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Religion and Use of Institutional Child Delivery Services: Individual and Contextual Pathways in Mozambique

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Abstract

CONTEXT: Research on institutional child delivery in Sub-Saharan Africa typically focuses on availability and accessibility of health facilities. Cultural factors, including religion, that may facilitate or hinder the use of such services have not been well examined and remain poorly understood.

METHODS: The relationship between religious affiliation and delivery in a health facility was explored using data from a household survey of 1,297 women aged 18–50 and a census of 825 religious congregations, both conducted in a predominantly Christian district in Mozambique in 2008. Multilevel logistic regression analyses were conducted to predict the likelihood of recent institutional delivery according to both individual religious affiliation and the concentration of religious congregations of certain denominations in the community of residence.

RESULTS: Approximately 63% of deliveries occurred in a health facility. The odds of such deliveries were lower among women who belonged to Apostolic churches or had no religious affiliation than among members of Catholic or mainline Protestant churches, net of other factors (odds ratios, 0.5 and 0.6, respectively). In addition, regardless of a woman's religion, the odds that she had an institutional delivery increased by 9% for each additional Catholic or mainline Protestant congregation in her community of residence (1.1).

CONCLUSIONS: Organized religion is associated with critical health outcomes in Mozambique and, potentially, in other Sub-Saharan African contexts. Policymakers should consider designing programs and interventions that promote the use of institutional delivery services among members of religious groups characterized by low use of these services and in areas where such religious groups have a strong presence.

RESUMEN

La investigación sobre los servicios institucionales de parto en África Subsahariana se enfoca generalmente en la disponibilidad y accesibilidad de las instituciones de salud. Los factores culturales, incluida la religión, que pueden facilitar o dificultar el uso de dichos servicios no han sido examinados a fondo y siguen siendo deficientemente comprendidos.

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Se exploró la relación entre la afiliación religiosa y el hecho de atender el parto en una institución de salud mediante el uso de datos de una encuesta de hogares de 1,297 mujeres en edades de 18–50 años y un censo de 825 congregaciones religiosas. Ambos estudios se llevaron a cabo en 2008, en un distrito predominantemente cristiano en Mozambique. Se realizaron análisis de regresión logística multinivel para predecir la probabilidad de un parto institucional reciente con base tanto en la afiliación religiosa individual como en la concentración de congregaciones religiosas de ciertas denominaciones en la comunidad de residencia.

Aproximadamente, el 63% de los partos tuvieron lugar en una institución de salud. Las probabilidades de ese tipo de partos fueron menores en mujeres que pertenecían a las iglesias apostólicas (razón de probabilidades, 0.5) o que no tenían una afiliación religiosa (0.6), que en miembros de las iglesias católica o protestantes históricas, independientemente de otros factores. Además, sin importar la religión, las probabilidades de que una mujer hubiera tenido un parto institucional aumentaron en 9% por cada congregación católica o protestante histórica adicional en su comunidad de residencia (1.1).

La religión organizada puede tener una influencia fundamental en los resultados de salud en Mozambique y, potencialmente, en otros contextos de África subsahariana. Los encargados de formular políticas deben considerar el diseño de programas e intervenciones que promuevan el uso de servicios de parto institucionales entre miembros de grupos religiosos caracterizados por un reducido uso de estos servicios y en áreas en donde tales grupos religiosos tienen una presencia significativa.

RÉSUMÉ

La recherche sur l’accouchement médicalisé en Afrique subsaharienne se concentre généralement sur la disponibilité et l’accessibilité de structures sanitaires. Les facteurs culturels, y compris la religion, qui peuvent faciliter ou entraver le recours à ces services ne sont guère examinés et restent mal compris.

Le rapport entre l’affiliation religieuse et l’accouchement en établissement de santé a été étudié sur la base des données d’une enquête de ménages concernant 1 297 femmes âgées de 18 à 50 ans et d’un recensement de 825 congrégations religieuses, menés tous deux dans un district principalement chrétien du Mozambique en 2008. Des analyses de régression logistique multiniveaux ont été effectuées pour prédire la probabilité d’un accouchement récent en milieu médicalisé en fonction de l’affiliation religieuse individuelle et de la concentration de congrégations religieuses de certaines confessions dans la communauté de résidence.

