



**Potential demographic influence on unintended pregnancies among reproductive aged women in Ghana**

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**Abstract**

Given that modern contraceptive use has been staggering over last decades, one in three women still report unmet need in Ghana. Our study sought to examine the potential demographic influence on unintended pregnancies among women of reproductive age (15-49) in Ghana using secondary data from the 2014 Ghana Demographic and Health Survey. Based on both binomial and multinomial logistic regressions, our results showed that reproductive aged women between the ages (25-49) were more likely to report total unmet needs for contraception's and if they reported unmet need, then they were more likely to report unmet for limiting compared to younger aged women 15-19years as these coefficients were found to be statistically significant and positively associated with unmet need for limiting and total unmet needs. Additionally, we found women age at first birth, number of marital unions, wealth quintiles, women educational attainment, women occupation, exposure to radio, cost of contraception's and women opposition to contraception use to be positive and significantly associated with unmet need for spacing. However, women residing in rural areas, religion, exposure to newspaper and television, distance to health facility, partner's opposition to contraceptive use, fertility preference were significant and correlated negatively with unmet for spacing. We recorded some variations in the effects these variables across the models for total unmet needs, unmet needs for spacing and unmet needs for limiting. We therefore recommended massive intensification of health promotion programmes particularly on contraception use at the micro level in order to address the various age specific needs and women within the different socio-demographic sectors so as to reduce unmet need and to improve maternal and child health outcomes in Ghana. Family Planning programmes incorporating religious activities and discouraging unintended pregnancies and unsafe abortions could play a vital role in improving child and maternal health in Ghana.

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**Keywords:** Demographic influence, unmet needs, demand, unintended pregnancies, Ghana.

**Introduction**

Many women of reproductive aged (15-49) in Sub-Saharan Africa (SSA) countries would either prefer to avoid been pregnant or want to delay the next child birth, but are not willing to use any modern method for contraception, Bongaarts and Bruce (1995); Westoff (1992). These reproductive aged women face what is defined as having an “unmet need for modern contraception”. Unmet needs simply explains the mismatch between a woman’s fertility desires/preferences and her ultimate practice of modern contraceptives methods. Unmet need for modern Contraception’s is further disaggregated into two categories as: unmet need for limiting (they do not wish to have any more children; and unmet need for spacing (if they wish to delay the birth of the next child by at least two years) and are not using any form of contraception Westoff (1992); Woldemicael and Beaujot (2011). Women aged (15-49) whose pregnancies are mistimed or unintended (unwanted) and who became pregnant because they were not using any contraception also have unmet need for family planning, Bongaarts and Bruce (1995); Govindasamy, et al (2000); Westoff and Bankole, (2000).

Data from the 2014 Ghana Demographic and Health Survey revealed that about 58.67 percent of women of reproductive age (15-49) have unmet needs for contraception with the remaining 41.33 percent having no unmet need. Despitess the widespread Knowledge of modern methods of contraceptives in Ghana, only 27 percent of currently married women are using any contraception methods. Also, the use of modern methods of contraceptions has more than quadrupled over the past two decades from 5 percent in 1988 to 22 percent in 2014. The Government of Ghana has remained the major provider of contraceptives, providing for about 64 percent of current users in 2014. The Data further revealed that one in four contraceptive users discontinued using a method within 12 months of starting its use and side effects has often been cited as the reason for discontinuation (6 percent). Thirty percent of currently married women have an unmet need for modern Contraception’s services, with 17 percent having an unmet need for spacing and 13 percent having an unmet need for limiting. Unmet need for modern contraception is high among women of reproductive age 15-49 in Sub-Saharan Africa (SSA) according to DHS reports (1988-2014). Recording 24 percent among married women in SSA, with much higher rates Ethiopia (34 percent), Malawi (36 percent), Kenya (36 percent), Rwanda (37 percent), Sedgh, (2007) considered unmet needs as the major cause of unintended fertility.

Although knowledge on the use of modern contraceptive have improved over the years in sub-Saharan Africa, access to consistent form of modern contraception for spacing or limiting child birth is still limited, Adeyemi et al. (2005); Anthony et al.,(2009). Women face a high potential for unintended fertility due to demographic and socioeconomic barriers to contraceptive use, Bongaarts and Bruce (1995); Hailemariam and Haddis (2011); Palamuleni (2013). As a result, many economies in sub-Saharan African region are still categorized as having high fertility rates due to high unmet demand for modern contraception, though in these countries, official reproductive health policies and family planning programs started in the early 1960s, Bongaarts and Bruce (1995); Westoff., Bankole, (2000); Casterline and Sinding (2000); Mekonnen and Worku (2011). Population-based surveys frequently report on women having more children than they wish to have, Bongaarts and Bruce (1995); Sengh, Bankole and Singh (2007). In spite of existing national family planning programs, one in three women who desires to postpone or stop child birth still have limited access to the use of modern methods of contraceptive, (Casterline and Sinding, 2000; Govindasamy et al., 2000; Shaikh, 2010; Westoff and Bankole, 2000).

