

Challenges to the reproductive-health needs of African women: On religion and maternal health utilization in Ghana

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Abstract

How relevant is religion to our understanding of maternal health (MH) service utilization in sub-Saharan Africa? We ask this question mainly because while the effect of religion on some aspects of reproductive behavior (e.g., fertility, contraception) has not gone unnoticed in the region, very few studies have examined the possible link with MH service utilization. Understanding this link in the context of sub-Saharan Africa is particularly relevant given the overriding influence of religion on the social fabric of Africans and the unacceptably high levels of maternal mortality in the region. As African countries struggle to achieve their stipulated reductions in maternal and child mortality levels by two-thirds by 2015 as part of the Millennium Development Goals, the need to examine the complex set of macro- and micro-factors that affect maternal and child health in the region cannot be underestimated. Using data from the 2003 Ghana Demographic Survey, we found religion (measured by denominational affiliation) to be a significant factor in MH use. This is true even after we had controlled for socio-economic variables. In general, Moslem and traditional women were less likely to use such services compared with Christians. The findings are discussed with reference to our theoretical framework and some policy issues are highlighted.

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Introduction

In the past couple of decades, the discourse on the reproductive-health needs of women in the developing world and those in sub-Saharan Africa in particular has typically focused on family planning and HIV/AIDS related issues. More recently, there has been renewed interest in studies that investigate other aspects of women's reproductive health, in

particular those relating to maternal and child health (MCH) issues. The rekindled interest in MCH issues stems in large part from three main factors. First is the sheer numbers of women and children in the developing world, and especially Africa, who die each year from pregnancy-related conditions (see e.g., Ross, Campbell, & Bulatao, 2001; Rutstein, 2000). A second reason has to do with the realization that most deaths and injuries to women from pregnancy-related conditions are preventable through early diagnosis and intervention (Mavalankar & Rosenfield, 2005). Third, it has long been acknowledged that the health of mothers and

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their children is at the cornerstone of public health and also an aspect of socio-economic development (AbouZahr, 2003).

Given the link that has been made between MCH service utilization and morbidity and mortality patterns, it is no surprise that many African countries have put strong emphasis on Safe Motherhood Programs, and also established targeted goals aimed at reducing maternal and child mortality as part of their Millennium Development Goals (Maine & Rosenfield, 1999; Mavalankar & Rosenfield, 2005; United Nations, 2000). What is more, the World Health Organization (WHO) and the Partnership for Safe Motherhood and Newborn Health have launched a new global campaign (October 2004) aimed at reducing maternal mortality and have already begun training staff in high-risk areas. However, as AbouZahr (2003) has pointed out, any progress in improving MCH will require a concerted effort by policy and non-policy makers alike.

While it is true to say that many African countries have made some progress in their attempt at reducing maternal and child morbidity and mortality levels, the most recent available data also indicate that maternal and child mortality levels in Africa are among the highest in the world. According to the WHO, for example, about a fifth of all children in sub-Saharan Africa die before their fifth birthday compared to less than a tenth reported in Asia and Latin America. In addition, AbouZahr and Wardlaw (2001) note that in comparison to North America where maternal mortality rates are estimated to be about 12 per 100,000 live births, estimated maternal mortality rate for sub-Saharan Africa is around 1000 per 100,000 live births.

It is against this background that we explore the linkages between macro-structural processes, in this case religion, and its impact on programs aimed at improving MCH in Ghana. More specifically, we use recent demographic and health data to examine the effect of religion on four markers of maternal health (MH) utilization during the most recent pregnancy: prenatal care (PNC) use, number of antenatal visits and tetanus immunizations, and delivery in an institutional facility. Our emphasis on the mothers' religion is borne in large part by its re-emergence as a major social force on the continent, and the fact that previous studies have linked women's reproductive behavior to their religious beliefs and involvement (see e.g., Takyi, 2003). In addition, a recent BBC News (2005) report in-

dicated that the Ghanaian government had to intervene in the case of a sick young girl whose parents declined medical treatment on religious grounds. According to the report, members of the religious sect believe in divine healing and do not even accept polio immunization. The above report provides us additional support to pursue the question of whether there is a relationship between religion and the use of MCH services, and whether such an association is mediated through other socio-economic, socio-cultural and demographic factors.

Background and conceptual framework

According to some estimates, about 90% of the 600,000 women around the world that die each year from pregnancy-related causes are from developing countries (Claeson & Waldman, 2000; Ransom, 2002). The issue is more grievous given that for every woman who dies from pregnancy-related conditions, Tahib (1989) has reported that an additional 10–15% are impaired or injured, thus preventing them from normal functioning.

Sub-Saharan Africa typifies this pattern of high maternal morbidity and mortality (AbouZahr & Royston, 1993). Although many African countries have made significant progress in reducing maternal and child mortality levels, the available data suggest that the region still lags behind other major global regions. According to the United Nations (2002), for example, about a fifth of children in sub-Saharan Africa die before their fifth birthday. In contrast, the comparable figures are about 8% and 5% for the other developing regions of Asia and Latin America, respectively. African nations also have the highest rates of childbirth-related deaths in the world with women in sub-Saharan Africa having a one-in-13 chance of dying during pregnancy or childbirth compared with a one-in-4000 chance for their counterparts in the developed countries.

