Spatio-temporal patterns of unmet need for family planning in Ghana: 2003-2014

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Abstract

Ghana has long prioritized family planning as the key strategy for improving health and socioeconomic development. However, despite the heavy investments in the sector over the last decade, the family planning program has not seen much success in improving the country's family planning indicators. This study seeks to describe the spatial and temporal patterns in unmet need for family planning in Ghana from 2003 to 2014. It also seeks to ascertain the sociodemographic determinants of these patterns at the regional level. This study is based on data from the 2003, 2008 and 2014 Ghana Demographic and Health Surveys. Geographic Information System (GIS) techniques in the R programming language were used to map the spatial and temporal trends while multilevel logistic regression models were used to ascertain the determinants of the patterns of unmet need at the regional level. The results show that there are considerable regional disparities in unmet need for family planning for the study period. These disparities exhibit various patterns for the ten regions in the country over the study period. There have been both negative and positive changes in the unmet need rate for the regions over the period. At the regional level, the patterns of unmet need are significantly determined by age, marital status, ethnic background, wealth status, work status, parity and survey year. In conclusion, the patterns of unmet need for family planning in the regions of Ghana are inconsistent and unsustainable and are significantly determined by various sociodemographic factors. Specially-tailored family planning policies to tackle attitudinal resistance from women and accessibility are needed.

Introduction

It has been observed that many women of reproductive age in developing countries worldwide are seeking to prevent or postpone pregnancy; however, they are not using any contraceptive

methods. These women are considered to have an unmet need for family planning because they are sexually active and want to avoid becoming pregnant but are not using contraception (Sedgh, Ashford, & Hussain, 2016). In the developing countries, between 8% and 38% of married women aged 15–49 years are found to have an unmet need for family planning (Sedgh et al., 2016).

Over the past decade, rising rates of contraceptive use have reduced unmet need for family planning in most developing countries, but the unmet need remains persistently high. This is probably because contraceptive use is much low in the developing countries (40%) and is particularly lower in Africa (33 %) (United Nations, 2015). In sub-Saharan Africa, the unmet need for family planning was highest (24 %), double the world average in 2015 (United Nations, 2015). However, research has established that reducing unmet need for family planning by improving upon family planning provides several benefits such as saving the lives of women and children; offering women more choices; and encouraging adoption of safer sexual behavior. This impacts positively on population growth and helps protect the environment and aids its development (Upadhyay & Robey, 1999). Thus, understanding unmet need for family planning is central for effective family planning policies and programs that aim to help women and couples to choose the number and timing of their children (Guttmacher Institute, 2016).

In spite of the steady decrease in the unmet need for family planning worldwide, wide disparities in the level of unmet need for family planning are still evident among some developing countries (United Nations, 2015). Ghana is, currently, one of the sub-Saharan African countries with high unmet needs for family planning. Since its inception in 1969, the Ghana National Family Planning Programme (GNFPP) has implemented a number of programs such as the contraceptive social marketing program and the family planning and health program. However, GNFPP has seen little success due to the myriads of challenges including

a dearth of skilled personnel and insufficient government funding among others (Ghana Health Service (GHS) & UNFPA, 2015). Furthermore, in spite of the substantial investments it received over the last decade, Ghana has not been able to record marked and constant improvements in its family planning indicators (Ghana Health Service (GHS) & UNFPA, 2015). It has, therefore, been noted that understanding how desired family size, contraceptive use, and levels of unmet need change over time helps countries set service priorities in family planning programs (UNFPA & PATH, 2008). Consequently, this study seeks to answers the following research questions: what are the spatial and temporal patterns of unmet need for family planning in Ghana from 2003 to 2014? Do sociodemographic factors at the regional level have an effect on the patterns of the individual-level unmet need for family planning? The first research question seeks to ascertain the disparities in unmet need among the ten regions of the country over time and estimate the percent change in unmet need for family planning in 2003-2008 and 2008-2014. The latter question seeks to determine the predictors of the pattern of unmet need for family planning at the regional level over the study period.

Materials and methods

Data and study population

This study draws on individual data from the 2003, 2008 and 2014 Ghana Demographic and Health Surveys. This is to allow for a temporal analysis of the subject while also focusing on regional disparities for each survey year. The study also used Ghana Geographic Information System (GIS) data in the form of shapefiles from the spatial data repository of the DHS Program. This study is limited to only women of reproductive age (married and unmarried) who were sexually active. As a result, women who had never had sex and infecund women, as well as women in menopause, were excluded from the study. This is to provide a fair picture of the state of unmet need for family planning in the country over the study period.