World Health Organization (WHO, 2014), estimates of global maternal mortalities indicates that nearly 290,000 women of reproductive ages (15-49 years) died or suffer from unwanted or unintended pregnancy related complications. Out of this figure, about 179,000 representing 65% are recorded in Sub-Saharan Africa. It is also estimated that one in three women from low and

middle income countries suffers or die from unintended pregnancies and unsafe abortion related complications. This figure is high compared to 1 in 9,500 women estimated for developed countries. In view of the high prevalence of unintended pregnancies and its consequences on the health of women, the use of modern contraceptive has helped reduced maternal mortality rate by 40% in Low and Middle income countries over the last two decades, Cleland (2006). The uses of modern Contraception enable women to either space or limit births and eventually improve child and maternal health outcomes, WHO, (2014). Consequently, reducing unmet need for modern contraception as the fundamental cause of unintended pregnancies should be the main target of any family planning interventions. The 2014 GDHS reported that, contraceptive prevalence rate among women of reproductive age rose from 10% each for traditional and modern methods of contraception to 7% and 22% respectively in 2014. This figure is still considered high compared to other reported with the Sub-Saharan Africa region according same report. Thus, understanding the potential demographic influence on unintended pregnancies could have profound implications for programmes and interventions aimed at reducing unwanted pregnancies and improving maternal and child health outcomes in Ghana. Given this background, our study to that sought to examine the potential demographic influence on unintended pregnancies in Ghana is not only timely but also appropriate.

Policy concerns about unintended pregnancies have gained prominence in both health policy and academic literature. Unmet need for modern Contraception's bears serious implications on health, population growth, and overall development. In low income countries, unintended pregnancies (mistimed/unwanted) are a major result of unmet need for family planning. Similarly, closely spaced pregnancies and child birth, early child bearing and concealed abortions and physical abuse, all of which are associated with unplanned pregnancies, in turn are main contributors to high maternal and infant mortality, Okonofua et al. (1999); USAID, (2009). This contributes to rapid population growth through unwanted fertility and closely spaced births, Sengh, Bankole and Singh (2007). Unintended pregnancies is generally high in societies where illiteracy, gender inequality, and poverty are most pronounced. In such communities, closely spaced pregnancies make it extremely difficult for women to participate in economic activities to gain financial independence resulting in a visual cycle of poverty and ill-health, which is often transfer onto subsequent generations, Kabagenyi, et al. (2014); Mosha, Ruben and Kakoko (2013). Therefore, addressing issues of unintended pregnancies has recently become a key global health priority, as it is seen as an effective means of ultimately having desired populations sizes and reducing maternal related morbidities and mortalities, USAID, (2009); Cates, (2010); WHO, (2007). The Government of Ghana over the years have initiated various strategies and policies to facilitate the use of family planning services as one surest way towards increasing contraceptive uptake and eventually reducing unintended pregnancies. The remaining sections of the paper proceeds as follows; section two provides a review of the empirical literature. Section three presents the empirical model, the methodology, data sources and variables definition variables. Section four presents the results and discussion of both logistics and multinomial regressions and ends with conclusions, recommendation

### **Literature Review**

The past three decades have witnessed a number of research around the used of DHS data to explore the factors influencing unintended fertility or Unmet needs for modern contraceptives. The literature review concentrates largely on empirical studies that investigate factors associated with unintended fertility (unmet need) and reasons for non-contraceptive use. In most parts of the developing world, most married women would prefer to have sizeable families so that the rapid population growth phenomenon will not be a continuum. Nearly 120 million women in less developed countries would prefer to delay or avoid pregnancy all together but are not practicing any form of contraception. Among country-specific studies, Nigeria in 2014 recorded the highest