More importantly, several studies have also noted that the advances that were made during the mid-1980s regarding child survivorship, and thus improvements in women's health, have in some cases slowed, stopped, or reversed (Kuate-Defo & Diallo, 2002; Rutstein, 2000). In the case of Ghana, data from the most recent national survey indicate that the pace of mortality decline has slowed in recent years (Ghana Statistical Service, Nugouchi Institute, and Macro International, 2004). Ghana's national objectives as outlined in the first Ministry of Health's Five Year (1997–2001) Program of

Work aimed to decrease maternal mortality rates from 214 per 100,000 in 1993 to 100 per 100,000 by the year 2001, and infant mortality rates from 56.7/1000 live births to 50/1000 live births within the same period although these targets were not achieved.

Given the existing epidemiological patterns on maternal and childhood mortality in Africa, and the acceptance in recent years that maternal mortality is a major development indicator (Currey, 2000), MCH is now regarded among the major public health concerns facing resource poor African nations. Consistent with this realization, many governments and non-governmental organizations (NGOs) have instituted various policies and programs aimed at improving MCH outcomes (e.g., Safe motherhood Initiatives; see also the Addis Ababa Declaration, 2004).¹ Claeson and Waldman (2000) have pointed to two main strategies that have been employed so far in this effort. The first has to do with disease-specific programs such as the smallpox and polio eradication programs in recent years, while the second approach focuses on the provision of primary health care for all through MCH programs. The latter approach encompasses the provision of basic health services, reductions in high-risk births, and access to PNC and immunization programs for women and children. Also, the latter approach is consistent with research findings that indicate that the lack of access to proper obstetrical, prenatal and postnatal care among others contributes to the high maternal mortality rates found in the developing world regions.

The study we report here focuses specifically on MH, a major component of MCH. In particular, we examine women's health seeking behavior—measured by their use of prenatal and antenatal care services, immunization for their children, and delivery in a professional setting.² In focusing on these indicators of MH, we are influenced in large part by an accumulating body of literature that has

linked accessibility to, and utilization of MCH services in general, and particularly the use of PNC during pregnancy, and professional care during delivery, with improved child and MH outcomes (Echevarria & Frisbie, 2001; Institute of Medicine, 1988).

While we acknowledge that some recent studies have questioned the positive association that has been made between PNC use and improved birth outcomes, on the whole, most studies on birth outcomes increasingly point to the use of MCH services as an important factor in whether a mother delivers a normal baby or not (Kogan et al., 1998; Kotelchuck, 1997, 1994). Expectant mothers who have access to MCH services, for example, are also more likely to receive preventive immunizations, and be checked for conditions that put them at an increased risk for negative birth outcomes (Rutstein, 2000). These services are more relevant in resource poor Africa where pregnancy-related conditions account for a significant share of death in the region.

Despite the focus on access to, and use of MH services in the overall scheme of women's reproductive health, concern still remains regarding the low utilization rates of such services in many African countries. In Ghana, for example, only 44.3% of births are attended to by a health professional, and only 50% of children aged 12–23 months are fully immunized (Ghana Statistical Service (GSS) Macro International (MI), 1999). Among the many factors researchers point to in explaining the low utilization of MCH services in the region are poor educational opportunities for women, poverty, affordability, and inaccessibility relating to poorly developed health infrastructure (see e.g., Brugha & Kevany, 1995; Grant, 1990). Others have also alluded to individual, household, community-level, and socio-cultural factors as important determinants (e.g., Elo, 1992; Goldman & Pebley, 1994; Magadi, Madise, & Rodrigues, 2000).

In the African context, increasing attention has also been drawn to religion as a factor that may facilitate or constrain the utilization of MCH services. Advocates of this latter perspective (religio-cultural thesis) point particularly to the overriding influence of religious and cultural processes on overall reproductive-health behavior independent of socio-economic processes (Addai, 1999; Caldwell & Caldwell, 1987; Fosu, 1981; Lesthaeghe, 1989). Indeed, Lesthaeghe (1989) has argued that reproductive behavior in sub-Saharan African

¹The Addis Ababa Declaration is available at www.healthy-newborns.org/content/article/detail/537

²Even though these variables are relevant to the overall scheme of affairs with regard to improving maternal and child health outcomes, we need to point out that our study is somewhat deficient when it comes to the "C" aspects of MCH since we focus primarily on MH. However, we are also of the view that the health of mothers and their children are often intertwined. So knowing something about the mothers health during pregnancy may provide some insight into assessing the health of their children as well.

cannot be adequately understood without reference to the unique social organizations. In their study in Ghana, for example, [Asenso-Okyere and colleagues \(1998\)](#) found that although cost was an important factor in the non-use of modern health services, they contended that the belief that some diseases and sicknesses have spiritual and religious undertones was an equally important determinant, an observation that has been collaborated by [Kirby's \(1997\)](#) research on childhood diseases in Northern Ghana. In the context of the present study, we argue that religion in Ghana represents a social structural attribute that may influence patterns of MH utilization, an assertion that has been collaborated by research in the West on the considerable influence of religious factors on different facets of health behavior and outcomes (see e.g., [Chatters, 2000](#); [Ellison & Levin, 1998](#)).

Our argument that religion may be relevant to our understanding of the use of MH services in Ghana also draws on prior work on women's reproductive-health behavior in the country (e.g., [Addai, 2000](#); [Allotey & Reidpath, 2001](#); [Kirby, 1993](#)). As [Kirby \(1993\)](#) points out, in many parts of rural Ghana, the delivery of better health care involves more than the provision of good medical services since such efforts need to take into account people's religious orientations and beliefs. This statement is consistent with findings in Northern Ghana where about 15% of infant deaths are attributable to the religious beliefs in "chichuru" or the spirit children ([Allotey & Reidpath, 2001](#)). In his study in rural Ghana, [Addai \(2000\)](#) also found that women who identified themselves as traditionalist were not only less likely to seek antenatal services but were also less likely to deliver in a health facility than their Christian counterparts. In a recent study on HIV, [Takyi \(2003\)](#) also found religion to have a significant effect on AIDS behavioral change. Others have also investigated religious group differences on a wide range of health-related behavior, including reproductive preferences ([Adongo, Phillips, & Binka, 1998](#)), disease classification ([Fosu, 1995, 1981](#)), and the utilization of health services ([Kirby, 1997](#)).

