381(55.8%)	163(23.9%)	139(20.4%)	
Other caste	283(66.6%)	62(14.6%)	80(18.8%)	
Region				<0.01
Mountain	185(60.7%)	86(28.2%)	34(11.1%)	
Hill	824(49.4%)	476(28.5%)	368(22.1%)	
Terai	1506(69.2%)	378(17.4%)	291(13.4%)	
Development Region				<0.01
Eastern	597(59.8%)	337(33.7%)	65(6.5%)	
Central	801(61.9%)	224(17.3%)	268(20.7%)	
Western	446(54.5%)	133(16.3%)	239(29.2%)	

Mid-western	388(64.9%)	111(18.6%)	99(16.6%)	
Far-western	283(64.3%)	135(30.7%)	22(5.0%)	
Wealth Index				<0.01
Poorest	411(41.9%)	341(34.8%)	228(23.3%)	
Poorer	501(55.7%)	208(23.1%)	191(21.2%)	
Middle	574(65.8%)	164(18.8%)	134(15.4%)	
Richer	520(69.5%)	132(17.6%)	96(12.8%)	
Richest	509(78.3%)	96(14.8%)	45(6.9%)	

5.8 Abortion prevalence according to demographic characteristics

Table 8 shows the crude and adjusted association of the studied demographic variables with the abortion. According to the bivariate model (Model I) the women of the age group 25-29 years and 30-34 years, had higher odds of abortion (OR for 25-29 age group= 4.16, 95% CI=1.74-9.95) compared to the youngest age group. The association was remained significant when all the studied variables were simultaneously added to the model (Model II). In Model II, the association with the age group 35 and above years of women also became statistically significant (OR = 3.45, 95% CI = 1.25-9.54). In the final mode (Model III), abortion was significantly associated with age older age group of women had higher odds of having abortion compared to the youngest age group. Rural resident women were less likely to have abortions (OR = 0.55, 95% CI = 0.37-0.81) in bivariate model, but the significant association was lost when all the variables were adjusted together in Model II. Abortion was associated with the educational level of the women in a dose-response like manner in the bivariate model (OR for the highest educational group of women = 4.43, 95% CI 2.64-7.43). The association remained significant in Model II when adjusted simultaneously. In the second model, women with higher education had higher odds of having abortion compared to women without an education (OR=2.69, 95% CI=1.71-4.23) and the association remained significant in the Model III also (OR=2.79,95% CI1.79-4.36). Women from the Dalit caste were less likely (OR=0.55, 95% CI= 0.36-0.85) to have abortion compared to Brahmin and Chhetri. However, in the second model the association became insignificant. Women in the Far Western region had higher odds of abortion (OR = 1.62, 95% CI = 1.01-2.59) compared to Eastern Development region. In the Model II, the association for Mid-Western also became significant along with Far-western. In Model II,

women from Far-Western and Mid-Western had higher odds of having an abortion compared to Eastern region (OR for Far-Western region = 2.40, 95% CI =1.44-4.01). In Model III, the association was still remained significant for Far-Western (OR=2.09, 95% CI=1.29-3.36) and Mid-Western(OR=2.56,95%CI=1.56-4.21). Similarly, women in the richest wealth quintile were more likely (OR = 3.76, 95% CI = 2.41-5.87) to have abortion compared to the poorer women. Also, the richer women had the higher odds of having abortion compared poorest women (OR= 1.88, 95% CI=1.16-3.05). However, the significant association for the richer women was lost in the Model II. But for the richest women the association was still significant in the Model II when variables are added simultaneously. The association for the richer women again appeared to be significant together with richest women in Model III (Richest women OR= 2.97, 95% CI= 1.71-5.17). Religion of the women and ecological region were not statistically significantly associated with abortion.

Table 8: Odds ratio (OR) and their 95% confidence intervals (CIs) for abortion due to various demographic characteristics.

