

Religious Participation and Mortality Risk Among the Oldest Old in China

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Objectives. Rapid population aging in China calls for more research into social factors responsible for health and well-being among older adults. This article adds to this line of inquiry by examining the relationship between religious participation and mortality, as well as the potential pathways linking these factors and subgroup variations among oldest old Chinese.

Methods. Using two waves (1998 and 2000) of the Chinese Longitudinal Healthy Longevity Survey, I estimated Cox proportional hazards models for a nationwide sample of Chinese aged 80 to 105.

Results. Controlling for a wide range of covariates, I found religious participation to be significantly associated with lower risk of mortality for oldest old women and for individuals in poor health. Engaging in leisure activities and exercises partially accounted for this association.

Discussion. Findings suggest that (a) religious participation, associated with other socially integrated and cognitively stimulating activities, predicts mortality risk among oldest old Chinese; and (b) religious participation offers psychosocial resources that are likely to compensate for the increased mortality risk associated with disadvantaged socioeconomic conditions of certain vulnerable groups such as women and individuals in poor health.

Key Words: Religious participation—Mortality—Oldest old—China.

CHINA, the most populous country in the world, is now aging at a rapid speed. The number of the oldest old population aged 80 and older, currently the largest of any nation in the world, may increase by more than 100 million by 2050 (Zeng, Liu, & George, 2003). China's population control program, the "one-child policy" introduced in 1980, worsened the situation by reducing the size of the younger population. This imbalance makes the care of older persons at both society and family levels increasingly difficult and calls for the recognition of social factors responsible for the well-being of older Chinese.

Religious participation stands out as one of the important health-promoting social factors worthy of exploration. Despite the recent decades of government constraint, China has historically been a country of multiple religious traditions, all of which have characteristics that are particularly relevant to health (e.g., Ai, 2000, 2006). A recent survey on religious beliefs in China (Wu, 2007) disclosed that approximately one fourth of the Chinese population, or more than 300 million Chinese, is involved in religious activities of one form or another. This makes it feasible to explore the religion-health association, a long neglected topic, in contemporary China. Specifically, this article examines the religion-mortality association, as well as the potential mechanisms linking these factors and the subgroup variations.

THEORETICAL AND EMPIRICAL BACKGROUND

Previous Research on Religion and Mortality in the United States

The past three decades have witnessed a growing body of U.S. research examining relationships between individual

religious involvement and health (for reviews, see Ellison & Levin, 1998; Koenig, McCullough, & Larson, 2001). Increasing evidence suggests that multiple features of religiousness have beneficial effects on a wide range of health outcomes (Hummer, Ellison, Rogers, Moulton, & Romero, 2004; Koenig et al., 2001). In particular, more frequent service attendance is associated with a reduced risk of mortality (for reviews, see Hummer et al., 2004; McCullough, Larson, Hoty, Koenig, & Thoresen, 2000). Evidence comes from community-based epidemiologic surveys (e.g., Koenig et al., 1999; Lutgendorf et al., 2004; Oman & Reed, 1998; Strawbridge, Cohen, Shema, & Kaplan, 1997), nationwide surveys (Hummer, Rogers, Nam, & Ellison, 1999; Musick, House, & Williams, 2004), as well as clinical samples (Oxman, Freeman, & Manheimer, 1995; Pargament, Koenig, Tarakeshwar, & Hahn, 2001). Not surprisingly, many of these studies have focused on older adults (e.g., Helm, Hays, Flint, Koenig, & Blazer, 2000; Hill, Angel, Ellison, & Angel, 2005; Krause, 1998; Lutgendorf et al., 2004), among whom levels of religiousness tend to be high and for whom religion is an arguably important social resource.

Despite these recent advances in research on religion and mortality, investigators have only begun to examine this association among racial and ethnic minorities (Ellison, Hummer, Cormier, & Rogers, 2000; Hill et al., 2005). There is evidence indicating that religious involvement is associated with a reduction in the risk of mortality among African American adults (Ellison et al., 2000) and older Hispanics (Hill et al., 2005). However, little research has been done on the religion-mortality association in a non-Western setting. In this study, I hypothesized that participating in Eastern religions would also reduce the odds of death. This is the first hypothesis.