While the extant research in Ghana has pointed to the overriding influence of religion on reproductive dynamics in general, for the most part, not many studies have investigated the possible link between women's religion and their use of MH services. Also, while religion is often used as a control variable in some studies that have investi-

gated some aspects of MCH, there has been little theoretical articulation on how it may impact on use of MH services. This neglect is unfortunate in light of prior findings on the significance of religious beliefs and practices among Ghanaians. Moreover, the extant literature is replete with studies that indicate that religion is relevant in shaping and influencing attitudes and behavior in a wide range of behavior including HIV preventive behavior, reproduction, use of health services, contraceptive use and others (e.g., [Addai, 1999, 2000](#); [Fosu, 1981](#); [Kirby, 1993](#); [Takyi, 2003](#)).

The question thus remains as to whether the religious influence reported on fertility and reproductive dynamics applies to the discourse on MH services. Thus, our goal here is to contribute to existing studies on religion and health in Africa by investigating the link between women's religious identity and their use of MH services. Given the pervasiveness of religion in Ghana, our findings could provide useful insights into the development of effective intervention programs for reducing MCH-related morbidity and mortality.

Hypotheses

Our conceptual framework is derived from two main theoretical orientations that provide hypotheses about why religion might affect maternal and child outcomes. The first hypothesis is based on the notion that the philosophical ideals, norms and values of the various religious groups by themselves may influence MCH behavior. This conception derives, in part, from the notion that religion often claims a strong therapeutic component and in some respects dictates acceptable medical intervention. In the African context also, some medical conditions are believed to have spiritual undertones and treatment is often sought likewise rather than the modern health sector. The [BBC News \(2005\)](#) report that certain religious groups in Ghana believe solely in divine healing and do not accept immunization comes to mind. It is therefore possible that certain religions may encourage behaviors that may constrain MH service utilization. Under this hypothesis thus, it is expected that the use of MH services will be influenced solely by religious beliefs regardless of other factors.

In contrast to the preceding thesis, the second hypothesis is based on what some researchers call the "characteristics" hypothesis. This thesis assumes that variations in observed behavior between religious

groups mainly reflect differential access to social and human capital rather than religion per se. Here, it is argued that although the decision to use MH services is an individual choice, it tends to be structurally determined by geographic, socio-economic and demographic factors. That is, religious affiliation masks other characteristics which are known to associate with health-related behavior and that, these factors need to be controlled statistically to be able to isolate the residual effect of religion.

We argue that these viewpoints may be synergetic in that while some religious differences are likely to attenuate in the context of socio-economic factors, there is the likelihood of the persistence of some differences. To test these competing hypotheses, two statistical models are estimated. The first model has religion as the only independent variable and assesses whether religious affiliation significantly impacts on the outcome of interest. In the full model, we include some controls for the mediating influence of geographic, socio-economic, socio-cultural and demographic factors to assess if religious affiliation has an independent effect net of the control variables on MH variables. Given data limitations, however, we are unable to consider all theoretically relevant factors that affect women's use of MH services in the developing world.

Methodology

Data

The data we use in assessing the association between religion and the utilization of MH services come from the 2003 Demographic and Health Survey conducted in Ghana [GDHS03]. As in the earlier DHS surveys that have been carried out in Ghana since the late 1980s, the GDHS03 which is the most recent survey conducted under the auspices of MeasureDHS and the Ghana Statistical Services collected detailed retrospective data on the reproductive and health histories of a nationally drawn representative sample of women between the ages of 15 and 49 ($N = 5691$). The sample design was based on a probabilistic two-stage sample using enumeration areas (EAs) as sample frame. From these EAs, households and selected individuals within them were then interviewed.

A major strength of the DHS data in analyzing the links between religion and MH utilization patterns is that the data are of a high quality and have been used in many studies (see e.g., Gyimah,

Maxim, & White, 2005; Takyi, 2003; Takyi & Dodoo, 2005). Besides the quality of the data, GDHS03 also collected detailed information on measures that can be used to tap several aspects of MCH services and utilization, including, for example, items on tetanus injections during pregnancies, antenatal visits, use of PNC, and place of delivery. In addition to these health-related dependent measures, GDHS03 also collected basic geographic and socio-demographic data such as the respondents' age, education, religion, place of residence, region of residence, ethnicity, and household wealth index that allow us to test their possible influence on MH utilization patterns.

Even though the response rates for the 2003 survey was very high (95.7%) and previous analyses of the DHS data have shown that it is of a high quality, in order to reduce the possibility of problems of recall, the analyses reported here are restricted to women with births in the 3 years preceding the interview, yielding a sample size of 2084 women. Besides recall problems, the restriction to women with recent births also ensures that religious affiliation and other background characteristics relate to current conditions. Despite these strengths, the DHS data lack some measures that some studies have pointed to may be relevant for MH utilization. These include items on the quality of services, affordability, and access.