estimates (59%) for unmet need for family planning, 58% in Rwanda based on 2005 DHS data, Adeyemi, et al. (2005); Ndaruhuye, et al. (2009). Egypt recorded an estimate of unmet need for limiting of 22% in 1997, Igwegbe et. al. (2009); Kotb et al. (2010); Yadav et al. (2009). Among studies with a regional focus, the highest estimates for total unmet need for modern Contraception's were found for the Sub Saharan Africa and Asian regions, Ross and Winfrey (2001); Bongaarts and Bruce (1995). A deeper review of studies revealed that, unmet need for modern Contraception's was influenced by a number of demographic factors. For instance, the age of the woman was negatively associated with total unmet need as women unmet demand for modern contraceptives decreases with age. Two studies from Zambia and Nepal report that, the correlation between a woman's age and her unmet need changes across the reproductive age cycles. While unmet need is higher among women below the age of 34 years, it decreased with ages above 34 years. Interestingly, this negative correlation also holds between women age and her unmet need for spacing. This implies that as a woman gets older, the unmet need to space pregnancies decreases over the life time, Imasiku, et al. (2014), Paudel and Budhathoki, (2011). In Zambia, a positive correlation was found between age of women and unmet needs for those below the age of 34 years and negative for those 34years and above. Most quantitative studies also report that, a woman's level of education is inversely associated with her unmet need for limiting, unmet need for spacing and her total unmet need. Women with basic level of education were more likely to have higher unmet need than their counterparts with higher level education. This pattern was reported by other studies from Sudan and other countries within Sub Saharan region. However, in the case of Eritrea, higher educational levels were found to be associated positively with unmet need for limiting but negative with spacing and total unmet needs, Palamuleni (2013); Bankole et al. (2014); Imasiku et. al. (2014); Hailemariam and Haddis (2011).

Kanitkar and Radkar, (2000) study on India, Kost and Forrest, (1995) study on United States also identified the Age of women, Religion, economic status of women, place of residence and education level of women as important demographic variables that influence unintended fertility. They concluded that for India, increases in women age is associated positivey with unwanted pregnancies and negatively with mistimed pregnancies. They also concluded that urban women were more likely to report more unwanted births than rural women. Similar findings were found for the Age of women at her first brith. Studies have indicated that the younger a women age at her first births, the higher is the probability of unwanted pregnancies during her subsequent births interval. Kidane, (1986); Singh, (1999), also identified marital status, number living children as other demographic factor that are associated with unintended pregnancies. Other studies identified exposure to mass media, such as newspaper, Radio or television, Decision making power on contraceptive use, husband's occupation to have influenced unintended pregnancies, Singh, (1999); Weller et.al., (1993); Blanc, (1982); Ram, (2001). Wulifan et al. (2018) analyzed the GDHS Data using a logistic regression and found that women's age, ideal number of children were less likely to experience unmet need. However, women preferred number of children, number of unions and number of living children, residing in a rural area and being employed were associated with lower risk of unmet need for spacing. They recommended the strengthening of contraception services in order to address the various age specific needs and women within the different socio-demographic could help to reduce unmet need. In general, the education level of women seems to have a much stronger effect than the partner's education on contraceptive use, Woldemicael and Beaujot, (2011); Prateek and Saurabh (2012). Also, a woman's ability to take decision about family planning was found to have decreased both unmet need for spacing and limiting in Eritrea compared to a setting where most decisions are taken by men, Woldemicael and Beaujot (2011); Mosha et al. (2013); Bawah, et al. (1999). Nevertheless, in societies with restrictive gender norms, women managed coping strategies on reproductive

health such as the secret use of contraception, Mosha et al. (2013); Kaida, et al. (2005); Bawah et al. (1999). Access to information services and availability on family planning were found to be negatively associated with all the categories of unmet need for family planning, Kaida et al. (2005); Bawah et al. (1999). Health service factors, such as family planning provider behaviour (friendliness towards clients), quality of care given, user fee payments, and proximity to family planning centers were frequently identified to influence contraceptive use, Bongaarts and Bruce (1995); Westoff and Bankole, (2000); Casterline et al. (2001).

At the health services level, a review of studies showed varying contributory factors to unmet need. From a demand perspective, users of family planning service mostly feel that they were rudely treated by family planning officials, confidentiality, inadequate family planning centers, Kaida, et al. (2005); Hall, et al. (2008); Plummer et al. (2006), and language barrier between clients and family planning official, Ward, et al. (1992); Kaida, et al. (2005). Substantial gaps exists in identifying potential demographic factors that impact of unintended fertility or Unmet needs. Unmet need reduction has been detected to be one of the crucial elements in improving woman’s reproductive health as captured in the Sustainable Development Goals, SDGs 2030, Horayangkura, (2015); Kols, (2008). Other discovered measures such as significant political will, designing of specific guidelines for encouraging contraceptive use for the varied population groups/rural settings are recommended for enhancing contraceptive use, Casterline et al. (1997); Bongaarts and Bruce, (1995).

