**ORIGINAL RESEARCH ARTICLE**

# Contraception before and after induced abortion: Trajectories of women in selected urban-poor settlements of Accra, Ghana

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## Abstract

This paper examined women's pre- and post-induced abortion contraceptive use and predictors of post-abortion modern contraceptive uptake in selected poor settlements of Accra, Ghana. Data from a cross-sectional study of 251 women aged 16-44 years were used. Patterns of contraceptive use were analysed descriptively while the predictors of modern contraceptive use in the month following induced abortion were examined using a binary logistic regression model. Majority of women (60%) were not using any method of contraception when they became pregnant before their abortion. Just over 30% of these women switched to using any method in the month immediately after abortion (22% modern and 9% traditional). Women who had became pregnant while using a modern method before their abortion had higher odds of using a modern method post-abortion than women who had not been using any method of contraception when they became pregnant. Following induced abortion, many women remained at potential risk of future unintended pregnancy. Our findings suggest the need for improved contraceptive counselling for women who seek abortion services, both during post-abortion care for facility-based abortions or at the time of obtaining medication abortion pills for those who are self-managing their abortion. *(Afr J Reprod Health 2021; 25[6]: 20-31).*

**Keywords:** Contraceptive use before and after induced abortion, urban-poor, Ghana

## Résumé

Cet article a examiné l'utilisation des contraceptifs avant et après l'avortement provoqué par les femmes et les prédicteurs de l'adoption de contraceptifs modernes après l'avortement dans certains quartiers pauvres d'Accra, au Ghana. Les données d'une étude transversale portant sur 251 femmes âgées de 16 à 44 ans ont été utilisées. Les modèles d'utilisation des contraceptifs ont été analysés de manière descriptive tandis que les prédicteurs de l'utilisation des contraceptifs modernes dans le mois suivant l'avortement provoqué ont été examinés à l'aide d'un modèle de régression logistique binaire. La majorité des femmes (60 %) n'utilisaient aucune méthode de contraception lorsqu'elles sont tombées enceintes avant leur avortement. Un peu plus de 30 % de ces femmes sont passées à l'utilisation de n'importe quelle méthode dans le mois suivant immédiatement l'avortement (22 % moderne et 9 % traditionnel). Les femmes qui étaient tombées enceintes alors qu'elles utilisaient une méthode moderne avant leur avortement avaient plus de chances d'utiliser une méthode moderne après l'avortement que les femmes qui n'avaient utilisé aucune méthode de contraception lorsqu'elles sont tombées enceintes. Après un avortement provoqué, de nombreuses femmes sont restées à risque potentiel de futures grossesses non désirées. Nos résultats suggèrent la nécessité d'améliorer les conseils en matière de contraception pour les femmes qui recherchent des services d'avortement, à la fois pendant les soins post-avortement pour les avortements en établissement ou au moment de l'obtention de pilules abortives médicamenteuses pour celles qui gèrent elles-mêmes leur avortement. *(Afr J Reprod Health 2021; 25[6]: 20-31).*

**Mots-clés:** Utilisation de contraceptifs avant et après un avortement provoqué, citadins pauvres, Ghana

## Introduction

Globally, on average 121 million unintended pregnancies occur each year, representing about 48% of all pregnancies[1]. In the developing world, about half of all induced abortions (referred to as "abortion" hereafter) are unsafe[2]. There are also legal restrictions for abortion in most developing countries[2]. However, unlike many other developing countries, the legal framework in Ghana is relatively liberal[3,4]. Women are permitted to obtain an abortion under the conditions of rape, incest,

risk of fetal impairment or if their physical or mental health would be affected[3,4]. Yet, unsafe abortion is a major contributor to maternal-related fatalities in Ghana, accounting for about 15% to 30% of all maternal deaths in the country[5-8].

Research indicates that fatalities resulting from unplanned pregnancies and subsequent unsafe abortions could be averted with the uptake of contraceptives[9,10]. One effective way of increasing contraceptive acceptance or utilization for those with unmet need is through high quality comprehensive abortion care (CAC) and post-abortion care (PAC), with counselling on contraception and a broad method mix for women to choose from[11]. In addition to increasing contraception uptake, effective CAC promotes the use of modern methods including long-acting reversible contraceptives (LARCs) for preventing future unintended pregnancies[12]. The literature shows that women who receive CAC have a higher tendency of adopting a method immediately after abortion[13]. More importantly, the risk of future unintended pregnancies and abortions decreases when contraceptives are immediately utilized following abortion compared with delayed uptake[12,14]. It is for these reasons that counselling on family planning (FP) is recommended by the International Federation of Gynecology and Obstetrics (FIGO) to be embedded in all abortion and post-abortion care[12,15].