Measures

We focus on four dependent variables that have a bearing on MH issues: (1) immunization against tetanus during the most recent pregnancy, (2) a binary measure of whether the woman received PNC from a health professional during pregnancy, and (3) the number of antenatal visits made during the pregnancy, and (4) a binary variable on whether the mother delivered the baby at a health facility. Even though these four items from the 2003 Ghana Demographic and Health Survey provide some insights into MH service utilization, we acknowledge their inadequacies in studying overall MCH issues in Ghana. For example, the DHS lacks some vital information such as the onset of care and gestational age, variables which could allow us to test whether the care provided was adequate or inadequate. Thus, while existing studies show that the timing as well as frequency of visits may be relevant to MCH utilization than the mere attendance of such services (see e.g., Alexander &

Kotelchuk, 1996; Kotelchuck, 1997), as a result of data constraints, we are unable to address these issues in the study. With regard to tetanus injection, we also want to point out that the number of injections received during pregnancy may not be indicative of better care per se since this depends on whether a mother had been fully vaccinated in previous pregnancies or not.

The main independent variable is religion. Although existing research has measured religion in several ways to include the frequency of church attendance (religiosity), subjective views about God (Krause, 1993), denominational affiliation (Goldscheider & Mosher, 1988), we are constrained in our analysis by the lack of multiple measures of religion in the dataset used in this study. Given that the only question used to capture religion in Ghana asked about affiliation, we define religion to mean denominational affiliation. As Lehrer (2004) has pointed out, however, religious affiliation on its own makes a difference in the discussion of a host of economic and demographic behavior since it has an impact on the perceived costs and benefits of several decisions that people make over their life time.

Thus, while we acknowledge the limits that come with the use of one-dimensional variable to capture a concept that has several meanings, we also contend that religious affiliation alone provides a window to assess women's MCH behavior in the context of Ghana. This is based on the assumption that denominational differences in moral proscriptions and normative expectations are vital to behavior formation. Given that many Ghanaians spend a considerable amount of time on faith and church-based activities, religion may also provide the milieu for the dissemination and diffusion of messages on MCH services and reproductive related issues.

On the basis of the notion of "theological homogeneity", most studies tend to group the various denominations, especially the Protestant groups into a homogeneous unit, which is then used in their comparisons. While such comparisons provide useful information about the role of religion in reproductive behavior and outcomes, they ignore the significant theological differences between the groups as well as the increasing Evangelical and Pentecostal movement sweeping the country (Assimeng, 1981). We avoided this pitfall in our analysis by distinguishing between the following groups: Catholics, mainline Protestants (comprising Presbyterians, Methodists, and Anglicans) and non-

mainline Protestant Christians. These non-mainline Protestants are coded as other Christians in the standard GDHS03 recode file and comprise a collection of evangelicals, sectarians, and Pentecostals groups in Ghana. For the non-Christian groups, we distinguished between Muslims (Moslems), traditionalists or adherents/ believers of African traditional religions (ATR). Included among the latter group are all those who reported no official religious affiliation.

Our multivariate models include control variables organized as demographic (current age, number of living children), socio-economic (education, household wealth), geographic (rural–urban place of residence, north–south region of residence) and socio-cultural (ethnicity, marital union). For the categorical variables, the following coding schemes are used: current age (under 25 years, 25–34 years, 35 years and above), maternal education (no schooling, elementary/primary, secondary/above secondary), household wealth (poorest, poorer, middle, richer, richest), place of residence (rural, urban), region of residence (north, south), type of marital union (not currently married, monogamous marriage, and polygamous marriage), and ethnic identity (as Akan, Ga-Adangbe, Ewe, Mole-Dagbani, and Guan/Others). The objective here is to assess if religion affects the use of MCH services net of these factors.

Analytical strategy

Given the different levels of measurement for the dependent variables, different analytical models are employed. The outcome variables, the number of tetanus injections and antenatal visits can be thought of as count variables. As Long (1997) points out, using linear regression for count outcomes can result in inefficient, inconsistent and biased estimates. The problem one faces with standard Poisson model is that the equi-dispersion assumption which underlies its estimation approach is often violated. To make the choice between a Poisson regression and Negative binomial regression models, we tested but found no evidence for over dispersion suggesting a preference for the Poisson model. In contrast to our count variables, the other outcome measures (had PNC from a health professional or not, and delivery at a health facility or not) are dichotomous variables and as such binary logit models are used. This makes it possible to estimate the odds of receiving PNC from

a health professional, and also the odds of delivering at a health facility.

As is the case with the Demographic and Health Surveys that have been conducted around the world in recent years, the Ghanaian data have a hierarchical structure due mainly to randomly sampling naturally occurring groups with women nested within households. The nested structure of the data violates the independence assumption of conventional regression models and unless some allowance is made for clustering, standard statistical methods are no longer valid as they generally underestimate the variance. To account for heterogeneity and possible clustering within households, we used the Huber–White sandwich estimator to produce robust variance estimates (StataCorp, 2003; White, 1980; Williams, 2000). This approach allows observations to be independent between but not within households.

Findings

Table 1 presents the descriptive statistics of the sample by religious affiliation. Of particular note is the proportion that identified as “other Christians”, accounting for nearly two out of every five respondents (40%). The relative size of this group reflects the growing influence of the new religious movements such as Pentecostal and evangelical groups throughout the whole of Africa. Only a few respondents identified as traditionalist and atheists, the majority of who live in rural areas. Although descriptive, these results highlight some significant differences among women of different religions. There is evidence that Christian mothers (Catholic, Protestant, and other Christian) are more urbanized and highly educated, tend to live in wealthier households, have fewer numbers of children, and are less likely to be in polygamous marriages than women of other religious faiths. For example, more than half of the Protestant women have at least secondary education compared with only 10% of Moslem women, and 3.6% of traditionalists. These striking differences among the religious groups would have significant bearing on MH service utilization.