**Theoretical Framework**

The theoretical framework used in this paper analyzed the set of factors that influence unintended fertility (Unmet Needs). It shows the extent of disparity between a women/couples family intention against their use of modern contraception. The concepts categories all predictor variables of unmet needs into four categories following the Genene, et. al. (2008), revision on factors affecting unmet needs as; demographic variables, socioeconomic variables, programmes variables and facility related variables as influencing each other. These four sets of predictors’ variables together influences the proximate variables which intend influence unintended pregnancies. Following this framework, we attempt to model the concept as both an unmet demand for family planning services and also as demand for unintended fertility. Theoretically, we view the women as a consumer not intending further births or want to postpone birth by at least two years but are not using any form of contraception. Hence, unmet need becomes a health outcome/indicator produced by the household productions function with inputs as predictor and proximate factors following a modification to the Grossman (1972) model of the health production function. Grossman (1972a, 1972b) used the household production framework to develop a model of the demand for health. He defined health as a durable capital stock and implied that the end product is not just health as such but an outcome indicator of health defined in this study as unintended fertility or unmet Needs. Using the Grossman (1972) theoretical formulation of health production function, we can specify a relationship between health outcome (unintended fertility or unmet needs) and health inputs as formulated by Fayissa and Gutema (2005) and used in Arthur and Oaikhenan (2017). This model is designed for analysis of health production at micro level but can also be applicable in macro analysis as follows;

$$H = F(X) \dots\dots\dots (1)$$

Where H is individual health indicator (unintended fertility or unmet needs) and X is a vector of health production inputs such as demographic factors, programmatic, facility level as well as proximate factors. In its simplest form, we specify the function as;

$$H = f(D, P_g, F, P_r) \dots\dots\dots (2)$$

Where H is defined as health outcome/indicators; unmet needs for contraception/unintended fertility and following review of empirical literature, D is a vector of demographic characteristics of the women such as; ages of woman, number of surviving children and religion, woman education, occupation, woman status, wealth status, Pg. captures programmatic variables to include woman exposure to media such as newspaper, radio, and television, F is a vector of facility level variables such as fertility preference, decision making power, perceive satisfaction with family planning services, appropriateness of cost of family planning services, perceived quality and distance to family planning facility. Pr. is a vector of proximate variables capturing Knowledge of family planning, discussion of family planning with partner, woman approval, husband approval as well as fertility preference. In a scalar form, the model can be written as;

$$H = f(D_1, \dots, D_n, P_{g1}, \dots, P_{gn}, F_1, \dots, F_n, P_{r1}, \dots, P_{rn}) \dots \dots \dots (3)$$

N is defined as the number of variables in each category with its own characteristics.

**Methodology**

Three empirical models are estimated in this study. In model I, the dependent variable; Unmet needs is categorical and coded as; 0 =no unmet need, 1=unmet need of spacing, 2=unmet needs for limiting and estimated using multinomial logistic regression. In model II, the outcome variable is treated as a dichotomous and code as; 0=No unmet Needs, 1=Total unmet need and in Model III, unmet need is treated as dichotomous and coded as 0=unmet need for spacing and 1= unmet need for limiting. Model II and III are estimated using logistic regression. Four level variables have been identified in literature to have influenced unintended fertility over time, Genene, et. al. (2008). These include; demographic variables (current age of woman, Age at first birth, type of place of residence, religion, wealth index, women education), Programmatic variables (exposure to media; newspaper, radio and television), Facility related variables (distance to get medical attention, cost of contraception, Convenience to health facility, permission to seek medical care,) and proximate factors (fertility preference, decision making on contraceptive use, partners approval, respondent approval). The logistic regression takes the form;

$$Pr ob(Y = 1 / X) = \wedge(XB) = \frac{\exp(XB)}{1 + \exp(XB)}, \dots \dots \dots (4)$$

Where  $\wedge$  indicates a link function, the cumulative standard logistic distribution function. This model can then be empirically estimated using the Maximum Likelihood Estimation (MLE) techniques. Mathematically, logistic regression estimates of a multivariate regression function defined;

$$Logit(P) = Log\left(\frac{p(y = 1)}{1 - (1 = 1)}\right) = \beta_0 + \beta_1.X_{i2} + \beta_2.X_{i2} + \dots + \beta_p.X_{in} \dots \dots \dots (5)$$

For i = 1.....n.

**Data Sources**

The study used secondary data from 2014 Ghana Demographic and Health Survey (GDHS) data. The GDHS is a cross-sectional nationally representative survey that forms part of the global demographic survey that divides all enumeration areas in Ghana into 427 clusters with approximately 30 households each. It sampled 216 and 211 urban and rural enumerations areas respectively. Several questions were asked to gather useful and policy relevant information on the demographic and health indicators of both men and women. These surveys gathered information on fertility, marriage, sexual activity, fertility preferences, awareness and use of family planning methods, breastfeeding practices, nutritional status of women and children, child mortality, maternal and child health, awareness and behaviour regarding HIV/AIDS, and other

sexually transmitted infections (STIs).

