Original Research Article

Religious involvement and psychological well-being in the Middle East

Harold G Koenig, MD[1,2] and Saad Al Shohaib, MD[3]

Abstract

Objective: There is growing evidence that religious involvement is associated with better mental health in Christian Western countries. Whether the same is true in Middle Eastern countries whose populations are largely Muslim is less clear. The present study examined the association between religiosity and psychological well-being in the Middle East.

Methods: This cross-sectional study involved nationally representative samples of adults aged 18 or older in Egypt (n = 3496), Tunisia (n = 3070), and Turkey (n = 3019) (Wave 1 of Middle Eastern Values Panel Study). Data on psychological well-being (life satisfaction, happiness, and optimism) were available on 8835-8886 participants. Bivariate analyses and multivariate analyses were conducted, controlling for age, gender, education, employment status, marital status, financial satisfaction, economic class, country, and Muslim religious affiliation. Interactions with gender were also examined.

Results: Most participants (95%) reported a Muslim affiliation. Bivariate analyses indicated a positive association between overall religiosity (the primary predictor) and life satisfaction (r = .12), happiness (r = .13) and optimism (r = .19) (P < .0001). Multivariate analyses indicated a significant relationship between overall religiosity and life satisfaction (B = .046, SE = .005), happiness (OR = 1.03, 95% CI = 1.02-1.04), and optimism (B = .054, SE = .005). A significant interaction between gender and religiosity

[1]Psychiatry & Behavioral Sciences, Department of Medicine, Duke University Medical Center, Durham, NC, USA
[2]Department of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia
[3]Division of Nephrology, Department of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia

Corresponding Author:
Harold G Koenig, MD, Department of Psychiatry, Duke University Medical Center, Box 3400, Durham, NC 27710, USA.
Email: harold.koenig@duke.edu

was found for life satisfaction (B = -.025, SE = .009, *P* = .007), such that the association was stronger in males than in females. For happiness and optimism, trends were in the same direction.

Conclusions: Small but significant associations between overall religiosity (beliefs and practices) and psychological well-being were found in this largely Muslim Middle Eastern sample. Prospective studies are needed to determine the causal direction of this relationship.

Introduction

Today, there are nearly 1800 million Muslims in the world (compared to 2300 million Christians). Islam and Christianity combined make up more than half of the world's population (4.1 of 7.8 billion).[1] Islam is the world's fastest growing religions.[2] By 2070, based on the current birth rates in these faith traditions, Islam and Christianity will have the same number of adherents (32% each of world's population); by 2100, the number of Muslims will exceed Christians (35% vs 34%, respectively).[3] As a result, research on the relationship between religiosity and mental health in Muslims is essential to inform clinicians, who will be seeing more and more Muslim patients in their practices over the next decades.

Most Muslims are proud of their religion. However, Muslims are under numerous psychological pressures worldwide due to stigma, exclusion, and sometimes persecution, particularly those outside of Muslim-majority countries (and to some extent, even within Muslim countries). Consequently, psychological distress among Muslims is not uncommon. For example, significant depressive symptoms have been reported in as many as 62% of American Muslims, depending on assessment method and population studied.[4–6] The same is true for anxiety symptoms, which have been reported in from one-quarter to two-thirds of American Muslims.[5,6]

Most Muslims believe that the Qur'an is the word of Allah (God) and rely heavily on what it says. With regard to mental health and well-being, the Qur'an says:

> "Seek the life to come by means of what God granted you, but do not neglect your rightful share in this world. Do good to others as God has done good to you. Do not seek to spread corruption in the land, for God does not love those who do this" (28:77)[7]

Misinterpretation of Qur'anic verses may trigger anxiety among individuals who are vulnerable or who misinterpret or misunderstand these Scriptures. In Muslim societies, individuals may become upset because they are afraid that they have not done enough good deeds to outweigh their bad deeds. The Quran promises that everyone's deeds,

good and bad, will be laid out before them and weighed on the Day of Judgment. If, on the one hand, their good deeds outweigh their bad deeds, the Qur'an promises they will spend eternity in paradise (Jennah). If, on the other hand, their bad deeds outweigh their good deeds, then they will spend eternity in hell (Jehannam):

> "The one who's good deeds are heavy on the scales will have a pleasant life, but the one who's good deeds are light will have the Bottomless Pit for his home" (101:6-9).

