



Exploring the Relationship Between Spiritual Well-Being and Death Anxiety in Survivors of Acute Myocardial Infarction: Moderating Role of Sex, Marital Status and Social Support

Mohammad Ali Soleimani¹ · Saeed Pahlevan Sharif² ·
Ameneh Yaghoobzadeh³ · Ken Kyid Yeoh⁴ · Bianca Panarello⁵

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Abstract Previous empirical studies have shown that both spiritual well-being (SWB) and death anxiety (DA) significantly affect the mental health of patients with acute diseases. In this regard, our paper contributes to the extant literature by scrutinizing the conditional relationship between SWB and DA as well as the various mechanisms underpinning such a relationship in patients with acute myocardial infarction (AMI). A descriptive, correlational methodology was utilized. Our main sample consisted of 300 patients with acute myocardial infarction who were hospitalized in a specialized medical institution in Iran throughout a two-month period (i.e. August–October 2015). Patients completed Spiritual Well-Being Scale (SWBS) and Templer’s Death Anxiety Scale (TDAS). Even though our study showed that the relationship between SWB and DA in patients with AMI is non-significant, we found that (1) single patients with higher SWB have lower DA, (2) single

✉ Ameneh Yaghoobzadeh
a.yaghoobzadeh@yahoo.com

Mohammad Ali Soleimani
soleimany.msn@gmail.com

Saeed Pahlevan Sharif
saeed.sharif@taylor.com

Ken Kyid Yeoh
Ken.Yeoh@nottingham.edu.my

Bianca Panarello
b_panarello@hotmail.com

¹ Social Determinants of Health Research Center, Qazvin University of Medical Sciences, Qazvin, Iran

² Taylor’s Business School, Taylor’s University Malaysia, Subang Jaya, Malaysia

³ School of Nursing & Midwifery, Tehran University of Medical Sciences, Tehran, Iran

⁴ Nottingham University Business School, University of Nottingham Malaysia Campus, Jalan Broga, 43500 Semenyih, Selangor Darul Ehsan, Malaysia

⁵ Interpersonal Relationships and Development Laboratory, Psychology Department, Concordia University (PY-205), 7141 Sherbrooke Street, West Montreal, QC H4B 1R6, Canada

patients with higher SWB as well as social support have significantly lower DA, and (3) for single men/men without social support, there is a negative relationship between SWB and DA. The relationship between SWB and DA is influenced by factors such as sex, marital status and social support. In addition, the specific nature of this relationship (i.e. strength and sign) is dependent upon the sociodemographic characteristics of patients as well as other contextual influences. Result revealed that although relationship between SWB and DA is non-significant, this is influenced by factors such as sex and social support. In addition, the specific nature of this relationship (i.e. strength and sign) is dependent upon the sociodemographic characteristics of patients as well as other contextual influences.

Keywords Death anxiety · Spirituality · Myocardial infarction · Conditional effect

Introduction

At the beginning of the twentieth century, cardiovascular diseases collectively caused less than 10% of overall human mortality. However, with increased industrialization across the globe in the past century, the number of people suffering from cardiovascular diseases and the overall impact of these diseases on death rates has increased dramatically. For instance, approximately 1.1 million cases of myocardial infarction occur each year in the USA alone and the rate of mortality has been reported to be close to 30% (Longo et al. 2011). In fact, acute myocardial infarction (AMI) is now the second most common cardiovascular disease in both developed and developing countries worldwide (Basam Pour 2004). Also, half of cardiovascular disease-related deaths are attributed specifically to AMI in Iran (Naghavi and Jafari 2007).

Previous empirical research has shown that AMI is associated with a number of physical and psychological consequences. One of the most common psychological reactions exhibited by patients with AMI is anxiety. The experience of anxiety negatively impacts patients throughout the course of exacerbating the disease as well as during both the physical and the psychological recovery periods (Soleimani et al. 2017). A North American study supported this contention as the researchers involved found that the level of anxiety in patients with AMI was estimated to be 26% more than the level of anxiety experienced by psychiatric patients (An et al. 2004). In addition to anxiety, some patients have also shown signs of denial and depressed affect (Yeganeh Khah et al. 2012). In this regard, our paper contributes to the existing literature by empirically examining a more specific and acute form of anxiety, that is, death anxiety (DA) in patients with AMI.

Another key factor that is potentially important in explaining the DA phenomenon exhibited by patients is their spirituality and spiritual well-being (SWB). Both spirituality and SWB make up the fundamental psychological/psychosocial elements of a typical individual where his/her association with the self, the community, the environment and religious beliefs may have a profound impact (both positive and negative) on his/her outlook on life and therefore his/her susceptibility to DA (Yaghoobzadeh et al. 2017). We posit that these elements are especially influential in instances where patients suffer from life-threatening diseases such as AMI. Due to the fact that DA and SWB have such a significant impact on overall patient well-being, more research is needed to determine the nature of the SWB-DA relationship as well as to identify related moderating factors, especially in patients with acute and/or chronic diseases. Our paper addresses this gap in the literature.

Death anxiety describes an individual's fear that arises from his/her own perception of his/her own death and/or dying process. DA appears when people are faced with

intimidating diseases or stressors that may cause them to perceive that death is approaching (Sherman et al. 2010). This psychological phenomenon negatively impacts many different aspects of the lives of those who suffer from it (both clinical and non-clinical). For instance, past research has shown that a number of psychiatric disorders such as depression, panic disorders and post-traumatic stress disorder are associated with high DA (Anvar et al. 2012; Soleimani et al. 2016). Worrying excessively about death can also negatively affect patients in terms of their relationships with others. One typical consequence is that they start distancing themselves from their caregivers (Bachner et al. 2011). Consistent with the line of argument above, the often life-threatening conditions that some AMI patients face do heighten their fear and anxiety relating to mortality quite considerably.

