Individual religious affiliation, religious community context, and reproductive health care in Mozambique*

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* The support of the Eunice Kennedy Shriver National Institute of Child Health & Human Development (grant # R01 HD050175) is gratefully acknowledged.

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Abstract

Most studies of religion and demographic behavior and outcomes in sub-Saharan Africa focus on effects of individual religious affiliation. In the present study we use recent data from a survey of over 2000 women and a survey of over 1000 religious congregations from southern Mozambique to examine the effects of women's religious affiliation and religious community environment on two indicators of reproductive health care utilization: child delivery in a health care facility and the number of prenatal consultations. Our findings suggest a beneficial effect of affiliation with Catholic and Mission Protestant denominations for child delivery in a health facility and a favorable effect of affiliation with any organized religion for prenatal visits. We also find a significant positive association between the presence of Catholic and Mission Protestant denominations within community with child delivery in a health care unit, regardless of individual religious affiliation, but no clear pattern for the effect of religious community context on prenatal consultations.

Theoretical background

In sub-Saharan Africa most people are affiliated with organized religion and view religion as having guiding power in their lives (e.g., Carmody, 2003; Gallup-International, 2010; Garner, 2000; Gyimah, Takyi and Addai, 2006; Trinitapoli, 2006). Researchers have sought to understand the relationship between religion and various demographic aspects such as HIV/AIDS (e.g., Agadjanian, 2005; Agadjanian and Menjívar, 2008; Lagarde et al., 2000; Maman et al., 2009; Rankin et al., 2005; Takyi, 2003; Trinitapoli, 2009; Trinitapoli and Regnerus, 2006), child survival (e.g., Antai et al., 2009; Cau, Sevoyan and Agadjanian, 2010; Gregson et al., 1999; Gyimah, 2007), fertility and contraceptive use (e.g., Adongo, Phillips and Binka, 1998; Agadjanian, 2001; Agadjanian, Yabiku and Fawcett, 2009; Avong, 2001; Yeatman and Trinitapoli, 2008) and health care services utilization (Gyimah, Takyi and Addai, 2006).

Typically, studies entertain three alternative hypotheses for the association of religion and demographic behavior and outcomes: 1) the "particularistic theology" hypothesis, which relates demographic behavior and outcomes to explicit religious prescriptions and proscriptions; 2) the "minority-group status" hypothesis, which focuses on a religious group socioeconomic and/or political disadvantages; and 3) the "characteristics" hypothesis, which posits that demographic differences among religious groups can be fully explained by other factors (Goldscheider, 1971). However, most studies, regardless of their theoretical perspective, have focused on individual religious affiliation without taking into consideration how the community religious context may influence demographic outcomes of both affiliated and unaffiliated individuals. Specifically, it has not been sufficiently investigated whether the presence and configuration of religious congregations in a community may have effects on health regardless of individual affiliation. In this study, we use recent unique individual- and congregation-level data collected in Mozambique, to examine individual and contextual effects of religion on reproductive health care utilization.

Previous literature that has looked at the association between religion and health-related outcomes in sub-Saharan Africa has painted a mixed picture. On the association between religion and HIV/AIDS for example, Lagarde and colleagues examined the role of religion on preventative behavior against HIV/AIDS in Senegal, a country predominantly Muslim but with a Christian population; they found religion to be negatively associated with preventative behaviors (Lagarde et al., 2000). Takyi (2003) investigated the association between women's religious affiliation and their knowledge of AIDS and practice of preventive behaviors against AIDS in Ghana to find that Christian women were more likely to report more knowledge of HIV than non-Christians. But there were inconsistent findings pertaining to the effect of religious affiliation on condom use and decrease in sexual partners (Takyi, 2003). In respect to child health, Gyimah found some association of religious affiliation with child survival in Ghana but that association disappeared after controlling for socioeconomic factors, especially education (Gyimah, 2007).