In Ghana, the need for counselling on contraceptive use to be emphasized in CAC is particularly important given that the uptake of contraceptives is generally low, with only 20% of all women aged 15 to 49 years using a modern contraceptive method[16]. Evidence from Ghana shows that counselling on contraceptive use, including post-abortion counselling, increases contraception acceptance. One study in Ghana showed a high contraception acceptance rate (66%) among post-abortion patients who had received counselling when they received care in a hospital facility, compared with their acceptance rate (16%) before the counselling[17]. Another study of hospitalized women who had received post-abortion care due to complications in Ghana indicated high acceptance (42%) of highly effective contraceptives (e.g. intrauterine device (IUD), implants, injectables and pills) following post-abortion FP counselling[18]. Those women not choosing highly-effective contraceptives stated they did not wish to become pregnant, and planned to use abstinence or natural methods (25%) or condoms (16%). Younger, unmarried, and women who reported a self-induced abortion were least likely to accept highly effective contraceptives[18].

In Ghana, policy permits for abortion to be performed by only qualified health professionals at specific registered health facilities under the legal conditions aforementioned (e.g. rape, incest, risk of fetal impairment, mental or physical health risk)[3,19], and women who access services from these facilities are more likely to receive CAC with counselling on contraceptives than women who seek abortion services outside of facilities. Most of the previous studies in Ghana on post-abortion contraceptive use are facility-based and little is known about the acceptance rate of contraceptives especially for women who self-managed abortion with pills such as those obtained through pharmacies, over-the-counter chemist stores or drug stores.

The comparison of women's contraceptive use both in the month before the pregnancy and one, three and six months after abortion has also not been investigated. Moreover, there is limited information about the characteristics of women who are likely to use modern contraceptives or otherwise following an abortion. This study contributes to the literature by examining contraceptive utilization among women in poor urban dwellings of Accra, Ghana in the month before pregnancy and at one, three and six months after their induced abortion. Women from urban poor areas are especially important to consider given that many of them may experience the negative health effects of urbanization more than their wealthier counterparts[20,21], and have more limited access to health services and other resources[22]. The study further analysed the factors associated with the use of modern contraceptives after an induced abortion, paying particular attention to previous contraceptive use.

# Methods

## *Study setting*

This paper draws data from the Willows Impact Evaluation (WIE) study which was implemented in Accra, Ghana between 2017 and 2018. The WIE study conducted a cross-sectional household survey of women of reproductive age (16-44 years) residing in two urban-poor areas of Accra. The two urban-poor areas were purposively selected on the basis of having similar ethnic mix, demographic and socio-economic attributes. One study area, which was chosen for a planned intervention, consisted of Osu Klotey, La, Teshie and Nungua communities, and the other consisted of La Nkwantanang (Madina), Abogba and Old Ashongman communities. Compared with other formal urban settings, these areas are characterized by denser populations, lower socio-economic indicators and prone to the effects of urbanisation such as floods and sanitation problems[20,21].

### *Sampling procedure*

The WIE overall study used a sample size calculation based on differences anticipated between study areas, over time, in the outcome of modern contraceptive prevalence rate (mCPR). With an anticipated effect size of 5 percentage points, each study area needed 2,000 women to test for a statistically significant effect at the 0.05 level[23]. The WIE study employed a three-stage cluster sampling strategy to create a representative sample of women of reproductive age living in each of the two study areas (Figure 1). At the first stage 200 clusters (100 in each study area) were sampled from equally-sized subdivision clusters of enumeration area (EA) maps obtained from the Ghana Statistical Service. This was followed by listing of all women ages 16-44 years in households within the sampled clusters. Overall, 5,651 households with women ages 16-44 years were listed from the sampled clusters. At second stage, 25 households with at least one eligible woman were sampled from each cluster. In the third stage, in the case where the sampled household had more than one eligible, one woman was randomly selected for the interview. Out of 4,323 women contacted, a total of 4,180 consented to participate in the WIE study and had completed interviews. Of these, 1,252 had ever had an abortion in their lifetime, yielding a prevalence rate of 30% among our entire study sample. For this specific analysis, we wanted to examine women who reported having had an abortion in the past 30 months prior to the interview for whom we also had contraceptive use data both prior to the pregnancy for which they induced abortion and for at least one month following the induced abortion. The final analytic sample included 251 women.

