

Magnitude And Associated Factors Of Induced Abortion Among Regular Undergraduate Students Of Dilla University

Cross sectional study

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Abstract

Background

Abortion is a major public health problem of the world. Sub Saharan Africa specifically suffers 14 % of maternal death due to unsafe abortion. Ethiopia as part of this region, estimated to have 3.27 million pregnancies every year, of which approximately 500,000 end in either spontaneous or unsafely induced abortion. Youth are among the segment of the population with large burden of induced abortion which is unsafe one. Having this fact in mind this study aims measuring the magnitude and identifying associated factors of induced abortion in Dilla university regular female undergraduate students and tries to fill the gap of scarcity of up-to-date and reliable information on induced abortion magnitude and associated factors.

Method

Cross sectional study design with internal comparison was employed using a multistage stratified sampling approach; 548 randomly selected respondents replied a self-administered pretested questionnaire. Data entered using Epi info version 3.5.1 then transported to SPSS version 16 for cleaning and analysis. Odds ratio along with the 95% confidence interval was estimated to identify factors associated with induced abortion using multivariable logistic regression. Level of statistical significance was declared at P- value less or equal to 0.05.

Result

There were 193 (35.2%) sexually active women out of which a pregnancy of 51(26.4%) were identified three years prior to the survey. The magnitude of induced abortion three years prior to the survey is found to be 35 which is 6.4% (95% CI: 4.4-8.4%) out of all women, 18% (95% CI: 12.6-23.4%) among sexually active and 68.6% (95% CI: 55.9-81.3%) among pregnant women. In multivariable analysis among women it was found that being sexually active before age 19 (AOR=4.298, 95% CI: 1.158-15.954), having single sexual partner (AOR=0.281, 95% CI: 0.108- 0.733) and ever use of FP (AOR=4.510, 95%CI: 1.859-10.942) were associated with induced abortion.

Key words: abortion, induced abortion, sexually active, youth, multiple sexual partners

I. INTRODUCTION

Abortion is the expulsion of the products of conception before the 24th week of pregnancy (28 weeks for developing countries). The word abortion is often considered by women to be a procured termination of pregnancy, legal or criminal. So abortions are either spontaneous, which are usually referred to as miscarriages or induced, which are purposefully caused. Induced abortions are either safe or unsafe[1].

Globally, at least 585,000 women die each year by complications of pregnancy and child birth. More than 70% of all maternal deaths are due to five major complications: hemorrhage, infection, unsafe abortion, hypertensive disorders of pregnancy, and obstructed labor. Though complications of abortion account for 13% of all direct causes of maternal deaths around the world, its distribution is not uniform. Developing world is being affected more than the developed ones with preventable pregnancy related complication. Not only those unmarried adolescents who suffer in this developing world but also married women living in stable union are prone to unsafe abortion and its complications due to the low accessibility of safe abortion services. And these abortions performed under unsafe conditions claim the lives of tens of thousands of women around the world every year, leaving many with chronic and often irreversible health problems, and drain the resources of public health systems. [2-3].

Generally factors associated with increased maternal mortality from unsafe abortion in developing countries include inadequate delivery systems for contraception needed to prevent unwanted pregnancies, restrictive abortion laws, pervading negative cultural and religious attitudes towards induced abortion, and poor health infrastructures for the management of abortion complications. Due to multiple factors like peer pressure, lack of maturity, alcohol and drug use, rampant habit of watching pornographic movies/pictures and alcohol induced sexual behavior youth in higher education institutions (like Dilla university) are assumed to be highly exposed to many risky sexual behaviors which may end up in unsafe abortion[11-12].

Our country Ethiopia as one of developing nations is under huge reform program in different sectors. Among these reform areas higher education expansion is one. New universities are being built, campuses expanded and new courses being added. Unequivocally the number of students joining these universities is increasing from time to time.

Despite the fact that there is dramatic increment of student population there is scarcity of information on how many of them are suffering from abortion and which specific factors exacerbate the risk. Having this in mind, this study aims to measure the magnitude and identify associated factors of induced abortion, fill the gap of scarcity of information and help informed RH interventions to youth in the university as well as similar facilities.