Several studies have argued that the effect of religion on health outcomes, such as child survival, operates through differential access to health services. Thus, in Nigeria, Antai and colleagues looked at the effect of mother's religion affiliation on under-five mortality and concluding that an association of belonging to a traditional religion and mortality was explained by religion-based differential use of maternal and child health services (Antai et al., 2009). In Ghana, Gyimah and colleagues showed significantly higher utilization of health services among Catholic mothers compared to unaffiliated mothers (Gyimah, Takyi and Addai, 2006).

While these investigations further our understanding of the relevance of religious affiliation on some health outcomes in sub-Saharan Africa, we need to better understand religious community context and its possible effect on health-related outcomes. In this study, in seeking to understand the role of community religious milieu in reproductive health care utilization, we are informed by the literature on contextual and social influences on fertility and contraceptive behavior and HIV/AIDS-related outcomes (Agadjanian, Yabiku and Fawcett, 2009; Helleringer & Kohler, 2005; Kohler, 1997; Kohler, Behrman & Watkins, 2007; Smith &

Watkins, 2005), and broader analyses of diffusion of innovations and demographic change (Rogers, 1995).

Research has identified woman's formal education as one of drivers of reproductive health-care services utilization (Elo, 1992; Fosu, 1994; Onah, Ikeako and Iloabachie, 2006; Caldwell, 1979). Studies in sub-Saharan Africa have also observed variations among religious congregations in average level of schooling of their members, with Mainline churches (Catholic and Mission Protestant churches) typically having better educated members (Agadjanian, 2001; Gymah, Takyi and Addai, 2006; Kollehlon, 1994; Takyi, 2003; Zou et al., 2009). However, it is likely that women's health-related knowledge is acquired not only through formal education but also through informal learning that occurs when mothers interact with each other in diverse situations. For example, in a religious environment of developing settings, relatively lower educated mothers may interact with relatively highly educated mothers (including nurses, school teachers), which may lead to informal exchanges of health-related information and experiences. Given the importance of religion and religious participation in sub-Saharan women's lives, much of these exchanges may occur in religion-related networks. As members of diverse religious organizations often live in the same community, informal social interaction among them might occur frequently.

Some studies suggest that social interactions might lead to diffusion of health ideas within communities. Using a household survey of about 2500 residents of coastal Ghana, Andrzejewski, Reed and White (2009) examined the effect of community context on adults' knowledge of etiology and prevention of child illnesses and they reported a positive association between the proportion of literate individuals in the community and health knowledge. These authors argued that living in a community with high levels of literacy increased health knowledge even for illiterate community members. In rural Guatemala, Goldman, Pebley and Beckett (2001) investigated whether women who had social contacts outside of the community were more likely to hold the belief in inadequate hygiene as cause of diarrheal illness and to use

hygienic practices. The researchers reported that having a relative living abroad or in the city of Guatemala was significantly and positively associated to holding beliefs related to hygiene or contamination and also to practicing hygienic behavior. Additionally, the authors found that participation in community groups (e.g., holding a directive position in a religious organization) was significantly associated with possessing beliefs related to hygiene or contamination but this finding was not consistent across the health measures. Agadjanian and Menjívar (2008) in their study in Mozambique showed how church-based informal social interactions help women in coping with their worries and misgivings about HIV/AIDS.

In this study, we contribute to the literature on the relationship between religion and health in sub-Saharan Africa by examining how women's religious affiliation affects their use of prenatal and child delivery services and whether the community religious environment, approximated by the spatial configuration of religious congregations, influences use of these services.

Hypotheses

Informed by the literature reviewed above, we formulate two main hypotheses. First, we expect that women belonging to a religious congregation will have a higher likelihood of delivering in health facilities and will have a higher number of antenatal consultations than women who are not affiliated with organized religion. As part of the first hypothesis, we also expect that Catholics and Mainline Protestants will display a particular advantage. This expectation is based on the literature reviewed above as well as our earlier investigation of denominational differences in under-five mortality (Cau, Sevoyan and Agadjanian, 2010).