### *Data collection*

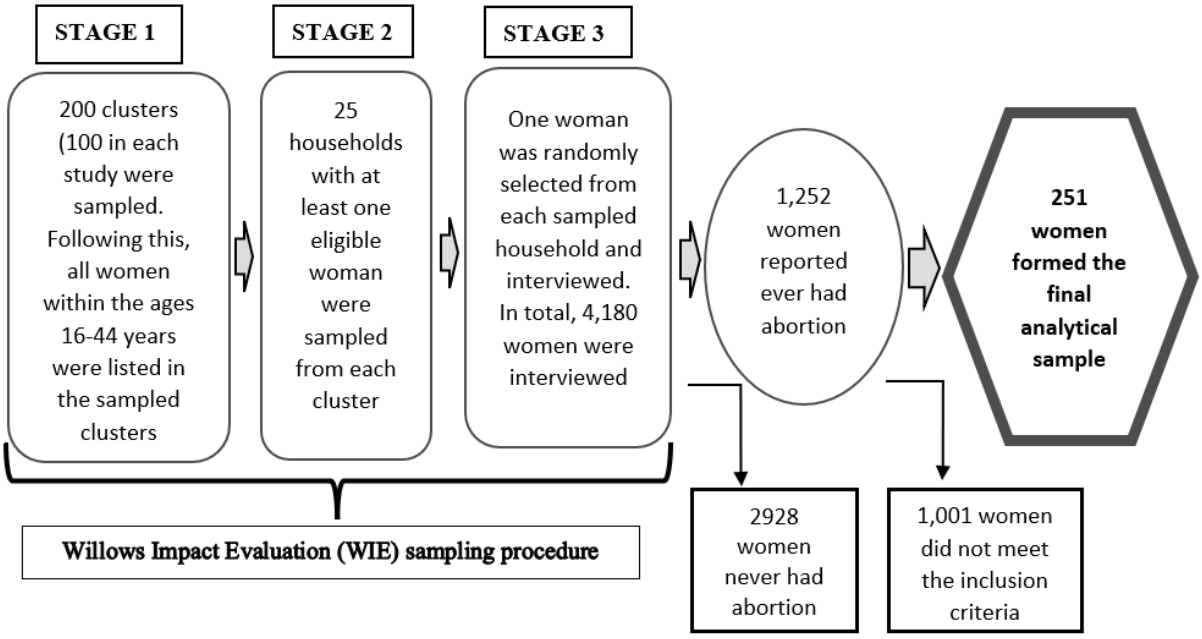
Data were collected between January and July 2018 and were captured with the use of electronic devices (tablets). The tablets were programmed with a questionnaire using CommCare software application (CommCare version 2.40.1). Enumerators with a minimum of first degree qualification and supervisors with masters degree or higher were extensively trained by professionals from the Regional Institute for Population Studies at the University of Ghana, Ghana Health Service and the Harvard T.H. Chan School of Public Health. Background characteristics and health information of women, including questions on reproductive behaviours, contraceptive use and abortion were collected in the survey. Interviews were conducted through face-to-face interaction between the enumerators and participating women in either local dialect or English.

### *Measures*

The survey included a contraceptive calendar from the Demographic and Health Survey (DHS), which captured the retrospective history of women for 31 months preceding the time of interview regarding births, pregnancies, terminations, contraceptives used and reasons for discontinuation and switching of contraceptives. Women whose recent induced abortions were captured in the calendar within 30 months prior to the interview were considered for analysis. The reason for limiting to 30 months prior the interview is to have at least one month of contraceptive use data of women pre-abortion. All women considered also had at least one month of contraceptive use information after abortion to enable analysis of pre- and post-abortion contraceptive use behaviour.

### *Analysis*

The contraceptive methods used immediately before and after induced abortion were examined in the study sample, for all induced abortions and for




Source: Adapted and modified from Agula *et al*.[6]

**Figure 1:** Sampling procedure for obtaining the analytic sample

medication versus surgical abortions. The contraceptive behaviours of women in the month immediately before pregnancy and at one, three, and six months after the last induced abortion were further analysed descriptively. Lastly, a binary logistic regression model was fitted to examine the factors associated with the uptake of modern contraceptives after an abortion. The binary logistic regression was employed because the dependent variable was classified into two categories: 1. modern method users, including users of: IUD, implants, injectables, pills, condoms and emergency contraceptive (EC) pills; 2. Non-modern method users inclusive of users of other methods, and non-users. All analyses were conducted using Stata 15.0 (Statacorp) and covariates of the regression model were considered as significant at 5% p-value.

# Results

### *Background characteristics of women*

Table 1 shows the socio-demographic characteristics of women who reported that they had their last induced abortion in the past 30 months before the survey while Table 2 shows their distribution by abortion characteristics. Majority of the sample (48%) fall within the age band 25-34 years. About two-thirds (67%) of the women had at least Junior High School (JHS) education and half (51%) of them were currently in union. Also, the majority (61%) of them identified as charismatic Christians and about 39% fall within the poorest two wealth quintiles, comparable to the Ghana Demographic and Health Survey quintiles for an urban population. Most of the respondents (43%) are from the Ga/Dangme descent and about three-quarters (71%) had reported ever giving birth.

Approximately 43% of the last induced abortions were performed within 12 months of the interview (Table 2). About a third of women (34%) reported surgical abortion. Nearly 45% of women had an abortion with pills containing only misoprostol or a combination of mifepristone and misoprostol, whereas about 16% used other pills

(or did not know the type) and an additional 6% used non-medical methods. Just over a quarter of women (≈28%) reported using a modern contraceptive in the month following their induced abortion.

As illustrated in Figure 2, all women who used a surgical procedure did so either at a government or private health facility.

