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## Original Research

# The prevalence of modern contraceptive use and its associated socio-economic factors in Ghana: evidence from a demographic and health survey of Ghanaian men



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## ABSTRACT

**Objective:** This study estimated the prevalence of modern contraceptive use (MCU) and the sociodemographic factors associated with MCU among sexually active men in Ghana. The study is informed by the Health Belief Model, which is used as a conceptual framework for understanding MCU.

**Study design:** This was a cross-sectional study of 2014 Ghana Demographic and Health Survey data.

**Methods:** Analysis was limited to 3373 men who reported being sexually active within the 24-months prior to the survey data collection. Descriptive statistics, Chi-squared test, and multivariable logistic regression analyses were used to estimate the prevalence of MCU and the associated factors affecting contraception use.

**Results:** The sexually active men ranged in age from 15 to 59 years of whom 26.20% used modern contraceptives. Men who had discussed family planning with a health worker were more likely to use contraceptives compared with men who did not (adjusted odds ratio [AOR] = 1.54; 95% confidence interval [CI] = 1.14–2.08). Men who were undecided about having additional children were more likely to be using modern contraception compared with men who wanted more children (AOR = 1.85; 95% CI = 1.06–3.22). Men with at least a primary education were more likely to use contraception compared with men with no education (AOR = 1.80; 95% CI = 1.23–2.63). Finally, men with multiple sexual partners were more likely to use contraception compared with men with a single sexual partner (AOR = 1.42; 95% CI = 1.09–1.85).

**Conclusion:** There was a low prevalence of MCU among sexually active Ghanaian men. MCU was associated with factors such as education and age.

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## Introduction

For Ghana, the target contraceptive prevalence rate (CPR), defined as 'the percentage of currently married women who are currently using a method of contraception', is 50% by the year 2020.<sup>1</sup> However, as of the 2014 Ghana Demographic and Health Survey (GDHS), the estimated rate was 22.8% among all women regardless of marital status and 26.7% among currently married women, which is well below the desired benchmark.<sup>1</sup> Historically, family planning research from low- and middle-income countries has focused on women, mostly with the aim of reducing the burden of unintended pregnancies and also with the goal of lowering fertility rates.<sup>2–4</sup> This has had the effect of limiting the information on men's roles in the study of the implications of population growth and fertility rates for countries such as Ghana. Research confirms an increase in the rate of contraceptive use, albeit a gradual one, and given the lack of focus on male contraceptive use, there is some question about how contraception use prevalence rates could change if this gap in knowledge is addressed.

The success of family planning efforts in developing regions are dependent on male involvement. Research has shown that men can encourage or dissuade their partners' decision to use modern contraception.<sup>5</sup> Men have been shown to influence the fertility preferences of their partners, including influencing of the number of children their spouses choose to have,<sup>6,7</sup> the spacing between children,<sup>7</sup> and can also exert pressure on the preferred gender of children.<sup>7</sup> Furthermore, in developing countries, men typically tend to be the main financial providers for the household, and women may rely on their male partners for their family planning needs.<sup>8</sup> Women's experience of domestic abuse and violence from their male partners has been associated with the use of modern contraception.<sup>9,10</sup> Finally, there is also research suggesting that married/cohabiting couples that discuss family planning needs and preferences are more likely to use modern contraceptives as opposed to couples who do not discuss their family planning needs.<sup>11–13</sup>

In Ghana, and in Sub-Saharan Africa more broadly, emerging research does confirm the need for outreach to men as part of family planning policy interventions. For example, in a study conducted in the Kassena-Nankana region of northern Ghana, there was a noted resistance to the notion of female reproductive autonomy, leading to some women adopting contraception without the knowledge of their long-term partners or spouses. The authors of this research conclude that male attitudes toward female reproductive autonomy could be tapered if male outreach were incorporated into family planning interventions at the community level.<sup>14</sup> In another study using data from Ghana, it was shown that discussion of family planning between spouses has significant effects on contraceptive use.<sup>15</sup> This research points to the fact that in Ghana specifically, male attitudes are important for the uptake of modern contraception. And while discussions between spouses or sexual partners do not necessarily guarantee accurate knowledge about a partner's attitudes on contraception, it does help to lay the groundwork for effective family planning.<sup>16</sup>

