Individual Religious Affiliation, Religious Community Context and Health in Mozambique

by

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A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Approved June 2011 by the
Graduate Supervisory Committee:

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ARIZONA STATE UNIVERSITY

August 2011

ABSTRACT

This dissertation examines associations between religious affiliation, religious community context and health of women and their children in Mozambique focusing on the following issues: (1) attending prenatal consultations and delivering children in a health facility; (2) women's symptoms of STDs; and (3) under-five mortality. Estimation of random intercept Poisson regression for the outcome about attending prenatal consultations demonstrated a favorable effect of affiliation to Catholic or Mainline Protestant and Apostolic religious groups. The concentration of Zionist churches in the community had a negative influence. Random intercept logistic regression was used to estimate the relationship between religion and institutional child delivery. Affiliation to Catholic or Mainline Protestant denominations as well as concentration of Catholic or Mainline Protestant churches in the community had some beneficial effect on giving birth in health clinics. The presence of Zionist churches in the community had some negative effect and that of other groups no significant influence. Random intercept logistic regression was also employed for investigating the influence of religion on women's symptoms of STDs. Belonging to the Catholic or Mainline Protestant church had some protective effect on reporting symptoms of STDs. There was no effect of religious context, except that the concentration of Other Pentecostal churches had a positive effect on reporting symptoms of SDTs. Event-history analysis was conducted for examining relationships between maternal religious affiliation with under-five mortality. Affiliation to Catholic or Mainline Protestant churches and to Apostolic

denominations increased the odds of child survival, although, the influence of having a mother belonging to Catholic or Mainline Protestant churches lost statistical significance after accounting particularly for the average level of education in the community, for the period of 5 years preceding the survey date. Taken together, the results in this dissertation show some protective effect of religion that varies primarily by denominational group to which women are affiliated. They also indicate that religious community context may have some negative effect on health of women and children. The nature of the effect of religious community context varies with the type of outcome considered and the type of religious mixture in the community.

ACKNOWLEDGMENTS

I am very thankful to my advisor and chair of the dissertation committee Dr. Victor Agadjanian for his invaluable intellectual guidance during my years in the PhD Program and particularly in writing this dissertation. I wish to express my gratitude to other members of the dissertation committee, Dr. Sarah Hayford and Dr. Scott Yabiku, for their instructive inputs to this dissertation. I thank my professors at the Center for Populations Studies for their support and inspiring guidance during my years at ASU. I would like also to thank my fellow colleagues at ASU for their support. To Arusyak Sevoyan, a word of appreciation for helping make the statistical program working for analysis of under-five mortality. I am very grateful to my wife Natércia, for her love, support and encouragement during my studies. To my son Denzil and my daughter Adriana, thinking about you was critical to help me overcome the difficult moments of my studies. To my parents, Maria Manguele and Manuel Cau, and to my siblings, I am thankful for your support. Data used in this dissertation was collected under the research project “Religious Organizations and HIV/AIDS in Mozambique” (Principal Investigator: Dr. Victor Agadjanian) funded by the Eunice Kennedy Shriver National Institute of Child Health & Human Development (grant # R01 HD050175). Data collection was carried out by the Center for Population Studies of ASU and the Center for African Studies of UEM in Mozambique. I am grateful for their effort to make data available for this dissertation. I would like to extend my appreciation to the team that undertook the actual data collection in Chibuto district, Mozambique.

TABLE OF CONTENTS

Page

LIST OF TABLES

Table Page

Table Page

Table Page

Table Page

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

Most studies of religion in sub-Saharan Africa have noted the importance of religious beliefs and practices on peoples' lives in this region (e.g., Carmody, 2003; Gallup-International, 2010; Garner, 2000; Gyimah, Takyi, & Addai, 2006; Pew Research Center, 2010; Trinitapoli, 2006). Yet, besides HIV/AIDS relatively little is known about the effect of religion on other most pressing health issues in sub-Saharan Africa. In this dissertation I examine the association of religion with health of women and their children in Mozambique. In particular, I investigate whether or not women's religious affiliation and religious community context is associated with (1) women's utilization of reproductive health-care services, and with (2) women's sexually transmitted diseases (STDs); and (3) whether or not women's religious affiliation has connections with under-five mortality.

Although I acknowledge that men's religious affiliation could influence their sexual behavior (Gyimah, Tenkorang, Takyi, Adjei, & Fosu, 2010; Trinitapoli & Regnerus, 2006) and their wives' risk of STDs, and that men's influence on women's reproductive issues (Avogo & Agadjanian, 2008; Ezeh, 1993; Dodoo, 1998) could affect the three outcomes I study, due to data limitation, in this dissertation I focus only on effects of women's religious membership.

The literature about religion in sub-Saharan Africa shows that in most countries of the region people are affiliated to organized religion and regard religion as a fundamental guide in everyday life. For example, a worldwide

survey conducted at the end of the millennium showed that in West Africa about 99 percent of respondents belonged to a religious denomination and 82 percent attended religious services regularly (Gallup-International, 2010). In East Africa, research found that approximately 92 percent Malawians reported to belong to a religious congregation (Trinitapoli, 2006), about 70 percent of Zambians belonged to a Christian denomination (Carmody, 2003) and in South Africa, about 90 percent of the Black population identified themselves with Christianity (Garner, 2000).

Perhaps due to this prominence of religion in lives of residents of sub-Saharan Africa, the literature on religion and health in sub-Saharan Africa has been flourishing (e.g., Agadjanian, 2005; Agadjanian & Menjívar, 2008; Antai, Ghilagaber, Wedrén, & Macassa, 2009; Gregson, Zhumu, Anderson, & Chandiwana, 1999; Gyimah, 2007; Lagarde et al., 2000; Maman, Cathcart, Burkhardt, Omba, & Behets, 2009; Rankin, Lindgren, Rankin, & Ng'oma, 2005; Takyi, 2003; Trinitapoli, 2009; Trinitapoli & Regnerus, 2006). However, most recent studies exploring the relationships between religion and health outcomes in sub-Saharan Africa have focused on HIV/AIDS (e.g., Agadjanian, 2005; Agadjanian & Menjívar, 2008; Lagarde et al., 2000; Maman et al., 2009; Rankin et al., 2005; Takyi, 2003; Trinitapoli, 2009; Trinitapoli & Regnerus, 2006).

Although the focus on HIV/AIDS in sub-Saharan Africa may be understandable given that two thirds of individuals living with HIV in the world reside in this region (WHO, 2010), we may be missing an opportunity to

understand possible effects of religion on other current health concerns in the region such as reproductive health-care utilization and under-five mortality.

In sub-Saharan Africa, on average only about 47 percent of births are attended by skilled health personnel, compared to an average of 96 percent in Europe (WHO, 2010). In sub-Saharan Africa, of every 1000 children born, on average, 142 die by age 5, compared with fewer than 10 of every 1000 born in developed countries (WHO, 2010). The figures are even worse in some countries in the region (WHO, 2010). Whether or not religion has an effect on the state of reproductive health-care utilization and under-five mortality in this region is not well known. Based on a case study in Mozambique, this dissertation contributes to our understanding of the association between religion and those health outcomes in sub-Saharan Africa.

Another omission in the current literature on religion and health outcomes in sub-Saharan Africa is the lack of examination of possible effects of community religious context on health outcomes. A few studies that are an exception to this practice in sub-Saharan Africa have examined the effects of religious organizations on HIV/AIDS issues (Agadjanian, 2005; Agadjanian & Menjívar, 2008; Trinitapoli, 2006; 2009). In a study in rural Malawi, Trinitapoli (2006) reported that congregations were responding to HIV/AIDS issues in various ways including preaching about fidelity and sexual abstinence. Agadjanian and Menjívar (2008) showed how church-based informal social interactions help women in coping with their worries and misgivings about HIV/AIDS in Mozambique.

Other studies also in sub-Saharan Africa have looked at the effect of religious community context on reproductive behavior (Agadjanian, Yabiku, & Fawcett, 2009; Stephenson, Baschieri, Clements, Hennink, & Madise, 2007). Agadjanian et al. (2009) investigated individual and community effects on Muslim-Christian differences in use of modern contraception in Nigeria and Tanzania and they reported that there was propensity for contraceptive use to be highest in religiously mixed areas. Stephenson et al. (2007) examined the association between community-level factors and geographic variation in modern contraceptive use in sub-Saharan Africa. Regarding community religious context, the authors reported that in Malawi women in communities predominantly Protestant showed higher use of modern contraceptive method compared with women in communities with mixture of religions. As these studies suggest, it could be that in Mozambique, variation in religious community context may be associated with differences in health outcomes, particularly differences in reproductive health care utilization behavior and STDs.

Despite the dearth of studies of associations between religious contextual factors and health outcomes in sub-Saharan Africa, researchers in the United States have documented connections between religious community context, mortality and reproductive health outcomes (e.g., Adamczyk, 2008; Dwyer, Clarke, & Miller, 1990; Jelen, O'Donnell, & Wilcox, 1993; Lesthaeghe & Neidert, 2006; Ovadia & Moore, 2010). For example, Dwyer and colleagues (1990) examined county religious concentration and denominational affiliation with cancer mortality in the United States and the authors reported that variations

in county religious context was associated with cancer mortality, net of other factors known to affect cancer mortality. Also in the United States, Ovadia and Moore (2010) examined the association between county religious context and adolescent childbearing. They reported that the percentage of total adherents in the count was not significantly associated with teen childbearing. However, significant effects of county religious milieu emerged after disaggregating county adherents by their religious denominations (Ovadia & Moore, 2010). These findings underscore the relevance of investigating effects of areal religious context on health outcomes.

The need to consider contextual factors when studying health and demographic outcomes is also suggested in studies that have examined associations between community contextual factors, other than religion, with health outcomes. For example, Andrzejewski, Reed, and White (2009) documented 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. Kravdal (2004) reported that the average education of women in a census enumeration area in India has a strong effect on child mortality beyond the effect of mother's own education. This study suggested that communities with high average level of education may have high knowledge about good health behavior, be better informed about health and less fatalistic.

With few exceptions (Moisi et al., 2010), community contextual factors as distance to health care units could also affect health outcomes in sub-Saharan

settings (Rutherford, Mulholland, & Hill, 2010; Schoeps, Gabrysch, Niamba, Sie´, & Becher, 2011). For example, Schoeps et al. (2011) examined relationships between distance to health facilities and mortality among infants and children under-5 years of age in the Nouna Health and Demographic Surveillance System, rural Burkina Faso. They found double mortality risk at a distance of 6 walking hours for all age groups. Considering infants, the effect of distance on mortality was small if living closer than about 3 hours from the closest health facility but higher if living further away. Overall, they concluded that travel distance to health facility was a major factor for infant, child, and overall under-5 mortality.

In Mozambique, it could be expected that contextual factors other than religion such as these (average level of education in the community and proximity to health care services) may influence utilization of health care services, STDs and under-five mortality. The present dissertation also contributes to increasing our understanding of relationships between religious contextual factors with health outcomes not related to AIDS in sub-Saharan Africa, and particularly in Mozambique.

Most studies in the religious literature typically entertain three alternative perspectives for the association of religion and demographic behavior and outcomes: 1) the “particularistic theology” perspective, which relates demographic behavior and outcomes to explicit religious prescriptions and proscriptions; 2) the “minority-group status” perspective, which focuses on a religious group socioeconomic and/or political disadvantages; and 3) the “characteristics” perspective, which posits that demographic differences among

religious groups can be fully explained by other factors (Goldscheider, 1971). The "particularistic theology" perspective and the "characteristic" perspective inform the formulation of hypotheses in this dissertation. In addition, there are two dimensions of religion that may affect health outcomes that are most important for this dissertation: (1) influence of religious membership on health outcomes, (2) and influence of religious context on health outcomes for members and non-members of religious organizations. For the first dimension, studies suggest that affiliation to organized religion may have protective effects on health (Ellison & George, 1994; Hummer, Ellison, Rogers, Moulton, & Romero, 2004; Jarvis & Northcott, 1987).

Individuals affiliated to organized religion (especially those who have a frequent religious service attendance) may benefit from religious-based resources that may contribute to better health outcomes (Benjamins, Trinitapoli, & Ellison, 2006; George, Ellison, & Larson, 2002; Taylor & Chatters, 1988). For example, studies indicate that Apostolic religious leadership in Central and Southern Africa have encouraged economic entrepreneurial endeavor among members that resulted in successful experiences in cottage industry, small trade and agriculture (Bourdillon, 1983; Jules-Rosette, 1997; Turner, 1980). This economic success among members of Apostolic religious group probably could allow for better housing and nutrition, creating a protection against under-five mortality.

Affiliated individuals also may benefit from social integration (social links and support) beyond what they could get from their families (Hummer et al., 2004). Most studies show that individuals affiliated to organized religion

(particularly those who attend to religious services frequently) have more non-family ties and greater access to social support than unaffiliated people (Ellison & George, 1994; Jarvis & Northcott, 1987). This social support could be in form of goods, money and transportation that may be critical for health (Benjamins et al., 2006; George et al., 2002; Taylor & Chatters, 1988). In resource-poor settings where health units are often far from most households, accessing additional support in money or transportation could offer health advantage.

Individual affiliation to organized religion could also provide critical health information and style of life that may lead to better health outcomes (Hummer et al., 2004; Benjamins et al., 2006; George et al., 2002; Levin, 1994; Rostas, 1999). For example, it could be considered that most religious organizations discourage risky sexual behavior (Cochran et al., 2004; Dollahite & Lambert, 2007; Rowatt, & Schmitt, 2003). Then, by avoiding exposure to risk sexual behavior those affiliated to an organized religion could be protected against STDs.

Members in religious congregations may also benefit from having co-religionists with diverse health skills who may provide health education and health counseling (Benjamins et al., 2006; Parish Nursing Website, 2010). Pfeiffer (2004) reported that in Central Mozambique midwives who are members of women's organizations in churches provide prenatal and birth care for members. This could be beneficial for health of involved women and their children.

However, it is important to note that religious organizations may vary in religious-based resources and their perspectives in relation to aspects of health

(i.e., health care utilization). That variation among religious organizations in resources and views about aspects concerning to health could have implications for health of members. For example, while Apostolic churches are known for economic entrepreneurship, like Zionist and most Pentecostal denominations they are among faith-healing religious organizations that in Southern Africa are reported to discourage use of modern health care services – even though Zionists are considered moderate on this aspect (Agadjanian, 2005; Gregson et al., 1999).

At the same time, other religious organizations, mainly Mission churches (e.g., Catholic, Anglican, Baptist and Methodist) are reported to encourage use of modern health care services by their members and to be connected with secular institutions, including those of education and health care (Agadjanian, 2001; Gregson et al., 1999; Gyimah et al., 2006; Kollehlon, 1994; Takyi, 2003; Zou et al., 2009). In Mozambique for example, Catholic and Anglican churches own formal educational establishments in some locations that could became vehicles to accessing health information.

The differences among religious organizations in economic endeavor, position towards use of modern health care services, connections to secular institutions and resources' endowment, could be expected to differently benefit health of affiliated individuals depending on the type of denomination to which he/she belong.

Another dimension that may affect health outcomes considered in this dissertation is religious community context. The theory on social influence and social learning developed primarily for studying reproductive behavior and

HIV/AIDS, argues that individuals may suffer social influence from the social environment in which they are (Helleringer & Kohler, 2005; Kohler, 1997; Kohler, Behrman, & Watkins, 2007; Behrman, Kohler & Watkins, 2002; Montgomery & Casterline, 1996). It is argued that individuals' behavioral preferences are potentially shaped by opinions and attitudes prevailing in their social environment (Behrman et al., 2002; Kohler et al., 2007). It could be that ideas influencing utilization of health care services and behaviors governing exposure to STDs are shaped by social environment as well.

In addition, social influence could be expected to occur in religious environments. It is likely that individuals residing in communities where a certain religious environment prevails, whether affiliated to an organized religion or not, could be socially influenced by the religious context that exist in their areas. This is the case in respect to the effect of religious context on reproductive behavior in some settings (Agadjanian et al., 2009; Cook, Jelen & Wilcox, 1993; Ovadia & Moore, 2010). Given differences among religious denominations, we would expect to find areal variation in the nature of religious-based social context. Furthermore, we would also expect differences in the effect of religious-based social context in shaping attitudes and behaviors of residents of certain area (whether or not affiliated to organized religion) on aspects such as reproductive health care utilization and STDs, depending on the type of religious denomination (or denominations) that is prevalent in that area.

Recently there have been advances in sub-Saharan Africa in research on relationships between religion and health especially on outcomes related to

HIV/AIDS (e.g., Agadjanian, 2005; Agadjanian & Menjívar, 2008; Lagarde et al., 2000; Maman et al., 2009; Rankin et al., 2005; Takyi, 2003; Trinitapoli, 2009; Trinitapoli & Regnerus, 2006), but with few exceptions (e.g., Antai et al., 2009; Gregson et al., 1999; Garner, 2000; Gyimah, 2007; Gyimah et al., 2006) the associations between religion and health care utilization, STDs other than AIDS, and under-five mortality remain largely underexplored particularly in Southern Africa. This is unfortunate given the reported significance of religion for people in the region, the lower use of reproductive health care services and higher under-five mortality. Our knowledge of associations between religion and health of women and their children continue to be limited, especially when we consider the contextual dimension of religious effect.

The present dissertation adds to the existing literature by providing new insights on how affiliation to specific religious groups may shape utilization of reproductive health care services and exposure to STDs. It also contributes to our understanding on how the religious context in areas where people live, whether or not they are affiliated to organized religion, may influence their health outcomes. Findings from this dissertation may also provide useful insights to those working towards improving health of women and their children (particularly those working toward reducing under-five mortality, women's STDs and increasing utilization of reproductive health care services) in poor sub-Saharan African settings.

