Journal of Religion and Health (2019) 58:2001–2018
https://doi.org/10.1007/s10943-019-00804-y

ORIGINAL PAPER

Religion and Health in Rural Malawi

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Published online: 5 April 2019

Abstract
While research has found important links between religion and health, there is a gap in knowledge in sub-Saharan Africa. The purpose of this paper is to examine the relationship between religion and health in rural Malawi. After controlling for baseline health, results show that: (1) the relationship differs between younger (15–44 years) and older (45 + years) adults; (2) among younger adults, Muslims are relatively less healthy, whereas Muslims are healthier in older age; (3) religious activities have a stronger relationship with health than do other measures, especially for women; and (4) religious activities have a relationship with health only for two or more activities. These findings suggest that religion is tied to health in Malawi, especially for older women. This paper was originally presented at the European Conference on African Studies in June 2017.

Keywords Malawi · Aging · Health · Religion

Background

Given the absence of formal systems of support in much of sub-Saharan Africa (SSA), religion is likely to play an important role (Afolabi and Aina 2014; Kaseke 2005; Kodzi et al. 2011a, b; Trinitapoli and Weinreb 2012). Despite the well-established relationship between religion and health observed elsewhere (Benjamins and Brown 2004; Corsentino et al. 2009; Deaton 2009; Park et al. 2015), the topic has largely been neglected in SSA (Kodzi et al. 2011a, b). This gap in research raises important questions. In a setting in which religion is important for many people, does religious involvement have a positive relationship with health? What aspects of religion are tied to health? Does religion serve unique roles for certain groups, such as women and older adults? The aim of this paper is to examine the relationship between religion and health in rural Malawi.

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Religion and Health

Previous studies, especially in industrialized contexts, have shown religion to be related to health in a number of ways. Attendance to religious services is a common and reliable measure in studies on religion (Yeatman and Trinitapoli 2008) and has been found to be related to health via lower likelihood of hospitalization (Koenig & Larson, 1998), lower mortality rates (Strawbridge et al. 1997), better functional recovery after myocardial infarction (Martin and Levy 2006), and lower alcohol consumption (Musick et al. 2000). Other aspects of religion, such as participation in activities and importance of religion in one's life, are also tied to positive health outcomes, such as lower likelihood of emotional distress and suicidal ideation (Chen et al. 2007) and lower likelihood of cognitive decline (Corsentino et al. 2009).

The relationship between religion and health can differ for certain groups, particularly women and older adults. In a study in the USA, older women exhibiting higher levels of depressive symptoms who attended religious services or meetings less frequently experienced greater cognitive decline, while this relationship did not obtain significance for men (Corsentino et al. 2009). Research has also found differences between age groups. Park et al. (2015) found in their study of Korean adults (aged 19 + years) that participation in social activities had a greater (positive) impact on quality of life for older adults (65 + years) compared to younger adults.

Religion and Health in SSA

While research on religion and health in SSA is limited, initial studies demonstrate a relationship between health and several dimensions of religion. In urban Kenya Catholics exhibited lower levels of satisfaction and worse health compared to non-Catholic Christians (Kodzi et al. 2011a, b). Many Pentecostal and Evangelical messages encourage hope and other positive attitudes that might buffer against the stressors of such a setting. Furthermore, compared to Catholics, other groups in Kenya tend to be more conservative and therefore more likely to discourage risky behaviors (Kodzi et al. 2011a, b). However, Muslims are also stricter yet do not exhibit the same pattern. In rural Malawi, compared to other groups, Muslims exhibited the lowest level of participation in religious activities, including visiting older adults and the sick (Yeatman and Trinitapoli 2008). Additionally, Muslims seem to place less emphasis on congregational activities compared to Christian groups (Trinitapoli and Regnerus 2007).

Religion may be especially important for women in SSA, as it is one of the few resources available to them beyond their household environment (Afolabi and Aina 2014; Trinitapoli and Weinreb 2012; Yeatman and Trinitapoli 2008) and women perform important roles, such as leading lay organizations or prayer groups (Jenkins 2006; Pfeiffer 2004). Age may also be an important factor. A study in rural Malawi (Myroniuk and Anglewicz 2015) found the positive relationship between religious involvement and health to be stronger at older ages (45 + years).

Hypotheses

Despite the well-established relationship between religion and health, the topic has received less attention in SSA. In this paper, I focus on affiliation, attendance, participation in other religious activities, and congregational support. I test the following hypotheses:

1. Muslim respondents have worse health compared to their counterparts in other religious groups
2. Respondents who attend church or mosque more frequently have better health compared to their counterparts who attend religious services less frequently
3. Respondents who participate in a greater number of religious activities have better health compared to their counterparts with fewer or no religious activities
4. Respondents who have greater congregational support have better health compared to their counterparts with less congregational support

Furthermore, I examine whether the relationship differs according to gender and age. I test the following hypotheses:

1. The relationship between religion and health will be stronger for women compared to men
2. The relationship between religion and health will be stronger at older ages compared to younger ages

There has been limited research on religion and health in Malawi. The southern African nation provides an instructive context in which to examine these topics due to its sociocultural and religious diversity (Reniers 2003; Trinitapoli 2006) and heavy burden of chronic diseases and their associated risk factors (Institute of Health Metrics and Evaluation 2013). Furthermore, Malawi's population is growing, aging (United Nations 2015), and impoverished (UNDP, 2010) and has a high-HIV prevalence of 8.8% (National Statistical Office (NSO) & ICF, 2017).

Setting

Religious affiliation is nearly ubiquitous in Malawi: fewer than 1% of women and 3% of men report no affiliation (National Statistical Office (NSO) and ICF 2017). While about 86% of Malawians are Christian, Islam also has a strong presence, claiming 13% and 11% of women and men, respectively. There are also several denominations within Christianity well represented in Malawi, including Catholicism (18% of women and 19% of men), and differences between other Christian groups warrant greater clarity (National Statistical Office (NSO) & ICF 2017; Trinitapoli 2006; Yeatman and Trinitapoli 2008).