**Table 1:** Socio-demographic characteristics of women who reported an induced abortion within 30 months of the survey (n=251)

| Variable | Frequency (%) |
|---|---|
| **Age (years)** | |
| 16-24 | 80 (31.9) |
| 25-34 | 120 (47.8) |
| 35-44 | 51 (20.2) |
| **Marital status** | |
| Never married/never lived together | 104 (41.4) |
| Married/living as if married | 128 (51.0) |
| Divorced/separated/widowed | 19 (7.6) |
| **Education** | |
| No formal education | 35 (13.9) |
| Primary | 44 (17.5) |
| Middle/JHS | 95 (37.8) |
| Secondary or higher | 74 (29.5) |
| **Religion** | |
| Catholic | 6 (2.4) |
| Anglican/Presbyterian/Methodist | 30 (12.0) |
| Pentecostal/Charismatic | 154 (61.4) |
| Other Christian | 43 (17.1) |
| Muslim | 13 (5.2) |
| Other | 5 (2.0) |
| **Ethnicity** | |
| Akan | 82 (32.7) |
| Ewe | 48 (19.1) |
| Ga/Dangme | 106 (42.2) |
| Other | 15 (6.0) |
| **Wealth quintile** | |
| Poorer | 98 (39.0) |
| Middle | 94 (37.5) |
| Richer | 59 (23.5) |
| **Parity** | |
| 0 | 73 (29.1) |
| 1 | 61 (24.3) |
| 2+ | 117 (46.6) |

**Table 2:** Abortion-related characteristics of women (n=251)

| Variable | Frequency (%) |
|---|---|
| **Time since last abortion** | |
| 0-6 months ago | 52 (20.7) |
| 7-12 months | 55 (21.9) |
| More than 1 year | 144 (57.3) |
| **Type of abortion** | |
| Surgical abortion | 84 (33.5) |
| Medication abortion pills | 112 (44.6) |
| Unspecified pills | 40 (15.9) |
| Non-medical methods | 15 (6.0) |
| **Used modern FP method 1 month after abortion** | |
| Yes | 71 (28.3) |
| No | 180 (71.7) |

Likewise, majority of women who reported using medication abortion pills (78%) accessed services from a pharmacy. The remaining women who reported using medication abortion sought services from private hospitals/clinics (10%) and other sources (12%) such as friends and relatives. Overall, results indicate that the difference in the distribution of where abortion services were obtained among methods of abortion is statistically significant ($p<0.01$).

### *Contraception behaviour of women before and after abortion episodes*

Table 3 shows the type of contraceptive methods used by women immediately before they became pregnant and in the month after inducing an abortion. Results indicate that most women (60%) were not using any method when they got pregnant before inducing abortion. However, within one month after the abortion less than half (48%) reported not using any method, indicating a 12 percentage point increase in any method use (either traditional or modern). A similar trend is observed among users of medication pills or surgical procedure. Results further show that traditional methods (22%) were the most frequently used methods before abortion. About 15% and 7% of women used periodic abstinence and withdrawal methods, respectively, before abortion. However, the use of traditional methods decreased slightly post abortion (0.8 percentage points) and observed mostly in women who used medication abortion. Regarding the use of modern methods, results show that EC (6%) and condom (4%), which are short-acting were the widely used methods before abortion. Other short-acting methods women used before abortion were OCP (2%) and injectable (2%). While the use of EC remain unchanged (~6%), the use of condom (7%), OCP (6%) and injectable (6%) doubled after abortion. Though no woman reported to have used a long-acting reversible method before abortion, a few (1%) started using implant following abortion. There

was no use of IUD before or after abortion. A few (4%) women also reported to have had used other methods such as N-tablets prior abortion, however, the figure reduced to 2% after abortion. Table 4 compares women's use of methods before abortion and one, three and six months after abortion by category: long-acting reversible contraceptive (LARC), short-term methods, traditional, no method, and other (e.g., drinking of concoctions). Generally, most women

