

## ORIGINAL RESEARCH ARTICLE

# Contraceptive Use among Women Seeking Repeat Abortion in Addis Ababa, Ethiopia

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## Abstract

Limited access to modern contraceptives in populations that desire smaller families can lead to repeat unintended pregnancy and repeat abortions. We conducted an analysis of the medical records of 1,200 women seeking abortion-related services in public and private facilities in Addis Ababa, Ethiopia from October 2008 to February 2009. We examined the characteristics of initial and repeat abortion clients including prior contraceptive use and subsequent method selection. The incidence of repeat abortion was 30%. Compared with women seeking their first abortion, significantly more repeat abortion clients had ever used contraceptives and they were nearly twice as likely to leave the facility with a method. However, repeat abortion clients were significantly more likely to have ever used short-term reversible methods and to choose short-term methods post-abortion. Contraceptive counseling services for repeat abortion clients' should address reasons for previous contraceptive failure, discontinuation, or non-use. Post-abortion family planning services should be strengthened to help decrease repeat abortion. (*Afr J Reprod Health* 2013; 17[4]: 56-65).

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**Keywords:** abortion, repeat abortion, contraception, urban, Ethiopia

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## Résumé

L'accès limité aux contraceptifs modernes chez les populations qui désirent des familles peu nombreuses mène aux grossesses non désirées et à des avortements répétés. Nous avons effectué une analyse des dossiers médicaux de 1.200 femmes qui recherchent des services liés à l'avortement dans les établissements publics et privés à Addis-Abeba, en Ethiopie, du mois d'octobre 2008 au mois du février 2009. Nous avons examiné les caractéristiques des clientes qui interrompaient la grossesse pour la première fois et celles qui ont répété l'avortement, y compris l'utilisation des contraceptifs dans le passé et la manière de sélectionner la méthode par la suite. L'incidence de l'avortement à répétition était de 30%. Par rapport aux femmes qui recherchent leur premier avortement, beaucoup plus de clients de l'avortement à répétition avaient déjà utilisé des contraceptifs et elles étaient à peu-près deux fois plus susceptibles de quitter l'établissement avec une méthode. Toutefois, les clientes qui ont eu l'avortement répétés étaient significativement plus susceptibles d'avoir déjà utilisé des méthodes réversibles à court terme et de choisir des méthodes de post-avortement à court terme. Les services de conseil sur la contraception pour les clientes de l'avortement à répétition devraient aborder les causes d'échec contraceptif précédent, l'arrêt ou la non-utilisation. Les services de planification familiale post-avortement devraient être renforcés pour aider à diminuer les avortements répétés. (*Afr J Reprod Health* 2013; 17[4]: 56-65).

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**Mots-clés:** avortement, avortement répété, la contraception, urbaines, Ethiopie

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## Introduction

Repeat abortion, or having more than one pregnancy termination, is bound in a vicious cycle with repeat unintended pregnancy<sup>1-5</sup>. Women who have had a recent abortion are more likely to

discontinue contraceptive use during a 1-year follow up period and both recent and other previous abortion clients have been found to be more likely to have a (repeat) unintended pregnancy during that time period<sup>6</sup>. While safe termination of pregnancy is a relatively low-risk

procedure<sup>7</sup>, repeated terminations have been associated with numerous adverse sequelae (e.g. ectopic pregnancy, placenta previa, fetal loss, preterm delivery, and potentially lower fertility, and breast cancer)<sup>8,9</sup>, thus avoiding repeated unintended pregnancy and associated repeat abortions is the ultimate goal<sup>10</sup>. Limited access to effective contraception in populations that desire smaller families often leads to increased reliance on abortion to help control fertility<sup>11</sup>. Anecdotal reports and qualitative research have documented concerns among providers about repeat abortion in the wake of legalization of abortion in the US and more recently in South Africa and Nepal<sup>12-15</sup>. Some of the increases in repeat abortion are due to changes in the population at risk as access to pregnancy terminations has become more available<sup>11,15,16</sup>. Repeat abortions incidence varies considerably by country but is generally quite common in high-resource settings where more reliable data is available<sup>9,17</sup>. According to recent findings, the level of repeat abortions in Europe, Canada and the US ranges from 22% and 50%<sup>9,17-22</sup>. A recent analysis of national data from Britain found that a third of women who reported having had an abortion also had a subsequent abortion<sup>23</sup>. However, since abortion also is notoriously underreported for a variety of reasons including social stigma<sup>24</sup>, repeat abortion may be as well, perhaps even more so<sup>4,25-27</sup>. Furthermore, there is no standard definition of repeat abortion; some studies count more than one abortion ever, others focused on multiple abortions within shorter intervals<sup>4,25,28-30</sup>. A seminal 1984 Canadian study found more similarities than differences among first-time and repeat abortion clients<sup>31</sup>. More recent research has identified an array of potential risk factors for repeat abortion including: age; socioeconomic status; parity; education; foreign origin; race; smoking; alcohol/drug abuse; physical abuse or violence; early sexual debut; previous contraceptive use; and type of contraceptives used<sup>4,9,10,17,22,23,32-35</sup>. Some of these characteristics were significant predictors in some studies but not others. Although still poorly understood, risk factors for repeat abortion likely vary in different countries<sup>9</sup>.