In terms of causal factors, DA has been linked to an individual's personal demographic characteristics such as gender and age. More specifically, previous empirical studies have shown that females exhibit higher death anxiety than males (Soleimani et al. 2016, 2017; Madnawat and Kachhawa 2007; Pierce et al. 2007). Moreover, researchers have found that age has a significant relationship with DA (Ghorbanalipoor et al. 2010; Maxfield et al. 2007). One exception is a study by Neimeyer et al. (2004) who reported a low but significant negative correlation between age and DA. They concluded that age alone is not a strong predictor for DA.

Apart from individual characteristics, many researchers have argued that DA may also be influenced by the beliefs and attitudes that are formed from a person's collective life experiences. As an individual's cultural, social and philosophical belief systems change and evolve over the course of his/her lifetime, so does the impact of DA on the individual over the years (Neimeyer et al. 2004; Peters et al. 2013). Also, religiosity has been identified as an antecedent of DA (Anvar et al. 2012). In this regard, researchers such as Krause and Hayward (2014) have scrutinized different aspects of religiosity including intrinsic versus extrinsic religiosity, being faithful and religious promising in life, in terms of their respective influences on DA.

Spirituality consists of religious beliefs as well as inner personal potential that patients often draw upon in framing their thinking in a more positive manner and also to focus on the goodness of life. Unsurprisingly then, Spirituality has often been described as a sense of peace, unity, harmony, purpose and meaning with one's life. It may likely have beneficial effects on reducing psychological distress and promoting quality of life in patients with chronic conditions (Kim et al. 2007). On the other hand, SWB is a sort of "mental healthiness" that arises from the affirmation of one's life through meaningful associations with God, the self, the community and his/her surrounding environment. The intricate balance between values, goals, beliefs and relationships with the self and with others is a key part of SWB. It also considered to be a psychosocial element and the embodiment of an individual's feelings; who he/she is, what he/she is doing and why, and where he/she belongs.

Both spiritual attitude and SWB play a fundamental role in terms of how individuals deal with the concept of death by influencing their understanding and vision of this morbid phenomenon (Soleimani et al. 2016; Yaghoobzadeh et al. 2017). For instance, scholars have argued that spirituality and SWB bring a sense of hope to individuals who are nearing death (Hadzic 2011). Previous studies have found that spirituality is indeed highly correlated with one's "relationship" with God, finding meaning in life, etc. Moreover, individuals who register high levels of SWB are much more likely to accept death as a natural process in life. In fact, for these people, death itself provides a sense of meaning in life (i.e. awareness of the inevitability of death as an existential crisis encourages them to find the real meaning of life and to accept death rather than experiencing excessive anxiety in

anticipation of it). Therefore, spirituality develops a sense of purpose and self-efficacy in individuals, aside from creating positive mental space, joy and hope which all serve to decrease anxiety relating to death (Moetamedi et al. 2015). Some studies have found that the positive effects of both spirituality and SWB persist even while patients endure illness-imposed symptoms (Jahani et al. 2014). Therefore, we posit that overall SWB is potentially significant in determining DA.

Empirically, many studies have shown that SWB is a predictive factor in determining mental health as well as medical distress (Bickerton et al. 2015; Lanfredi et al. 2014; Martinez and Custodio 2014). More specifically, individuals who lack SWB are more likely to exhibit signs of mental confusion, anxiety, depression and loss of meaning of life (Khademvatani et al. 2015). Despite the findings mentioned above, further exploration of the related literature that examines the relationship between SWB with DA has uncovered a number of inconsistencies and conflicting findings (Wen 2010). Several studies have demonstrated that there is a negative relationship between SWB and DA across different groups and contexts, namely among (1) female and male undergraduate college students in the USA (Rasmussen and Johnson 1994), (2) elderly people in Korea (Kim et al. 2010), (3) elderly males in Iran (Moetamedi et al. 2015), (4) advanced-stage cancer patients in India (Shukla and Rishi 2014) and (5) cancer patients in Iran (Khezri et al. 2015). Furthermore, other empirical research found a non-significant relationship between SWB and DA. These studies were conducted on (1) American elderly people (Wink 2006), (2) US funeral directors/embalmers (Harwood 2010) and (3) female breast cancer survivors living in the USA (Creary 2011).

The mixed and inconclusive findings above can be due to the complex mechanisms that underpin this key relationship. Consequently, we postulate that the strength (or even the direction) of this relationship may largely depend on specific contextual and sociocultural characteristics of the chosen samples. Since conditional studies on this relationship are scarce, little is known about “how” and “under which condition” spiritual well-being may contribute significantly to death anxiety. Although some studies have examined the direct relationship between DAS and SWB in patients who are suffering from other chronic diseases in Iran (Anvar et al. 2012; Momeni et al. 2013), no studies conducted with patients with AMI were found. Thus, this study aims to explore the relationship between spiritual well-being and death anxiety in Iranian patients with AMI by developing a conditional effect model.

Apart from selecting AMI patients, we argue that the predictive power of SWB on DA merits empirical scrutiny particularly in countries such as Iran. This is because of the distinct cultural context that our chosen setting provides where the spiritual and SWB aspects (therefore, effects) are “amplified” as they form an integral part of everyday life. More specifically, according to culture and religious doctrine of the Persian people, human beings (as God’s creatures) are made up of physical, mental, emotional, cultural, social, spiritual and environmental dimensions (Omidvari 2008). Iranian Muslims consider praying to be one important way to communicate with God, through which they seek justice, divine guidance, submit petitions, and to strengthen their resolve for dealing with stressful incidents. In general, the Iranian people practice their religious rituals on a daily basis to achieve higher levels of spirituality. Such rituals, including almsgiving, attending spiritual events, and holy shrines, respecting other religions (such as Christianity, Judaism, etc.), taking part in religious activities such as repeating prayer verses, are means by which the people develop a sense of life satisfaction, promote their overall spiritual health, and create a better relaxation and “spiritually guided” approach to cope with diseases and life issues (Jahani et al. 2014).

