

Reviewers comment-1

WIDOWHOOD, RELIGION, AND MORTALITY AMONG OLDER ADULTS

Abstract

Background and Purpose: The death of a spouse can have a negative impact on mental health, physical functioning, and even increased mortality among surviving spouses. On the other hand, religious factors are positively related to health outcomes among older adults. The relationship between widowhood, religion, and mortality among older adults can be better understood by clarifying the main and moderating effects of religion. Therefore, this study examines the main and moderating effects of three measures of religion on mortality among older adults in widowhood.

Methods: The sample included 9,956 older adults aged 65 and over who participated in the Health and Retirement (HRS) RAND study. Time frame? Hierarchical binary logistic regression procedures were used to analyze the data. Religion was measured using three variables—religious preference, religious services participation, and religious importance. Models controlled for demographic, socioeconomic, and health status factors.

Results: Widowed older adults were more likely to die than married older adults. However, when demographic and socioeconomic factors were controlled, the effect of widowhood on mortality was no longer significant. Two religion variables—religious services participation and religious importance—had a direct impact on mortality. The odds of mortality were lower for older adults who participated in religious services (OR=.86; $p=.001$) but higher for those with stronger beliefs about the importance of religion (OR=1.17; $p=.001$). Religious participation moderated the relationship between widowhood and mortality in that the odds of mortality increased among widowed older adults who participated in religious services more often (OR=1.21; $p=.001$).

Conclusions and Implications: Unlike religious services participation which was negatively related to the risk of mortality, religious importance was positively related to the risk of mortality. The positive moderating effect of religious participation on the relationship between widowhood and mortality is also incongruent with our hypothesis and requires further investigation. More sophisticated longitudinal models need to be conducted to clarify the causal relationships between widowhood, religion, and mortality, and potentially relevant factors such as social support should be considered in future studies.

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Comment [SE2]: I suggest adding a time frame here. It seems like a very generalized statement.

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Keywords: Widowed older adults, Religious preference, Religious participation, Religious importance, Moderating effect of religion

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As people age, they experience loss of loved ones. Particularly, the death of a spouse is a traumatic event in one's life (Atchley & Barusch, 2000). Several studies have shown negative effects of widowhood on mental health, physical functioning and positive effects of widowhood on mortality (Elwert & Christakis, 2008; Grundy & Tomassini, 2010; Lee & Carr, 2007; Stimpson, Kuo, Ray, Raji, & Peek, 2007; Sullivan, 2010; Wilcox et al., 2003).

On the other hand, religion have shown positive effects on health outcomes (Helm, Hays, Flint, Koenig, & Blazer, 2000; Palmer, Katerndahl, & Morgan-Kidd, 2004). In addition, religion may have more influence on older adults than the young because older persons were more likely to report religion's significance on their lives (Benjamins, 2006). Recent studies showed that religiousness could decrease the negative effects of widowhood on the well-being of older adults (Momtaz, Ibrahim, Hamid, & Yahaya, 2010; Roff, Durkin, Sun, & Klemmack, 2007).

In spite of the importance of religion among older adults in widowhood, available studies have rarely considered the effects of religion on older adults' mortality in widowhood. The relationships between widowhood, religion, and mortality among older adults can be much better understood by clarifying the main and moderating effects of religion. Therefore, this study examines the effects of religion on mortality among older adults in widowhood, especially focusing on the moderating effects of religion. That is, the study mainly explains the effects of religion on mortality by comparing widowed older adults to married ones.

~~Firstly, hypotheses and the conceptual model of the study were explained based on previous studies. Then, methods including explanations of datasets, a study sample, variables, data analysis plan, and missing data analysis were reported. Thirdly, the results of descriptive analysis and the binary logistic regression analysis were reported. Finally, the implications and the limitations of the study were discussed.~~

Effects of Religion on Mortality

Hypotheses

This study tries to clarify main and moderating effects of religion on mortality. Because the loss of a spouse is a stressful life event, the negative effects of widowhood on the risk of mortality are obvious. Many previous studies have reported the positive effects of widowhood on mortality, that is, widowed older adults have higher risks of mortality than married ones (Grundy & Tomassini, 2010; Moon, Kondo, Glymour, & Subramanian, 2011; Stimpson et al., 2007; Sullivan, 2010).

