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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

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ABSTRACT

Background*:* Abortion is the termination of a pregnancy by the expulsion of a fetus or embryo from the uterus. Induced abortion is usually defined as deliberate pregnancy termination prior to 20 weeks (for developed countries) and 28weeks (for developing countries) gestation. Describing the determinants of induced abortions contributes for long lasting reduction of induced abortion.

Objective: The aim of this study was to describe determinants of induced abortion among women of child bearing age, which experienced abortion, attending maternal and child health clinic in Mekelle town, Ethiopia.

Method*:* Institutional based cross sectional study was employed and 260 study subjects were selected using convenient sampling technique, and the data was collected using interviewer administered structured questionnaire; data was analyzed and cleaned using SPSS version 16. Binary logistic regression analysis was carried out to see determination of variables.

Results*:* Majority of women who had experienced induced abortion 138 (53.1%) were under the age of 25 years, with mean age 26.22 ±7.01years. A large number, 105 (40.4%) were with secondary school and above, and about 93 (35.8%) of the respondents were with no formal education. Those 213(81.9%) respondents were aborted in health institution. Among the total induced abortion, those 215(82.7%) were induced by health professional. Among 59 (22.7%) contraceptive user respondents for their aborted pregnancy, the largest percent, 30 (50.8 %) had used oral contraceptives. From the total interviewed women, 56(21.5%) respondents were replied health problem as their determinants of induced abortion. Contraceptive failure and child spacing were the next most common determinants reported with 43(16.5%) and 39 (15%) respectively. There was a significant association between health status daily worker, number of pregnancy marital status, occupational status monthly income child spacing. But there was no significant association with number of children, contraceptive failure, incest and age.

Conclusion: findings of this study indicated that majority of the unmarried and co-habitant women were more likely to induce their first pregnancies.

INTRODUCTION: Abortion is the termination of a pregnancy prior to 20 weeks (for developed countries) and 28weeks (for developing countries) gestation or less than 500gm birth weight; which occurs spontaneously or deliberately induced. The term abortion most commonly refers to the induced abortion of pregnancy, while spontaneous abortions are usually termed as miscarriages. Induced abortion to preserve the health of the pregnant is termed as therapeutic abortion; while an abortion induced for any other reason is termed as elective abortion. It can be safe or unsafe abortion In Ethiopia, abortion has been contributing to the high maternal mortality rate. The risk groups, (mothers and children) have priority in health service implementation [1, 2].

The proportion of abortions that are illegal ranges from almost none in Eastern Asia, Western Europe and Northern America to almost all in Africa, Central America and South America among women aged 15–44. Worldwide, the plan to achieve the Millennium Development Goal 5 is focusing on maternal and child health as a primary goal in health program. Approximately 44% of abortions worldwide were performed illegally (of which many, though not all, are unsafe). Studies conducted in Spain in 2004, levels of alcohol consumption, living conditions, and personal health and education influences the induced abortion rate. It is not out of consideration that sex before marriage also contributes to usually unsafe abortion; results in serious complications [3, 4, 5].

Unsafe abortion accounted for 14% of all maternal deaths in sub-Saharan Africa, where half of the world maternal deaths occurred. The demand for abortion in Ethiopia, predominantly rural country, is rooted in low contraceptive use and high levels of unintended pregnancy. Indeed, only 14% of Ethiopian women of reproductive age use contraception and more than 40% of pregnancies are unintended. Recently in 2008, an estimated 382,000 induced abortions were performed in Ethiopia, and 52,600 women were treated for complications of such abortions [4, 5, 6]. In Ethiopia as elsewhere in developing countries maternal health problem predominate. According to the World Health Organization, Ethiopia has the fifth largest number of maternal deaths. The maternal mortality ratio (MMR) in Ethiopia was estimated at 673 deaths per 100 000 live births in the year 2005, and unsafe abortion was estimated to account for 32% of all maternal deaths in Ethiopia [7, 8]. After legalization of abortion in Ethiopia, decreased trends of abortion ratio and the abortion related MMR were identified; the MMR is reduced to 470 deaths per 100,000 live births in (2008), but the severity of abortion complications and the case fatality rate increased during the transition of legal revision; the case fatality rate of abortion increased from 1.1% in 2003 to 3.6%. Limited access to contraceptives for all groups of women has been clearly identified as a determinant of unwanted pregnancy and subsequently, induced and even spontaneous abortion in some studies. In 2007 and the case fatality rate among women seeking post abortion care in public hospitals were the most serious complications seen, (628 per 100,000) [7, 9, 10].