Methods

Participants

A descriptive, cross-sectional correlational design was used to examine the relationship between DA and SWB. A convenience sampling approach was adopted in order to gather the final sample, which consisted of patients who were hospitalized in a specialized, governmental and referral hospital over a two-month period (i.e. between August and October 2015). In addition, survey respondents were evaluated using the following inclusion criteria: each respondent must (1) be suffering from acute myocardial infarction based on ECG results, presence of known cardiac enzymes and other forms of universally accepted medical diagnosis technique(s) carried out by qualified doctors; (2) have not exhibited signs of, or, diagnosed with, known psychological problems such as anxiety and depression for a period of at least 4 weeks prior to our survey date; and (3) have stable vital signs. Our final sample consisted of 300 respondents, and the overall response rate was 83.7%.

In terms of the practical procedures that were adopted when the data collection took place, it was ensured that all patients under scrutiny had been hospitalized for at least 24 h and also that they recorded stable vital signs and cardiac hemodynamics. Typically, patients were selected post-discharge from the respective hospitals' Cardiac Care Units (CCUs). When carrying out our survey, we strived to ensure that we do not threaten or jeopardize the health of the affected patients.

Measures

The questionnaire consisted of three main sections that focused on the following aspects: (1) basic demographics, (2) death anxiety, mainly through the inclusion of a 15-item Templer Death Anxiety Scale (TDAS) and (3) spiritual well-being, using a known Spiritual Well-Being Scale (SWBS). More specifically, questions in the first section were used to gather information about each patient's age, sex, marital status, education level, socio-economic status and main source of income. Data relating to the participants' perception of death, social support and religious behaviours were collected. The perceived level of social support and religiosity was measured with empirically validated scales that were developed by nursing researchers. We, however, adapted and simplified the aforementioned scales in order to avert the potential burden to our respondents, especially since they were suffering from AMI. For each item within the measurement scales, participants were asked to rate them using a 10-point Likert-type scale. For example, they were required to indicate the strength of their religious belief on a scale from 1 to 10 (1 = the weakest, 10 = the strongest) and the amount of social support they received from 1 to 10 (1 = the least, 10 = the most).

The 15-item Templer Death Anxiety Scale (TDAS) was used to measure each patient's overall level of DA. The TDAS, developed by Templer in 1970, was chosen because it is a well-established tool and it is recognized internationally. In fact, the TDAS has been translated into several languages and is the most commonly used DA instrument (Templer 1970). Each item was measured from 1 (completely disagree) to 5 (completely agree); therefore, possible total scores ranged from 15 to 75 (McMordie 1979). In terms of interpretation, lower scores indicated lower levels of DA. Within the context of Iran, the TDAS has been used and normalized by past researchers who also found consistently high

validity and reliability in relation to the cultural and social context (Sharif Nia et al. 2017; Soleimani et al. 2016). Furthermore, Cronbach's Alpha for the 15-item DA scale was .794 indicating satisfactory internal consistency.

In order to measure SWB, the scale designed by Paloutzian and Ellison (1982) was chosen. This scale is mainly used as a general indicator of perceived well-being as previous researchers have made use of it for the assessment of both individual and congregational SWB. This is primarily due to the fact that it provides an overall measure of the perception of spiritual quality of life. More specifically, this scale is comprised of two distinctive subscales, that is, religious well-being and existential well-being. The religious well-being subscale (consisting of 10 items) provides a self-assessment of one's relationship with God, while the existential well-being subscale (also made up of 10 items) gives a self-assessment of one's sense and purpose in life and life satisfaction (Bufford et al. 1991). Unlike the TDAS however, the SWB scale uses a 6-point Likert-type scale ranging from completely disagree (1) to completely agree (6).

For the SWB scale in the current study, negative questions were reverse-scored (i.e. for items 1, 2, 5, 6, 9, 12, 13, 16 and 18). The range of possible scores for each, the religious as well as the existential subscales, was between 10 and 60. A higher score indicated higher religious and existential "health". The overall validity and reliability of this SWB scale have been well established by past empirical studies across different contexts (Soleimani et al. 2016a, b; Yaghoobzadeh et al. 2017). In this regard, our corresponding Cronbach's alpha score was .826 which is very similar to those reported by past studies which is typically more than 0.8 (Riley et al. 1998).

Statistical Analysis

The statistical package for social sciences, version 23.0 (SPSS Inc., Chicago, IL, USA) and PROCESS were utilized for the data analysis procedure. Descriptive statistics for continuous variables were shown as means with standard deviation (SD) and n (%) for the categorical variables. Single dummy variables were created for sex, marital status (single/widowed reference versus married), education (e.g. guidance school or less, high school graduate, college graduate, etc.), socio-economic status (e.g. lower income, middle and upper income levels) and history of "near" death experiences (yes/no). Pearson correlation was used to examine the relationships between the chosen variables. Subsequently, the relationship between DA and SWB was examined using conditional process analysis. Statistical significance was set at $p < 0.05$ for all of the analysis procedures.

Results

Please refer to Table 1 for the demographic information regarding the main sample of respondents. A majority of them were married (81.3%) with a mean age of 59.89 years. Approximately 47.7% were male and the remaining 52.3% were female.

Table 2 demonstrates the relationship between the variables using Pearson correlation analysis. A significant negative association was found between age and DA ($r = -.161$, $p < .01$). Moreover, age had a significant positive relationship with religious belief ($r = .183$, $p < .01$) and an almost significant positive relationship with religious well-being ($r = .108$, $p = .06$). Collectively, our findings suggest that respondents tend to become more religious and their DA decreases as they grow older.