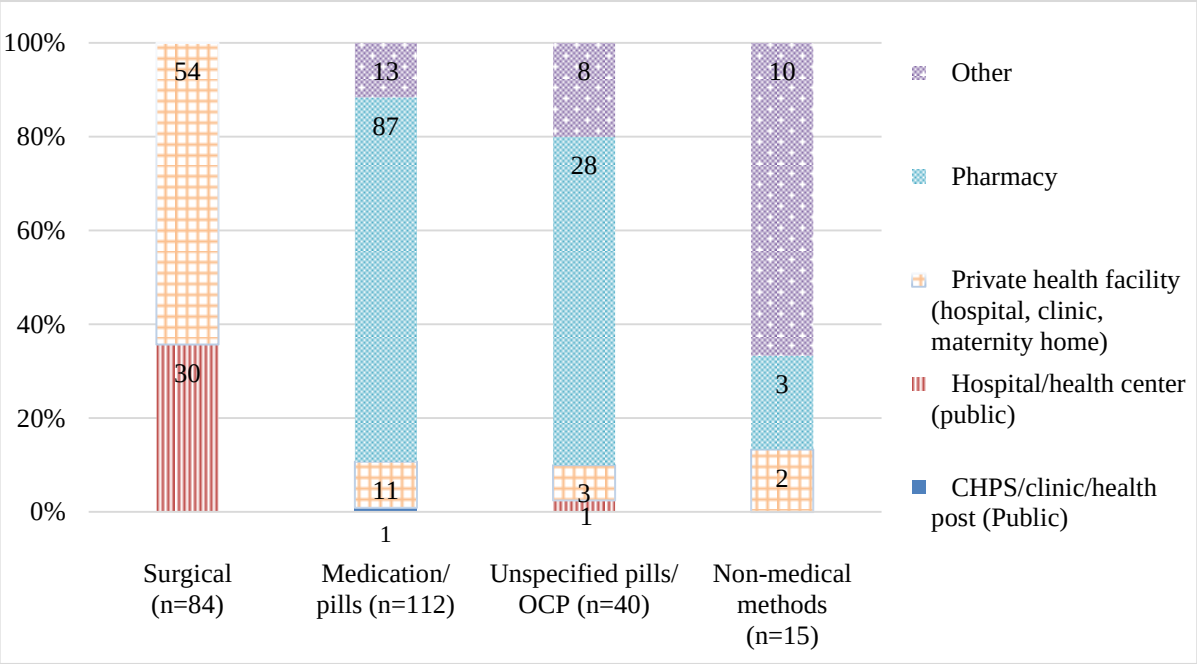



**Figure 2:** Type of the last abortion method used, by service site (n=251)[φ]

maintained the methods they were using before and after one, three and six months following induced abortion. Results show that majority (71%) of women who used short-term methods before abortion maintained using the same method one month after abortion while the rest switched to either no method (18%) or traditional method (11%). None of the short-term methods users had switched to a long-acting method between the period one and six months after abortion. Like the short-term methods users, majority (67%) of the women who used traditional method before abortion maintained using traditional method one month following abortion while the rest switched to no method (21%), short-term modern methods (10%) and LARC (2%). Similar trends are observed for previous short-term method and traditional method users for months three and six after abortion. Further, results show that about 67% of non-method users continued not to use a method one month after abortion and the remaining women switched to short-term methods (18%), traditional method (9%) and LARC (4%). Two percent (2%) of pre-abortion non-method users (2%) became pregnant one month after the abortion. Women who switched from no method to any method after abortion consistently increased at the third (38%) and sixth (43%) months following abortion. A further 6% and 9% of previous non-method users were pregnant at the third and sixth months after abortion, respectively. None of the pre-abortion users, irrespective of the type of method used, became pregnant within the six months after abortion.

### *Determinants of using a modern method following induced abortion*

Table 5 shows the factors that are associated with the use of modern contraceptives one month after induced abortion. The adjusted model indicates that women who had been using a modern method in the month when they got pregnant were more likely to use modern method post-abortion.

Specifically, pre-abortion modern contraceptive users were 12.4 times more likely to use modern method after abortion compared with no method users, and this is statistically significant at 1% level. When modelling modern method uptake at three and six months following an induced abortion, prior use of a modern method in the month before the abortion continues to be strongly associated (results not shown). Except parity, which is marginally significant (p=0.06), none of the other variables (age, marital status, education, religion, wealth, or

**Table 3:** Contraceptive behaviors among women of reproductive age (16-44) in the month immediately before pregnancy and the month immediately after last induced abortion, by type of abortion (n=251)