II. ELABORATIONS

Dilla University is one of accredited government universities in Ethiopia located in Dilla town, southern Ethiopia. It is 365 km south of the capital, Addis Ababa. The university has three campuses; Odaya, health science and main campuses, eight schools and forty four departments. The total students enrolled in on a regular basis during the study period were 12,326. Out of these, 4222 (34.2%) were female students. Cross sectional study design was used and data were collected from March 12-13/2019.

The collected data was checked by principal investigator on daily bases for its completeness and consistency then entered into Epi info version 3.5.1. Data were then exported to statistical package for the social sciences (SPSS) window versions 20 for cleaning and analysis. Descriptive statistics used for the description of the study participants. Bi-variate analysis is applied to see the association of socio demographic and other independent variables with dependent one. Variables with p-value less than 0.25 were taken to multivariable analysis.

During multivariable analysis confounders were controlled and independent factors identified. Odds ratio along with the 95% confidence interval was estimated to identify factors associated with induced abortion. Level of statistical significance was declared at P- value less than or equal to 0.05.

III. RESULTS

Magnitude of induced abortion

Among all study participants 51(9.3%) have had history of one pregnancy in the last three years. Unwanted pregnancies are twice of wanted ones, 68.6% and 31.4 % respectively. All of those wanted pregnancies ended up by giving birth of a child unlike to that of unwanted pregnancies which all ended up in induced abortion. There were 35 induced abortions making the magnitude **6.4%** (95% CI: 4.4-8.4%) out of all women, 18% (95% CI: 12.6-23.4%) among sexually active and 68.6% (95% CI: 55.9-81.3%) among pregnant women. (Table 4)

Majority of the induced abortion occurred in students with the age group of 20-24, 25(71.4%), followed by age category of 15-19, 7(20%) and 3(8.6%) in the age group of 25 and above. (Figure 4)

Factors associated with induced abortion

At the end of bivariate, the multivariate logistic regression was taken into account to take the effects of confounding variables. Variables with p-value less than 0.25 were taken to the multivariate analysis and AOR along with 95% CI was used to estimate association. Accordingly, the two variables prior sex education and watching pornography short out of significance during the multivariate analysis but the remaining three variables remained as factors affecting induced abortion.

Practicing sexual intercourse at age 19 and earlier had almost 4 times higher risk of induced abortion (AOR=4.298, 95% CI: 1.158-15.954).

Single sexual partner experience had 73.2% reduced chance of getting induced abortion than with multiple sexual partner experience (AOR=0.281, 95% CI: 0.108- 0.733).

Sexually active students who did not ever used FP /family planning/ were found to have almost 4.5 times higher chance of getting induced abortion than women who had (AOR=4.510, 95% CI:1.859 -10.942). (Table 5)

Discussions

Magnitude and associated factors of induced abortion

The main aim of this study is measuring magnitude and identifying associated factors of induced abortion among regular undergraduate university students. The study revealed that the magnitude of induced abortion is 6.4 %. Majority of induced abortions were undergone at private clinic 15 (42.8%) followed by traditional abortionist's home, public clinic, hospital and other places 9(25.7%), 8 (22.9%), 1(2.9%) and 2(5.7%) respectively.

There are different studies conducted on this issue at community, health and higher education institutions with different figures. The magnitude of induced abortion reported by this study is higher than the magnitude reported by a study conducted on university and college students of Arbaminch town, 2.83%[34] but lower than community studies conducted in Latin American country Peru , Harar ,North West Ethiopia and Guraghe zone with magnitudes 11.6%,14.4%,19% and 12.3% respectively [19, 29-30, 32]. On the other hand it is almost similar with findings from Wolaita Sodo University and South Africa; 6.5% and 6.7% respectively [33, 36].

The three factors identified during the multivariate analysis associated with induced abortion were age at first sexual intercourse, number of sexual partner and family planning service use.