Less is known about the women who require repeat abortion services in low-resource settings.

Some of the available data from Africa is dated and/or of limited generalizability. In Vietnam, Huong et al found that more than 70% of women presenting for pregnancy termination at a hospital in the capital city had sought at least one prior abortion; education and economic status were not associated with repeat abortion but prior contraceptive use was<sup>36</sup>. Elsewhere in Asia, repeat abortion incidence ranged from 29-46%<sup>37-39</sup>. Following the legalization of abortion, a study of risk for repeat termination in Nepal found that nearly a third of surveyed women were seeking a repeat abortion. The study also found that significantly more repeat abortion seekers “would consider having another abortion in the future” compared with those seeking abortion for the first time (49% vs. 37%)<sup>39</sup>. In addition, women who did not intend to have another child in the future were twice as likely to have a repeat abortion as those who intended to do so. In a study of abortion and contraception conducted in Ivory Coast in the late 1990s, the repeat abortion incidence among multi-gravid women was 18%<sup>40</sup>. “Research from Zimbabwe reported a 1-year incidence of repeat abortion among women who both expressed a need for family planning and attended follow up appointments of between 2.5% and 5.3%<sup>41</sup>. A 2002 study of women seeking (i.e., wanted to avoid pregnancy for at least the next 2 years) and attended follow up appointments of between 2.5% and 5.3%<sup>41</sup>.” care for complications of unsafe abortion in Ghana found that more than 22% were presenting for their second abortion and 14% for a higher order abortion<sup>42</sup>.

Total fertility rate (TFR) in Ethiopia has been declining but remained high at 4.8 children per woman in 2011; more than a quarter (28%) of recent births and current pregnancies were reported mistimed or unwanted<sup>43</sup>. Modern contraceptive prevalence among married women was 29% but the 1-year discontinuation rate was 37%. In addition, a quarter of married women (25%) have an unmet need for family planning<sup>43</sup>. In stark contrast, the TFR in the capital city, Addis Ababa, is 1.5 children per woman, well below replacement fertility and approaching the city’s estimated total wanted fertility rate of 1.3<sup>43,44</sup>. Contraceptive prevalence in Addis Ababa is 63%, more than twice the national average with about a

tenth (11%) of married women reporting an unmet need for family planning<sup>43</sup>. While contraceptive prevalence is high in Addis Ababa, the estimated abortion incidence is also high at 49 per 1000 women of reproductive age (WRA) compared to 23 per 1000 WRA in the country<sup>45</sup>. Abortion contributes to Ethiopia's fertility decline and the decriminalization of the country's penal code in 2005, which broadened the circumstances under which abortion is permitted, is likely to be playing an even greater role particularly in Addis Ababa<sup>44</sup>. Unlike in other African countries, the conscientious objection of providers does not seem to be a major barrier to service delivery<sup>47</sup>. At the same time, abortion continues to contribute to Ethiopia's high maternal mortality rate (590 maternal deaths per 1000 live births in 2008)<sup>48,49</sup>. It is estimated that only 27% of abortions in the country were safe procedures<sup>45</sup> and according to global estimates, unsafe abortions account for 13% of maternal mortality worldwide<sup>49,50</sup>. A study of unwanted pregnancy in rural Tigray, Ethiopia did not report repeat abortion rates but noted that "[a] significant number of patients reported a previous history of induced abortion"<sup>51</sup>. A nationally representative study of post-abortion complications in Ethiopia found a repeat abortion incidence of 35% among women seeking post-abortion care<sup>52</sup>. Other estimates from Ethiopia determined that more than a third of women presenting for induced abortion (35%) had had a previous termination, as did more than a quarter (27%) of post-abortion care (PAC) clients<sup>53</sup>. In addition to the morbidity and mortality risks associated with repeat abortion, post-abortion care represents the lion's share of abortion-related costs in Ethiopia and creates a substantial drain on scarce resources<sup>54</sup>.

A recent study by Prata et al identified factors associated with post-abortion method choice among women seeking abortion-related care in Addis Ababa since the legal reforms<sup>55</sup>. Briefly, among other significant factors such as age, occupation, type of clinic, education, and number of living children, the number of previous abortions was significantly associated with increased odds of adopting any method post-abortion but decreased odds of adopting a long-term one." The characteristics of women

presenting for abortion-related care who have had a previous abortion might point to risk factors and interventions to interrupt the cycle of repeat abortion. This paper uses the same data to examine the socio-demographic characteristics and patterns of contraceptive use of women seeking care for initial and repeat abortions in Addis Ababa, Ethiopia.