Our second hypothesis is that the higher the number of religious congregations in a community, the greater the probability that women living in that community, whatever their religious affiliation, will give birth in a clinic, and that this number will be positively associated with the number of prenatal consultations, regardless of other factors. Again, as a sub-

hypothesis, we posit that the presence of congregations of Mainline denominations (Catholic and Mission Protestant churches) will be particularly beneficial given their greater socioeconomic diversity and a relatively high proportion of educated members (e.g., nurses and teachers.). The presence of Mainline churches may facilitate the spread of attitudes and preferences that encourage reproductive health care utilization among the members of those churches and non-members alike. Although we cannot observe the process of religion-based information exchange and influence directly with our data, we assume based on the literature that this process would be at the root of whatever individual and community level differentials that we might detect after controlling for standard sociodemographic factors.

Setting

Mozambique is a nation in Southern Africa with 21.9 million inhabitants in 2009 (INE, 2010). It became independent from Portugal in 1975 and then went through a civil war between 1976 and 1992 that destroyed much of the social and economic infrastructure of the country (Abrahamsson and Nilsson 1995; Minter 1994). The post-civil war reconstruction in Mozambique has been remarkable, with economic growth averaging 8% per year between 1997 and 2003. However, the country remains one of poorest in the world, with the Gross National Income per capita of $380 in 2008, life expectancy at birth of 48 years in 2008 (World Bank, 2010).

The setting of this study is Chibuto district of Gaza province in Southern Mozambique (Figure 1). Ethnically homogenous, Chibuto district had a population of about 165,000 in 2007 (INE, 2009), one third of it living in the only urban area of the district (its headquarters). The economy of Chibuto is based on subsistence agriculture and labor migration remittances, mainly from South Africa. The religious landscape of Chibuto district is dominated by Catholics, Mainline or Mission Protestants (e.g., Presbyterian, Anglican, Methodist and Baptist) and a growing number of small Pentecostal-type churches – mainly Zionist churches, Apostolic

churches and Assemblies of God (Agadjanian, 2005; Agadjanian and Menjivar, 2008). Zionist churches are a growing group of small Pentecostal churches originating in southern Africa that emphasize miracle healing through prayer and Holy Spirit (Agadjanian, 2001; Gregson et al., 1999; Turner, 1967).

[Figure 1 about here]

Data and Methods

This study uses data from an individual survey and an institutional survey conducted in 2008 in Chibuto district. The individual survey was a representative-based cluster survey of 2019 women aged 18-50, both affiliated and nonaffiliated with a religious denomination. In 82 randomly selected communities (clusters) located in both urban and rural areas of the district, the individual survey collected information on respondents' religious affiliation history since birth until the year of the survey. The institutional survey conducted in parallel with the individual survey included all the congregations active in the district—more than a thousand different congregations in total. The survey collected a variety of information about the congregations, including their geographic coordinates. The study also uses geographic coordinates of health units in Chibuto district and three other districts that share border with Chibuto (districts of Chókwè, Guijá and Manjacaze).

Measures

Outcome variables

Two measures of reproductive health care utilization constitute our outcome variables: i) whether a woman's youngest living child was born in a health care facility and ii) the number of prenatal consultations a woman attended before the birth of her youngest child. Mozambique, like much of sub-Saharan Africa has very high maternal mortality and morbidity (Hill et al., 2007; Gage, 2007; WHO, 2004), and it is assumed that use of reproductive health care services may

improve the health of women and their children (Short and Zhang, 2004). To be able to use the information on congregations collected through the institutional survey and the current characteristics from the individual surveys and to minimize problems associated with recall, the study looks only at women whose youngest children were born in 5 years before the survey.

Predictor variables

We use two predictors—individual religious affiliation and religious community context. Individual affiliation includes the following categories: 1. Catholic or Mainline Protestant; 2. Zionist; 3. Other Pentecostal or Similar; and 4. Non-affiliated. Affiliation is lagged one year before the birth of the youngest child. It is based on a question about religious life history of the respondent. The religious community context measure is build from the geographic coordinates of congregations and of respondents' households. Using the Geodist function in SAS 9.2, distance from each respondent's household in the sample to each congregation in each category of religious congregation (Mainline churches, Zionist churches and Other Pentecostal churches) was calculated. Following this, the congregation's concentration measure was created based on the number of congregations of a given type that exist with 5 Km from each respondent's household for rural areas and 1 Km in urban area. We assumed that within 5 Km of distance people in rural areas are able to interact with each other (for example, people may frequently walk within 5 Km to the field or to church). Because of relatively a high concentration of people in urban areas, interaction among individuals within 1 Km of distance from each other was considered to be equivalent to that which occurs within 5 Km in rural areas.