Previous studies, however, have rarely considered the effects of religion on mortality among older adults. Religion may give solace to older adults, so they may have a lower risk of mortality. Several previous studies have reported the positive effects of religion on health outcomes (Benjamins, 2004; Helm et al., 2000; Momtaz et al., 2010; Palmer et al., 2004; Roff et al., 2007). The stress-buffering theory suggests that religion could also decrease the risk of mortality by providing personal activities and social networks. This indicates main effects of religion on mortality. The effects of religion may differ by various components of religiousness such as religious participation and religious importance. Therefore, the study suggests the first hypothesis as follows:

Hypothesis 1. Religion influences mortality.

The more religious participation and the more religious importance, the lower their risk of mortality.

Comment [SE3]: There are a lot of older articles here. Adding current (past decade) literature is important since we have technology and differences in a community that might impact these outcomes. Here are a couple of examples that might provide better sources in their reference section.

Zheng J, Yan L. The impact of widowhood on the mental health of older adults and the buffering effect of social capital. *Front Public Health*. 2024 Apr 24;12:1385592. doi: 10.3389/fpubh.2024.1385592. PMID: 38721532; PMCID: PMC11076834.

Hawes, F. M., Tavares, J. L., Ronneberg, C. R., & Miller, E. A. (2024). The Effects of Religiosity on Depression Trajectories After Widowhood. *OMEGA - Journal of Death and Dying*, 88(4), 1240-1257. <https://doi.org/10.1177/00302228211051509>

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Comment [SE4]: This is true and you have found an important gap in the literature to examine.

Comment [SE5]: This paragraph is unnecessary explanation for a typical research paper

Comment [SE6]: Consider using the term religiosity. This encompasses your use of three measures about religion - preference, participation, importance

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In addition, the effects of widowhood on mortality could differ by religion. This indicates moderating effects of religion on the relationships between widowhood and mortality. Widowed older adults are likely to be more influenced by religion because they are exposed to more vulnerable situation than married older adults. Therefore, this study suggests the second hypothesis as follows:

Hypothesis 2. The effects of widowhood on mortality differ by religiousness.

The effect of religiousness (i.e., religious participation and religious importance) are stronger for widowed older adults than for married ones.

Conceptual Model

Main purpose of the study is to examine the effects of religion on mortality comparing widowed older adults to married ones. Therefore, mortality is a dependent variable, widowhood is an independent variable, and religion is a moderating variable. Religion can be regarded as a social institution which intends to find the meaning of life and death. Religious behavior and beliefs can have several scales ranging from external manifestations such as religious denominations to internal manifestations such as faith and emotions (Atchley & Barusch, 2000). In this study, religion was measured by religious preference, participation, and importance.

Additionally, when examining the effects of religion on mortality in widowhood, other factors which can affect widowhood effects should be also considered. Based on previous studies, demographic (e.g., age, gender, race) and socioeconomic factors (e.g., educational attainment) should be considered to be control variables. Widowed men showed a higher risk of health than widowed women (Lee, DeMaris, Bavin, & Sullivan, 2001). On the other hand, the widowhood effects did not differ by race (Carr, 2004). The negative relationship between mental health and lower household income increased over the life course (Miech, Shanahan, & Elder, 2000), and lower socioeconomic status were positively related to the risk of mortality among widows (Grundy & Tomassini, 2010; Sullivan, 2010).

The diagram of the conceptual framework is shown in Figure 1. The arrow from widowhood to mortality shows the positive direct effect of widowhood on mortality. The arrow from religion to the arrow of the direct effect indicates the negative moderating effects of religion on mortality.

Methods

Datasets

This study utilized datasets of the Health and Retirement Study (HRS), a nationally-representative and longitudinal study of the U.S. population aged 50 and over. The original target group in 1992 included older adults born during the years between 1931 and 1941 who resided in households. Every six years, a new cohort group is selected and added to the original sample, and the datasets have nine waves until 2008. Although the HRS provides biennial data products such as Core, Exit, Post-Exit, and Imputation datasets and products for longitudinal data analysis such as Tracker File and Master ID, these datasets are enormous and complicated.