Religious Participation and Mortality in China

Most people in China practice a combination of folk religion, Confucianism, Taoism, and Buddhism. Different from Western congregational religions, Chinese religious traditions have long-standing and distinct psychosocial and behavioral functions on health and well-being. For instance, followers of Confucian teachings believe that virtues such as self-cultivation, *chung* (loyalty), *shu* (empathy), and *jen* (humaneness) are imperative to developing and maintaining deep and profound relationships with self, family, community, and state (Taylor, 1998). This greatly facilitates the formation of secular social ties, on the basis of which coreligionists are likely to engage in various leisure activities that are socially integrated or cognitively stimulating, such as collective exercises, playing cards, chess, or Mah-jongg (Ross & Zhang, 2008). Buddhism is more similar to Western religion with respect to spiritual and ritual practices that are likely to offer means to spiritual well-being, such as tolerance, self-control, harmony, inner peace, and wisdom (Ai, 2000). These faith-based attitudes, along with rituals such as prayer, may lead to positive expectations such as hope and optimism (Ai, Peterson, Tice, Bolling, & Koenig, 2004) that are likely to help vulnerable older Chinese such as women and individuals in bad health to cope effectively with traumatic life events. The spirit of Taoism underlines the mind-body connection and promotes holistic well-being through energy-based health practices and healing processes such as tai chi or qigong, which involve deep breath and meditation with movement (Ai, 2006).

In sum, Chinese religions have a potential impact on the health and well-being of older adults. They integrate essences from different religious traditions, build social as well as spiritual relationships, encourage an active lifestyle among participants, and create positive expectations. In this sense, China is a nation of religion, not by a Western definition, but in its own way. Many aspects of Chinese religions are likely to be associated with a reduction in the risk of mortality. This study hypothesized two sets of potential mediators linking Chinese religions and mortality: psychological resources indicated by optimism and autonomy, and health behaviors indicated by engaging in collective exercises and other leisure activities. This is the second hypothesis.

Religion and Mortality: Subgroup Variations

Findings on religion and mortality have become increasingly robust, but studies have only begun to examine the contingent effects of religious involvement on mortality, and the available evidence is far from conclusive. Rogers, Hummer, and Nam (2000) suggested a stronger religion-mortality association for younger adults, Ellison and colleagues (2000) showed gender differences in mechanisms underlying the religion-mortality link, and Oman and Reed (1998) indicated that religious attendance amplified the effects of social support on mortality. Whereas some studies have shown stronger religion-mortality links among women, and especially among older women (Koenig et al., 1999; Strawbridge et al., 1997), studies of general populations have not (Hummer et al., 1999; Musick et al., 2004). Virtually no evidence suggests that the religion-mortality association differs by health status.

To explain how the influence of religiosity on health and well-being conditioned on demographic factors, Schieman, Nguyen, and Elliot (2003) proposed two competing theories.

One is called *resource amplification theory*: Religion is more valuable in the context of other resources such as education, income, and social activities. The other is called *resource compensation theory*: Religion is more important in the absence of other types of advantage. Supporting the resource amplification view, Schieman and colleagues suggested that the negative association between religiosity and mortality was stronger among those who were poorly educated. Their findings on religion and mental health shed light on the religion-mortality association. Alternatively, Ellison (1991) indirectly suggested the resource compensation view: The "existential certainty" was associated more positively with life satisfaction among those who were less educated. Similarly, Ross and Mirowsky (2006) disclosed the gender-conditioned association between education and psychological well-being: Women benefit more from education than men because resources substitute for one another, and the presence of education makes the absence of other resources less harmful.

Extending resource compensation or substitution theory into the religion-mortality scenario, one can reasonably argue that religiousness, and the resources derived from it, benefit longevity more for socioeconomically deprived groups such as women and individuals in poor health. For instance, Chinese women have historically lived in a patriarchal society where they have structurally and systematically been denied education and mentally stimulating occupations (National Research Council, 2000; Zhang, 2006). As a result, they face more economic dependency and are more socioeconomically disadvantaged. In this study, I examined how participating in religious activities may compensate for or amplify the disadvantaged socioeconomic positions for women and for individuals in poor health. This is the third hypothesis of this article.

METHODS

Data

Data to test these ideas came from the 1998 and 2000 Chinese Longitudinal Healthy Longevity Survey (CLHLS). CLHLS was conducted by randomly selecting one half of the cities and counties of China's 22 provinces where Han Chinese are the ethnic majority. The survey area covered more than 85% of the Chinese population. The baseline sample included 9,093 respondents aged 77 to 122 and had a response rate of 88%. In 2000, 4,831 respondents remained and were reinterviewed, whereas 3,368 respondents had died and 894 were unavailable for follow-up. This data set was ideal for testing the three proposed hypotheses because of its richness in variables tapping characteristics of religious participation, psychosocial resources, and a wide range of health behaviors. This study focused on 8,805 respondents aged 80 to 105 years old at baseline. I excluded those aged 106 and older due to insufficient information to validate their old age (Zeng & Vaupel, 2002). After listwise deletion of missing values, the analytic sample was reduced to 6,747.