Although the three groups of outcomes that I explore in this dissertation may not be closely interrelated, the parts of the dissertation were developed as a basis for three separate papers to be submitted for publication.

Overview of the Dissertation

Following the overview presented in this introductory Chapter focusing on previous research that has been carried out about relationships between religion and health of women and children, in Chapter 2 I describe the study setting and data that were used to undertake the analysis. Chapter 3 is the first substantive part of the dissertation. In Chapter 3 I examine associations between women's religious affiliation, the religious context in the community where women are residing with utilization of reproductive health care services, particularly attending prenatal consultations and giving births in health facilities.

In Chapter 3, I start by assessing whether women's affiliation to organized religion regardless of type of denomination is connected to attending prenatal consultations and giving births in health clinics. Then, I examine the effect of women's affiliation to specific religious groups on these outcomes. Still in Chapter 3, I also examine the effect of community religious context on attending prenatal consultations and giving births in health establishments. The religious community context is operationalized in two ways: first, I consider the context represented by the concentration of any religious organizations in the community, regardless of their specific denomination, and second, I consider the concentration of congregations belonging to specific religious denominational groups in the community. This distinction is critical as religious organizations differ on several aspects important for health of women and children.

In Chapter 4 I examine associations between women's religious affiliation, the religious context in the community with women's symptoms of

STDs other than HIV/AIDS. In this chapter I also consider the influence of women's affiliation to any organized religion and to specific religious groups. This approach of considering any religious denomination and specific religious groups is followed for examining the effect of the community religious context as well.

Chapter 5 explores the effect of women's affiliation to any religious organizations and to specific religious groups on under-five mortality. Here the analysis is first carried out considering deaths that occurred during the entire woman's reproductive span prior to the survey date and thereafter, taking into account only deaths that occurred in 5 years prior to the survey date. This approach is necessary because deaths that occurred in a distant past are likely to be forgotten. In Chapter 6 I present the summary and interpretation of the main findings of the dissertation and their implications.

CHAPTER 2

THE SETTING AND DATA

The Setting

Located in Southern Africa, Mozambique is a nation with 21.9 million inhabitants in 2009 (Instituto Nacional de Estatística, 2010). Having won independence from Portugal 35 years ago, it went through a civil war between 1976 and 1992 that destroyed the social and economic infrastructure of the country (Abrahamsson & Nilsson 1995; Minter 1994). After the signing of a peace agreement in Italy, and the end of civil war in October 1992, the country embarked in a post-war reconstruction effort, leading to an average economic growth in excess of 7 percent per year between 1997 and 2010 (UN Mozambique, 2011).

Despite the remarkable economic growth, Mozambique remains one of the poorest countries in the World, with the Gross National Income per capita of $380 in 2008, and life expectancy at birth of 48 years in 2008 (The World Bank, 2010). It is estimated that the country has more than one-third of its people living on less than US$1 a day (United Nations Development Programme, 2007). Huge floods that destroyed social and economic infra-structure especially in the South of the country in the year 2000 were a setback in the post-war reconstruction effort.

The prolonged civil war in Mozambique destructed much of health care infrastructure (Chao & Kostermans, 2002; Cliff & Noormahomed, 1993). However, since the end of war in 1992 the health care infrastructure in the

country has undergone development through rehabilitation and construction of new units in both urban and rural areas (Mozambique's Human Development Report, 2006). As a result, the country has made some strides in improving child health in the last 18 years: under-five mortality rate in Mozambique decreased from 249 deaths per 1000 live births in 1990 to 130 deaths per 1000 live births in 2008. However, both under-five mortality and maternal mortality, which in 2008 was 520 deaths 100 000 live births, are among the highest in the world (WHO, 2010).

Access to health care services in Mozambique remains a serious problem, particularly in rural areas. Most births in the country are not attended by skilled health personnel: in the year 2008, only 48 percent of births were assisted by a skilled health professional (WHO, 2010). Women often have to walk long distances to reach health units. Once in the health unit, delays and poor provision of health services have been reported as factors that partially discourage use of health care services in the country (Mozambique's Human Development Report, 2006). These poor health indicators exist in an environment characterized by high levels of illiteracy, particularly for women: the 2003 Mozambique's Demographic and Health Survey report indicated that about 41 percent of women and approximately 17 percent of men were illiterate among those surveyed (Instituto Nacional de Estatatística & Marco International, 2005).

Like many other countries of sub-Saharan Africa, Mozambique is a country where religious beliefs and practices are important for everyday lives of people. A recently conducted survey reported that among interviewed individuals

in Mozambique, about 87 percent said that religion is very important in their lives (Pew Research Center, 2010). Yet, currently, it is not well understood whether religion may influence the situation of maternal and child health in the country.

The 2003 Mozambique's Demographic and Health Survey report indicated that among women aged 15-49 years, 30.3 percent were Catholics, 27.2 percent Protestant or Evangelical and 18.8 percent Muslims. Women non-affiliated with any religious denomination were 14.5 percent, affiliated with a Zionist denomination (Zionists are small Pentecostal churches originating in Southern Africa) about 8.8 percent and with other religion, approximately 0.4 percent (Instituto Nacional de Estatatística & Marco International, 2005). This religious distribution masks regional differences, with Muslims primarily concentrated in the North and the coastal strip of Central Mozambique.

Tables 1 to 5 show selected demographic and health indicators by religious group in the South (provinces of Gaza, Inhambane and Maputo) of Mozambique – the location of the area in which data for this dissertation was collected. The statistics in the tables were computed on the basis of the 2003 Mozambique's Demographic and Health Survey data. Although this data uses a less detailed categorization of religious groups (particularly in the group called Protestant or Evangelical) than the one I use, it is in some ways informative for this research.

Important variation among religious groups is observed in demographic and health indicators. Table 1 shows educational distribution of women by denominational affiliation. It indicates that among interviewed women, Catholics

are the most educated in the South of Mozambique, with about 66 percent of those belonging to this religious group having 5 or more years of education. Catholics are followed by Protestant or Evangelical with about 49 percent of members having 5 or more years of schooling.

Table 1

Distribution of Women by Level of Education in Each Religious Group, Ages 15-49 Years, Southern Mozambique, Mozambique's Demographic and Health Survey 2003

Educational level	Non-Affiliated	Catholic	Protestant/ Evangelical	Zionist
	Percent	Percent	Percent	Percent
None	31.5	11.0	18.5	33.1
1 to 4 Years	30.5	22.8	32.1	40.4
5 or More Years	38.0	66.2	49.4	26.5
Total	100.0	100.0	100.0	100.0

Notes. Weighted percentages; differences across religious groups are significant at $p \leq .05$ (Chi-square test).

The least educated religious groups are Zionist and Non-Affiliated with about 33 percent and 32 percent of those belonging to these groupings having no formal education at all, respectively. These congregational differences in levels of female education are important as education is often correlated with overall socioeconomic status of members of each religious group, and because it could have implications in utilization of health care services and under-five mortality. Indeed, members of those religious groups with poorer educational level of their members are also standing poorly in attending the recommended number of 4 or more prenatal consultations, as it is shown in Table 2. For example, among women aged 15-49 years whose pregnancy ended in 5 years prior to the survey,

only about 67 percent of those belonging to the Zionist group had 4 or more prenatal consultations, compared to 70 percent among Protestant or Evangelical and 74 percent among Catholic women.

Table 2

Women with 4 or More Prenatal Consultations Among Those whose Pregnancy Ended in 5 Years Preceding the Survey Date by Religious Group, Ages 15-49 Years, Southern Mozambique, Mozambique's Demographic and Health Survey 2003

Religious affiliation	Percent
No Affiliation	53.6
Catholic	73.6
Protestant/Evangelical	70.4
Zionist	67.2

Notes: Weighted percentages; the difference across religious groups is significant at p≤ .05 (Chi-square test).

Because delivering children in health facilities and reporting women's STDs other than HIV/AIDS are issues addressed in the dissertation I also bring statistics referring to these health aspects in the South of Mozambique. Table 3 shows percentage of women in each religious group with institutional births among those that pregnancy ended in 5 years preceding the survey. Table 3 indicates that the Non-Affiliated and the Zionist group have fewer women than other religious groups who delivered their children in health facilities (64 and 66 percent, respectively).

Table 4 displays religious variation in percentage of women who had genital sore/ulcer in 12 months preceding the survey and Table 5 shows the percentage of women who had genital discharge in 12 months also before the

survey by religious affiliation (for both outcomes, only women who had ever had sexual intercourse were inquired).

Table 3

Child Delivery in a Health Institution among Women whose Pregnancy Ended in 5 Years Preceding the Survey Date by Religious Affiliation, Southern Mozambique, Ages 15-49 Years, Mozambique's Demographic and Health Survey 2003

Religious affiliation	Percent
No Affiliation	64.2
Catholic	77.7
Protestant/Evangelical	75.8
Zionist	66.4

Notes: Weighted percentages; the difference across religious groups is significant at p≤ .05 (Chi-square test).

Table 4

Women Had Genital Sore/Ulcer in 12 Months Preceding the Survey by Religious Affiliation, Southern Mozambique, Ages 15-49 Years, Mozambique's Demographic and Health Survey 2003

Religious affiliation	Percent
No Affiliation	4.5
Catholic	2.1
Protestant/Evangelical	1.9
Zionist	3.5

Notes: Weighted percentages; the difference across religious groups is significant at p≤ .05 (Chi-square test).

Although the percentage of women who reported having symptoms of STDs is small for every religious group, those women belonging to the Non-Affiliation and to the Zionist groups were at a disadvantage (except for reporting genital discharge in 12 months before the survey that Zionist women had the lowest percentage – about 9.9%). The demographic and health picture

characterizing the South of Mozambique may be similar to what is taking place in the study area.

Table 5

Women Had Genital Discharge in 12 Months Preceding the Survey by Religious Affiliation, Southern Mozambique, Ages 15-49 Years, Mozambique's Demographic and Health Survey 2003

Religious affiliation	Percent
No Affiliation	14.8
Catholic	11.1
Protestant/Evangelical	10.9
Zionist	9.9

Notes: Weighted percentages; the difference across religious groups is significant at p≤ .05 (Chi-square test).

The setting of this study is Chibuto district of the southern Gaza province (Figure 1). It is a district inhabited largely by speakers of the Changana language. In 2007 the district had a population estimated in 165,000 inhabitants (Instituto Nacional de Estatística, 2009), one third of that population lived in the headquarters of the district. Rain-dependent agriculture and labor migration remittances, mainly from migration to the Republic of South Africa and the capital of Mozambique, Maputo, are the basis of the district economy. Catholics, Mainline or Mission Protestants churches (e.g., Presbyterian, Anglican, Methodist and Baptist), Apostolic and numerous small Pentecostal-type churches, mainly Zionist churches, and Assemblies of God, are the prevailing religious organizations in Chibuto district (Agadjanian, 2005; Agadjanian and Menjivar, 2008).

Most authors describe Zionist churches as 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). Like in other parts of Mozambique, religious organizations in Chibuto district vary in socioeconomic make-up of their members and the degree of involvement with secular institutions. Catholic and Mainline Protestant churches are socioeconomically diverse and often have connections to public and private non-religious institutions in the country. As it was shown above, in the South of Mozambique these groups are the most educated and healthier (unfortunately Mainline Protestants were included in the religious group called Protestant or Evangelical together with faith-healing churches as Apostolic and Assembly of God).

Although Zionists in Chibuto are more open to other religious organizations and to secular institutions than Apostolics and Other Pentecostals, they are poorer and bear similarities with Other Pentecostal denominations that are relatively inward-oriented (Agadjanian, 2005). Although emphasizing faith-healing like Zionists and Other Pentecostals, Apostolic in Central and Southern Africa stand apart from these groups particularly due to their economic entrepreneurship in cottage industry, small trade and agriculture (Bourdillon, 1983; Jules-Rosette, 1997; Turner, 1980). Apostolics are also said to be tightly-knit mutual help communities (Bourdillon, 1983; Turner, 1980). It is most likely that Apostolics in Chibuto hold these characteristic as well. As the statistics indicated above about the South of Mozambique suggest, Non-Affiliated individuals in Chibuto are likely to be less educated and poorer. In addition Non-

Affiliated often tend to give primacy to traditional health practices over modern health care services (Addai, 2000; Pew Research Center, 2010).

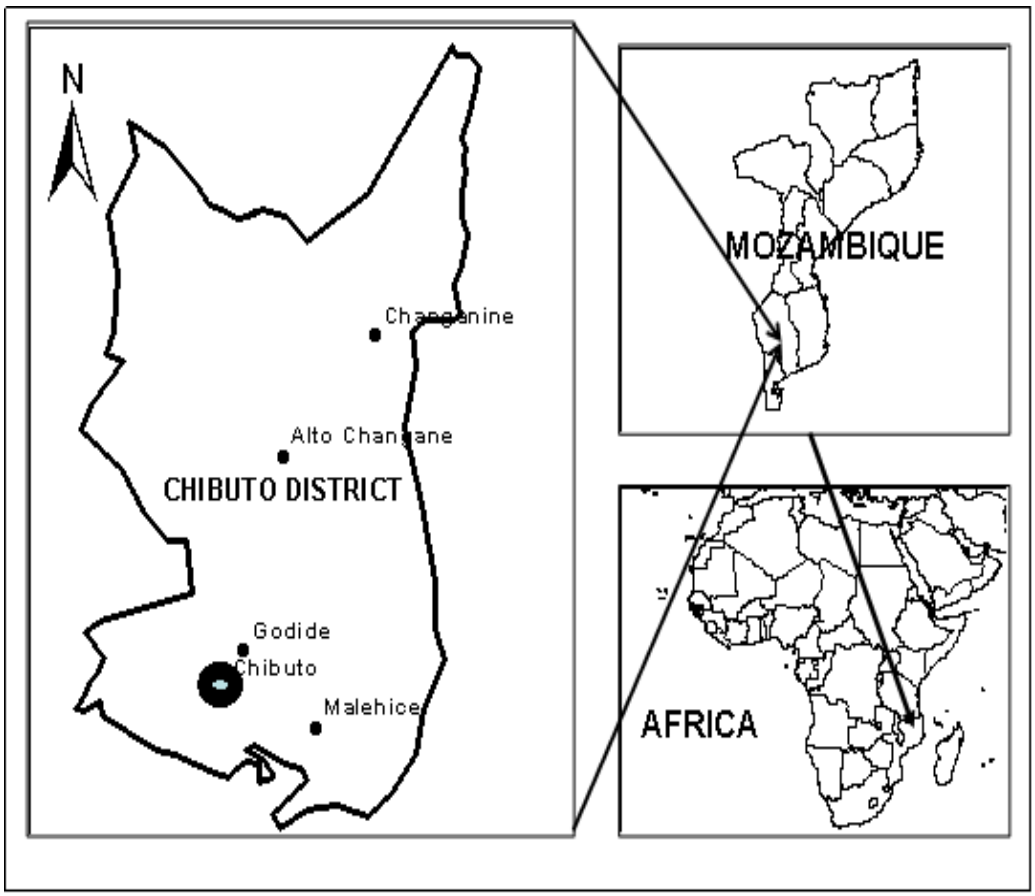

Figure 1. Location of Chibuto District, Gaza Province, Mozambique

Data

In the dissertation, I use data from an individual survey and an institutional survey conducted in 2008 in Chibuto district under the "Religious Organizations and HIV/AIDS in Mozambique" research project. The individual survey was a representative 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 individual survey also collected information about recent use of prenatal and child birth care, household socioeconomic factors, respondents' demographic and socioeconomic characteristics, and respondents' reproductive history (all births and deaths).

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. I also use geographic coordinates of health units in Chibuto district and three other districts that share border with Chibuto (districts of Chókwè, Guijá and Manjacaze).

Data collection was conducted by the Center for Populations Dynamics of Arizona State University (USA) and the Center for African Studies of Eduardo Mondlane University in Mozambique. The research and its instruments were approved by the Arizona State University Institutional Review Board and they also received approval in Mozambique.

CHAPTER 3

INDIVIDUAL RELIGIOUS AFFILIATION, RELIGIOUS COMMUNITY CONTEXT AND REPRODUCTIVE HEALTH CARE UTILIZATION

Introduction

With only about 48 percent of births assisted by skilled health personnel and an average maternal mortality ratio of 520 deaths per 100,000 live births, in Mozambique women are at highest risk of dying during pregnancy and childbearing (WHO, 2010). The report from the 2003 Mozambique's Demographic and Health Survey indicates that in the country only 53 percent of women had 4 or more prenatal consultations for the last child born within 5 years prior to the survey (Instituto Nacional de Estatística & Macro International, 2005). In sub-Saharan Africa as a whole the situation of maternal and child health is worrisome: on average only about 47 percent of births are attended by skilled health personnel and maternal mortality ratio stands at an average of 900 per every 100,000 live births (WHO, 2010). It is well documented that child delivery in health facility with assistance of skilled personnel may reduce maternal and neonatal mortality and morbidity compared to births taking place at home (Buor & Bream, 2004; Stephenson et al., 2006).

Given the recognized importance of religion on people's lives in sub-Saharan Africa, and the favorable effect of utilization of reproductive health care services for health of women and children, examination of relationships between religion with utilization of reproductive health-care services is needed.

Nonetheless, the association between religious affiliation and reproductive health care utilization (particularly attending prenatal consultations and giving births in health facilities) in sub-Saharan Africa as a whole and in Mozambique in particular has been little studied.