Good supply of unmet contraceptive needs, restriction of underage marriage, abortion legalization and preventive policy of rape were some of the solutions to reduce unintended pregnancy. Even after this measurement, one survey of 15-24 year-olds women, in Addis Ababa, half of the 976 young women interviewed reported having been pregnant; 76% of these women told interviewers that they had a spontaneous (2%) or an induced abortion (74%). Another record review of Addis Ababa maternal deaths 35 of 36 abortion related deaths were induced abortion cases; that impede rapid and high quality abortion care; and it is contradicting the liberalization of abortion law that was for the purpose of reducing maternal death [6, 12].

Legalization of abortion law and fulfilling of unmet need of contraceptive can't reduce abortion and maternal mortality rate as needed as possible; rather flow of abortion and related deaths are common. A cross sectional study conducted countrywide in 2000 indicates that Mekelle town is the second highest next to Gonder in abortion prevalence (15.7%). Research done by Ipas and the Tigray Health Bureau, from 2007 until 2009, illustrate that women treated for abortion complications declined, while the number of women using safe, induced abortions dramatically increased from 7.3 % of all abortion cases to almost 60 % two years later [6, 13]. The major problem about determinants of induced abortion is that there are limited research findings in sub Saharan Africa especially in Ethiopia.

To address the limitation, this research explores determinants of induced abortions among child bearing age women attending MCH clinic in Mekelle town, Ethiopia.

METHODOLOGY:

Study setting: The study was carried out in Mekelle town which is the capital of Tigray regional state. The region covers 54,572.6 square kilometers, with a population estimated at 4.48 million in 2007; and public health infrastructure of 12 public hospitals and 38 health centers. Total population of the Mekelle town is estimated to be 227,505 (2008) and women of childbearing age group are 60, 998 (32.97%) of total population in 2007. There are three general, one referral, governmental hospitals and four private hospitals rendering induced abortion. There are eight health centers and 38 private clinics in Mekelle.

An institutional based cross-sectional study design was conducted in Mekelle, from Jan-Feb, 2011. The source population was all women of child bearing age that experienced induced abortion in the catchment area, attending MCH clinic during the study period. The study population was all women of child bearing age, attending the MCH clinics at study period and fulfilling the inclusion criteria. The sample size for the study was determined using single population proportion and data was collected using standardized structured questionnaire and female diploma Nurses were recruited. Continuous follow up and supervision was made by the principal investigator throughout the data collection period. Interviewer administered structured questionnaire that contain two parts, (Socio-demographic, and regarding induced abortion) was used to describe determinants of induced abortion.

Independent variables were age, education, marital status, income, occupation, residence, lack of contraceptives, contraceptive failure, lack of knowledge about contraception, child spacing, rape, incest, and health problems and the outcome variable was induced abortion. To assure data quality, training was given for the data collectors by the principal investigator. The questionnaire was initially prepared in English and then translated in to Tigrigna version. The Tigrigna version was again translated back to English to check for consistency of meaning.

Moreover questionnaire was pre-tested and necessary corrections were considered. The collected data was reviewed and checked for completeness by principal investigator on daily bases at the spot during the data collection time. The data was entered in to EPI-INFO version 3.5.1, exported to SPSS then the data was cleaned and analyzed using SPSS version 16 software statistical packages. Ethical clearance was secured from the AAU-college of health science department of Nursing and Midwifery IRB (research committee).

Respondents were informed about the purpose of the study then information was collected after obtaining verbal consent from each participant. Respondents were allowed to discontinue participation at any time they want. Information was recorded anonymously and confidentiality and beneficence was assured throughout the study period.

RESULTS:

Socio-demographic characteristics: A total of 260 women of reproductive age group were interviewed, making the response rate of 100%. Most of the clients were inhabitants of Mekelle town, 243 (93.45%) and more than one year period of residence were 84.6%. The majority of the women who had experienced induced abortion 138 (53.1%) were under the age of 25 years, with mean age 26.22±7.01years. In their ethnicity, about 230 (88.5) were Tigrian. Twenty seven (10.4%) were Amhara and the rest 3(1.2%) were Erob.

Most of the respondents, 229 (88.1%) were followers of orthodox religion, and the rests few were Muslim, Catholic, and Protestant. Their marital status revealed that the largest number 103 (39.6%) were married, and the next largest were single 67(25.8%). Of the total 260 interviewed women, 117(45%) were housewives, and only 10.8% (28) were commercial sex worker. A large number, 105 (40.4%) were with secondary school and above, and about 93 (35.8%) of the respondents were with no formal education.