Prevailing research points to the importance of male perspectives and attitudes toward family planning and the use of modern contraception. To better understand contraceptive use from the male perspective, there is a need to get an estimate of use prevalence and also look at the sociodemographic factors that affect contraception use behavior among Ghanaian men. Consequently, this study estimates the prevalence of modern contraceptive use (MCU) among sexually active men in Ghana and highlights some of the sociodemographic factors that drive the use of modern contraception within this population. The Health Belief Model (HBM), provides a structural framework within which to identify specific social and demographic characteristics that affect the estimation of modern contraception use. The HBM has been used extensively in research studying contraception use behavior and is suited for isolating and categorizing key factors for the analysis described below.<sup>17</sup>

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## Methods

### *Study design and sampling method*

This is a cross-sectional study using data from the 2014 GDHS.<sup>1</sup> The GDHS is a nationally representative household survey that used a two-stage sample design, with a sampling frame based on the 2010 National Census in Ghana, to designate household clusters around the country. Households within the clusters were then randomly sampled to collect survey data. The 'Man's Questionnaire' is a subsection of the survey, which collects data from men ranging in age between 15 and 59 years, on a range of sociodemographic characteristics, making this data set ideal for this kind of analysis. The analytical sample was restricted to men who reported being sexually active within the 24-months prior to taking the survey ( $N = 3373$ ), because this group of men would be better able and more likely to report making efforts to avoid or delay pregnancy with their female sexual partners. Additionally, other studies utilizing demographic and health survey data focus on contraception use among married or cohabiting men. However, because there are a variety of sexual relationships that fall outside of the strict understanding of marriage,<sup>14,15</sup> the below analysis focuses on men who have been recently sexually active.

### *Outcome variable*

Modern contraceptive methods are defined to include sterilization (male and female), intrauterine devices (IUDs) and systems, subdermal implants, oral contraceptives, condoms (male and female), injectables, emergency contraceptive pills, patches, diaphragms and cervical caps, spermicidal agents (gels, foams, creams, suppositories, etc.), and vaginal rings sponge.<sup>18</sup> Within the survey is an item asking, 'Are you currently doing something or using any method with any partner to delay or avoid a pregnancy?' Those responding in the affirmative were then asked to denote the specific method they were using either individually or in conjunction with their partner.<sup>1</sup> The responses provided included all the above as well as mention of traditional (i.e., fertility awareness

approaches, withdrawal, abstinence, and lactational amenorrhea)<sup>18</sup> and folkloric methods of contraception. To facilitate analysis, a dichotomous variable was created representing MCU, such that '0' indicated no MCU and '1' indicated MCU.

### Explanatory variables

The explanatory variables for this analysis were selected and categorized using HBM constructs as a basis to hypothesize their influence on MCU (see Fig. 01).