Table 1 also shows the association between religion and MH service utilization. In general, prenatal professional care is very high in Ghana with about 90% of women using such services. On the other hand, only 41% of mothers delivered the most recent birth at a health facility. Considerable

differences are, however, discernible in the use of these services by religious affiliation. The use of prenatal professional care, for example, ranges from a high of 95% among Protestant women to a low 75% among traditionalists. Similar patterns are discernible on the number of tetanus injections received during pregnancy as well as delivery at a health facility which are consistent with prior work in Ghana (see for example, Addai, 2000).

However, the association between MH service utilization and religion noted above may be spurious due to the confounding effects of the control variables. The gross effects of the control variables on service utilization as shown in Table 2 are consistent with extant research. Utilization is highest among highly educated mothers, urban residents as well as those in wealthier households. For tetanus injections in particular, the expected number is about 20% higher among highly educated mothers compared with women with no education. Similar patterns are noticeable on the other outcome variables. Considering the relationship between the control variables and religion as discussed in Table 1, however, the question arises as to whether religion has an independent effect net of these variables. To answer this question and revisiting our hypothesis, two models are estimated for each dependent variable. Model 1 examines the gross effect of religion while Model 2 controls for the observed geographic, socio-economic, socio-cultural and demographic variables.

Table 3 shows the results of the Poisson regression model of the number of tetanus injections during pregnancy. Model 1 suggests that compared with the mainstream Catholic women, women who are traditionalist are less likely to receive tetanus immunizations during pregnancy. The expected number of injections is about 22% lower among traditionalist compared with mainstream Catholics. While Protestant, Moslem and other Christian women do not differ significantly from their Catholics counterparts, a post-estimation equality of slope test indicates significant differences among such women and their traditional counterparts.

In Model 2, we test if the effects of religion can be explained by the control variables. By controlling for these factors, not only do we see a significant attenuation of the effect associated with traditional women but it becomes statistically insignificant at the conventional alpha of 0.05. While the directions of the effects are consistent with observations in

Table 1
Percentage distribution of respondents by religion and selected characteristics, GDHS 2003

	All religious groups	Religious affiliation				
		Traditional	Moslem	Catholic	Protestant	Other christian
Religion						
Traditional	13.40	—	—	—	—	—
Moslem	20.92	—	—	—	—	—
Catholic	13.80	—	—	—	—	—
Protestant	12.90	—	—	—	—	—
Other Christians	39.03	—	—	—	—	—
Current age^{***}						
Under 25 years	26.81	20.70	23.40	28.90	30.60	28.80
25–34 years	47.29	41.80	49.80	47.00	47.40	48.80
35 years and above	25.90	37.50	26.80	24.00	22.00	23.40
Level of education^{***}						
None	46.91	87.90	75.20	41.50	21.30	27.90
Primary	20.91	8.60	14.70	23.00	22.80	27.20
Secondary and above	32.18	3.60	10.10	35.50	56.00	44.90
Wealth index^{***}						
Poorest	33.53	69.30	42.90	36.90	15.70	20.80
Poorer	21.44	17.90	19.00	18.50	23.50	24.40
Middle	18.23	9.30	14.70	20.90	21.60	21.20
Richer	13.57	3.20	12.20	12.90	19.80	16.10
Richest	13.24	0.40	11.20	10.80	19.40	17.60
Place of residence^{***}						
Rural	71.89	96.40	72.20	22.60	36.90	64.20
Urban	28.11	3.60	27.80	77.40	63.10	35.80
Number of living children (mean) [*]	3.15	3.88	3.09	2.99	2.82	3.08
Number of children ever born (mean) [*]	3.61	4.64	3.66	3.45	3.12	3.45
Type of marriage^{***}						
Polygamous	22.14	37.90	36.90	20.90	12.70	12.80
Not currently married	8.44	4.20	3.20	9.10	14.60	10.00
Monogamous	69.45	57.90	59.90	70.00	72.80	77.20
Region of residence^{***}						
North	34.10	70.70	66.30	35.90	10.10	11.60
South	65.90	29.30	33.70	64.10	89.90	88.40
Ethnicity^{***}						
Akan	37.28	11.07	6.88	36.59	62.31	54.61
Ga-Adangbe	6.48	2.14	1.15	0.70	10.45	11.56
Ewe	11.18	9.64	0.69	11.85	13.81	16.24
Mole-Dagbani	34.40	63.93	65.14	44.95	6.72	13.16
Guan & Other	10.65	13.21	26.15	5.92	6.72	4.43
# of Antenatal visits (mean) [*]	8.26	6.88	11.01	7.84	8.93	7.18
# of tetanus injections (mean) [*]	1.54	1.26	1.60	1.60	1.58	1.57
Had prenatal care from a health professional ^{***}	90.84	75.00	91.70	93.00	95.10	93.50
Delivered at a health facility ^{***}	41.29	14.30	32.00	42.90	49.60	51.90
Total sample	2084	280	436	288	267	813

Statistical significance: ^{***} $p < 0.001$; ^{**} $p < 0.01$; ^{*} $p < 0.05$.

Model 1, the results in Model 2 suggest that much of the religious differences on the number of tetanus injections operate through the control variables.