Table 1 Demographic characteristics of the study participants

Demographic characteristics		N (%)
<i>Sex</i>		
	Male	143 (47.7)
	Female	157 (57.3)
<i>Marriage</i>		
	Single	5 (1.7)
	Married	244 (81.3)
	Widowed	51 (17)
<i>Employment</i>		
	Yes	119 (36.1)
	No	211 (63.9)
<i>Educational status</i>		
	No formal education	155 (51.7)
	Primary	69 (33)
	Intermediate	30 (10)
	High school	36 (12)
	Collegiate	10 (3.3)
<i>Economic status</i>		
	Poor	71 (23.7)
	Average	213 (71.0)
	Good	16 (5.3)
<i>Main source of income</i>		
	Personal	129 (43)
	Family	26 (8.7)
	Friends	3 (1)
	Pension from the government	117 (39)
	Charity	25 (8.3)
<i>Death experiences</i>		
	Yes	18 (6)
	No	282 (94)
		Mean (SD), range
Age	Age of subject	59.89 (11.94), 22–96
Social support		6.32 (2.76), 0–10
Religious belief		9.08 (1.47), 0–10
Death anxiety score	Total death anxiety scale	44.61 (11.24), 19–75
Spiritual well-being	Total spiritual well-being	96.24 (11.84), 40–116
	Religious well-being	57.81 (5.70), 10–60
	Existential well-being	38.38 (9.24), 16–56

Table 2 Correlation between the research variables

	Age	Sex	Marital status	Death experience	Education	Social support	Religious belief	Religious well-being	Existential well-being	Spiritual well-being	Death anxiety
Age	1										
Sex	-.044	1									
Marital status	-.160**	-.183**	1								
Death experience	.018	.152**	-.085	1							
Education	-.291***	-.212***	.172**	-.065	1						
Social support	.142	.083	.069	.019	.063	1					
Religious belief	.183**	.143*	-.073	-.005	-.279***	.120*	1				
Religious well-being	.108	.096	-.032	.088	-.138*	.054	.401***	1			
Existential well-being	-.086	.043	.114*	-.034	.154**	.250***	-.028	.213**	1		
Spiritual well-being	-.012	.076	.075	.017	.050	.218***	.173**	.648***	.880***	1	
Death anxiety	-.161**	.199**	-.004	.061	-.005	-.030	-.059	-.036	-.064	-.074	1

* $p < .05$; ** $p < .01$; *** $p < .001$

Next, it was found that females were relatively more religious ($r = .143, p < .05$) and also had higher DA ($r = .199, p < .01$) compared to their male counterparts. In general, respondents who were married had higher existential well-being ($r = .114, p < .05$). On the other hand, respondents who were illiterate exhibited significantly higher religious belief ($r = -.279, p < .001$), higher religious well-being ($r = -.138, p < .05$) and lower existential well-being ($r = .154, p < .01$) when compared to those who were literate. We also found a significant positive relationship between social support and religious belief ($r = .120, p < .05$), existential well-being ($r = .250, p < .001$) and SWB ($r = .218, p < .001$). Finally, religious belief was positively associated with both religious well-being ($r = .401, p < .001$) and SWB ($r = .173, p < .01$). Contrary to our earlier prediction, we were unable to find any significant relationship between DA and other variables.

Table 3 reports the results of the multiple regression test that was carried out in order to determine the predictors of DA. In this regard, age ($b = -.134, p < .05$) and sex ($b = 4.585, p < .01$) were the only significant predictors and the model's $R^2 = .075, F(7, 292) = 3.36, p < .01$. In line with our earlier Pearson correlation test, male respondents reported lower DA. Once again, DA decreased as age increased.

Table 4 presents the results of the potential predictors of SWB. It was found that social support ($b = .866, p < .001$) and religious belief ($b = 1.233, p < .01$) significantly predicted SWB, $R^2 = .079, F(6, 291) = 4.16, p < .01$.

Moderated Regression Analysis

A two-stage, PROCESS procedure was used to explore (1) the moderating effect of sex, marital status and social support and (2) their three-way interaction on the relationship between SWB and DA. Put simply, we examined whether the strength or direction of the relationship between SWB and DA depended on other variables or their interactions (Hayes 2013). Moderation analysis was used to determine “when” or “for whom” there was a significant relationship between SWB and DA or otherwise (Frazier et al. 2004; Jaccard and Turrisi 2003).

As per Fig. 1, six models were developed to test the aforementioned moderation(s) effects. The first three models tested the moderating effect of sex (model 1), marital status (model 2) and social support (model 3) on the relationship between SWB and DA. The

Table 3 Multiple regression model for predicting death anxiety

	<i>b</i>	SE	β	<i>p</i> value
$R^2 = 7.5\%$; adjusted $R^2 = 5.2\%$; $F(7, 292) = 3.36, p < .01$; maximum VIF = 1.098, Durbin-Watson = 2.035				
Age	-.134*	.056	-.142	.017
Sex	4.585**	1.326	.204	.001
Marital status	.477	1.693	.017	.779
Death experience	1.676	2.700	.035	.535
Social support	-.018	.240	-.004	.940
Religious belief	-.350	.450	-.046	.437
Spiritual well-being	-.080	.056	-.084	.153

* $p < .05$; ** $p < .01$

Table 4 Multiple regression model for predicting spiritual well-being

	<i>b</i>	SE	β	<i>p</i> value
$R^2 = 7.9\%$; adjusted $R^2 = 6.0\%$; $F(6, 291) = 4.16, p < .01$; maximum VIF = 1.165, Durbin-Watson = 1.783				
Age	− .048	.060	− .049	.423
Sex	1.072	1.410	.045	.448
Marital status	− 1.038	.937	− .067	.269
Death experience	.572	2.828	.012	.840
Social support	.866***	.246	.203	.000
Religious belief	1.233**	.466	.154	.009

