**Title: Contraceptive use among women in Accra, Ghana, in 2003 and 2008**

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**Abstract:** Despite a relatively low fertility rate, maternal mortality in Ghana still remains high. According to the Ghana Demographic and Health Surveys, about 22% of Ghanaian women of reproductive age currently use contraception. We analyzed contraceptive use among a representative sample of women in Accra, Ghana, to better understand contraceptive use patterns. We used data from two cross-sectional surveys of a representative cohort of women in Accra. In 2003, 28.9% of sexually active women used a contraceptive method. In 2008, 31.5% of sexually active women used a contraceptive method. Additionally, we observed high rates of discontinuation—from 64.1% among those using longer-acting methods to 82.1% among those using traditional methods—between years. Further research on women’s contraceptive decision-making is needed to explain these patterns and to ensure that family planning interventions meet the needs of women in Ghana.

# INTRODUCTION

Ensuring access to contraception is critical for the health and rights of women and families, and is one of the most clinically effective and cost-effective public health interventions available to reduce the burden of maternal and child mortality[1](#_ENREF_1), [2](#_ENREF_2). Globally, about 800 women die every day from complications arising from pregnancy or childbirth [3](#_ENREF_3), [4](#_ENREF_4); about 3 million newborn babies die each year, and 2.6 million babies are stillborn[3](#_ENREF_3), [4](#_ENREF_4). Approximately 99% of maternal deaths occur in developing countries—and more than half occur in sub-Saharan Africa—where many women are unable to access a safe birth attendant or facilities equipped to manage labor and delivery emergencies[3-5](#_ENREF_3). Additionally, for every maternal death, approximately 30 women live with severe pregnancy-related morbidities, including infertility, fistula, and incontinence [5](#_ENREF_5). Current strategies to reduce maternal mortality and morbidity have focused on improving access to safe birth attendants and emergency obstetric care, but many low-resource settings lack the human resources and infrastructure to support these interventions [1](#_ENREF_1), [5](#_ENREF_5). Expanding access to high-quality family planning services supports women’s rights and can prevent unintended pregnancies, which are associated with poor maternal mental health, poverty, poor child health outcomes, and especially mortality and morbidity arising from unsafe abortions [5-7](#_ENREF_5). Family planning interventions are much less resource-dependent since they do not require complex equipment and can be provided by a wide range of health care and lay providers[1](#_ENREF_1), [5](#_ENREF_5); family planning interventions have been proven to prevent unwanted pregnancies leading to improvements in women’s and children’s health and wellbeing[5](#_ENREF_5), [7-9](#_ENREF_7).

In Ghana, maternal mortality has declined substantially, from 216 deaths in 1990 to 164 deaths in 2013 per 100,000 live births, but is still far from its target of 54 per 100,000 [3](#_ENREF_3), [10](#_ENREF_10), [11](#_ENREF_11). According to the most recent Ghana Demographic and Health Survey (GDHS, 2014), although knowledge of contraception in Ghana is quite high at about 99%, and although the majority of the population agrees that smaller family sizes are better for the health of the mother and children, the rate of modern contraceptive use is only 22.2% among women of reproductive age[12](#_ENREF_12). Contraceptive prevalence rates in Ghana nearly doubled between the late 1980s and 1990s, but more recent trends suggest that contraceptive use rates since 2003 have remained relatively low[12-14](#_ENREF_12). Between 2003 and 2014, contraceptive prevalence remained unchanged (25% versus 26%, respectively)[12](#_ENREF_12), [14](#_ENREF_14), [15](#_ENREF_15). Use of modern methods (i.e., sterilization, pill, IUD, injectable, implant, condom, diaphragm, foam/jelly, emergency contraception) nearly doubled from 10% in 1993 to 19% in 2003, but has essentially remained unchanged through 2008 when the rate was approximately 17%, and then slightly higher at 22% in 2014[12](#_ENREF_12), [14](#_ENREF_14). Additionally, among women with contraceptive use experience, discontinuation of use is common—over half of women who adopted a contraceptive method in 2000 did not use any method by 2008[12](#_ENREF_12), [16](#_ENREF_16). Commonly reported reasons for not intending to use contraception include side effects, opposition to family planning, infertility, menopause/hysterectomy, desire for more children, or health concerns[12](#_ENREF_12). One-year rates of discontinuation were also explored in the 2014 DHS, and found that 25% of women discontinued all use of contraception[14](#_ENREF_14). Reasons for discontinuation included method failure, desire to become pregnant, other fertility-related reasons (e.g., decreased sexual activity, difficulty getting pregnant, separation from spouse), side effects / health concerns[14](#_ENREF_14). Very few women cited lack of access or costs as a barrier to use, and the current literature indicates that a wide range of methods is available through both the private and public health sectors[12](#_ENREF_12), [13](#_ENREF_13).

We aimed to analyze contraceptive use among a representative sample of urban women in Accra, Ghana, to understand more fully contraceptive use patterns and trends. We conducted our analysis using data from two cross-sectional surveys conducted in 2003 and 2008 of a representative cohort of women in Accra[17](#_ENREF_17), [18](#_ENREF_18). This analysis makes a unique contribution because, unlike previous studies such as the DHS that have been primarily cross-sectional with data from a single survey round, we followed a cohort of women over five years and were therefore able to look at predictors of contraception use, discontinuation, and switching[19](#_ENREF_19).