Based on their monthly income, about 190 (73.1%) women had monthly income less than 500 Birr, and only 12, (34%) respondents had a monthly income of more than 1500 Birr. The distribution of socio-demographic characteristics of the respondents is shown below in **table 1**.

TABLE 1: SOCIO DEMOGRAPHIC CHARACTERISTICS AMONG REPRODUCTIVE AGE WOMEN, IN MEKELLE TOWN, ETHIOPIA, 2011 (n=260)

Characteristics		Frequency	Percent
Age	15-19	45	17.3
	20 -24	75	28.8
	25-29	60	23.1
	30-34	42	16.2
	35-39	23	8.8
	40-44	12	4.6
	45-49	3	1.2
Marital status	Single	67	25.8
	Married	103	39.6
	Divorced/widowed	46	17.7
	Co-habitant	44	16.9
Occupation	House wife	117	45.0
	Governmental Employee	35	13.5
	Commercial sex worker	13	5.0
	Daily worker	28	10.8
	Student	65	25.0
	Others ♥	2	0.8
Educational level	No formal education	93	35.8
	primary	62	23.8
	Secondary and above	105	40.4
Monthly income	<500 Birr (low)	190	73.1
	500-1500 (medium)	58	22.3
	>1500 (high)	12	4.6

Obstetrics related variables: The women who had no child accounts 118 (45.4 %) and those who had three or more were 57(21.9%). Women who had only one pregnancy were 110 (42.3%) and almost all of the women 244(93.8%) had not experienced stillbirth. Those 213(81.9%) respondents were aborted in health institution, and 51(19.6%) were out of health institution. The mean age of institution based induced abortion was 25.19 years, and the mean age of non health institution based induced abortion those 30.89 years.

Among the total induced abortion, those 215(82.7%) were induced by health professional, and 26(10.0%) were induced by the woman herself. Among those 72 (27.7%) respondents who had complication, those 49 (68.1%) respondents had bleeding, and 18 (25.0%), had infection. All of those who had monthly income more than 1500 Birr, 100% (12) were institution based abortions. Among 59 (22.7%) contraceptive user respondents for their aborted pregnancy, the largest percent, 30 (50.8 %) had used oral contraceptives.

TABLE 2: OBSTETRIC CHARACTERISTICS AMONG REPRODUCTIVE AGE WOMEN, IN MEKELLE TOWN, ETHIOPIA, 2011 (n=260)

Characteristics		Frequency	Percent
Number of children	No	118	45.4
	One-two	85	32.7
	Three or more	57	21.9
Number of abortion	One	240	92.3
	Two or more	20	7.7
Order of abortion	First pregnancy	149	57.3
	Second pregnancy	86	33.1
	Third pregnancy	45	17.3
determinants of abortion	Lack of contraceptive	4	1.5
	Contraceptive failure	38	14.6
	Lack of awareness	37	14.2
	Child spacing	39	15.0
	Rape	37	14.2
	Incest	22	8.5
	Health problem	56	21.5
	Others ♥	28	10.8

Place of abortion	Health institution	213	81.9
	Her home	40	15.4
	Traditional healer's house	11	4.2
Doer of abortion	Health professional	215	82.7
	Non health professional	49	18.3
Admission	Yes	48	18.5
	No	212	81.5
Duration of admission	One day	12	4.6
	Two-five days	30	11.5
	More than five days	6	2.3
Complication	Yes	72	27.7
	No	188	72.3
Amount of birr paid	Less than 50 Birr	167	64.2
	55-99 Birr	29	11.2
	100-199 Birr	26	10.0
	200-400 Birr	22	8.5
	Greater than 400 Birr	16	6.2

♥ = Religion issue, Condom rupture, Lack of economie.

Determinants of induced Abortion related variables: From the total interviewed women, 56(21.5%) respondents were replied health problem as their determinants of induced abortion. Contraceptive failure and child spacing were the next most common determinants reported with 43(16.5%) and 39(15%) respectively. Those women who had lack of awareness and rape had also significant number. Among teenagers, 33.5% respondents had raped when compared to higher age group, 25-29 years, only 8.3%. Rape with 14.2% and incest with 8.5% had significant numbers as determinants of induced abortion among those women who had never married; whereas married women had child spacing with higher percent (16.5%) as determinants of induced abortion. Contraceptive failure and lack of awareness were equally found as determinants of induced abortion among student respondents with 16.9% (11) each.