### **Variable Definition and Descriptive Statistics**

The outcome variable is unintended pregnancies and is used as a proxy for unmet need. Women age 15-49 years in the survey were asked specific questions regarding their fertility intentions and their use of contraception's. Women of reproductive age (15-49) who are either married or in a union, who want to stop birth or delay childbearing but are not using any method of contraception were classified as having unmet need. They included women whose pregnancies are mistimed and non-pregnant, fecund women, who want to give birth after two years, or those who are not sure they want to be pregnant (unmet need for spacing) and women whose pregnancies are unwanted or who want no more children (unmet need limiting). It excludes non-pregnant women who are infecund, women who were no married women or having sex in the last 30 days and pregnant women whose pregnancies are intended. The GDHS categories several responses into nine groups made up of 22,956 women. Categories 1, 2 and 7 were grouped as unmet needs for spacing (2,821 women, 12.29%), unmet need for limiting (3,728 women, 16.245%), and no unmet need (4,610 women, 20.08%) respectively and were maintained for the purpose of the analysis. The other categories (3-6 and 8-9) such as; 3= using contraceptives for spacing (2,616 women, 11.4%), 4= using for limiting (3,338 women, 14.54%), 5= spacing failure (172 women, 0.75%), 6=limiting failure (116 women, 0.51%), 8=not married and no sex in last 30 days (1,543 women, 6.72%), 9= infecund/menopausal (4,012 women, 17.48%) were dropped from the study. Model I, the responses were categorized into threes; 0 if woman had unmet need for spacing, 1 if unmet need for limiting, 7 if woman had no unmet needs. And it was found that 25.37% of these women had unmet needs for spacing, 33.21% had unmet need for limiting, making a total unmet need of 58.6% and 41 % had no unmet need. In Model II, we included unmet need as a dichotomous variables code 0 if woman had no unmet needs and 1 if women had unmet needs and out of the 11,148 women who were sampled for the survey, 58.67 percent of them were recorded as having unmet need compared with the remaining 41.33 that had no unmet need. In model III, women with unmet need were categorized by type of unmet needs. 0= unmet needs foe spacing (2,762 women, 25.37%) and unmet needs for limiting (3,615 women, 33.21 %) given a sample of 6,377 women.

The independent variables are grouped into woman demographic and socioeconomic variables, programmatic variables; facility related variables as well as proximate variables based on the revision by Genene, et. al. (2008). The demographic variables used include; Current Age of respondents which indicates the age of women in 5-year groups in the GDHS. However, in this study, the age of respondents was recoded into three as 15-24 (6.84%), 25-34 (37.03%) and 35-49 (56.13%). Age at first birth and number of living children variables are in original continuous structure as appeared in the GDHS. Women age at first birth had a range of 11-41 years with a mean age of 19.58 and standard deviation of 3.86 while the number of living children had a mean of 4.28 children and a standard deviation of 2.01 with range of 0-13 children. Women highest educational attainment: Respondents are classified in terms of their education as having, no education, primary and secondary education or higher. 46.9% of these women had no education, 19.32% had only primary education and 33.78% had secondary school or higher. Religious Affiliation describes the religious practice of the woman, they are categorized in three; women who are affiliated to Christian, Islamic and traditional religions. 65.31% of the respondents were found have been affiliated with the Christian religion while 23.78 % and 10.91% were affiliated with the Islamic and traditional religion respectively. Type of place of residence-this describes the residential location of the woman as either 0=urban or 1=rural. It was estimated that 63.25 % of the women live in rural areas. Wealth index-This is a composite measure of a household's cumulative living standard and is calculated using easy-to-collect data



on a household's ownership of selected assets, such as televisions and bicycles; materials used for housing construction; and types of water access and sanitation facilities. This is coded into 5 grouped as; 1=poorest, 2=poorer, 3=middle, 4=richer and 5=richest in the GDHS. We found 60.2% of the women were poor, 22.86% were rich while 16.94 were in the middle wealth group. Respondent's occupation is classified as either: not employed, professional/clerical/services, Sales, Agriculture-self-employed/employee and Skilled/Unskilled Manual. This study recoded occupation as 0=unemployed (1363 women, 12.54%) and 1=employed (9507 women, 87.46%) and included; professional/clerical/services, Sales, agriculture -self-employed/employee and Skilled/Unskilled Manual).The next set of variables were the programmatic (Exposure) variables that captures respondents frequency of exposure/use of media such newspaper, radio and television. Reponses were coded originally as 0=not all and 1=less than once a week. We recoded these variables yes 0=No exposure 1= have exposure. We found 93.9% were not exposed to newspaper, 78.64 were exposed to radio and 55.31% were exposed to television. At Facility level variables, women were asked whether they had problems or not seeking medical, and we found 93.32% of women not having a big problem seeking care and it was code Yes/ No. We also include convenience to facility found that 91.66% see it convenient to get to facilities. Another facility variable was the cost to use contraceptives and found many of the women do not see cost to use as a problem (6635 women, 94.79%). The last sets of variables used were the proximate variables. We used Fertility preference to measures whether or not the respondents have preference for another child. It is indicated 1 if respondent wants another, 2 if undecided and 3 if respondent no more want children and we dropped don't know responses. 45.71% no more wanted children, 44.88% want to have another and only 9.41% were undecided. Women were also asked were they opposed to using contraceptive and we found 93.03% not to have opposed and we further asked whether their partners were also opposed to using contraceptive and also found 94.94% were not opposed. These were also grouped 0=No Opposed ad 1=Opposed. This statistics are presented in Table 1 in the appendix.