Although not examining specifically connections between religion and utilization of reproductive health care services for prenatal consultations and child delivery, some studies in sub-Saharan Africa have reported about religious-based interpretation of health of women and children that has implications in decisions whether to use modern health services or resort to traditional health practices (Adetunji, 1991; Allotey & Reidpath, 2001; Kirby, 1997). For example, Kirby (1997) reported about underutilization of health care services by residents of some areas of Northern Ghana, whose beliefs about management of illness made them delay seeking modern health care services, often looking for help when there was already little hope for survival. In a situation like this, it appears possible that the same religious-based beliefs could deter women from promptly attending prenatal consultations and delivering children in medical health facilities. Indeed, Chapman (2003) argues that in Central Mozambique pregnant women hide their pregnancy and delay attending prenatal consultation as a strategy to protect themselves and their unborn child from possible harm that could derive from public knowledge of their pregnancy condition.

Studies that specifically examined associations between religious affiliation and reproductive health care services utilization indicate that it varies by the type of religious group to which women belong. Gyimah et al. (2006) have

assessed the effect of religion on health care utilization in sub-Saharan Africa (including prenatal care and child delivery in a health facility), using data from Ghana Demographic and Health Survey of 2003. Overall, these researchers found higher utilization of maternal health care services among Christian mothers, net of other factors. The authors suggested that differences in utilization of maternal health care services among distinct religious groups could be related to lifestyles and differences in theological perspectives.

Another study of factors determining the use of maternal and child health services in rural Ghana (Addai, 2000), reported an important role of traditional and Catholic religion: women with Catholic affiliation displayed higher use of maternal and health services (prenatal care, antenatal care, place of child delivery and family planning) than Muslim women; while women affiliated to the traditional religion had lower use of these services (with the exception of family planning) relative to Muslim women. The study suggested that the positive effect of affiliation to Catholic denomination might be related to the role of Catholic Church in providing health services in Ghana and the negative effect of being affiliated to the traditional religion could be linked to the use of traditional health services. It seems plausible to expect that in Mozambique, the utilization of reproductive health care services might vary by individual religious affiliation as well.

While the effect of religious affiliation on reproductive health care utilization has received some attention in sub-Saharan Africa, the role of community religious context, particularly for use of prenatal care and child

delivery services has not been adequately addressed. A few studies examined associations of religious context with contraceptive use in sub-Saharan Africa (Agadjanian et al., 2009; Stephenson et al., 2007). Agadjanian et al. (2009) reported that contraceptive use was likely to be highest in areas with a mixture Muslims and Christians in Nigeria and Tanzania, while Stephenson et al. (2007) found higher use of modern contraceptive in areas that are predominantly Protestant in Malawi.

Although these studies were about contraceptive use and not utilization of reproductive health services for prenatal care and child delivery they are pertinent for the present study for the following reasons: it is likely that a religious context that favors use of contraception was likely to allow utilization of health care services for prenatal consultations and child delivery. Furthermore, in sub-Saharan settings most women who use contraception were likely to have gotten them from health facilities – which suggests that those women may be willing to use health facilities for other uses too.

Because the ways in which contextual factors may shape health outcomes are diverse (Stephenson & Tsui, 2002) there is a need to consider also factors other than religion that might mediate the influence of religious environment. Even if an individual's religious context encourages utilization of prenatal and child delivery services, an individual could still not use these services because they are not available in the community or they are located too far from his/her residential area. Some of those contextual factors other than religion that are

likely to mediate the influence of religious context are access to health facilities and average level of female education in the community.

Indeed, in a study in Mali, Gage (2007) found that the shortage of health facilities was a barrier to attending prenatal care in the first trimester of pregnancy and transportation barriers limited attending four or more prenatal visits. In addition, distance to a health facility was a barrier both to antenatal and delivery care. Stephenson et al. (2006) examined connections between contextual factors other than religion and child delivery in health facility in sub-Saharan Africa. Among other findings, they reported that the percentage of women with secondary education or higher in the community was significantly associated with giving birth in health facilities in Kenya, Malawi and Tanzania. According to these researchers, the results suggested the importance of community economic development (approximated by the level of female education) in enabling women to seek care and that the higher levels of education of women in communities could point to greater awareness of the need to deliver in a health facility.

The results of these studies suggest the need to control for distance to health facilities and the average level of female education in the community when examining association between the community religious environment and reproductive health care utilization.

One issue that seems important for understanding the connections between religion and utilization of reproductive health care services is the nature of differences across religious organizations in sub-Saharan Africa. If some organizations have attributes that enable utilization of skilled prenatal and child

delivery services it could be relevant to identify those attributes at the levels of individual members of religious organizations and of religious organizations themselves. At the individual level, previous studies have reported that demographic and socioeconomic factors are likely to influence utilization of prenatal and child birth services (Franckel, Arcens, & Lalou, 2008; Stephenson & Tsui, 2002; Stephenson et al., 2006). Of those, socioeconomic and contextual factors have been considered more important than demographic ones in influencing women's utilization of prenatal and child delivery services (Obermeyer & Potter, 1991; Stephenson & Tsui, 2002).

With respect to socioeconomic factors, individuals with more female education (Addai, 2000; Mrisho et al., 2007; Nuwaha & Amooti-kaguna, 1999; Onah, Ikeako, & Iloabachie, 2006), higher household income (Castro-Leal, Dayton, Demery, & Mehra, 2000; Houweling, Ronsmans, Campbell, & Kunst, 2007), better household living conditions (Castro-Leal et al., 2000; Houweling et al., 2007) and those who can afford the cost of health care (Castro-Leal et al, 2000; Houweling et al., 2007; Kiwanuka et al., 2008) have been reported to be more likely to use professional prenatal and child delivery services than their counterpart.

The limited evidence available on sub-Saharan Africa shows that Catholic and Mainline Protestant churches (e.g., Anglican, Baptist and Methodist) are likely to have members with better education (Agadjanian, 2001; Garner, 2000; Gyimah et al., 2006; Takyi & Addai, 2002) and better household living conditions (Gyimah et al., 2006), while most Pentecostal churches, especially Zionist

churches, are likely to have members with less education and poorer (Agadjanian, 2001; Pfeiffer, 2002; Schoffeleers, 1991). Taking Christian churches as a whole, members of Christian congregations have been found to be better educated and more likely to live in wealthier households than those of other faiths, including traditional religion (Antai, Ghilagaber, Wedrén, Macassa, & Moradi, 2009; Gyimah et al., 2006; Kollehlon, 1994; Takyi & Addai, 2002).

Because of correlation of education with income, we would expect members of Catholic and Mainline Protestant churches and those of Apostolic denominations to have high household income and to be more prepared to afford the cost of using reproductive health services. The variation among religious groups in socioeconomic make-up of their members suggests a need to control for socioeconomic factors to try capturing the independent effect of religion.

Besides characteristics of their members, religious organizations are distinct on many aspects that have implications to the use of prenatal and child delivery services. Perhaps the most important difference is that while Catholic and Mainline Protestant churches support the use of medical health services, most Pentecostal religious organizations encourage faith-healing (Agadjanian, 2005; Gregson et al., 1999). Catholic and Mainline Protestant congregations are reported to be more connected to secular institutions of health care and education (Addai, 2000; Gyimah et al., 2006; Takyi & Addai, 2002) where they could access health-related information. In Ghana (Takyi & Addai, 2002) and Mozambique (Morier-Genoud, 2000), some Catholic and Mainline Protestant churches have schools that are part of the formal system of education. Apart from

faith-healing, as I have indicated, encouragement of economic endeavor is another distinctive aspect of Apostolic churches (Bourdillon, 1983; Jules-Rosette, 1997; Turner, 1980). These characteristics of religious organizations could be expected to differently influence utilization of prenatal and child delivery services among members and non-members.

It has been argued that people's social behaviors may be influenced by communication with others and by opinions and beliefs that prevail in their social environment (Behrman et al., 2002; Kohler, Behrman, & Watkins, 2001; Rutenberg & Watkins, 1997). Therefore, we would expect religious-based ideas in communities where certain congregations are prevalent to influence behaviors regarding attending prenatal consultations and having assisted births, for both members and non-members of religious organizations.

Informed by the above literature I formulate two main hypotheses on the association between religion and utilization of prenatal and child delivery services. First, I expect that women belonging to any religious congregation will have a higher number of antenatal consultations and a higher likelihood of delivering in health facilities than women who are not affiliated with organized religion. As part of the first hypothesis, I also expect that Catholic and Mainline Protestant women 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, & Agadjanian, 2010).

My second hypothesis is based on the theory of social learning and social influence (Behrman et al., 2002; Kohler, Behrman, & Watkins, 2001; Montgomery & Casterline, 1996). Given that the theory of social learning and social influence proposes that individuals' social behaviors may be influenced by the social context in the areas where they live and interact, religious-based social context approximated by the presence of religious congregations in communities could be expected to influence social behaviors of residents of communities. Thus, I expect 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 have a higher number of prenatal consultations, and that that number of religious congregations will be positively associated with giving birth in health facilities, regardless of other factors.

Again, as a sub-hypothesis, I posit that the presence of congregations of Mainline denominations (Catholic or Mission Protestant churches) will be particularly beneficial given their greater socioeconomic diversity and connections to secular institutions (including those of health care services). 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 I cannot observe the process of religion-based information exchange and influence directly with my data, I assume based on the literature that this process would be at the root of whatever individual and community level differentials I might detect after controlling for standard sociodemographic factors.

Methods

Outcome variables. Two measures of reproductive health care services utilization constitute my outcome variables: i) the number of prenatal consultations a woman attended before the birth of her youngest child, and ii) whether a woman's youngest living child was born in a health care facility. To be able to use the current characteristics from the individual survey (i.e., socioeconomic information referring to the time of the survey) and to minimize problems associated with recall, I only look at women whose youngest children were born in 5 years before the survey. As some congregations may not have existed more than 5 years before the survey, limiting the observation period to 5 years before the survey also allows the use of more information on congregations collected through the institutional survey (global positioning system-based spatial location of congregations).

I acknowledge that the use of information collected at the time of the survey to predict past events is a limitation of this study; however, I believe that it may not introduce a large bias to the results as in some characteristics the situation may not have changed very much in 5 years prior to the survey. Take education for example: few women continue going to school after marriage in the study setting, especially in rural areas.

Predictor variables. I use two main predictors—individual religious affiliation and religious community context. For individual religious affiliation I first distinguish between women affiliated to an organized religion and non-affiliated women; second, I categorize individual religious affiliation in the

following categories: 1. Catholic or Mainline Protestant; 2. Apostolic; 3. Zionist; 4. Other Pentecostal; and 5. Non-affiliated. Religious affiliation is lagged one year before the birth of the youngest child to eliminate the possibility of reversed causality (i.e., health outcomes influencing religious membership). Religious affiliation is based on the religious life history of the respondent. There were few Muslims in the sample that were excluded from the analysis.

In this chapter, I do not take into account possible switching of religious affiliation. If a woman switched religious denomination there is a possibility that her decision whether or not to use reproductive health care service could be also influenced by ideas and beliefs acquired in previous denomination. This is a limitation of this study. However, given that I consider religious affiliation one year prior to the birth of the last child, I belief that any bias to the results could be minimum.

The religious community context measure is built using 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 (e.g., distance from each respondent's household to each Zionist church) 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 areas. I assume that within 5 Km of distance people in rural areas are able to interact with each other (for example, people may frequently walk this distance to the field or to church). Because of a

relatively 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.[1] Two types of congregation concentration measures are used: 1) distance from respondent's household to any church; and 2) distance from respondent's household to any church of a given denomination.

As individual controls I use woman's age, marital status, parity (all three variables are time-varying and are lagged one year before the birth of the youngest living child), woman's education, and household assets at the time of the survey. Previous studies have indicated that younger mother's age (Bhatia & Cleland, 1995) and low parity may increase the propensity to use health services (Obermeyer & Potter, 1991). Educated women and those from households with higher income and better living conditions (in this study indicated by household assets) were found to be more likely to use health care services (Addai, 2000; Castro-Leal et al., 2000; Houweling et al., 2007; Mrisho et al., 2007; Nuwaha & Amooti-kaguna, 1999; Onah, Ikeako, & Iloabachie, 2006). Marital status has also been reported to influence the decision to use reproductive health care services (Stephenson et al., 2006).

Distance to health facility has been indicated as major barrier to utilization of prenatal and child delivery services, with closer proximity to a health facility

[1] I also considered creating a congregation concentration measure based on similar distance in both urban and rural areas. However, based on my knowledge of the field, the measure that I use here seems to be the best approximation of individuals' typical area of interaction for both urban and rural areas.

generally having a positive effect (e.g., Gage, 2007; Rutherford et al., 2010; Schoeps et al., 2011). Therefore, I 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. This variable is also used as a proxy for place of residence as those residing in urban areas were found to be more likely to use prenatal and child delivery services (in part due to proximity to these services) than their rural counterparts (Gyimah et al., 2006; Magadi, Madise, & Rodrigues, 2000).

I also control for female average literacy level in each community (computed as the aggregate average survey cluster). In developing countries female average level of education in the community may be an indicator of many aspects that might favor use of skilled prenatal and child delivery services: predominance of socioeconomically advantaged households (Stephenson et al., 2006), greater knowledge about good health behavior and the need to seek maternal health care (Kravdal, 2004; Stephenson et al., 2006) and a possible favorable imitation of behaviors (Kravdal, 2004).

For analysis I use the xtpoisson command in Stata to fit a random intercept Poisson regression for the number of prenatal consultation a woman attended before the birth of her youngest child and xtlogit command also in Stata to estimate random intercept logistic regression for whether or not the respondent's last child was born in a health care establishment (StataCorp, 2007). A model with random intercept is employed because respondents are clustered within

communities and therefore may share some unobserved characteristics, which may confound the results.

Results

Descriptive results. Table 6 and 7 show key descriptive statistics characterizing the various groups in my sample. In Table 6 it is observed that there is little variation on number of prenatal consultations among religious groups – women in all groups have on average about 4 prenatal consultations. However, there is variation in proportion of children born in a health facility between denominational groups. Among members of Catholic or Mainline Protestant churches, about 74 percent had their youngest child born in a health care establishment. Following women affiliated to Mainline churches, about 69 percent of women belonging to Other Pentecostal churches gave birth in a health facility. The religious category of No Affiliation exhibits the smallest percentage of members who had their last child born in a health facility (about 49 percent).

Table 6 also shows notable differences in educational attainment of members of different religious groups. This suggests variation in socioeconomic background among members belonging to distinct groups. The religious group of No affiliation is overwhelmingly composed of illiterate members (about 56 percent). It is followed by the Zionist group in terms of presence of members without any schooling (about 38 percent). These findings reflect the situation presented above for the South of Mozambique as a whole.

Table 7 displays the mean number of religious congregations in each denominational category in urban and rural areas. Notable in Table 7, Zionist churches are the most prevalent congregations in both rural and urban areas. This is not surprising because Zionist churches tend to be smaller and numerous. Also noticeable, Apostolic churches appear to be less prevalent in rural areas.

Table 6

Selected Descriptive Statistics by Religious Group (Percentage, Unless Stated Otherwise), Religious Organizations and HIV/AIDS Survey, 2008

Variable	Woman's Religious Affiliation				
	Catholic or Mainline Protestant	Apostolic	Zionist	Other Pentecostal	No Religion
Woman's Number of Prenatal Consultations (mean)	4.4	4.4	4.0	4.0	3.6
Last Child Born in Health Facility**	74.3	58.8	58.9	68.5	49.5
Woman's Education**					
None	18.2	26.5	38.4	27.3	56.2
1 to 4 Years	35.1	45.7	39.2	33.8	32.2
5+ Years	46.7	27.8	22.3	38.9	11.6
Percentage of denominational group in the sample	21.8	11.6	41.9	10.7	11.5

Notes. These figures refer to the time of the survey; Statistical significance (Chi-Square); *- p≤ .05; **- p≤ .01.

Table 7

Mean Number of Congregations in Chibuto District by Denominational Group and Place of Residence, Religious Organizations and HIV/AIDS Survey, 2008

Place of residence	Catholic or Mainline Protestant	Apostolic	Zionist	Other Pentecostal
Urban	3.1	4.1	14.1	2.1
Rural	5.7	1.5	8.9	6.3

Multivariate results. Table 8 and 9 display the results from random intercept Poisson regression models estimating the effect of individual religious affiliation and community concentration of religious denominations on number of prenatal consultations attended before the birth of the youngest child. Table 8 uses as main predictors affiliation to any organized religion and concentration of denominations of any type in the community. The main predictors in Table 9 (individual religious affiliation and concentration of religious denominations in the community) were classified into religious groups.

I started the analysis by asking whether there is a difference in attending prenatal consultations between women affiliated to organized religion and non-affiliated women; and whether the presence of Christian churches of any kind in the proximity of respondents' households adds an advantage in attending prenatal consultations. The results are presented in Table 8. As Model 1 shows, belonging to any Christian denomination is associated with increased number of prenatal consultations. On average affiliation to any organized religion increases attendance of prenatal consultations by 0.07 visit, net other factors (Model 2). But

there is no significant association between concentration of any religious organization in the community with attending prenatal consultations.

The results in Table 8 only appear to support the hypothesis that affiliation to an organized religion is positively associated with the number of prenatal consultations, net of other factors (the statistical significance is marginal for the effect of belonging to any religious organization). Next, I asked whether or not affiliation to distinct religious groups and the presence in the proximity of respondents' households of denominations of a given type could make difference in attending prenatal consultations. Thus, Table 9 which distinguishes the type of religious group indicates in Model 1 a positive association of affiliation to Catholic or Mainline Protestant churches and belonging to Apostolic churches with attending prenatal consultations, relative to non-affiliation.