Association of independent variables with induced Abortion: As compared with status, commercial sex workers were more likely to have more than one induced abortion, (COR=9.75, 95% C.I (1.45, 65.78). Women who had no children had less likely chance to have more than one induced abortions, (COR = 0.271, 95%, C.I (0.084, 0.870) than those with three or more children. When we compare with those who had not health problem as determinant, those women with health problem were more likely to hove more than one induced abortion (COR=2.667, 95%, C.I. (1.032, 6.887). Contraceptive related variables, lack of awareness, rape, incest, and child spacing did not show association in the crude odds ratio with number of induced abortion.

When compared using multivariate binary logistic regressions, those daily worker had less likely possibility to have more than one induced abortion (AOR =0.003, 95% C.I (0.000, 0.600), than students. As compared to those who had three or more pregnancy, those with one to two number of pregnancy had less likely chance to have more than one induced abortion, (AOR= 0.013, 95% C.I (0.001, 0.325). The age, marital status and educational status were not associated with number of induced abortion.

TABLE 3: DEMOGRAPHIC AND DETERMINANT VARIABLES BY NUMBER OF INDUCED ABORTION IN MEKELLE TOWN, ETHIOPIA, 2011 (n=260)

Characteristics	Number of induced abortion			
	One No (%)	More than one No (%)	COR (95% C.I.)	AOR (95% C.I.)
Occupation				
Housewife	107(44.6)	10(50.0)	3.037(0.645, 14.298)	0 .267(0.011, 6.22)
Gove employed	31(12.9)	4(20.0)	4.194(0.728, 24.143)	5.481(0.05, 648.5)
Commercial sex work	10(4.2)	3(15.0)	9.75(1.445, 65.780)*	0.482(0.014, 16.25)
Daily worker	27(11.3)	1(5.0)	1.20(0.105, 13.838)	0.003(0.000, 0.600)*
Students	63(26.3)	2(10.0)	1	1

Number of children				
No	113(95.8%)	5(4.2%)	0.27(0.084, 0.87)*	27062.9(25.70,2848)
One to two	78(91.8%)	7(8.2%)	0.55(0.188,1.611)	5.047(0.281, 90.525)
Three or more	49(86.0%)	8(14.0%)	1	1
Number of pregnancy				
One	110(45.8)	0(0.0)	0.000(0.000 .)	0.000(0.000,----)
two- three	80(33.3)	9(45.0)	0.511(0.198, 0.321)	0.013(0.001, 0.325)**
four or more	50(20.8)	11(55.0)	1	1
Lack of contraceptives				
Yes	4(1.7)	0(.0)	0.000(0.000, --- .	0.000(0.000,----)
No	236(98.3)	20(100.0)	1	1
Contraceptive failure				
Yes	34(14.2)	4(20.0)	1.515(0.478, 4.804)	1.631(0.412, 6.46)
No	206(85.8)	16(80.0)	1	1
Lack of awareness				
Yes	32(13.3)	5(25.0)	2.167(0.737, 6.37)	2.063(0.56, 7.58)
No	208(86.7)	15(75.0)	1	1
Child spacing				
Yes	38(15.8)	1(5.0)	0.28(0.036, 2.15)	0.139(0.016, 1.197)
No	202(84.2)	19(95.0)	1	1
Rape				
Yes	36(15.0)	1(5.0)	0.298(0.039, 2.3)	0.75(0.07, 7.17)
No	204(85.0)	19(95.0)	1	1
Incest				
Yes	20(8.3)	2(10.0)	1.222(0.264, 5.65)	4.774(0.70,32.55)
No	220(91.7)	18(90.0)	1	1
Health problem				
Yes	48(20.0)	8(40.0)	2.667(1.032, 6.887)*	0.823(0.142, 4.77)
No	192(80.0)	12(60.0)	1	1
Admission				
Yes	40(16.7)	8(40.0)	3.333(1.280, 8.68)*	3.505(1.202,10.226)*
No	200(83.3)	12(60.0)	1	1

NB: *= p-value < 0.05, ** = p-value < 0.01, *** = p-value < 0.001

Binary logistic had been also used to assess the association of independent variables with order of pregnancies aborted. Those who were married and divorced/widowed had less likely chance to have first pregnancy induced abortions, (COR = 0.058, 95%, CI (0.021, 0.160) and (COR = 0.056, 95%, CI (0.018, 0.172) than co-habitants.