### Empirical Results and Discussion

The empirical model estimations. Three empirical models measuring the potential demographic influence on unintended pregnancies are estimated. Model I is a multinomial logistic regression model with categories as 1= unmet need for spacing 2=unmet needs for limiting and 7= No unmet need (base outcome). The results for this model are expressed in equation one (Eqn.1) and equation two (Eqn.2). Model II presents a logistic regression estimates for total unmet needs =1 and No unmet need = 0 as shown in equation three (Eqn.3) while Model III focused on only women who reported unmet needs with a binary outcome; unmet need for Spacing=1 and unmet for limiting=0 and estimated using logistic regression as shown in equation four (Eqn.4).

**Table 1: Multinomial and Logistic Regression Result**

Independent variables	(Eqn.1) Spacing	(Eqn.2) Limiting	(Eqn. 3) Total	(Eqn.4) Type (SP)
<b>Age of Woman (15-24)</b>				
25-34	0.0130 (0.0875)	1.118*** (0.143)	0.220*** (0.0787)	-2.330*** (0.225)
35-49	-0.198 (0.145)	2.646*** (0.167)	1.206*** (0.108)	-4.244*** (0.310)
<b>Age at first birth</b>	0.0257** (0.0110)	-0.115*** (0.0126)	-0.0390*** (0.00870)	0.207*** (0.0268)
<b>Religion (Christians)</b>				
Islam	-0.0753 (0.0942)	-0.281** (0.113)	-0.122 (0.0761)	0.0194 (0.255)
Traditional	-0.453***	0.133	-0.305***	-0.820**



	(0.125)	(0.139)	(0.0934)	(0.395)
<b>Number of Unions(Once)</b>				
More than once	0.195*	-0.0248	0.121	0.508**
	(0.0998)	(0.0984)	(0.0749)	(0.205)
<b>Place of Residence( Urban)</b>				
Rural	-0.00856	0.303***	0.159*	-0.0652
	(0.110)	(0.114)	(0.0835)	(0.233)
<b>Marital Status (Living)</b>				
Living Elsewhere	0.379***	0.699***	0.487***	-0.0137
	(0.109)	(0.123)	(0.0887)	(0.208)
<b>Wealth Index (Poorest)</b>				
Poorer	0.803***	0.224**	0.462***	0.994***
	(0.111)	(0.109)	(0.0831)	(0.262)
Middle	0.403***	1.017***	0.675***	0.600*
	(0.140)	(0.154)	(0.107)	(0.310)
Richer	0.627***	1.439***	0.968***	-0.194
	(0.178)	(0.194)	(0.138)	(0.414)
Richest	0.664***	1.132***	0.820***	-0.000945
	(0.202)	(0.207)	(0.155)	(0.453)
<b>Women Education (No Educ.)</b>				
Primary	0.318***	0.725***	0.509***	-0.943***
	(0.114)	(0.122)	(0.0877)	(0.258)
Secondary or Higher	0.317***	0.763***	0.532***	-0.821***
	(0.117)	(0.123)	(0.0902)	(0.238)
<b>Women Occupation (Not)</b>				
Employed	0.0270	0.586***	0.222***	-0.247
	(0.101)	(0.132)	(0.0861)	(0.252)
<b>Programmatic/ Exposure</b>				
<b>Media: Newspaper (No)</b>				
Yes	-0.0535	-0.122	-0.125	0.0372
	(0.187)	(0.187)	(0.145)	(0.344)
<b>Media: Radio (No)</b>				
Yes	0.189**	0.514***	0.302***	-0.182
	(0.0939)	(0.103)	(0.0732)	(0.230)
<b>Media: Television (No)</b>				
Yes	-0.167*	-0.128	-0.142*	-0.229
	(0.0999)	(0.100)	(0.0754)	(0.204)
<b>Facility Level Variables</b>				
<b>Distance (Problem)</b>				
No Problem	-0.105	-0.298***	-0.164***	-0.0870
	(0.0818)	(0.0896)	(0.0634)	(0.190)
<b>Cost (No)</b>				
Yes	0.722***	-0.0855	0.153	0.326
	(0.192)	(0.159)	(0.139)	(0.341)
<b>Proximate Variables</b>				
<b>Husband Opposed (No)</b>				
Yes	-0.214	-0.359**	-0.271**	-0.513
	(0.146)	(0.168)	(0.115)	(0.513)
<b>Woman Opposed (No)</b>				
Yes	0.722***	0.661***	0.596***	0.139
	(0.147)	(0.188)	(0.125)	(0.344)
<b>Fertility Preference(want)</b>				
No more want	-2.189***	5.740***	0.437***	-8.394***
	(0.110)	(0.385)	(0.0724)	(0.422)