** $p < .01$; *** $p < .001$

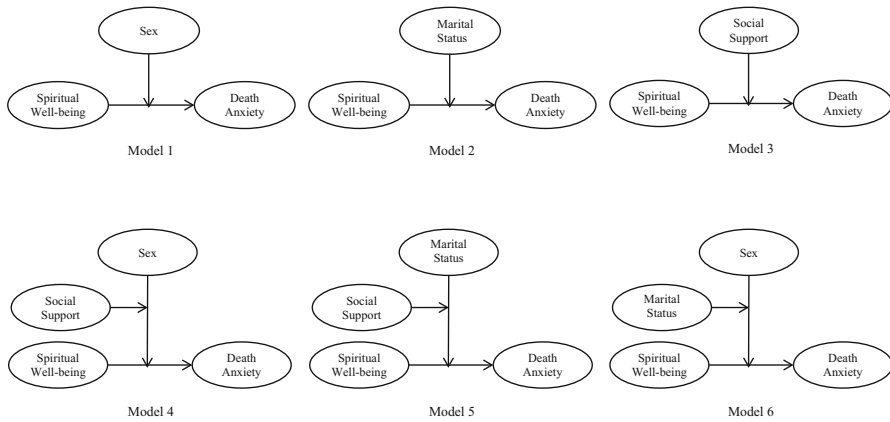


Fig. 1 (Moderated) moderation effect models

remaining were conditional models designed to test the moderating effect of these variables. More specifically, model 4 tested the interaction effect of social support on the moderating role of sex on the relationship between SWB and DA. In model 5, marital status was the primary moderator and social support was the secondary moderator. Finally, model 6 tested the three-way interactions of marital status and sex on the relationship between SWB and DA. The test results for these six models are reported in Tables 5 and 6. Below is a summary of the results.

Model 1

As shown in Table 3, we did not find any significant relationship between SWB and DA in both male ($b = - .1212, p = .107$) and female ($b = - .046, p = .554$) respondents and the difference between these two subgroups was not significant at 95% confidence level ($b = .075, p = .489$).

Table 5 The results of the interaction model for the relationship between spiritual well-being and death anxiety

	<i>b</i>	SE	<i>p</i>	95% confidence intervals	
				Lower bound	Upper bound
<i>Model 1. Moderator: sex</i>					
$R^2 = 4.92\%$, $F(3, 296) = 5.11$, $p < .05$; ΔR^2 due to interaction (<i>s</i>) = .15%, $F(1, 296) = .48$, $p = .49$					
Sex	− 2.581	10.492	.806	− 23.230	18.067
Spiritual well-being	− .196	.169	.247	− .529	.136
Sex × spiritual well-being	.075	.108	.489	− .138	.288
Subgroup analysis					
Spiritual well-being _{male}	− .121	.075	.107	− .269	.026
Spiritual well-being _{female}	− .046	.078	.554	− .200	.107
<i>Model 2. Moderator: marital status</i>					
$R^2 = 1.87\%$, $F(3, 296) = 1.88$, $p = .13$; ΔR^2 due to interaction(<i>s</i>) = 1.32%, $F(1, 296) = 3.99$, $p < .05$					
Marital status	− 26.086	13.173	.049	− 52.011	− .162
Spiritual well-being	− .291	.123	.019	− .534	− .048
Marital status × spiritual well-being	.275	.138	.047	.004	.546
Subgroup analysis					
Spiritual well-being _{single}	− .291	.123	.019	− .534	− .048
Spiritual well-being _{married}	− .016	.061	.796	− .137	.105
<i>Model 3. Moderator: social support</i>					
$R^2 = .57\%$, $F(3, 296) = .56$, $p = .64$; ΔR^2 due to interaction(<i>s</i>) = .00%, $F(1, 296) = .00$, $p = .99$					
Social support	− .073	1.831	.968	− 3.675	3.530
Spiritual well-being	− .068	.129	.595	− .321	.185
Social support × spiritual well-being	.000	.019	.993	− .037	.037
Subgroup analysis (Johnson–Neyman’s technique)					
There are no statistical significance transition points within the observed range of the moderator					

Model 2

Marital status moderated the relationship between SWB and DA ($b = .275$, $p < .05$) at 95% confidence level, meaning that the relationship between SWB and DA was significantly different between single ($b = − .291$, $p < .05$) and married ($b = − .016$, $p = .796$) respondents. Put simply, while there was a significant negative relationship between SWB and DA for single respondents, this study was unable to demonstrate any significant relationship for married ones (i.e. the difference between these two subgroups was significant).

Table 6 The results of the three-way interaction model for the relationship between spiritual well-being and death anxiety

