Religious Activity and Transitions in Functional Health and Mortality among Middle Aged and Older Adults in Taiwan

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September 18, 2010

1 Abstract

Although the importance of religious activity on the health and mortality of older persons has been well-established in countries where Judeo-Christian traditions are predominant, little research has examined the nature of the relationship in Asian countries where Eastern religions such as Buddhism and Taoism are predominant. These religions have very different practices from Judeo-Christian religions, which is a central element to the religion-health/mortality relationship in the West. In this paper we examine the effects of private and public religious practice and affiliation on transitions in physical functioning and mortality among elderly Taiwanese using a nationally representative longitudinal dataset spanning an eight year period. Our preliminary analyses indicate that persons with higher frequencies of religious activities tend to have lower risks of dying and higher probability of recovery from functional problems. Nevertheless, this relationship depends on previous health status. Consistent with previous research, we find some mediating effect of social/demographic factors.

2 Brief Background

Previous studies have generally found that religious activities have positive effects on health and longevity (Bagiella et al., 2005; Ellison, 1991; Ellison & Levin, 1998; Hummer et al., 1999, 2004; Hummer, 2005; Idler & Kasl, 1997; Kelley-Moore & Ferraro, 2001; Koenig et al., 1999; Krause et al., 1999, 2002; Cour et al., 2006; Strawbridge et al., 1997). The relationship becomes somewhat more varying upon further examination of specific dimensions of religion. The most-examined dimension is frequency of attendance in public religious events such as church / temple services. This dimension also garners the most consistent evidence of religiosity being associated with mortality and other health outcomes(Hummer et al., 1999; Musick et al., 2004; Oman et al., 2002). Fewer studies examine the relationship between private practice and health/mortality or the impact of specific denomination on health outcomes. For instance, there is little evidence regarding whether practice at home associates with health in similar ways as public practice. Some of the scarcity of research in these areas may derive from the complexity in defining and measuring the concept of private religious practice and in the existence of data with valid information on religious denomination.

Moreover, very few studies to date have examined religion, health and mortality among Asian populations. The importance of such studies for advancing understanding of the association is clear. While denominational distributions are very different in Asia, it can also be argued that forms of practice differ from what is seen in the West. Some religions, like Buddhism, involve very personal meditative types of practice and are less focused on the public meetings and interpersonal associations that are measured by the public dimension. If a key link between religiosity and health is through interpersonal associations, it might be hypothesized that the practice of Asian religions would show less robust associations. Still, meditative practices, whether they be denominational or non-denominational, have been found in psychological and neurological literature to be beneficial for reducing stress and promoting a feeling of control and overall well-being (Davidson et al., 2002; Kabat-Zinn, 2003). Therefore, there are aspects of religions like Buddhism that could provide important benefits to health even when practiced outside of the public sphere.

Among the few studies that do exist in Asia, conclusions are mixed. One study by Zhang (2008) analyzed data from the Chinese Longitudinal Healthy Longevity Study (CLHLS) and found higher religious participation was related to lower mortality only for women and individuals with poor health status at baseline, albeit effects are still statistically significant after controlling for social support, health behaviors, baseline health status, socioeconomic and demographic factors. Another study by Yeager et al. (2006) analyzed older adults in Taiwan and found that religious attendance had a statistically significant favorable impact on an array of health outcomes, including biological measures, even after controlling for demographic factors, health behaviors, and social support. Compared to those who never attended religious services, elderly Taiwanese who attended sometimes had reduced risk in mobility limitations and mortality, and this was even more so for those who attend often. However, effects were greatly reduced when adjusting for earlier levels of health. Religiosity measures were based on indices made up of a number of diverse items.

The current study examines religiosity and health outcomes among older adults in Taiwan employing the same base data as Yeager et al. (2006). We advance upon their work in several ways. First, we examine transitions in functional status and mortality, modeling outcomes as a function of baseline status. While mortality is an important health outcome for obvious reasons, functional outcomes, such as the ability to conduct various daily activities, is equally critical due the link with formal and informal health care needs. Therefore, associations between religiosity and functional status outcomes can be vital for the determination of policy within an aging society such as Taiwan. Second, we focus in on two survey items that report specifically on levels of public versus private religious experience. Third, we examine interactions between religious denomination (Buddhism, Taoism, Other, None) and religiosity. Finally, we extend the analysis to more recent data collected in 2007.