Study variables

The outcome variable is an unmet need for family planning which includes the unmet need for spacing, limiting, spacing failure and limiting failure as against women who had met the need for family planning which generated a binary outcome. Sociodemographic and spatiotemporal variables were also included in the study and recoded as follows: age (15-19, 20-29, 30-39, 40-49), level of education (No education, primary education, secondary/higher), religious affiliation (Christianity, Islam, Traditional, Other), ethnicity (Akan, Ga-Dangme, Ewe, Mole-Dagbani, Other), wealth status (Poor, middle, rich), marital status (Never married, Married/living together, widowed/divorced/separated), work status (working, not working), parity (0, 1-2, 3-4, 5+), type of residence (urban, rural) and year of survey (2003, 2008, 2014).

Analytical strategy

The analysis was done using the R programming language (version 3.5.1). The three datasets were merged and the outcome variable was recoded into "Unmet need=1" and "Met need=0". The merged data were then linked to the shapefiles and then reshaped for use. A basic multilevel logistic regression model was fitted at the regional level for each survey year to generate the regional proportions. Also, a function was created to calculate the percent change in unmet need with its direction of change for the years 2003-2008 and 2008-2014. These proportions were all mapped using the required mapping packages in R. Two multilevel logistic regression models were then fitted to assess the sociodemographic and spatiotemporal factors influencing the patterns of unmet need for family planning over the period.

Results

Socio-demographic characteristics of respondents

Descriptive results on the background characteristics of the respondents have been presented in Table 1 for each of the survey years as well as all the years combined. On the whole, the large proportion of the respondents comprised women aged 20-29(39.9%) and 30-39(36.0%)

while more than half of the respondents had secondary school or higher education (53.9%) whereas 26.4% had no formal education.

Table 1: Percent of respondents by socio-demographic characteristics: 2003 - 2014

Characteristics	2003	2008	2014	All Years
Age				
15-19	20.2	20.8	17.3	6.6
20-29	34.5	34.8	34.2	39.9
30-39	26.8	26.1	28.4	36.0
40-49	18.5	18.3	20.1	17.5
Education level				
No education	28.2	21.2	19.1	26.4
Primary education	20.0	20.1	17.8	19.7
Secondary/higher	51.8	58.7	63.1	53.9
Religious affiliation				
Christianity	97.0	77.5	80.1	83.3
Islam	2.7	15.0	15.2	12.0
Traditional	0.1	4.2	2.0	2.3
Other	0.2	3.3	2.7	2.4
Ethnicity				
Akan	52.3	53.2	52.4	51.5
Ga-Dangme	8.2	7.0	7.7	7.2
Ewe	13.1	12.9	13.5	13.5
Mole-Dagbani	12.8	16.1	14.8	15.6
Other	12.6	10.8	11.6	12.2
Wealth status				
Poor	33.7	34.3	33.5	36.9
Middle	18.8	19.9	20.6	19.8
Rich	47.5	45.8	45.9	43.3
Marital status				
Never married	28.4	32.4	32.9	12.0
Married/living together	62.4	58.5	56.6	84.2
Widowed/divorced/separated	9.2	9.1	10.5	3.8
Work status				
Working	75.2	75.3	73.5	83.1
Not working	24.8	24.7	26.5	16.9
Parity				
0	31.6	33.7	31.3	15.2
1-2	26.0	27.0	28.2	33.0
3-4	20.1	20.8	21.5	27.5
5+	22.3	18.5	19.0	24.3
Residence				
Urban	48.4	48.5	53.8	46.6
Rural	51.6	51.5	46.2	53.4

Also, the majority of the respondents were affiliated with the Christian religion (83.3%) and more than were Akans (51.5%). With regard to wealth, more than one-third of the respondents were from poor households (36.9%) whereas 43.3% were from rich households. The majority of the respondents were either married or living together with their partners (84.2%) while the majority were also working (83.1%) at the time of the surveys. About a third

of the respondents had 1-2 (33.0%) children and more than a fifth had 5 or more children (24.3%) whereas 15.2% had no children. Lastly, more than half of the respondents were living in rural settings (53.4%).