# MATERIALS AND METHODS

## Population

We analyzed data on contraceptive use from two population-based, cross-sectional, representative household surveys of a representative cohort of women in Accra: the Women’s Health Study of Accra (WHSA) in 2003 (WHSA I) and 2008 (WHSA II). Details of each survey are described elsewhere [17](#_ENREF_17), [20](#_ENREF_20), [21](#_ENREF_21). Briefly, for WHSA I, a random sample of women aged 18 and older was selected using the Ghana 2000 census as a frame. Using a 2-stage, stratified sample design, we selected 3200 women for study. For the WHSA II, the women interviewed in the WHSA I, all of whom had consented to be revisited in Wave 1, were approached again and invited to participate in the second wave. Those who were not able to be contacted or who moved outside of the Accra Metropolitan Area were replaced with new participants who matched the age and socio-economic status profile of the original women in WHSA I. Although all women aged 18 and over were included in the WHSA, for this analysis, we focus on women of reproductive age, defined as 15 to 49 years old[12](#_ENREF_12), who had data for both WHSA I and WHSA II. Since the WHSA included only women older than 18, this analysis included women between 18 and 49 (**Figure 1**). We excluded women who reported that they were currently pregnant at the time of the survey.

## Data collection

In WHSA I and WHSA II, women were asked to list contraceptive methods they had ever used or were currently using at the time of the survey. Interviewers recorded any of the following methods if reported: oral contraceptive pill (hereafter referred to as OC), IUD/loop, Norplant/other implant, diaphragm/foam/jelly, condom, male sterilization, female sterilization, injection, or emergency contraception (EC). The following methods were also included in the list, and classified as “traditional” methods[12](#_ENREF_12): periodic abstinence/timing/calendar method, breastfeeding/lactational amenorrhea (LAM), and withdrawal. Women in WHSA II were asked separate, close-ended questions (yes or no) about whether they currently were using the following methods: periodic abstinence/timing/calendar method, withdrawal, or breastfeeding/LAM.

## Data analysis

We calculated the proportion of women that reported the current use and/or the history of use (“ever use”) of each method at both time points. We coded contraceptive use into eight mutually exclusive categories. If a woman was using more than one method, she was included in the category of the most effective method reported. For example, if a woman reported using both contraceptive implants and condoms, she was coded as using implants. In increasing order of effectiveness, contraceptive categories included: no method, traditional method (i.e., withdrawal, periodic abstinence/timing/calendar method, breastfeeding/LAM), male or female condoms, diaphragm, EC, OC, and longer-acting methods (IUD/loop, injection, Norplant/other implant, male or female sterilization)[22-24](#_ENREF_22).

We coded and compared four categories of contraceptive use switching between both survey waves, calculating the proportion of women who: (1) switched from a more effective to a less effective method, (2) switched from a less effective to a more effective method, (3) switched from any method to no method (discontinuation), (4) used the same method in both waves (no switching).

Proportions were calculated for each method, and McNemar’s chi-square test was used to compare differences in proportions between survey years. Univariable and multivariable logistic regression analyses were performed to estimate the odds of the four types of contraceptive use switching (1=switch, 0=no switch) by demographic, reproductive background, fertility intentions, and reproductive decision-making factors (e.g., knowledge/attitudes pertaining to methods) characteristics. All variables were coded as binary or categorical predictors, with one category selected as the reference group. All independent variables were included in an initial regression model for each outcome. Sequentially, extraneous variables with a p-value>0.20 were removed from the model. Statistical tests assumed significance at p-value<0.05. Data analysis was conducted using Stata 12.1 (Stata, StataCorp LP, College Station, TX, USA).

# RESULTS

A total of 1050 women met our criteria for inclusion in this analysis (**Table 1**). The mean number of lifetime sexual partners was 2.3 partners per woman, and the mean household size was 4.8 members in 2008. Most women were between 25 and 44 years of age. Most women were educated at the junior secondary or senior secondary level. More than half of women were self-employed, and the distribution of women across the five wealth indices was relatively even. Most women were Christian, and most identified as Akan or Ga/Dangbe. Most reported good or excellent health, and most received their usual healthcare at a medical facility. Less than one-third reported having health insurance through Ghana’s National Health Insurance Scheme (NHIS).

Women mostly made decisions around contraceptive use either individually (11.9%) or jointly with their husband/partner (35.0%) (**Table 2**). Almost a third of women (31.0%) believed the OC was safe or very safe, and almost half (45.3%) reported they did not know if it was safe; almost one-quarter (23.3%) said that OC was not safe. About half (53.5%) of women believed that it is not safe to buy OC without consulting a doctor or clinic.

More than half of women were married (59.0%) (**Table 1**). Slightly less than one-third (29.0%) reported being sexually active in 2008 (**Table 2**), which was less than the proportion of women reported being sexually active in 2003 (47.8%): of the sexually active women in 2003, 28.9% used a contraceptive method. Of the sexually active women in 2008, 31.5% used a contraceptive method. Contraceptive use in 2003 and 2008 is shown in **Table 3**. In both years, the proportion of women who reported current use of any modern contraceptive method (17.3% in 2003 and 18.7% in 2008) was less than the proportion reporting being sexually active. From 2003 to 2008, there was a significant increase in the current use of condoms and implants as well as in each of the traditional methods; there was a significant decrease in the current use of IUDs, alone or in combination with other methods. The rates of current use for all other methods, were comparable between years.