The Research and Development (RAND) Center for the Study of Aging, therefore, created datasets in order to help users better understand and easily utilize the datasets. Two kinds of datasets produced by RAND are available: The RAND Enhanced Fat Files and the RAND HRS Files. The Fat Files include most of the public release data from each questionnaire section for each wave. The RAND HRS Files, on the other hand, incorporate Core datasets for all nine

Comment [SE7]: You do not look at the differences in religion by type - protestant, none, catholic, etc...

Comment [SE8]: Consider religiosity again throughout the document as a clearer term for your created variable

Comment [SE9]: What type of health? Do you mean risk of mental health disorders or physical health problems or both?

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waves as well as Tracker File; therefore, these files are useful in longitudinal analysis although the files do not include all variables from the questionnaire section as the Fat Files do.

This study analyzed the datasets from 2004 to 2008, in which the information of a new cohort group has been included. Among several files, the RAND HRS File (version K, hereafter RAND) was mainly used. This file was merged with the Fat File in 2004, 2006, and 2008 because the RAND does not include variables relating to religion, namely importance of religion and participation in religion. Each individual has a unique HHIDPN value which consists of household ID (hhid) and a person number (pn); therefore HHIDPN was used as the key variable for merging. All other variables except religion were taken from the RAND file.

Study Sample

Older adults. From the RAND file including all 30,547 respondents from 1992 to 2008, the 20,129 respondents from 2004 to 2008, in wave 7, 8, and 9, were selected. Of those, the number of older adults age 65 and over was 11,786. The older adults were defined as those who had lived for more than 768 months at the interview in 2004.

Decision of Marital Status. The marital status variable in the RAND file included eight categories: married, married but spouse absent, partnered, separated, divorced, separated/divorced, widowed, and never married. Those married, married but spouse absent, and partnered were assigned into the married group. Those widowed were assigned into the widowed group. Those separated, divorced, and separated/divorces were assigned into the third group. Those never married were assigned into the fourth group.

Of 11,786, the 10,482 respondents who were assigned into the married and widowed groups in the first wave were firstly selected, and then changes of marital status across the three waves were examined in order to decide marital status of respondents. Married ones were defined as those who kept their marital status to be married during the waves where they were alive. Widowed ones were defined as those who had been widowed since the first wave or those who changed their marital status from married to widowed during the three waves. For the cases which had only one missing observation for marital status during the three waves, if other two observed marital status of the respondents were the same, the missing marital status was assumed to be the same with the observed marital status. When applying the logistic regression analysis, the results were the same in the sample with the assumed cases and the sample without the cases. The total number of the sample after considering overall marital status and missing cases was 9,956; the number of the married ones was 6,034, and that of the widowed ones was 3,922.

Survival status. All 9,956 respondents in 2004 were alive. Of those, 983 were dead between 2004 and 2006, and 864 were dead between 2006 and 2008; therefore, approximately 81% of the respondents were alive, and 19% were dead between 2004 and 2008.

Considering both marital and survival status, the number of live and married older adults was 5,167 whereas that of live and widowed ones was 2,942. The number of dead and married older adults was 851 while that of dead and widowed ones was 951. The cross tabulation between the marital status and the survival status is shown in Table 1.

Variables

Mortality. Mortality is the dependent variable in this study and was measured as an incidence of death during a 4-year period time, from 2004 to 2008. Survival status was dichotomized into alive and dead.

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Widowhood. Widowhood is an independent variable. Widowhood was defined as a state in which someone lives without a new partner after his or her spouse dies. Widowhood was measured based on someone's marital status. Marital status includes two categories: married and widowed.

Religion. Religion is a moderating variable. In this study, religion was measured by religious preference, participation in religious services, and importance of religion. Religious preference includes five categories: Protestant, Catholic, Jewish, None, and Other. Participation in religious services was coded as follows: 'more than once a week' into 5, 'once a week' into 4, 'two or three times a month' into 3, 'one or more times a year' into 2, or 'not at all' into 1. Importance of religion was coded as follows: 'very important' into 3, 'somewhat important' into 2, or 'not too important' into 1. High scores indicate high involvement of religion.

Control Variables. Demographic, socioeconomic, and health factors were considered to be control variables.

Demographic. Age is a continuous variable. Gender is dichotomized to male and female. Race includes three categories: Caucasian, African-American, and Other (American Indian, Alaskan Native, Asian, and Pacific Islander).

Socioeconomic. Educational attainment is a continuous variable and was measured by years of education.