When compared with those, secondary school and above, those who had no formal education had less likely chance to have first pregnancy induced abortion, with COR = 0.27, 95%, C.I (0.153, 0.49). This result showes that students were 26.6 times more likely to induce their first pregnancy than others, (COR=26.667, 95% C.I. (7.9, 89.77).

Those who had rape and incest were also more likely to have first pregnancy induced abortion, with (COR=3.745, 95%, C.I (1.579, 8.88) and (COR= 5.262, 95%, C.I (1.52, 18.26) respectively. As indicated in the outcomes of multivariate binary logistic regression, married and divorced/widowed had less likely chance to have first induced abortion, (AOR=0.14, 95% C.I (0.04, 0.49) and (AOR =0.15, 95% C.I (0.04, 0.6) respectively than co-habitants.

Commercial sex workers had less likely to have first pregnancy induced abortion (AOR =0.111, 95% C.I (0.01, 0.89), than students.

TABLE 4: DETERMINANT VARIABLES BY FIRST PREGNANCY INDUCED ABORTION OF RESPONDENTS IN MEKELLE TOWN, ETHIOPIA, 2011 (n=260)

Characteristics	First pregnancy induced abortion			
	yes	No	COR (95% C.I.)	AOR (95% C.I.)
Marital status				
Single	64(43.0)	3(2.7)	2.73(0.61, 12.08)	2.8(0.54, 15.0)
Married	32(21.5)	71(64.0)	0.058(0.021, 0.160)***	0.14(0.04, 0.49)**
Divorced/Widowed	14(9.4)	32(28.8)	0.056(0.018, 0.172)***	0.15(0.04, 0.6)**
Co-habitant	39(26.2)	5(4.5)	1	1
Level of education				
No formal education	33(22.1)	60(54.1)	0.27(0.153,0.49) ***	0.36(0.12,1.11)
Primary	46(30.9)	16(14.4)	1.44(0.71, 2.89)	0.50(0.16,1.64)
Secondary & above	70(47.0)	35(31.5)	1	1
occupation				
housewife	65(58.6)	52(34.9)	0.038(0.01, 0.126)***	0.222(0.044, 1.12)
Govt. employed	22(19.8)	13(8.7)	0.028(0.007, 0.12) ***	0.172(0.027, 1.11)
commercial sex work	7(6.3)	6(4.0)	0.040(0.008, 0.19) ***	0.111(0.014, 0.89)*
daily worker	14(12.6)	14(9.4)	0.047(0.012, 0.18) ***	0.195(0.031, 1.21)
student	3(2.7)	64(43.0)	1	1
Economical status				
Less 500 Birr	120(80.5)	70(63.1)	3.42(0.996,11.79)	7.142(1.01, 50.42)*
500-1500 Birr	25(16.8)	33(29.7)	1.51(0.41, 5.604)	4.72(0.694, 32.135)
More than 1500 Birr	4(2.7)	8(7.2)	1	1
Lack of contraceptive				
Yes	3(2.0)	1(0.9)	2.260(0.23, 22.024)	3.38(0.224, 51.15)
No	146(98.0)	110(99.1)	1	1
Contraceptive failure				
Yes	22(14.8)	16(14.4)	1.029(0.512, 2.064)	0.66(0.15, 2.98)
No	127(85.2)	95(85.6)	1	1
Lack of awareness				
Yes	23(15.4)	14(12.6)	1.265(0.619, 2.58)	1.040(0.234, 4.6)
No	126(84.6)	97(87.4)	1	1
Rape				
Yes	30(20.1)	7(6.3)	3.745(1.579, 8.88)**	0.804(0.15, 4.19)
No	119(79.9)	104(93.7)	1	1
Incest				
Yes	19(86.4%)	3(13.6)	5.262(1.52, 18.26)**	1.98(0.32, 12.18)
No	130(54.6%)	108(45.4)	1	1
Health problem				
Yes	22(14.8)	34(30.6)	0.392(0.214, 0.71)**	0.50(0.12, 2.02)
No	127(85.2)	77(69.4)	1	1

NB: *= p-value < 0.05, ** = p-value < 0.01, *** = p-value < 0.001

The independent variables were calculated their association with second pregnancy induced abortion to see the crude and adjusted odds ratio. Compared with students, commercial sex workers were more likely to induced their second pregnancy, (COR=25.20, 95% C.I (5.6, 113.7).

Those who had child spacing as determinants had significantly higher chance to have second pregnancy induced abortion (COR=3.175, 95% C.I (1.582, 6.37) than those did not have child spacing.