As individual controls we use woman's age, marital status, education, and the number of children. We also include location of respondent's household relative to the closest clinic, which is operationalized as a set of dummy variables: urban (no or negligible distance); rural less than 5 Km, and rural 5 Km or more). We also control for average literacy level in each community (individual survey cluster). For analysis we use SAS 9.2 Glimmix procedure to fit a random

intercept logistic regression for the outcome whether the respondent's last child was born in a health care establishment and random intercept ordinary linear regression for the outcome about the number of prenatal consultations that the respondent attendant before the birth of her last child. A model with random intercept is employed because respondents are clustered within communities and therefore may share some unobserved characteristics, which confound the results.

Preliminary results

Descriptive results

Table 1 and 2 show key descriptive statistics characterizing the various groups in our sample. There is variation in proportion of children born in health facility between denominational groups. Among members of Mainline churches, about 74% had their youngest child born in a health care establishment. Following Mainline church goers, members belonging to Other Pentecostal churches had about 65.12%. The category of No Affiliation exhibits the smallest percentage of members who had their last child born in a health facility (about 49%). Similar pattern is observed for the mean number of prenatal consultations that a mother attended before the birth of her last child: women belonging to Mainline churches show the highest mean number of prenatal consultations (4.44) and nonaffiliated women the lowest (3.60). The mean age of respondents in the sample does not vary across religious denomination groups, ranging from 30 years in the Mainline religious group to 32 years in the No Affiliation group. All religious groups have slightly similar number of living children (approximately 3 children). Our sample is dominated by married women, with at least one forth of women in each denomination group married.

Differences in educational achievement of members between groups are notable. This suggests variation in socioeconomic background among members belonging to distinct groups.

The religious group of No affiliation is overwhelmingly composed by illiterate members (about 56%). It is followed by the Zionist group in terms of presence of members without any schooling. The average level of education among communities (sample clusters) of the study area is 3 years. Table 2 displays the mean number of religious congregations in each denominational category within 5 Km in rural areas (1 Km in the urban area) from respondents' residence within the district boundaries. Other Pentecostal churches are the most prevalent congregations in both rural and urban areas (5.3 churches per 5 Km and 6.3 churches per 1 Km, respectively). Zionist congregations follow Other Pentecostal churches and are more common in urban areas (with 5.21 churches per 1 Km). For Mainline churches, on average there are approximately three churches within the defined distance from respondents' households.

[Table 1 and 2 about here]

Multivariate results

Whether the youngest child was born in a health care facility

Table 3 shows results from random intercept logistic regression models examining the association between the religious affiliation of the mother, denominational concentration in the community and whether or not the youngest child was delivered in a health care establishment. Model 1 assesses the effect of maternal religious affiliation and it shows that overall religion appears to have a favorable effect on the odds of child delivery in a health facility, but it is only significant for mothers affiliated to Mainline denominations. Compared to non-affiliated women (the reference category), children of women affiliated with Mainline churches are 2 times likely to have been delivered in a health facility.

[Table 3 about here]

In model 2, we try to capture the independent effect of maternal religion on youngest child delivery in a health care establishment controlling for socioeconomic covariates. The effect of mother's religious affiliation decreases in magnitude for all denominations but remains significant for Mainline churches. While affiliation with a Zionist and Other Pentecostal denominations appears to increase the odds that the youngest child was delivered in a health facility, mothers affiliated to these congregations are not significantly different from unaffiliated mothers. These findings seem to support the hypothesis that religion has its own effect on child delivery in a health facility, particularly for mothers affiliated to Mainline churches. Also notable in model 2 is that education has a significant positive effect on the odds of the youngest child having been delivered at a health care establishment. Thus, children of mothers with 5 and more years of schooling are more than 2.4 times likely to have been born in a health facility than children of women with no education.