Spatial and temporal variations of unmet need for family planning in Ghana

The spatial and temporal patterns of unmet need for family planning have been pictorially presented in Figure 1 and 2 below. In Figure 1, the maps show that there were wide regional disparities in unmet need for family planning for 2003, 2008 and 2014. In 2003, the Central region, the Eastern region, the Volta region, and the Upper East region had the highest unmet need for family planning between 42% and 55% whereas the Upper West region had the lowest unmet need (<33%). The Western region, Central region, and the Eastern region also had the highest unmet need for family planning (42%-55%) in 2008, whereas the Greater Accra and the Upper East region had the lowest unmet need (<33%). In 2014, however, the Eastern region had the highest rate of unmet need for family planning, followed by the Ashanti region and the Volta region whereas regions such as the Western, Brong Ahafo, Upper East and the Upper West had the lowest unmet need for family planning (<33%). In the same year, sexually active women in the Ashanti region and the Volta region had between 37% and 42% unmet need for family planning.

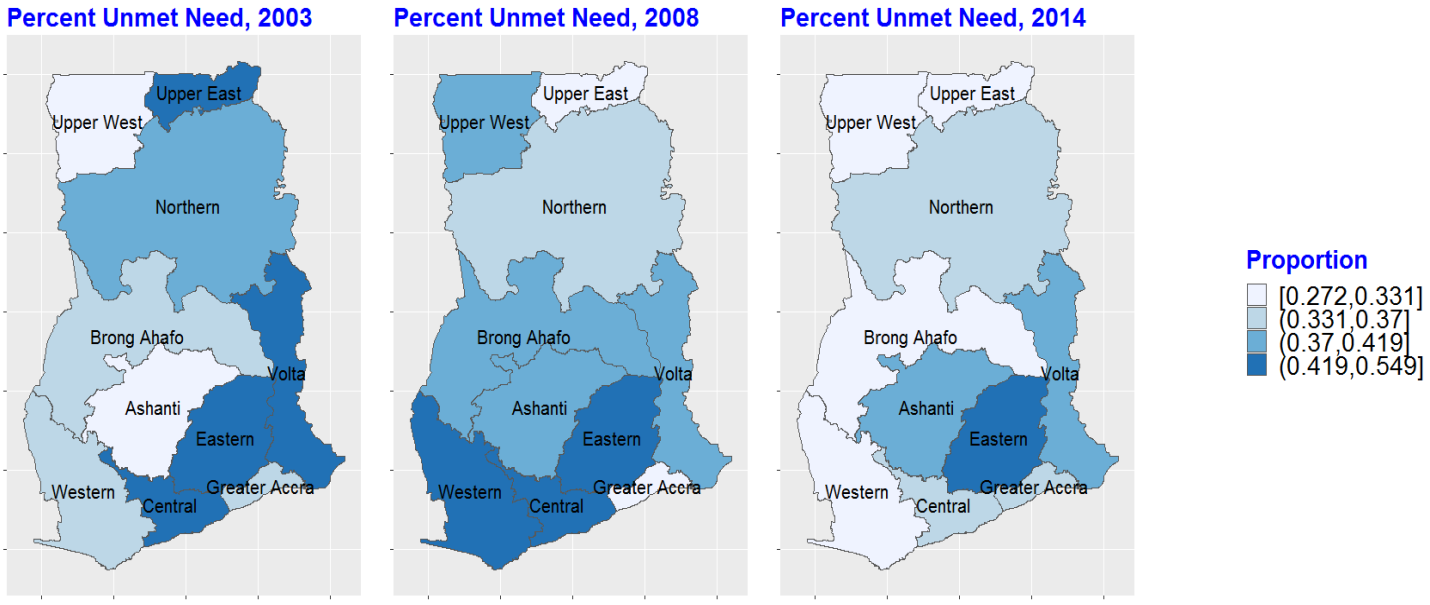

Figure 1: Spatio-temporal variations in unmet need for family planning in Ghana

With regard to percent change in unmet need for family planning between 2003 and 2008, Upper East region had the highest decrease in unmet need by 7.8% to 18% followed by the Greater Accra region and the Volta region by 2.5% to 7.8%. Regions such as the Central and the Northern only had slight reductions (0.68%-2.5%) in unmet need over the period. On the contrary, the Western region, Ashanti region, Upper West region, Eastern, and the Brong Ahafo were the regions having an increase in unmet need of up to 11% for the period (Figure 2). Furthermore, for the period 2008-2014, the Brong Ahafo region, Western region, and the Central region made some reductions in unmet need between 7.8% and 18%, while the Northern and the Upper West region had reductions up to 7.8%. However, there was an increase in the unmet need for family planning of up to 11% in the Greater Accra region, Eastern region and the Volta region for the period 2008-2014.