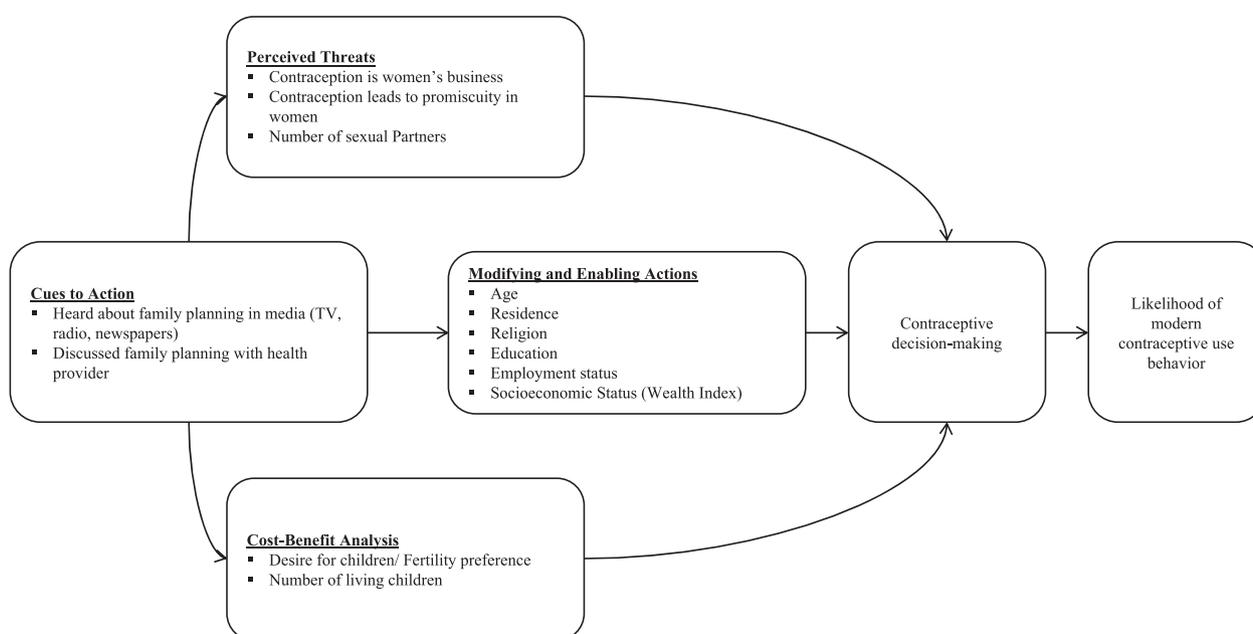
### Modifying and enabling variables

Per the HBM, these include sociodemographic factors that could interact with perceptions of pregnancy and/or decision-making around contraception use.<sup>17</sup> Based on data availability, the following variables were categorized under this construct: age, place of residence, marital status, religion, level of education, employment status, and socio-economic status. Age was a continuous variable that was coded as a categorical variable accounting for men who were 15–24, 25–34, 35–44, and 45 or more years of age. The 'residence' variable was dichotomous variable accounting for whether the respondent lived in a household that was in a rural or an urban area. Religion was a categorical variable and coded to account for men who identified as being Christian (or belonging to one of many Christian or Christian affiliated sects), Muslim (or belonging to one of the Islamic sects in Ghana), and traditional or other religious (Ghana is ethnically diverse, and there are numerous indigenous belief systems that people identify with; to facilitate analysis these are all grouped as traditional/other). The level of education variable was composed of three categories: primary, secondary, and higher education. Where primary referred to participants who had at least an elementary school or basic level of education, and secondary accounts for participants having completed or

having some middle and/or high school education. Finally, higher education accounted for participants with a university education (or education at a tertiary institution). Employment status was dichotomous and based on an item denoting whether respondents were presently employed. Finally, socio-economic status was based on an index within the data set that was based on household and asset ownership and including basic society amenities or utilities (e.g., water and electricity). In low-to middle-income countries such as Ghana, this index within the GDHS attempts to capture relative economic position.<sup>19</sup> Based on the index, a categorical variable was created to classify men into three wealth groups: low, middle, and upper income.

### Perceived threat variables

This particular construct considers variables accounting for incentives to use contraception, based on the seriousness or susceptibility of an unwanted pregnancy and its consequences.<sup>17</sup> In considering this definition, the following variables were selected from the data: the idea that contraception is a woman's business, women using contraception are promiscuous, and the number of sexual partners. Contraception being a woman's business implies a certain set of perceptions about the risk of pregnancy on the part of men. The ensuing variable was dichotomous, denoting whether respondents disagreed with that sentiment or whether they agreed with said sentiment and/or did not know. The idea of women's use of contraception making them promiscuous also suggests male attitudes that can affect perceptions about the susceptibility to pregnancy. A dichotomous variable denoting whether men disagreed with the sentiment or whether they agreed with said sentiment and/or did not know was created. The number of sexual partners within the previous 12-months prior to taking the survey indicates certain attitudinal perceptions about seriousness and susceptibility of an unwanted



**Fig. 1** – A customized Health Belief Model to facilitate understanding of the determinants of modern contraceptive use among Ghanaian men. The customized model is based on prior work done by Hall (2012).<sup>17</sup>

pregnancy. This was a categorical variable where the respondent denoted one partner, between two and four sexual partners, and five or more sexual partners in the previous 12 months.

#### Cost-benefit analysis

This construct hinges on internal calculations that take into account the negative consequences of using contraception and the perceived effectiveness, feasibility, and general advantages of using contraception.<sup>17</sup> This construct was represented by the following variables: a desire for children and the number of living children. The desire for a child or additional children will factor into male calculations about using contraception. This variable was categorical with respondents grouped by whether they wanted more children, were undecided, were incapable of having more children (infecund), or whether they were not married or without a partner. The number of living children male respondents had may affect family planning decisions moving forward and was also denoted by a categorical variable that grouped men according to whether they presently had no children, one or two children, and whether they had three or more children.

#### Cues to action

The final construct considered in this analysis accounted for external stimuli that could elicit awareness about the perceived threat of pregnancy and also aid in the consideration of whether to use contraception. A dichotomous variable accounted for the effect of media (i.e. radio, television, and newspaper/magazines), where respondents noted in the affirmative or negative, whether they had heard about family planning from one type of media in the past year. The final variable was also dichotomous, accounting for whether respondents had discussed family planning with a health worker in the year prior to the survey.