	OR, 95% CI for Abortion Prevalence		
Demographic characteristics	**Model** I	**Model** II	**Model** III
Age			
15-19	1.00	1.00	1.00
20-24	2.38(0.98-5.81)	2.41(0.98-5.91)	2.39(0.97-5.84)
25-29	4.16(1.74-9.95)	4.23(1.74-10.29)	4.24(1.75-10.25)
30-34	3.95(1.61-9.74)	4.51(1.79-11.38)	4.59(1.83-11.50)
35 and above	1.97(0.74-5.23)	3.45(1.25-9.54)	3.53(1.29-9.66)
Types of residence			
Urban	1.00	1.00	
Rural	0.55(0.37-0.81)	0.96(0.62-1.49)	
Education			
No Education	1.00	1.00	1.00
Primary	2.67(1.75-4.07)	2.69(1.71-4.23)	2.79(1.79-4.36)
Secondary	3.18(2.18-4.65)	2.44(1.51-3.97)	2.58(1.62-4.09)
Higher	4.43(2.64-7.43)	2.10(1.10-4.01)	2.36(1.28-4.35)
Religion			

Hindu	1.00	1.00	
Buddhist	0.86(0.51-1.46)	1.37(0.75-2.51)	
Others[†]	0.64(0.34-1.17)	1.04(0.53-2.03)	
Ethnicity			
Brahmin and Chhetri	1.00	1.00	
Janajati	0.53(0.38-0.73)	0.78(0.54-1.15)	
Dalit	0.55(0.36-0.85)	1.10(0.68-1.77)	
Other caste	0.27(0.13-0.55)	0.53(0.25-1.13)	
Region			
Mountain	1.00	1.00	
Hill	1.46(0.76-2.80)	1.10(0.55-2.18)	
Terai	1.44(0.75-2.74)	1.23(0.56-2.27)	
Development Region			
Eastern	1.00	1.00	1.00
Central	0.65(0.42-1.01)	0.80(0.50-1.28)	0.77(0.49-1.22)
Western	1.38(0.91-2.09)	1.38(0.89-2.13)	1.42(0.93-2.16)
Mid-western	1.32(0.84-2.09)	2.05(1.26-3.33)	2.09(1.29-3.36)
Far-western	1.62(1.01-2.59)	2.40(1.44-4.01)	2.56(1.56-4.21)
Wealth Index			
Poorest	1.00	1.00	1.00
Poorer	1.13(0.67-1.89)	1.19(0.69-2.06)	1.15(0.68-1.96)
Middle	1.18(0.71-1.98)	1.25(0.71-2.22)	1.18(0.69-2.03)
Richer	1.88(1.16-3.05)	1.81(0.99-3.31)	1.75(1.02-3.00)
Richest	3.76(2.41-5.87)	3.11(1.64-5.89)	2.97(1.71-5.17)

Model I: crude association
Model II: simultaneous adjustment
Model III: backward stepwise
[†]Other = Muslim + others

5.9 Unsafe abortion according to Demographic characteristics

Table 9 shows the crude and adjusted association of the studied demographic variables with prevalence of unsafe abortion.

Women in the age group, 25-29 years were less likely (OR= 0.16, 95% CI =0.02-0.95) to perform unsafe abortion compared to the youngest age group of women. In Model II, women's age still remained significantly associated with the unsafe abortion with the age group 25- 29 were less likely (OR= 0.08, 95% CI =0.01-0.95) compared to youngest age group. In Model III, only the association of the age group, 30-34 remained statistically significant (OR=0.08,95% CI=0.01-0.68) with lesser likelihood of unsafe abortion compared to youngest age group. Women from Mid-Western region were more likely (OR=3.21 95% CI = 1.05-9.77) to have unsafe abortion compared to women from Eastern Development region. But the significant association between the unsafe abortion and the development regions was lost in the second model (Model II) after adding all the variables simultaneously in the model. Women from middle- class, richer and richest category had significantly lower odds of having unsafe abortion compared to poorest women (OR for middle class women= 0.31, 95% CI= 0.09-0.99) in bivariate analysis. In the second model, the association of the middle- class women became insignificant but the association of the richer and the richest women was still remained significant. The richer women were less likely to have an unsafe abortion compared to poorest women (OR=0.12, 95% CI =0.02-0.78). Again in the third model association of the middle-class women became statistically significant(OR for middle class=0.25, 95% CI= 0.07-0.89).

Place of residence, educational level of women, religion, ethnicity and ecological region were not significantly associated with an unsafe abortion.

Table 9: Odds ratio (OR) and their 95% confidence intervals (CIs) for unsafe abortion due to various demographic characteristics.