Constant	-0.643** (0.269)	-5.544*** (0.492)	0.0181 (0.215)	4.455*** (0.714)
Observations	6,867	6,867	6,867	4,978

Standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1  
Source: Authors Own Computation

Note

**Equation 1 and 2** are multinomial regression results with spacing need, limiting need and no need (reference group)

**Equation 3** is logistic regression with total need and no need (reference group)

**Equation 4** is logistics regression with spacing need and limiting need (reference group)

The estimates revealed that reproductive aged women between the aged of 25-34 and 35-49 respectively were more likely to report total unmet needs for contraception's and if they reported unmet need, then they were more likely to report unmet for limiting compared to women aged 15-19years as these coefficients were found to be statistically significant and positively associated with unmet need for limiting and total unmet needs as in equation Egn.2 and eqn.3. We also found that women positive and significant correlation between women aged 35-49 years and unmet need for limiting as they were more likely to report unmet needs for limiting and total unmet need. This implies that as women aged increased, they are more likely to reduce her unmet need for spacing but would increase their unmet needs for limiting. This confirm studies by Imasiku, et al. (2014), Paudel and Budhathoki, (2011) that found a positive correlation between age of women and unmet needs for those below the age of 34 years and negative for those 34years and above. It is therefore important that policy should aim at addressing age-specific needs for family planning purposes.

A significantly positive relationship was also found between women age at first birth and unmet need for spacing (Eqn.1 and Eqn.4) and a negative association with unmet need for limiting and total unmet needs (Eqn.2 and Eqn.3). This suggests that, women who gave birth at early ages were more likely to have no unmet need but if they reported any unmet needs, then they were more likely to report unmet needs for spacing. Therefore, measures should be put in place to limit early births as they may also report no unmet need. On religious affiliation and unmet needs, the study revealed that women who were affiliated to the Islamic religion were less likely to reports unmet need for spacing compared to those affiliated with the Christian religion as we found a significantly negative association between religion and unmet need for limiting. We also found a significantly negative relationship between traditional African religious worship and unmet need for spacing (E.1), total unmet need (E.3). This implies that women who worshipped the traditional religion were less likely to report unmet need and if they reported unmet need, they are also likely to report unmet need for limiting rather than unmet need for spacing compared with their Christian counterpart. Women who had more than one marriage union were found to have significant and positive relationship with unmet need for spacing thus they were more likely to report unmet need and if they reported unmet needs, then are were more likely to report having unmet need for spacing compared those who had one marital union. This supports the findings by Wulifan et al. (2018) that analyzed the GDHS data using a logistic regression and found that women's age, their preferred number of children, number of unions and number of living children, residing in a rural area were associated with unmet needs.

The type of place of residence also impacted on unmet need. We found that residing in rural areas had a significant and positive association with unmet need for limiting and total unmet need hence women who reside in rural areas were more likely to report total unmet need as well as unmet needs for limiting compared to women who resided in urban areas. Women who also living elsewhere other than with their partners were found to be significant and positively associated with unmet need for spacing, limiting and total unmet need. This imply that women who were married and living elsewhere were more likely to report total unmet need as well as both unmet needs for spacing and unmet needs for limiting. Similar results were found in Kidane, (1986); Singh, (1999), who identified similar demographic factors as marital status, number living children to have significant and positive association with unintended pregnancies. The socioeconomic status of women measured in wealth quintiles had a significant impact on unmet needs for contraception's. The study found that women within the poorer to richest wealth quintiles had significant and positively associated with unmet need for spacing, unmet need for limiting and total unmet need. Therefore, all women from the richer and richest wealth group were likely to report unmet need for limiting compared with women from poorest households. This imply that as women income level increases, they were more likely to report total unmet needs as well as report unmet needs for spacing and unmet needs for limiting. The study also identified a significant and positive correlation between women education and unmet need for spacing (Eqn.1), unmet for limiting (Eqn. 2), total unmet need (Eqn.3) and significantly negative association with unmet need for spacing (Eqn.4). This implies that women who had at least primary or secondary or higher education were more likely to report all forms of unmet needs and if they were to report an unmet need, then they were relatively more likely to report unmet need for limiting compared to women who had no education. These results are consistent with several empirical studies; Palamuleni, (2013); Bankole et al. (2014); Imasiku et. al. (2014); Hailemariam and Haddis, (2011) whose studies found that women with higher educational levels and higher wealth were associated positively with unmet need for limiting and total unmet need but negative with unmet needs for spacing. The employment status of women also had implication for unmet needs for contraception's. Among women who were employed, we found a significantly positively association between women who are employed and unmet need for limiting (Eqn.2) and total Unmet needs (Eqn.3) as they were more likely to report unmet need for limiting and total unmet need as we compared to those not employed at all.