3 Methodology

The data come from The Survey of Health and Living Status of the Middle Aged and Elderly in Taiwan. The survey begun in 1989 by the Taiwan Provincial Institute of Family Planning (which later became the Bureau of Health Promotion of the Taiwan Department of Health) and the University of Michigan, with support from the Taiwan government and the U.S. National Institute on Aging. The initial respondents were representative of the nine percent of Taiwan's population in 1989 that was aged 60 and older and living in either the community or institutions. Follow-ups have been conducted in 1993, 1996, 1999, 2003 and 2007. A second survey cohort of 2,462 people ages 50 to 67 were added in 1996 and were re-interviewed in subsequent waves. The current baseline data is the 1999 wave, which was the first since 1989 to include questions on religiosity, but unlike the 1989 data has consistent follow-up measures of functional health.

The data is divided into two time segments each with a baseline and follow-up measure: 1999 to 2003 and 2003 to 2007. The first segment includes 4,263 observations, and the second includes 3,362 observations, with baseline and outcome functional status and mortality information. For the analysis, these two segments are pooled to provide a total sample size of 7,625 observations (see Table 1). From 1999-2003, 7.5% of the sample died while from 2003-2007, another 9.6% died.

We consider three separate measures of functional status, each of which provides specific information about physical health. Our conceptualization is based on the disablement process, which suggests that each of the three measures provide distinct information about functionality (Verbrugge & Jette, 1984). The first two are Activities in Daily Living (ADLs), and Instrumental Activities of Daily Living (IADLs), which are defined as measures of disability in common disability frameworks. These measures were originally developed for rehabilitation patients in a clinical setting to mark the milestone of independent self-care (Katz, 1983). ADLs include items that pertain to self-maintenance, such as bathing and dressing. IADLs include items that pertain to maintenance of one's physical environment, such as cooking and cleaning. We define a person as having an ADL or IADL limitation if they report one or more difficulties across a series of consistently measure items included in the three surveys. The third measure is functional limitation, which involves more basic physical movements such as standing or lifting things. In the common disability framework, these limitations are thought to potentially induce disabilities, depending upon other accessible and environmental factors, such as having individuals to help with tasks and social norms defining task performance.

We begin descriptively by examining functional and mortality transitions (see Table 2) using terms 'Active' and 'Inactive' to define those with and without limitations. As expected, those that begin a period in an active state are less likely to die and more likely to remain functionally healthy at follow-up. We then model the transitions from active or inactive to active, inactive and dead for each functional indicator separately using measures of religiosity. Given three possible non-ordered outcomes we use a multinomial equation (see Figure 1). The sum of the all transitions from each origin state is 1, as represented by:

$$\Sigma P_1 = P_{11} + P_{12} + P_{13} = 1, \text{[Equation 1]}$$

$$\Sigma P_2 = P_{21} + P_{22} + P_{23} = 1, \text{[Equation 2]},$$

where P_{ij} represents the probability of transitioning from one state to another, State 1 represents Active (no limitation) state, State 2 represents Inactive (any limitation) state, and State 3 represents Death.

Religious activities are measured as private (home) religious activity and public (church/temple) attendance. The main religious activity question was, "Please tell me how often you do each activity." Home religious activity was measured from the question, "At home, pray, burn incense, worship gods or Buddha." Church/temple attendance was measured from the question, "Go to church or temple to worship." Table 3 presents the descriptive information for religiosity. We find that about half of the sample (51.5%) engages in home religious activity often while only 18.4% participates in church/temple worship with the same frequency.

We also examine the impact of religious affiliation on these transitions. Affiliation is shown in Table 4. About half of the sample identify as Taoists while 29% identify as Buddhist. We combined those who identify as Christians, Catholics, Yi-Guan Dau, and Other as a single "Other" category because they comprise a small proportion of the sample (4.2%). Lastly, 13.5% of our sample identifies as having no religious affiliation. Our models adjust for several demographic, social and other health factors.

4 Preliminary Multivariate Findings

At the current point in time, we have run preliminary multivariate models for all of the functional status outcomes. An example is found in Table 5, which presents the impact of home religious activity on functional limitations, that is, the more general physical tasks like standing and lifting. The findings here suggest effects of religious activity is found among those with previous health problems, and is more likely to impact mortality than transitions to active or inactive functional states. Other models suggest that there are differences between home and public religious activities and across specific outcomes. In general, across all our models, we notice that the effects on mortality are more robust than for the non-mortality transitions, and tend to persist even after controlling for demographic and social factors. Comparing between home and public religious activity, our findings suggest that the latter seems to affect both functionality and mortality transitions while the former seems to only affect mortality transitions.