	OR,95% CI for Unsafe Abortion		
Demographic characteristics	**Model** I	**Model** II	**Model** III
Age			
15-19	1.00	1.00	1.00

20-24	0.16 (0.02-1.04)	0.09(0.01-1.13)	0.21(0.03-1.53)
25-29	0.16 (0.02-0.95)	0.08(0.01-0.95)	0.18(0.03-1.25)
30-34	0.10(0.01-0.70)	0.04(0.00-0.53)	0.08(0.01-0.68)
35 and above	0.40(0.05-2.95)	0.07(0.00-1.24)	0.18(0.02-1.59)
Types of residence			
Urban	1.00	1.00	
Rural	1.01(0.38-2.67)	0.36(0.09-1.84)	
Education			
No Education	1.00	1.00	
Primary	0.46(0.16-1.30)	0.42(0.09-1.84)	
Secondary	0.50(0.21-1.23)	1.51(0.37-6.13)	
Higher	0.41(0.11-1.58)	1.13(0.17-7.26)	
Religion			
Hindu	1.00	1.00	
[†]Others	0.27(0.05-1.34)	0.25(0.04-1.76)	
Ethnicity			
Brahmin and Chhetri	1.00	1.00	
Janajati	0.76(0.31-1.83)	0.98(0.29-3.25)	
Dalit	2.55(0.98-6.59)	2.20(0.67-7.20)	
Other caste	0.57(0.06-5.28)	1.39(0.10-18.98)	
Region			
Mountain	1.00	1.00	
Hill	0.94(0.21-4.21)	1.78(0.26-12.10)	
Terai	0.48(0.11-2.22)	1.91(0.26-14.09)	
Development Region			
Eastern	1.00	1.00	
Central	1.08(0.31-3.78)	0.96(0.17-5.41)	
Western	1.09(0.37-3.51)	0.73(0.19-2.79)	
Mid-western	3.21(1.05-9.77)	1.24(0.33-4.69)	
Far-western	1.47(0.42-5.13)	0.66(0.14-2.97)	
Wealth Index			
Poorest	1.00	1.00	1.00

Poorer	0.32(0.09-1.00)	0.44(0.10-1.89)	0.29(0.08-1.03)
Middle	0.31(0.09-0.99)	0.28(0.06-1.30)	0.25(0.07-0.89)
Richer	0.20(0.06-0.65)	0.13 (0.02-1.78)	0.16(0.04-0.57)
Richest	0.12(0.04-0.38)	0.07(0.01-0.55)	0.12(0.03-0.41)

Model I: crude association

Model II: simultaneous adjustment

Model III: backward stepwise

[†]Other = Buddhist+ Muslim + others

6. DISCUSSIONS

6. 1 Summary of main findings

The aim of this study was to determine the prevalence of abortion and unsafe abortion and associated factors among the women of the reproductive age (15-49 years) in Nepal. The respondents of the women were limited to women who had at least one birth in the last five years.

The prevalence of abortion was found to be 4.8 percent among women with 17.9 percent of them were conducted using unsafe methods. Of all the abortions conducted, the highest prevalence was in the age group 25-29 years (6.5%). Urban women had tendency of conducting significantly more abortions compared to rural women (7.9% Vs 4.5%). Women with higher education (9.5%), who follow other than Hindu religions (6.4%), women with Brahmin and Chhetri caste (7.2%) had higher rates of abortion. Similarly, the prevalence of abortion among women of Hilly region and Far-Western Development Region were 5% and 7% respectively. According to the wealth index quantile, richest women (10.5%) had the highest prevalence of abortions. Among the women performing abortions, 70.6% had knowledge on legality of abortion in Nepal. Similarly, 93% of the women who performed abortion had knowledge on the safe place to conduct abortion. Among the reasons of abortions conducted, highest (20%) was for spacing child. The prevalence of abortion conducted in the private institutions was the highest (35.5%).

After adjustment, women in the age group 30-34 were more likely (OR=4.59, 95% CI 1.83-11.50) to perform abortions compared to women of the youngest age group (15-19 years). Women having secondary level of education were more likely (OR=2.58, 95% CI 1.62-4.09) to conduct abortions compared to illiterate women. Women from the Far-Western Development Region were more likely (OR=2.56, 95% CI 1.56-4.21) to perform abortions compared to women from the Eastern Development Region. Finally, richest women in the wealth index quantiles were more likely (OR=2.97, 95% CI 1.71-5.17) to have abortion compared to the poorest women. Also from the logistic regression models, women in the age group 30-34 were less likely (OR=0.08, 95% CI 0.01-0.89) to have unsafe abortions compared to the youngest age group (15-19 years). Also the women who were in middle class in the wealth index quantiles had

lesser (OR=0.25, 95% CI 0.07-0.89) likelihood of conducting unsafe abortion compared to poorest women.