Mission Protestant churches (Anglican, Baptist, and Presbyterian) were founded by European missionaries in the nineteenth century and were followed several decades later by New Mission Protestant groups (Church of Christ, Jehovah's Witness, and Seventh-Day Adventist). Pentecostal churches have been established by Africans since the 1930s (Trinitapoli and Regnerus 2006). African independent churches (AICs), derived from Mission Protestants, developed in response to disagreements over traditional culture (Trinitapoli and Weinreb 2012).

Malawian society is highly sex-segregated. Beyond family, religion is one of the most accessible sources of social support for women. Bars and paid labor are predominated by men, while women are largely constrained to their subsistence agriculture livelihoods. Religion tends to provide an even wider and more diverse context for social engagement than the residential setting (Trinitapoli 2006; Trinitapoli and Weinreb 2012; Yeatman and Trinitapoli 2008).

Furthermore, Malawi is among the world's 49 least developed countries (UNDP 2010) and more than 13% of Malawi's population has no education (National Statistical Office (NSO) & ICF 2017). Malawi's population is also aging, with projected increases in the older age groups over the next several decades (United Nations 2015). Population aging in Malawi is likely to be accompanied by an increase in chronic diseases and disability.

Overall, most of Malawi's population lives in a high-disease-risk environment characterized by both infectious and chronic diseases and by risk factors such as tobacco and alcohol consumption, high blood pressure, micronutrient deficiency, and poor sanitation (Institute of Health Metrics and Evaluation 2013). Physical limitations begin earlier and are more severe compared to more industrialized settings (Payne et al. 2013). A study in the USA found that older adults aged 90 years could expect 43% of their remaining life to be free of disability (Crimmins et al. 2009), while a similar profile was estimated for rural Malawian women half that age (Payne et al. 2013).

Due to the ubiquity of religion, sociocultural and religious diversity, the prevalence of risk factors and chronic diseases, and an aging population, Malawi is an instructive setting for research on religion and health. The data used in this study are well suited for these topics.

Methods

The Malawi Longitudinal Study of Families and Health

I use data that are unique to SSA with information on several dimensions of religion and mental and physical health, and a substantial sample of older adults. The Malawi Longitudinal Study of Families and Health (MLSFH), a longitudinal, population-based cohort study, began in 1998 with a sample of approximately 1500 ever-married women aged 15–49 years and about 1000 of their spouses. Data were subsequently collected in 2001, 2004, 2006, 2008, 2010, and 2012. While the original sampling strategy did not aim to produce a sample that is representative of Malawi's

national rural population, characteristics of the sample closely match those of the rural population enumerated in the Malawi 1996 DHS. To enable greater study of health across the adult lifespan, in 2008 a sample of approximately 800 parents of MLSFH respondents was added, based on 2006 MLSFH data. More information about the MLSFH data can be found in Kohler et al. (2015). The MLSFH project was approved by the Institutional Review Board (IRB) at the University of Pennsylvania and in Malawi by the College of Medicine Research Ethics Committee (COMREC) or the National Health Sciences Research Committee (NHSRC). Research for this paper was approved by the IRB at Mercer University.

The MLSFH study sites are in rural areas in the northern, central, and southern regions in Malawi and are similar to other African settings in having high HIV prevalence, inadequate health facilities and schools, low living standards, and poor health and nutrition (Kohler et al. 2015). While these study areas are fairly similar in overall epidemiology, socioeconomic conditions, and an economy of subsistence agriculture (Kohler et al. 2015), they differ in religious, sociocultural, and ethnic features.

Muslims are largely concentrated in the south, while Catholics and Protestants are spread throughout Malawi. The Tumbuka, the predominant ethnic group in Rumphi District in the northern region, follow a patrilineal system, in which inheritance is traced through sons. The Chewas are the predominant group in Mchinji District in the central region and follow a matrilineal system less rigidly. Balaka District in the south is inhabited primarily by Yaos and Lomwes and follows a matrilineal system, where residence is typically matrilocal. Divorce is more common and remarriage occurs faster in Balaka compared to the other two districts (Kohler et al. 2015; Reniers 2003; Yeatman and Trinitapoli 2008).

The Outcome Measures: The Short Form-12 (SF-12)

To assess health I use the SF-12. Based on twelve items of self-report the SF-12 uses summary scores for mental and physical health (Ware et al. 1996), with higher scores representing better overall health status and lower scores reflecting greater functional limitation (Peltzer and Pengpid 2012). The SF-12 has been found to be a valid and reliable measure for health and has been effectively used in a variety of settings, including sub-Saharan Africa (Gandek et al. 1998; Obtel et al. 2013; Payne et al. 2013; Ware et al. 1996). The SF-12 measures from the 2010 MLSFH are the outcome measures in analysis; all independent variables, including baseline SF-12 scores, are from the 2008 MLSFH.

The Covariates of Interest: Religion and Religious Involvement

Affiliation in this paper is based on five categories: Muslim, Catholic, Mission Protestant, New Mission Protestant, and AIC/Pentecostal/other. There are several important differences between these groups that are relevant to health.

Previous studies in rural Malawi show differences in level of congregational support (such as visiting sick and older members), with Muslims exhibiting the lowest

tendencies. Muslim and Catholic congregations tend to be larger than Mission Protestant groups or AICs. Catholic leaders discuss death and the afterlife less often than leaders of other denominations (Adams and Trinitapoli 2009; Trinitapoli and Regnerus 2007). New Mission Protestants have particular beliefs about health practices, such as the proscriptions of Jehovah's Witnesses against blood transfusions and Seventh-Day Adventists' suspicions of biomedicine (Trinitapoli 2011). While Pentecostals and AICs have different origins, some researchers consider the two groups to be a part of the same general Pentecostal movement and the two groups value the healing power of the "Holy Spirit." Findings from other research suggest a continuum between Pentecostal and independent churches that lacks clear distinctions (Gilliland 1986; Pfeiffer 2005).