Most women using a traditional method as their most effective method in 2003 (82.1%) discontinued all methods in 2008, though 17.9% switched to a more effective method (**Figure 2**). More than half of women using condoms as their most effective method in 2003 (67.5%) reported not using any method in 2008; while about over a quarter (26.0%) continued to use condoms as their most effective method in 2008, and 6.5% switched to OC or longer-acting methods. Over half (66.7%) of those who reported OC as their most effective method in 2003 discontinued use of any method in 2008, while 11.1% switched to condoms and/or a traditional method, and 7.4% switched to a longer-acting method. Of those using longer-acting methods in 2003, more than half (64.1%) discontinued use of all methods, while almost a third (29.5%) continued to use a longer-acting method, and 6.4% switched to OC, condoms, and/or a traditional method. Among the 72 women who reported use of longer-acting methods, 42 (58.3%) were sexually active. However, of the 143 women that discontinued all contraceptive use, 48 (33.6%) were sexually active.

In multivariable analysis (**Table 4**), those who were self-employed had significantly lower odds of discontinuing contraceptive use as compared to women who were formally employed. Women who reported another type of decision-making (i.e., neither independent nor jointly with their partner; surveyed as “other”) had significantly lower odds of switching to a more effective method. “Other” decision-making processes were not probed for in the administration of the survey, but may refer to processes that involved family or other community members. Those who did not know if OC was safe were significantly less likely than those who believed OC was safe to switch to a more effective method. Women who were sexually active had significantly higher odds of switching to a more effective contraceptive method than those who were not.

# DISCUSSION

Prevalence of contraceptive use can be an indicator of the effectiveness of family planning programs and reproductive health policies, and can potentially give insight on fertility trends[12](#_ENREF_12). In both cross-sectional surveys, about a third of women reported being sexually active, and less than a fifth reported use of any contraceptive method in both studies. Additionally, while around 40% of women reported ever using any form of contraception, only 17.3% to 18.7% were currently using contraception when surveyed in those years. A relatively low proportion of contraceptive users of reproductive age in Accra, Ghana, was also reported by the GDHS[12](#_ENREF_12), [14](#_ENREF_14) where less than a quarter of married women of reproductive age reported current contraceptive use[12](#_ENREF_12). Despite this, parity remained low at 0 to 3 for most women in both 2003 and 2008, which suggests that there are other factors besides contraceptive use that may be contributing to relatively low fertility.

Similar to the GDHS findings, the male condom, injectable, and pill were the most frequently used contraceptive methods in 2003 and 2008. Increase in uptake of methods between years was modest. This is consistent with previous research that has shown modest improvement in the uptake of contraceptive methods from 2003 to 2008[10](#_ENREF_10), [12](#_ENREF_12), [15](#_ENREF_15).

We found that large proportions of women in 2003—ranging from 64.1% of women reporting use of longer-acting methods to 82.1% of women using condoms—discontinued all forms of contraception between 2003 and 2008. It is possible that high rates of discontinuation can be attributed to decreased rates sexual activity (47.8% in 2003 vs. 29.0% in 2008). Similar rates of discontinuation of modern contraception were also observed in previous studies in the same years[12](#_ENREF_12), [16](#_ENREF_16), [25](#_ENREF_25). Among those who used any form of contraception in 2003, those who were using longer-acting methods were most likely to continue to use the same method.

Previous research by Adanu et al. using other data from this sample of women explored and identified significant predictors of ever and current contraceptive use in 2003[17](#_ENREF_17). Adanu et al. found that age, education level, marital status, work status, number of lifetime sexual partners, and number of household members were significant predictors of contraceptive use. We included these variables, as well as variables on reproductive health history (as proposed by previous research[14](#_ENREF_14), [17](#_ENREF_17), [18](#_ENREF_18), [20](#_ENREF_20), [21](#_ENREF_21)), to extend our investigation to factors that may contribute to switching in contraceptive use. We found that women who reported another type of decision-making (i.e. not independent and not done jointly with their partners) had significantly lower odds of switching to a more effective method. Additionally, although not statistically significant, we also found that the odds of discontinuing all methods were also higher among those whose decision-making was neither independent nor done jointly. Our findings suggest that decision-making around contraceptive methods that involve the woman—either independently or jointly—are likely to result in use of contraception generally and more effective methods specifically.

We also found that those who did not know if OC was safe were significantly less likely than those who believed OC was safe to switch to a more effective method. Previous studies have shown that family planning literacy is high in Ghana[12](#_ENREF_12), [14](#_ENREF_14), [15](#_ENREF_15). Investigating women’s understanding of different types of methods, and how this understanding contributes to decision-making around contraception, would be valuable in identifying opportunities to increase knowledge of the full range of contraceptive methods and ensure women are able to choose the method that best meets their needs.

Women who were sexually active had significantly higher odds of switching to a more effective contraceptive method than those who were not. Only about a tenth of respondents who were sexually active reported non-use of contraceptive methods. Within this population of sexually active women who did not use any methods, parity remained relatively low, with a mean of 2.2 (SD: 1.5). Further research on the decision to not use contraception among sexually active women may provide insight on alternative strategies to prevent or manage unintended pregnancy.

We found marked differences in reported use of withdrawal, periodic abstinence/timing/calendar method, and LAM between the two surveys. Women in WHSA II (2008) were specifically asked about use of periodic abstinence and withdrawal whereas women in WHSA I (2003) were not. Previous research suggests that the difference in reported usage may have been the result of the respondents not considering traditional methods to be forms of contraception[26](#_ENREF_26). Our finding that significant numbers of women report they are not doing anything to prevent pregnancy but report they are using abstinence, withdrawal, and LAM/breastfeeding is consistent with women not considering these methods “contraceptives”. This underscores (1) the importance of consistent data collection methods to ensure valid comparisons, and (2) the need for consistent definitions of contraceptive methods, especially for practices that may or may not be regarded as effective contraceptive methods in different contexts. The results from WHSA II also suggest that data from surveys where women are not asked specifically about these methods may underreport the prevalence of use of periodic abstinence and withdrawal, which could have important implications for need for information and counseling. The use of these methods and their role in the method mix is a topic that needs more research.