| | Medication Abortion (n=112)* | | | Surgical Abortion (n=84) | | | OCP / Unspecified Pills (n=40) | | | Non-medical methods (n=15) | | | Pooled (All methods) (n=251)** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Before** Freq. (%) | **After** Freq. (%) | ***Diff.*** | **Before** Freq. (%) | **After** Freq. (%) | ***Diff.*** | **Before** Freq. (%) | **After** Freq. (%) | ***diff.*** | **Before** Freq. (%) | **After** Freq. (%) | ***Diff.*** | **Before** Freq. (%) | **After** Freq. (%) | ***Diff.*** |
| **No method** | 67 (59.8) | 52 (46.4) | -13.4 | 52 (61.9) | 40 (47.6) | -14.3 | 24 (60.0) | 21 (52.5) | -7.5 | 8 (53.3) | 8 (53.3) | 0.0 | 151 (60.2) | 121 (48.2) | -12.0 |
| **Modern±** | 17 (15.2) | 39 (34.8) | 19.6 | 12 (14.3) | 23 (27.4) | 13.1 | 5 (12.5) | 8 (20.0) | 7.5 | 3 (20.0) | 1 (6.7) | -13.3 | 37 (14.7) | 71 (28.3) | 13.5 |
| **Implants** | 0 (0.0) | 2 (1.8) | 1.8 | 0 (0.0) | 5 (6.0) | 6.0 | 0 (0.0) | 1 (2.5) | 2.5 | 1 (6.7) | 0 (0.0) | -6.7 | 1 (0.4) | 8 (3.2) | 2.8 |
| **Injectables** | 2 (1.8) | 9 (8.0) | 6.3 | 2 (2.4) | 4 (4.8) | 2.4 | 1 (2.5) | 1 (2.5) | 0.0 | 0 (0.0) | 0 (0.0) | 0.0 | 5 (2.0) | 14 (5.6) | 3.6 |
| **OCP** | 2 (1.8) | 7 (6.3) | 4.5 | 2 (2.4) | 5 (6.0) | 3.6 | 1 (2.5) | 3 (7.5) | 5.0 | 1 (6.7) | 1 (6.7) | 0.0 | 6 (2.4) | 16 (6.4) | 4.0 |
| **Condom** | 3 (2.7) | 11 (9.8) | 7.1 | 3 (3.6) | 4 (4.8) | 1.2 | 2 (5.0) | 2 (5.0) | 0.0 | 1 (6.7) | 0 (0.0) | -6.7 | 9 (3.6) | 17 (6.8) | 3.2 |
| **EC** | 10 (8.9) | 10 (8.9 | 0.0 | 5 (6.0) | 5 (6.0) | 0.0 | 1 (2.5) | 1 (2.5) | 0.0 | 0 (0.0) | 0 (0.0) | 0.0 | 16 (6.4) | 16 (6.4) | 0.0 |
| **Traditional*** | 24 (21.4) | 20 (17.9) | -3.6 | 18 (21.4) | 19 (22.6) | 1.2 | 11 (27.5) | 10 (25.0) | -2.5 | 1 (6.7) | 3 (20.0) | 13.3 | 54 (21.5) | 52 (20.7) | -0.8 |
| **Periodic abstinence** | 14 (12.5) | 12 (10.7) | -1.8 | 12 (14.3) | 12 (14.3) | 0.0 | 11 (27.5) | 9 (22.5) | -5.0 | 0 (0.0) | 2 (13.3) | 13.3 | 37 (14.7) | 35 (13.9) | -0.8 |
| **Withdrawal** | 10 (8.9) | 8 (7.1) | -1.8 | 6 (7.1) | 7 (8.3) | 1.2 | 0 (0.0) | 1 (2.5) | 2.5 | 1 (6.7) | 1 (6.7) | 0.0 | 17 (6.8) | 17 (6.8) | 0.0 |
| **Other** | 4 (3.6) | 0 (0.0) | -3.6 | 2 (2.4) | 1 (1.2) | -1.2 | 0 (0.0) | 1 (2.5) | 2.5 | 3 (20.0) | 3 (20.0) | 0.0 | 9 (3.6) | 5 (2.0) | -1.6 |
| **Pregnant** | 0 (0.0) | 1 (0.9) | 0.9 | 0 (0.0) | 1 (1.2) | 1.2 | 0 (0.0) | 0 (0.0) | 0.0 | 0 (0.0) | 0 (0.0) | 0.0 | 0 (0.0) | 2 (0.8) | 0.8 |

***p<0.01, **p<0.01 ±No women reported using IUD or sterilization***

**Table 4:** Comparison of method use before and one, three and six months after abortion (n=199)

| | One Month after Abortion** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Pre-Abortion Method** | **LARC** | **Short-term methods** | **Traditional** | **No Method** | **Pregnancy** | **Other** | **TOTAL** |
| | **Case (%)** | **Case (%)** | **Case (%)** | **Case (%)** | **Case (%)** | **Case (%)** | **Case (%)** |
| **LARC+** | 0 (0.0) | 0 (0.0) | 1 (100) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 1 (100) |
| **Short-term methods** | 0 (0.0) | 20 (71.4) | 3 (10.7) | 5 (17.9) | 0 (0.0) | 0 (0.0) | 28 (100) |
| **Traditional** | 1 (2.4) | 4 (9.5) | 28 (66.7) | 9 (21.4) | 0 (0.0) | 0 (0.0) | 42 (100) |
| **No Method** | 5 (4.1) | 22 (18.0) | 11 (9.0) | 82 (67.2) | 2 (1.6) | 0 (0.0) | 122 (100) |
| **Other** | 0 (0.0) | 1 (16.7) | 2 (33.3) | 1 (16.7) | 0 (0.0) | 2 (33.3) | 6 (100) |
| | **Three Months after Abortion**±** | | | | | | |
| | **LARC** | **Short-term methods** | **Traditional** | **No Method** | **Pregnancy** | **Other** | **TOTAL** |
| **LARC** | 0 (0.0) | 0 (0.0) | 1 (100) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 1 (100) |
| **Short-term methods** | 0 (0.0) | 19 (67.9) | 3 (10.7) | 6 (21.4) | 0 (0.0) | 0 (0.0) | 28 (100) |
| **Traditional** | 1 (2.4) | 5 (11.9) | 28 (66.7) | 8 (19.0) | 0 (0.0) | 0 (0.0) | 42 (100) |
| **No Method** | 7 (5.7) | 27 (22.1) | 12 (9.8) | 67 (54.9) | 7 (5.7) | 1 (0.8) | 122 (100) |
| **Other** | 0 (0.0) | 1 (16.7) | 2 (33.3) | 1 (16.7) | 0 (0.0) | 2 (33.3) | 6 (100) |
| | **Six Months after Abortion**** | | | | | | |
| | **LARC** | **Short-term methods** | **Traditional** | **No Method** | **Pregnancy** | **Other** | **TOTAL** |
| **LARC** | 0 (0.0) | 0 (0.0) | 1 (100) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 1 (100) |
| **Short-term methods** | 0 (0.0) | 21 (75.0) | 2 (7.1) | 5 (17.9) | 0 (0.0) | 0 (0.0) | 28 (100) |
| **Traditional** | 1 (2.4) | 2 (4.8) | 26 (61.9) | 13 (31.0) | 0 (0.0) | 0 (0.0) | 42 (100) |
| **No Method** | 9 (7.4) | 32 (26.2) | 11 (9.0) | 58 (47.5) | 11 (9.0) | 1 (0.8) | 122 (100) |
| **Other** | 0 (0.0) | 1 (16.7) | 2 (33.3) | 1 (16.7) | 0 (0.0) | 2 (33.3) | 6 (100) |