Among the 51 pregnancies traced by this study 68.6% is unwanted which is twice of wanted pregnancies where all ended up in induced abortion (6.4%). This figure shows the discrepancy that youth in the university still are not reached well with reproductive

health services despite the knowledge of modern contraception among sexually active unmarried women is reported to be 99.7% according to EDHS, 2011[37]. This might give us a clue that reproductive health programs being implemented on youth specifically of higher education institutions are not strong enough.

With regard to associated factors, the multivariate analysis revealed women started sex age 19 and earlier were almost four times at higher odds of getting induced abortion than who started sex after age 19. This might be associated with lack of FP information and decreased use and tendency of having multiple sexual partners. This study identified there is larger proportion of women (12.8%) who started sex at age 19 and before but no FP information as compared to those women started sex age after 19 but no women without FP information. Computing the proportion of FP use, there is slightly lower proportion among participants who practiced sex at age 19 and before as compared to those who practiced sex after age 19 (66.4% vs. 67.9%).

The proportion of participants with multiple sexual partners is high in those having sexual experience at age 19 and before as compared to those participants who experience sex after age 19 (23.2% vs. 7.6%).

On the other hand participants with single sexual partners were almost at 71.9 % reduced chance of getting induced abortion than participants with multiple sexual partners in their life time (AOR 0.281, 95% CI: 0.108 - 0.733).

This relation could be an indication that the earlier a woman begins sexual activity, the greater the number of non-marital sex partners she is likely to have over the course of her life. Early initiation of sexual activity and higher numbers of non-marital sex partners are linked in turn to a wide variety of negative life outcomes, including increased rate of induced abortion.

This study also identified an association between ever FP use and induced abortion. Women who did not ever use FP were almost 4.5 times at higher risk of developing induced abortion than their counterparts (AOR=4.510, 95% CI: 1.859-10.942). According to this study 90.7 % of sexually active respondents replied have heard of FP which is also in conformance with the high percentage (99.8%) of FP information of any method reported by EDHS, 2011 among unmarried sexually active women[37]. But coming to FP use among those of sexually active only 126 (65.3 %) responded have ever used on this study and 59 (30.6 %) did not, indicating high number of sexual intercourses are unprotected. This paradox is also explained by the high magnitude of unwanted pregnancy 27 (64.3%) among those sexually active youth despite the knowledge of FP.

From associated factors perspective this study revealed that participants with sexual experience at age 19 and earlier had much higher risk (four times) of developing induced abortion than those who had experienced it after age 19. This is in congruent with different studies.

According to a study conducted in Latin America Peru a high prevalence of induced abortion (7.5%) found among the youngest women in the study (18 years of age) who reported having been sexually active[19]. Another study conducted in Beijing, Shanghai and Zhengzhou indicated comparing women with and without history of repeated abortion, those with history of repeated abortion had higher rate among women whose first sex was below 18 years (16.2% vs. 9.4%, $P < 0.01$)[38]. Another supportive study conducted in the district of Diez de Octubre, Havana, Cuba identified first pregnancy in women younger than 24 years of age as risk factor for induced abortion, a risk even increasing with women who were less than 20 years old[39]. This clearly indicates those women who became pregnant younger than 24 years of age started their sexual debut at early age less than 24 years.

Male early sexual initiators had a significantly higher risk profile of partner history of pregnancy in life time (AOR= 2.89, 95% CI: 1.21-6.94) and partner history of induced abortion in life time (AOR=2.95, 95% CI: 1.20-7.26) compared with late initiators. Though this study is conducted on males it highlights us on a picture of their female counterparts[40]. Studies also revealed that early sexual debut are significantly associated with teenage/adolescent pregnancies which are usually unwanted [41-43].

Cross sectional studies can't establish temporal relation or sequence and determine causality however, this study is consistent with other studies above indicated adolescent women who start sexual debut at early age are more likely than older women to have unwanted pregnancies and induced abortion subsequently. This is occurring due to different factors, one is decreased trend of FP use in those who start sexual debut at early age. Others like unwanted or unplanned sex, poor FP knowledge, poor skill to refuse early sex, longer exposure to sexual acts and others [40-42, 44].