Our findings are consistent with previous research on contraceptive use on Ghana. We found a relatively low proportion of women using any form of contraception and high rates of discontinuation and switching to less effective methods of contraception. Previous studies have suggested that access, cost, and lack of awareness are not significant barriers to contraceptive use in Ghana[12](#_ENREF_12), [13](#_ENREF_13); rather, resistance to contraceptive use may be driven mostly by fear of side effects, opposition to family planning, infertility, menopause/hysterectomy, a desire for more children, or health concerns[12](#_ENREF_12). Others have drawn attention to the use of induced abortion, including traditional and potentially unsafe methods, as a way of limiting final family size[27](#_ENREF_27). Our research highlights the role that sexual activity plays a role in the need and use of contraceptives. For instance, low sexual activity may explain low contraceptive use but also high use of traditional methods. Further research, specifically more qualitative research that can capture the nuances of women’s decision-making processes and explore the drivers of these patterns of different types of contraceptive use, is therefore needed to explain these trends, and to ensure that the design of family planning interventions is adapted to meet the needs and context of women in Accra.

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# CONTRIBUTION OF AUTHORS

Kelly Blanchard, Allan Hill, and Richard Adanu were involved in the conceptualization of the study and the development of the study instruments. Naomi Lince-Deroche and Hialy Gutierrez were involved in the data management and analysis. Kelly Blanchard and Hialy Gutierrez produced the first draft of the paper and led the responses to editor feedback. All authors contributed to the review and revision of the drafts. All authors approved of the final submission of the manuscript.

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| **Table 1a.** Population demographic characteristics, by contraceptive method switch | | | | | | | | | | | | |  |
|  | | **Any switch** | | | **Discontinuation** | | | **More effective method** | | | **Less effective method** | | |
| **Characteristic** | **Total (N=1050)** | **No switch (n=823)** | **Switch (n=227)** | **p** | **No switch (n=907)** | **Switch (n=143)** | **p** | **No switch (n=974)** | **Switch (n=76)** | **p** | **No switch (n=1042)** | **Switch (n=8)** | **p** |
| **Age, %** | | | | | | | | | | | | | |
| 18-24 | 9.7 | 10.9 | 5.3 | 0.008 | 10.6 | 4.2 | 0.100 | 9.9 | 7.9 | 0.003 | 9.8 | 0.0 | 0.904 |
| 25-34 | 45.3 | 43.6 | 51.5 | 45.2 | 46.2 | 44.1 | 60.5 | 45.2 | 62.5 |
| 34-44 | 31.2 | 30.7 | 33.0 | 30.5 | 35.7 | 31.4 | 28.9 | 31.3 | 25.0 |
| 45-49 | 13.7 | 14.7 | 10.1 | 13.7 | 14.0 | 14.6 | 2.6 | 13.7 | 12.5 |
| NR | 0.0 | 0.0 | 0.0 |  | 0.0 | 0.0 |  | 0.0 | 0.0 |  | 0.0 | 0.0 |  |
| **Household size, mean (sd)** | 4.8 (2.3) | 4.8 (2.3) | 4.8 (2.1) | 0.898 | 4.8 (2.3) | 4.9 (2.2) | 0.487 | 4.8 (2.3) | 4.6 (1.9) | 0.448 | 4.8 (2.3) | 4.9 (1.1) | 0.904 |
| **Education level, %** | | | | | | | | | | | | | |
| None | 10.0 | 11.2 | 5.7 | 0.010 | 10.6 | 6.3 | 0.061 | 10.4 | 5.3 | 0.349 | 10.1 | 0.0 | 0.025 |
| Primary | 11.7 | 11.2 | 13.7 | 11.0 | 16.1 | 12.0 | 7.9 | 11.6 | 25.0 |
| Junior secondary | 47.7 | 45.4 | 55.9 | 46.7 | 53.8 | 46.9 | 57.9 | 47.5 | 75.0 |
| Senior secondary | 22.1 | 23.3 | 17.6 | 23.0 | 16.1 | 22.1 | 22.4 | 22.3 | 0.0 |
| Tertiary | 8.2 | 8.5 | 7.0 | 8.3 | 7.7 | 8.3 | 6.6 | 8.3 | 0.0 |
| NR | 0.3 | 0.4 | 0.0 |  | 0.4 | 0.0 |  | 0.3 | 0.0 |  | 0.2 | 0.0 |  |
| **Wealth index, %** | | | | | | | | | | | | | |
| Highest | 18.0 | 17.9 | 18.5 | 0.393 | 17.9 | 18.9 | 0.905 | 18.1 | 17.1 | 0.652 | 17.9 | 25.0 | 0.026 |
| Fourth | 21.8 | 21.6 | 22.5 | 21.7 | 22.4 | 21.6 | 25 | 22.0 | 0.0 |
| Middle | 21.1 | 20.5 | 23.3 | 20.9 | 22.4 | 21.1 | 21.1 | 21.5 | 62.5 |
| Second | 21.4 | 21.1 | 22.5 | 21.4 | 21.7 | 21.1 | 25.0 | 21.5 | 12.5 |
| Lowest | 17.6 | 18.8 | 13.2 | 18.1 | 14.7 | 18.1 | 11.8 | 17.8 | 0.0 |
| NR | 0.0 | 0.0 | 0.0 |  | 0.0 | 0.0 |  | 0.0 | 0.0 |  | 0.0 | 0.0 |  |
| **Marital status, %** | | | | | | | | | | | | | |
| Not married | 40.0 | 44.2 | 29.5 | 0.000 | 42.8 | 30.1 | 0.004 | 42.0 | 28 | 0.029 | 41.2 | 25.0 | 0.482 |
| Married | 59.0 | 55.8 | 70.5 | 57.2 | 69.9 | 58.0 | 71.1 | 58.8 | 75.0 |
| NR | 0.0 | 0.0 | 0.0 |  | 0.0 | 0.0 |  | 0.0 | 0.0 |  | 0.0 | 0.0 |  |
| **Religion, %** | | | | | | | | | | | | | |
| Catholic | 7.0 | 6.9 | 7.0 | 0.452 | 6.9 | 7.0 | 0.434 | 7.0 | 6.6 | 0.221 | 6.9 | 12.5 | 0.281 |
| Protestant | 11.1 | 10.4 | 13.2 | 10.9 | 11.9 | 10.6 | 17.1 | 11.1 | 0.0 |
| Presbyterian | 14.8 | 14.6 | 15.4 | 14.9 | 14.0 | 14.5 | 18.0 | 14.8 | 12.5 |
| Other Christian | 50.0 | 50.2 | 49.8 | 49.4 | 54.5 | 50.9 | 39.5 | 50.0 | 62.5 |
| Muslim | 13.1 | 14.2 | 9.3 | 14.0 | 7.7 | 13.1 | 13.2 | 13.2 | 0.0 |
| None | 1.9 | 1.7 | 2.6 | 1.8 | 2.8 | 2.0 | 1.3 | 1.8 | 12.5 |
| Other | 1.8 | 1.7 | 2.2 | 1.9 | 1.4 | 1.6 | 3.9 | 1.8 | 0.0 |
| NR | 0.3 | 0.2 | 0.4 |  | 0.2 | 0.7 |  | 0.3 | 0.0 |  | 0.3 | 0.0 |  |