Environ 63% des accouchements avaient eu lieu en structure sanitaire. La probabilité de ces accouchements était moindre parmi les femmes membres d’Églises apostoliques (RC, 0,5) ou sans affiliation religieuse (0,6), par rapport aux membres de l’Église catholique ou des Églises protestantes traditionnelles, après correction d’autres facteurs. De plus, indépendamment de la religion de la femme, la probabilité qu’elle ait accouché en milieu médicalisé augmentait de 9% par congrégation catholique ou protestante traditionnelle dénombrée dans sa communauté de résidence (1,1).

La religion organisée peut affecter d’importants résultats de santé au Mozambique et, potentiellement, dans d’autres contextes d’Afrique subsaharienne. Les décideurs politiques doivent envisager la conception de programmes et d’interventions qui favorisent le recours aux services

d'accouchement médicalisé parmi les membres des groupes religieux caractérisés par un faible recours à ces services et dans les zones où ces groupes ont une forte présence.

Sub-Saharan Africa accounts for two-thirds of all global maternal deaths;[1] in the region, the lifetime risk of maternal death is one in 36, compared with one in 4,900 in developed countries. In addition, in Sub-Saharan Africa, one child in 12 dies before age five.[2] Most of these deaths can be prevented,[3] especially through the use of institutional child delivery services—i.e., births assisted by skilled professionals in health care facilities.[4] Yet only 57% of births in the region take place in such facilities, according to data compiled between 2013 and 2018.[5] Factors that impede women from having institutional deliveries include poverty, the need to travel long distances to reach facilities, inadequate provision of services and frequent reliance on traditional birth attendants.[4,6,7]

The influence of religion may be particularly important, given its centrality to people's lives on the subcontinent.[8,9] Although the literature on the relationship between religion and health in Sub-Saharan Africa is still incipient, in more-developed settings—especially, the United States—this subject has received considerable attention.[10–14] Studies there have found that behaviors and choices regarding health care services use are associated with religious affiliation and involvement, as religious organizations may provide health information, facilitate access to services, promote healthy lifestyles and enhance trust in the health care system.[15–19] Moreover, several of these studies have reported that variations among religious groups and denominations in health beliefs and norms may be associated with different levels of health care utilization.[13–20] For example, Benjamins found that mainline Protestants, Catholics and Jews were generally more likely to trust physicians than Evangelical Protestants were,[19] and Bartkowski et al. highlighted the importance of faith healing and the distrust of conventional medicine among Pentecostal communities.[20] Other research has demonstrated that religiously engaged individuals are exposed to religious teachings that may encourage or discourage certain health behaviors,[14] and affiliation with religious groups that discourage the use of specific medications or treatments may lead to lower utilization of health care services.[13] Yet religious affiliation and involvement may also cultivate deference to authority and compliance with nonreligious societal rules and regulations in such a way that affiliated individuals may be more likely to follow such secular rules and regulations.[14,21] In the context of developing countries, this may apply to such critical health care practices as family planning and institutional delivery. For instance, a study in a religiously conservative area of rural Mexico found that young women creatively interpret religious scripts to justify contraceptive use and family size limitation.[22]

Similarly, the nascent body of studies exploring connections between religion and health in Sub-Saharan Africa have reported religious and denominational differences in such diverse health outcomes as child nutrition, child survival and HIV risk reduction.[8,23–25] For example, Antai et al. found an association between affiliation with a traditional religion (i.e., one involving "the worship of idols that serve as intermediaries to the spirits of the dead, and the supernatural residents of the land") and under-five mortality in Nigeria, which they attributed to differential use of prenatal health care services.[23] Agadjanian found that, in Mozambique, members of Catholic and mainline Protestant denominations were more likely

than members of healing denominations (e.g., Zionist and Apostolic) to have heard about HIV and AIDS in their churches, and to have a better understanding of HIV transmission risks.[25]