Religious involvement is based on three measures, attendance to a worship service, other types of religious activities, and congregational support. Attendance is a common and reliable measure of public collective expression of religion (Trinitapoli 2006) and in this paper is based on the question "When was the last time you went to a church/mosque?" The options are attendance in the last week or less frequently (including never). Trinitapoli and Regnerus (2007) found that regular attendants to a worship service visit the sick much more often than those who never attend. Regular attendance has been found to be associated with greater life satisfaction and health in Kenya (Kodzi et al. 2011b), the USA (Hybels et al. 2012; Lutgendorf et al. 2004), and China (Zhang 2008).

The measure for religious activities includes choir, elder's meeting, Bible/Koran study, prayer meeting, visiting the sick, revival meetings, evangelical work, and Islamic school/Madrasa. The respondent participated (or not) in each activity at least once in the past month. I combined the activities and divided the categories into no activities in the past month, one activity, and two or more activities. Congregational activities such as prayer meetings and caregiving committees serve a variety of roles in rural Malawi, with implications for health. Extracurricular religious activities can supplement or augment social groups beyond the family and may act as social support mechanisms and forms of social control over members' behaviors (Adams and Trinitapoli 2009; Bazant and Boulay 2007; Stark 1996; Yeatman and Trinitapoli 2008).

Finally, the measure for congregational support is based on receipt of financial support from the congregation in the previous 3 years. While the measures of religious activities and attendance reflect social support in general, congregational support reflects material support specifically, which can be important for persons with HIV/AIDS and their families (Bazant and Boulay 2007; Trinitapoli 2011) and are likely to serve similar roles for other members.

Control Variables

In my analysis, I also control for sociodemographic and other characteristics of respondents. First, I include a measure of baseline health in 2008. Additionally, I include controls for HIV status, age, education, wealth, marital status, region, number of living offspring, household size, and social activities. Education includes

none and primary level or higher. Marital status includes married and unmarried (divorced, separated, widowed, and never married). The wealth index is a continuous score based on principal component analysis of ownership of durable assets, such as a bicycle, television, or radio (Chin 2010; Filmer and Pritchett 2001). Households and families are important sources of support in SSA (Cliggett 2005; Hoddinott 1992, 1993; Kendall and Anglewicz 2016) and in this paper serve to distinguish from non-familial support. Finally, social activities include funeral, drama performance, beer place, place for dancing, and market. The continuous measure is a sum of how many times the respondent participated in each activity in the past month.

Analytical Approach

I conduct linear regression analysis in three stages, using Stata 12. All analysis is run separately for mental and physical health for both women and men. The first stage is bivariate regression analysis for social activities and religion, with all ages (15 + years). The second stage is multiple linear regression analysis with all covariates and controls, for ages 15–44 years. The third stage is multiple linear regression analysis with all covariates and controls, for ages 45 + years. I initially ran multiple linear regression for all ages together but found no notable results (not shown). I use robust standard errors in all analysis to adjust for heteroskedasticity.

Results

Description of Study Sample

Background characteristics for the study sample are provided in Table 1. Nearly a third of women have no education, and over 18% are currently not married. Women on average participated in about ten social activities in the previous month, and nearly half of women participated in two or more types of religious activities in the previous month. Only about 13% of men have no education, and most men are married. Men on average participated in about fifteen social activities in the previous month, and nearly 60% of men participated in two or more types of religious activities in the previous month. Both women and men live with an average of four other household members.

Table 2 shows bivariate linear regression results for the relationship between religion (and social activities) in 2008 and health in 2010 for MLSFH women and men. New Mission Protestants have better mental and physical health compared to Muslims and Pentecostal, and AIC women have better mental health compared to Muslims. Women who participated in two or more types of religious activities in the past month have better mental and physical health compared to women who participated in no religious activities. Both women and men participating in a greater number of social activities have better physical health.

Table 1 Background characteristics of 2008 Malawi Longitudinal Studies of Families and Health women and men and mean Short Form-12 (SF-12) scores for 2008 and 2010

	Women (no. of obs. = 1242)	Men (no. of obs. = 793)
Mean 2008 SF-12 mental health score	53.2	56.0
Mean 2008 SF-12 physical health score	51.4	52.6
Mean 2010 SF-12 mental health score	51.4	53.7
Mean 2010 SF-12 physical health score	49.0	50.3
Mean wealth index score	0.1	0.1
Mean age	40.0	41.9
HIV positive	5.7%	3.5%
Education		
No school	30.9%	13.1%
Primary level or higher	69.1%	86.9%
Marriage		
Currently married	81.2%	87.4%
Currently unmarried	18.8%	12.6%
Region		
North	35.4%	39.5%
Central	30.9%	32.5%
South	33.7%	28.0%
Mean number of living offspring	4.3	4.5
Mean household size	4.0	4.0
Mean number of social activities in past month	10.3	15.5
Religious affiliation		
Muslim	23.9%	20.3%
Catholic	17.4%	16.8%
Mission Protestant	20.5%	22.5%
New mission Protestant	12.0%	14.4%
Pentecostal/African independent church/other	26.2%	26.1%
Attended church/mosque in past week	64.0%	69.4%
Number of types of religious activities in past month		
No activities	21.7%	21.1%
One activity	30.0%	29.5%
Two or more activities	48.5%	59.4%
Received congregational support in past 3 years	11.9%	12.4%

Table 3 shows multiple linear regression results for the relationship between religion (and social activities) in 2008 and health in 2010 for MLSFH women and men aged 15–44 years, after including all controls (control variables not shown). There are no significant findings for women. Mission Protestant, New Mission Protestant, and Pentecostal/AIC men have better physical health compared to Muslims.