Women with single sexual partner are almost with 71.9 % reduced chance of having induced abortion than participants with multiple sexual partners in their life time; indicating the risk of multiplicity of sexual partners. This result is in congruent with studies conducted in different areas.

A study which was conducted in Peru indicated ever having had an induced abortion was associated with having had more than 1 sexual partner in life time ($p < 0.001$). Having 2 sexual partners in life time had 1.6 times higher odds of getting induced abortion as compared with those women with single sexual partner (AOR=1.61, 95% CI:1.23-2.09). The risk also increased when the number of sexual partner a women had in lifetime increased; women with 3 or more sexual partners in life time were found to have 2.79 times higher risk of getting induced abortion than with women with single sexual partner (AOR=2.79, 95% CI: 2.12-3.67). This study also identified having multiple sexual partners in the year before the survey had association with induced abortion ($p < 0.005$). Women with 2 or more sexual partners in the year before the survey had 1.54 times higher chance of getting induced abortion than their counterparts (AOR=1.54, 95% CI:1.14-2.02)[19].

Another study conducted in Beijing, Shanghai and Zhengzhou indicated having multiple sexual partners had higher rate of repeated induced abortion than their counterparts (36.0% vs. 15.0%, $P < 0.01$)[38].

Having multiple sexual partners during life time as factor of induced abortion is also evidenced by another study [45].

Initiation of sexual activity at a younger age is linked to tendency of having high numbers of sexual partners. The earlier a woman begins sexual activity, the more sexual partners she will have during her life time. One can anticipate the prevalence of induced abortion to increase with younger age at first sexual intercourse due to an increasing exposure to cumulative risk. If youth are exposed to non-marital sex for a longer time then they will be prone to induced abortion. Unmarried women will have increased risk of repeated induced abortion if exposed to sexual behavior for more than 3 years (33.6% vs. 6.6 %, $P < 0.01$) [38, 40].

The third factor identified to be associated with induced abortion was FP use. Not ever using FP despite the act of sexual intercourse was found to have almost four times higher chance of getting induced abortion than who ever use. Of 193 women who reported practice sexual intercourse, 59 (30.6%, 95% CI: 24.1 – 37.1%) were not using contraception. This kind of relation is also established by other studies. A study conducted in North West Ethiopia revealed contraceptive users were at a reduced risk of having induced abortion compared to non-contraceptive users (AOR = 0.4, $P = 0.012$)[30].

Another study conducted in Iran indicated reduction of abortion rates were strongly associated with increased contraceptive use rates.[46] Study conducted in Bangladesh also described the complete lack of use or lack of use-effectiveness of FP methods resulted in unwanted pregnancies that will make desperate women to seek abortion services[47].

Looking at the three different variables identified as factors of induced abortion it is understandable that they are interrelated one another. The earlier the women begin sexual intercourse the more they are prone to harmful sexual behaviors like multiple sexual partner experiences due to repetitive and longer duration of exposure. This is also accompanied by the higher rate of non-use of FP due to lack of knowledge, negligence, not to think thoroughly like their adult counterparts on consequences of unprotected sex, fear of social stigma to attend FP clinics, peer pressure or others.

Other factors which showed significance in the bivariate analysis; lack of prior sex education and watching pornography did not show significance in the multivariate. This is not in line with other literatures which state them as predictors of abortion.

Regarding age, different studies identified different results. In many settings it is believed that abortion distribution by age is bimodal; women at the youngest age who want to delay childbearing and women at the end of childbearing years who think they cannot be pregnant at that age are at increased risk of getting induced abortion. The youngest women due to lack of awareness and unmet need for contraception and older women due to perceived need of contraception. Higher age at interview [19] was identified factor associated with abortion but similar to the finding of the studies conducted at mekele town and Wolaita sodo university [31, 33] the finding of the current study did not confirm an association between age and induced abortion. This could be due to the fact that the mean age of respondents in this study is different than the above studies.