#### Data analysis

All of the analysis reported in this article was carried out using STATA v.14.<sup>20</sup> Appropriate weights were applied during all analyses to ensure the external validity of the results.<sup>21</sup> These analyses began with descriptive statistics for the outcome and explanatory variables. This stage also allowed for the calculation of the prevalence of modern contraception use among sexually active Ghanaian men, such that the numerator was the number of men reporting MCU and the denominator was the total number of men in the sample. The outcome and explanatory variables were all categorical, and consequently, cross-tabulations were applied using Pearson's Chi-squared test to determine significant associations between each explanatory variable and modern contraception use. This bivariate analysis helped to assess the individual relationship between each explanatory variable and MCU. The cut-off for statistical significance was a *P*-value less than 0.05. Explanatory variables that were not significantly associated with the outcome variable were excluded from the multivariable logistic regression.

The sociodemographic factors that comprise the explanatory variables in the analysis are predicted to influence

contraceptive use behavior as per Fig. 1. As a consequence, this analysis fits four logistic regression models to observe the effects of each construct on MCU. The following explanatory variables were eliminated from this portion of the analysis because they were not significantly associated with MCU: residence, socio-economic status/wealth, contraception is a woman's business, women who use contraception are promiscuous, and hearing about family planning through any media. Model 01 considered the effects of 'enabling and modifying factors' (i.e., age, marital status, religion, education, and employment status). Model 02 then incorporated the remaining 'perceived threat' variable, number of sexual partners in the previous 12 months. Model 03 then factored in the 'cost-benefit' variables, which included the desire for children and the number of living children as of the time the survey was conducted. The fourth model controls for all the explanatory variables by incorporating the 'cues to action' construct's remaining variable: whether the male respondents discussed family planning with a health worker.

## Results

### Sample characteristics

As noted in the methods section, the sample was restricted to men who had had sex within the 24-months prior to completing the survey ( $N = 3373$ ). The descriptive statistics in Table 1 show that the mean age of the respondents was approximately 36 years, with the majority of men being aged between 25 and 34 years (30.95%). Most of the men in the sample lived in urban communities (52.29%), were married or living with a long-term female partner (66.55%), and identified as being Christian (72.19%). Regarding education, most reported having at least a secondary education (62.08%). The majority of respondents were currently employed in some form (93.95%).

When it came to actual MCU, condoms were the favored form of contraception with 12.98% of the respondents noting that they used condoms in their most recent sexual encounter. About 5% of the respondents reported that their partner or last sexual partner was on the pill. Traditional and/or folkloric contraceptive methods were utilized by some 6.27% of sampled Ghanaian men and their partners. The majority of the men in the sample, 67.46%, reported not currently using any form of contraception with their sexual partners.

Many of the respondents agreed that contraception was strictly the woman's business (74.79%), while many agreed with (or did not dispute) the sentiment that women using contraception are promiscuous (50.28%). About 78% of the respondents had heard about family planning or modern contraception use from at least one media source (i.e. television, newspapers, or radio). Conversely, very few of the sampled men noted discussing family planning with a health workers at some point in the previous 12 months (8.76%). Finally, Table 1 also shows about 19% of the sampled men had more than one sexual partner at the time the survey was conducted.

**Table 1 – Weighted sample characteristics of sexually active men aged 15–59 years in Ghana.**

Characteristics (N = 3373)	n (%)
<b>Modifying and enabling factors</b>	
Age (x = 35.8 years)	
15–24 years	625 (18.21)
25–34 years	1004 (30.95)
35–44 years	893 (26.52)
45+ years	851 (24.32)
Residence	
Urban	1603 (52.29)
Rural	1770 (47.71)
Marital status	
Never married	890 (27.47)
Married (cohabiting)	2292 (66.55)
Formerly married	191 (5.97)
Religion	
Christian	2233 (72.19)
Islam	705 (16.98)
Other	435 (10.84)
Education	
No education	593 (12.42)
Primary	476 (12.49)
Secondary	1917 (62.08)
Higher	387 (13.01)
Currently working	
No	214 (6.05)
Yes	3158 (93.95)
Wealth status	
Low	1451 (32.66)
Middle	652 (20.12)
Upper	1270 (47.22)
<b>Perceived threat variables</b>	
Contraception is woman's business	
Disagree	2546 (74.79)
Agree/don't know	827 (25.21)
Women using contraception are promiscuous	
Disagree	1788 (49.72)
Agree/don't know	1585 (50.28)
Number of sex partners	
One or less	2769 (81.41)
Two–four	579 (17.53)
Five plus	25 (1.06)
<b>Cues to action</b>	
Family planning through media	
None	762 (21.74)
At least one source	2611 (78.26)
Discuss family planning w/worker	
No	3049 (91.24)
Yes	323 (8.76)
<b>Cost-benefit analysis</b>	
Desire for children	
Want more	1317 (36.51)
Undecided	114 (3.63)
No more/infecund	8599 (26.39)
Partner less	1081 (33.47)
Number of living children	
No child	978 (30.37)
One–two	831 (25.75)
Three plus	1564 (43.88)
<b>Modern contraceptive use by type</b>	
Female/partner methods	
Pill	158 (5.00)
IUD	5 (0.27)
Injections	154 (4.34)
Female sterilization	18 (0.63)