Health. Health status includes self-perceived health and functional status. Self-perceived health is defined as an individual's response regarding his or her overall health. It is measured by a 5-point scale: excellent, very good, good, fair, and poor. Functional status was measured by the activities of daily living (ADL) and the instrumental activities of daily living (IADL). ADL includes 5 items: bathing, eating, dressing, walking across the room, and getting in or out of bed; IADL also includes 5 items: using a telephone, taking medication, handling money, shopping, and preparing meals. Each item was dichotomized to either need for help (1 point) or no need for help (0 points). Both ADL and IADL were calculated by adding the 5-item points, respectively, ranging from 0 to 5. In all health status variables, higher value means poorer functional status.

Data Analysis

The binary logistic regression analysis was performed. Variables that explain mortality were entered in 6 steps. In step 1, the widowhood variable, indicating whether or not an individual is widowed, was entered. From step 2 to step 4, demographic, socioeconomic, and health status variables were entered in order. In step 5, religious variables such as religious preference, participation in religious services, and importance of religion were entered. Lastly, interaction terms between widowhood and religious variables were entered.

Missing Data Analysis

The impact of missing data across all variables on the analysis was assessed by examining the number of variables missing per case, the number of cases missing per variable, and the correlations among variables. Results showed that the impact of missing data was extremely minimal. First, considering missing data for each case, 99.1 % ($n = 9,869$) of the cases had no missing observations. The cases which have one missing observation were .7 % ($n = 69$), and the cases which have two missing observations were .2 % ($n = 18$). Considering missing data for each variable, five variables had no missing observations. Other variables had missing observations ranging from .04 % ($n = 4$) to .3 % ($n = 29$). Although the correlations between missing observations of some variables (i.e., religious importance and religious participation,

Comment [SE10]: Address why muslim or islamic culture is not represented here since that is a huge population. Was it not an option in the RAND study? If so, mention that.

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Comment [SE12]: Was this a choice based on available options in the dataset? Or did you have a reason for excluding income specifically?

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years of education and religious preference, self-perceived health and religious preference, and ADL and IADL) were statistically significant, the impact of the missing cases was ignorable because the number of the missing observations was remarkably small (less than 1 % of overall cases). Overall, these results indicated that missing observations of this study are well below conventional levels of acceptability.

Results

Descriptive Analysis

As shown in Table 2, 81% of 9,956 respondents were alive, and 19% were dead between 2004 and 2008. 61% of respondents were married while 39% were widowed. A majority of respondents preferred Protestant, 47% of respondents were participated in religious services at least once a week, and 72% considered that religion is very important in their lives. The average age of the sample was 75 years old. Female older adults were a majority of the sample, and most of the respondents were Caucasian. 67% of the respondents reported their health status is good or more than good, 80% of the sample did not experience any functional difficulty because of a health problem.

Logistic Regression Analysis

The binary logistic regression analysis was performed to examine the relationships between widowhood and mortality, considering religious factors. As shown in Table 3, the odds ratio of widowhood was 1.97, which means that the widowed older adults tend to be 1.97 times more likely to die than the married older adults (see Model 1). However, when demographic variables such as age, gender, and race were controlled, the positive effect of widowhood on mortality was no longer significant (see Model 2). The odds ratio of age was 1.13, which indicates that as older adults aged, the risk of mortality increased. The odds ratio of women was less than 1 while that of African-American [individuals](#) was more than 1, which means that men and African-American [individuals](#) had higher risk of mortality than women and Caucasian [individuals](#).

The odds ratio of education was .952, which means that older adults who had higher educational attainment were likely to live longer (see Model 3). However, the negative effect of educational attainment on the risk of mortality was not significant when health status was controlled (see Model 4). The odds ratios of self-perceived health, ADL, and IADL were 1.5, 1.2, and 1.4, respectively. It means for one unit decrease in health status, ~~the~~ older adults tend to be 1.5, 1.2, and 1.4 times more likely to die. That is, older adults who reported healthier health status were likely to live longer. Religious preference was not associated with the risk of mortality, showing no statistical significance, however, participation in religious services and importance of religion were related to the risk of mortality (see Model 5). The odds ratio of participation in religion was .862, which means that older adults who ~~were~~ more often participated in religious services had lower risk of mortality. On the other hand, the odds ratio of religious importance was 1.17, which means that older adults who considered religion more important had higher risk of mortality. The moderating effects of participation in religious services between widowhood and mortality were significant (see Model 6), however, the direction of the effects was not consistent with the hypothesis; the odds ratio of the interaction term of religious participation was 1.21, which indicates that the risk of mortality increased when the widowed older adults ~~were~~ participated in religious services more often.