Unlike to a study conducted in Nigeria [28] lack of prior sex education had no association in this study probably due to the fact that majority of the respondents had no communication at all on sexual matters with their parents (70 %). Unlike to different studies origin of residence, marital status, college, class year, income, and alcohol use [30-31, 33] did not show any significant association with the outcome variable.

Declarations:

Ethics approval and consent to participate

Ethical clearance obtained from Hawassa University, college of medicine and health science IRB. Permission of Dilla University is asked with a letter from Hawassa University, college of medicine and health science. The purpose and benefit of the study is discussed with each study participants. Participants assured of selected randomly, taking part in the study was completely of choice. If they chose not to participate in the study or if they decided to stop participating in the study they had no harm. They were also assured to stop participating in this study at any time, even if they have already given their consent. Refusal to participate or withdrawal from the study had no penalty or loss of any benefits to which they were otherwise entitled. Informed consent of the respondents obtained. Administering the questionnaires was conducted in a way that it did not compromise their privacy and confidentiality of information as no one had the access to know specific student’s information since it did not involve name and ID number of students.

APPENDIX

Table 4 Pregnancy and abortion of regular undergraduate students in Dilla University, Southern, Ethiopia, March, 2019

Characteristics	Category	Frequency	Percent
Ever pregnant within the Last three years (n=548)	No	497	90.7
	Yes	51	9.3
Pregnancy Wanted or Unwanted (n=51)	Unwanted	35	68.6
	Wanted	16	31.4
History of abortion (n=51)	No	16	31.4
	Yes	35	68.6
Induced or spontaneous (n=35)	Spontaneous	0	0
	Induced	35	100

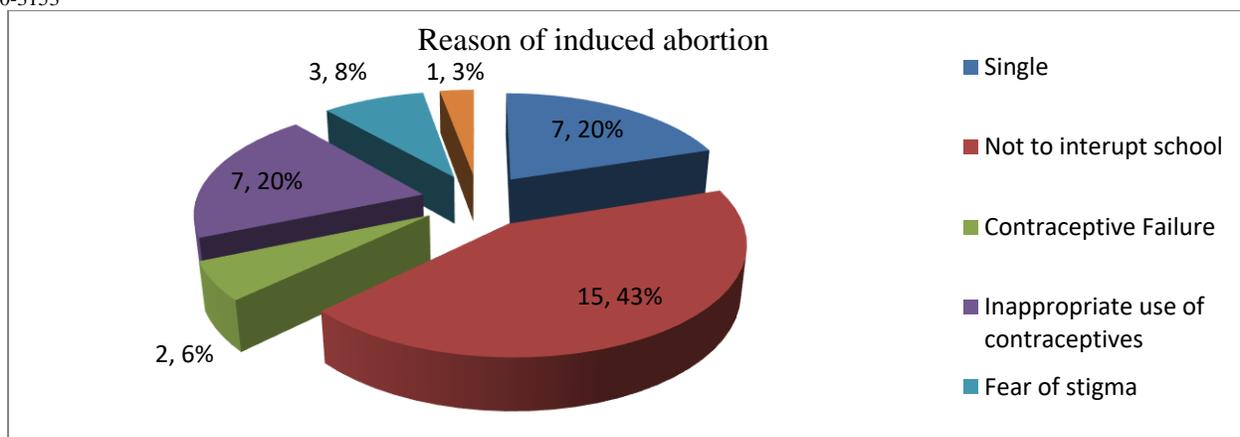


Fig. 3 Reasons for induced abortion in regular female undergraduate students of Dilla university, Southern Ethiopia, March, 2019, (n=35)