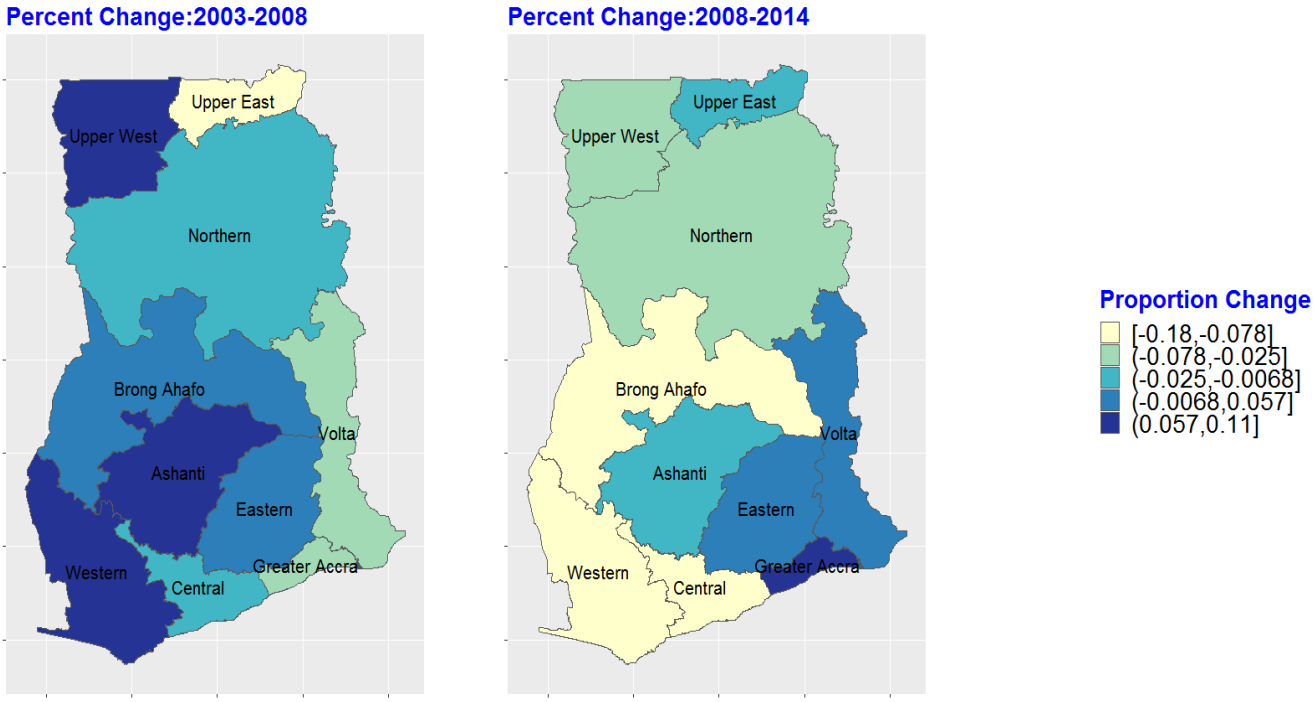

Figure 2: Percent change in unmet need for family planning in Ghana: 2003-2014

Multilevel analysis of unmet need among women in Ghana

In this section, logit multilevel analysis was performed to ascertain the predictors of the patterns of unmet need for family planning in the country at the regional level (Table 2). The age of the woman was found to be consistently significant in the two models fitted in the analysis. Women aged 20-29(OR=0.45), 30-39(OR=0.32), and 40-49(OR=0.38) all had significantly lower odds of having an unmet need for family planning compared to women aged 15-19. However, in both models, the level of education of a woman never had any significant effect on the pattern of unmet need for family planning among women, albeit the highly educated seemed to have lower odds. Likewise, the religious affiliation of a woman had no significant effect on the unmet need for family planning in both models. The ethnic background of a woman, however, was significantly related to the unmet need for family planning in both models. Ga-Dangme (OR=1.30) and Ewe (OR=1.15) women both had higher odds whereas Mole-Dagbani (OR=0.86) women had lower odds compared to Akan women in both models. With regard to

wealth status, women from rich households (OR=0.76) had significantly lower odds of unmet need in both models compared to their counterparts from the poor households.