With respect to maternal and child health services utilization, the few studies that have focused on Sub-Saharan Africa have also detected religious and denominational differences. For example, a study in Zimbabwe found that affiliation with Apostolic churches was strongly associated with reduced utilization of maternal and child health services.[26] Dodzo et al. attributed the relatively high maternal mortality among members of Apostolic churches to their reliance on prayer-based healing, which may inhibit or delay use of professional health assistance in cases of obstetric complications.[27] Moreover, members of Apostolic churches often rely on spiritual birth attendants—those whose skills in assisting deliveries are believed to be "spiritually imparted"—because they believe that some maternal health care needs can only be addressed spiritually. A study in Ghana reported higher use of maternal and child health services, including institutional delivery, among Christian women than among Muslim women and women practicing traditional religion.[9] The authors suggest that variations in institutional delivery between Christian and non-Christian women could be linked to differences in religious teachings and related preferences, and choices regarding the use of modern versus traditional medicine. Variations in how individuals from different religions access other health services, such as family planning, have also been documented.[28–30]

Contextual mechanisms of religious influence on health care services use in Sub-Saharan Africa have received less attention. In Zimbabwe, Makate and Makate found a positive association between the percentage of Christians in an area and women's receipt of any prenatal care.[31] A study in Nigeria and Tanzania found that modern contraceptive use was higher in religiously mixed areas—those with sizeable shares of both Christians and Muslims—than in religiously homogenous areas.[29] Another study, in Malawi, reported higher levels of modern contraceptive use in communities where the majority of the population was affiliated with Protestant denominations than in communities where no single religious group predominated.[30]

These studies all point to the importance of religion at both the individual and contextual levels for various sexual and reproductive health behaviors and outcomes, including institutional delivery, in Sub-Saharan Africa. However, they typically investigated the association between individual religious affiliation and the use of maternal and child health services;[9,26,32] studies on how community-level religious composition and contextual factors relate to maternal health services remain scarce. Yet research has shown that both individual and contextual-level factors may be associated with use of institutional delivery services.[33] Our study seeks to expand the literature in the context of Sub-Saharan Africa by examining the association between individual- and community-level religious characteristics and women's likelihood of delivering a child in a health care facility in Mozambique.

The Setting

Mozambique, a nation of nearly 30 million inhabitants located in southeast Africa,[34,35] is typical of the subcontinent with respect to the state of maternal and child health. After the end of its 16-year civil war, in 1992, Mozambique initiated reconstruction efforts that resulted in annual gross domestic product growth of roughly 7% throughout much of this postwar period to the present day.[36] However, the country currently ranks near the bottom of the Human Development Index, created by the United Nations Development Programme to measure achievements in life expectancy, standards of living and education.[37] Despite improvements in maternal and child health outcomes in Mozambique during the last two decades, levels of poor outcomes remain among the highest in the world; in 2015, the maternal mortality ratio was estimated at 489 deaths per 100,000 live births, compared with 216 per 100,000 globally, and only 70% of births took place in a health care facility.[38,39] To prevent maternal and child deaths, the country launched the National Maternal Mortality Reduction Strategy in 2000,[40] followed by several other initiatives, including the creation of maternal waiting homes for pregnant women,[41] the implementation of the Estratégia Nacional de Planeamento Familiar e Contracepção 2011–2020 (National Strategy for Family Planning and Contraception 2011–2020), and campaigns promoting use of maternal and child health services and combating child marriage.[42] Currently, all maternal and child health services, including institutional deliveries, are provided free of charge in state-run health clinics.[43]