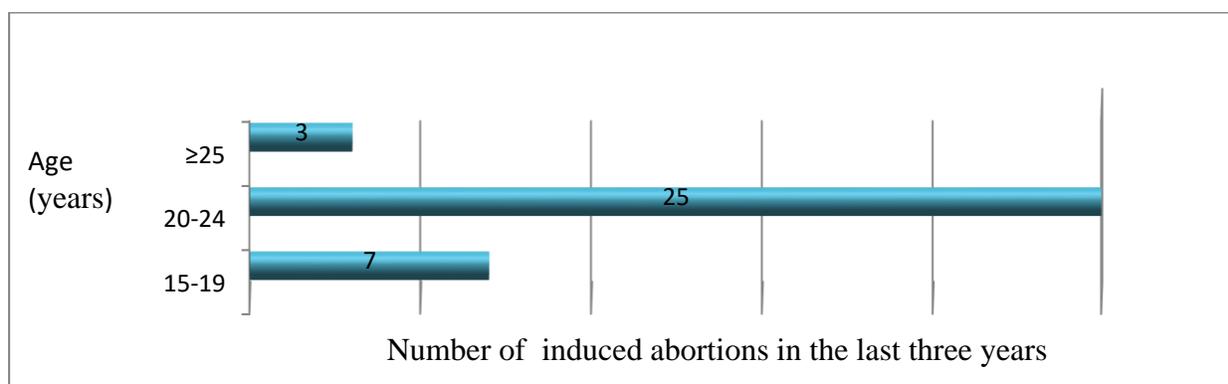


Fig. 4 Age distribution of respondents who had induced abortion in the last three years among regular undergraduate students of Dilla University, Southern Ethiopia, March 2019, (n=35)

Table 5 - : Factors associated with induced abortion among regular undergraduate students in Dilla University, Southern Ethiopia, March, 2019

Characteristics	Category	Induced abortion		COR(95% CI)	AOR(95% CI)
		No (%) (n=513)	Yes (%) (n=35)		
Age of respondent	15-19	135(24.6)	7(1.3)	1	
	≥20	378 (69)	28(5.1)	1.429 (0.61 – 3.346)	
Origin of residence	Urban	211(38.5)	14(2.5)	1	
	Rural	302(55.2)	21(3.8)	1.048 (0.521-2.108)	
Marital status	Ever Married	35(6.4)	5(0.9)	1	
	Never married	478(87.2)	30(5.5)	0.439 (0.160 -1.203)	
Class Year	First	154(28.1)	11(2)	1	
	Second and above	359(65.5)	24(4.4)	0.936 (0.447 - 1.958)	

Age at first sexual practice	>19	50(28.1)	3(1.7)	1	1
	≤19	98(55)	27(15.2)	4.592 (1.33-15.875)*	4.298 (1.158-15.954)*
Prior sex education	No	364(66.4)	18(3.3)	0.433 (0.217-0.864)*	0.547 (0.244 -1.340)
	Yes	149(27.2)	17(3.1)	1	1
Watching pornography	No	325(59.3)	11(2)	0.265 (0.127-0.553)*	1.298 (0.487 - 3.454)
	Yes	188(34.3)	24(4.4)	1	1
Number of sexual partner	One	127(71.4)	18(10.1)	0.248 (0.105- 0.589)*	0.281 (0.108-0.733)*
	Two or more	21(11.8)	12(6.7)	1	1
Heard of any family planning	No	60(10.9)	8(1.5)	2.237 (0.972- 5.149)	
	Yes	453(82.7)	27(4.9)	1	
Ever used any family planning	No	41(22.2)	18(9.7)	4.171 (1.85 - 9.403)*	4.510 (1.859-10.942)*
	Yes	114(61.6)	12(6.5)	1	1