## Methods

We analyzed 1,200 records of women seeking abortion-related services (safe termination and treatment for incomplete abortion) using data collected prospectively from October 2008 to February 2009 in four public and three private health facilities in Addis Ababa. Data regarding socio-demographic characteristics, reproductive and contraceptive history, and post-abortion contraception were extracted from client records. Any women using abortion-related services for a second or higher order procedure was considered to be a "repeat abortion" client. Bivariate analyses were conducted on socio-demographic characteristics and reproductive and contraceptive history by first vs. repeat abortion. Chi-square test or t-test for comparison of two proportions were estimated and significance was established at p-value of <0.05. We used multiple logistic regression analysis to assess the likelihood of repeat abortion among the study population. We also stratified the study population according to last contraceptive method used prior to current procedure were grouped into three categories: i) none/never used a method; ii) ever used short-term reversible (pills, condoms, emergency contraception) and; iii) ever used longer term reversible (injectables, implants, intrauterine devices)." Interaction terms were tested but deemed non-significant so they were not included in the final model.

Ethical review was provided by the Committee for the Protection of Human Subjects at the University of California, Berkeley (#2008-9-56).

## Results

Of the 1,200 women included in the sample, nearly one third (30%) sought a repeat abortion.

The sample characteristics are provided in Table 1. Compared to women seeking first abortion, women seeking repeat abortion were more likely to be older (26 vs. 25 years old;  $p < 0.001$ ). The distribution of women seeking first and repeat

abortion was similar in marital status and education. Students were more likely to be seeking first abortion than repeat abortion but no other statistically significant differences in occupation were observed.

**Table 1:** Socio-demographic characteristics of women seeking abortion-related services by first vs. repeat abortion

	Total %	First Abortion %	Repeat Abortion %	p-value for $\chi^2$ or t-test
<b>Total (%)</b>	N=1200 (100%)	n=837 (69.8%)	n=363 (30.3 %)	
<b>Age (years)</b>				0.000
<b>Mean age (<math>\pm</math> SD)</b>	25.1 (4.4)	24.7 (4.3)	26.1 (4.6)	<0.001
15 – 19	7.3	9.1	3.3	<0.001
20 – 24	41.0	42.4	37.7	0.1308
25 – 29	37.8	37.2	39.4	0.4633
30 – 34	9.3	8.4	11.6	0.0795
35 – 44	4.5	3.0	8.0	0.0001
<b>Marital Status</b>				0.0400
Single (never married)	53.5	55.9	47.9	0.0109
Ever Married	46.5	44.1	52.1	0.0107
<b>Current Residence</b>				0.0020
Addis Ababa	91.3	89.5	95.3	0.0010
Outside Addis Ababa	7.4	9.2	3.3	0.0003
Abroad	1.3	1.3	1.4	0.9302
<b>Education</b>				0.1120
No Education	7.9	8.4	6.9	0.3847
Primary	16.9	18.3	13.8	0.0559
Secondary	51.8	49.5	57.3	0.0125
Above Secondary	23.3	23.8	22.0	0.5134
<b>Occupation</b>				0.0020
Housewife/unemployed	27.9	28.4	26.7	0.5438
Student	15.6	18.0	9.9	0.0004
Professional/Clerical/Sales	35.8	34.0	39.7	0.0516
Hospitality/Housework <sup>a</sup>	20.8	19.5	23.7	0.1198

<sup>a</sup>Includes hostess, cleaner, waitress, housemaid, commercial sex worker, and cook

**Table 2:** Reproductive history

	Total %	First Abortion %	Repeat Abortion %	p-value for $\chi^2$ or t-test
<b>Total (%)</b>	N=1200 (100%)	n=837 (69.8%)	n=363 (30.3 %)	
<b>Mean gravity (<math>\pm</math> SD)</b>	2.2 (1.4)	1.8 (1.3)	3.0 (1.3)	<0.001
<b>Mean parity (<math>\pm</math> SD)</b>	0.8 (1.2)	0.8 (1.3)	0.7 (1.1)	0.6052
<b>Mean number of living children (<math>\pm</math> SD)</b>	0.7 (1.2)	0.8 (1.2)	0.7 (1.0)	0.5483
<b>Mean number of previous abortions (<math>\pm</math> SD)</b>	---	---	1.3 (0.7)	---
<b>Ever use of contraceptives</b>	56.6	51.1	69.2	<0.001
<b>Last contraceptive method used (grouped by type)</b>				<0.001
None	43.4	48.9	30.9	<0.001
Short-term reversible modern methods <sup>a</sup>	34.6	29.0	47.4	>0.001
Long-term reversible modern methods <sup>b</sup>	20.4	20.9	19.3	0.5218
Traditional/non-modern method	1.6	1.2	2.5	0.1017

<sup>a</sup>Pills, condoms, emergency contraception

<sup>b</sup>Injectable, implant, intrauterine device

As shown in Table 2, women seeking repeat abortion reported higher number of pregnancies (mean of 3 pregnancies) than women seeking first abortion (mean of 1.8 pregnancies) but parity was similar owing to a mean of 1.3 previous abortions among women seeking repeat abortion. Repeat abortion patients were more likely to have ever used contraceptives than first abortion patients (69% vs. 51%,  $p < 0.001$ ). However, repeat abortion clients were also more likely to have ever used a short-term or coital dependent method (e.g. pills and condoms etc.) (47% vs. 29%,  $p < 0.001$ ).