	<i>b</i>	SE	<i>p</i> value	95% confidence intervals	
				Lower bound	Upper bound
<i>Model 4. Primary moderator: sex, secondary moderator: social support</i>					
$R^2 = 7.96\%$, $F(7, 292) = 3.61$, $p < .05$; ΔR^2 due to interaction(s) = 2.94%, $F(1, 292) = 9.31$, $p < .05$; Johnson–Neyman’s significance region: social support < 4.704					
Social support	– 15.595	5.495	.005	– 26.409	– 4.780
Spiritual well-being	– 1.195	.388	.002	– 1.959	– .432
Social support × spiritual well-being	.164	.057	.005	.051	.277
Sex	– 67.922	23.786	.005	– 114.737	– 21.107
Sex × spiritual well-being	.772	.252	.002	.277	1.267
Sex × social support	10.763	3.582	.003	3.712	17.814
Spiritual well-being × sex × social support	– .113	.037	.002	– .1865	– .040
Johnson–Neyman’s significance region: social support < 4.704					
Sexsocial support < 4.704	– 65.445	23.763	.007	– 112.754	– 18.137
Spiritual well-beingsocial support < 4.704	– 1.174	.395	.004	– 1.960	– .387
Spiritual well-being × sexsocial support < 4.704	.773	.253	.003	.269	1.278
Sexsocial support ≥ 4.704	21.110	10.959	.055	– .492	42.712
Spiritual well-beingsocial support ≥ 4.704	.175	.175	.318	– .170	.520
Spiritual well-being × sexsocial support ≥ 4.704	– .177	.112	.115	– .397	.044
Subgroup analysis					
Spiritual well-beingsocial support < 4.704 and male	– .400	.175	.025	– .749	– .052
Spiritual well-beingsocial support < 4.704 and female	.373	.183	.045	.009	.738
Spiritual well-beingsocial support ≥ 4.704 and male	– .001	.078	.987	– .155	.152
Spiritual well-beingsocial support ≥ 4.704 and female	– .178	.080	.027	– .336	– .020
<i>Model 5. Primary moderator: marital status, secondary moderator: social support</i>					
$R^2 = 2.10\%$, $F(7, 292) = .90$, $p = .51$; ΔR^2 due to interaction(s) = .00%, $F(1, 292) = .40$, $p = .53$;					
Social support	2.760	3.629	0.448	– 4.383	9.902
Spiritual well-being	– 0.152	0.226	0.502	– 0.596	0.292
Spiritual well-being × social support	– 0.029	0.038	0.450	– 0.104	0.046
Marital status	– 13.240	25.766	0.608	– 63.951	37.471
Spiritual well-being × marital status	0.146	0.275	0.598	– 0.396	0.687
Social support × marital status	– 2.773	4.236	0.513	– 11.110	5.564
Spiritual well-being × social support × marital status	0.028	0.044	0.527	– 0.059	0.115
Johnson–Neyman’s significance region: social support > 4.986					
Marital statussocial support > 4.986	– 34.324	15.984	0.033	– 65.830	– 2.828
Spiritual well-beingsocial support > 4.986	– 0.398	0.154	0.010	– 0.701	– 0.095

Table 6 continued

	<i>b</i>	SE	<i>p</i> value	95% confidence intervals	
				Lower bound	Upper bound
Spiritual well-being × marital statussocial support > 4.986	0.369	0.165	0.027	0.043	0.695
Marital statussocial support ≤ 4.986	− 22.930	26.537	0.390	− 75.761	29.902
Spiritual well-beingsocial support ≤ 4.986	− 0.146	0.229	0.524	− 0.601	0.309
Spiritual well-being × marital statussocial support ≤ 4.986	0.233	0.284	0.416	− 0.333	0.799
Subgroup analysis					
Spiritual well-beingsocial support ≤ 4.986 and single	− 0.146	0.229	0.524	− 0.601	0.309
Spiritual well-beingsocial support ≤ 4.986 and married	0.086	0.169	0.612	− 0.251	0.424
Spiritual well-beingsocial support > 4.986 and single	− 0.398	0.154	0.010	− 0.701	− 0.095
Spiritual well-beingsocial support > 4.986 and married	− 0.029	0.061	0.632	− 0.149	0.091
<i>Model 6. Primary moderator: sex, secondary moderator: marital status</i>					
$R^2 = 10.28\%$, $F(7, 292) = 4.78$, $p < .05$; ΔR^2 due to interaction(s) = 1.03%, $F(1, 292) = 3.34$, $p = .06$					
Marital status	− 110.819	42.517	0.010	− 194.497	− 27.142
Spiritual well-being	− 1.011	0.427	0.019	− 1.852	− 0.170
Marital status × spiritual well-being	1.038	0.465	0.026	0.123	1.953
Sex	− 47.478	23.738	0.046	− 94.197	− 0.758
Sex × spiritual well-being	0.480	0.256	0.062	− 0.025	0.984
Sex × marital status	57.618	26.392	0.030	5.675	109.561
Spiritual well-being × sex × marital status	− 0.516	0.282	0.069	− 1.072	0.039
Subgroup analysis					
Spiritual well-beingmale and single	− 0.532	0.197	0.008	− 0.920	− 0.143
Spiritual well-beingmale and married	− 0.010	0.081	0.904	− 0.169	0.150
Spiritual well-beingfemale and Single	− 0.052	0.164	0.752	− 0.374	0.270
Spiritual well-beingfemale and married	− 0.047	0.086	0.590	− 0.216	0.123

Model 3

No empirical support for the predicted moderating role of social support on the relationship between SWB and DA was found ($b = .000$, $p = .993$). Next, the Johnson–Neyman technique developed by Johnson and Neyman (1936) was used to identify the regions of significance (or non-significance) at $\alpha = .05$ (Hayes 2015). However, we could not find any statistical significance transition points within the observed range of the moderator.

Model 4

Table 5 shows the three-way interaction between SWB, sex and social support. We found that the interaction was negative and significant at the 95% confidence level ($b = -.113$, $p < .01$). This means that social support negatively moderated the moderating effect of sex on the relationship between SWB and DA. The results of Johnson–Neyman technique showed that when social support was less than 4.704, sex positively moderated the relationship between SWB and DA ($b = .773$, $p < .01$). Next, we divided the samples into two subgroups, i.e. low social support (social support < 4.704) and high social support (social support ≥ 4.704), and the moderating effect of sex on the relationship between SWB and DA was tested for each subgroup separately. The results showed that when social support was low, while the conditional effect of SWB on DA was negative and significant for male respondents ($b = -.400$, $p < .05$), it was positive and significant for female respondents ($b = .373$, $p < .05$). Moreover, the difference between male and female respondents was significant ($b = .773$, $p < .01$). Put simply, by increasing SWB in male respondents who experienced low social support, their DA decreased. On the other hand, in females who experienced low social support, there was a positive relationship between SWB and DA. When social support was high, the conditional effect of SWB on DA in the female subgroup was negative and significant ($b = -.178$, $p < .05$). However, this was not significantly different from male respondents ($b = -.001$, $p = .987$).