Consistent with Singh, (1999); Weller et.al., (1993); Blanc, (1982); Ram, (2001), exposure to mass media, such as newspaper, Radio or television, Decision making power on contraceptive use, husband's occupation to have influenced unintended pregnancies. Our estimates on the programmatic/exposure to media particularly newspaper did not show any statistically significant association with unmet needs. The result however showed that women who were exposed to newspaper will likely to report no unmet need compared to those who not exposed to newspaper. We also found that women who were exposed to radio were significant and positively associated with unmet needs. This suggest that women who were exposed to radio were more likely to report total unmet needs, unmet needs for spacing and unmet need for limiting compared to women who were not exposed to radio. Also, among those women who had exposure to television, we found to be significant and negatively associated with unmet need for spacing, limiting and total unmet need. This implies that those women with exposure to television were likely not to have reported an unmet need compared to those who were not exposed to television and if they were to report, they were relatively more likely to report unmet need for limiting rather than for spacing.

On facility related variables, we found that women who were closer to health facility were associated negatively and significantly with unmet needs for contraceptives. This imply that women who were closer to health facility were less likely to report unmet need compared to women were saw distance to the health facility to be a big problem. Also, we found that where cost of contraceptive was a problem, women were more likely to report unmet need for spacing as we found a significant and positive association between cost and unmet need for spacing. Proximate factor has important impact on the demand for unintended fertility in Ghana. The study revealed that husband/partners opposition to contraceptive use was negative and significantly associated with unmet needs for limiting and total unmet need. In this case, women were more likely to report no unmet need if their partners opposed the use of contraceptives and if they to reported any unmet need, they were also likely to report unmet need for spacing. On the other hand, women opposition to contraceptive use were found to be positive and significantly associated with unmet need for contraception for spacing, unmet need for limiting and total unmet needs. This imply that women who opposed contraceptive use were more likely to report unmet need for spacing, unmet need for limiting and total unmet needs compared to women who did not opposed to contraceptive use. The study also found women/household who no more want another child were significant and positively associated with unmet need for limiting, total unmet need and if they were to report any unmet need, they were likely to report unmet need for limiting. However, a significantly negative relationship with unmet need for spacing compared to women who wanted another birth. This implies that women/ couples who no want additional child were more likely to report unmet need for limiting compared to women to wanted another child.

### **Conclusion and recommendation**

The study estimated the potential demographic impact on unintended fertility among reproductive aged women 15-49 in Ghana. This study assessed the associations between selected explanatory variables and unmet need in Ghana. We found that significantly positively associated between women aged 25-34 and unmet need for spacing, limiting and total unmet needs and also found a positive association between women aged 35-49 and unmet for limiting and total unmet need. The study revealed that women marital status, wealth index, women educational attainment, women occupation, exposure to radio, women opposition to use contraceptives were significant and associated positively with unmet needs for spacing, limiting and total unmet needs. However, we found religion, exposure to newspaper and television, distance to facility, husband opposition to contraceptive use to be significant and negatively associated with unmet need for spacing, limiting and total unmet need with the exception of exposure to newspaper that was insignificant. The results further suggest some significant variations in association between women age, age at first birth, number of marital unions, cost of contraception's, fertility preference and unmet need for spacing, limiting and total unmet needs for contraception. We recommend that constant public health education on the importance of contraception at both micro and meso level could play a very important and strategic role in reducing the high levels of unmet need for contraceptives in Ghana. Policy should also support faith-based and community-based initiatives on family planning programmes to serve all rural population. Policy should target the age-specific needs of the population for the purpose of family planning as women age is associated with variation in different types of unmet needs for contraception. It is therefore important that policy should target reducing early births through the promotion of family planning programmes. Policy should encourage and support discussions of family planning programmes more frequently on radio and television so as to increase knowledge and awareness on the use of family planning services. Achieving reduction in unmet needs for contraception could entail the involvement of both sexes on issues involving family

planning services as husband opposition to contraceptive use is associated significantly with unmet needs and this requires more of a significant political will than reproductive health intervention in the designing of specific guidelines for encouraging contraceptive use for the varied population groups particularly in rural locations. Promoting girl child education and women empowerment could significantly reduce unmet needs for contraceptives in Ghana.

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