Table 4 shows multiple linear regression results for the relationship between religion (and social activities) in 2008 and health in 2010 for MLSFH women and men

Table 2 Bivariate linear regression results for relationship between 2008 measures of social involvement and religion and 2010 Short Form-12 mental and physical health scores of Malawi Longitudinal Study of Families and Health women and men

	Women (no. of obs. = 1242)		Men (no. of obs. = 793)	
	Mental health	Physical health	Mental health	Physical health
	Coefficient (robust standard error)			
Social activities in past month	0.01	0.08***	0.01	0.05**
	(0.03)	(0.03)	(0.03)	−0.02
Religious affiliation				
Muslim (*reference*)	–	–	–	–
Catholic	1.10	0.32	−0.33	0.65
	(0.91)	(0.87)	(1.05)	(0.98)
Mission Protestant	1.00	−0.32	−0.30	−1.02
	(0.87)	(0.82)	(0.99)	(0.94)
New Mission Protestant	2.31**	2.07**	0.84	1.04
	(1.01)	(0.93)	(1.03)	(0.98)
Pentecostal/African independent church/other	1.59**	0.81	−0.23	−1.09
	(0.80)	(0.76)	(0.97)	(0.89)
Attended church/mosque in past week	0.84	1.57***	0.22	−0.34
	(0.59)	(0.57)	(0.69)	(0.66)
Religious activities in past month				
No activities (*reference*)	–	–	–	–
One activity	0.89	0.86	0.29	0.02
	(0.81)	(0.82)	(0.94)	(0.87)
Two or more activities	1.51**	2.31***	0.25	0.27
	(0.74)	(0.74)	(0.83)	(0.81)
Received congregational support in past 3 years	−0.09	−0.22	−0.83	−0.16
	(0.88)	(0.81)	(1.06)	(0.77)

*$p = 0.1$; **$p = 0.05$; ***$p = 0.01$

aged 45 + years, after including all controls (control variables not shown). Women who participated in two or more types of religious activities in the past month have better mental health compared to women with no activities. Mission Protestant and Pentecostal/AIC men have worse physical health compared to Muslims, and Catholic men have worse mental health.

Discussion

Overall, I find that religion is related to health in a number of ways, with important differences between women and men and between younger and older adults. Outside of affiliation, religion is related to the health of women but not men. The relationship is stronger in older age, particularly for women participating in two or more

Table 3 Multiple linear regression results for relationship between 2008 measures of social involvement and religion and 2010 Short Form-12 mental and physical health scores of Malawi Longitudinal Study of Families and Health women and men aged 15–44 years in 2008, stratified by younger and older age groups and controlling for 2008 mental/physical health, wealth, age, HIV-positive status, education, marital status, region, number of living offspring, and household size (controls not shown)

	Women (no. of obs. = 827)		Men (no. of obs. = 466)	
	Mental health	Physical health	Mental health	Physical health
	Coefficient (robust standard error)			
Social activities in past month	−0.01	0.03	−0.00	0.01
	(0.04)	(0.03)	(0.03)	−0.02
Religious affiliation				
Muslim (*reference*)	–	–	–	–
Catholic	0.88	−0.90	0.26	2.14*
	(1.35)	(1.11)	(1.76)	(1.12)
Mission Protestant	−0.64	−1.69	−1.27	2.70**
	(1.57)	(1.18)	(2.00)	(1.14)
New Mission Protestant	1.20	−0.51	−0.66	3.51***
	(1.57)	(1.20)	(1.88)	(1.20)
Pentecostal/African independent church/other	0.38	−1.38	−1.10	3.01**
	(1.45)	(1.21)	(1.96)	(1.24)
Attended church/mosque in past week	−0.10	0.13	−0.12	−0.14
	(0.69)	(0.54)	(0.85)	(0.62)
Religious activities in past month				
No activities (*reference*)	–	–	–	–
One activity	0.21	−0.13	−1.02	0.04
	(0.95)	(0.74)	(1.08)	(0.87)
Two or more activities	−0.28	0.01	−1.72	−0.40
	(0.95)	(0.71)	(1.08)	(0.85)
Received congregational support in past 3 years	0.12	−0.80	−2.22	−0.79
	(0.99)	(0.79)	(1.48)	(0.83)
Constant	45.44	60.66	48.04	51.16
	(3.38)	(3.14)	(4.56)	(4.02)
R^2	0.06	0.10	0.05	0.14

Additionally, I included interaction terms between the wealth index score and each of the religious involvement measures: attendance, religious activities, and congregational support—there were no significant findings

*$p = 0.1$; **$p = 0.05$; ***$p = 0.01$

types of religious activities. In terms of affiliation, Christians are relatively healthier than Muslims in younger adulthood, whereas Muslims are healthier in older adulthood. After including controls, there is no relationship between health and either attendance or congregational support.

Research on religion and health in Malawi has largely focused on HIV/AIDS and reproductive behavior, such as contraceptive use being more strongly encouraged in

Table 4 Multiple linear regression results for relationship between 2008 measures of social involvement and religion and 2010 Short Form-12 mental and physical health scores of Malawi Longitudinal Study of Families and Health women and men aged 45 + years in 2008, stratified by younger and older age groups and controlling for 2008 mental/physical health, wealth, age, HIV-positive status, education, marital status, region, number of living offspring, and household size (controls not shown)