Table 3 shows that most women sought safe termination (as opposed to treatment of incomplete abortion) with no significant differences in types of services sought between first and repeat abortion clients. Based on mean gestational age at

presentation, as determined by uterine size, there was no difference in timing of abortion visit between first-time and repeat abortion clients. Although not statistically significantly different, post-abortion contraceptives were provided to 76% of women seeking first-time abortion and 81% of women seeking repeat abortion. Yet women seeking repeat abortion were significantly more likely to leave the facility with a short-term method at the time of abortion service (56% vs. 48%,  $p = 0.0164$ ) than first-time clients. The same distribution shows that repeat abortion clients were significantly less likely to leave the facility with a longer acting contraceptive method than their first-time abortion counterparts (20% vs. 26%,  $p = 0.0397$ ).

**Table 3:** Service Provision and Post-abortion Contraception Provision

	Total %	First Abortion %	Repeat Abortion %	p-value for $\chi^2$ or t-test
<b>Total (%)</b>	N=1200 (100%)	n=837 (69.8%)	n=363 (30.3 %)	
<b>Type of service provided</b>				
Safe termination	82.2	82.4	81.5	0.1383
Treatment of incomplete abortion	17.8	17.6	18.5	
<b>Uterine size/Gestational age (weeks)</b>				
Mean # of weeks	3.2	3.2	3.1	0.3913
4 – 9	68.1	67.0	70.5	0.3320
10 – 12	23.4	24.6	20.7	
13 – 27	8.5	8.4	8.8	
<b>Post-abortion contraceptive method provided</b>	77.7	76.2	81.0	0.0690
<b>Type of contraceptive provided (grouped by type)</b>				0.0010
None	22.3	23.8	19.0	0.0687
Short-term reversible modern methods <sup>a</sup>	50.7	48.4	55.9	0.0164
Long-term reversible modern methods <sup>b</sup>	24.3	25.9	20.4	0.0397
Other	2.8	1.9	4.7	0.0070

<sup>a</sup>Pills, condoms, emergency contraception

<sup>b</sup>Injectable, implant, intrauterine device

As shown in Table 4, after controlling for socio-demographic characteristics, the type of contraceptive method used last was a significant predictor of repeat abortion, with women who last used short-term methods facing twice the odds ( $p < 0.001$ ) of having a repeat abortion compared to those who had never used contraceptives. In multiple logistic regression analysis, the odds of repeat abortion tripled ( $p < 0.001$ ) with increasing number of pregnancies and was 1.8 times greater ( $p < 0.05$ ) for single (never married) women compared to ever married women. Age exerted an

effect on repeat abortion risk, such that women faced a 10% ( $p < 0.001$ ) greater risk of repeat abortion for every 1 year increase in age. Education significantly increased the adjusted odds of repeat abortion. Primary education more than doubled ( $p < 0.05$ ) and higher education more than quadrupled ( $p < 0.001$ ) the risk of repeat abortion compared to women with no education. Adjusted odds of repeat abortion also varied significantly according to occupation/employment status, with professional/clerical and hospitality workers facing slightly greater odds of repeat

abortion than unemployed women (OR =1.5,  $p<0.001$  and OR = 1.7,  $p<0.001$ , respectively). Overall, repeat abortion patients had twice the odds of receiving a contraceptive method at the

time of abortion service compared to first-time abortion patients (adjusted OR = 1.9, 95% CI 1.4-2.5) (data not shown).

**Table 4:** Multiple logistic regression models, of the odds of repeat abortion to socio-demographic characteristics and stratified by last contraceptive method used

	Model 1 – Socio-demographic characteristics	Model 2 – None	Model 3 – short-term	Model 4 – Long-term
<b>Last Contraceptive Method Used</b>	Stratified by Last Contraceptive Method Used			
None	---			
Short-term reversible	2.12 (1.52, 2.95)**			
Longer-term reversible	0.72 (0.47, 1.11)			
Traditional/non-modern	1.26 (0.42, 3.75)			
<b>Gravida (number)</b>	3.15 (2.67, 3.77)**	2.46 (1.88, 3.23)**	3.78 (2.94, 4.86)**	2.48 (1.76, 3.50)**
<b>Age (years)</b>	0.89 (0.85, 0.93)**	0.92 (0.85, 1.00) *	0.86 (0.81, 0.92)**	0.87 (0.78, 0.98)*
<b>Marital Status</b>				
Single	1.78 (1.21, 2.62)*	0.40 (0.21, 0.76)*	5.21 (3.22, 8.43)**	2.32 (0.99, 5.47)
Married/Divorced/Widowed	---	---	---	---
<b>Education</b>				
No education	---	---	---	---
Primary	2.25 (1.06, 4.78)*	4.40 (1.29, 15.1)*	0.79 (0.31, 2.02)	0.36 (0.10, 1.34)
Secondary	4.61 (2.27, 9.34)**	13.1 (3.95, 43.7)**	1.30 (0.55, 3.04)	0.77 (0.24, 2.46)
Above secondary	4.32 (2.01, 9.30)**	11.0 (3.00, 40.6)**	1.37 (0.54, 3.46)	0.52 (0.13, 2.01)
<b>Occupation</b>				
Unemployed/housewife	---	---	---	---
Student	0.79 (0.46, 1.37)	1.39 (0.59, 3.25)	0.70 (0.32, 1.54)	1.40 (0.30, 7.53)
Professional/clerical	1.51 (1.01, 2.25)*	2.27 (1.09, 4.70)*	1.51 (0.91, 2.51)	1.08 (0.47, 2.50)
Hospitality	1.69 (1.09, 2.62)*	1.75 (0.78, 3.93)	1.80 (1.08, 3.24)*	1.22 (0.48, 3.07)
<b>-2Log Likelihood</b>	1160.68	421.68	678.8	251.22
<b>Number of observations</b>	1200	521	660	245