Although religious groups tend to be characterized by different belief systems and theologies that may affect the use of health services, the results here

Table 2
Bivariate models of maternal health service utilization and the control variables, GDHS 2003

Control variables	Maternal health service							
	Poisson models				Binary logit models			
	# of tetanus injections during pregnancy		# of antenatal visits during pregnancy		Received professional prenatal care		Delivered at health facility	
	<i>b</i>	Exp <i>b</i>	<i>b</i>	Exp <i>b</i>	<i>b</i>	Exp <i>b</i>	<i>b</i>	Exp <i>b</i>
Level of education								
None (reference)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Primary	0.186***	1.204	0.220***	1.246	0.876***	2.401	0.692***	1.998
Secondary and above	0.180***	1.197	0.481***	1.618	1.771***	5.877	1.765***	5.842
Wealth index								
Poorest	-0.074	0.929	-0.252***	0.777	-1.151***	0.317	-1.212***	0.298
Poorer	0.006	1.006	-0.151***	0.860	-0.366	0.694	-0.562***	0.570
Middle (reference)	0.000	1.000	—	—	0.000	1.000	0.000	1.000
Richer	0.148**	1.160	0.225***	1.252	0.798*	2.221	1.455***	4.284
Richest	0.180***	1.197	0.499***	1.647	1.768***	5.859	2.469***	11.811
Place of residence								
Rural	-0.187***	0.829	-0.511***	0.600	-2.181***	0.113	-2.398***	0.091
Urban (reference)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Number of living children	-0.029**	0.971	-0.045***	0.956	-0.112***	0.894	-0.139***	0.870
Type of marriage								
Polygamous	-0.109*	0.897	-0.227***	0.797	-0.671***	0.511	-0.855***	0.425
Not currently married	-0.020	0.980	-0.024	0.976	-0.030	0.970	-0.005	0.995
Monogamous (reference)	0.000	1.000	0.000	1.000	1.000	1.000	1.000	2.718
Region of residence								
North	-0.087*	0.917	-0.278***	0.757	-1.072***	0.342	-1.411***	0.244
South (reference)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Ethnicity								
Ga-Adangbe	-0.073	0.929	-0.111**	0.895	-0.230	0.795	0.116	1.123
Ewe	-0.047	0.953	-0.168***	0.845	-0.453	0.636	-0.386**	0.680
Mole-Dagbani	-0.095*	0.908	-0.233***	0.792	-1.164*	0.312	-1.237***	0.290
Guan & Other	-0.149*	0.861	-0.177***	0.838	-1.134*	0.322	-0.545***	0.580
Akan (reference)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
Current age								
Under 25 years	0.042	1.043	-0.104***	0.901	0.277	1.319	-0.078	0.925
25–34 years (reference)	0.000	1.000	0.000	1.000	0.000	1.000	0.000	1.000
35 years and above	0.005	1.005	-0.056*	0.946	-0.206	0.814	-0.142	0.868

Statistical significance: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$. ! $p < 0.10$.

suggest that religion may be masking other characteristics that associate with use of MH services.

Turning to the control variables, their effects tend to be consistent with previous work. Starting with maternal education, Model 2 suggests that the number of tetanus injections associates positively with her level of education. Precisely, the expected number of injections increases by about 13% for women with at least secondary education compared

with those with no education. This is not a surprising finding given the empirical regularity between maternal education and child health in general. Also, while rural residence associates with a lower number of injections, the effect is not statistically significant. Another finding worth commenting on is the negative association between the number of living children and the number of injections. The results suggest that women with

Table 3
Poisson regression model of religion on number of tetanus injections during recent pregnancy

	Model 1		Model 2	
	<i>b</i>	Exp <i>b</i>	<i>b</i>	Exp <i>b</i>
Religion				
Traditionalist	−0.242***	0.785	−0.127	0.881!
Protestant	−0.012	0.988	−0.062	0.940
Other Christian	0.013	1.013	−0.057	0.945
Moslem	0.000	1.000	0.061	1.063
Catholic (reference)	—	—	—	—
Current age				
Under 25 years			−0.022	0.978
35 years and above			0.126	1.134**
25–34 years (reference)			—	—
Level of education				
Primary			0.159	1.172**
Secondary and above			0.108	1.114*
None (reference)			—	—
Wealth index				
Poorest			0.005	1.005
Poorer			0.052	1.053
Middle (reference)			—	—
Richer			0.101	1.106!
Richest			0.094	1.100!
Place of residence				1.000
Rural			−0.071	0.931
Urban (reference)			—	—
Number of living children			−0.037	0.964*
Type of marriage				
Polygamous			−0.055	0.946
Not currently married			−0.050	0.951
Monogamous (reference)			—	—
Region of residence				
North			0.049	1.050
South (reference)			—	—
Ethnicity				
Ga-Adangbe			−0.065	0.937
Ewe			−0.024	0.976
Mole-Dagbani			−0.044	0.957
Guan & Other			−0.134	0.875
Akan (reference)			—	—
Constant	0.473***		0.529***	
Model fitness				
Log Pseudolikelihood	−3110		−3085	
AIC × <i>n</i>	6230		6215	
BIC	−9667		−9586	

Note: Robust standard errors are produced by adjusting for clustering at the household level.

Statistical significance: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; ! $p < 0.10$.

larger number of living children have lower number of injections.