	Women (no. of obs. = 415)		Men (no. of obs. = 327)	
	Mental health	Physical health	Mental health	Physical health
	Coefficient (robust standard error)			
Social activities in past month	−0.13*	0.07	−0.02	0.06
	(0.07)	(0.06)	(0.06)	−0.04
Religious affiliation				
Muslim (*reference*)	–	–	–	–
Catholic	−1.13	−2.96	−6.13**	−3.67
	(2.06)	(2.00)	(2.36)	(2.23)
Mission Protestant	−0.54	−3.12	−3.73*	−4.47**
	(2.07)	(2.01)	(2.19)	(2.19)
New Mission Protestant	0.00	−1.20	−1.34	−2.09
	(2.41)	(2.17)	(2.38)	(2.33)
Pentecostal/African independent church/other	−0.97	−1.66	−2.50	−5.30**
	(2.27)	(2.11)	(2.32)	(2.34)
Attended church/mosque in past week	1.48	0.66	0.77	0.31
	(1.16)	(1.04)	(1.21)	(1.16)
Religious activities in past month				
No activities (*reference*)	–	–	–	–
One activity	1.67	1.22	1.01	−0.90
	(1.54)	(1.53)	(1.67)	(1.31)
Two or more activities	4.07***	2.73*	2.23	−0.72
	(1.54)	(1.51)	(1.48)	(1.31)
Received congregational support in past 3 years	−1.84	−0.42	0.12	0.87
	(1.65)	(1.48)	(1.69)	(1.34)
Constant	36.26	36.63	52.98	47.60
	(5.58)	(5.28)	(7.49)	(6.78)
R^2	0.09	0.25	0.11	0.27

Additionally, I included interaction terms between the wealth index score and each of the religious involvement measures: attendance, religious activities, and congregational support—there were no significant findings

*$p = 0.1$; **$p = 0.05$; ***$p = 0.01$

some congregations than others (Adams and Trinitapoli 2009; Yeatman and Trinitapoli 2008). One of the implications of focusing on HIV/AIDS has meant greater emphasis on younger ages. Furthermore, ethnographic research in rural Zambia (Cliggett 2005) has found that the most active participants at (Christian) church gatherings and the loudest voices at prayer meetings are among younger adults (< 40 years). One explanation might be that with aging there is greater emphasis

placed on indigenous belief systems (and thus less on formalized Christianity or Islam), which can include a focus on the power of the supernatural and connections to ancestors (Cliggett 2005). While these observations might suggest that the formal religious practices of Christianity and Islam in SSA are more relevant at younger rather than at older ages, my own analysis challenges this notion.

In my analysis of younger adults (15–44 years), men in Mission Protestant, New Mission Protestant, and Pentecostal/AIC/other groups have better physical health compared to Muslims. Notably, the relationship is reversed for older (45 + years) men: those in Mission Protestant and Pentecostal/AIC/other groups are less physically healthy compared to Muslims, and Catholics are less mentally healthy. Muslims in other settings in SSA have been found to maintain less contact with rural origins (Mberu et al. 2013). Furthermore, previous research shows that Muslims in Malawi are less likely to be migrants compared to certain Christian groups (Kendall and Anglewicz 2017). If Muslims place less emphasis on maintaining ties to long-distance networks and are less healthy at younger ages compared to Christians, the explanation may be that Muslim households with migrant members benefit less from migrants' remittances compared to Christian households, with implications for well-being (Cliggett 2005; Englund 2002). Previous research found that older healthier men in Malawi are more likely to migrate compared to their less healthy counterparts (Kendall and Anglewicz 2017), although this research did not distinguish the health of migrants by religious affiliation. Thus, it is also important to consider that causal effects might work in the opposite direction: Muslims who are less healthy might be less able to maintain long-distance remittance patterns or may be more likely to migrate themselves.

Another explanation might be based on the level of importance placed on congregation-based activities. Congregations for which attendance is less regular, such as with Muslims, place less emphasis on activities that are likely to have relevance in a high-HIV context, such as prayer meetings and visiting the sick. As noted throughout this paper, the specific features of congregations seem to have an impact on HIV-related behavior (Adams and Trinitapoli 2009; Yeatman and Trinitapoli 2008). It seems apparent that migration and congregational activities might explain differences in health between Christians and Muslims at younger ages, when HIV prevalence is higher (Freeman and Anglewicz 2012). However, additional factors are needed to explain the differences in health at older ages. For example, it is notable that younger Muslim men in the MLSFH are relatively less healthy compared to Christians, whereas for older adults Muslims are relatively healthier.

Of note is the positive relationship between religious activities and health for older women but not for anyone else. The MLSFH does not account for any form of private religious expression, although such aspects of religion may be important to health (Ellison 1991; Musick et al. 2000). For instance, many Muslims in Malawi pray five times a day, often in their own homes, and participation in Friday prayer services is not required (Trinitapoli and Regnerus 2007). Identifying, and thereby providing support to, those who are absent from weekly activities, including for poor health, can be easier in congregations in which regular participation is the norm (Trinitapoli and Regnerus 2007). It is perhaps not surprising, then, that younger Muslims in the MLSFH are less healthy compared to their

Christian counterparts, who can expect greater support from their fellow congregation members. Furthermore, while unexamined factors like private religiosity might explain differences between older and younger adults in my sample, gender dynamics may shed further light on the findings.

Women in rural Malawi have fewer opportunities for social interaction outside religious settings, whereas men have greater involvement in paid labor and other social settings, such as bars, that are nearly exclusively male (Yeatman and Trinitapoli 2008). Regular social interaction in a wide variety of public settings might permit greater attention to private religious practices for men. Women, on the other hand, might seek to benefit from one of the relatively few types of settings available to them for social interaction. In my analysis older women in rural Malawi who participated in two or more types of religious activities at least once in the previous month are healthier compared to their counterparts with fewer activities. The implication is that participating in different types of activities exposes women to a greater amount of interaction and information and overall promotes a greater sense of community (Yeatman and Trinitapoli 2008). Health may be tied to greater access to social support and information in a number of ways.