**Table 1 – (continued)**

Characteristics (N = 3373)	n (%)
Female condom	6 (0.20)
Implants	69 (2.07)
Other modern method	17 (0.63)
Male methods	
Condoms	456 (12.98)
Male sterilization	1 <0.01
Traditional/folkloric methods	
Periodic abstinence	92 (3.46)
Withdrawal	75 (2.81)
Other	5 (0.12)
Not using contraception	2317 (67.46)

### Prevalence of modern contraceptive use

Table 2 highlights MCU across all demographic characteristics of interest. Among sexually active Ghanaian men 26.21% (n = 884) reported using a form of modern contraception with their partner. When looking at age categories, 6.83% of men aged 15–24 years and 8.83% of men aged 25–34 years reported using modern contraception. Some 20.22% of modern contraception using men identified as Christian and 3.71% identified as Muslim. Of the men using contraception, 13.03% were in the upper category of socio-economic status.

Table 2 also highlights Pearson's Chi-test of association between MCU and the demographic characteristics of interest. Five of these characteristics (i.e. place of residence, wealth status, occupation, contraception being a woman's issue, contraception making women more promiscuous, and media as a source of contraception information) were not significantly associated with MCU ( $P > 0.05$ ). Consequently, these variables were excluded from the multivariable logistic regression analysis.

### Multivariable logistic regression

Prior to conducting analysis, all variables were tested for collinearity using variance inflation factor. No evidence was found of multicollinearity. However, the dummy variable created from the factor desire for children, indicating men without a partner, can be correlated with marital status of men and was omitted from the final regression analysis. Logistic regression analysis was conducted with nine independent variables and introduced via a stepwise approach based on HBM constructs; the results of which are shown in Table 3.

When taking into account just the 'modifying and enabling factor' variables, married or cohabiting men are less likely to use modern contraception compared with men who had never been married (adjusted odds ratio [AOR] = 0.44; 95% confidence interval [CI] = 0.31–0.62). All educational categories are significantly associated with contraceptive use, with Ghanaian men with a primary education (AOR = 1.82; 95% CI = 1.24–2.66), a secondary education (AOR = 1.75; 95% CI = 1.22–2.52), and a higher level of education (AOR = 2.85; 95% CI = 1.68–4.83), all being more likely to use modern contraceptive compared with men with no education.

The second model introduced the number of sex partners variable under the 'perceived threat' construct of HBM. Men

**Table 2 – Prevalence of modern contraceptive use across characteristics of sexually active men (N = 3373), Ghana, 2014.**

Characteristics (n = 884)	n (%)
<b>Modifying and enabling factors</b>	
Age (P < 0.001)	
15–24 years	242 (6.83)
25–34 years	289 (8.83)
35–44 years	211 (6.10)
45+ years	142 (4.40)
Residence (P = 0.926)	
Urban	453 (13.73)
Rural	431 (12.42)
Marital status (P < 0.001)	
Never married	370 (11.05)
Married (cohabiting)	458 (13.26)
Formerly married	56 (1.84)
Religion (P < 0.006)	
Christian	630 (20.22)
Islam	167 (3.71)
Other	87 (2.23)
Education (P < 0.001)	
No education	81 (1.62)
Primary	122 (3.33)
Secondary	544 (16.45)
Higher	137 (4.79)
Currently working (P = 0.002)	
No	84 (2.25)
Yes	800 (23.91)
Wealth status (P = 0.056)	
Poor	332 (7.44)
Middle	177 (5.68)
Upper	375 (13.03)
<b>Perceived threat variables</b>	
Contraception is woman's business (P = 0.070)	
Disagree	643 (18.54)
Agree/don't know	241 (7.61)
Women using contraception are promiscuous (P = 0.061)	
Disagree	438 (11.90)
Agree/don't know	446 (14.25)
Number of sex partners (P = 0.015)	
One or less	702 (20.28)
Two–four	172 (5.47)
Five plus	10 (0.41)
<b>Cost-benefit analysis</b>	
Desire for children (P < 0.001)	
Want more	243 (6.60)
Undecided	29 (1.05)
No more/Infecund	186 (5.62)
Partner less	426 (12.9)
Number of living children (P < 0.001)	
No child	370 (11.07)
One–two	182 (5.63)
Three plus	332 (9.45)
<b>Cues to action</b>	
Family planning through media (P = 0.347)	
None	177 (5.35)
At least one source	707 (20.80)
Discuss family planning w/worker (P = 0.004)	
No	777 (23.21)
Yes	107 (2.96)