\*  $p<0.05$

\*\*  $p<0.001$

Multiple logistic regression analysis by last contraceptive method used shows that among women who had never used any method in the past, each pregnancy increased the odds of repeat abortion by 2.5 times ( $p<0.001$ ). Among those who had never used contraception (Table 4/Model 2), the odds of repeat abortion were lower at younger ages (OR=0.92,  $p<0.05$ ). Single (never married) non-users faced lower adjusted odds (OR=0.40,  $p<0.05$ ) of repeat abortion than ever married ones. A women's level of education had a significant effect on the odds of repeat abortion among women who did not use contraception, with primary education increasing the odds 4.4 times ( $p<0.05$ ); secondary education increasing the odds 13.1 times ( $p<0.001$ ); and above secondary education increasing the odds 11 times ( $p<0.001$ ). In this group of women who did not use

contraception, women with professional/clerical employment had 2.3 greater odds ( $p<0.05$ ) of repeat abortion than their unemployed counterparts. Stratified analysis showed different odds of repeat abortion among users of short-term contraceptive methods as well (Model 3). The effect of increasing number of pregnancies in increasing the adjusted odds of repeat abortion was greater for short-term method users (OR=3.8,  $p<0.001$ ) than for non-users. Younger short-term method users faced lower odds of repeat abortion than older ones (OR=0.86,  $p<0.001$ ). Furthermore, while single marital status was protective for non-users, being single (never married) vs. ever married increased the odds of repeat abortion more than 5-fold ( $p<0.001$ ) among short-term method users. Short-term method users employed in the hospitality industry faced nearly twice the odds of

repeated abortion ( $p < 0.05$ ) compare to their unemployed counterparts. Among women who used a long-term method as their last contraceptive method (Model 4), the adjusted odds of repeat abortion increase 2.5 times as gravidity increased ( $p < 0.001$ ). Long-term method users who were younger were at lower risk of repeat abortion than older long-term method users ( $OR = 0.87$ ,  $p < 0.05$ ).

## Discussion

This study found that 30% of women seeking abortion-related services at urban public and private facilities in Addis Ababa, Ethiopia had had a previous abortion. Women seeking repeat abortion tended to be older than those seeking first-time abortions and the proportion reporting ever use of contraceptives was significantly greater. Age, gravidity, education, being single, being employed in professional/clerical or hospitality work, and use of short-term contraceptives as last method were significantly associated with repeat abortion. Age and gravidity remained significant predictors of repeat abortion across all categories of last method used (short-term, long-acting, and none). The effect of marital status varied according to the last contraceptive method use category. Education only remained significant for increased risk of repeat abortion among non-contraceptive users but had no effect by type of method last used for both short-term and long-acting contraceptive users. Working in the hospitality industry was a significant predictor of repeat abortion among those who last used a short-term method.

Our findings fall within the range of repeat abortion found in developed countries<sup>18-20,22</sup>. Our results also show a repeat abortion level remarkably similar to the incidence seen in Nepal (32%) where abortion has been legalized in recent years<sup>39</sup>. In Nepal, increasing age, parity and education were all associated with higher odds of having a repeat abortion. However, while we found a difference between first-time and repeat abortion clients in the category of last method used, Thapa et al found no difference between these groups by contraceptive use or specific method<sup>39</sup>. In addition, while repeat abortion clients in Nepal were as likely to adopt a

contraceptive method post-abortion as first-time clients, in keeping with the results from our data, they were more likely to choose condoms and less likely to choose injectables. While our sample included both pregnancy terminations and treatment of incomplete abortion clients, similar repeat abortion incidences were reported in samples limited to women presenting with post-abortion complications in Ethiopia and Ghana<sup>42,52</sup>. Some researchers have found older age and higher parity to be associated with repeat abortion but several others have concluded that these associations reflected confounding and/or were an artifact of greater time at risk<sup>10,23,31,36,39</sup>. Our results differ from a similar study in the Vietnamese capitol which found much higher levels of repeat abortion (70%) and no associations with education<sup>36</sup>.