In this study, we use data from Chibuto District in southern Mozambique's Gaza Province, which had an estimated total fertility rate of 4.7 children per woman in 2015.[39] According to the 2017 National Population and Housing Census, the district had approximately 221,000 inhabitants.[34] The main economic activity is subsistence agriculture, but male labor migration to neighboring South Africa is common.[43] The district is ethnically homogenous —Changana was the primary language of nearly 95% of participants in a 2008 survey—and largely Christian, with considerable denominational diversity.[28] Before Mozambique gained independence from Portugal, in 1975, the religious landscape of the district and surrounding areas was dominated by the Catholic Church and mainline, or mission-based, Protestant (e.g., Anglican, Baptist, Methodist or Presbyterian) churches. The end of the colonial era and the early independent period witnessed the rapid growth of African-initiated churches that primarily followed (broadly defined) Pentecostal traditions and focused on faith healing, such as Apostolic and, especially, Zionist churches; these neo-Pentecostal denominations have flourished in the district, as elsewhere in Mozambique. Despite losing membership and much of their earlier public clout, Catholic and mainline Protestant denominations have retained strong connections to the state, and particularly to the state-run health sector (where almost all rural residents receive care), mainly because many health care professionals belong to these denominations.[8] This tendency has its roots in colonial times, when many basic health, educational and social services were provided by the state-supported Catholic Church and by Protestant missions.[8,44] Although the district's religious makeup includes Muslims, their proportion in the population is very small.[24]

Conceptual Framework and Hypotheses

Three main theoretical perspectives on the relationship between religion and health outcomes have traditionally been entertained in the literature: the particularistic theology, the characteristics and the minority group status perspectives.[45–47] The particularistic theology perspective argues that the differences among religious denominations in the teachings and belief systems that guide members' everyday behaviors and practices may result in differences in health behaviors among individuals affiliated with distinct religious denominations.[23,46] According to the characteristics perspective, variations in health behaviors among individuals affiliated with distinct religious groups are attributable to differences in the socioeconomic and other nonreligious characteristics of these groups; once such characteristics are accounted for, the observed religious differences should disappear.[46] Finally, the minority group status perspective attributes differences among minority groups in health behaviors and outcomes to group members' unique status and conditions in society.[45] Agadjanian adapted the minority group status perspective to the study setting by arguing that Catholic and mainline Protestant congregations in Mozambique historically have been connected to the state apparatus—particularly to its educational and health branches.[28] Consequently, while constituting a minority, members of these denominations may be more likely than members of other denominations to use health care services—including institutional delivery—not because of any theological predispositions, but because of their enduring historical connections to the public health sector.

Our study draws on all these perspectives and connects them with scholarship that argues that communities' social environments may shape individuals' health behaviors.[48,49] Considering religion as a characteristic of the social environment, Ovadia and Moore reported that in the United States, the local denominational makeup was associated with levels of teen childbearing.[50] Similarly, in Sub-Saharan Africa, studies have demonstrated associations between an area's religious composition and prenatal care utilization, child health and contraceptive use.[29–32] However, the role of cultural factors, including religion, in encouraging or deterring the utilization of child delivery services—and of maternal and child health services in general—has not been well studied in the subcontinent.

Adapting these theoretical perspectives to our study context, we propose two hypotheses. First, the likelihood of a woman delivering in a health care facility will vary by religious affiliation. Consistent with previous research in southern Africa, we expect to find particularly low levels of institutional delivery among women affiliated with faith healing–oriented apostolic denominations, as well as among members of Zionist and neo-Pentecostal churches. Institutional deliveries should also be less common among women unaffiliated with any specific denomination, as such women may hold traditional religious beliefs and follow related pregnancy and child birth practices,[9,51] which could favor home delivery services. In contrast, we expect women affiliated with Catholic and mainline Protestant denominations to have high levels of institutional delivery. Second, the religious makeup of the residents of the area where a woman resides will be associated with the likelihood of her delivering a child in a facility. Specifically, we expect that the advantages Catholic and mainline Protestant women gain in the propensity to access health care services may be transmitted through both verbal and nonverbal interactions to members of other religious

groups in the area. We therefore expect to find an association between residing in a community with a high proportion of Catholic or mainline Protestant churches and the likelihood of institutional delivery, regardless of individual religious affiliation and other factors.