Table 4, which presents a binary logit model on the use of a professional PNC, indicates a significant

Table 4
A binary logit model of religion on use of professional prenatal care

	Model 1		Model 2	
	<i>b</i>	Exp <i>b</i>	<i>b</i>	Exp <i>b</i>
Religion				
Traditionalist	−1.547***	0.213	−0.971	0.379**
Protestant	0.329	1.390	−0.138	0.871
Other Christians	0.019	1.019	−0.355	0.701
Moslems	−0.238	0.788	0.062	1.064
Catholic (reference)	—	—	—	—
Current age				
Under 25 years			0.176	1.192
35 years and above			0.040	1.041
25–34 years (reference)			—	—
Level of education				
Primary			0.311	1.365
Secondary and above			0.822	2.275**
None (reference)			—	—
Wealth index				
Poorest			−0.439	0.645
Poorer			−0.033	0.968
Middle (reference)			—	—
Richer			0.103	1.108
Richest			0.603	1.828
Place of residence				
Rural			−1.249	0.287**
Urban (reference)			—	—
Number of living children			−0.001	0.999
Type of marriage				
Polygamous			−0.187	0.829
Not currently married			−0.287	0.751
Monogamous (reference)			—	—
Region of residence				
North			0.014	1.014
South (reference)			—	—
Ethnicity				1.000
Ga-Adangbe			−0.067	0.935
Ewe			−0.044	0.957
Mole-Dagbani			−0.233	0.792
Guan & Other			−0.484	0.616
Akan (reference)			—	—
Constant	1.72***		3.837***	
Model fitness				
Log pseudolikelihood	−600		−577	
AIC × <i>n</i>	1209		1159	
BIC	−14687		−14642	

Note: Robust standard errors are produced by adjusting for clustering at the household level.

Statistical significance: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; ! $p < 0.10$.

effect of religion. Model 1 suggests a significantly lower use of such services for traditionalist compared with the Catholics. The pattern observed for traditionalist indicates that they are about 80% less

likely to use professional PNC compared with the Catholics. Although Moslem women seem to have a lower likelihood of using professional PNC compared with Catholics, the effect is not statistically significant. Conversely, Protestant and other Christian women are more likely to use such services although the effects are not statistically significant. After controlling for socio-economic and demographic factors, the results from Model 2 show that religion continues to have a significant effect on the use of professional PNC.

While the estimated effects of the religion are somewhat changed in Model 2, they are still significant and consistent with the hypothesized relation. Compared to the main Catholics, Model 2 indicates that women who identify themselves as traditionalist exhibit a significantly lower use of professional PNC services. Less use is also discernible among Protestant and other Christians although the effects are not statistically significant. While the effects of the control variables are consistent with theoretical expectations, they are not always significant. In general, the use of professional PNC is higher among educated and urban women. Highly educated women in particular are about 2.2 times more likely to use such services than their counterparts with no education. Also, rural women as well as those from poorer households are significantly less likely to use such services.

The results presented in Table 5, which examines the effect of religion on whether a woman delivered at a health facility, are similar to that found on the use of PNC utilization. The findings from Model 1 suggest that religion on its own is associated with place of delivery. Compared to the reference category, the odds of delivering at a health facility is significantly lower for traditionalists and Moslems but higher for other Christians and Protestant women. After controlling for the observed characteristics, we see a significant reduction in the magnitude of the religion variables. Nonetheless, there is evidence of a significantly lower likelihood of delivering at a health facility for women who identify themselves as traditionalists and Moslems. Turning to the control variables, we again see that highly educated women as well as those from the wealthier households are significantly more likely to deliver at a health facility. On the other hand, rural women and those with large number of living children are less likely to deliver at a health facility. For rural women, it is likely that their non-use could

Table 5
A binary logit model of religion and delivery at a health facility

	Model 1		Model 2	
	<i>b</i>	Exp <i>b</i>	<i>b</i>	Exp <i>b</i>
Religion				
Traditionalist	-1.504	0.222***	-0.678	0.508**
Protestant	0.272	1.313	-0.388	0.678
Other Christian	0.363	1.438*	-0.032	0.969
Moslem	-0.429	0.651*	-0.412	0.662*
Catholic(Reference)	—	—	—	—
Current age				
Under 25 years			-0.349	0.705*
35 years and above			0.487	1.627*
25–34 years (reference)			—	—
Level of education				
Primary			0.069	1.071
Secondary and above			0.727	2.069***
None (reference)			—	—
Wealth index				
Poorest			-0.456	0.634**
Poorer			-0.189	0.828
Middle (reference)			—	—
Richer			0.935	2.547***
Richest			1.438	4.212***
Place of residence				
Rural			-1.142	0.319***
Urban (reference)			—	—
Number of living children				
			-0.136	0.873**
Type of marriage				
Polygamous			-0.211	0.810
Not currently married			-0.027	0.973
Monogamous (reference)			—	—
Region of residence				
North			-0.370	0.691*
South (reference)			—	—
Ethnicity				
Ga-Adangbe			0.277	1.319
Ewe			-0.052	0.949
Mole-Dagbani			0.086	1.090
Guan & Other			0.379	1.461
Akan (reference)			—	—
Constant	-0.287**		0.797	
Model fitness				
Log Pseudolikelihood	-1335		-1028	
AIC × <i>n</i>	2680		2100	
BIC	-13217		-13701	

Note: Robust standard errors are produced by adjusting for clustering at the household level.