reporting multiple sexual partners in the past year, particularly men reporting having two to four sexual partners were more likely to use modern contraception compared with men reporting only having one sexual partner (AOR = 1.44; 95% CI = 1.11–1.87). Similarly, married men remained less likely to use modern contraception compared with their never-married counterparts (AOR = 0.43; 95% CI = 0.30–0.61), and men with any form of education remained more likely to use modern contraception compared with their counterparts without any education.

In the model that introduced the 'cost-benefit' construct, the desire for children was not significantly associated with MCU. However, men who were undecided about whether they wanted more children or not were more likely to use modern contraception compared with their male counterparts who were certain they wanted more children (AOR = 1.82; 95% CI = 1.03–3.22). Men with two to four sexual partners remained more likely to use modern contraception compared with men with only one sexual partner, and men with some education remained more likely to use modern contraception compared with men without any education. Men who were married were still less likely to use modern contraception compared with their never-married counterparts. What was different in this model was men who were aged 45 years and above were less likely to use modern contraception compared with men within the youngest age category, 15–24 years (AOR = 0.56; 95% CI = 0.34–0.93).

In the final model where the construct 'cues to action' was introduced, men who discussed family planning with a health worker were more likely to use modern contraception compared with their counterparts who had not (AOR = 1.5; 95% CI = 1.14–2.06). Men who were undecided about having more children remained more likely to use modern contraception compared with their counterparts who were certain about having more children (AOR = 1.85; 95% CI = 1.06–3.22). Men reporting two to four sexual partners in the year prior to the survey were also more likely to use modern contraception compared with their counterparts reporting one sexual partner (AOR = 1.42; 95% CI = 1.09–1.85). Men with a primary (AOR = 1.80; 95% CI = 1.23–2.63), secondary (AOR = 1.75; 95% CI = 1.23–2.49), or higher education (AOR = 2.88; 95% CI = 1.70–4.87) were more likely to use modern contraception compared with men without any formal education. Conversely, married or cohabiting men were less likely to use modern contraception compared with never-married men (AOR = 0.31; 95% CI = 0.172–0.57). And finally, men aged 45 years or older were less likely to use modern contraception compared with their men within the youngest age category (AOR = 0.58; 95% CI = 0.35–0.96).

## Discussion

The prevalence of MCU among sexually active Ghanaian men is approximately 26%, which is lower than the prevalence rates reported within similar demographics in other Sub-Saharan African countries.<sup>4,22,23</sup> However, of note is the fact