METHODS

Data

We used data on Chibuto District's religious composition that were collected in 2008 as part of the household Chibuto Religion and Health survey, as well as data from a census of religious congregations, also collected in 2008; both the survey and the census were conducted through the Religious Organization and HIV/AIDS Prevention and Care research project, sponsored by the National Institutes of Health. The household survey used cluster sampling to attain a representative sample of households in 82 communities (clusters) in both urban and rural areas of Chibuto District. In each selected household, one woman aged 18–50, regardless of marital or childbearing status, was randomly chosen for an interview. The survey collected information on 2,019 respondents' religious affiliation from birth through the year of the survey; information on recent use of maternal and child health services, including the place of delivery of the respondent's youngest living child; and various characteristics of respondents and their households. To reduce potential for recall bias, we excluded from our analysis 605 women who had not had any births in the past five years; 49 women who did not know their children's year of birth; 12 Muslim women, because this number was too small for robust statistical comparisons; and 56 women with missing information on covariates. The final analytic sample comprises 1,297 women.

The congregation census collected information about the structure, size, activities and geographic coordinates of all of the 1,133 active religious congregations that were registered with local authorities and the district's Commission for Religious Affairs. The survey and the census were approved by the institutional review board of Arizona State University. Additional information about the household survey and the congregation census design and content is available from the authors upon request.

Measures

Outcome.—Our outcome is a binary variable indicating whether a woman's youngest living child was born in a health care facility.

Independent variables.—Our individual-level measure is religious affiliation in the year preceding the youngest living child's year of birth; we used the year prior to birth to reduce the possibility of reverse causality (i.e., that the circumstances of childbirth influenced religious membership). Adopting the classification widely used in previous research in Mozambique,[24] because it best reflects the religious landscape of southern Mozambique and the study site in particular, we classified respondents into one of five religious affiliation categories: Catholic or mainline Protestant, Apostolic, Zionist, neo-Pentecostal and nonaffiliated. Though each of the four denominational categories is internally diverse, these groupings are justified on the basis of both doctrinal and institutional characteristics. In

particular, combining the Catholic and mainline Protestant denominations into one category is meaningful because of the tendency of Mozambican health care professionals to come from either Catholic or mainline Protestant backgrounds.

Our community-level measure is the concentration of religious congregations of each denominational type in a respondent's community of residence. The congregation concentration measure, which uses the same denominational classification as the individual-level measure, was created using geographic coordinates of respondents' households and of 825 religious congregations; 308 congregations were excluded because of missing coordinates. To address this limitation, we conducted a review of congregations without coordinates, which suggested no specific denominational or geographic patterns. Employing the *geodist* package in Stata, we computed the distance from each respondent's household to each congregation. We recorded the number of congregations of a given type within five kilometers of each respondent's household in rural areas and within one kilometer in urban areas. On the basis of previous work in this district,[24] we assumed that in rural areas, people are likely to interact with others within five kilometers of their home; we assumed that in urban areas, which have high population densities, such interactions occur within one kilometer.

Controls.—We controlled for woman's age (18–24, 25–34 and 35 or older), parity at the time of the focal birth (a continuous variable), education (none, 1–4 years and five or more years) and marital status (in official marriage or marriage-like union or not). Another variable, the household assets index, is an additive composite index based on household possession of five items: a radio, a metal or wooden bed with a mattress, a landline or cellular phone, a bicycle and a plough (a continuous variable scored from 0 to 5). Finally, we controlled for distance from each respondent's home to the nearest health facility. To account for considerable variation in access to health services between urban and rural areas, this measure is represented by three dummy variables: urban residence (distance to a facility likely is negligible), rural residence less than five kilometers from a health facility and rural residence five or more kilometers from a health facility. Given that Chibuto District is largely monoethnic (Changana-speaking), we did not control for ethnicity. With the exception of parity at last birth, all control variables were measured at the time of survey.