Table 2: Multilevel logistic regression models of unmet need among women in Ghana

Variables	Model 1	Model 2
Age (Ref=15-19)	**OR(95% CI)**	**OR(95% CI)**
20-29	0.44(0.36, 0.52)***	0.45(0.37, 0.53)***
30-39	0.31(0.25, 0.80)***	0.32(0.26, 0.39)***
40-49	0.37(0.29, 0.46)***	0.38(0.30, 0.48)***
Education level (Ref= No education)		
Primary education	1.03(0.91, 1.16)	1.04(0.92, 1.17)
Secondary/higher	0.90(0.80, 1.01)	0.92(0.82, 1.03)
Religious affiliation (Ref= Christianity)		
Islam	1.04(0.91, 1.17)	1.05(0.92, 1.18)
Traditional	0.96(0.76, 1.21)	0.94(0.74, 1.19)
Other	0.83(0.65, 1.05)	0.84(0.65, 1.07)
Ethnicity (Ref= Akan)		
Ga-Dangme	1.30(1.08, 1.55)***	1.30(1.08, 1.55)***
Ewe	1.16(0.99, 1.35)*	1.15(0.99, 1.35)*
Mole-Dagbani	0.85(0.72, 0.99)*	0.86(0.74, 1.01)*
Other	0.90(0.80, 1.04)	0.93(0.80, 1.08)
Wealth status (Ref= Poor)		
Middle	1.04(0.93, 1.16)	0.99(0.88, 1.12)
Rich	0.84(0.75, 0.93)**	0.76(0.67, 0.88)***
Marital status (Ref= Never married)		
Married/living together	1.18(0.99, 1.41)*	1.15(0.96, 1.37)
Widowed/divorced/separated	0.45(0.34, 0.62)***	0.46(0.33, 0.61)***
Work status (Ref= Working)		
Not working	1.22(1.10, 1.36)***	1.25(1.12, 1.40)***
Parity (Ref= 0)		
1-2	1.95(1.65, 2.30)***	1.99(1.68, 2.35)***
3-4	2.66(2.20, 3.20)***	2.71(2.25, 3.27)***
5+	3.86(3.14, 4.74)***	3.95(3.21, 4.85)***
Type of residence (Ref= Urban)		
Rural		0.90(0.81, 1.01)
Year (Ref= 2003)		
2008		1.10(0.99, 1.23)*
2014		0.83(0.76, 0.92)***
Region – Random intercept variance	0.15	0.16
Deviance	15068.6	15030.2

Note: Ref= Reference Category; OR= Odds ratios * p≤0.05; **p≤0.01; *** p≤0.001

Women who were widowed, divorced or separated (OR=0.46) had significantly lower odds in both models whereas married or cohabiting women (OR=1.18) had significantly higher odds in model 1 compared to women who were never married. Also, the work status of a woman had a significant impact on the level and pattern of unmet need for family planning in

both models for the study period. Unemployed women had 25% higher odds of having an unmet need for family planning compared to their employed counterparts. The number of children ever born (parity) was also found to have a considerable effect on the unmet need for family planning. Women who had 1-2 children (OR=1.99), 3-4 children (OR=2.71) and 5 or more (OR=3.95) children had significantly higher odds of unmet need for family planning compared to women who had no children in both models. Even though rural women had 10% lower odds of having unmet need, the results indicate that the type of residence of a woman had no significant role to play in unmet need for family planning. The study also found some significant temporal variations, where women had 10% higher odds of having unmet need in 2008 but had 17% lower odds of having unmet need in 2014 compared to 2003.

Discussion

This paper seeks to describe the regional variations in unmet need for family planning among women in Ghana from 2003 to 2014. The maps in the study indicate that there are considerable regional disparities in unmet need for family planning in the country over the study period. The patterns of unmet need for family planning are inconsistent and diverse over time. In effect, four main patterns of change in unmet need for family planning can be observed among the regions over the study period – negative pattern, positive pattern, U-shaped pattern and an inverted U-shaped pattern which is a sign of mixed policy outcomes in the country over the period. Similar outcomes were also observed in Ghana from 1988 to 1998 (Govindasamy, & Boadi, 2000) and in Kenya from 1993 to 2003 (Ojakaa, 2008). It is an indication that no consistent results have been achieved in the country in terms of reducing unmet need for family planning over the past three decades. This, it has been observed, is not only as a result of lack of access to contraceptive methods, but also due to an increase in attitudinal resistance to

contraceptive methods mainly because of previous experience of side effects (Ajong et al., 2016; Machiyama, & Cleland, 2014).