Those with health problem were also more likely to induce their second pregnancy (COR=2.080, 95% C.I (1.135, 3.810). But those who had rape as their determinants had less likely chance to have second pregnancy induced abortion, (COR=0.149, 95% C.I (0.044, 0.50).

The AOR outcome of those variables had also shown association.

Commercial sex workers had significantly higher chance to induce their second pregnancy (AOR= 14.37, 95% C.I (2.30, 89.53) than students. Women with less than 500 Birr monthly income were less likely to induce their second pregnancy than those with 1500 or more Birr, (AOR= 0.12, 95% C.I (0.021, 0.67). This implies that even though the governmental institutions render cost free induced abortion, clients prefer clandestine procedures which might be due to lack of social acceptance. Child spacing as determinants had shown more chance to have second pregnancy induced abortion, (AOR= 10.27, 95% C.I (2.76, 38.25), than others. Women with health problem as determinants of induced abortion, were also more likely to induce their second pregnancy (AOR= 6.876, 95% C.I ((1.93, 24.41), as compared with those did not have health problem as determinants.

TABLE 5: DETERMINANT VARIABLES BY SECOND PREGNANCY INDUCED ABORTION OF RESPONDENTS IN MEKELLE TOWN, ETHIOPIA, 2011 (n=260)

Characteristics	Second pregnancy induced abortion			
	yes	No	COR (95% C.I.)	AOR (95% C.I.)
Marital status				
single	5(5.8)	62(35.6)	0.43(0.12,1.44)	0.60(0.15, 2.505)
married	54(62.8)	49(28.2)	5.8(2.379, 14.26)***	1.26(0.39,4.062)
divorced/widowed	20(23.3)	26(14.9)	4.06(1.501,11.01)**	0.86(0.245,3.016)
co-habitant	7(8.1)	37(21.3)	1	1
Occupation				
housewife	50(58.1)	67(38.5)	11.75(4.01, 34.4) ***	2.82(0.69,11.45)
Govt. employed	18(20.9)	17(9.8)	16.67(4.98, 55.8) ***	1.36(0.27, 6.93)
commercial sex work	8(9.3)	5(2.90	25.20(5.6, 113.7)***	14.37(2.30, 89.53)**
daily worker	6(7.0)	22(12.6)	4.29(1.10, 16.65)*	0.95(0.17, 5.228)
student	4(4.7)	63(36.2)	1	1
Economical status				
Less 500 Birr	49(57.0)	141(81.0)	0.17(0.05,0.60)**	0.12(0.021, 0.677*
500-1500 Birr	29(33.7)	29(16.7)	0.5(0.14,1.85)	0.28(0.05, 1.56)
Morethan1500 Birr	8(9.3)	4(2.3)	1	1
Contraceptive failure				
Yes	16(18.6)	22(12.6)	1.579(0.782, 3.19)	5.77(1.54, 21.61) **
No	70(81.4)	152(87.4)	1	1
Child spacing				
Yes	22(25.6)	17(9.8)	3.175(1.582, 6.37)**	10.27(2.76, 38.25) **
No	64(74.4)	157(90.2)	1	1
Rape				
Yes	3(3.5)	34(19.5)	0.149(0.044, 0.50)**	0.686(0.136, 3.463)
No	83(96.5)	140(80.5)	1	1
Health problem				
Yes	26(30.2)	30(17.2)	2.080(1.135, 3.810)*	6.876(1.93, 24.41) **
No	60(69.8)	144(82.8)	1	1

NB: *= p-value < 0.05, ** = p-value < 0.01, *** = p-value < 0.001

The third or more pregnancies induced abortion were also calculated related to independent variables of induced abortion, married and those divorced/ widowed were more likely to induced their third or more pregnancies, (COR= 13.06, 95% C.I (1.70, 99.92) and (COR= 30.25 95% C.I ((3.82, 239.2) respectively than cohabitants. Respondents with health problems as their determinants had significantly higher chance to have induced abortion for their third or more pregnancies, with COR= 2.122, 95% C.I (1.05, 4.303) and (AOR= 4.553, 95% C.I (1.008, 20.57), than those with other determinants of their induced abortion.

Divorced/widowed women had also significant association with third or more pregnancies abortion with AOR= 17.7, 95% C.I (1.7, 182.16).