When controlling for other factors (Model 2) affiliation to Catholic or Mainline Protestant churches and to Apostolic churches is associated with a significantly higher number of prenatal consultations attended before the birth of the child (although the effect of the former is marginally significant). Relative to non-affiliated women, on average women affiliated to Catholic or Mainline Protestant denominations and those belonging to the Apostolic religious group have an additional 0.08 and 0.10 prenatal consultation visit, respectively. The fact that affiliation to the Apostolic religious group is significantly associated with an increase in number of prenatal visits relative to not being affiliated, contradicts my hypothesis that expected particular advantage only for affiliation to the Catholic or Mainline Protestant group, relative to not being affiliated . Affiliation

to a Zionist church and to the Other Pentecostal religious group is not significantly associated with the number of prenatal visits.

Table 8

Random Intercept Poisson Regression Predicting Number of Prenatal Consultations a Mother Attended Before the Birth of Her Child, with Mother's Affiliation to Any Religious Organization and Concentration of Any Churches in the Community as Main Predictors (Coefficients), Religious Organizations and HIV/AIDS Survey 2008

Variable	Model 1	Model 2
Mother's Religious Affiliation		
No Affiliation [reference]	1	1
Affiliated to an Organized Religion	0.08*	0.07†
Community Concentration of Religious Congregations		
Any Religious Congregation		-0.00
Mother's Age		0.01*
Mother's Marital Status		
Not Married [reference]		1
Married		-0.05
Parity		-0.02†
Mother's Education		
5 or More Years [reference)		1
1 to 4 Years		-0.02
0 Years		-0.07
Household Assets Index		0.02†
Distance to the Closest Clinic		
Urban [reference]		1
Rural Less than 5 Km		0.07
Rural more than 5 Km		0.03
Intercept	1.35**	1.25**
Log Likelihood	-2,398.69	-2334.23
Number of Cases	1193	1168

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

When concentration of religious congregations in the community is disaggregated by type of religious group (Model 2), number of Catholic or Mainline Protestant congregations and number of Other Pentecostal churches in the community have a positive but not statistically significant effect on attending

prenatal consultations, net of other factors. The concentration of Apostolic and Zionist churches has a negative effect on attending prenatal consultations. However, only the effect of the presence of Zionist churches close to women's households shows a marginal statistical significance.

Table 9

Random Intercept Poisson Regression Predicting Number of Prenatal Consultations a Mother Attended before the Birth of Her Child, with Mother's Affiliation to Specific Religious Group and Concentration of Specific Churches in the Community as Main Predictors (Coefficients), Religious Organizations and HIV/AIDS Survey, 2008

Variable	Model 1	Model 2
Mother's Religious Affiliation		
No Affiliation [reference]	1	
Catholic or Mainline Protestant	0.11*	0.08†
Apostolic	0.10*	0.10*
Zionist	0.06	0.07
Other Pentecostal	0.03	0.44
Community Concentration of Religious Congregations		
Catholic or Mainline Protestant		0.00
Apostolic		-0.00
Zionist		-0.01†
Other Pentecostal		0.01
Mother's Age		0.01*
Mother's Marital Status		
Not married [reference]		1
Married		-0.05
Parity		-0.03*
Mother's Education		
5 and more years [reference)		1
1 to 4 years		-0.02
0 years		-0.07†
Household Assets Index		0.01
Distance to the closest clinic		
Urban [reference]		1
Rural less than 5 Km		0.03
Rural more than 5 Km		-0.02
Intercept	1.35**	1.29**
Log Likelihood	-2397.35	-2330.79
Number of cases	1193	1168

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

The findings in Table 9 seem to confirm the expectation that women affiliated to Catholic or Mainline Protestant churches will have an advantage in attending prenatal consultations over non-affiliated women, net of other factors. Also the presence of Catholic or Mainline Protestant churches in the community has a positive effect on attending prenatal consultations; but overall, the expectation that the presence of any congregation in the community will increase the number of prenatal consultations does not appear to find confirmation.

Table 10 and 11 show 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. Similarly to the number of prenatal consultations attended, as main predictors, Table 10 distinguishes between affiliation and non-affiliation to an organized religion and considers concentration of any organized religion in the community. And Table 11 disaggregates the main predictors by religious groups. Model 1 in Table 10 assesses the effect of maternal religious affiliation on giving birth in a health facility and it shows that women affiliated to organized religion are significantly more likely to give birth in a health facility than non-affiliated women.

When adding the measure of concentration of religious congregations in the community and other characteristics, the influence of individual affiliation to an organized religion, although positive, is not statistically significant. The concentration of any religious denomination in the community does not significantly predict giving birth in clinics.

Table 10

Random Intercept Logistic Regression Predicting Child Delivery in a Health Facility with Mother's Affiliation to Any Religious Organization and Concentration of Any Churches in the Community as Main Predictors (Odds Ratio), Religious Organizations and HIV/AIDS Survey, 2008

Variable	Model 1	Model 2
Mother's Religious Affiliation		
No Affiliation [reference]	1	1
Affiliated to an Organized Religion	1.29+	1.13
Community Concentration of Religious Congregations		
Any Religious Congregation		1.00
Mother's Age		1.00
Mother's Marital Status		
Not Married [reference]		1
Married		0.86
Parity		0.87**
Mother's Education		
5 or More Years [reference)		1
1 to 4 Years		0.73+
0 Years		0.47**
Household Assets Index		1.10*
Distance to the Closest Clinic		
Urban [reference]		1
Rural Less than 5 Km		1.40
Rural more than 5 Km		0.90
Average Level of Education in the Community		1.30**
Intercept	1.44*	1.39
Variance (S.E.)	0.75(0.15)	0.58(0.10)
Log Likelihood	-825.36	-759.26
Number of Cases	1297	1267

Notes. †- p<.1; *- p≤ .05; **- p≤ .01.; S.E. - Standard Error

Notable in Table 10, household assets and the average level of education in the community have a positive effect on child birth in health facilities. The hypothesis that those affiliated to an organized religion would be more likely to give birth in health facilities than non-affiliated does not find support.

Table 11 assesses whether or not there is a difference in giving birth in a health facility between non-affiliated women and women belonging to various religious groups. It also examines the effect of concentration of various religious groups in the community on giving birth in clinics. Model 1 shows that women affiliated to Catholic or Mainline Protestant churches have significantly higher odds of giving birth in clinics to their youngest children than unaffiliated women. Although the effect is only marginally significant, women belonging to Other Pentecostal churches also show higher odds of giving birth in a health facility than non-affiliated women. In Model 2, I add the concentration of various religious denominations in the community and other controlling factors. As for the effect of maternal religious affiliation, I find that although this effect is only marginally significant, women affiliated to Catholic or Mainline Protestant denominations are different from non-affiliated women in giving birth in health facilities. Compared to unaffiliated women, the odds of giving birth in a health facility for women in Catholic or Mainline Protestant religious group are 1.5 times higher, net of other factors. This finding appears to support the expectation that Catholic or Mainline Protestant women will have pronounced advantage on this outcome.

Table 11

Random Intercept Logistic Regression Predicting Child Delivery in a Health Facility with Mother's Affiliation to Specific Religious Organization and Concentration of Specific Churches in the Community as Main Predictors (Odds Ratio), Religious Organizations and HIV/AIDS Survey, 2008

Variable	Model 1	Model 2
Mother's Religious Affiliation		
No Affiliation [reference]	1	1
Catholic or Mainline Protestant	2.01**	1.48+
Apostolic	0.89	0.81
Zionist	1.15	1.11
Other Pentecostal	1.56+	1.24
Community Concentration of Religious Congregations		
Catholic or Mainline Protestant		1.06+
Apostolic		1.00
Zionist		0.97+
Other Pentecostal		1.01
Mother's Age		1.00
Mother's Marital Status		
Not Married [reference]		1
Married		0.88
Parity		0.87**
Mother's Education		
5 or more Years [reference)		1
1 to 4 Years		0.78
0 Years		0.49**
Household Assets Index		1.10+
Distance to the Closest Clinic		
Urban [reference]		1
Rural Less than 5 Km		1.13
Rural more than 5 Km		0.66
Average Level of Education in the Community		1.24*
Intercept	1.42*	1.75
Variance (S.E.)	0.72 (0.10)	0.56(0.10)
Log Likelihood	-817.96	-752.20
Number of Cases	1297	1267

Notes. †- p<.1; *- p≤ .05; **- p≤ .01; S.E. - Standard Error.

Model 2 (Table 11) also shows that women affiliated to other religious groups (Apostolic, Zionist and Other Petencostal) are not significantly different

from non-affiliated women in the probability of giving birth in a health facility, controlling for other factors. I also hypothesized that with other factors held constant, higher number of congregations in the community, particularly of Catholic or Mainline Protestant denominations will increase the likelihood of giving birth in health establishments.

Regarding the effect of this main predictor, I find that the presence of Catholic or Mainline Protestant churches in the proximity of respondents' households significantly increases the odds of giving birth in clinics (OR=1.1, Model 2) (however, the coefficient is only marginally significant); while the presence of Zionist churches significantly decreases the odds of giving birth in clinics by 3 percent. The concentration of Apostolic denominations and Other Pentecostal churches does not significantly affect the probability of giving birth in a health facility, net of other factors. Also notable in Model 2, the average level of education in the community (cluster) significantly increases the odds of giving birth in health facilities, net of other factors (OR=1.2, Model 2). Household assets also have a positive effect on giving birth in health clinics, net of other factors (OR=1.1, Model 2).

Summary and Conclusion

In this chapter I first asked whether affiliation to a religious organization, regardless of the type of denomination could favor attending prenatal consultations than being non-affiliated. I expected that women affiliated to an organized religion would have higher number of prenatal consultations attended

before the birth of their youngest children than non-affiliated women. The results showed a positive and marginally significant relationship between affiliation to an organized religion and attending prenatal consultations. I also asked whether the concentration of religious denominations of any kind in the community could increase the number of prenatal consultations that women living in that community attended. The findings did not support the expectation that the concentration of any denominations in the proximity of respondents' households could significantly increase prenatal visits.

Thereafter, the question that I raised was whether women affiliated to organized religion could be different of non-affiliated women on attending prenatal visits depending on the type of religious group of those women belonging to religious organizations. For this question I had expected that affiliation to religious organizations, particularly to Catholic or Mainline Protestant churches, could benefit attending prenatal visits. The findings showed that the effect of affiliation to organized religion on attending prenatal visits depended on the type of religious group that women belonged. The hypothesis that women affiliated to Catholic or Mainline Protestant churches would have particularly higher number of prenatal consultations than non-affiliated women finds some support as the coefficient for the effect of belonging to Catholic or Mainline Protestant churches is marginally significant net of other factors. Women affiliated to Apostolic churches were significantly more likely than non-affiliated women to attend prenatal consultations. The differences across religious groups in the likelihood of

attending prenatal consultations were not statistically significant (results not shown).

The approach of examining the effect of religion according to the type of religious group was also extended to the measure about concentration of religious congregations in the community. Regarding this measure, the hypothesis of a positive and significant effect of concentration of religious congregations (particularly of the Catholic or Mainline Protestant category) on attending prenatal consultations was not confirmed. An interesting finding is that concentration of Zionist congregations in the community to some extent decreases the probability of women attending prenatal consultations, irrespective of their religious affiliation. The reason for this finding is not clear at this stage of the analysis.

The second outcome considered in this chapter was whether women's youngest living children were born in health care establishments. For this outcome, I also asked the same kind of questions as for the outcome on prenatal visits. My first expectation was that affiliation to an organized religion irrespective of the type of denomination would be positively and significantly associated with giving birth in health facilities, net of other factors. Although the result followed the expected direction, the coefficient was not statistically significant, suggesting that women affiliated to any denomination are not different of non-affiliated women on giving birth in clinics. The expectation of a positive and significant effect of concentration of any religious denomination in the community on giving birth in clinics was not confirmed either.

Following that, I then assessed whether significant differences could be observed between women in my sample if I considered religious groupings. For the effect of individual religious affiliation I had predicted a positive and significant effect of belonging to religious denominations, especially if women belonged to the Catholic or Mainline Protestant grouping. Similar prediction was considered regarding the effect of presence of religious denominations in the community.

Regarding individual effects, findings showed that maternal affiliation to the Catholic or Mainline Protestant religious group had some association with giving birth in health facilities net of other factors. The prediction regarding the favorable effect of presence of Catholic or Mainline Protestant denominations in the community on giving birth in health facilities was confirmed although the effect was marginally significant. However, the presence of Apostolic and of Other Pentecostal denominations in the community had no significant effect and that of Zionist denominations had a negative effect on the likelihood of giving birth in clinics. I do not have a plausible explanation for this finding at this stage of the analysis.

Overall, for both outcomes, women affiliated to Catholic or Mainline Protestant denominations displayed some advantage over non-affiliated women on reproductive health services utilization as measured by my outcomes. Also the presence of Catholic or Mainline Protestant congregations in communities appeared to encourage giving birth in health facilities. For the effect of concentration of Mainline Churches on prenatal visits the coefficient was positive

but failed to reach conventional statistical significance level. Women affiliated to Zionist and Other Pentecostal religious groups were not significantly different from Catholic and Mainline Protestant women in the probability of giving birth in a health facility. However, Catholic and Mainline Protestant women were more likely to give birth in a health facility than Apostolic women controlling for other factors ($p<.05$, results not shown).

I interpret the modest advantage of affiliation to Catholic or Mainline Protestant denominations and of presence in the community of congregations of this category to socioeconomic diversity and connections to medical institutions within this grouping. Most literature on religion and health suggests that religious settings may improve access to health-related information and support, especially in congregations with connections to health care services (Agadjanian, 2005; Benjamins et al., 2006; George et al., 2002; Hummer et al., 2004; Levin, 1994).

It is interesting that affiliation to the Apostolic religious group had a positive effect on attending prenatal consultations but a negative effect on giving birth in health clinics. In other settings, studies have indicated that individuals may give birth at home even after having attended prenatal consultations if they believe that home delivery is superior to professional one (Obermeyer & Potter, 1991; Griffiths & Stephenson, 2001). Whether that is part of reasons for Apostolic and other religious groups not giving birth in clinics in the study setting it is less clear. The results in this chapter may suggest the importance of religion at both the individual and contextual levels for maternal and child health in resource-limited settings as the one I studied in Mozambique. The results also suggest the

needed for further research to understand specific mechanisms of religious effects.

CHAPTER 4

INDIVIDUAL RELIGIOUS AFFILIATION, RELIGIOUS COMMUNITY CONTEXT AND STDS

Introduction

Most studies of religion and sexually transmitted diseases (STDs) in sub-Saharan Africa focus on HIV/AIDS (e.g., Garner, 2000; Gyimah, Tenkorang, Takyi, Adjei, & Fosu, 2010; Lagarde et al., 2000; Takyi, 2003). As a result, there is a dearth of knowledge of the role of religion in STDs other that AIDS in sub-Saharan Africa. Understanding the role of religion on STDs other than AIDS in the region is critical as most studies indicate that STDs highly facilitate sexual transmission of HIV infection (Fleming & Wasserheit, 1999; Galvin & Cohen, 2004; Korenromp et al., 1999). This dissertation contributes to the reduction of this gap in the current literature about religion and STDs in sub-Saharan Africa by examining the association between religious affiliation, religious community milieu and STDs in Mozambique. Religion may impact STDs through regulating and influencing social behaviors such as encouraging delayed initiation of sexual activity, sexual abstinence and fidelity (Page, Ellison, & Lee, 2009; Thornton & Camburn, 1989; Trinitapoli, 2009). The constraints that religion imposes on sexuality may negatively affect acquisition of STDs (Gray, 2004; Page et al., 2009).

Despite the scarcity of studies examining connections between religion and STDs other than AIDS in sub-Saharan Africa, we can benefit from previous

studies' findings about the relationships between religion and HIV/AIDS given that in sub-Saharan Africa most studies indicate that HIV is primarily a sexually transmitted disease (Buvé et al., 2001; Kamenga et al., 1991). Garner (2000) investigated the connection between religion and levels of premarital and extramarital sex in a South African township and found little difference in behaviors conducive to STDs between interviewers belonging to Mainline Christian churches and Zionist church compared to unaffiliated individuals. Garner documented lower levels of extramarital and premarital sexual activity among members of Pentecostal church. The author attributed lower premarital and extramarital sexual activity among members of Pentecostal church primarily to church's strong social control over its members – a factor that was weak in other denominations.

Church's teachings and strong social control against premarital and extramarital sexual activity resulting in less HIV and STDs was also reported in Zimbabwe among Zionists and Apostolic church members (Gregson et al., 1999). In rural Malawi, Trinitapoli and Regnerus (2006) found that Pentecostal men were less likely to report ever having had sexually transmitted infection and having recently had an extramarital sexual partner than Catholics. In another study of men in Ghana, Gyimah et al. (2010) reported that men belonging to the traditional religion (including individuals classified as non-affiliated in some surveys) were less likely to be involved in risky sexual behavior than Christian men. The authors attributed this finding to looseness of norms in some Christian denominations and to the fact that Christians were generally better educated than traditionalist men

and likely to disobey the church's teachings against engagement in risky sexual behaviors.

These findings from studies in sub-Saharan Africa suggest a complex relationship between religious affiliation and sexual behavior. For example, while in Zimbabwe Zionists showed little exposure to STDs, the opposite seemed to occur in Garner's study in South Africa. Furthermore, Agadjanian (2005) in his study in Mozambique reported that although Zionists and Pentecostal women were advantageous in practicing fidelity and abstinence than women in Mainline Christian denominations, these women were in disadvantage in using condom as a means of preventing HIV and in accessing messages about HIV/AIDS through their congregations. As polygyny is often allowed in Zionist and Apostolic churches (Gregson et al., 1999), the low use of condom in Zionist and Apostolic churches in Mozambique might expose women in these denominations to elevated risk of contracting STDs through their regular partners.