Analysis

We first conducted a descriptive analysis to assess the distributions of the variables of interest. When estimating these distributions, we accounted for the clustering of observations within sampling units (villages or town boroughs) by using the *svyset* command in Stata.[52] Then, to estimate the likelihood that a woman had delivered her youngest child at a health facility, we employed binomial logistic regression for multivariate analysis. Individuals living in the same community may have similar health outcomes because of shared community environment, regardless of their individual characteristics.[53] To minimize possible bias due to unobserved shared characteristics among women living in the same communities, we fitted two-level logistic regression models in which level 1 is represented by women and level 2 by their communities.[54]

In our models, the log odds of a woman delivering her youngest child in a health care facility (compared with not delivering her youngest child in a health care facility) is a function of her characteristics and those of her community. In these models, the individual-level random intercept refers to variations in the probability of institutional delivery across women, and the community-level random intercept indicates how this probability may vary across communities.[53]

We started with a baseline model that examines the association between woman's denominational affiliation and institutional delivery without controls. The second model adds individual and community-level controls, and the third model further includes community-level concentration of religious congregations of the four denominational categories. All models are fitted using the *xtmelogit* command in Stata.

RESULTS

Descriptive Statistics

Some 63% of women delivered their youngest living child in a health care facility (Table 1). Considerable variation in religious affiliation existed; the greatest share of women were Zionist (43%), followed by Catholic or mainline Protestant (21%), Apostolic (13%), nonaffiliated (13%) and neo-Pentecostal (11%). Accordingly, Zionist congregations had the highest concentration in the study area (mean concentration, 10), followed by neo-Pentecostal congregations and Catholic or mainline Protestant congregations (five each). Approximately half of women (46%) were in the 25–34 age-group, and 84% were married. Women had had 3.7 live births, on average; most had never gone to school (30%) or had only 1–4 years of education (40%). Women's households had, on average, 2.3 of the five household items that were used to construct the household assets index. Fifty-seven percent lived five or more kilometers from the nearest health facility.

Multivariate Analyses

In the baseline model that omitted control variables, women had lower odds of having delivered their last child in a health care facility if they were affiliated with Apostolic (odds ratio, 0.5) or Zionist (0.6) denominations than if they belonged to a Catholic or mainline Protestant congregation (Table 2). Similarly, women not affiliated with a religious organization had lower odds than the reference group of having given birth in a facility (0.5).

In model 2, which added variables for demographic and socioeconomic characteristics and distance to the nearest health facility, the magnitude of coefficients diminished. Compared with their Catholic or mainline Protestant counterparts, women who were affiliated with Apostolic congregations had 46% lower odds of delivering a child in a health care facility (odds ratio, 0.5), and nonaffiliated women had 36% lower odds (0.6). These odds were also 31% lower for Zionists (0.7), although the finding was only marginally significant.

Model 3 tested our second hypothesis by adding the variable for concentration of congregations of different denominations. The results show that living in an area with considerable presence of Catholic or mainline Protestant congregations was positively associated with giving birth in a facility: A one-congregation increase in the number of such

congregations increased a woman's odds of giving birth in a health care facility by 9%, net of her religious affiliation, distance to the closest facility and other characteristics (odds ratio, 1.1). The concentration of congregations of the other denominations was not associated with institutional delivery. Moreover, the odds ratios for women's religious affiliation were essentially unchanged from model 2: Women had reduced odds of institutional delivery if they belonged to an Apostolic church (0.5) or had no religious affiliation (0.6) than if they were affiliated with a Catholic or mainline Protestant congregation.

Using the Stata covariance (unstructured) option, we also fitted a set of models in which the community-level random intercepts in general and the slope of religious composition were allowed to covary (not shown).[54] These additional tests produced a statistically significant random intercept of concentration of Catholic or mainline Protestant congregations in the community, with standard deviation of 0.04 ($p<.05$). Therefore, the odds of institutional delivery for a woman residing in a community where the number of Catholic or mainline Protestant congregations is one standard deviation above the mean is approximately 4% higher than for women in communities with the average number of these congregations. However, this model specification did not change the magnitude of individual- and community-level associations between religion and institutional delivery displayed in model 3.

Among the control variables included in model 3, a one-child increase in parity was associated with a 10% reduction in the odds of an institutional delivery (odds ratio, 0.9). Furthermore, compared with mothers who had five or more years of education, those with no education and those with 1–4 years of education had lower odds of having delivered in a health facility (0.4 and 0.7). Finally, women who lived in a rural area at least five kilometers from the nearest facility had 36% lower odds of an institutional delivery compared with those residing in an urban area (0.6).