Previous research on religion in the midst of the AIDS epidemic in SSA (Adams and Trinitapoli 2009) found that participation in congregational activities plays a number of roles. Congregations can impose social control mechanisms on their members by sanctioning those who deviate from doctrinal guidelines, providing prayer and material support for those affected by AIDS, and increasing the density of social networks. For example, women in larger congregations in Malawi were more likely to use contraception compared to women in smaller congregations (Yeatman and Trinitapoli 2008). In a setting in which women are often restricted to fewer spaces for social interactions, religion is likely to have important implications for women in particular (Yeatman and Trinitapoli 2008). I suspect that some of the functions of congregations observed in studies of sexual activity and family planning in the high-HIV context of rural Malawi (Trinitapoli and Regnerus 2006; Yeatman and Trinitapoli 2008) serve similar purposes in light of other health-related issues, although there are also likely to be unique functions of religion for certain populations, particularly older adults.

The lack of findings for attendance and congregational support is also notable. I suspect attendance appears to be less important for health due to the near-ubiquitous nature of religion in Malawi: if most adults attend services anyway, the unique roles of religion beyond family and other social networks are likely to play out in other types of religious activities and settings. The lack of findings for the measure of material support from congregational members suggests that the functions of religion in the lives of rural Malawians are based on mechanisms beyond material support, such as exchange of ideas and information, much of which might be related to health in some way. The potential importance of such unobserved factors points to a few limitations in the MLSFH and the need for further research on the topic.

Limitations

The main limitations of this study pertain to a lack of more nuanced data on religion in the MLSFH, including on affiliation and religious activities. While most Malawians seem to remain affiliated with the same religious group throughout life, religion is nonetheless dynamic in Malawi, as Pentecostalism continues to grow and some Malawians switch between different Islamic sects (Trinitapoli and Regnerus 2006). Therefore, ongoing research on the topic needs to account for one's changes in religious affiliations and behaviors over time.

Another limitation of this study is the lack of information on other aspects of religion, including private religiosity and more detailed information on participation in religious activities. Without such measures I am unable to gain further clarity on why the relationship between religion and health differs between younger and older ages and between women and men. Nonetheless, the ability of the MLSFH data to account for Malawi's religious diversity is a strength of the data that enables analysis beyond the common Catholic and Protestant groups (Martin and Levy 2006; Strawbridge et al. 1997). Furthermore, I suspect that the statistical significance of the limited measure of religious activities I use reflects the importance of this aspect of religion. For example, if information on the degree of involvement were also available, the statistical effect in analysis would apparently be even stronger.

Finally, while I attempt to establish time order, by assessing health 2 years after baseline and including baseline health, causality cannot be determined. In general, it is reasonable to consider whether people who are more religious are healthier, or whether healthier people are more religious. After all, less healthy individuals may prefer to be more involved in religious activities if not for lower health status. It is also possible that less healthy individuals die earlier or are more likely to migrate than their healthier counterparts, which highlights challenges in data collection particularly relevant for certain populations, including older adults.

While the question of causation is an important consideration in research on religion and health in general, my own analysis points to specific areas warranting further inquiry. For example, I found that younger Muslim men in the MLSFH are relatively less healthy compared to Christians, whereas for older adults Muslims are relatively healthier. I suspect that Christian and Muslim congregations differ in the ways they respond to the types of health-related issues normally faced by younger and older adults. As outlined above, there is strong evidence to suggest that religion in Malawi has continued to have an impact on such behaviors as contraceptive use (Adams and Trinitapoli 2009; Yeatman and Trinitapoli 2008). While there is much less attention on the relationship between health and religion at older ages, there is little reason to assume that religion does not continue to have an impact on health and well-being throughout the life course. On the other hand, it is also clear that religion itself has changed in response to the HIV/AIDS epidemic (Adams and Trinitapoli 2009). Perhaps this is also true for older ages, in that religious contexts in Malawi are responding to the unique and changing roles of older adults, such as caring for orphans while dealing with their own chronic diseases. Further research on these topics is warranted.

Despite the limitations in this paper, the findings provide new insight on a topic scarcely addressed in the literature and point to topics of further research on the relationship between religion and health in SSA, including important gender and age differences and the importance of using longitudinal data.

Implications

Previous research on religion and health in SSA has focused on the role of religion amidst the AIDS epidemic (Adams and Trinitapoli 2009; Yeatman and Trinitapoli 2008). This paper addresses several gaps in research by using several measures of social and religious involvement and including a sample of both younger and older adults. The findings in this study suggest that there are several mechanisms by which religion may be related to health. Health differs between Muslims and various Christian groups, likely due to a number of both religious and non-religious factors, including the emphasis placed on maintaining contact with geographically distant family members, the importance of congregation-based activities, and perhaps also unobserved factors like private religious practices. Furthermore, there are important age and gender differences, such that religious activities beyond regular attendance appear to be particularly important for older women. Additionally, the lack of a statistical relationship between secular activities and health suggests that religion serves a unique role in rural Malawi.

The findings in this paper highlight areas for further study. Future studies need to account for religious diversity and private expressions of religion. Why are Muslims at older ages (45 + years) relatively healthier compared to their Christian counterparts, when a reverse pattern is observed at younger ages (< 45 years)? Why is the relationship between health and religious activities stronger at older ages? For what specific reasons are religious activities tied to health and what kind of information and knowledge do people exchange in such contexts that might be relevant for health? As research on health in SSA will continue to grow, including greater focus on aging, there is an increasing need for deeper investigation of the role of religion.

Acknowledgements The Malawi Longitudinal Study of Families and Health (MLSFH) has been supported by the National Institute of Child Health and Development (Grant Nos. R03 HD058976, R21 HD050652, R01 HD044228, R01 HD053781), the National Institute on Aging (Grant No. P30 AG12836), the Boettner Center for Pensions and Retirement Security at the University of Pennsylvania, and the National Institute of Child Health and Development Population Research Infrastructure Program (Grant No. R24 HD-044964). The MLSFH has also been supported by pilot funding received through the Penn Center for AIDS Research (CFAR), supported by NIAID AI 045008, and the Penn Institute on Aging. This paper is a reworked version of an earlier paper presented at the European Conference on African Studies in Basel, Switzerland, in 2017. (The author gratefully acknowledges comments from Philip Anglewicz at Tulane University in New Orleans, LA, and Katrien Pype at the Catholic University of Leuven in Leuven, Belgium.)