Regarding the association between individual religious affiliation and STDs, I firstly predict that women belonging to an organized religion, whatever their denomination, will have lower likelihood of reporting symptoms of STDs than women non-affiliated to an organized religion (as I discuss later in the methods section, I use symptoms as a proxy for actual STDs). This expectation is based on the assumption that Christian religious teachings are generally against risky sexual behavior (Cochran,Chamlin, Beeghley, & Fenwick, 2004; Dollahite & Lambert, 2007; Rowatt, & Schmitt, 2003).

Secondly, given that the literature about religion in sub-Saharan Africa has documented differences in characteristics of religious groups (especially regarding socioeconomic diversity of members, social control to members and openness to secular institutions), when comparing women affiliated to an organized religion to non-affiliated ones in having had symptoms of STDs, I expect to find variation depending on the type of religious group that women belong. Specifically, I predict that women belonging to Catholic or Mainline Protestant denominations will have lower likelihood of having had symptoms of STDs than non-affiliated women because women affiliated to Catholic or Mainline Protestant denominations, particularly in Mozambique, have been found to be more likely to use condoms as an HIV prevention tool and to have access to preventative messages against HIV (and by extension against STDs) through their churches (Agadjanian, 2005).

In respect to comparison of members of Apostolic, Zionist and Other Pentecostal religious groups with members of the non-affiliation category in the likelihood of reporting symptoms of STDs, I test two possible hypotheses. On the one hand, affiliation to these religious groups (Apostolic, Zionist and Other Pentecostal), could be expected to lower the likelihood of having had symptoms of STDs because members of these congregations were reported in some studies to be less likely to engage in extramarital affairs (Gregson et al., 1999; Trinitapoli & Regnerus, 2006). On the other hand, no difference in reporting symptoms of STDs could be expected between women belonging to Apostolic, Zionist and Other Pentecostal religious groups and women belonging to the non-affiliated

grouping owing to a couple of factors that characterized these denominational groups in Mozambique: lower connection to medical health care services, acceptance of polygyny, lower use of condom as a prevention means against HIV and lower access to HIV prevention messages through church in these congregations (Agadjanian, 2005; Pfeiffer, 2004b).

To hypothesize the relationship between community religious milieu and the likelihood of women reporting symptoms of STDs I am informed by the literature on contextual and social influences on fertility and contraceptive behavior and HIV/AIDS-related outcomes (Agadjanian et al., 2009; Helleringer & Kohler, 2005; Kohler, 1997; Kohler, Behrman, & Watkins, 2007; Montgomery & Casterline, 1996). While this literature does not address specifically the issue of exposure to STDs other than AIDS, there is a possibility that social influence and social learning on sexual matters could affect individuals' exposure to STDs other than AIDS as well. The literature suggests that individuals' behaviors may be influenced by relationships and communication with others and by opinions and attitudes prevailing in their communities (Behrman, Kohler & Watkins, 2002; Kohler et al., 2007). It seems plausible to think that the range of individuals' social behaviors that may be influenced by interactions with others could include behaviors that expose individuals to STDs addressed in this chapter.

Informed by this literature, I firstly predict that the prevalence of religious denominations in the community, regardless of their type, will decrease the likelihood of having symptoms of STDs among women living in that community. Again, this prediction is based on the idea that all Christian denominations

discourage risky sexual behavior (Cochran et al., 2004; Dollahite & Lambert, 2007; Rowatt, & Schmitt, 2003) and that even if some members of religious organizations do not attend religious services frequently, they could be influenced by their interactions with those involved in religious life. Secondly, I posit that the presence of Catholic or Mainline Protestant congregations in the community will particularly decrease the likelihood of having had symptoms of STDs for all residents of the community. Catholic or Mainline Protestant denominations are characterized by greater socioeconomic diversity, connections to health care service institutions and greater access to preventative messages (against HIV and by extension, other STDs). In addition, Catholic or Mainline Protestant members are said to be more likely to use condoms as means of preventing HIV in the study setting (Agadjanian, 2005), a fact that suggests that even if Catholics and Mainline Protestants were to have more sexual partners, they would probably also be more likely to use condoms than members of other religious groups. Thus, we would expect health-related behaviors and attitudes of members of Catholic or Mainline Protestant residents to spread to other members of the same community.

In respect to the concentration of Apostolic, Zionist and Other Pentecostal denominations in communities, I have two divergent expectations: lowering the likelihood of women residing in communities reporting symptoms of STDs due to lower prevalence of extramarital sexual practices among members of these denominations (Gregson et al., 1999; Trinitapoli & Regnerus, 2006); and increasing the likelihood of reporting symptoms of STDs among women residing in communities where these denominations are prevalent because of lower

connections to medical health care services, acceptance of polygyny and lower use of condom as a prevention tool against HIV and other STDs among members of these congregations) (Pfeiffer, 2004b; Agadjanian, 2005).

As part of my inquiry into the effects of religion on STDs, I also examine, among women who reported having had symptoms of STDs, whether there is a difference by religious affiliation in seeking advice or treatment for symptoms in medical health establishments (hospital or another health unit). The literature in sub-Saharan Africa has documented variations in use of health care services by religious affiliation (e.g., Addai, 2000; Agadjanian, 2005; Gregson et al., 1999). Addai (2000) reported that in Ghana, Catholic women displayed higher use of maternal health care services (medical health services) while women belonging to the traditional religion favored the use of traditional health services.

In a study in Zimbabwe, Gregson et al. (1999) indicated that while Mission churches (which in my religious categorization include Catholic or Mainline Protestant churches) promote the use of medical health care services, Apostolic and Zionist churches (to a lesser degree Zionist churches) avoid modern health services and teach faith-healing. In Mozambique, Agadjanian (2005) argued that Apostolic, Zionist and Other Pentecostal churches emphasize faith-healing for physical diseases.

Given this background, I expect that women belonging to Catholic or Mainline Protestant congregations will show higher likelihood of seeking advice or treatment for symptoms of STDs in health units than non-affiliated women. For other religious groups (Apostolic, Zionist and Other Pentecostal) I expect to find

no difference between women belonging to these religious groups (particularly among Apostolic women) with non-affiliated women in seeking advice or treatment for symptoms of STDs in health establishments. As for the effect of prevalence of religious denominations in the community, I posit that the concentration of Catholic or Mainline Protestant churches in the community will have a positive effect while that of other religious groups (Apostolic, Zionist and Other Pentecostal churches) a negative effect on the probability of women seeking advice or treatment for symptoms of STDs in health care facilities.

Methods

Outcome variables. Direct clinical evidence of STDs is not available from the survey, and I instead use STD-like symptoms reported by respondents. In resource-poor settings where laboratory diagnostic of most STDs is difficult, the World Health Organization has encouraged the use of common symptoms of STDs for detection and treatment of STDs (typically called the syndromic approach to STDs case management) (WHO, 1997). Although it may overestimate occurrence of STDs, the syndromic approach is more likely to capture cases of untested STDs, especially in poor settings where women may be unable or unwilling due to fear of stigma to get tested for STDs (Sevoyan & Agadjanian, 2010).

The main outcome variable therefore is whether in 12 months preceding the survey date the respondent had symptoms of STDs. It is derived from a series of questions that ask whether in the past 12 months the respondent did have (a)

abnormal vaginal discharge (excluding menstruation); (b) ulcer/lesions in the genital area; and (c) pain when urinating. This outcome is coded as 1 if the respondent had at least one of these symptoms and as 0 otherwise.

Another outcome variable is whether or not women who reported having had symptoms of STDs in 12 months preceding the survey date sought advice or treatment for those symptoms in a medical health establishment. This outcome derives from a follow-up to questions that ask whether women had had symptoms of STDs in 12 months before the survey. The follow-up question asks whether women sought advice or treatment for the symptoms she had at a hospital or another health unit. It is coded as 1 if the answer is yes and as 0 otherwise.

Predictor variables. As in the previous chapter, the main predictors are individual religious affiliation and the religious community context. For individual religious affiliation I first distinguish between women affiliated to organized religion and non-affiliated women. Second, I categorize individual religious affiliation as follows: 1. Catholic or Mainline Protestant; 2. Apostolic; 3. Zionist; 4. Other Pentecostal; and 5. Non-affiliated. Religious affiliation is lagged two years before the survey date. The other main predictor is concentration of religious congregations in the community. As in the previous chapter, this measure considers 1) concentration of any religious congregations in the community; and 2) concentration of religious congregations of a given denominational type in the community.

For the outcome whether or not women had symptoms of STDs in 12 months before the survey, I control for women's age and marital status two years

before the survey date. Woman's age is coded as a dichotomous variable to capture possible variation of sexual desire and frequency with age, as a sexual intercourse could primarily expose a woman to STDs. I also control for women's education, households assets, distance to the closest health clinic from the respondent's household and average level of education in the community. These variables are coded as in previous chapter and with the exception of the distance from the respondent's household to the closest health clinic, they refer to the time of the survey date. Distance from the respondent's household to the closest health clinic refers to two years before the survey date.

Most studies report that spatial mobility is a risk factor for acquisition of STDs (Agadjanian & Avogo, 2008; Brockerhoff & Biddlecom, 1999; Decosas, Kane, Anarfi, Sodji, & Wagner, 1995). For example, Brockerhoff and Biddlecom (1999) indicated that women migrating in rural areas of Kenya are more likely to engage in risk sexual behavior than non-migrant women. To account for a possible effect of spatial mobility in the likelihood of women having had symptoms of STDs, I control for number of nights that a woman spent away from home in a month preceding the survey date.

Because women who are preventing pregnancy could be protected from STDs, especially if they are using a condom as contraceptive (Becker & Costenbader, 2001; Maharaj & Cleland, 2004), I control for a variable indicating whether or not a woman is doing anything to prevent pregnancy (coded as 1 if yes and as 0 otherwise). Other controls used for the outcome whether or not women had symptoms of STDs in 12 months before the survey are whether or not a

woman works outside home, whether or not a woman has talked to someone about HIV, whether or not a woman is worried about being infected with HIV, and a woman's autonomy. Work outside home may be a household economic characteristic and may indicate exposure to non-family relationships. Talking to others about HIV could expose a woman to more information about STDs. Being very worried about getting the HIV infection could be a proxy for worries about contracting STDs. More autonomy could allow freedom of movement to women and possibly enlarge their area of interaction. With the exception of woman's autonomy all these variables are dichotomous (coded as 1 if yes and as 0 otherwise).

In settings where agriculture is the mainstay of the economy, there is a possibility that women might delay or forgo seeking medical advice or treatment for symptoms of STDs because they could not miss a day for going to the agricultural field. For women who employ paid agricultural labor, missing going to the agricultural field could not be a problem. Thus, besides some variables used in models examining whether or not a woman had had symptoms of STDs in the 12 months preceding the survey, for the outcome whether or not a woman sought advice or treatment for symptoms of STDs I also add as a control whether or not the woman's household usually employs labor that is paid in money or products in a woman's agricultural fields (coded as 1 if yes and as 0 otherwise). This variable is also a characteristic of household socioeconomic status.

In this chapter, the fact that some of the predictors for both outcomes refer to the period of the survey is a limitation. However, I believe that any bias

introduced to the analysis due to that fact could be small as the outcome variables refer to a recent past. There is a possibility that some women may have switched religious affiliation and that religious teachings from previous affiliations could affect current exposure to STDs. This is another limitation in this research. For the analysis I fit a random intercept logistic regression using the xtlogit command in Stata (StataCorp, 2007).

Results

Descriptive results. Table 12 shows statistics of the sample referring to report of symptoms of STDs and seeking advice or treatment for those symptoms, one year prior to the survey, by religious group. There is no large variation among religious groups on the percentage of women who declared having had symptoms of STDs. But Apostolic and Zionist religious groups have the highest percentage of women who reported having had symptoms of STDs in each group (28.2 percent and 26.8 percent, respectively). With only 21.8 percent, Other Pentecostals show the lowest percentage of women who reported having had symptoms of STDs.

As for seeking advice or treatment for symptoms of STDs there is also no substantial variation among religious groups. But the Catholic or Mainline Protestant and the Zionist religious groups have the highest percentage of women who sought advice or treatment for symptoms of STDs in a hospital or other health unit (74.5 percent and 72.3 percent, respectively).

Multivariate results. Table 13 presents results assessing the effect of affiliation to religious organizations and concentration of religious organizations in the community, irrespective of the type of congregation, on the likelihood of women reporting symptoms of STDs. The baseline model (Model 1) shows a negative but non-significant effect of affiliation to any religious organization on the likelihood of women reporting symptoms of STDs.

Table 12

Descriptive Results about Women's Symptoms of STDs by Religious Group, Two Years Before the Survey Date, Percentage, Religious Organizations and HIV/AIDS Survey, 2008

Variable	Woman's Religious Affiliation				
	Catholic or Mainline Protestant	Apostolic	Zionist	Other Pentecostal	No Religion
Had at least one symptom of sexually transmitted diseases	23.2	28.2	26.8	21.8	23.6
Sought advice or treatment of symptoms of sexually transmitted diseases in hospital or other health unit	74.5	62.7	72.3	70.2	68.4

Notes. The differences across religious groups are not statistically significant.

When adding the measure of the concentration of any religious congregations in the community and other control variables (Model 2, Table 13), I find that net of other factors, women affiliated to organized religion have lower odds of reporting symptoms of STDs than non-affiliated women. But the corresponding coefficient is not statistically significant. As for the effect of concentration of any religious congregations in the community, the effect is positive and statistically significant net of other factors. The hypothesis that

women affiliated to any organized religion will have lower odds of reporting symptoms of STDs relative to non-affiliated women was not confirmed. The hypothesis that the concentration of any religious congregations in the community will decrease the odds of women reporting symptoms of STDs, does not find support either.

Also in this chapter, my hypotheses raise the possibility of specific effects of religion, depending on the type of religious denomination. Table 14 displays results examining effects of specific religious denominations on the likelihood of women reporting symptoms of STDs. Although not statistically significant, Model 1 shows that women affiliated to Catholic or Mainline Protestant denominations and to Other Pentecostal churches have lower odds of reporting symptoms of STDs than non-affiliated women. The effect of affiliation to Apostolic and Zionist congregations is positive (but the effect is not statistically significant). In Model 2, I add concentration of specific religious groups in the community and controlling factors.

As for the effect of individual religious affiliation, women affiliated to the Catholic or Mainline Protestant religious group have lower odds of reporting symptoms of STDs than non-affiliated women (although the effect is only marginally significant). The effect of being affiliated to the Catholic or Mainline Protestant religious group decreases the odds of a woman reporting symptoms of STDs by about 28 percent, net of other factors. The effect of being a woman affiliated to other religious groups was not statistically different from the effect of being a woman non-affiliated, controlling for other factors.

Table 13

Random Intercept Logistic Regression Predicting Whether in the Past 12 Months a Woman Had STDs Symptoms, with Woman's Affiliation to Any Religious Organization and Concentration of Any Churches in the Community as Main Predictors (Odds Ratio), Religious Organizations and HIV/AIDS Survey, 2008

Variable	Model 1	Model 2
Women's Religious Affiliation		
No Affiliation [Reference]	1	1
Affiliated to an Organized Religion	0.94	0.90
Community concentration of religious congregations		
Any Religious Congregation		1.01**
Woman's Age		
31 or More Years [Reference]		1
Less than 26 Years		1.03
26 to 30 Years		1.27
Woman's Marital Status		
Not Married [Reference]		1
Married		0.97
Woman's Education		
5 and More Years [Reference)		1
1 to 4 Years		1.26
0 Years		1.24
Household Assets Index		1.01
Whether Woman Works Outside Home for Income		
Does Not Work Outside Home [Reference]		1
Works Outside Home		1.60**
Distance to the Closest Clinic		
Urban [Reference]		1
Rural Less than 5 Km		0.67*
Rural More than 5 Km		0.69*
Number of Nights that Woman Spent Away from Home		1.46*
Whether Woman Is Doing Anything to Avoid Pregnancy		
Not Avoiding Pregnancy [Reference]		1
Avoiding Pregnancy		0.86
Whether Woman Has Talked to Someone About HIV		
Has Not Talk to Someone [Reference]		1
Has Talked To Someone		1.33
Whether Woman Is Very Worried About Getting HIV Infection from Her Husband		
Not Worried		1
Very Worried		1.27
Woman's Autonomy		1.02
Average level of education in the community		0.94
Intercept	0.35**	0.18**
Variance (S.E)	0.31(0.10)	0.01(0.07)
Log Likelihood	-884.44	-855.74
Number of cases	1565	1565

Notes. †- p<.1; *- p≤ .05; **- p≤ .01; S.E. - Standard Error

Regarding the effect of concentration of specific religious groups in the community, I find a negative effect for the presence of the Catholic or Mainline Protestant group and a positive effect for the concentration of other religious groups in the community. However, with the exception of the presence of the Other Pentecostal religious group, all other effects are not statistically significant.

The findings in Model 2 provide some support to the hypothesis that women affiliated to the Catholic or Mainline Protestant religious group in particular, will have lower likelihood of reporting symptoms of STDs than non-affiliated women, controlling for other factors. The hypothesis that the concentration of Catholic or Mainline Protestant denominations in the community will decrease the likelihood of reporting symptoms of STDs for residents of the community does not find support.

One question that I also ask in this chapter is whether or not those women who reported symptoms of STDs sought advice or treatment for those symptoms in health care establishments. Table 15 presents results regarding this question. I expected that women affiliated to Catholic or Mainline Protestant denominations would show higher odds of having sought advice or treatment for symptoms of STDs in health establishments than non-affiliated women, net of other factors. Although the coefficient is positive, there is no statistically significant difference between women affiliated to Catholic or Mainline Protestant denomination with non-affiliated women.