TABLE 6: DETERMINANT VARIABLES BY THIRD OR MORE PREGNANCY INDUCED ABORTION OF RESPONDENTS IN MEKELLE TOWN, ETHIOPIA, 2011 (n=260)

Characteristics	Third or more pregnancy induced abortion			
	yes	No	COR (95% C.I.)	AOR (95% C.I.)
Marital status				
single	1(2.2)	66(30.7)	0.65(0.04, 10.69)	0.79(0.04, 15.91)
married	24(53.3)	79(36.7)	13.06(1.70, 99.92)*	6.05(0.59, 62.1)
divorced/widowed	19(42.2)	27(12.6)	30.25(3.82, 239.2)**	17.7(1.7, 182.16)*
co-habitant	1(2.2)	43(20.0)	1	1
Contraceptive failure				
Yes	4(8.9)	34(15.8)	0.519(0.175, 1.55)	(3.433(0.698, 16.88)
No	41(91.1)	181(84.2)	1	1
Lack of awareness				
Yes	8(17.8)	29(13.5)	1.387(0.588, 3.27)	4.291(0.900, 20.471)
No	37(82.2)	186(86.5)	1	1
Child spacing				
Yes	10(22.2)	29(13.5)	1.833(0.82, 4.096)	1.969(0 .375, 10.347)
No	35(77.8)	186(86.5)	1	1
Rape				
Yes	5(11.1)	32(14.9)	0.715(0.26, 1.948)	0.569(0 .053, 6.152)
No	40(88.9)	183(85.1)	1	1
Incest				
Yes	1(2.2)	21(9.8)	0.210(0.028, 1.60)	4.553(1.008, 20.57)
No	44(97.8)	194(90.2)	1	1
Health problem				
Yes	15(33.3)	41(19.1)	2.122(1.05, 4.303)*	4.553(1.008, 20.57)*
No	30(66.7)	174(80.9)	1	1

NB: *= p-value < 0.05, ** = p-value < 0.01, *** = p-value < 0.001

DISCUSSION: The aim of this study is to assess the determinants of induced abortion among reproductive age mothers. A decline in desired family size and lack of awareness to control unwanted pregnancy leads to an increase in risk of induced abortion and its consequences. A study of this type is thus; very important to assess the type and description of the determinant factors that influence induced abortion.

1. **Demographic factors:** Though the determinants might require to be investigated in detail, demographic characteristics are also likely contributing factor for induced abortion. The mean age of respondents who experienced induced abortion was 26.22±7.01, which is greater than the mean age of women seeking induced abortion in Ethiopia, in 2008 annual report (9, 23) that was 23 years. Even though there may be delay in first sex in this study, young women are still at risk for induced abortion. Being unmarried and co-habitants contribute to first pregnancy induced abortion. Similar to a study conducted in China on sexually active attendees (18) that was the main response, single women had higher proportion (43.0%) to induce their first pregnancy than married women, (21.5%), and married women were 0.021 times less likely to induce their first pregnancy, than single in its crude odds ratio. Married women were also 0.14 times less likely to induce their first pregnancy in the adjusted odds ratio, than cohabitants. It is also true in this study that divorced/widowed women were less likely to induce their first pregnancy than cohabitant (AOR =0.15). This might indicates that cohabitant and single women may not be in stable parenthood when become pregnant, and could be lack of conformity one to have child before marriage.

Commercial sex worker were 14.37 times more likely to induce their second pregnancy than students, (AOR=14.37), but daily laborer had 0.003 times less likely to have more than induced abortion, than students. This is similar to the study done in North West Ethiopia, in 2003(28), that being student was the reason to induce abortion. This study showed that commercial sex workers were more exposed to unprotected sex than students. Students might have difficulty to give birth not to interrupt school, and have economical and social burden.

Unlike to the cross-sectional study done in Agaro town, Ethiopia, in 2006, (28, 29), that as educational status increases, the likelihood of induced abortion decreases, respondents with no formal education had 0.27 times less likely to induce their first pregnancy. This is also in line with that of U.S, study on reproductive age women (16), that the likelihood of induced abortion was decreased among less than 12 grades than greater than 12 grades. It could be the first pregnancy that occurred during school time that they prefer to complete their education.

The women with low monthly income were 7.142 times more likely to induce their first pregnancies than more income. This is unlike the study in Brazil, in 2006 (22), that the likelihood of induced abortion was 4 times higher among high income than low income. This might be related to that the induced abortion done in this study area is cost free and the need for reducing economical burden on their family. Women with a few numbers of pregnancies were 0.013 times less likely to have more than one induced abortion, than more pregnancies; which might be related to the want for reducing economical burden on the family. This is unlike to the study in North West Ethiopia, (2003), that the number of pregnancies was negatively associated with induced abortion.