5 Conclusion and Analysis Plan

In this paper we set out to examine whether the religion-health/mortality relationship commonly found in countries with Judeo-Christian traditions would be observed in an East Asian setting where the predominant religions are Taoism and Buddhism. Although Eastern religions in Taiwan have very different patterns of observance compared to Western religions, our preliminary conclusions suggest that the effects of religion on health and mortality seem to be similar to other countries. Religious activities tend to have positive effects on health and longevity. Although this is consistent with prior research, we are cautious about our findings since our relationship is highly dependent on previous functional status. We also do not find a clear gradient in the frequency of religious activity and health/mortality transition. For instance, those who say they attend or practice 'rarely' tend to have better health outcomes than those who attend or practice 'never', but those in the 'often' group are not necessarily more advantageous. This suggests a complex set of associations between religiosity and health outcomes that we will explore in our further analyses.

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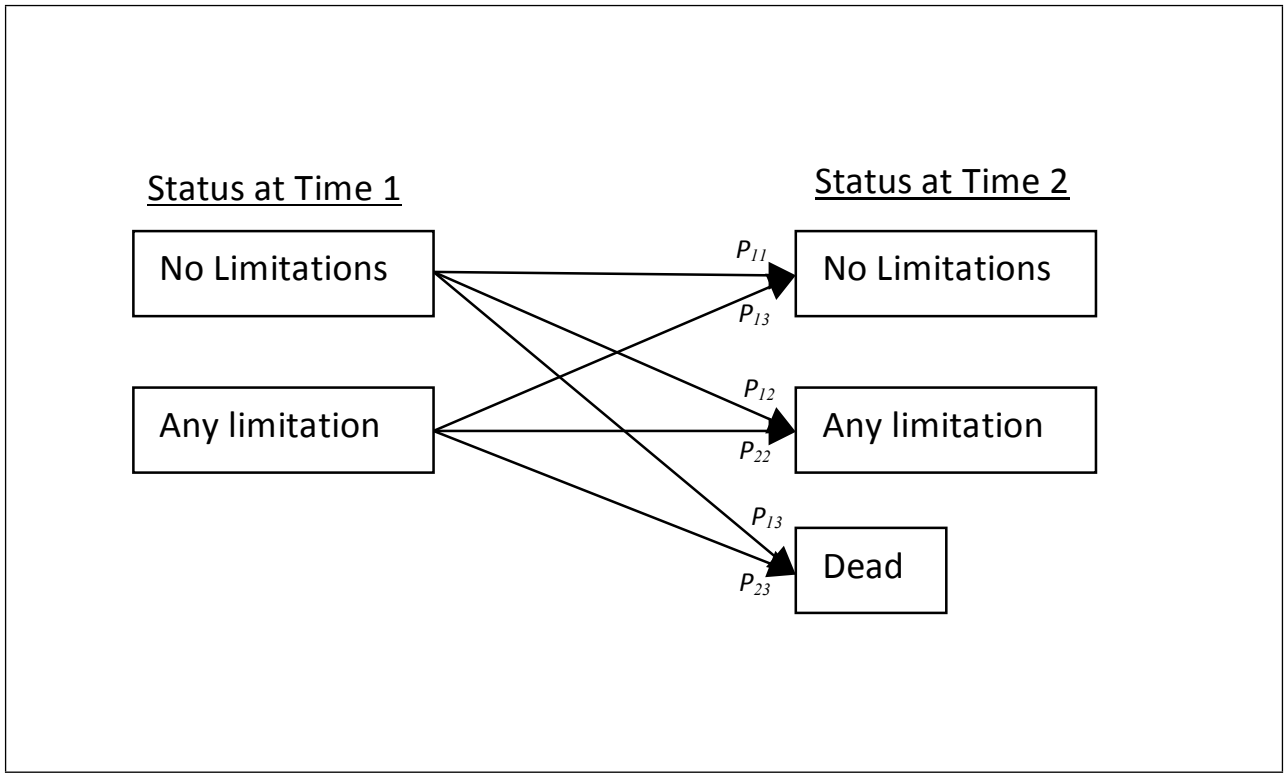

Figure 1: Transition diagram

Table 1: Sample composition (Unweighted N, Weighted %)

	1999		2003		2007	
	N	%	N	%	N	%
Alive	4439	100.0	3503	92.5	2740	90.4
Dead	0	0.0	760	7.5	622	9.6
Total (Non-Missing)	4439	100.0	4263	100.0	3362	100.0
Missing	0		176		141	

Table 2: Descriptives of health and mortality transitions (Unweighted N, Weighted %)

	ADL		IADL		Functional Limitations	
	N	%	N	%	N	%
Active to Active	5318	82.6	2871	69.5	1400	55.5
Active to Inactive	567	6.8	1225	23.9	1110	38.9
Active to Dead	919	10.6	369	6.6	185	5.7
Total	6804	100.0	4465	100.0	2695	100.0
Inactive to Active	97	14.1	454	17.7	531	13.9
Inactive to Inactive	261	32.5	1693	53.8	3202	65.8
Inactive to Dead	463	53.4	1013	28.5	1197	20.3
Total	821	100.0	4263	100.0	4930	100.0