Table 14

Random Intercept Logistic Regression Predicting Whether in the Past 12 Months a Woman Had STDs Symptoms, with Woman's Affiliation to Specific Religious Group and Concentration of Specific Churches in the Community as Main Predictors (Odds Ratio), Religious Organizations and HIV/AIDS Survey 2008

Variable	Model 1	Model 2
Woman's Religious Affiliation		
No Affiliation [reference]	1	1
Catholic or Mainline Protestant	0.76	0.72+
Apostolic	1.05	1.00
Zionist	1.01	0.96
Other Pentecostal	0.92	0.90
Community concentration of religious congregations		
Catholic or Mainline Protestant		0.97
Apostolic		1.05
Zionist		1.01
Other Pentecostal		1.03+
Woman's Age		
31 or More Years [Reference]		
Less than 26 Years		1.01
26 to 30 Years		1.26
Woman's Marital Status		
Not Married [Reference]		1
Married		0.99
Woman's Education		
5 and More Years [Reference)		1
1 to 4 Years		1.25
0 Years		1.18
Household Assets Index		1.01
Whether Woman Works Outside Home for Income		
Does Not Work Outside Home [Reference]		1
Works Outside Home		1.61**
Distance to the Closest Clinic		
Urban [Reference]		1
Rural Less than 5 Km		0.85
Rural More than 5 Km		0.85
Number of Nights that Woman Spent Away from Home		1.46*
Whether Woman Is Doing Anything to Avoid Pregnancy		
Not Avoiding Pregnancy [Reference]		1
Avoiding Pregnancy		0.88
Whether Woman Has Talked to Someone About HIV		
Has Not Talk to Someone [Reference]		1
Has Talked To Someone		1.33*
Whether Woman Is Very Worried About Getting HIV Virus		
Not Worried		1
Very Worried		1.29
Woman's Autonomy		1.01
Average level of education in the community		0.97
Intercept	0.35**	0.15**
Variance (S.E)	0.31 (0.10)	0.00 (0.02)
Log Likelihood	-882.67	-851.62
Number of cases	1565	1565

Notes. †- p<.1; *- p≤ .05; **- p≤ .01; S.E. - Standard Error

Table 15

Random Intercept Logistic Regression Predicting Whether Women Who Had STDs Symptoms in the Past 12 Months Sought Advice or Treatment in a Health Unit, with Woman's Religious Affiliation and Concentration of Churches in the Community as Main Predictors (Odds Ratio), Religious Organizations and HIV/AIDS Survey, 2008

Variable	Model 1
Woman's Religious Affiliation	
No Affiliation [reference]	1
Catholic or Mainline Protestant	1.30
Apostolic	0.96
Zionist	1.39
Other Pentecostal	0.81
Community concentration of religious congregations	
Catholic or Mainline Protestant	1.07
Apostolic	1.02
Zionist	0.99
Other Pentecostal	1.00
Woman's Age	
31 or More Years [Reference]	1
Less than 26 Years	0.74
26 to 30 Years	1.84*
Woman's Marital Status	
Not Married [Reference]	1
Married	1.40
Woman's Education	
5 and more Years [Reference)	1
1 to 4 Years	0.52*
0 Years	0.56+
Household Assets Index	1.08
Woman’s Household Usually Employs Paid Labor in Its Agricultural Fields	
Does Not Employ Paid Labor [Reference]	1
Employs Paid Labor	1.47
Distance to the Closest Clinic	
Urban [Reference]	1
Rural less than 5 Km	0.76
Rural more than 5 Km	0.39*
Average level of education in the community	0.84
Intercept	4.53*
Variance (S.E.)	0.10(0.67)
Log Likelihood	-262.64
Number of cases	467

Notes. †- p<.1; *- p≤ .05; **- p≤ .01; S.E.-Standard Error.

The results in Table 15 also show, as I expected, that women affiliated to Apostolic, Zionist and Other Pentecostal religious groups are not statistically different from non-affiliated women in seeking advice or treatment for symptoms of STDs in health establishments. Table 15 also examines the effects of concentration of religious denominations in communities on the likelihood of women seeking advice or treatment for symptoms of STDs. For all religious groups, the concentration of churches in the community does not significantly affect the likelihood of seeking advice or treatment for symptoms of STDs.

Summary and Conclusion

Studies attempting to understand the role of religion on STDs other than AIDS are relatively scarce in sub-Saharan Africa, despite the recognition that other STDs may facilitate infection with HIV (Fleming & Wasserheit, 1999; Galvin & Cohen, 2004; Korenromp et al., 1999). In this chapter I tried to contribute for addressing this gap in the literature. I started by examining effects of affiliation to any religion on the likelihood of women reporting symptoms of STDs. I found that women affiliated to any religious organization were not statistically different from non-affiliated women in reporting symptoms of STDs controlling for other factors. The effect of concentration of any religious denomination in the community was positive and statistically significant.

The finding that the presence of any congregation in the community increases the likelihood of reporting symptoms of STDs may not constitute a surprise as this measure includes diverse religious organizations, some of them as

Apostolics and Other Pentecostals are known for their lower connection to medical health services (where they could get information about STDs), acceptance of polygyny and lower use of condom as a preventing tool against STDs (Agadjanian, 2005; Gregson et al., 1999; Pfeiffer, 2004b).

I moved further the analysis by examining the effect of affiliation to specific religious denominations and concentration of churches of a given type in the community on the likelihood of women reporting symptoms of STDs. I found that belonging to the Catholic or Mainline Protestant religious group lowered the odds of reporting symptoms of STDs relative to not being affiliated, net of other factors; although the corresponding effect is only marginally significant. The effect of being a woman affiliated to other religious groups (Apostolic, Zionist and Other Pentecostal) was not statistically different from the effect of being a woman non-affiliated to an organized religion, net of other factors. The differences across religious denominations in the likelihood of a woman reporting symptoms of STDs were not statistically significant (results not shown).

As for the effect of concentration of religious congregations in the community, the hypothesis that the presence of Catholic or Mainline Protestant denominations in the community would decrease the odds of women reporting symptoms of STDs was not confirmed; but the coefficient followed the hypothesized direction. I also found that residing in communities where Apostolic and Zionist denominations are prevalent is not significantly associated to reporting symptoms of STDs. However, the concentration of Other Pentecostal churches in communities had a positive and significant effect on reporting

symptoms of STDs, net of other factors. It is possible that characteristics of Pentecostal denominations that may expose women to STDs (as discouraging the use of condoms and lower connection to medical health care organizations where access to STDs' preventive information may be obtained) could be part of the explanation of a positive effect of the presence of Other Pentecostal churches in communities.

In this chapter I also examined differences in seeking advice or treatment for symptoms of STDs between women affiliated to various religious groups and non-affiliated women. I found no statistically significant differences. The results in this chapter appear to suggest a variation of the effect of religious affiliation on symptoms of STDs by religious affiliation of women. The results also appear to suggest an advantage on avoiding symptoms of STDs among women belonging to the Catholic or Mainline Protestant religious group when compared to non-affiliated women. With the exception of the presence of Other Pentecostal religious groups, the concentration of religious congregations in the community does not appear to have an effect on symptoms of STDs. Overall the findings in this chapter underscore the importance of considering religion, especially individual religious membership, for understanding the risks of STDs in sub-Saharan African context.

CHAPTER 5

RELIGIOUS AFFILIATION AND UNDER-FIVE MORTALITY

Introduction

Sub-Saharan Africa is the region of the world with the highest under-five mortality (WHO, 2010). The United Nations points out that although most causes of child deaths are preventable and treatable, most children die every year in sub-Saharan Africa than anywhere else in the world: of 8.8 million children under-five years of age who died in 2008, half were in sub-Saharan Africa (United Nations, 2010). Yet, few studies have examined the effect of religion on child survival in the region (Antai et al., 2009; Gregson et al., 1999; Gyimah, 2007). In Mozambique in particular, under-five mortality rate is one of the highest in sub-Saharan Africa (130 deaths per 1000 live births in 2008), but little is known of the effect of religious affiliation on under-five mortality in the country. The few existing studies that have been carried out about religion and child survival in sub-Saharan Africa have been focused in West Africa and there is a lack of understanding about the effect of religion on under-five mortality in Southern Africa (with the exception of Gregson et al., 1999).

The few existing recent studies about religion and child survival in sub-Saharan Africa, mostly conducted in West Africa, suggest that the effect of religion on under-five mortality is typically explained by maternal education and religion-based differential use of maternal and child health services. Gyimah (2007) investigated differences in child survival by religious affiliation using

Ghana Demographic and Health Surveys of 1998 and 2003. Bivariate analysis showed that children of women belonging to Islam and traditional religion were significantly at higher risk of dying compared to children of mainstream Christian mothers; but there were no difference of the risk of death of children between mothers affiliated to mainstream Christian denominations and other Christian denominations. The association between religious affiliation and child survival observed at bivariate level disappeared after controlling for socioeconomic factors, especially education.

Another study in Nigeria concluded that the association between belonging to a traditional religion and under-five mortality was explained by religion-based differential use of maternal and child health services (Antai et al., 2009). In Zimbabwe, Gregson et al. (1999) observed that Zionist and Apostolic members historically showed high death rates of children than members of Mission churches; presumably because Zionist and Apostolic churches discouraged the use of both traditional and modern medical services. These researchers also note that the disadvantage of Zionist and Apostolic church members in infant mortality reduced in earlier 1990s probably owing to enforced vaccination.

Although the literature on religious affiliation and child survival in sub-Saharan Africa is scant, researchers in other parts of the world have recently devoted attention to understanding how religious affiliation may affect child survival. Using the 2000 Demographic Census of Brazil, Wood, Williams and Chijiwa (2007) examined the association between religious affiliation and child

death among mothers aged 20 to 34 years in Northeast Brazil. They found significantly lower death rate among children of mothers affiliated to traditional Protestant (Baptist and Presbyterian denominations) and Pentecostal denominations when compared to children of mothers belonging to Catholic religious affiliation. This difference was mainly attributed to socioeconomic differences between religious denominations. Unlike Catholics and Pentecostals, according to Wood et al. (2007), traditional Protestants in Northeast Brazil are characterized by higher levels of education and household income and more likely to be married and live in households with piped water. The authors' note that although Assembly of God –a Pentecostal denomination not affluent in Northeast Brazil – displayed significantly lower deaths of children than Catholics, the difference between the two congregations was not too high.

Bivariate results of another study extended to whole Brazil found significantly lower infant death among Protestant mothers when compared to Catholic ones; however, after adjusting for socioeconomic and demographic factors denominational differences in infant deaths became statistical insignificant (Verona, Hummer, Júnior, & De Lima 2010). The findings from both Brazilian studies appear to draw attention to the relevance of socioeconomic factors in explaining child deaths.

Another study in Mexico (Valle, Fernández, & Potter, 2009) investigated the effect of religious affiliation of the mother on child mortality among women belonging to indigenous and nonindigenous ethnic groups in Chiapas. For the indigenous ethnic group, the study reported significantly lower child mortality

among mothers affiliated to Presbyterian denomination compared to mothers belonging to Catholic denomination, net of demographic and socioeconomic factors of the mother. Among nonindigenous women, religious affiliation of the mother was not significantly associated with child mortality in Chiapas. The authors suggested that the reasons behind favorable effect on child survival of affiliation to Presbyterian denomination among indigenous women might be explained by a couple of factors: better use of health care services by Presbyterian women compared to Catholic women; greater social integration and organization among Presbyterian congregations than Catholic ones. The researchers further noted that indigenous health promoters among Presbyterians provided members with health education and helped members with referral to public and private health services.

Overall, the literature about relationships between individual religious affiliation and child survival appear to show that differences in child survival among religious groups are mostly explained by socioeconomic characteristics of religious groups and religion-based differences in use of health care services. The limited evidence about sub-Saharan Africa shows that there is variation among religious groups in socioeconomic characteristics of their members. Catholic and Mainline Protestant churches tend to have members with better education (Agadjanian, 2001; Garner, 2000; Gyimah et al., 2006; Takyi & Addai, 2002) and better household living conditions (Gyimah et al., 2006), while most Pentecostal church goers tend to be less educated and poorer, especially those belonging to Zionist churches (Agadjanian, 2001; Pfeiffer, 2002; Schoffeleers, 1991).

Apostolic members are likely to be relatively wealthier owing to economic endeavor in cottage industry, small trade and agriculture within the Apostolic religious group (Bourdillon, 1983; Jules-Rosette, 1997; Turner, 1980). Despite differences among Christian denominations in socioeconomic diversity of their members, when considered as one group, members of Christian churches have been reported to be economically wealthier than those belonging to the traditional religion (often including those non-affiliated to a religious organization) (Antai et al., 2009; Gyimah et al., 2006; Kollehlon, 1994; Takyi & Addai, 2002). These differences between religious groups in socioeconomic make-up of their members could be expected to translate into variation in under-five mortality in sub-Saharan Africa.

Another variation with implications for child survival that has been reported about congregations of sub-Saharan Africa is referring to connections to health care institutions and religious-based position regarding using medical health services. Catholic and Mainline Protestant churches have been found to support the use of medical health services, while Apostolic, Zionist and most Pentecostal religious organizations are reported to encourage faith-healing (Agadjanian, 2005; Gregson et al., 1999). In addition, Catholic and Mainline Protestant congregations are reported to be more connected to secular institutions of health care and education (Addai, 2000; Gyimah et al., 2006; Takyi & Addai, 2002) which could be a vehicle to accessing preventive information against under-five mortality. It seems reasonable to expect that in Mozambique, variation between religious groups in their position regarding use of medical health services

and socioeconomic make-up of their members could lead to differences in under-five mortality depending on religious affiliation of children's mothers.

In this chapter, I first expect that children of mothers affiliated to any religious organization will have higher survival than children of non-affiliated mothers, net of other factors. This expectation stems from the finding that individuals affiliated to Christian denominations in sub-Saharan Africa when considered as one group are typically wealthier than those non-affiliated (Antai et al., 2009; Gyimah et al., 2006; Kollehlon, 1994; Takyi & Addai, 2002). And from the recognition that religious organizations in general have organizational aspects that may benefit child survival of affiliated members, such as social integration and social support to members (Ellison & George, 1994; George et al., 2002; Hummer et al., 2004; Jarvis & Northcott, 1987; Taylor & Chatters, 1988). Thus, beyond household and individual characteristics, women affiliated to organized religion may have additional resources than non-affiliated mothers that may contribute for child survival.

Although in general individuals affiliated to organized religion may have additional resources than non-affiliated people, religious organizations differ among themselves in socioeconomic diversity of their members, connection to health care institutions and access to health information. Thus, I expect in particular that children of mothers belonging to Catholic or Mainline Protestant denominations as compared to children of women non-affiliated to an organized religion will experience the lowest under-five mortality rate because Catholic and Mainline Protestant mothers are reported to be better educated, of higher income

and better living conditions (Agadjanian, 2001; Garner, 2000; Gyimah et al., 2006; Takyi & Addai, 2002). In addition, Catholic and Mainline Protestant churches have connections to medical health care institutions (Addai, 2000; Gyimah et al., 2006; Takyi & Addai, 2002) which could benefit survival of members' children.

I also expect to find particularly lower rate of under-five mortality among children born to Apostolic women when compared to children of non-affiliated mothers. As I indicated, most studies describe the Apostolic in Central and Southern Africa as mutual help and cooperative communities whose work discipline and entrepreneurship in agriculture, cottage industry and small trade encourage relative economic success (e.g., Bourdillon, 1983; Jules-Rosette, 1997; Turner, 1980). Children of mothers affiliated to the Apostolic religious group could benefit from better nutrition and household living conditions (correlates of child survival) than children of non-affiliated mothers owing to encouragement of economic endeavor and practice of social support within the Apostolic group.

Although I cannot directly test the effect of social support on child survival with my data, based on the literature (Ellison & George, 1994; George et al., 2002; Hummer et al., 2004; Jarvis & Northcott, 1987; Taylor & Chatters, 1988) it appears reasonable to expect that social support could be part of explanation of any religious differences in child survival that I may observe after accounting for other factors, particularly among Apostolic.

Methods

Outcome variable. In this chapter, the outcome is the hazard of under-five mortality. For every child, the risk period begins at the time of birth. The risk period ends when the child dies, completes 5 years or at the end of the survey for children less than 5 years who were still alive by the survey date. I build a person-year file in which each child contributes one observation for every year of life before the end of the risk period. For children who were still alive by the survey date, the outcome variable is coded 0 in each year of exposure. Children who died between age 0 and 5 were coded 0 for each year of life before death and coded 1 in the year of death. Each child stops contributing person-years when the risk period ends. This is the typical data restructuring for employing discrete-time event-history models (Allison, 1995).

The age of children was operationalized in a set of five dummy variables to capture the variation of mortality risk with age: 0 to less than 1 year, 1 to less than 2 years, 2 to less than 3 years, 3 to less than 4 years, and 4 to exact 5 years. In this study I use a total of 5619 births and 1297 deaths. Children with incomplete birth and death information were excluded from the analysis.

Predictor variables. The main predictor in this study is time-varying women's religious affiliation. As in previous chapters, I first distinguish between women affiliated to an organized religion and non-affiliated women. Second, I categorize religious affiliation as follows: 1) Catholic or Mainline Protestant; 2) Apostolic; 3) Zionist; 4) Other Pentecostal; and 5) Non-affiliated. As in other chapters, these categories are built based on a question about religious life history

of the respondent. For each year of observation, religious affiliation of the respondent is lagged one year. I considered including religious community context as a predictor in the study of the association between religion and under-five mortality. However, in preliminary analysis a significant effect of religious community context measures on under-five mortality was not found. Because of lack of statistical significance of measures of religious community context that I am currently using, the analysis in this chapter is limited to the understanding of connections between individual religious affiliation with under-five mortality.