Respondents that were admitted secondary to induced abortion were also more likely to have more than one induced abortion, (AOR =3.505). One third of the respondents 33.07% were either not in institution or not by health professionals (unsafe abortion), which is less than that of study in developing nations of Africa, 2003(5, 15), that 55% were unsafe abortion. Among those who had complications, the non institution based induced abortions had higher proportion, (Traditionalist's house 40.0% and her home 35.0%) than those with institution based abortion 25.7%. In this study, no one reports male disapproval as determinants of induced abortion; which implies women are independent of males to decide their pregnancies. This is unlike the study in Ethiopia, in 2008(25) that the partner decision for induced abortion was 9.3%.

2. **Other determinants of induced Abortion:** The most frequent determinant mentioned by the participants of this study for induced abortion was health problem. Health problem covers 56(21.5%), respondents that were 6.87 times more likely to induce second pregnancy, and 4.50 times more likely to induce their third pregnancy in the AOR. It might be the life style that pregnant mothers did not use optimal nutrition during pregnancy; and the distribution and capacity of health institutions to address maternal health problem as early as possible might be also poor. This result is similar to a study conducted in Spain in 2004(11), that living conditions and personal health influences the induced abortion rate.

   Child spacing was the next determinant, showed significant association with second pregnancy induced abortion, (AOR=10.27) and it was with highest proportion among married and commercial sex workers. This result showed that, those respondents might engage to continuous sexual contact, and could have lack of knowledge to prevent unwanted pregnancies. Women with contraceptive failure were also 5.77(AOR) times more likely to induce their second pregnancy and it was 14.6%, among respondents that decreases from the nationwide hospital based survey in Ethiopia in 2000(25), which was 19%. Even though there is good supply of contraceptives, respondents did not have enough knowledge about timing, and use of contraceptives; and this might also indicates the need of long term contraceptive which reduces failure.

   Unlike the nationwide hospital based survey in Ethiopia (25), in which 3% of the abortion survivors reported rape, 14. 2% of the respondents in this study had rape as determinants of induced abortion. Even though it had no association in the AOR, rape had 3.74 times higher chance to have first pregnancy induced abortion. Incest was 8.45%, with significantly higher chance to have first pregnancy induced abortion (COR=5.26). This might be related to the negative impact of unrestricted law of abortion in Ethiopia 2006; rape and incest are criteria to induce abortion legally.

Lack of contraceptives (only 1.5%) and lack of awareness were not associated with induced abortion in the multivariate binary logistic regression out come. Lack of contraceptives was unlike to the nationwide hospital based survey in Ethiopia (25) that was the most common reason for termination of pregnancy. This result showed that the supply of contraceptives is relatively good. Unlike to a study in Turky, in 2002(25), which was 64.6% unwanted pregnancy; 2.7% determinants of induced abortion in this study were unwanted pregnancy, that significantly reduced from the previous nationwide hospital based survey in Ethiopia, which was 50%.

The unmarried reason to induce abortion (0.7%) was not similar to the cross sectional study in northwest Ethiopia in 2003(28), which was 31.3%. In general, Religion issue, separation, unwanted pregnancy, lack of economies, not to interrupt school, and Sex before marriage, had also appreciable contribution on induced abortion.

Strengths and Limitations of the study:

Strength of the study: It is primary data, which can be used as base-line information for intervention programs and further study. Non response rate were absent.

Limitation of the study: There may be mothers in the community with other determinants who do not visit the MCH clinic during data collection period. Study is less representative since it uses convenient sampling.

CONCLUSION: The study tried to assess the determinants of induced abortion among survivors in the reproductive age mothers in Mekelle town. Participants in this study were women who experienced induced abortion that attends MCH clinic in the selected Mekelle town health institutions. From the study findings, the following conclusions are drawn. Firstly, most of the respondents, experienced induced abortion were under the age of 25 years; and more than half (57.3%) of respondents were induced only their first pregnancy. Unmarried and co-habitant women were more likely to induce their first pregnancies. It is also true in this study that being commercial sex workers and low monthly income were influential factors for induced abortion.

The most common determinants of induced abortion reported were health problems and child spacing. Contraceptive failure, rape and incest had also substantial contribution among determinants of induced abortion. Other determinants like lack of awareness, lack of contraceptive were not associated with the induced abortion. Had it been avoided all those determinants, dramatic reduction in induced abortion and its complications would be succeeded. At the end, these findings highlight the need for greater understanding of the determinants of induced abortion among reproductive age women in Mekelle town. Besides, elaborating the meaning of determinants of induced abortion is another importance of this study.

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