Our finding that repeat abortion is associated with use of short-term reversible contraceptive methods is consistent with some of the existing literature<sup>17,19,32</sup>. In contrast, Berger et al<sup>31</sup> found slightly higher contraceptive prevalence among repeat abortion seekers, but no differences between repeat abortion and first-time abortion seekers in type of method used at the time of conception. While our study found no association between repeat abortion and the use of long-term methods as last method, Prager et al found a positive association between injectable contraceptives and repeat abortion that approached significance<sup>10</sup>. Ultimately, the link between abortion and contraceptive use is extremely complex and “paradoxical”<sup>11,15,16,40</sup>. High contraceptive use among repeat abortion clients likely reflects stronger desires to control fertility, more active family planning efforts and persistent difficulties in achieving fertility goals<sup>17,19,32,36</sup>. Ethiopia, and more specifically Addis Ababa, appears to be following a pattern observed in six other countries where contraceptive use and abortion incidence rose simultaneously during a period of fertility transition because increases in contraceptive prevalence were insufficient to meet needs stemming from an increasing desire to limit fertility<sup>11</sup>. In these countries, abortion incidence eventually fell and contraceptive use remained high.

A major strength of this study is the prospective enrollment of women resulting in a complete, uninterrupted time series of clients who presented at participating facilities. Our sample size and the number of covariates allowed us to investigate the association between aspects of contraceptive history/socio-demographic factors and repeat abortion. Our study is unique in including women presenting for both induced abortion and treatment of incomplete abortion in a developing country, yielding insights regarding women who have different experiences accessing safe abortion in a very low fertility environment.

Our study also has limitations. We must acknowledge that four years have passed since the data was collected in 2008 & 2009, which could potentially limit their current relevance. However, like other recent reports drawing pertinent lessons from data from the same early post-legal reform period (cf. Abdella 2013 and Vlassoff 2012)<sup>15,47</sup> and pending of more recent comparable data, the findings presented here capture a telling “snapshot”, offering a useful benchmark for gauging progress while also providing some insight, which is likely still valid, regarding a “dynamic abortion environment”<sup>47</sup>. The analysis was based on record review relying on the data recorded at the time of service. Recall bias, underreporting or misreporting of abortion, or contraceptive use may have occurred<sup>26,27</sup>. Thus, the actual incidence of repeat abortion may be higher than we found. In addition, the last method used does not necessarily reflect the type of contraceptive used, if any, at the time of the conception leading to the index abortion. Therefore, contraceptive failure cannot be inferred and discontinuation rates are not captured, both of which represent major risk factors for repeated unintended pregnancy and thus abortion<sup>1,2</sup>. Moreover, some studies focus on repeat abortion during a limited follow up period<sup>28,41</sup>. However, typical of many studies of abortion, we captured the occurrence of more than one abortion ever<sup>4</sup>, but not the interval (i.e. lengthen of time) between the index abortion and any previous one. Consequently, we were not able to distinguish between those seeking immediate repeat abortions from those seeking subsequent abortions at longer intervals (e.g. years apart), even though their

characteristics, contraceptive use patterns and needs might differ in ways that could have important implications for targeting services.

Our study findings are specific to our facility-based sample in Addis Ababa not necessarily generalizable to the rest of Ethiopia. However, the study may provide insights into the characteristics and contraceptive use patterns of women at risk for repeat abortion in other low fertility, high contraceptive use, low-resource urban settings.

## Conclusions

Abortion-related services in urban areas of developing countries should pay special attention to women at higher risk for repeat abortion including single, high gravidity, educated, and working women. It is also important to bear in mind that some of these risk factors for repeat abortion vary according to contraceptive use history (never or ever use of short-term or long-term methods). Contraceptive counseling for repeat abortion clients should address reasons for repeat unintended pregnancy, which might include contraceptive failure, method discontinuation, or non-use. Given that Ethiopia appears to be following one of the classic trajectories involved in continuing fertility transition after the decriminalization of abortion, every effort should be made to support the process by strengthening family planning services, addressing unmet need, preventing unintended pregnancy and interrupting the cycle of repeat abortion.

## Contributions of authors

NP conceived and designed the study and conducted data analysis and contributed to the writing of the manuscript; MH analyzed the data; AF contributed to the preparation of the manuscript; YM contributed to the study design and collected the data. All authors approved the manuscript.

## Acknowledgements

We would like to thank Dr. Caitlin Gerds for her invaluable insights on data analysis and earlier iterations of this article. We are also grateful to

Suzanne Bell who provided useful comments and feedback as well.