**Table 3 – Likelihood estimates of modern contraception use among sexually active men, Ghana, 2014.**

Characteristic	OR (95% CI)	Model 01 <sup>a</sup> AOR (95% CI)	Model 02 <sup>b</sup> AOR (95% CI)	Model 03 <sup>c</sup> AOR (95% CI)	Model 04 <sup>d</sup> AOR (95% CI)
<b>Modifying and enabling factors</b>					
<b>Age</b>					
15–24 years	1	1	1	1	1
25–34 years	0.66 (0.49–0.90)	0.97 (0.69–1.36)	0.98 (0.69–1.37)	0.95 (0.66–1.36)	0.95 (0.66–1.37)
35–44 years	0.50 (0.36–0.68)	0.98 (0.68–1.40)	0.99 (0.69–1.44)	0.82 (0.54–1.25)	0.83 (0.55–1.26)
45+ years	0.37 (0.25–0.53)	0.74 (0.50–1.11)	0.76 (0.51–1.15)	0.56 (0.34–0.93)	0.58 (0.35–0.95)
<b>Marital status</b>					
Never married	1	1	1	1	1
Married (cohabiting)	0.37 (0.28–0.49)	0.44 (0.31–0.62)	0.43 (0.30–0.61)	0.32 (0.18–0.58)	0.31 (0.17–0.57)
Formerly married	0.66 (0.38–1.16)	0.78 (0.42–1.45)	0.87 (0.42–1.39)	0.70 (0.35–1.39)	0.69 (0.35–1.37)
<b>Religion</b>					
Christian	1	1	1	1	1
Islam	0.72 (0.55–0.94)	0.93 (0.70–1.25)	0.93 (0.69–1.25)	0.94 (0.70–1.26)	0.94 (0.69–1.26)
Other	0.67 (0.48–0.93)	0.88 (0.62–1.26)	0.87 (0.61–1.23)	0.89 (0.60–1.22)	0.85 (0.59–1.22)
<b>Education</b>					
No education	1	1	1	1	1
Primary	2.40 (1.65–3.48)	1.82 (1.24–2.66)	1.82 (1.24–2.66)	1.82 (1.25–2.66)	1.80 (1.23–2.63)
Secondary	2.40 (1.72–3.37)	1.75 (1.22–2.52)	1.74 (1.22–2.49)	1.79 (1.26–2.54)	1.75 (1.23–2.49)
Higher	3.88 (2.48–6.08)	2.85 (1.68–4.83)	2.84 (1.67–4.82)	3.06 (1.82–5.15)	2.88 (1.70–4.87)
<b>Currently working</b>					
No	1	1	1	1	1
Yes	0.59 (0.42–0.84)	1.03 (0.73–1.47)	1.02 (0.71–1.46)	1.02 (0.71–1.47)	0.99 (0.70–1.41)
<b>Perceived threat</b>					
<b>Number of sex partners</b>					
One or less	1		1	1	1
Two–four	1.37 (1.07–1.75)		1.44 (1.11–1.87)	1.44 (1.11–1.87)	1.42 (1.09–1.85)
Five plus	1.89 (0.85–4.17)		1.94 (0.86–4.37)	2.06 (0.91–4.68)	2.15 (0.94–4.89)
<b>Cost benefit</b>					
<b>Desire for children</b>					
Want more	1			1	1
Undecided	1.84 (1.04–3.25)			1.82 (1.03–3.22)	1.85 (1.06–3.22)
No more/infecund	1.23 (0.97–1.55)			1.19 (0.92–1.55)	1.18 (0.91–1.54)
Partner less	2.84 (2.19–3.70)			Omitted <sup>e</sup>	Omitted <sup>e</sup>
<b>Number of living children</b>					
No child	1			1	1
One–two	0.49 (0.34–0.71)			1.14 (0.62–2.09)	1.13 (0.62–2.07)
Three plus	0.48 (0.37–0.62)			1.61 (0.79–3.30)	1.61 (0.79–3.28)
<b>Cues to action</b>					
<b>Discuss family planning w/worker</b>					
No	1				1
Yes	1.50 (1.14–1.98)				1.54 (1.14–2.08)

OR, odds ratio; AOR, adjusted odds ratio; CI, confidence interval; MCU, modern contraceptive use; HBM, Health Belief Model.

<sup>a</sup> Model 01, which considers just the effects of 'enabling and modifying factors' on MCU.

<sup>b</sup> Model 02, which considers just the effects of both 'enabling and modifying factors' and 'perceived threats' on MCU.

<sup>c</sup> Model 03, which considers just the effects of 'enabling and modifying factors', 'perceived threats' and 'cost-benefit' factors on MCU.

<sup>d</sup> Model 04, which considers the effects of all four HBM constructs, including cues to action on MCU.

<sup>e</sup> A test for multicollinearity between marital status and the dummy variables for desire for children showed that sampled men, categorized as being partner less, was correlated with marital status. Consequently, that dummy variable was omitted from the regression analysis.

that CPR among men is higher than the CPR of 22% among all Ghanaian women who have ever had sex. Furthermore, the male CPR is lower than the CPR among married or cohabiting Ghanaian women.<sup>1</sup> The precise reason for the low contraceptive rate among men deserves further study. The present literature suggests that it may be a product of the fragmented way in which family planning interventions are financed and implemented in developing countries such as Ghana.