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| **Table 1b.** Population demographic characteristics, by contraceptive method switch (continued) | | | | | | | | | | | | |  |
|  | | **Any switch** | | | **Discontinuation** | | | **More effective method** | | | **Less effective method** | | |
| **Characteristic** | **Total (N=1050)** | **No switch (n=823)** | **Switch (n=227)** | **p** | **No switch (n=907)** | **Switch (n=143)** | **p** | **No switch (n=974)** | **Switch (n=76)** | **p** | **No switch (n=1042)** | **Switch (n=8)** | **p** |
| **Ethnicity, %** |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Akan | 37.0 | 36.1 | 40.1 | 0.380 | 36.3 | 41.3 | 0.423 | 36.8 | 39.5 | 0.045 | 37.0 | 25.0 | 0.171 |
| Ga/Dangbe | 35.7 | 35.8 | 35.2 | 36.6 | 30.1 | 35.0 | 44.7 | 35.7 | 37.5 |
| Ewe | 12.8 | 12.8 | 12.8 | 12.5 | 14.7 | 13.2 | 6.6 | 12.6 | 37.5 |
| Other | 14.4 | 15.3 | 11.0 | 14.4 | 14.0 | 15.0 | 6.6 | 14.5 | 0.0 |
| NR | 0.2 | 0.0 | 0.9 |  | 0.2 | 0.0 |  | 0.0 | 2.6 |  | 0.2 | 0.0 |  |
| **Perception of health, %** | | | | | | | | | | | | | |
| Good/Excellent | 89.7 | 89.7 | 89.9 | 0.894 | 90.2 | 86.7 | 0.312 | 89.3 | 94.7 | 0.345 | 89.6 | 100.0 | 1.000 |
| Fair | 8.1 | 8.0 | 8.4 | 7.6 | 11.2 | 8.4 | 3.9 | 8.2 | 0.0 |
| Poor | 1.3 | 1.5 | 0.9 | 1.4 | 0.7 | 1.3 | 1.3 | 1.3 | 0.0 |
| NR | 0.9 | 0.9 | 0.9 |  | 0.8 | 1.4 |  | 0.9 | 0.0 |  | 0.9 | 0.0 |  |
| **Usual healthcare source, %** | | | | | | | | | | | | | |
| Medical facility | 80.6 | 81.3 | 78.0 | 0.795 | 81.5 | 74.8 | 0.273 | 80.3 | 84.2 | 0.303 | 80.6 | 75.0 | 1.000 |
| Non-medical facility | 13.0 | 13.0 | 13.2 | 12.7 | 15.4 | 13.3 | 9.2 | 13.1 | 12.5 |
| NR | 6.4 | 5.7 | 8.8 |  | 5.8 | 9.8 |  | 6.4 | 6.6 |  | 6.3 | 12.5 |  |
| **Insurance (NHIS), %** | | | | | | | | | | | | | |
| No | 71.8 | 72.1 | 70.9 | 0.718 | 72.1 | 69.9 | 0.577 | 71.5 | 76.3 | 0.372 | 72.1 | 37.5 | 0.044 |
| Yes | 28.1 | 27.8 | 29.1 | 27.8 | 30.1 | 28.4 | 23.7 | 27.8 | 62.5 |
| NR | 0.1 | 0.1 | 0.0 |  | 0.1 | 0.0 |  | 0.1 | 0.0 |  | 0.1 | 0.0 |  |
| **Work status, %** | | | | | | | | | | | | | |
| Formal employment | 17.5 | 16.8 | 20.3 | 0.014 | 16.8 | 22.4 | 0.008 | 17.6 | 17.1 | 0.489 | 17.6 | 12.5 | 0.161 |
| Self-employment | 60.7 | 60.1 | 62.6 | 61.0 | 58.7 | 60.0 | 69.7 | 60.7 | 62.5 |
| Student/Apprentice | 5.8 | 6.9 | 1.8 | 6.6 | 0.7 | 6.0 | 3.9 | 5.9 | 0.0 |
| Housewife | 0.9 | 0.7 | 1.3 | 0.8 | 1.4 | 0.9 | 0.0 | 0.8 | 12.5 |
| Retired/Unemployed | 15.1 | 15.4 | 14.1 | 14.9 | 16.8 | 15.6 | 9.2 | 15.2 | 12.5 |
| NR | 0.0 | 0.0 | 0.0 |  | 0.0 | 0.0 |  | 0.0 | 0.0 |  | 0.0 | 0.0 |  |