I include as controls socio-demographic variables typically reported to affect child survival (Brockerhoff & Derose, 1996; Cleland & Sathar, 1984; Omariba, Beaujot, & Rajulton, 2007): time-varying mother's age, time-varying parity, time-varying marital status, and the length of preceding birth interval. The length of preceding birth interval is categorized as follows: less than 2 years and 2 or more years.

Two measures of individual and household socioeconomic condition are considered: respondent's education and the household assets' index. These variables have been found to affect the risk of child survival (e.g., Agha, 2000; Farah & Preston, 1982; Folasade, 2000; Macassa, Ghilagaber, Bernhardt, Diderichsen, & Burström, 2003; Schellenberg et al., 2002). Respondent's education and household assets' index are coded as in previous chapters. I also control for mother's place of residence (dichotomized as urban versus rural) as it has been reported to affect child survival (Andoh, Umezaki, Nakamura, Kizuki, &Takano, 2007).

A measure of historical period of child birth is created to attempt capturing the influence of broad socio-economic and political changes in Mozambique in the last 40 years. For example, the country went through a period of civil war and post-war reconstruction. It is likely that children born in some years of Mozambican history might have faced an elevated risk of death – as in the period of relatively intense civil war between 1983 and 1992. Four dummy variables were created to account for the historical period of child birth: born between 1970 and 1982, born between 1983 and 1992, born between 1993 and 2000, and born between 2001 and 2008.

I also control for the average female educational level in the community (cluster). Average educational level in the community has been found to have an effect on child survival beyond the effect of mother's own education; and it could also be suggestive of the degree of community knowledge about good health behavior, community environmental hygiene and nutrition (Kravdal, 2004). To account for the fact that women with ill children might have been selected to joining healing religious organizations, I control for a time-varying variable indicating whether a mother joined a religious denomination due to health reasons. This variable is lagged one year.

Statistical analysis. Analysis was done employing discrete-time event history approach. Discrete-time event-history analysis is adequate because it allows the inclusion in the model of children who are still alive by the time of the survey – censored children (Sear, Steele, McGregor, & Mace, 2002). Two analytical approaches are followed in this study. First I consider all deaths that

occurred throughout respondents' childbearing years. Second, I consider only deaths that occurred in the last 5 years before the survey date.

The rationale for following these two approaches is based on the understanding that women may be more likely to recall births and deaths that occurred in recent past than distant ones. Because this is a cross-sectional sample, restricting the analysis to the last 5 years before the survey allows the use of socioeconomic predictor variables that were collected at the time of the survey. Yet, at the same time, it reduces the number of events, which may affect estimates.

For analysis I use xtlogit command in Stata to fit random-effects discrete-time logistic regression models (StataCorp, 2007). I employ a model with random-effects to take into account that children born to the same mother may share some unobserved characteristics which may introduce bias to the results (Avogo & Agadjanian, 2010). Most studies have reported that children of the same mother share factors that tend to affect mortality risks (Curtis, Diamond, & McDonald, 1993; Das Gupta, 1990; Sear et al., 2002). Following Sear et al. (2002), let y_{tij} be the event indicator, where $y_{tij}=1$ if child i in family j experiences death at time t and $y_{tij}=0$ if the child survives past time t. The model that I fit may be described by the following equation:

$$\log (h_{tij}/(1-h_{tij})) = \alpha_t + \beta' \mathbf{x}_{tij} + u_j, \quad (1)$$

where $h_{tij} = Pr(Y_{tij}=1/Y_{t-1,ij}=0)$ is the hazard that child i in family j finds death at time t; α_t is a function of time (operationalized in a set of dummy variables corresponding to each period of child life); β are coefficients of $\mathbf{x}_{tij}$ vectors of

time-fixed or time-dependent covariates, and u_j is the family level random effect which is assumed to follow a normal distribution with a mean of zero.

To describe baseline under-five mortality differences between children of non-affiliated women and children of women belonging to each one of other categories of religious affiliation, I estimated five-year probabilities of survival using the Kaplan-Meier (product limit) estimator. Analysis was done using the LIFETEST procedure in SAS 9.2 (SAS Institute Inc., 2008). The Log-rank test was used to assess the equality of survival functions between children of non-affiliated women and those of women belonging to each one of other religious affiliation categories.

Results

Figure 2 displays comparison of survival probabilities between children of non-affiliated mothers and children of mothers belonging to each one of other religious categories (Catholic or Mainline Protestant, Apostolic, Zionist and Other Pentecostal). Figure 2 is based on deaths of children during all years of women childbearing that were considered in the sample. It indicates that children of Catholic or Mainline Protestant mothers and children of Apostolic mothers have higher survival probabilities when compared to children of unaffiliated mothers (Log-rank test, $p<.01$). The survival probabilities of children of Zionist mothers and those of children of women belonging to the Other Pentecostal religious group are not significantly different from those of children of non-affiliated mothers.

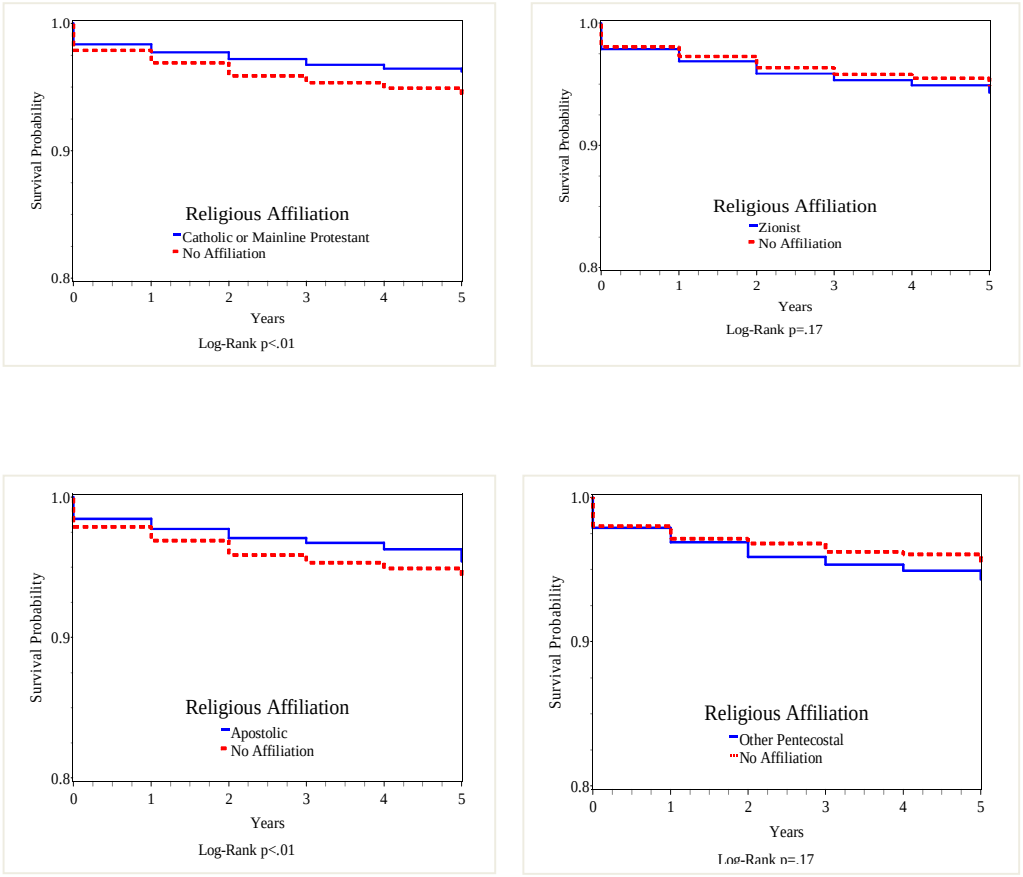

Figure 2. Kaplan-Meier child survival probabilities by religious affiliation during women's childbearing years, Religious Organizations and HIV/AIDS Survey, 2008

To move on with the analysis, I start by assessing whether there is difference in under-five mortality between children of non-affiliated mothers and children of mothers affiliated to an organized religion regardless of the type of Christian denomination. Table 16 presents results of random-effects discrete-time hazard models predicting the effect of mother's religious affiliation on under-five mortality. Models 1 and 2 consider deaths that women had during their

childbearing years. Model 3-5 consider only deaths that occurred in 5 years prior to the survey date. The results are shown as odds ratio which are obtained from exponentiation of logistic regression coefficients. The results will be interpreted as rates because in situations where there are many time periods of risk in relation to the number of events, discrete-time event-history odds may approximate to rates (Yabiku, 2005).

Model 1 in Table 16 examines the effect of mother's affiliation to any religious organization on the rate of child death and displays the baseline hazard. Model 1 indicates that mother's affiliation to any religious organization have a protective effect on child death. The rate of death of children of mothers affiliated to an organized religion is 20 percent lower than that of children of mothers belonging to the No Affiliation religious group (the reference category). As expected, the baseline hazard indicates that the rate of child death is significantly higher after birth and decreases with age.

Model 2 presents the estimation of under-five mortality rate considering all controls and it indicates significantly lower mortality rate among children of affiliated mothers when compared to children of unaffiliated women. The findings in Model 2 suggest that religious affiliation has beneficial effect on child survival, net of other factors.

Also evident in Model 2, the baseline hazard remains statistically significant after controlling for other factors. Additionally, maternal education lowers the rate of child death: compared to children of mothers with 5 or more years of education, children of mothers without schooling and those of mothers

with 1 to 4 years of education have higher mortality rate. Also noticeable in Model 2, shorter preceding birth interval significantly increases the rate of under-five mortality. This evidence is corresponding to several other studies that have reported deleterious effects of shorter prior birth intervals for child survival (Cleland & Sathar, 1984; Forste, 1994; Miller, Trussell, Pebley, &Vaughan, 1992).

In Models 3-5 I turn to examining the effect of mother's belonging to any religious organization on under-five mortality in 5 years preceding the survey date. As I stated earlier, deaths occurring more recently are more likely to be recalled. In addition, to adequately assess my hypothesis I need to control for more socioeconomic factors typically correlated with child survival that were measured at the time of the survey. Thus, in Model 3 I find that even considering only deaths that occurred five years before the survey, mother's affiliation with an organized religion appears to be beneficial for child survival.

When I add socioeconomic covariates in Model 4, children of mothers affiliated to an organized religion continue to have lower death rate than children of unaffiliated mothers, although the effect is only marginally significant. The rate of death of children born to mothers affiliated to an organized religion is 20 percent lower than that of children born to non-affiliated mothers. In Model 5 I add the average level of education in the community and the variable indicating whether a mother joined an organized religion for health reasons. Although mother's affiliation to an organized religion is still having positive effect on child survival, the coefficient loses statistical significance.

Table 16

Odds Ratio from Random-Effects Discrete-time Hazard Models of the Effect of Any Mother's Religious Affiliation on Under-five Mortality, Religious Organizations and HIV/AIDS Survey, 2008

	Period		Period		
	Entire Reproductive Span Prior to the Survey Date		Five Years Prior to the Survey Date		
	Model 1	Model 2	Model 3	Model 4	Model 5
Mother's Religious Affiliation					
No Affiliation [Reference]	1	1	1	1	1
Affiliated to an Organized Religion	0.80**	0.84*	0.80+	0.80+	0.83
Child's Age					
4 to Exact 5 Years [Reference]	1	1	1	1	1
0 to Less than 1 Year	14.44**	14.25**	14.78**	15.13**	15.04**
1 to Less than 2 Years	5.39**	5.42**	7.11**	7.32**	7.28**
2 to Less than 3 Years	4.38**	4.42**	4.54**	4.63**	4.60**
3 to Less than 4 Years	2.21**	2.22**	2.04*	2.05*	2.05*
Mother's Age		0.97**		0.98	0.98
Mother's Marital Status					
Not Married [Reference]		1		1	1
Married		1.05		1.11	1.10
Parity		1.08*		1.05	1.05
Birth Interval					
2 Years or More [Reference]		1		1	1
Less than 2		1.42**		1.45*	1.44*
Child Birth Cohort					
Born 2001 to 2008 [Reference]		1			
Born 1970 to 1982		1.08			
Born 1983 to 1992		1.04			
Born 1993 to 2000		1.21+			
Mother's Education					
5 or More Years [Reference)		1		1	1
1 to 4 Years		1.55**		1.61**	1.49*
0 Years		1.38**		1.06	0.94
Household Assets Index				0.96	0.95
Mother's Place of Residence					
Rural [Reference]		1		1	1
Urban		1.24		1.13	1.25
Average Level of Education in the Community		0.95			0.87*
Joined an Organized Religion for Health Reasons		0.99			0.52
Intercept	0.01**	0.01**	0.01**	0.00**	0.01**
Variance (S.E.)	0.34(0.05)	0.31(0.05)	0.33(0.09)	0.28(0.10)	0.26(0.10)
Log-Likelihood	-3558	-3520	-1344	-1332	-1329
Person-years	26320	26296	12042	12042	12042

Notes. †- p<.1; *- p≤ .05; **- p≤ .01; S.E.-Standard Error.

Another notable finding in Model 5, the average level of education in the community significantly lowers the rate of child death. Joining a religious organization for health reasons is not statistically significant, suggesting that it does not influence child deaths. Overall, findings in Table 16 appear to partially support the hypothesis that affiliation to an organized religion irrespective of type of denomination has a protective effect on child mortality (as the religious coefficient in Model 5 does not reach the conventional statistical significant level).

As in previous chapters, my hypotheses consider the possibility of variation of the effect of religion by the type of religious group that women (children's mothers) belong. Thus, Table 17 compares under-five mortality rate between children of unaffiliated mothers and children of mothers belonging to each one of other religious groups. As in Table 16, Model 1 and 2 in Table 17 consider deaths during women's reproductive years. Model 3-5 refers to deaths that occurred 5 years prior to the survey date. Compared to children of mothers not affiliated to an organized religion, Model 1 indicates survival advantage of children of mothers affiliated to all religious groups; but coefficients are only statistically significant for the effect of mother's affiliation to Catholic or Mainline Protestant denominations and affiliation to the Apostolic religious group. Relative to children of non-affiliated mothers, children born to Catholic or Mainline Protestant mothers and to Apostolic mothers have a mortality rate that is lower by 28 and 24 percent, respectively.

Although the magnitude of child survival advantage reduces after adding other controls in Model 2, the pattern of denominational influence on child survival remains similar to that observed in Model 1. The rate of death of children born to Catholic or Mainline Protestant mothers is significantly lower by 25 percent than that of children born to mothers belonging to the reference group, net of other factors (Model 2). Also noteworthy in Model 2, compared to children of unaffiliated mothers, children of Apostolic mothers display a rate of death that is significantly lower by 23 percent, controlling for other factors.

Turning to child deaths that occurred 5 years before the survey date, I find in Model 3 that affiliation to an organized religion gives an advantage for child survival, except for children of women belonging to the Other Pentecostal religious group; but the results in Model 3 are only statistically significant for the effect of having a mother affiliated to the Catholic or Mainline Protestant religious group, and marginally significant for the effect of having a mother affiliated to the Apostolic religious group. After including demographic and household characteristics in Model 4, children born to Catholic or Protestant mothers and those born to Apostolic mothers continue to show higher survival than children of unaffiliated mothers. In Model 5 when I introduce the average level of education in the community and whether or not women joined an organized religion due to health reasons I find a couple of interesting findings: although only marginally significant, the effect of having a mother affiliated to the Apostolic religious group still lowers child death; the effect of having a Catholic or Mainline Protestant mother, although lowering child death is no

longer statistically significant; while the average level of education in the community significantly lowers the rate of child death.

In Model 5 I also find that joining a religious organization for health reasons is not significantly associated with under-five mortality. The results shown in Model 3-5 of Table 17 seem to support the hypothesis of elevated advantage in child survival among children of Catholic or Mainline Protestant mothers that may operate through concentration of Catholic or Mainline Protestant mothers in communities with elevated average level of education. These results also provide some support to the expectation that having a mother affiliated to the Apostolic religious group would have a positive effect on child survival, net of other factors.

Summary and Conclusion

In this chapter, I first examined the hypothesis that children of women affiliated to an organized religion irrespective of religious denomination would gain survival advantage over children of non-affiliated women. In the analysis, I separately considered, on the one hand, child deaths that women had during their childbearing years; and on the other hand, only deaths of children that occurred in five years preceding the survey date. Considering child deaths during years of women's childbearing, findings showed that affiliation to any religious organization significantly decreased the hazard of under-five mortality (Table 16, Model 1-2).

Table 17

Odds Ratio from Random-effects Discrete-time Hazard Models of the Effect of Mother's Affiliation to Specific Religious Groups on Under-five Mortality, Religious Organizations and HIV/AIDS Survey, 2008

	Period		Period		
	Entire Reproductive Span Prior to the Survey Date		Five Years Prior to the Survey Date		
	Model 1	Model 2	Model 3	Model 4	Model 5
Mother's Religious Affiliation					
No Affiliation [Reference]	1	1	1	1	1
Catholic or Mainline Protestant	0.72**	0.75**	0.68*	0.70+	0.74
Apostolic	0.76*	0.77*	0.70+	0.66*	0.69+
Zionist	0.88	0.92	0.85	0.84	0.88
Other Pentecostal	0.80	0.85	1.01	1.03	1.07
Child's Age					
4 to Exact 5 Years [Reference]	1	1	1	1	1
0 to Less than 1 Year	14.43**	14.25**	14.70**	15.01**	14.93**
1 to Less than 2 Years	5.39**	5.43**	7.10**	7.30**	7.26**
2 to Less than 3 Years	4.39**	4.43**	4.53**	4.62**	4.60**
3 to Less than 4 Years	2.21**	2.22**	2.04*	2.05*	2.05*
Mother's Age		0.97**		0.98	0.98
Mother's Marital Status					
Not Married [Reference]		1		1	1
Married		1.06		1.10	1.09
Parity		1.08*		1.06	1.06
Birth Interval					
2 Years or More [Reference]		1		1	1
Less than 2		1.43**		1.44*	1.43*
Child Birth Cohort					
Born 2001 to 2008 [Reference]		1			
Born 1970 to 1982		1.10			
Born 1983 to 1992		1.04			
Born 1993 to 2000		1.23*			
Mother's Education					
5 or More Years [Reference)		1		1	1
1 to 4 Years		1.53**		1.61**	1.50*
0 Years		1.34*		1.03	0.93
Household Assets Index				0.96	0.95
Mother's Place of Residence					
Rural [Reference]		1		1	1
Urban		1.22		1.11	1.22
Average Level of Education in the Community		0.95			0.88*
Joined an Organized Religion for Health Reasons		0.93			0.50
Intercept	0.01**	0.01**	0.01**	0.01**	0.01**
Variance (S.E.)	0.34(0.05)	0.30(0.5)	0.32(0.09)	0.28(0.10)	0.26(0.10)
Log-Likelihood	-3556	-3518	-1343	-1330	-1327
Person-years	26320	26296	12042	12042	12042

Notes. †- p<.1; *- p≤ .05; **- p≤ .01; S.E.-Standard Error.