Table 3: Frequency of religious activities (Unweighted N, Weighted %)

	Home Activity		Church/Temple Activity	
	N	%	N	%
Often	2207	51.5	786	18.4
Sometimes	639	15.0	1541	37.3
Rarely	484	10.5	893	19.7
Never	438	9.3	546	10.8
Missing	671	13.7	673	13.8
Total	4439	100.0	4439	100.0

Table 4: Religious affiliation (Unweighted N, Weighted %)

	N	%
Taoist	2205	50.9
Buddhist	1231	28.5
Other	195	4.2
None	664	13.5
Missing	144	2.9
Total	4439	100.0

Table 5: Frequency of home religious activity and physical limitations

	Active to Inactive				Inactive to Active				Active to Dead				Inactive to Dead			
	Model One		Model Two		Model One		Model Two		Model One		Model Two		Model One		Model Two	
	β	S. E.	β	S. E.	β	S. E.	β	S. E.	β	S. E.	β	S. E.	β	S. E.	β	S. E.
Intercept	-.380***	.107	-5.099***	.536	-1.522***	.122	5.621***	.579	-.806***	.083	-7.852***	1.042	6.341***	.504	-6.341***	.504
Religious affiliation																
Taoist	-.027	.177	-.136	.187	.065	.175	.130	.347	.109	.325	.080	.195	.210†	.122	.389**	.129
Buddhist	-.174	.186	-.213	.194	-.181	.193	.058	.349	-.022	.344	-.241	.209	.077	.134	.270*	.139
Other	.112	.278	.045	.286	-.411	.312	.117	.540	.103	.518	-.331	.325	.076	.209	.294	.212
None	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Frequency of home religious activity																
Often	.157	.205	.277	.213	-.343	.228	.024	.426	-.224	.408	-.422†	.247	-.274*	.138	-.209	.144
Sometimes	.139	.189	.227	.200	.243	.191	.120	.358	-.050	.338	.058	.207	-.520***	.140	-.229	.147
Rarely	.084	.163	.078	.170	-.010	.159	-.004	.307	-.221	.292	-.108	.175	-.837***	.110	-.511***	.116
Never	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Covariates																
Age			.073***	.007			.097***	.013			-.097***	.007			.072***	.006
Female			.654***	.108			-.848**	.253			-.541***	.114			-.778***	.090
Education			-.058***	.011			-.066*	.021			.049***	.013			.001	.010
Prev SRH			.862	.723			1.648†	.998			-1.729***	.392			1.238***	.111
Married			-.086	.126			-.798***	.205			.032	.132			-.286**	.087

Table 6: Frequency of church/temple religious activity and physical limitations

	Active to Inactive				Inactive to Active				Active to Dead				Inactive to Dead			
	Model One		Model Two		Model One		Model Two		Model One		Model Two		Model One		Model Two	
	β	S. E.	β	S. E.	β	S. E.	β	S. E.	β	S. E.	β	S. E.	β	S. E.	β	S. E.
Intercept	-.374***	.107	-5.054***	.538	-1.579***	.124	5.615***	.580	-2.161***	.192	-7.698***	1.040	-.796***	.083	-6.269***	.508
Religious affiliation																
Taoist	.096	.169	-.002	.176	-.192	.172	-.063	.194	.514	.313	.520	.332	.257*	.121	.304*	.126
Buddhist	-.053	.179	-.089	.185	-.427*	.183	-.383*	.202	.381	.330	.450	.339	.102	.129	.167	.133
Other	.211	.268	.163	.278	-.665*	.317	-.467	.332	.356	.506	.388	.532	.123	.208	.229	.206
None	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Frequency of church/temple activity																
Often	.126	.166	.065	.170	.309†	.172	.062	.191	-.477†	.301	-.313	.315	-1.007***	.127	-.452**	.133
Sometimes	-.062	.159	-.041	.163	.449*	.164	.129	.183	-.911*	.288	-.675*	.303	-.823***	.111	-.313*	.116
Rarely	-.133	.176	-.073	.182	.165	.182	-.058	.200	-.403	.309	-.221	.329	-.519***	.119	-.199†	.124
Never	Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.		Ref.	
Covariates																
Age			.072***	.007			-.097***	.007			.095***	.013			.071***	.006
Female			.641***	.108			-.549***	.114			-.826**	.252			-.786***	.090
Education			-.058***	.011			.049***	.013			-.067**	.021			.001	.010
Prev SRH			.886	.707			-1.702***	.393			1.682+	1.001			1.234***	.111
Married			-.079	.126			.027	.133			-.775***	.207			-.280**	.087