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| **Table 2.** Reproductive health history and decision making characteristics, by contraceptive method switch | | | | | | | | | | | | |  |
|  | | **Any switch** | | | **Discontinuation** | | | **More effective method** | | | **Less effective method** | | |
| **Characteristic** | **Total (N=1050)** | **No switch (n=823)** | **Switch (n=227)** | **p** | **No switch (n=907)** | **Switch (n=143)** | **p** | **No switch (n=974)** | **Switch (n=76)** | **p** | **No switch (n=1042)** | **Switch (n=8)** | **p** |
| **Would you say that using contraception is mainly your decision, mainly your husband/partner's decision, or did you both decide together?, %** | | | | | | | | | | | | | |
| Mainly respondent | 11.9 | 9.7 | 19.8 | 0.073 | 11.6 | 14.0 | 0.141 | 10.4 | 31.6 | 0.002 | 11.9 | 12.5 | 0.443 |
| Mainly husband/partner | 3.8 | 3.5 | 4.8 | 3.7 | 4.2 | 3.7 | 5.3 | 3.7 | 12.5 |
| Joint decision | 35.0 | 33.5 | 40.1 | 35.9 | 28.7 | 33.2 | 57.9 | 34.6 | 75.0 |
| Other | 9.2 | 9.1 | 9.7 | 8.6 | 13.3 | 9.7 | 3.9 | 9.3 | 0.0 |
| NR | 40.1 | 44.2 | 25.6 |  | 40.2 | 39.8 |  | 43.0 | 1.3 |  | 40.5 | 0.0 |  |
| **Based on what you know about contraception, would you say the oral contraceptive pill is …, %** | | | | | | | | | | | | | |
| Safe/Very safe | 31.0 | 28.8 | 39.2 | 0.000 | 30.4 | 35.0 | 0.004 | 30.2 | 42.1 | 0.031 | 30.6 | 87.5 | 0.001 |
| Not safe | 23.3 | 21.7 | 29.1 | 22.1 | 31.5 | 23.1 | 26.3 | 23.4 | 12.5 |
| Don't know | 45.3 | 49.2 | 31.3 | 47.3 | 32.9 | 46.4 | 31.6 | 45.7 | 0.0 |
| NR | 0.4 | 0.3 | 0.4 |  | 0.2 | 0.6 |  | 0.3 | 0.0 |  | 0.3 | 0.0 |  |
| **Would you agree or disagree that it is safe to buy the oral contraceptive pill from a drug seller or chemist without visiting a doctor or clinic?, %** | | | | | | | | | | | | | |
| Agree | 14.4 | 12.4 | 21.6 | 0.000 | 13.6 | 19.6 | 0.011 | 13.6 | 25 | 0.023 | 14.3 | 25.0 | 0.699 |
| Disagree | 53.5 | 53.2 | 54.6 | 52.8 | 58.0 | 53.9 | 48.7 | 53.6 | 50.0 |
| Don't know | 31.7 | 34.0 | 23.3 | 33.3 | 21.7 | 32.1 | 26.3 | 31.8 | 25.0 |
| NR | 0.4 | 0.4 | 0.5 |  | 0.3 | 0.7 |  | 0.4 | 0.0 |  | 0.3 | 0.0 |  |
| **Had abortion prior to 2008, %** | | | | | | | | | | | | | |
| No | 51.0 | 48.2 | 61.2 | 0.960 | 49.1 | 63.6 | 0.783 | 50.9 | 52.6 | 0.328 | 50.7 | 100.0 | 0.203 |
| Yes | 10.2 | 9.6 | 12.3 | 9.9 | 11.9 | 9.9 | 14.5 | 10.3 | 0.0 |
| NR | 38.8 | 42.2 | 26.5 |  | 41.0 | 24.5 |  | 39.2 | 32.9 |  | 39.0 | 0.0 |  |
| **Had miscarriage or stillbirth prior to 2008, %** | | | | | | | | | | | | | |
| No | 54.1 | 50.1 | 68.7 | 0.018 | 51.6 | 69.9 | 0.131 | 53.3 | 64.5 | 0.107 | 53.8 | 87.5 | 1.000 |
| Yes | 7.1 | 7.8 | 4.8 | 7.4 | 5.6 | 7.5 | 2.6 | 7.1 | 12.5 |
| NR | 38.8 | 42.1 | 26.5 |  | 41.0 | 24.5 |  | 39.2 | 32.9 |  | 39.1 | 0.0 |  |
| **Parity prior to 2008, %** | | | | | | | | | | | | | |
| 0-3 | 82.4 | 82.7 | 81.1 | 0.554 | 83.2 | 76.9 | 0.065 | 81.8 | 89.5 | 0.092 | 82.4 | 75.0 | 0.636 |
| 4 and above | 17.6 | 17.3 | 18.9 | 16.8 | 21.3 | 18.2 | 10.5 | 17.6 | 25.0 |
| NR | 0.0 | 0.0 | 0.0 |  | 0.0 | 1.8 |  | 0.0 | 0.0 |  | 0.0 | 0.0 |  |
| **Lifetime sexual partners, mean (sd)** | 2.3 (3.4) | 2.3 (1.6) | 2.6 (6.2) | 0.376 | 3.7 | 1.3 | 0.378 | 2.2 (1.5) | 10.7 | 0.349 | 2.3 (3.4) | 2.5 (1.5) | 0.758 |
| **Sexual activity, %** | | | | | | | | | | | | | |
| Not active | 71.0 | 75.0 | 56.8 | 0.000 | 71.8 | 66.4 | 0.191 | 73.2 | 43.4 | 0.000 | 71.5 | 12.5 | 0.001 |
| Active | 29.0 | 25.0 | 43.2 | 28.2 | 33.6 | 26.8 | 56.6 | 28.5 | 87.5 |
| NR | 0.0 | 0.0 | 0.0 |  | 0.0 | 0.0 |  | 0.0 | 0.0 |  | 0.0 | 0.0 |  |