## References

- Curtis S, Evens E, Sambisa W. Contraceptive Discontinuation and Unintended Pregnancy: An Imperfect Relationship. *Int Perspect Sex Reprod Health*. 2011;37(2):58-66.
- Curtis C, Huber D, Moss-Knight T. Postabortion Family Planning: Addressing the Cycle Of Repeat Unintended Pregnancy and Abortion. *Int Perspect Sex Reprod Health*. 2010;36(1):44-8.
- Singh S, Sedgh G, Hussain R. Unintended Pregnancy: Worldwide Levels, Trends, and Outcomes. *Stud Fam Plann*. 2010;41(4):241-50.
- Rowlands S. More than one abortion. *J Fam Plann Reprod Health Care*. 2007;33(3):155-8.
- Healy J, Otsea K, Benson J. Counting abortions so that abortion counts: Indicators for monitoring the availability and use of abortion care services. *Int J Gynaecol Obstet*. 2006;95(2):209-20.
- Upadhyay UD, Brown BA, Sokoloff A, Raine TR. Contraceptive discontinuation and repeat unintended pregnancy within 1 year after an abortion. *Contraception*. 2012;85(1):56-62.
- Raymond EG, Grimes DA. The comparative safety of legal induced abortion and childbirth in the United States. *Obstet Gynecol*. 2012;119(2, Part 1):215.
- Thorp JM, Hartmann KE, Shadigian E. Long-term physical and psychological health consequences of induced abortion: Review of the evidence. *Obstet Gynecol Surv*. 2003;58(1):67-79.
- Heikinheimo O, Gissler M, Suhonen S. Age, parity, history of abortion and contraceptive choices affect the risk of repeat abortion. *Contraception*. 2008;78(2):149-54.
- Prager SW, Steinauer JE, Foster DG, Darney PD, Drey EA. Risk factors for repeat elective abortion. *Am J Obstet Gynecol*. 2007;197(6).
- Marston C, Cleland J. Relationships between contraception and abortion: A review of the evidence. *Int Fam Plan Perspect*. 2003;29(1):6-13.
- Harries J, Stinson K, Orner P. Health care providers' attitudes towards termination of pregnancy: A qualitative study in South Africa. *BMC Public Health*. 2009;9(1):296.
- Möller A, Öfverstedt S, Siwe K. Proud, not yet satisfied: The experiences of abortion service providers in the Kathmandu Valley, Nepal. *Sex Reprod Healthc*. 2012;3(4):135-40.
- Puri M, Lamichhane P, Harken T, Blum M, Harper CC, Darney PD, Henderson JT. "Sometimes they used to whisper in our ears": health care workers' perceptions of the effects of abortion legalization in Nepal. *BMC Public Health*. 2012;12(1):297.
- Tietze C. The 'Problem' of Repeat Abortions. *Fam Plann Perspect*. 1974;6(3):148-50.
- Tietze C, Jain AK. The Mathematics of Repeat Abortion: Explaining the Increase. *Stud Fam Plann*. 1978;9(12):294-9.
- Fisher WA, Singh SS, Shuper PA, Carey M, Otchet F, Maclean-Brine D, Dal Bello D, Gunter J. Characteristics of women undergoing repeat induced abortion. *Can Med Assoc J*. 2005;172(5):637-41.
- Yassin A, Cordwell D. Does dedicated pre-abortion contraception counselling help to improve post-abortion contraception uptake? *J Fam Plann Reprod Health Care*. 2005;31(2):115-6.
- Palanivelu LM, Oswal A. Contraceptive practices in women with repeat termination of pregnancies. *J Obstet Gynaecol*. 2007;27(8):832-4.
- Cohen S. Repeat abortion, repeat unintended pregnancy, repeated and misguided government policies. *Guttmacher Policy Review*. 2007;10(2):8-12.
- Jones RK, Singh S, Finer LB, Frohwirth LF. Repeat abortion in the United States. *Occasional Report*. 2009 (29).
- Makenzius M, Tydén T, Darj E, Larsson M. Repeat induced abortion – a matter of individual behaviour or societal factors? A cross-sectional study among Swedish women. *The European Journal of Contraception and Reproductive Health Care*. 2011;16(5):369-77.
- Stone N, Ingham R. Who presents more than once? Repeat abortion among women in Britain. *J Fam Plann Reprod Health Care*. 2011;37(4):209-15.
- Shellenberg KM, Moore AM, Bankole A, Juarez F, Omideyi AK, Palomino N, Zeba S, Singh S, Tsui AO. Social stigma and disclosure about induced abortion: results from an exploratory study. *Glob Public Health*. 2011;6(Suppl. 1):S111-S25.
- Weitz TA, Kimport K. A need to expand our thinking about "repeat" abortions. *Contraception*. 2012;85(4):408-12.
- Tang M-TC, Weiss NS, Daling JR, Malone KE. Case-Control Differences in the Reliability of Reporting a History of Induced Abortion. *Am J Epidemiol*. 2000;151(12):1139-43.
- Jagannathan R. Relying on Surveys to Understand Abortion Behavior: Some Cautionary Evidence. *American Journal of Public Health*. 2001;91(11):1825-31.
- Das S, Adegbenro A, Ray S, Amu O. Repeat abortion: facts and issues. *J Fam Plann Reprod Health Care*. 2009;35(2):93-5.
- Tornbom M, Moller A. Repeat abortion: a qualitative study. *J Psychosomat Obstet Gynecol*. 1999;20(1):21-30. Epub 1999/04/23.
- Madden T, Westhoff C. Rates of Follow-up and Repeat Pregnancy in the 12 Months After First-Trimester Induced Abortion. *Obstet Gynecol*. 2009;113(3):663-8.
- Berger C, Gold D, Andres D, Gillett P, Kinch R. Repeat abortion - Is it a problem? *Fam Plann Perspect*. 1984;16(2):70-5.