DISCUSSION

Whereas most analyses of institutional delivery in Sub-Saharan Africa have focused on availability of and access to delivery services, the results of this study illuminate the important role of religion—on both an individual and a community level—in women's availing themselves of these services. At the individual level, our finding that nonaffiliated women and those affiliated with Apostolic and Zionist congregations are less likely than women belonging to Catholic or mainline Protestant congregations to deliver in a facility supports our first hypothesis—that the likelihood of delivering in a health care facility will vary by a woman's religious affiliation. The finding also generally aligns with previous research that has found lower use of professional health care services in Sub-Saharan Africa among faith healing–oriented denominations, such as Apostolic and Zionist congregations, and nonaffiliated women, who disproportionately resort to nonmedically trained providers of reproductive health care.[9,26,27,51] The greater usage among Catholic and mainline Protestant women may reflect their higher levels of decision-making autonomy compared with women belonging to other religious denominations (e.g., Zionist or Apostolic);[55] it may also derive from their historical connections to public medical services (e.g., having fellow congregation

members who work in the health sector) or their stronger inclination to use professional health care services, compared with women of Zionist or Apostolic denominations.[8,26,28]

Our findings therefore point to the importance of considering congregation-derived societal connections in addition to doctrinally rooted practices in investigations of the role of religion in women's access to and use of institutional delivery services. Although we cannot examine these specific mechanisms directly with our data, the findings suggest directions for future research. Interestingly, the likelihood of institutional delivery did not differ between members of neo-Pentecostal congregations and those of Catholic and mainline Protestant congregations. This finding may indicate the unique nature of membership in Mozambique's neo-Pentecostal congregations, which combine high levels of religious engagement with relatively strong practical connections to the secular world—including the health sector—driven by pursuit of personal betterment.[56]

In examining the role of religion in institutional child delivery in a community-level religious context, we found a positive association between residing in a community with a greater presence of Catholic or mainline Protestant congregations and the likelihood of institutional delivery, after adjustment for individual religious affiliation, other individual-level characteristics and distance to the nearest health facility. This finding supports our second hypothesis—that the likelihood of a woman delivering in a health facility will be associated with the religious makeup of the residents of the area in which she resides—and suggests that the presence of Catholic or mainline Protestant congregations in an area may benefit not only the members of these denominations but also adherents of other faiths. Although we cannot directly examine the relevant mechanisms, this community-level influence may operate through informal interactions among neighbors belonging to different churches. A specialized inquiry, preferably engaging both quantitative and qualitative analytic tools, is needed to fully capture and evaluate these processes.

Limitations

Our study has limitations. First, we did not consider the possibility that women might change their religious affiliation. If a woman did so, her use of institutional delivery services could be linked to a previous, rather than current, affiliation. However, because we considered a woman's religious affiliation a year before the birth of her youngest child, any bias in the results because of religious switching should be minimal. There is also a possibility that some women attended services at multiple churches of different denominations but reported only one congregational affiliation. Occasional visits to other churches out of spiritual curiosity, search for faith-based solutions to health disorders or other reasons do happen, and switching religious affiliation is not unusual; however, concurrent membership in multiple congregations is not common.[55,57] Although our study does not account for the use of professional birth attendants at home, this practice is not widespread in Chibuto District.[6] Finally, our study site is predominantly Christian, and we therefore could not examine potentially consequential differences between Christian and Muslim congregants. However, our results may be generalizable to many other parts of Sub-Saharan Africa where Christianity is the dominant religion.

Conclusions

This study expands our understanding of barriers to and facilitators of the use of institutional delivery services—in particular, the role of cultural factors, including religion, in encouraging or deterring the use of these services in Mozambique and similar Sub-Saharan African settings. Although questions remain about the complex mechanisms through which religion may be linked to use of maternal and child health services, our findings illustrate the particular role that organized religion plays in this aspect of people's lives. To fully harness the potential of organized religion, policies and programs aimed at improving health and well-being in Sub-Saharan societies should be mindful of those societies' religious intricacies at both the individual and contextual levels. In particular, programs and interventions designed to increase the coverage of institutional delivery services should target religious denominations whose members are less likely to use such services and areas where the religious composition is associated with lower use of such services.