In model 3 we attempt to assess whether living in a community with a higher number of religious organizations has an effect on child delivery in a health facility. No other variables are included. The findings show a positive and significant effect of the presence of Mainline denominations. On average, each additional Mainline church in the community increases the odds that the youngest child was born in a health facility by 14% (OR=1.14). When we added maternal religious affiliation and other characteristics and a community-level control in model 4, the coefficient for the prevalence of Mainline churches retained its magnitude and significance. One interesting finding from model 4 is that the prevalence of Zionist congregations significantly decreases the odds that the youngest child was delivered in a health facility. To be sure that these effects do not simply reflect the fact that Mainline and Zionist churches are disproportionately concentrated in socioeconomically more and less advanced areas, respectively, we control for the average educational level in the community.

Notable in model 4 is that individual religion is still positively associated with the odds of giving birth in a health clinic; but it is only significant for mothers belonging to Mainline churches

($p < .1$). The findings from model 4 partially support our second hypothesis that higher number of religious congregations in the community increases the odds of giving birth in clinic: while the concentration of Mainline congregations displays a positive association, that of Zionist congregations shows a negative effect. Our sub-hypothesis for the second hypothesis positing a particular large advantage of Catholic and Mission Protestant churches for delivering in clinics therefore finds support.

Number of prenatal consultations before the birth of the youngest child

In Table 4 we assess the association between the religious affiliation of the mother, religious community environment and the number of prenatal consultations attended before the birth of the youngest child. The first model in Table 4 includes maternal religious affiliation as the only predictor. In the second model socioeconomic covariates are added as controls. The results in model 1 show that religion has a positive and significant effect on the use of prenatal services. Compared to unaffiliated mothers, mothers identifying themselves with any denomination were significantly likely to have attended more prenatal visits before the birth of the youngest child. The positive effect of religious affiliation on the use of prenatal services remains unchanged in model 2. Compared to unaffiliated women, women belonging to any denomination are more likely to have attended higher number of prenatal consultations. Coefficients for all the categories of mother's religious affiliation decrease in magnitude and for Zionist affiliation it becomes marginally significant. However, no advantage of Mainline church members of Other Pentecostals and Zionist is noticeable.

In Model 3 and 4 we examine the contribution of community religious context to predicting the number of women's prenatal consultations. Although the results are not statistically significant, Model 1 suggests that the concentration of Mainline churches and Other Pentecostal churches in the community has positive effect and the predominance of Zionist churches a negative effect on prenatal visits. This pattern holds after controlling for women's

individual characteristics and community average level of literacy, and the presence of Zionist churches reaches a marginal significance (model 4). An interesting observation in model 4 is that women affiliated to any religious denomination continue to have significant advantage over unaffiliated women. Findings in table 4 support the hypothesis that in this setting maternal religion has a positive effect on number of prenatal visits net of socioeconomic characteristics. The effect of religious community context on prenatal visits is unclear; while the direction of the coefficients in model 4 points to the expectations for the predominance of Mainline and Other Pentecostal denominations, for the prevalence of Zionist churches the effect is in opposite direction of the one hypothesized.

[Table 4 about here]

Next steps

To prepare the paper for presentation at the PAA Meeting we plan to fine-tune the specification of our models and expand our analysis. Specifically we will develop and test alternative definitions of community religious milieu. Also, because the location of churches and maternal and child clinics in the study area may not be random, in our final paper we will control for distance between clinics and churches.