Statistical significance: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; ! $p < 0.10$.

be due to accessibility since most rural communities lack such health facilities. The pattern observed in Table 6 on antenatal visits is similar

Table 6
Poisson regression model of religion on number of antenatal visits during recent pregnancy

	Model 1		Model 2	
	<i>b</i>	Exp <i>b</i>	<i>b</i>	Exp <i>b</i>
Religion				
Traditionalist	−0.576	0.562***	−0.338	0.713***
Protestant	0.042	1.043	−0.043	0.958
Other Christian	−0.02	0.980	−0.068	0.934!
Moslem	−0.107	0.899**	−0.061	0.941
Catholic (reference)	—	—	—	—
Current age				
Under 25 years			−0.169	0.845***
35 years and above			0.144	1.155***
25–34 years (reference)			—	—
Level of education				
Primary			0.151	1.163***
Secondary and above			0.262	1.300***
None (reference)			—	—
Wealth index				
Poorest			−0.109	0.896*
Poorer			−0.060	0.942!
Middle (reference)			—	—
Richer			0.100	1.105**
Richest			0.256	1.292***
Place of residence				
Rural			−0.167	0.846***
Urban (reference)			—	—
Number of living children			−0.049	0.952***
Type of marriage				
Polygamous			−0.053	0.948
Not currently married			−0.004	0.996
Monogamous (reference)			—	—
Region of residence				
North			−0.025	0.975
South (reference)			—	—
Ethnicity				
Ga-Adangbe			−0.069	0.933
Ewe			−0.072	0.930!
Mole-Dagbani			0.123	1.131*
Guan & Other			0.046	1.047
Akan (reference)			—	—
Constant	1.72***		1.829***	
Model fitness				
Log Pseudolikelihood	−5336		−4941	
AIC × <i>n</i>	10683		9927	
BIC	−4576		−5236	

Note: Robust standard errors are produced by adjusting for clustering at the household level.

Statistical significance: ****p* < 0.001; ***p* < 0.01; **p* < 0.05; !*p* < 0.10.

to observations made on the other outcome variables with traditional women being less likely to use such services.

Summary and conclusion

Notwithstanding the progress that has been made in recent years, existing data suggest that maternal and infant mortality rates are still high in many African countries, including Ghana. Although many factors have been identified as contributing to this pattern, the use of MH services is widely recognized as an important factor in reducing MCH. In this paper, we used recent data from Ghana to examine MH service utilization by assessing whether the use of such services differs by religion. Our focus on religion derives in part from its significant association with other reproductive behavior such as fertility and contraceptive behavior. Guided by two competing theoretical paradigms, we ask if religion by itself influences the use of MH services.

Although previous studies have suggested that religion poses a constraining influence with regards to overall reproductive health in many parts of Africa, our analyses provide mix results. Overall, there is evidence that MH service utilization is significantly higher among Christian women, and in most cases, such differences were found to persist after controlling for observed characteristics. Revisiting our major theoretical paradigms thus, there is evidence to support both the religio-cultural and characteristics theses. Our results challenge the notion that religious differences in MH service utilization mainly reflect socio-economic disparities. Although there was a significant reduction in the effect of being a traditionalist in particular after controlling for the socio-economic variables, the coefficient was large and statistically significant. This suggests that although religion partly affects MH service utilization through other factors, it is still epidemiologically important. These observations provide added support to a growing body of literature, especially in the developed world, that finds an association between religious involvement and health outcomes and behavior (for a review of this work, see Chatters, 2000; Ellison, 1991; Ellison & Levin, 1998; Krause, 1993; Levin & Chatters, 1998; Thornton & Camburn, 1989). Interestingly enough, the salutary effect of religion has also been found to be true irrespective of how religion is measured: as frequency of church attendance, belief in God, or denominational affiliation.

Although we are unable to determine why women of certain religious groups are more likely to use MH services, explanations may be sought in the life

style and theological differences. The norms and characteristics of some religious groups may encourage negative attitudes toward orthodox medicine. Also, attention needs to be drawn to the issues of divine healing as well as social support networks and interaction that religion fosters as providing an environment for perhaps the diffusion of health-related ideas. Qualitative studies are warranted to determine the specific ways in which religion and the utilization of MCH services are linked.

The relevance of religion on MH service utilization has some policy implications. Given the failure of the first Ministry of Health's 5-year plan to realize the targeted maternal and child mortality rates, and the subsequent revisions in the second 5-year plan to achieve maternal mortality rate of 150 per 100,000 and infant mortality rate of 50 per 1000 by 2006, there is the need to include religious bodies in this effort. Considering the interaction that religion fosters, their inclusion in the overall MCH educational programs can facilitate the dissemination of the relevance of such services. As studies on AIDS preventive efforts in Uganda indicate, collaboration between religious leaders and health officials are vital for changes in health and risky behavior (UNAIDS, 1998). The finding regarding the low use of MH services by traditional women means there is the need to target this population in any program aimed at reducing MCH.

Health policy workers often discuss the issue of disparities in the delivery of health services. Our findings regarding the rural–urban differentials bring attention to this issue. While we are unable to assess if the lower utilization of MH services among women resident in rural areas relates to accessibility, Ghana is known to have a marked rural–urban disparity in health infrastructure (Brown, 1986). Given that the majority of Ghanaian women live in rural areas, there is the need to bridge the rural–urban gap in order to make such services available to rural residents. The results also bring to the fore the relevance of maternal education on the use of MH services. In this direction, policies and programs that improve higher educational opportunities for women will be useful in improving MCH. Although Ghana has registered some gains in educational attainment (see Gyimah et al., 2005), the educational reforms accompanying the economic restructuring of the 1980s have made education more expensive for the rural majority. With the emphasis on 'cost-sharing' in education in the face of abject poverty, many parents may be likely to

educate their sons at the expense of their daughters, an issue that may derail progress in female education.

Finally, for Ghana to improve its MCH outcomes as suggested by the WHO, serious consideration should be given to the interplay between poverty status, religion, and the use of MCH services. Indeed a systematic and rigorous assessment of the issues is called for as any casual observer of health service utilization in Ghana can observe an upsurge in the use of spiritual churches, healing powers, and traditional medicine. This trend suggests that there is more to the issue than meets the eye. Also, religious leaders can be consulted in policy formulation, education and implementation of health programs. At the same time, the spiritual churches can also be incorporated in some form in the health delivery system.

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