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TABLE 1.

Selected characteristics of women aged 18–50, Chibuto Religion and Health Survey, Chibuto District, Mozambique, 2008

Characteristic	% or mean (N=1,297)
Delivered youngest living child in a facility	
Yes	62.6
No	37.4
Religious affiliation	
Catholic/mainline Protestant	21.4
Apostolic	12.6
Zionist	42.7
Neo-Pentecostal	10.7
None	12.6
Mean congregation concentration[†]	
Catholic/mainline Protestant	5.2
Apostolic	2.1
Zionist	10.1
Neo-Pentecostal	5.2
Age	
18–24	30.3
25–34	46.1
≥35	23.6
Married	
No	15.6
Yes	84.4
Mean parity	3.7
Education	
None	30.1
1–4 years	39.6
≥5 years	30.3
Mean no. of household assets (range, 0–5)	2.3
Distance to nearest health care facility	
Negligible (urban residence)	21.4
<5 km (rural residence)	21.5
≥5 km (rural residence)	57.1

[†]Refers to the number of congregations within five kilometers for rural areas and one kilometer for urban areas.

Notes: Unless otherwise noted, figures are percentages. km=kilometers.

TABLE 2.

Odds ratios (and 95% confidence intervals) from random-intercept logistic regression analyses assessing women's likelihood of delivery in a health care facility, by selected characteristics, according to model

Characteristic	Model 1	Model 2	Model 3
Religious affiliation			
Catholic/mainline Protestant (ref)	1.00	1.00	1.00
Apostolic	0.45 (0.29–0.71) **	0.54 (0.34–0.86) **	0.54 (0.34–0.86) *
Zionist	0.55 (0.38–0.79) **	0.69 (0.47–1.00) †	0.70 (0.48–1.02) †
Neo-Pentecostal	0.75 (0.45–1.24)	0.80 (0.48–1.35)	0.83 (0.50–1.40)
None	0.48 (0.33–0.71) **	0.64 (0.43–0.95) *	0.64 (0.43–0.96) *
Congregation concentration ‡			
Catholic/mainline Protestant	na	na	1.09 (1.03–1.16) **
Apostolic	na	na	1.02 (0.93–1.12)
Zionist	na	na	1.00 (0.97–1.03)
Neo-Pentecostal	na	na	0.95 (0.88–1.03)
Age			
18–24 (ref)	na	1.00	1.00
25–34	na	0.80 (0.57–1.11)	0.79 (0.57–1.11)
≥35	na	0.90 (0.56–1.46)	0.89 (0.55–1.44)
Married			
No (ref)	na	1.00	1.00
Yes	na	0.94 (0.66–1.33)	0.93 (0.65–1.32)
Parity	na	0.89 (0.81–0.99) *	0.90 (0.81–0.99) *
Education			
None	na	0.41 (0.29–0.59) **	0.44 (0.31–0.63) **
1–4 years	na	0.66 (0.47–0.92) *	0.69 (0.49–0.97) *
≥5 years (ref)	na	1.00	1.00
No. of household assets	na	1.08 (0.99–1.18) †	1.07 (0.98–1.17)
Distance to nearest health care facility			
Negligible (urban residence, ref)	na	1.00	1.00
<5 km (rural residence)	na	1.41 (0.90–2.22)	1.27 (0.77–2.09)
≥5 km (rural residence)	na	0.71 (0.49–1.04) †	0.64 (0.42–0.97) *
Intercept	*2.89(2.08–4.01)* **	*5.41 (3.02–9.66)* **	*4.18(2.23–7.86)* **
Level-two random intercept (SE)	*0.61 (0.10)* *	*051 (0.10)* *	*0.49(0.10)* *

* p≤.05.

** p≤.01.

† p<.10.

‡ Mean number of congregations within five kilometers for rural areas and one kilometer for urban areas.

Notes: ref=reference. na=not applicable. km=kilometers. SE=standard error.