* Statistically significant at $P < 0.05$

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REFERENCES

- Hamilton-Fairley D. Lecture notes: obstetrics and gynecology. 2nd edition ed. 2004, London: Blackwell publishing.
- World Health organization. Reduction of maternal mortality: A joint WHO/UNFPA/UNICEF/World Bank statement. Geneva. WHO, 1999
- WHO, Unsafe Abortion -A World wide problem Safe motherhood a news letter of Worldwide activity 2001.
- Bureau, P.R., Making pregnancy and childbirth safer factsheet world population data sheet 1997.
- Deborah, M. and Donna C., Abortion facts and figures. 2011, Connecticut.
- IK, W., S. IH, and eds., Preventing Unsafe Abortion and its Consequences: Priorities for Research and Action. 2006, Guttmacher Institute: New York.
- World Health Organization. Maternal Mortality in 2005 Estimates developed by WHO, UNICEF, UNFPA and the World Bank. Geneva, Switzerland: WHO, 2007, 15–8.
- Department, F.D.R.o.E.M.o.H.F.H., Technical and Procedural Guidelines for Safe Abortion Services 2006: Addis Ababa, Ethiopia.
- Gebrehiwot, Y. and T. Liabsuetrakul, Trends of abortion complications in a transition of abortion law revisions in Ethiopia. Journal of Public Health, 2009. 31(1): p. 81-7.
- CDC, Family planing methods and practice, Africa. second ed. 1999, p. 547-60.
- I, S. and A. E., Unsafe abortion in 2008: global and regional levels and trends. 2010. 18(36): p. 90-101.
- Unasho, A. and T. Tadesse, Assessment of potential risky sexual behaviors among Dilla University students: A survey study for enhancing self-protection from human immunodeficiency virus (HIV) infection. Journal of AIDS and HIV Research, 2013. 5(7): p. 235-48.
- DA1, G., et al., Unsafe abortion: the preventable pandemic. 2006 Nov 25. 368(9550): p. 1908-19.
- Koster, W. and Oyekan, Why resort to illegal abortion in Zambia? Findings of a community-based study in Western Province. 20 March 1998. 46(10): p. 1303–12.
- Organization, W.H., Global and regional estimates of the incidence of unsafe abortion and associated mortality in 2003. Ginebra: WHO, 2007.