32. Garg M, Singh M, Mansour D. Peri-abortion contraceptive care: Can we reduce the incidence of repeat abortions? *J Fam Plann Reprod Health Care*. 2001;27(2):77-80.
33. St John H, Critchley H, Glasier A. Can we identify women at risk of more than one termination of pregnancy? *Contraception*. 2005;71(1):31-4.
34. Mentula MJ, Niinimäki M, Suhonen S, Hemminki E, Gissler M, Heikinheimo O. Young age and termination of pregnancy during the second trimester are risk factors for repeat second-trimester abortion. *Am J Obstet Gynecol*. 2010;203(2).
35. Nguyen PH, Van Nguyen S, Nguyen MQ, Nguyen NT, Keithly SC, Mai LT, Luong LTT, Pham HQ. The association and a potential pathway between gender-based violence and induced abortion in Thai Nguyen province, Vietnam. *Glob Health Action*. 2012;5:1-11.
36. Huong NTM, Chongsuvivatwong V, Geater A, Prateepchaikul L. Characteristics of repeat aborters in Vietnam. *Southeast Asian J Trop Med Public Health*. 2000;31(1):167-72.
37. Delvaux T, Sœur S, Rathavy T, Crabbe F, Buve A. Integration of comprehensive abortion-care services in a Maternal and Child Health clinic in Cambodia. *Trop Med Int Health*. 2008;13(8):962-9.
38. Perera J, Silva Td, Harshana G. Knowledge, behaviour and attitudes on induced abortion and family planning among Sri Lankan women seeking termination of pregnancy. *Ceylon Med J*. 2004;49(1):14-7.
39. Thapa S, Neupane S. Risk factors for repeat abortion in Nepal. *Int J Gynaecol Obstet*. 2013;120(1):32-6.
40. Guillaume A, du Lou AD. Fertility regulation among women in Abidjan, Cote d'Ivoire: Contraception, abortion or both? *Int Fam Plan Perspect*. 2002;28(3):159-66.
41. Johnson BR, Ndhlovu S, Farr SL, Chipato T. Reducing unplanned pregnancy and abortion in Zimbabwe through postabortion contraception. *Stud Fam Plann*. 2002;33(2):195-202.
42. Aniteye P, Mayhew S. Attitudes and experiences of women admitted to hospital with abortion complications in Ghana. *Afr J Reprod Health*. 2011;15(1):47-55.
43. Central Statistical Agency [Ethiopia], ICF International. Ethiopia Demographic and Health Survey (DHS) 2011. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency and ICF International, 2012.
44. Sibanda A, Woubalem Z, Hogan DP, Lindstrom DP. The proximate determinants of the decline to below-replacement fertility in Addis Ababa, Ethiopia. *Stud Fam Plann*. 2003;34(1):1-7.
45. Singh S, Feters T, Gebreselassie H, Abdella A, Gebrehiwot Y, Kumbi S, Audam S. The Estimated Incidence of Induced Abortion In Ethiopia, 2008. *Int Perspect Sex Reprod Health*. 2010;36(1):16-25.
46. Guttmacher Institute. Making Abortion Services Accessible in the Wake of Legal Reforms: A Framework and Six Case Studies. New York: Guttmacher Institute, 2012.
47. Abdella A, Feters T, Benson J, Pearson E, Gebrehiwot Y, Andersen K, Gebreselassie H, Tesfaye S. Meeting the need for safe abortion care in Ethiopia: Results of a national assessment in 2008. *Glob Public Health*. 2013;8(4):417-34.
48. Gebrehiwot Y, Liabsuetrakul T. Trends of abortion complications in a transition of abortion law revisions in Ethiopia. *J Public Health*. 2009;31(1):81-7.
49. Hogan MC, Foreman KJ, Naghavi M, Ahn SY, Wang MR, Makela SM, Lopez AD, Lozano R, Murray CJL. Maternal mortality for 181 countries, 1980-2008: a systematic analysis of progress towards Millennium Development Goal 5. *Lancet*. 2010;375(9726):1609-23.
50. World Health Organization. Unsafe abortion: global and regional estimates of incidence of unsafe abortion and associated mortality in 2003. Geneva: World Health Organization, 2007.
51. Gessesew A. Unwanted pregnancy and its impact on maternal health and utilization of health services in Tigray Region (Adigrat Hospital). *Ethiop Med J*. 2009;47(1):1-8.
52. Gebreselassie H, Feters T, Singh S, Abdella A, Gebrehiwot Y, Tesfaye S, Geressu T, Kumbi S. Caring for Women with Abortion Complications In Ethiopia: National Estimates and Future Implications. *Int Perspect Sex Reprod Health*. 2010;36(1):6-15.
53. Guttmacher Institute. Facts on Unintended Pregnancy and Abortion in Ethiopia. New York: Guttmacher Institute, 2010.
54. Vlassoff M, Feters T, Kumbi S, Singh S. The health system cost of postabortion care in Ethiopia. *International Journal of Gynecology & Obstetrics*. 2012;118:S127-S33.
55. Prata N, Bell S, Holston M, Gerds C, Melkamu Y. Factors Associated with Choice of Post-Abortion Contraception in Addis Ababa, Ethiopia. *Afr J Reprod Health*. 2011;15(3):55-62.