The multivariable analysis provided some interesting findings, the first being the significance of men discussing contraception with health workers. The statistically significant finding that men who recently spoke to a health worker

about family planning were more likely to use modern contraceptives may be key to the development of family planning interventions in Ghana. That finding speaks to the importance of health workers in the Ghanaian health system and consequently, interventions looking to address the family planning needs of men specifically, may choose to use health workers as a delivery mechanism, an approach that has met with success in countries such as Ethiopia.<sup>24</sup> Additionally, speaking directly with a health professional may suggest that those men are able to gain a more personalized solution to their family planning needs compared with their counterparts who do not speak with a health professional.<sup>25</sup>

The finding that men who reported having two to four sexual partners are more likely to use modern contraceptives when compared with their counterparts with one sexual partner may inspire some confidence in the fact that a segment of the male Ghanaian population is making an effort to mitigate the risk of pregnancy or that their sexual partners are able to act in a manner to mitigate the risk of pregnancy. Multiple concurrent sexual partners represent a risky sexual behavior that is associated with certain health outcomes including sexually transmitted infections unplanned for pregnancies. Though this subset of sexually active Ghanaian men is small, it suggests a population that is amenable to interventions. Additionally, it highlights subsets of the population of sexually active men that could be the target of family planning interventions moving forward.

Finally, there is the issue of education. Study findings point to education having a significant association with modern contraceptive use, such that sampled men with any form of education were more likely to use modern contraception when compared with their counterparts with no formal education. This may be indicative of the fact that men with education are exposed to information about family planning that could spur them to use contraception when with their partners. Formal education could also imbue men with the ability to better appreciate family planning and health intervention programs, more so, than their counterparts with little to no formal education. Moving forward, more detailed research is needed to better understand the reasons why men with no formal education are less likely to use modern contraception, a line of inquiry which could explore whether it is an issue of cost.

On the matter of advancing this line of research, this study used the HBM as a means of categorizing variables of interest. As researchers, health practitioners, and even policy-makers seek to better understand the contraceptive and family planning needs of Ghanaian men, there is further opportunity to employ the constructs of the HBM. For instance, health practitioners often rely on patient interviews to understand their patients' needs. Such interviews could be designed to elicit information from all the major HBM constructs, thus providing Ghanaian health practitioners with a holistic picture of the fertility intentions of men (and their partners). For researchers seeking to understand the family planning needs of men specifically, HBM may help in isolating factors and variables for analysis. For example, Ghana is an ethnically diverse country. Such ethnic divisions may make certain forms of contraception more suitable to men from one ethnic group relative to another. The HBM provides an opportunity for researchers to better understand factors of setting and environment or interpersonal cues such as the interactions between patients and health workers, affecting decisions around contraception use.

### Limitations

A limitation of this study is the imprecise measure of modern contraceptive use. The majority of modern contraceptives serve women specifically, and the options that require direct male involvement are the male condom and perhaps male sterilization/vasectomy. Consequently, male reports on contraceptive use during a previous sexual encounter may be

biased, as they rely on information provided by their respective sexual partners. Additionally, some researchers argue that MCU prevalence as an indicator of contraceptive behavior within a population is an inadequate measure of whether family planning interventions are helping men and women achieve their reproductive health goals. Future research exploring contraceptive use behavior among Ghanaian men should consider an indicator such as the 'public-sector family planning program impact score' (PFPI), which is being used with greater frequency to assess contraceptive use behavior. Indicators such as the PFPI, which looks at the effect of specific family planning programs in terms of the demand, offer a more nuanced perspective that better informs policy-making.<sup>26</sup>

Furthermore, cross-sectional studies do not allow for claims about causality. So, while the study results provide clues about factors influencing MCU among Ghanaian men, the results do not allow claims about how tweaking one factor or a set of factors could influence MCU. However, subsequent studies in this area may help clarify this challenge. Lastly, the study as described raises questions about generalizability, as contraception use practices among all sexually active men, for example, may differ from contraception use practices among married sexually active men.<sup>23</sup>

### Conclusion

The study described above found a low prevalence of MCU among recently sexually active men in Ghana. Men who were over the age of 49 years, married or cohabiting men, men with some level of education, men with one sexual partner, men with a desire for children, and men who had discussed family planning with health worker were all predictors of modern contraception use. These results may point to some value in community-based interventions programs that capitalize on community health workers and serve to educate men about the value of contraception. The results also suggest that men without any formal education should be a primary focal group for interventions seeking to raise the prevalence rate of contraception use. Finally, the significance of the other sociodemographic factors, such as the desire for more children, suggests that interventions acknowledge the nuanced interplay of factors that affect contraceptive use behavior in Ghanaian men.

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### Author statements

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#### Ethical approval

Access to the data was granted from the DHS Program website by providing a brief description of the intended research study. Approval for this specific study was sought from the

DHS Program, which is authorized to distribute data sets for legitimate academic research, as long as the requested data are only used for the registered research study. Per the DHS Program website and the 2014 GDHS Report, ethical clearance for the primary data collection was obtained from Ghana Health Service Ethical Review Committee and the Institutional Review Board of ICF International.

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The author has no competing interests to report.

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