References

Adams, J., & Trinitapoli, J. (2009). The Malawi Religion Project: Data collection and selected analyses. *Demographic Research, 21*(4), 255–288.

Afolabi, F. J., & Aina, O. O. (2014). Gender differentials in subjective well-being among religious elderly Yoruba people in southwest Nigeria. *Ageing International, 39,* 180–193. https://doi.org/10.1007/s12126-014-9197-8.

Bazant, E. S., & Boulay, M. (2007). Factors associated with religious congregation members' support to people living with HIV/AIDS in Kumasi, Ghana. *AIDS Behavior, 11,* 936–945. https://doi.org/10.1007/s10461-006-9191-6.

Benjamins, M. R., & Brown, C. (2004). Religion and preventative health care utilization among the elderly. *Social Science and Medicine, 58,* 109–118. https://doi.org/10.1016/S0277-9536(03)00152-7.

Chen, H., Cheal, K., McDonel Herr, E. C., & Zubrinsky, C. (2007). Religious participation as a predictor of mental health status and treatment outcomes in older persons. *International Journal of Geriatric Psychiatry, 22*(144–153), 144–153. https://doi.org/10.1002/gps.1704.

Chin, B. (2010). Income, health, and well-being in rural Malawi. *Demographic Research, 23*(35), 997–1030.

Cliggett, L. (2005). *Grains from grass: Aging, gender, and famine in rural Africa*. Ithaca: Cornell University Press.

Corsentino, E. A., Collins, N., Sachs-Ericsson, N., & Blazer, D. G. (2009). Religious attendance reduces cognitive decline among older women with high levels of depressive symptoms. *Journals of Gerontology. Series A, Biological Sciences and Medical Sciences, 64*(12), 1283–1289. https://doi.org/10.1093/gerona/glp116.

Crimmins, E. M., Hayward, M. D., Hagedorn, A., Saito, Y., & Brouard, N. (2009). Change in disability-free life expectancy for Americans 70 years old and older. *Demography, 46*(3), 627–646.

Deaton, A. S. (2009). *Aging, religion, and health*. National Bureau of Economic Research, Inc. NBER Working papers: 15271. Retrieved from http://www.nber.org/papers/w15271.pdf.

Ellison, C. G. (1991). Religious involvement and subjective well-being*. *Journal of Health and Social Behavior, 32,* 80–99.

Englund, H. (2002). The village in the city, the city in the village: Migrants in Lilongwe. *Journal of Southern African Studies, 28*(1), 137–154. https://doi.org/10.1080/03057070120117015.

Filmer, D., & Pritchett, L. H. (2001). Estimating wealth effects without expenditure data-or tears: An application to educational enrollments in states of India*. *Demography, 38*(1), 115–132.

Freeman, E., & Anglewicz, P. (2012). HIV prevalence and sexual behaviour at older ages in rural Malawi. *International Journal of STD and AIDS, 23*(7), 490–496.

Gandek, B., Ware, J. E., Aaronson, N. K., Apolone, G., Bjorner, J. B., Brazier, J. E., et al. (1998). Cross-validation of item selection and scoring for the SF-12 health survey in nine countries: Results from the IQOLA project. *Journal of Clinical Epidemiology, 51*(11), 1171–1178.

Gilliland, D. S. (1986). How "Christian" are African independent churches. *Missiology: An International Review, 14*(3), 259–272.

Hoddinott, J. (1992). Rotten kids or manipulative parents: Are children old age security in Western Kenya? *Economic Development and Cultural Change, 40*(3), 545–565. http://www.journals.uchicago.edu/EDCC/home.html.

Hoddinott, J. (1993). Family size and support to the elderly in western Kenya. In C. B. Lloyd (Ed.), *Fertility, family size, and structure: Consequences for families and children* (pp. 41–73). New York, NY: Population Council.

Hybels, C. F., Blazer, D. G., George, L. K., & Koenig, H. G. (2012). The complex association between religious activities and functional limitations in older adults. *The Gerontologist, 52*(5), 676–685.

Institute of Health Metrics and Evaluation. (2013). GBD Profile: Malawi. In G. B. O. Disease (Ed.), *Global burden of diseases, injuries, and risk factors study 2010* (pp. 1–4). Seattle, WA: Institute for Health Metrics and Evaluation.

Jenkins, P. (2006). *The new face of christianity: Believing the bible in the global south*. New York, NY: Oxford University Press Inc.

Kaseke, E. (2005). Social security and older people: An African perspective. *International Social Work, 48*(1), 89–98. https://doi.org/10.1177/0020872805048711.

Kendall, J., & Anglewicz, P. (2016). Living arrangements and health at older ages in rural Malawi. *Ageing and Society*. https://doi.org/10.1017/S0144686X16001422.

Kendall, J., & Anglewicz, P. (2017). Characterizations associated with migration among older women and men in rural Malawi. *Illness, Crisis and Loss, 25*(21), 283. https://doi.org/10.1177/1054137317723102.

Kodzi, I. A., Gyimah, S. O., Emina, J. B., & Ezeh, A. C. (2011a). Religious involvement, social engagement, and subjective health status of older residents of informal neighborhoods of Nairobi. *Journal of Urban Health, 88,* 370–380. https://doi.org/10.1007/s11524-010-9482-0.

Kodzi, I. A., Gyimah, S. O., Emina, J. B., & Ezeh, A. C. (2011b). Understanding ageing in sub-Saharan Africa: Exploring the contributions of religious and secular social involvement to life satisfaction. *Ageing and Society, 31*(3), 455–474.

Koenig, H. G., & Larson, D. B. (1998). Use of hospital services, religious attendance, and religious affiliation. *Southern Medical Journal, 91*(10), 925–932.