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| **Table 3.** Ever use and current use of any contraceptive method, by method | | | |
| **EVER USE** | | | |
|  | **WHSA I** | **WHSA II** | **p** |
| **Modern method, n (%)** | 444 (42.3) | 430 (41.0) | 0.459 |
| Condom | 309 (29.4) | 193 (18.4) | 0.000 |
| Diaphragm/foam/jelly/spermicide | 4 (0.4) | 2 (0.2) | 0.414 |
| Injection | 93 (8.9) | 123 (11.7) | 0.003 |
| IUD | 44 (4.2) | 38 (3.6) | 0.461 |
| Norplant / Implant† | 4 (0.4) | 16 (1.5) | 0.007 |
| Pill | 85 (8.1) | 120 (11.4) | 0.001 |
| Morning after pill | 0 (0.0) | 0 (0.5) | 0.063 |
| Sterilization, male | 1 (0.1) | 0 (0.0) | 1.000 |
| Sterilization, female | 1 (0.1) | 1 (0.1) | 1.000 |
| **Traditional method‡, n ()** | 33 (3.2) | 406 (38.7) | 0.000 |
| Periodic abstinence | 32 (3.1) | 319 (30.4) | 0.000 |
| LAM (breastfeeding) | 0 (0.0) | 72 (6.9) | 0.000 |
| Withdrawal | 3 (0.3) | 206 (19.6) | 0.000 |
| **CURRENT USE** | | | |
|  | **WHSA I** | **WHSA II** | **p** |
| **Modern method, n (%)** | 182 (17.3) | 196 (18.7) | 0.380 |
| Condom | 77 (7.3) | 104 (9.9) | 0.023 |
| Diaphragm/foam/jelly/spermicide | 0 (0.0) | 0 (0.0) | 1.000 |
| Injection | 51 (4.9) | 46 (4.4) | 0.580 |
| IUD | 23 (2.2) | 13 (1.2) | 0.040 |
| Norplant / Implant† | 2 (0.2) | 10 (0.9) | 0.039 |
| Pill | 28 (2.7) | 22 (2.1) | 0.441 |
| Morning after pill | 0 (0.0) | 1 (0.1) | 1.000 |
| Sterilization, male | 1 (0.1) | 0 (0.0) | 1.000 |
| Sterilization, female | 1 (0.1) | 3 (0.3) | 0.500 |
| **Traditional method‡** | 29 (2.8) | 431 (41.1) | 0.000 |
| Periodic abstinence | 23 (2.2) | 159 (15.1) | 0.000 |
| LAM (breastfeeding) | 1 (0.1) | 15 (1.4) | 0.001 |
| Withdrawal | 6 (0.6) | 90 (8.6) | 0.000 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 4a.** Multivariable-adjusted odds ratios for contraceptive method switch typesa, by demographics | | | | | | | | | |
|  | **Any switch (n=227)** | | | **Discontinued (n=143)** | | | **Switched to more effective method (n=76)** | | |
| **Characteristic** | **Adjusted OR** | **95%CI** | | **Adjusted OR** | **95%CI** | | **Adjusted OR** | **95%CI** | |
| **Demographics** |  | **Lower limit** | **Upper limit** |  | **Lower limit** | **Upper limit** |  | **Lower limit** | **Upper limit** |
| **Age** |  |  |  |  |  |  |  |  |  |
| 18-24 | 1.00 |  |  | 1.00 |  |  | 1.00 |  |  |
| 25-34 | 1.70 | 0.40 | 7.29 | 0.93 | 0.16 | 5.37 | 2.35 | 0.27 | 21.10 |
| 34-44 | 1.55 | 0.36 | 6.66 | 1.33 | 0.23 | 7.72 | 1.75 | 0.19 | 15.89 |
| 45-49 | 1.38 | 0.29 | 6.61 | 1.39 | 0.21 | 9.25 | 0.76 | 0.05 | 10.78 |
| **Education level** |  |  |  |  |  |  |  |  |  |
| No education | 1.00 |  |  | 1.00 |  |  | -- | -- | -- |
| Primary school | 1.82 | 0.72 | 4.55 | 1.22 | 0.42 | 3.51 | -- | -- | -- |
| Junior secondary | 1.94 | 0.88 | 4.25 | 1.33 | 0.54 | 3.31 | -- | -- | -- |
| Senior secondary | 1.61 | 0.63 | 4.14 | 0.95 | 0.3 | 2.98 | -- | -- | -- |
| Tertiary | 1.52 | 0.38 | 6.03 | 1.19 | 0.26 | 5.39 | -- | -- | -- |
| **Marital status** |  |  |  |  |  |  |  |  |  |
| Not married | 1.00 |  |  | 1.00 |  |  | 1.00 |  |  |
| Married | 0.66 | 0.36 | 1.20 | 0.89 | 0.42 | 1.88 | 0.55 | 0.25 | 1.24 |
| **Ethnicity** |  |  |  |  |  |  |  |  |  |
| Akan | -- | -- | -- | -- | -- | -- | 1.00 |  |  |
| Ga/Dangbe | -- | -- | -- | -- | -- | -- | 1.18 | 0.57 | 2.43 |
| Ewe | -- | -- | -- | -- | -- | -- | 0.23 | 0.05 | 1.10 |