Measurement

Mortality.—Based on informant report, I recorded mortality from 1998 to 2000, yielding a roughly 2-year follow-up period.

I created a binary variable to distinguish the oldest old who had died (sometime between 1998 and 2000) from those who were still alive at the 2000 interview. I defined survival time as the number of days between the baseline interview and the date of death or final interview, at which point surviving participants represented censored observations. Roughly 37% of the participants died over the 2-year study period.

Religious participation.—Respondents were asked how often they participated in religious activities (1 = every day, 3 = never). I grouped participants indicating every day and sometimes were grouped into one category (1) and participants indicating never into another (0). More than 17% of the sample reported participating in religious activities at least sometimes.

Demographics.—Demographic measures included age (in years), ethnicity (Han: 0 = minority, 1 = Han), gender (female: 0 = male, 1 = female), marital status (married: 0 = not married, 1 = married), education (literate: 0 = illiterate, 1 = literate), urban/rural residence (urban: 0 = rural residence, 1 = urban residence), and east/west residence (east: 0 = west residence, 1 = east residence). A majority of the sample was Han (93%), female (57%), rural (63%), illiterate (66%), and unmarried (82%).

Baseline health status.—Respondents were asked to evaluate their overall health status (1 = very bad, 5 = very good). The mean level of self-reported health was 3.64, roughly approaching the “good” category.

Psychological resources.—I used optimism and autonomy as the indicators of psychological resources. Respondents were asked the following: “How often do you look on the bright side of things?” and “How often do you make your own decisions?” Responses to these two questions were coded in an increasing (1–5) manner such that higher scores reflected more optimism and autonomy. A majority of the sample reported above average levels of optimism ($M = 3.9$) and of making their own decisions ($M = 3.51$).

Health behaviors.—I incorporated three health risk factors, some of which have been used in previous studies (Hill, Ellison, Burdette, & Musick, 2007; Musick et al., 2004; Strawbridge, Shema, Cohen, & Kaplan, 2001), and some of which were highly relevant in the Chinese cultural setting (Ross & Zhang, 2008). A four-item index on engagement in leisure activities gauged how often (1 = never, 3 = every day) respondents (a) did gardening, (b) read newspapers or magazines, (c) watched television or listened to the radio, and (d) played cards or Mah-jongg. I measured exercise in response to the question “Do you exercise at present?” I measured smoking in response to the question “Do you smoke at present?” The answers were coded into yes = 1 and no = 0. The mean level of leisure activity engagement was around 1.34. Approximately 30% of the sample reported that they exercised, and 19% of the respondents smoked.

RESULTS

I first examined the sample attrition pattern. A binary variable marked those lost to the second interview and those

who either were available for the second interview or had died. I then applied logistic regression to regress this binary outcome on the Wave 1 measures. Findings revealed that the sample attrition did not occur in a random manner: Participants who were lost between 1998 and 2000 were more likely to be Han, urban residents, and highly educated. However, religious participation and the proposed mediators did not predict the loss of sample. This kept enough variability in religious participation in the remaining sample and facilitated the follow-up analyses on the effects of religious participation on mortality.

I then applied Cox proportional hazards models to estimate mortality risk depending on religious participation and control, mediating, and moderating factors. Model 1 tested the religion–mortality association, adjusting for demographics and health status when appropriate. In Models 2 through 4, I added psychosocial mediators to see how much they could account for the religion–mortality association. I examined moderating effects by creating cross-product terms between religion and gender, and health status, with each cross-product term entering the main effects model separately.

Upon examination of the whole sample ($N = 6,747$; data not shown), the hazard ratio (HR) in the first model suggested that religious participation was significantly related to a lower risk of mortality ($HR = 0.87$, $p = .002$) over and above controls. Exercise and engagement were significant mediators, substantially reducing the significance level of religion ($HR = 0.92$, $p = .16$). Adding the cross-product terms into the final model (Model 4) suggested that the interaction effects for gender ($HR = 0.81$, $p = .085$) and health status ($HR = 1.35$, $p = .009$) were moderately to strongly significant.