Considering deaths in the short period of five years, though decreasing the rate of child deaths, the coefficient for affiliation to any religious organization failed to reach statistical significance in the final model (Table 16, Model 5). Overall, my findings partially supported my first hypothesis that children of women affiliated to any religious organization would have lower under-five mortality rate than children of non-affiliated mothers, net of other factors.

Secondly, in this chapter I assessed the hypothesis that the effect of religious affiliation on under-five mortality rate would vary by religious group to which mothers of children belong. Following this hypothesis, I expected to find favorable effect of being children of mothers affiliated to an organized religion on survival, particularly if mothers belonged to the Catholic or Mainline Protestant religious group and to the Apostolic grouping. In the analysis based on my first approach (considering deaths in all women's reproductive years before the survey date), as expected, I found significantly lower death rate among children of Catholic or Mainline Protestant mothers and children of mothers belonging to the Apostolic religious group, when compared to children of non-affiliated mothers (Table 17, Model 1-2). Considering the entire reproductive span prior to the survey date, the differences in under-five mortality across religious groups were not statistically significant. However, children born to Zionist mothers were more likely to die than those born to Catholic and Mainline Protestant mothers (although the effect was only marginally significant; results not shown).

When considering deaths in the short five year period prior to the survey, I found interesting results: children of mothers affiliated to Apostolic and to

Catholic or Mainline Protestant denominations displayed lower under-five mortality rate than children of non-affiliated mothers; but the coefficient for being children of mothers affiliated to Catholic or Mainline Protestant religious group failed to reach the conventional statistically significance level (Table 17, Model 5).

The findings in Table 17 demonstrated that the survival of children of mothers belonging to Zionist and to Other Pentecostal religious groups was not significantly different of that of children whose mothers are non-affiliated. My findings in Table 17 also appear to suggest that the beneficial effect on child survival of having mothers affiliated to Catholic or Mainline Protestant denominations operate through concentration of mothers from this religious grouping in communities with high average level of education. Previous studies have documented favorable effects of living in communities with high levels of literacy on child survival (Kravdal, 2004; Ladusingh &Singh, 2006).

The fact that children born to mothers affiliated to the Apostolic religious group displayed consistently lower death rate than children born to unaffiliated mothers could be linked to the role of mutual help in distributing the outcomes of the group's economic entrepreneurship. Although Zionist and Other Pentecostal religious groups also have cohesion and provide social support, these Pentecostal religious groups could not have much to distribute to members through social support as in Mozambique they are relatively poorer, particularly Zionists. In this study, I also considered the possibility that healing religious groups could attract women with ill children, confounding the effects of my predictors on child

survival. My findings do not provide support to the idea that under-five mortality differences between religious groups could be due to concentration of mothers of children with poor health in healing churches. Also it should be noted that differences in the rate of under-five mortality across religious denominations were not statistically significant for the period of 5 years prior to the survey date (results not shown).

When people in sub-Saharan Africa continue to view religion as having a guiding power in their lives (Carmody, 2003; Gallup-International, 2010; Gyimah et al., 2006; Trinitapoli, 2006) and under-five mortality in the region is still the highest in the world (WHO, 2010), it seems that efforts to improve child survival in sub-Saharan Africa and in Mozambique in particular will have to pass through understanding the role of religion. The present study was a step in that direction particularly for Mozambique. It points to the need to better understand the importance for child survival of socioeconomic dimensions of religious groupings – as connections to secular institutions, particular those of health care service, and practice of social support. Future research should continue trying to better explore the mediating role of these and other religious dimensions for child survival in the region.

CHAPTER 6

SUMMARY AND CONCLUSION

In this dissertation I explored associations between religion, at individual and contextual levels, with health of women and their children in Mozambique. The need to undertake this research stems from observation of dire health of women and children in Mozambique, particularly sheer maternal and under-five mortality, while at the same time, it is recognized that this situation could partially be improved through behavioral change. Because religion is recognized as having major influence on everyday lives of residents of this part of the world, it appeared relevant to examine connections that religion at individual and contextual levels may have on health of women and their children.

The three substantive chapters that I developed in the dissertation addressed specifically three issues: (1) associations between women's religious affiliation, the religious community context with utilization of reproductive health care services, particularly attending prenatal consultations and delivering children in a health facility; (2) connections between women's religious affiliation, the religious context in the community with women's symptoms of STDs; and (3) associations between maternal religious affiliation with under-five mortality. The analysis demonstrated that in this setting, religion has some protective effect on health of women and their children that varies primarily by denominational group to which women are affiliated. It also indicated that religious community context could have some negative effect on health of women and children. The nature of the effect of religious community context showed variation with the type of

outcome considered and the type of religious mixture in the community. This chapter presents the summary and interpretation of main findings as well as their implications.

The interpretation is done in light of general theoretical perspectives that informed the formulation of hypotheses in this dissertation, particularly the particularistic theology perspective which essentially proposes that religious teachings and beliefs could affect demographic behaviors and outcomes (in this case the health of women and children) – e.g., through regulating social behaviors of members of religious organizations; the characteristics perspective which posits that demographic differences among religious groups can be fully explained by other factors; and the theory on social learning and social influence which proposes that the social context in which individuals live and interact could shape their social behaviors. In the present situation, attempting to understand connections between religion and health of women and children, it was argued in the dissertation that the religious context in places where people live and interact could shape their social behaviors as well.

Summary of findings

Chapter 3 examined how women's religious affiliation and the religious context in the community, indicated by approximation of women's household to a religious congregation of a given type, are connected to attending prenatal consultations and giving birth in a health facility. There was a favorable effect of affiliation to an organized religion regardless of the type of denomination on

attending prenatal consultations. But there was no religious contextual effect on attending prenatal consultations, when proximity of a woman's household to any congregation in the community was taken as a marker of religious community context.

When disaggregating women's religious affiliation by various religious groups, women affiliated to Catholic or Mainline Protestant churches and those belonging to Apostolic churches were significantly more likely to attend prenatal consultations than non-affiliated women (although the effect of belonging to Mainline churches was only marginally significant). Those affiliated to Zionist and Other Pentecostal religious groups were not different from non-affiliated women, net of other factors. When considering religious community context indicated by predominance of specific group of congregations (Catholic or Mainline Protestant, Apostolic, Zionist and Other Pentecostal) in the community no significant effect was observed, except that the predominance of Zionist churches had significantly a negative effect on attending prenatal consultations ($p<0.1$).

Regarding giving births in a health facility, affiliation to any organized religion, compared to not being affiliated, and the concentration of religious organizations of any type in the community were not significant predictors. Considering religious groupings, those affiliated to Catholic or Mainline Protestant denominations were more likely to give birth in health facilities ($p<0.1$). Living in proximity to a congregation belonging to the Catholic or Mainline Protestant group was beneficial to giving births in health establishments

($p<0.1$). There was no significant difference between women affiliated to other religious groups (Apostolic, Zionist and Other Pentecostal) and non-affiliated women in giving birth in clinics. With the exception of Zionist churches that had significantly a negative effect, living in proximity to a church belonging to Apostolic or Other Pentecostal groupings was not associated with giving birth in clinics. The differences across religious groups in the likelihood of a woman giving birth in a health establishment were not statistically significant, except that women affiliated to the Apostolic religious group displayed lower odds of giving birth in a health facility than Catholic or Mainline Protestant women, net of other factors ($p<0.5$; results not shown).

Chapter 4 explored associations between women's religious affiliation, the religious community context with women's symptoms of STDs. Differences between women affiliated to any religious organization and women non-affiliated on reporting symptoms of STDs were not statistically significant. The concentration of any religious congregation in the community significantly increased the odds of a woman residing in the community reporting symptoms of STDs, net of other factors. When categorizing religious denominations into groupings, those women affiliated to the Catholic or Mainline Protestant religious group were less likely to report symptoms of STDs than non-affiliated women ($p<0.1$). Those women affiliated to other religious groups (Apostolic, Zionist and Other Pentecostal) were not different from non-affiliated women in the likelihood of reporting symptoms of STDs, controlling for other factors.

With the exception of the concentration of Other Pentecostal religious groups in the community that had a positive effect on odds of a woman reporting symptoms of STDs ($p<0.1$), there was no religious contextual effect when categorizing religious context into denominational groupings. Although affiliation to the Catholic or Mainline Protestant group and to the Zionist religious group showed a positive direction, there were no significant differences between women affiliated to an organized religion and non-affiliated women in the likelihood of having sought help or advice about symptoms of STDs in health care establishment.

Chapter 5 investigated associations between maternal religious affiliation with the hazard of under-five mortality. Considering women's entire reproductive span prior to the survey date, children of women affiliated to any organized religion displayed lower hazard of under-five mortality than those of non-affiliated mothers. Considering deaths that occurred in 5 years prior to the survey date, the favorable effect of being a child of a mother affiliated to any organized religion was lost after accounting for the average level of education in the community. With the classification of maternal religious affiliation into groups, and observing the entire reproductive span before the survey, children of Catholic or Mainline Protestant mothers and those of Apostolic mothers were significantly less likely to die relative to those of non-affiliated mothers. Mortality risk of children of mothers affiliated to Zionist and Other Pentecostal religious groups was not different of that of children of non-affiliated mothers. With the exception of children of Zionist mothers that showed higher rate of mortality than children

of Catholic or Mainline Protestant mothers ($p<0.1$), the differences across religious groups in under-five mortality were not statistically significant controlling for other factors (results not shown).

Considering deaths that occurred 5 years preceding the survey date children of women affiliated to the Apostolic group significantly showed lower hazard of under-five mortality than those of non-affiliated mothers. Although lowering the hazard of under-five mortality, the effect of maternal affiliation to the Catholic or Mainline Protestant group was not statistically significant, as also the effect of maternal affiliation to the Zionist grouping. Affiliation to the Catholic or Mainline Protestant religious group lost its statistical significance after adjusting for the average level of education in the community; suggesting the importance of average level of education in the community in mediating the effect of maternal affiliation to the Catholic or Mainline Protestant group on the hazard of under-five mortality.

Taken together, the three substantive chapters of the dissertation show important patterns and disparities on the association between religion and health of women and children. Overall, at the individual level, affiliation to an organized religion points to a protective effect on health of women and their children that varies with the type of religious group that women are affiliated and with the health outcome under consideration. Specifically, relative to not being affiliated, affiliation to the Catholic or Mainline Protestant group offers some protection for attending prenatal consultations, giving birth in a health clinic and reporting symptoms of STDs. Relative to not being affiliated, a woman's affiliation to the

Apostolic religious group provides benefit for attending prenatal consultations and some protection for under-five mortality. However, affiliation to the Apostolic group does not have a significant effect on giving birth in a health facility and reporting symptoms of STDs. Compared to not being affiliated, belonging to Zionist and to Other Pentecostal churches does not have a protective effect for any of the outcomes.

The picture presented in this dissertation suggests a complex nature of the effect of religious affiliation, the one in which specific dimensions of religion might have stronger effect on some outcomes but weaker on others. For example, it appears that at the individual level, some favorable effect of affiliation to Catholic or Mainline Protestant group may be linked to higher socioeconomic diversity within this group – marked by having relatively more educated and wealthier members (Agadjanian, 2001; Garner, 2000; Gyimah et al., 2006; Takyi & Addai, 2002), in some way, providing some support to the characteristic perspective.

It should be noted that for the hazard of under-five mortality the average level of education in the community mediated the effect of affiliation to the Catholic or Mainline Protestant religious group. For under-five mortality, it is likely that the effect of having a mother affiliated to the Catholic or Mainline Protestant group in part operated through concentration of women belonging to this grouping in wealthier communities (with higher average level of education). Economic entrepreneurship and mutual help among Apostolics could in part explain the beneficial effect of affiliation to this religious group on attending

prenatal consultations and child survival. However these features of being Apostolic might not be working for delivering children in health facilities. Previous studies have indicated that women may prefer to deliver children at home even after having attended prenatal consultations, if they believe that home delivery is of good quality than institutional one (Obermeyer & Potter, 1991; Griffiths & Stephenson, 2001). Whether this is happening with women affiliated to Apostolic churches is not clear at this stage of my analysis.

It should be noted that because of multidimensional nature of religion (often operating at individual and contextual levels) for outcomes observed above also contextual aspects of religion may have had influence. The concentration of Catholic or Mainline Protestant congregations in the community, for example, increased the odds of delivering children in a health facility, even taking into account individual factors ($p<0.1$). As the literature on social interactions and demographic change has suggested (Behrman et al., 2002; Kohler, Behrman, & Watkins, 2001; Rutenberg & Watkins, 1997), it is likely that views of Catholic or Mainline Protestant churches in communities could be influencing opinions and behaviors of members and non-members of these religious organizations for using child delivery services.

It is worth to note also that the results in this dissertation show that religion may not have a protective effect in some contexts. The concentration of Zionist religious congregations in the community has some negative effect on the likelihood of a woman attending prenatal consultations and giving birth in a health facility ($p<.01$); while the concentration of Other Pentecostal churches in

the community is associated with some increase in the likelihood of women reporting symptoms of STDs ($p<.01$). The effect of other measures of religious community context (the concentration of some religious organizations in the community) in the outcomes studied was not statistically significant. This finding could provide some support to the characteristics perspective that argues that differences between groups in demographic outcomes could be due to other factors, not religion per se. Some negative effect of concentration of Zionist churches in the community on the likelihood of women attending prenatal consultations and giving birth in a health facility could be due to religious-based factors that could discourage utilizations of reproductive health service (providing some support to the particularistic theology perspective). However, the negative effect of concentration of Zionist churches in the community could also be due to other factors not related to religion, which could confirm the characteristic perspective. At this stage of my research I am unable to provide an explanation for this finding.

This dissertation tried to make a contribution to the literature particularly by examining association between religion and STDs other than HIV/AIDS in sub-Saharan Africa, as well as by examining connections between religion and utilization of reproductive health care services. While some studies have been conducted about religion and under-five mortality in the region, there is dearth of studies examining possible associations of religion (especially religious community context) with attending prenatal consultations and child delivery in a health facility in sub-Saharan Africa.

Exploring the effect of religious community context for these outcomes appears to be relevant as studies have indicated that ideas and opinions prevailing in the community may influence how people behavior (Behrman et al., 2002; Kohler, Behrman, & Watkins, 2001; Rutenberg & Watkins, 1997). The decision whether to use prenatal and child delivery services may be partially influenced by how others in one's social environment think about these services. This research was a step forward in trying to reveal possible effects of religious context on these outcomes. Studies of relationships between religion and health outcomes would benefit from more investigation directed particularly to better examination of mechanisms of influence of specific religious groups on outcomes explored in this dissertation. Such studies could help unravel, for example, why the concentration of Zionist churches in the community has a negative effect on the likelihood of a woman attending prenatal consultations and giving birth in a health clinic.

For those working towards improving the health of women and children in sub-Saharan Africa the findings from the present dissertation show the need to consider the role of religion in their strategies. Furthermore, it calls attention to the need to consider particularities of each religious group – especially those religious groups that are typically put together under the umbrella of African Independent Churches (e.g. Apostolic and Zionist). Broader categorizations of religious groups such as African Independent Churches may put in the same basket religious groups that are different in terms of their impact on health of women and children. In this study for example, Apostolic and Zionists were often different in their influence on the outcomes examined in this dissertation.

This research has limitations. At the individual level, only individual religious affiliation was used to capture the influence of a broader concept as religion. I acknowledge that other dimensions of religious participation such as frequency of attendance might be more informative for some outcomes. Given retrospective nature of data, however, there is a possibility that women might not remember about frequency of attendance of church in the distant past. Despite this shortcoming, individual religious affiliation has been considered a useful predictor of religious influence in sub-Saharan Africa (Gyimah et al., 2006).

Despite the effort made to create more religious categories in order to avoid bringing together organizations so different, there is a possibility that categories such as Other Pentecostals considered in this dissertation might still be broader. Nonetheless, without detailed information about organizational characteristics of congregations that are part of Other Pentecostals it is challenging to make disaggregation. More examinations of characteristics of religious organizations that make-up Other Pentecostals is needed.

Another limitation is that the measure of religious community context in this research considers proximity to religious organizations of a given type from respondent's household within the boundaries of the study area. There is a possibility that behaviors of women who are located in the boundaries of the study area might be affected by religious organizations that are located the other side of the border, which are not part of our data. Despite these limitations, the findings in this dissertation point to the importance of various dimensions of

religion on health of women and children in sub-Saharan Africa, particularly in Mozambique.

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