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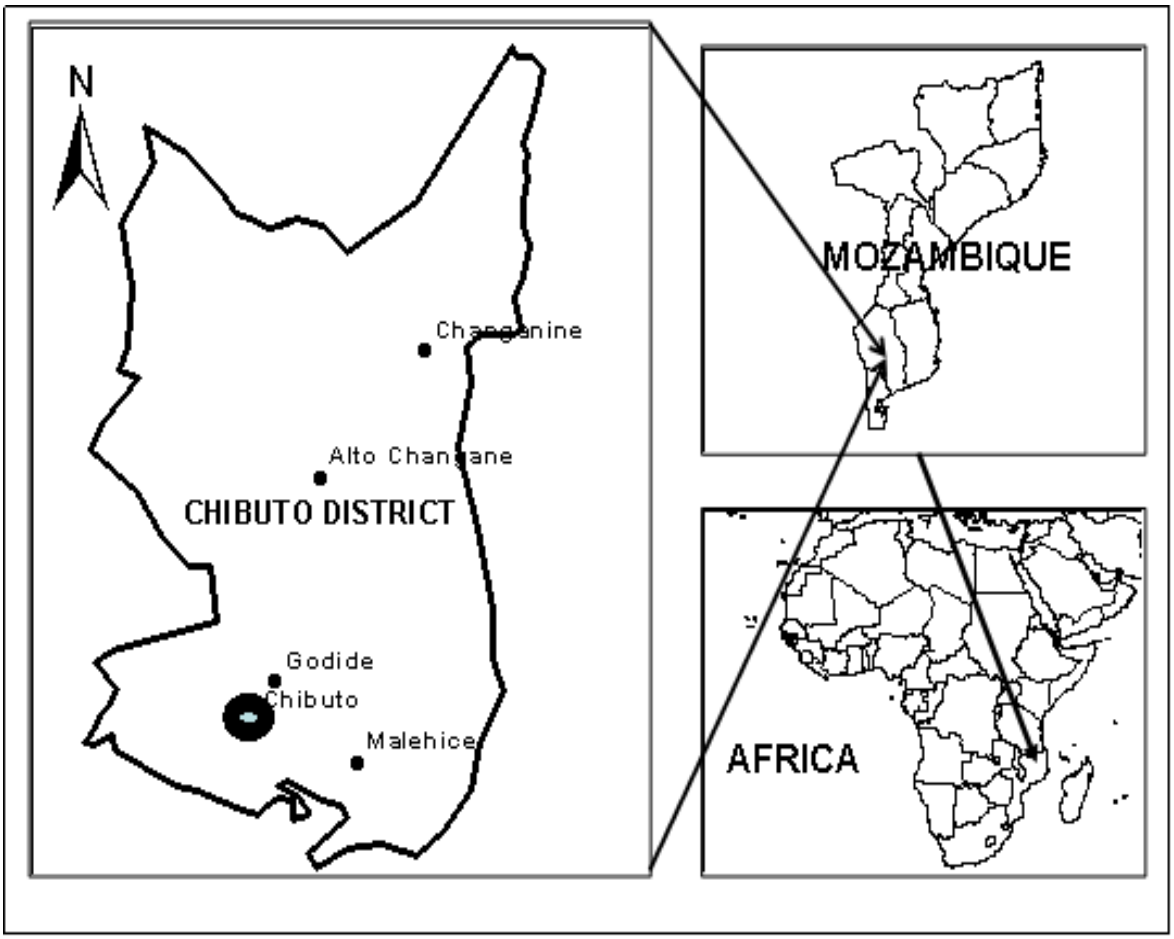

Figure 1. Map of Chibuto district

Table 1. Selected descriptive statistics (percentage, unless stated otherwise)

	Woman's religious affiliation			
Variable	Mainline	Zionist	Other Pentecostal	No Affiliation
Last child born in health clinic	74.07	58.94	65.12	49.47
Woman's number of prenatal consultations (mean)	4.44	3.98	4.30	3.60
Woman's age (mean)	30.41	31.18	31.18	32.41
Woman's number of children (mean)	2.71	2.75	2.89	2.89
Married woman	76.07	76.12	78.13	81.97
Women's education				
None	16.41	38.37	26.69	56.12
1 to 4 years	36.62	39.08	38.05	32.07
5+ years	46.97	22.55	35.26	11.81
Percentage of denominational group in the sample	19.66	41.90	25.36	11.54