6.2 Abortion prevalence

In our study the prevalence of abortion was 4.8 percent and the prevalence of unsafe abortion was 17.9 percent. Similar prevalence rates have been reported in an earlier study for e.g. one Ghanaian study reported 10 percent prevalence of abortion and of the total abortion conducted 45% of were conducted unsafely (Sundaram et al., 2012). The findings are comparable despite being countries from two different regions as both of these studies are nationally representative. However, the higher rate of abortion and unsafe abortion in Ghanaian study compared to our study can be due to the different socio-economic circumstances of the countries. Another study conducted in the district of the India has identified the rate of abortion as 3.8% per all the pregnant women. The rate is low compared to our study and the study constitutes women of only one district (Kant et al., 2015). Another study from China have also reported 22% prevalence of abortion in their study (Gao et al., 2015) which is quite high compared to our study. The high prevalence was probably due to one child policy in china due to which they may have aborted girl child..Moreover, study constituted data from rural women of a province in China may lead to over estimation of the abortion rate in their study (Gao et al., 2015).

Our study identified that the age of women was significantly associated with the rate of abortion. Lower rates of abortion were found among the women of the youngest age group and higher rate among older age group of women. In our study the population of the younger women is low compared to older women who may lead to less prevalence among them. The other reason being the older women being engaged in the employment which may sometimes lead to performing abortions. In line to our findings, earlier studies reported that older the age of the women more is the rate of abortion (Sundaram et al., 2012; Gao et al., 2015; Mote, Otupiri, & Hindin, 2010). On contrary, some other studies have identified that the rate of abortion is high in the younger age group (Ilboudo, Somda, & Sundby, 2014 ; Maina, Mutua, & Sidze, 2015). One earlier study in Nepal have identified that the rate of medical abortion is higher in the younger age group of less than 30 years as compared to the women of more than 30 years (KC et al., 2010). A possible

reason for the rate of abortion being high in the older women may be due to want of boy. Many older women who already have girl child may have want and demand of boy child from family though illegal do sex determination and abortion is performed.

We identified that higher the education of the women more the rate of abortion. Our study result supports the evidence of earlier studies from Nepal and other low-and middle-income countries (Tamang et al., 2012; Ilboudo et al., 2014 ;Gao et al., 2015; Sundaram et al., 2012 ;Mote et al., 2010). The possible reason for educated women having higher rates of abortion may be due to educated women being involved in the employment and working due to which they may need to perform abortion. A study conducted in Kenya, despite identifying that the rate of abortion is high among the educated women identified that repeat abortion is more prevalent among the less educated (Maina et al., 2015).

Our study identified that the richer women had higher abortion rates. Similar findings have also been reported in an earlier study from Ghana where richer the women higher was the rate of abortion (Sundaram et al., 2012). The wealth defines the purchasing power of the individual and the richer the women are the purchasing power increases. Since the abortion services are not free of charge in low- and middle- income countries like ours which may attribute to richer women having higher abortions compared to poorer women due to their high purchasing capacity.

Although insignificant in our study the women in the rural area have less chance of obtaining abortion compared to women of urban area may be because of the more unplanned pregnancy and the access to means and methods of contraception. But another study conducted in Nepal identified that the rate of abortion is more among the women of rural areas (Tamang et al., 2012). As the aforementioned study constituted data from only 3 districts of Nepal which may lead to the over estimation of the rural women having more abortion. Similarly, a study conducted in Kenya have identified that more rural women do abortion but the repeat abortion is high among the urban women (Maina et al., 2015). A study in Ghana also identified the same findings that abortion is more prevalent among the women of urban areas compared to the rural (Sundaram et al., 2012).

6.3 Unsafe abortion and factors associated with it

We identified that younger women had higher likelihood of having abortion in an unsafe way compared to older women. This may be due to risky behavior among the younger women and also due to unavailability of safe abortion services throughout the nation. A study from Pakistan have also reveled that the rate of unsafe abortion is high among the younger women compared to the older women (Shaikh et al., 2010). A study from Nepal have identified that higher the age of the women less likely are women in conducting abortion in unsafe way (Rocca et al., 2013).