The study went further to examine the socio-demographic factors affecting the variations in unmet need for family planning at the regional level. It was found that the age of a woman has a considerable effect on the variations in unmet need for family planning among the regions. It is apparent that the likelihood of having an unmet need for family planning is highest for the women in teenage as the risks significantly reduce with increasing age, albeit they increase non-linearly. This confirms the findings of a number of similar previous studies from other countries (Ayele, Tesfaye, Gebreyes, & Gebreselassie, 2013; Oginni, Ahonsi, & Adebajo, 2015; Wulifan, Brenner, Jahn, & Allegri, 2016). In the context of the age of the woman, the highest risk that is observed among the teens may probably be due to cost and lack of access as many women in this age category are likely economically inactive and for this reason, they cannot afford the family planning services, unlike the older women. There were also marked ethnic background disparities in unmet need for family planning at the regional level with Ga-Dangme and Ewe women becoming more likely whereas Mole-Dagbani women become less likely to have an unmet need than their Akan counterparts. Similarly, considerable ethnic disparities in unmet need for family planning have also been observed elsewhere in Nigeria (Alaba, Olaomi, & Olubusoye, 2015). There is, therefore, no a quite clear explanation for these ethnic disparities in unmet need for family planning; however, this is a reflection of the high prevalence of unmet need in the Eastern region and the Volta region shown in the map which are the respective native lands of these ethnic groups.

Quite unsurprisingly, women from rich households seem to have a significantly lower risk of having an unmet need for family planning than the women who were from poor or less rich households. This is expected because this category of women have the economic power to access and patronize family planning services than their counterparts. The significant effect of

a woman's household wealth status on unmet need for family planning is well-documented in the extant literature (Alaba et al., 2015; Ayele et al., 2013; Nzokirishaka, & Itua, 2018), and this is consistent with the findings of this study. Furthermore, marital status seems to have some effect on the unmet need for family planning as women who were widowed, divorced or separated are considerably less likely than married women and women who were never married. The marital status and the unmet need for family planning nexus has been established in the literature as married women are observed to have the higher risk of having unmet need (Nyauchi & Omedi, 2014). The lower risk of unmet need among the formerly married women can possibly be attributed to their belief that they have infrequent sexual intercourse (Machiyama & Cleland, 2013) or abstain from sexual intercourse because they have no marital partner.

Additionally, this study shows that a woman's employment status has a substantial effect on the state of her unmet need for family planning. This effect has also been shown by some extant studies that observe that women who are not working are significantly more likely to have an unmet need for family planning than employed women (Nyauchi & Omedi, 2014; Oginni et al., 2015; Ojakaa, 2008). Following from this, it can clearly be understood that the disparity in unmet need between the employed and the unemployed women is mainly due to economic power and affordability of family planning services. The number of children ever born to a woman is also found by some previous studies to have a significant effect on the state of her unmet need for family planning (Ayele et al., 2013; Oginni et al., 2015). This study finds a positive relationship between the parity of a woman and the unmet need for family planning. Thus, the risk of unmet need linearly increases with the increase in parity of a woman (Letamo & Navaneetham, 2015; Wulifan et al., 2016). This clearly implies that women are rather having a higher number of children simply because they are experiencing a higher risk of unmet need for family planning services, but not merely because they already have high parity.

One of the focuses of this paper is to ascertain temporal pattern and effect and this study has shown a significant effect of time on the unmet need for family planning. The results show that unmet need for family planning in Ghana has seen a curvilinear pattern over the study period (2003-2014). Thus, in 2008, the risk of unmet need for family planning significantly increased among women whereas, in 2014, the risks significantly plummeted among women as compared to the risk in 2003. The effect of time (survey year) on unmet need for family planning has been shown elsewhere in Ethiopia (Ayele et al., 2013), even though unlike the case of Ghana, the risk of unmet need has consistently reduced over time. This study, therefore, did not find any consistent improvement or reduction in unmet need for family planning over the study period.

Conclusion

The study reveals considerable regional disparities in unmet need for family planning among women in Ghana over time. The disparities follow inconsistent and diverse patterns over the study period which accentuates the inadequacies in family planning policies in the country. These patterns have been significantly determined by the age of the woman, ethnic background, marital, wealth, and work status, and parity as well as time (survey year). What is needed is to formulate consistently effective family planning policies using the determinants as a baseline. Some of these policies can focus on fighting and reducing attitudinal resistance among both women and their partners while still providing enough and accurate family planning information to the uninformed women in the country.

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