| Other | -- | -- | -- | -- | -- | -- | 0.37 | 0.10 | 1.43 |
| **Work status** |  |  |  |  |  |  |  |  |  |
| Formal employment | 1.00 |  |  | 1.00 |  |  | -- | -- | -- |
| Self-employment | 0.49\* | 0.24 | 0.98 | 0.24\* | 0.11 | 0.52 | -- | -- | -- |
| Student/Apprentice | 0.47 | 0.03 | 6.28 | 0.81 | 0.06 | 11.06 | -- | -- | -- |
| Housewife | 0.62 | 0.08 | 4.63 | 0.44 | 0.04 | 4.66 | -- | -- | -- |
| Retired/Unemployed | 0.69 | 0.29 | 1.64 | 0.41 | 0.16 | 1.06 | -- | -- | -- |
| Could not perform for switch to less effective : \*Too few cases to produce reliable statistics.  Adjusted for all variables in table unless data was excluded based on bivariate tests for significance (indicated with --)  \*Significant at p<0.05 | | | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 4b.** Multivariable-adjusted odds ratios for contraceptive method switch typesa , by reproductive health variables | | | | | | | | | |
|  | **Any switch (n=227)** | | | **Discontinued (n=143)** | | | **Switched to more effective method (n=76)** | | |
| **Characteristic** | **Adjusted OR** | **95%CI** | | **Adjusted OR** | **95%CI** | | **Adjusted OR** | **95%CI** | |
|  |  | **Lower limit** | **Upper limit** |  | **Lower limit** | **Upper limit** |  | **Lower limit** | **Upper limit** |
| **Would you say that using contraception is mainly your decision, mainly your husband/partner's decision, or did you both decide together?** | | | | | | | | | |
| Mainly respondent | 1.00 |  |  | 1.00 |  |  | 1.00 |  |  |
| Mainly husband/partner | 0.70 | 0.27 | 1.79 | 0.59 | 0.17 | 2.07 | 0.82 | 0.23 | 2.92 |
| Joint decision | 0.63 | 0.37 | 1.09 | 0.73 | 0.37 | 1.45 | 0.62 | 0.29 | 1.32 |
| Other | 0.62 | 0.30 | 1.32 | 1.34 | 0.57 | 3.15 | 0.15\* | 0.03 | 0.69 |
| **Based on what you know about contraception, would you say the oral contraceptive pill is …** | | | | | | | | | |
| Safe/Very safe | 1.00 |  |  | 1.00 |  |  | 1.00 |  |  |
| Not safe | 0.94 | 0.53 | 1.68 | 1.14 | 0.56 | 2.33 | 0.94 | 0.4 | 2.20 |
| Don't know | 0.43\* | 0.21 | 0.87 | 0.92 | 0.40 | 2.14 | 0.33\* | 0.11 | 0.99 |
| **Would you agree or disagree that it is safe to buy the oral contraceptive pill from a drug seller or chemist without visiting a doctor or clinic?** | | | | | | | | | |
| Agree | 1.00 |  |  | 1.00 |  |  | 1.00 |  |  |
| Disagree | 0.59 | 0.31 | 1.11 | 0.78 | 0.35 | 1.73 | 0.58 | 0.25 | 1.38 |
| Don't know | 0.82 | 0.35 | 1.94 | 0.66 | 0.23 | 1.91 | 1.19 | 0.35 | 4.07 |
| **Had miscarriage or stillbirth prior to 2008** | | | | | | | | | |
| No | 1.00 |  |  | 1.00 |  |  | 1.00 |  |  |
| Yes | 0.45 | 0.35 | 1.94 | 0.69 | 0.27 | 1.77 | 0.24 | 0.05 | 1.08 |
| **Parity prior to 2008** |  |  |  |  |  |  |  |  |  |
| 0-3 | -- | -- | -- | 1.00 |  |  | 1.00 |  |  |
| 4 and above | -- | -- | -- | 1.76 | 0.82 | 3.78 | 0.35 | 0.09 | 1.36 |
| **Sexual activity** | | | | | | | | | |
| Not active | 1.00 |  |  | 1.00 |  |  | 1.00 |  |  |
| Active | 1.22 | 0.77 | 1.95 | 0.78 | 0.44 | 1.36 | 2.05\* | 1.00 | 4.22 |
| Could not perform for switch to less effective : \*Too few cases to produce reliable statistics.  Adjusted for all variables in table unless data was excluded based on bivariate tests for significance (indicated with --)  \*Significant at p<0.05 | | | | | | | | | |

**Figure 1.** Development of comparison samples from WHSA I and WHSA II



**Figure 2.** Switching of contraceptive method from WHSA I to WHSA II