Contrary to our findings, a study from Ghana identified that older the age of the women more likely are they in conducting abortion in an unsafe way (Sundaram et al., 2012). Also in our study it was identified that wealth index or the economic condition of a women affect on the women in conducting unsafe abortion. Women who were identified as rich and richer in the wealth index quantiles have lesser chances of having unsafe abortion compared to poor and poorer women. As the women who have economic problems do not have sufficient to pay for the abortion services so they choose unsafe ways of abortion at home by self or from traditional healers in the community. Because of the stigma attached to abortion in Nepal, generally women cannot come open in the society and choose for clandestine abortions which are mostly unsafe. A study conducted in Ghana also have identified that compared to women in the lower quantiles the women in the upper quantiles have higher chances of having abortion safely (Sundaram et al., 2012).

6.4 Strength and limitation of the study

Our study focuses on women of the reproductive age from age 15-49 from the whole country. Data were extracted from the NDHS 2011. NDHS is one of the largest studies conducted in Nepal covering all the region in terms of both ecological region and developmental region making it a highly representative sample. So the research findings from this study assure the high level of validity and reliability. Also, the study has high validity in comparison to reference standard. The questionnaires used in this study are comparable to reference standard to measure external validity of the research. So, the data from this study are used in the national level

planning by the government of the country. Not only the government but these data are used by various international and national nongovernmental organizations in planning their interventions at the different level. Also, the facts that the research abortion related topics are basically limited to a particular area or particular institutions. So, NDHS for the first time has included variables related to abortion. The questionnaires are adapted including core questionnaire on issues related to health and population. The questionnaires are properly pretested before the final study. The questionnaires were translated to different local languages to increase the accuracy in response from different respondents speaking different mother tongue.

Response rate to the survey was 98% which is very high compared to other national level survey. No missing values on variables. Software SPSS automatically eliminate missing values in the analysis of variables in descriptive, frequencies, correlation and regression therefore the result obtained after non-missing values were used. The chance of recall bias was addressed by including only those women from the main study having at least one birth in the last five years. Considering logistic regression can control the potential confounding (provided large sample size which was 4148 in our study) we used bivariate regression models for our analysis.

Though our data covers women having at least one birth in the last five years but we failed to include the exact time period when the recent abortion took place in the period of five years preceding our study. Only limited variables related to abortion could be studied as NDHS have limited variables on abortion related topic. Lack of data on availability and the access to contraceptive methods thus making it difficult to identify the relation between use of contraception and abortion. The access to places providing safe abortion services could not be studied due to unavailability of the data. Our study is based on the cross-sectional data thus no casual relationship between the outcomes and the exposures could be observed.

7. FURTHER RESEARCH

Although in our study we have tried to cover different factors associated with abortion and unsafe abortion in Nepal a wide range of factors could be studied in the future. Also in our study due to unavailability of the data on whether the institution was certified for abortion or not, further studies can be done including both the provider and the place for abortion to identify prevalence of unsafe abortion. The access to safe abortion service primarily in the remote areas of Nepal can be studied. Though reasons for abortion were studied in our study, similar studies for people choosing different unsafe methods for abortion are needed. Repeat abortions being a challenge in many countries including Nepal is needed to be studied further in Nepal.

8. CONCLUSIONS AND RECOMMENDATIONS

Our study focused on prevalence of abortion and unsafe abortion and factors associated with the occurrences of abortion and unsafe abortion in Nepal. From our study it was identified that one in every twenty women of reproductive age (15-49) abort their child. Similarly, of the total abortion nearly one in every five abortion taking place in Nepal is unsafe. The abortion was found to be associated with the age of the women, education of the women, the development region where the women resides and the economic condition of women. Similarly, age of women and economic condition of the women were significantly associated with occurrences of unsafe abortion.

Further studies should consider the relationship between the use of contraception and abortion to identify if women were aborting due to lack of access to contraception or due to other reasons. Women in the older age group need to be educated on abortion being not a method of contraception. They should be encouraged to use method of contraception and incase of compulsion to use abortion, safe abortion methods should be practiced. Studies on repeat abortion should be conducted nationally so as to promote methods of contraception.

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