Table 2. Concentration of religious congregations by denomination (means)

Place of residence	Mainline	Zionist	Other Pentecostal
Rural	2.94	2.98	5.30
Urban	1.69	5.21	6.26

Note: Within 5 Km in rural areas and 1 Km in urban areas from respondents' residence within District boundaries

Table 3. Random intercept logistic regression predicting youngest child delivery in a health care facility with mother's religious affiliation and concentration of churches as main predictors (odds ratio)

Predictors and controls	Model 1		Model 2		Model 3		Model 4	
Mother's religious affiliation								
No Affiliation [reference]	1		1				1	
Mainline churches	2.00	**	1.57	*			1.47	†
Zionist churches	1.17		1.08				1.06	
Other Pentecostal churches	1.22		1.06				1.04	
Community concentration of religious congregations								
Mainline churches					1.14	**	1.14	**
Zionist churches					1.00		0.94	*
Other Pentecostal churches					1.02		1.06	
Individual (mother) controls								
Mother's age			0.99				0.99	
Mother's number of children			0.89	*			0.89	*
Mother's marital status								
Not married [reference]			1				1	
Married			1.14				1.16	
Mother's education								
Less than 1 [reference]			1				1	
1-4 years education			1.54	**			1.54	**
5+ years education			2.42	**			2.19	**
Distance to closest clinic								
Urban [reference]			1				1	
Rural less than 5 Km			1.12				0.90	
Rural 5 Km or more			0.64	*			0.59	*
Community context controls								
Average level of education in the village							1.18	†
Intercept	1.36	*	1.94		1.18		1.21	
-2 Res Log Pseudo-Likelihood	5693.69		5781.54		5708.36		5822.76	
Generalized Chi-Square	1218.19		1223.25		1219.76		1224.63	
Number of cases	1297		1297		1297		1297	

Notes: †- p<.1; *- p≤ .05; **- p≤ .01.

Table 4. Random intercept ordinary linear regression predicting the number of prenatal consultations before the birth of youngest child with mother's religious affiliation and concentration of churches as main predictors (coefficient and standard error in parentheses)

Predictors	Model 1		Model 2		Model 3		Model 4	
Mother's religious affiliation								
No Affiliation [reference]	1		1				1	
Mainline churches	0.41*	(0.16)	0.33*	(0.17)			0.28†	(0.17)
Zionist churches	0.27*	(0.14)	0.25†	(0.14)			0.24†	(0.14)
Other Pentecostal churches	0.37*	(0.15)	0.34*	(0.15)			0.31*	(0.15)
Community concentration of religious congregations								
Mainline churches					0.04	(0.03)	0.03	(0.03)
Zionist churches					-0.03	(0.02)	-0.04†	(0.02)
Other Pentecostal churches					0.04	(0.04)	0.05	(0.03)
Individual (mother) controls								
Mother's age			0.02	(0.01)			0.01	(0.01)
Number of living children			-0.06	(0.04)			-0.06	(0.04)
Mother's marital status								
Not married [reference]			1				1	
Married			-0.08	(0.14)			-0.07	(0.14)
Mother's education								
Less than 1 [reference]			1				1	
1-4 years education			0.19	(0.13)			0.18	(0.13)
5+ years education			0.28*	(0.15)			0.22	(0.15)
Distance to the closest clinic								
Urban [reference]			1				1	
Rural less than 5 Km			0.14	(0.20)			0.09	(0.22)
Rural 5 Km or more			-0.02	(0.16)			0.00	(0.20)
Community context controls								
Average level of education in village							0.10	(0.07)
Intercept	3.84**	(0.12)	3.84**	(0.33)	4.03**	(0.10)	3.25**	(0.41)
-2 Res Log Pseudo-Likelihood	4762.19		4777.58		4777.27		4792.00	
Generalized Chi-Square	3640.37		3614.43		3626.09		3594.2	
Number of cases	1193		1193		1193		1193	

Notes: †- p<.1; *- p≤ .05; **- p≤ .01.