***** p<0.01***

***±Not shown here is 1 woman who was using no method and had a termination at three months***

**LARC in our sample is only represented by implants, as no women had uptake of IUDs**

type of abortion method) included in the analysis was a significant predictor of modern contraceptive use in the month following abortion.

## Discussion

Our study found that six in ten women who had an induced abortion had not been using a method of contraception when they became pregnant. Of these previous non-method users, 18% and 4% began using short-term methods and LARCs respectively in the month immediately following the abortion, regardless of whether they had received their abortion through a surgical procedure or by using medication pills. The vast majority of women who were using a modern method when they became pregnant continued to use some method in the month after abortion (82%= short-term (71%) + traditional (10.7%)). At the same time, almost half of all women were not using any method of contraception following abortion, indicating that many women remain at risk of unplanned pregnancy.

One reason for our investigation of contraceptive uptake at one-month post abortion is that there is evidence that women become fertile soon after abortion. According to literature, fertility sets in as early as 8-10 days after abortion[11,24-26]. Moreover, Boeson and colleagues showed that almost half of women in Denmark who abort become sexually active within 2 weeks after the abortion[26], suggesting that even women who begin utilizing contraceptives at three and six months after abortion may have been at risk of subsequent unintended pregnancy in the previous months. Indeed, in our study, 9% of women who had not previously used a method of contraception when they became pregnant and had an induced abortion were pregnant six months following the abortion. At the same time, we do not have the context of decision-making around each of these pregnancies

**Table 5:** Factors associated with modern contraceptive uptake one month after abortion (n=237)

| Variable | OR | p-value | 95% CI | |
|---|---|---|---|---|
| **Age(years)** | | | | |
| 16-24 | (ref) | | | |
| 25-34 | 2.18 | 0.12 | 0.83 | 5.78 |
| 35+ | 0.65 | 0.50 | 0.19 | 2.29 |
| **Marital Status** | | | | |
| Never union | (ref) | | | |
| Current union | 0.56 | 0.15 | 0.25 | 1.24 |
| Former union | 0.40 | 0.19 | 0.10 | 1.57 |
| **Education** | | | | |
| None | (ref) | | | |
| Primary | 0.76 | 0.65 | 0.24 | 2.46 |
| Middle | 0.82 | 0.70 | 0.30 | 2.25 |
| Secondary or Higher | 0.54 | 0.31 | 0.16 | 1.78 |
| **Religion** | | | | |
| Catholic | 1.00 | | | |
| Anglican/Presbyterian/Methodist | 0.67 | 0.49 | 0.22 | 2.09 |
| Pentecostal/Charismatic | (ref) | | | |
| Other Christian | 0.93 | 0.88 | 0.37 | 2.36 |
| Muslim | 0.24 | 0.12 | 0.04 | 1.42 |
| Other | 1.00 | | | |
| **Wealth** | | | | |
| Poorer | (ref) | | | |
| Middle | 1.06 | 0.89 | 0.49 | 2.28 |
| Richer | 0.85 | 0.74 | 0.34 | 2.16 |
| **Parity** | | | | |
| 0 | (ref) | | | |
| 1 | 1.19 | 0.74 | 0.42 | 3.35 |
| 2+ | 3.05 | 0.06 | 0.96 | 9.76 |
| **Type of most recent abortion** | | | | |
| Surgical procedure | (ref) | | | |
| Medication pills | 1.70 | 0.16 | 0.81 | 3.59 |
| OCPs/Other pills | 0.60 | 0.38 | 0.20 | 1.85 |
| Non-medical | 0.32 | 0.35 | 0.03 | 3.43 |
| **Method Used Before Abortion** | | | | |
| None | (ref) | | | |
| Modern | 12.36 | 0.00 | 4.71 | 32.39 |
| Traditional | 0.84 | 0.73 | 0.32 | 2.21 |
| Other | 0.31 | 0.30 | 0.03 | 2.82 |

and cannot and should not assume that this subsequent pregnancy was unintended.