Discussion

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The relationships between widowhood and the risk of mortality were positively associated, that is, the widowed respondents were likely to die than the married ones. This confirms the results of previous studies (Grundy & Tomassini, 2010; Moon et al., 2011; Stimpson et al., 2007; Sullivan, 2010). However, the positive effects of widowhood on mortality did not last when controlling for demographic variables. Moon et al. (2011) pointed out that the relationships between widowhood and mortality should be understood after controlling for other variables that can mediate and moderate these relationships, such as socioeconomic variables. The results of this study support the importance of controlling for related variables.

The relationships between other variables and mortality were consistent with the results of previous studies. Widowed men demonstrated a higher risk of mortality than widowed women (Lee et al., 2001), and widowhood effects mostly did not differ by race (Carr, 2004). The higher educational attainment was negatively associated with the risk of mortality among older adults (Grundy & Tomassini, 2010; Sullivan, 2010). The fact that the negative effects of education on the risk of mortality were eliminated after controlling for health status indicates that more services to improve older adults' health status should be developed in the field of social work.

The results relating to religion are more complicated. Religious preferences were not associated with the risk of mortality. However, religious participations were negatively related to the risk of mortality, being consistent with the hypothesis. On the other hand, religious importance was positively related to the risk of mortality, being against the hypothesis, which may imply reverse causality. Individuals at the end of life may be likely to think religion is important because most religion emphasize an afterlife. Roff et al. (2007) reported similar results; frequency of service attendance was positively associated with well-being whereas frequency of prayer was negatively associated with well-being. An advanced model which includes time-varying covariates regarding religion and employs more sophisticated longitudinal analysis can suggest the answer about the reverse causality issue.

Regarding the moderating effects of religion, although the interaction effects between religious participation and the risk of mortality were statistically significant, the direction was against the hypothesis. This may indicate that more services and support should be offered to the widowed older adults because the widowed older adults more often participated in religious services could be those with low social support. That is, this could imply that geriatric care and church-based social services need to focus more on widowed older adults. This assumption can be answered by considering additional variables such as social support or social networks.

Overall, the effects of religion were different from the components of religion; religious participation was negatively associated with the risk of mortality whereas religious importance was positively associated with that. Also, the moderating effect of the religious participation was not consistent with the hypothesis. More a more sophisticated longitudinal model needs to be conducted to examine the causal relationships between religion and mortality, and more related variables such as social support should be considered in future studies.

Comment [SE14]: Say more about this and what it confirms.

Comment [SE15]: How does the information you share in the discussion increase our knowledge of older adults? Why is it important to the reader?

Comment [SE16]: Say more here...what does this mean for the reader? How is this useful for professionals or those working with older populations?

Comment [SE17]: Is there a more recent research study?

Comment [SE18]: If they focus on this, what do you think might happen? Clarify why this might be important to nursing, education, social work, etc...

*Competing interests: The author declares that they have no competing interests.

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Table 1
Cross Tab Between Marital and Survival Status

	Alive	Dead	Total
Married	5167 (51.9%)	867 (8.7%)	6034 (60.6%)
Widowed	2942 (29.6%)	980 (9.8%)	3922 (39.4%)
Total	8109 (81.4%)	1847 (18.6%)	9956 (100.0%)

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Table 2
Descriptive Analysis (N=9,956)