Model 5

The three-way interaction of SWB, marital status and social support shown in model 5 was not significant at the 95% confidence level ($b = .028$, $p = .527$). However, the results of the Johnson–Neyman technique showed that when social support was greater than 4.986, marital status positively moderated the relationship between SWB and DA ($b = .369$, $p < .05$). Next, the interaction effect of marital status on the relationship between SWB and DA was tested by using the samples of two subgroups of low (social support ≤ 4.986) and high (social support > 4.986) social support separately. For low social support (social support ≤ 4.986), we could not find any significant relationship between SWB and DA in both the single ($b = -.146$, $p = .523$) and married ($b = .086$, $p = .611$) subgroups. Furthermore, the difference between these two subgroups was not significant ($b = .232$, $p = .416$). On the other hand, when there was a high level of social support (social support > 4.986), for single respondents, there was a significant negative relationship between SWB and DA ($b = -.398$, $p < .05$) which was significantly different from married respondents ($b = -.029$, $p = .631$). In other words, single respondents with high social support who had higher SWB experienced significantly lower DA.

Model 6

The results reported in Table 5 show that the three-way interaction of SWB, marital status and sex was quasi-significant ($b = -.516$, $p = .0068$). Then, the samples were divided into four subgroups (2 marital status \times 2 sex); the relationship between SWB and DA in each group was tested separately. For single male respondents, the relationship between SWB and DA was negative and significant ($b = -.531$, $p < .01$) and this was almost significantly different from married male ($b = -.010$, $p = .904$), single female ($b = -.052$, $p = .751$) and married female ($b = -.046$, $p = .590$) subgroups

($b = -.516$, $p = .0068$). Put simply, this study found a negative relationship between SWB and DA in single male respondents.

Discussion

The current study explored the relationship between SWB and DA in patients with AMI as well as examined the predictive factors for these two variables. Similar to past empirical studies in this area (Harrowood 2010; Rasmussen and Johnson 1994), the relationship between DA and SWB in AMI patients was found to be non-significant. This finding, however, runs contrary to those of Khezri et al. (2015), Anvar et al. (2012) and Otoom et al. (2007) who all reported a significant inverse relationship between DA and SWB (Anvar et al. 2012; Khezri et al. 2015; Otoom et al. 2007). Such contradictory findings may be due to differences in (1) the kinds of acute or chronic diseases under scrutiny (i.e. this study included patients with AMI, while other studies have focused on other chronic diseases) (Khezri et al. 2015; Kim and Lee 2013) and/or (2) the kinds of patients sampled (Maxfield et al. 2007). Another possibility is that contextual and cultural distinctiveness fundamentally influences one's perception/perspective of the experience of death.

The results showed that, in a population of patients with AMI, age had a significant negative relationship with DA and it was also reported as one of its predictors. Similarly, Suhail and Akram (2002) and Maxfield et al. (2007) showed that there was a negative relationship between age and DA (Maxfield et al. 2007; Suhail and Akram 2002). Even so, the results of some previous nursing studies did not support a significant relationship between age and DA (Aghajani et al. 2010; Anvar et al. 2012). Based on our findings, it seems that raising awareness about the possibility of death and also anxiety related to death may cause older patients to adopt age-appropriate strategies to cope with the death phenomenon as well as the anxiety associated with it. Also, ageing itself enables one to become familiar with the reality that death will eventually occur, which make ones more likely to accept the fact that it is inevitable (Heckhausen and Schulz 1995).

Next, sex was found to be another significant predictor of DA in patients. In fact, women reported higher DA than men. Various research findings demonstrated that women were indeed more concerned about death (Masoudzadeh et al. 2008; Schumaker et al. 1991), despite the fact that few studies have failed to uncover a correlation between DA and sex (Aghajani et al. 2010; Khezri et al. 2015). The inconclusive results obtained thus far may be due to differences in the respondents' culture, religion and customs as each study extracts samples from a different community. As a result of the various roles played/assumed by men and women and the stereotype that society has about how both genders express fear and anxiety differently, the DA experience may vary significantly. For instance, it has been said that men are less willing to express emotions such as anxiety and fear (Aghajani et al. 2010). On the other hand, women can express their stress and anxiety, especially DA, more freely than men (Fink 2000).

The participants in this study showed a significant positive relationship between social support, religious belief and SWB. Also, social support and religious belief were found to be two major predictors of SWB in patients with AMI. Religiosity, SWB and health had strong relationships with each other (Argyle 2001). In this regard, SWB/spirituality can be seen as a coping mechanism that aids patients in dealing with anxiety and stress more effectively. It is apparent that religious and spiritual practices meet the inherent needs of people for dependency, relationship and support, as well as reduce anxiety and depression

(i.e. provision of a sense of security). Moreover, religious and spiritual behaviours decrease the effects of traumatic stress through the establishment of support networks. Therefore, SWB and religious beliefs can be used as a buffer which regulate (balance) psychological distress or life suffering situations, in addition to providing a sense of control over these situations (Dabbaghi 2009).

In terms of moderated regression analysis, our findings showed that sex was not an effective factor on the correlation between DA and SWB. This means that the present study could not support a significant relationship between DA and SWB in both sexes. It is worth noting that ours is the first study to investigate the effect of sex on the association between these two main variables. However, some studies in this field have reported levels of DA and SWB in both sexes separately (i.e. they only stated the direct relationship between these two variables). For example, the results of various studies have failed to find a significant relationship between DA and sex (Aghajani et al. 2010; Khezri et al. 2015). Ossarodi et al. (2012) showed that the mean score of SWB was not significantly different between the two sexes (Osarodi et al. 2012).