Our observation of high rates of non-use of a method after abortion are expected as most of the women (88%=220/251) had received their abortion from sources other than public/government health facilities and were unlikely to be provided with contraceptive counselling which is an essential component of comprehensive abortion care. For instance, of the women who utilized medication abortion pills, the vast majority (78%) obtained their services from a pharmacy and are likely to not have received any contraceptive counselling. Furthermore, since in Ghana there are strict legal limitations put on pharmacies for the provision of abortion services, it is even more likely that women were clandestinely accessing MA. If pharmacies and other chemical shops were supported in the provision of abortion services, they could be a feasible option for expanding counselling and information on contraception. As the preference and practices of women appear to be shifting toward self-managed abortion using medication pills, the need to identify possible avenues to provide counselling in non-facility based settings is important.

The study also found that some of the women (6%=15/251) used inappropriate or

dangerous methods to self-manage abortion, and a further 16% used unspecified pills. This finding is not unique in Ghana as Appiah-Agyekum had showed that some female students use over-the-counter drugs and herbal concoctions solely or simultaneously with other methods to self-manage abortion[27]. Aniteye, O'Brien and Mayhew have attributed the use of these unsafe methods partly to stigma owing to the legal requirements for abortion in the country and negative attitude from both society and health service providers[28].

On the factors associated with post-abortion modern family planning use, we found that prior users of modern contraceptives had higher odds for modern contraception uptake after abortion. This finding is not unique in the sub-Saharan African region. Literature in the sub-region show women often maintain using same pre-abortion methods even after abortion[29]. Though not specific to modern contraceptives, Mekuria and colleagues showed that women who use any contraceptive versus no method users prior to termination of pregnancy have higher inclination to adopt a contraception method after abortion[27]. This finding underscores the importance of identifying the pre-abortion methods used, in that studies focusing solely on modern method uptake may fail to account for the fact this uptake may be driven by prior use of modern methods. Moreover, having women's pre-abortion method use background during post-abortion counselling session could support health providers to better understand the one aspect of women's reproductive health history. This may enable them to offer patient-centered counselling that meets a woman's specific needs.

## Limitations

This study is not without limitations. Our data rely on self-report of abortion, which is often underreported. However, the prevalence of abortion in the WIE study (30%) was similar to that reported in the Ghana Maternal Health Survey in 2014, giving us confidence that the underreporting may be minimal. Further, the size of our analytic sample constrained the analysis.

## Ethical approval

Separate ethical approvals were obtained from Ghana Health Service Ethical Review Committee (GHS-ERC) and University of Ghana Ethics Committee for the Humanities (UG-ECH) before the study. Written consents were also sought from respondents before participation in the study.

## Conclusion

The study sought to analyse the pattern of contraceptives utilization before and after induced abortion, as well as the factors associated with modern contraception uptake following abortion. Our results indicate that the majority of women who induced abortion had not been using a method when they became pregnant. While one-third of those who had not used a method prior to abortion used one in the month immediately following, the remaining two-thirds were still at risk for future unplanned pregnancy. Further, one in five women had induced abortion with potentially unsafe or dangerous methods. Prior users of modern methods were more likely to use modern contraceptives following abortion. In order to improve the utilization of modern contraceptives post-abortion to reduce risk of future unplanned pregnancy, our study highlights a need to develop strategies to promote contraceptive counselling for women who seek abortion services living in poor urban settlements of Accra, Ghana who have been using either traditional methods or no contraceptive methods. As the majority of women in our study self-managed using medication abortion pills obtained at pharmacies, provision of counselling at the point-of purchase may be one important approach to consider. Task-shifting accompanied with continuous training of informal service providers (e.g. pharmacies and chemical shops) as well promoting a more liberal environment through amendment of the current abortion law may be an effective way of reducing unsafe abortion in the country. We also suggest further qualitative investigation to understand why women prefer not to use any contraceptive method after induced abortion.

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## Competing interest

The authors declare that there is no competing interest regarding this manuscript.

## Contribution of authors

CA: initiated the study, methods, analysis and wrote the manuscript. EGH: generated all tables and contributed to fine-tuning the study, methods and analysis, and as well provided comments and edits. POA, CAA, MK and EWK: read and provided edits. IS and AAB: assisted in the methods, discussion and provided insightful comments, edits and leadership as lead investigators of the study. All authors read and approved the final manuscript.

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