Type	Variable	Measurement	N (%)
Dependent	Mortality	Alive	8,109 (81.4)
		Dead	1,847 (18.6)
Independent	Widowhood		
	Marital Status	Married	6,034 (60.6)
		Widowed	3,922 (39.4)
Explanatory	Religion		
	Preference	Protestant	6,445 (64.7)
		Catholic	2,715 (27.3)
		Jewish	255 (2.6)
		No	422 (4.2)
		Other	90 (.9)
		Missing	29 (.3)
	Participation	More than once a week	1,665 (16.7)
		Once a week	2,977 (29.9)
		Two or three times a month	1,062 (10.7)
		One or more times a year	1,885 (18.9)
		Not at all	2,356 (23.7)
		Missing	11 (.1)
	Importance	Very important	7,115 (71.5)
		Somewhat important	1,804 (18.1)
		Not too important	1,018 (10.2)
		Missing	19 (.2)
Control	Demographic		
	Age ^a	Years	75.11 (7.84)
	Gender	Male	4,343 (43.6)
		Female	5,613 (56.4)
	Race	Caucasian	8,499 (85.4)
		African American	1,160 (11.7)
		Other	297 (3.0)
	Socioeconomic		
	Education ^a	Years of education	11.90 (3.34)
		Missing	27 (.3)
	Health		
	Self-perceived health	Excellent	862(8.7)
		Very good	2,614 (26.3)
		Good	3,219 (32.3)
		Fair	2,230 (22.4)
		Poor	1,020 (10.2)

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	Missing	11 (.1)
Functional status		
ADL	0	7,906 (79.4)
	1	911 (9.2)
	2	421 (4.2)
	3	253 (2.5)
	4	212 (2.1)
	5	249 (2.5)
	Missing	4 (.0)
IADL	0	7,959 (79.9)
	1	853 (8.6)
	2	408 (4.1)
	3	225 (2.3)
	4	213 (2.1)
	5	294 (3.0)
	Missing	4 (.0)

Note. ADL = activities of daily living; IADL = instrumental activities of daily living.

^a The variables are continuous, therefore a mean and a standard deviation were shown instead of a number and a percentage.

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Table 3
Odds Ratios from Logistic Regression Analysis of Widowhood and Religion on Mortality (N=9,869)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Widowhood	1.968***	.995	.966	.941	.912	.788
Demographic						
Age		1.132***	1.130***	1.105***	1.106***	1.107***
Female (Reference: Male)		.709***	.706***	.637***	.643***	.640***
Race (Reference: White)						
Black		1.235*	1.099	.879	.898	.891
Other		1.113	.956	.849	.931	.927
Socioeconomic						
Education			.952***	1.008	1.010	1.011
Health Status						
SPH				1.525***	1.493***	1.499***
ADL				1.224***	1.215***	1.213***
IADL				1.403***	1.388***	1.396***
Religion						
Preference (Reference: No)						
Protestant					.945	.954
Catholic					.889	.896
Jewish					.866	.867
Other					.534	.516
Participation					.862***	.789***
Importance					1.165**	1.253**
Interaction						
Widowhood						1.207***
x Participation						
Widowhood						.867
x Importance						

Note. SPH = self-perceived health; ADL = activities of daily living; IADL = instrumental activities of daily living. *p < .05, **p < .01, ***p < .001

WIDOWHOOD, RELIGION, AND MORTALITY

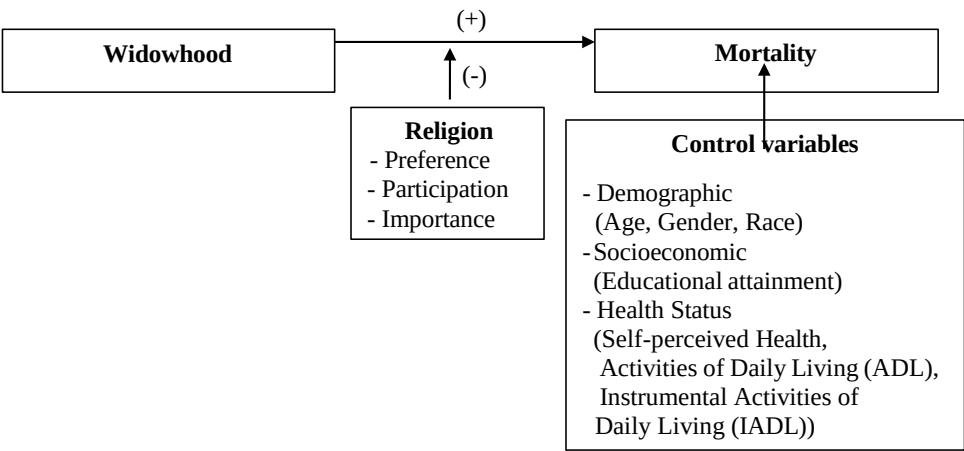


Figure 1. Conceptual framework for the effects of widowhood on mortality, focusing on moderating effects of religion.