The results of the second model showed a negative correlation between DA and SWB in AMI patients who are single, whereas no significant relationship was found among married couples. Hence, single people have greater DA than those who are married (Rezaei et al. 2008). This finding is consistent with past empirical studies that have uncovered that SWB is directly linked with marital status (Hojjati et al. 2010; Sadrollahi and Khalili 2015). Yet again, ours is the first study to investigate the effect of marital status on the relationship between SWB and DA. We contend that married people have a number of support systems including their spouse and children, which may lead to peace of mind and reduced feelings of DA. On the other hand, single people are more likely to be deprived of the aforementioned support.

It seems that SWB plays a role in reducing DA in married patients with AMI. This means that single people use SWB as an alternative to the supportive typically received from a spouse or a child in order to reduce their DA. Higher SWB is associated with lower DA in unmarried patients. Perhaps SWB/spirituality is an essential psychosocial element that helps patients deal with DA (i.e. reduce the fear of death).

The results of the third model showed that social support has no significant impact on the relationship between DA and SWB. This is rather unexpected as people with higher social support are generally better in terms of coping with the various stresses of life (Sadeghi et al. 2015). As expected, SWB causes a person to feel a superior force which protects him/her and gives him/her attention. It also leads to a better relationship with others and increases the supportive resources of the individual. Spiritual well-being increased confidence, compatibility and effective coping with mental health problems, as well as raised the adaptation of the individual against life events by increasing self-awareness, communicating and bonding with others, and receiving social support from them (Narimani et al. 2014). Therefore, finding no relationship between social support and these two variables may be due to the presence of other moderators that were present in this study.

In the fourth model, men with low social support had a tendency to resort to spirituality as a mechanism in order to reduce anxiety. This is in line with the results of previous studies which showed that spirituality/SWB, especially when one is lonely/isolated or facing hardship, gives peace of mind as well as relieves anxiety (Jadidi et al. 2011). Similarly, the tendency to enhance spirituality/SWB considerably reduces men's anxieties related to the perception of impending death. Social support may have a big impact for men as they are generally less able to cope emotionally with life pressures

compared to women. This is because men tend to opt to suffer in silence in order to keep up pretences of masculine strength and pride, which are in line with traditional societal norms (Lakzaei et al. 2015). As for women, with increased social support, the correlation between DA and SWB was negative. This finding is consistent with those of past empirical studies where it was found that good social support is effective in the prevention of mental stress as well as in enhancing the overall health levels of patients (Goudarz et al. 2015). Hence, we posit that women with AMI require ample social support and, in case this is not fulfilled, SWB alone is inadequate in reducing DA. Therefore, more attention must be given to the provision of ample social support as most patients who contract chronic diseases do suffer psychologically from existential conflicts that are associated with the meaning and purpose of life.

The results of the fifth model indicated that single patients who had high spirituality/SWB as well as social support experienced less DA. The life-threatening nature of the disease increases anxiety and dependency while, at the same time, reduces self-esteem. As mentioned in a previous section, past studies have shown that social support is considered to be a coping mechanism that lessens DA in addition to reducing the severity of physical and mental illness in patients (Sadeghi et al. 2015; Stringhini et al. 2012). Therefore, in terms of reducing the level of DA, the role of both factors is found to be essential.

Finally, the results from the sixth model showed that, when it comes to single men with AMI, the relationship between DA and SWB is significantly negative. Previous studies suggest that men experience less DA and have higher SWB compared to women (Sadeghi et al. 2015; Sadrollahi and Khalili 2015). Even though our second model indicated that there was a negative correlation between SWB and DA, the sixth model explained this mechanism more accurately. Essentially, it showed that the significant negative correlation between DA and SWB was particularly prevalent in patients who were single. This is likely due to the fact that patients who are single do not receive the close support and care that a spouse or that children provide. Once again, this is compounded by the fact that men are less likely to explicitly show feelings of anxiety and worry related to death in order to preserve their masculine image. An alternative coping mechanism for male patients comes in the form of enhanced spirituality/SWB which reduces their fear of death in critical situations (Mahboubi et al. 2012). In fact, single men who have SWB perceive death as a natural process of life. So, spirituality/SWB can influence how they deal with the trials and hardships, and reduces DA by creating a positive mental space (Moetamedi et al. 2015).

Conclusions

Although the present study did not find a significant relationship between SWB and DA in patients with AMI, the results showed that this relationship is influenced by other factors such as sex, marital status and social support. Put simply, the relationship between SWB and DA in these AMI patients (and, probably also in patients with other life-threatening diseases) should be examined among different sociodemographic dimensions.

More specifically, this research found no significant correlation between DA and SWB in married patients. Single patients who lack the support from their spouse and children use SWB as a mechanism to reduce DA. A closer examination of our empirical findings suggests that when SWB is accompanied by social support in single patients, DA is significantly reduced. While single men without social support enhance their SWB to decrease DA, for women, SWB does not have any significant effect in terms of reducing

DA unless coupled with strong social support. Overall, we have demonstrated that having a comprehensive view of the relationship between DA and SWB would greatly help healthcare professionals to provide better care for patients with acute, life-threatening diseases.

Limitation of Study

One of the limitations of this study is the fact that a convenience sampling procedure was used, which in turn limits the generalizability of the research findings. Moreover, the cross-sectional nature of the study limits our ability to determine the causal relationships among the constructs. Although the study was carried out on a completely voluntary basis and patients were reassured that the information collected would be kept confidential, participants may not have answered in a completely non-biased manner due to the sensitivity of their medical condition as well as in acknowledging the impact of DA.

Recommendation for Future Study

Due to the impact of chosen demographic variables such as sex, marital status and social support in the modification of DA and SWB, further empirical work is warranted, especially in patients with other acute illnesses. Based on the results of this study, future research should examine the moderating role of social support with comprehensive tools on the relationship between SWB and DA.

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Compliance with Ethical Standards

Conflict of interest All authors declared that they have no conflict of interest.

Ethical Approval Our study was approved by our main affiliated university's medical sciences ethics committee (QUMS.REC.1394.11).

Human and Animal Rights All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent It was obtained from all individual participants included in the study.

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