Kohler, H.-P., Watkins, S. C., Behrman, J. R., Anglewicz, P., Kohler, I. V., Thornton, R. L., et al. (2015). Cohort profile: The Malawi Longitudinal Study of Families and Health (MLSFH). *International Journal of Epidemiology, 44*(2), 394–404. https://doi.org/10.1093/ije/dyu049.

Lutgendorf, S. K., Russell, D., Ullrich, P., Harris, T. B., & Wallace, R. (2004). Religious Participation, Interleukin-6, and mortality in older adults. *Health Psychology, 23*(5), 465–475. https://doi.org/10.1037/0278-6133.23.5.465.

Martin, K. R., & Levy, B. R. (2006). Opposing trends of religious attendance and religiosity in predicting elders' functional recovery after an acute myocardial infarction. *Journal of Religion and Health, 45*(3), 440–451. https://doi.org/10.1007/s10943-006-9037-6.

Mberu, B. U., Ezeh, A. C., Chepngeno-Langat, G., Kimani, J., Oti, S., & Beguy, D. (2013). Family ties and urban–rural linkages among older migrants in Nairobi informal settlements. *Population, Space and Place, 19,* 275–293. https://doi.org/10.1002/psp.1711.

Musick, M. A., Blazer, D. G., & Hays, J. C. (2000). Religious activity, alcohol use, and depression in a sample of elderly Baptists. *Research on Aging, 22*(2), 91–116.

Myroniuk, T., & Anglewicz, P. (2015). Social participation and health in rural Malawi. *Journal of Health and Social Behavior, 56*(4), 552–573.

National Statistical Office (NSO), & ICF. (2017). *Malawi Demographic and Health Survey 2015–2016*. Retrieved from Zomba, Malawi and Rockville, Maryland, USA.

Obtel, M., Rhazi, K. E., Elhold, S., Benjelloune, M., Gnatiuc, L., & Nejjari, C. (2013). Cross-cultural adaptation of the 12-Item Short-Form survey instrument in a Moroccan representative survey. *South African Journal of Epidemiology and Infection, 28*(3), 166–171.

Park, H. K., Chun, S. Y., Choi, Y., Lee, S. Y., Kim, S. J., & Park, E.-C. (2015). Effects of social activity on health-related quality of life according to age and gender: An observational study. *Health and Quality of Life Outcomes, 13*(140), 1–9. https://doi.org/10.1186/s12955-015-0331-4.

Payne, C. F., Mkandawire, J., & Kohler, H.-P. (2013). Disability transitions and health expectancies among adults 45 years and older in Malawi: A cohort-based model. *PLoS Medicine, 10*(5), 1–15. https://doi.org/10.1371/journal.pmed.1001435.

Peltzer, K., & Pengpid, S. (2012). Alcohol use and health-related quality of life among hospital outpatients in South Africa. *Alcohol and Alcoholism, 47*(3), 291–295. https://doi.org/10.1093/alcalc/ags001.

Pfeiffer, J. (2004). Civil society, NGOs, and the holy spirit in Mozambique. *Human Organizations, 63*(3), 359–372. https://doi.org/10.17730/humo.63.3.wr0rc09qeyafn84l.

Pfeiffer, J. (2005). Commodity *Feticismo*, the Holy spirit, and the turn to pentecostal and African independent churches in central Mozambique. *Culture, Medicine and Psychiatry, 29,* 255–283. https://doi.org/10.1007/s11013-005-9168-3.

Reniers, G. (2003). Divorce and remarriage in rural Malawi. *Demographic Research, 1*(6), 175–206. https://doi.org/10.4054/DemRes.2003.S1.6.

Stark, R. (1996). Religion as context: Hellfire and delinquency one more time. *Sociology of Religion, 57*(2), 163–173.

Strawbridge, W. J., Cohen, R. D., Shame, S. J., & Kaplan, G. A. (1997). Frequent attendance at religious services and mortality over 28 Years. *American Journal of Public Health, 87*(6), 957–961.

Trinitapoli, J. (2006). Religious responses to aids in sub-saharan Africa: An examination of religious congregations in rural Malawi. *Review of religious research, 47*(3), 253–270.

Trinitapoli, J. (2011). The AIDS-related activities of religious leaders in Malawi. *Global Public Health, 6*(1), 41–55. https://doi.org/10.1080/17441692.2010.486764.

Trinitapoli, J., & Regnerus, M. D. (2006). Religion and HIV risk behaviors among married men: Initial results from a study in rural sub-Saharan Africa. *Journal for the Scientific Study of Religion, 45*(4), 505–528. https://doi.org/10.1111/j.1468-5906.2006.00325.x.

Trinitapoli, J., & Regnerus, M. (2007). AIDS Related stigma in sub-Saharan Africa: Reconsidering Its Prevalence and Sources. In *Conference papers—American Sociological Association* (Vol. 1).

Trinitapoli, J., & Weinreb, A. (2012). *Religion and AIDS in Africa*. New York, NY: Oxford University Press.

UNDP. (2010). The real wealth of nations: Pathways to human development. In *Human development report* (Vol. 20th Anniversary edn, pp. 1–229). New York, NY: United Nations Development Programme.

United Nations. (2015). World population prospects: The 2015 Revision, Key findings and advance tables. In *Working paper no. ESA/P/WP.241*: United Nations, Department of Economic and Social Affairs, Population Division.

Ware, J. E., Jr., Kosinski, M., & Keller, S. D. (1996). A 12-item Short-Form health survey: Construction of scales and preliminary tests of reliability and validity. *Medical Care, 34*(3), 220–233.

Yeatman, S. E., & Trinitapoli, J. (2008). Beyond denomination: The relationship between religion and family planning in rural Malawi. *Demographic Research, 19,* 1851–1881.

Zhang, W. (2008). Religious participation and mortality risk among the oldest old in China. *Journal of Gerontology: Social Sciences, 63B*(5), S293–S297.