To provide more insight into the moderating effects, I divided the sample into four subgroups: women, men, individuals in poor health, and individuals in good health. For each subgroup, I applied the same modeling strategies. Table 1 presents the hazard rate ratios from the Cox proportional hazards models for women and for individuals in poor health. For women, participating in religious activities significantly reduced the mortality risk over and above controls for demographics and health status ($HR = 0.82$, $p = .006$). Tests of mediating effects suggested that respondents who engaged little in exercise or other leisure activities were at an increased risk for mortality. By adding these mediators into Models 3 and 4, I found that the effects of religion diminished somewhat ($HR = 0.87$, $p = .054$). I found similar patterns for individuals in poor health (see the right-hand side of Table 1): Religious participation significantly reduced their mortality risk over and above controls and mediators ($HR = 0.79$, $p = .009$). By contrast, religious participation had no significant effects for men or for individuals in good health (data not shown). These results suggest that religious participation in China has significant and sizeable direct and indirect effects on mortality for women and for individuals in poor health.

DISCUSSION

Focusing on oldest old people in China, this study advances prior research by specifically examining the contingent effects of religion on mortality. I found that the impact of religious participation on the reduction of mortality was more salient for

Table 1. Estimated Net Hazard Ratios for Religious Participation, Demographics, Baseline Health Status, and Mediators on Mortality for Women and for Individuals in Poor Health (Cox Proportional Hazards Regression Estimate: Oldest Old Chinese, 1998–2000)

Variable	Women (N = 3,873)				Individuals in Poor Health (N = 2,783)			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Religious participation	0.84**	0.85**	0.85**	0.88*	0.82**	0.82**	0.83**	0.85*
Psychological resources								
Optimism		0.95	0.96	0.97		0.95	0.96	0.97
Making own decisions		0.96	0.97	0.99		0.97	0.99	0.99
Health behaviors								
Exercise			0.65***	0.69***			0.54***	0.57***
Engagement				0.53***				0.73**
Smoke				1.17				1.05
Health status								
Self-reported health	0.83***	0.85***	0.86***	0.88***				
Demographics								
Literate	0.83*	0.83 [†]	0.87	0.98	0.95	0.96	1.03	1.08
Han	1.15	1.19	1.24 [†]	1.24 [†]	1.02	1.03	1.08	1.08
Age	1.08***	1.08***	1.07***	1.07***	1.07***	1.07***	1.07***	1.06***
Married	0.84	0.84	0.83	0.84	0.67***	0.67***	0.67***	0.68***
Urban	0.99	1.00	1.03	1.10	0.64***	0.64***	0.62***	0.63***
Female					0.95	0.97	1.02	1.07
East	1.05	1.04	1.03	1.04	1.07	1.07	1.05	1.06
-2 log likelihood	22,362.94	22,358.44	22,326.50	22,292.91	17,998.06	17,993.92	17,934.15	17,925.03
χ^2 / df	452.74/8	457.29/10	481.67/11	502.69/13	314.38/8	318.41/10	366.03/11	372.28/13

Note: [†]p < .10; *p < .05; **p < .01; ***p < .001.

socioeconomically disadvantaged groups such as women and individuals in poor health who have fewer alternative resources. This implies resource compensation rather than amplification: Resources can substitute for one another to decrease the risk of mortality. The effect of having a specific resource is greater for those who have fewer alternatives. Religion not only helps people who are healthy to avoid illness but favorably alters the course of illness among those who are already ill.

In addition, the religion-mortality mediators exhibited unique features in China: A substantial portion of religious effect on mortality was mediated by health behaviors rather than by psychological resources such as optimism and autonomy. This indicates the dialectic nature of Eastern religions, which do not necessarily lead to positive psychological status as do Western religions. These findings suggest that religious participation in China might help older Chinese develop healthy lifestyles, stimulate social engagement, and thus reduce mortality risk. Not only do individuals participate in religious activities, they also help to produce them; by doing so, they greatly enhance their health and well-being (Musick et al., 2004).

The results of this investigation are intriguing; however, much remains to be explored. The first priority is measurement improvement. Future research should examine the content of religion and spirituality practice or beliefs rather than treat them as social or demographic components such as simple measures of education or income. For example, the measure of religious participation needs to be further decomposed to identify the precise facet of religion that is responsible for the health-protective effects. Does it reflect public attendance (similar to organizational participation in the United States) or private religious practice (such as praying at home)? Although my follow-up in-depth interviews in China suggested both, more

well-developed survey questions gauging multiple features of religiousness are greatly needed. In addition, more waves of data covering a longer period of time, as well as more comprehensive samples covering younger generations, are likewise imperative. In this study, approximately 23% of the sample was lost due to item nonresponse. This high rate indicates the general low levels of education among oldest old Chinese. By sampling younger generations with more years of schooling, future researchers will likely overcome this problem.

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