16. Il, S. and A. E., Age patterns of unsafe abortion in developing country regions. *Reprod Health Matters* 2004 Nov. 12(24 Suppl): p. 9-17.
17. Bankole, A., S. Singh, and T. Haas, Reasons why women have induced abortions: evidence from 27 countries. *International family planning perspectives*, 1998: p. 117-52.
18. S1, A. and R. R2, Determinants of pregnancy and induced and spontaneous abortion in a jointly determined framework: evidence from a country-wide, district-level household survey in India. *J Biosoc Sci*, 2014 July. 46(4): p. 480-517.
19. A1, B.-O., et al., Clandestine induced abortion: prevalence, incidence and risk factors among women in a Latin American country. *CMAJ.* , 2009 180(3): p. 298-304
20. Frejka, T., L.C. Atkin, and O.L. Toro, *Research Program for the Prevention of Unsafe Induced Abortion: And Its Adverse Consequences in Latin America and the Caribbean*. 1989: Population Council.
21. Zamudio, L., et al., The incidence and social and demographic characteristics of abortion in Colombia. *Abortion in the developing world*. New Delhi, Vistaar Publications, and London: Zed Books, 1999: p. 407-46.
22. A, M., I. C, and eds., *Abortion in the developing world* 1999,407-46, London.
23. Organization, W.H., *Unsafe abortion: global and regional estimates of incidence of and mortality due to unsafe abortion with a listing of available country data*. 1998.
24. JC, K., O. KA, and L. OA., Health and economic consequences of septic induced abortion. *Int J Gynaecol Obstet*, 1992 Mar. 37(3): p. 193-7.
25. Huntington, D., et al., The postabortion caseload in Egyptian hospitals: a descriptive study. *International family planning perspectives*, 1998: p. 25-31.
26. AA., O., *Unsafe abortion in adolescents*. Presentation made at Action to Reduce Maternal Mortality in Africa: A regional consultation on unsafe abortion, 5- 7-March 2003: Addis Ababa, Ethiopia.
27. Radhakrishna, A., R. Gringle, and F.C. Greenslade, *Identifying the intersection: Adolescent unwanted pregnancy, HIV/AIDS, and unsafe abortion*. Vol. 4. 1997: Ipas.
28. Wahab, et al., *Causes and consequences of induced abortion among university undergraduates in Nigeria, in 2009*.
29. Worku, S. and M. Fantahun, Unintended pregnancy and induced abortion in a town with accessible family planning services: The case of Harar in eastern Ethiopia. *Ethiopian Journal of Health Development*, 2007. 20(2): p. 79-83.
30. Elias, S., et al., Prevalence and associated risk factors of induced abortion in northwest Ethiopia. *Ethiopian Journal of Health Development*, 2005. 19(1): p. 37-44.
31. Abera, G.B., et al., Assessment of determinants of induced abortion among child bearing age women attending maternal and child health clinic in Mekelle town, Tigray, Ethiopia: a cross sectional study. *International Journal of Pharmaceutical Sciences and Research*, 2012. 3(12): p. 4745-56.
32. Tesfaye, G., M.T. Hambisa, and A. Semahegn, *Induced Abortion and Associated Factors in Health Facilities of Guraghe Zone, Southern Ethiopia*. *Journal of pregnancy*, 2014.
33. Gelaye, A.A., K.N. Taye, and T. Mekonen, Magnitude and risk factors of abortion among regular female students in Wolaita Sodo University, Ethiopia. *BMC women's health*, 2014. 14(1): p. 50.
34. Animaw, W. and B. Bogale, *Abortion in university and college female students of Arba Minch town, Ethiopia, 2011*. *Sexual & Reproductive Healthcare*, 2014. 5(1): p. 17-22.
35. Adhikari, R., K. Soonthorndhada, and P. Prasartkul, *Determinants of unintended pregnancy among currently pregnant married women in Nepal*. in *biennial conference of the European Association of Population Scientists*, Liverpool, UK. 2006.
36. Mchunu, G., et al., *Adolescent pregnancy and associated factors in South African youth*. *African health sciences*, 2013. 12(4): p. 426-34.
37. Central Statistical Agency [Ethiopia] and ICF International. 2012. *Ethiopia Demographic and Health Survey 2011*. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency and ICF International.
38. Cheng, Y., et al., [Study on the risk factors of repeated abortion among unmarried adolescents]. *Zhonghua liu xing bing xue za zhi= Zhonghua liuxingbingxue zazhi*, 2006. 27(8): p. 669-72.
39. Cabezas-Garcia, E., et al., [Epidemiologic profile of induced abortion]. *Salud publica de Mexico*, 1997. 40(3): p. 265-71.
40. Ma, Q., et al., Early initiation of sexual activity: a risk factor for sexually transmitted diseases, HIV infection, and unwanted pregnancy among university students in China. *BMC Public Health*, 2009. 9(1): p. 111.
41. Morhe, E.S., et al., *Reproductive experiences of teenagers in the Ejisu-Juabeng district of Ghana*. *International Journal of Gynecology & Obstetrics*, 2012. 118(2): p. 137-40.
42. Goicolea, I., et al., *Risk factors for pregnancy among adolescent girls in Ecuador's Amazon basin: a case-control study*. *Revista Panamericana de Salud Publica*, 2009. 26(3): p. 221-28.
43. Mulugeta, Y. and Y. Berhane, *Factors associated with pre-marital sexual debut among unmarried high school female students in bahir Dar town, Ethiopia: cross-sectional study*. *Reproductive health*, 2014. 11(1): p. 40.
44. Gonçalves, H., et al., *Sexual initiation among adolescents (10 to 14 years old) and health behaviors*. *Revista Brasileira de Epidemiologia*, 2015. 18(1): p. 25-41.
45. Rector, R.E., et al., *The harmful effects of early sexual activity and multiple sexual partners among women: a book of charts*. Washington: The Heritage Foundation, 2003.

46. Erfani, A. and K. McQuillan, Rates of induced abortion in Iran: the roles of contraceptive use and religiosity. *Studies in Family Planning*, 2008. 39(2): p. 111-22.
47. Bhuiya, A., A. Aziz, and M. Chowdhury, Ordeal of women for induced abortion in a rural area of Bangladesh. *Journal of Health, Population and Nutrition*, 2001: p. 281-90.

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