Muslims believe that this verse and others like it in the Qur'an are intended to motivate people to change their ways, live a life submitted to God, and become a better person, which will enable them to experience a full and happy life here on earth. They believe that these verses reflect God's love for and mercy towards all those he has created. But as noted above, these holy Scriptures can be misunderstood, and when that happens, emotional distress and unhappiness may be the result. This raises the question of whether Muslims more generally experience greater well-being and better mental health compared to individuals from other faith traditions or those with no religious belief. Population-based research may assist in answering this question.

There is growing evidence that religious involvement is associated with better mental health in Christian Western countries. In a 2012 systematic review of quantitative studies published in the English language on the relationship between religiosity and psychological well-being, 326 quantitative studies were identified.[8] Of those, 256 (79%) reported that religiosity was significantly and positively related to greater well-being; only 3 studies (<1%) found a significant negative relationship with well-being. Whether the same positive association is also present in Middle Eastern countries whose populations are largely Muslim is less certain. Of the 326 studies mentioned above, only 20 examined religiosity and well-being in Muslim countries (Pakistan, Kuwait, Alicia, Algeria, Saudi Arabia, Egypt, Lebanon, Qatar); the majority of those studies were conducted in adolescents or college students and nearly half involved samples of less than 500.[9]

Several more recent studies have also examined the relationship between religiosity and mental health in Muslim populations, some finding significant relationships with better mental health[10–13] and others finding no relationship.[14–17] However, as with earlier studies, these studies often involved small convenience samples, immigrant populations, or college students. The relationship between religiosity and psychological well-being among Muslims across the adult age spectrum in Muslim-majority countries, however, remains unclear.

Study aims

Given the relatively few studies that have examined the relationship between religiosity and psychological well-being among adults in Middle Eastern Muslim-majority countries, we sought to examine the associations between religious beliefs/practices and three indicators of psychological well-being in three Middle Eastern countries. In

addition, given possible differences in religiosity between men and women among Muslims in the Middle East and the effects that those differences might have on psychological well-being, we examined the interaction between overall religiosity and gender on the relationship between religiosity and indicators of well-being.

Methods

The sample for this analysis was the baseline wave (W1) of the Middle Eastern Values Panel Study, which involved nationally representative samples of persons aged 18 or older living in three Middle Eastern countries: Egypt (n = 3,496, Turkey (n = 3019), and Tunisia (n = 3070).[18] Face-to-face interviews were performed in 2011 (Egypt) and 2013 (Turkey and Tunisia). A total of 12 093 interviews were conducted. In order to increase the likelihood that the data would be reliable, only participants who indicated that they were somewhat interested or very interested in conducting the interview were included (n = 11 548), resulting in the exclusion of 545 individuals who indicated that they were "not at all interested." Of the 11 548 interested participants, 3072 were missing responses to one or more of the four religious variables described below, leaving 8476 cases with no missing values on any of the four religious variables. A total of 462 cases had missing values on only one of the four religious variables; after substitutions for these missing values (see below), this increased the number of cases for constructing the overall religiosity variable (the primary predictor) to 8936. Of those, responses for psychological well-being variables were available on 8835 cases for life satisfaction, 8886 cases for happiness, and 8841 cases for optimism.

Comparison of respondents to non-respondents

Only a limited amount of demographic and financial characteristics were available on non-respondents. Age and country was obtained on all 11 548 cases. However, gender was available for only 9040 cases; marital status for 9039; education for 9034; satisfaction with financial status for 9020; employment status for 9040; and economic class status for 8955. After accounting for 8936 responders, this left only 98 to 103 non-responders for comparison on these characteristics. Responders were more likely to be older (average 43.6 vs 41.4 years for 2611 non-responders, $P < .01$) and were less likely to be from Egypt (37.1% vs 54.8% of 2611 non-responders, $P < .01$). Although low numbers limit other comparisons, responders may also have been more likely to be married (68.0% vs 58.3%, $P = .04$); less educated (4.9 vs 6.1, $P < .0001$, where 1 = "no formal education" up to "9 = university education with degree"); and somewhat less satisfied with their financial situation (5.53 vs 5.57, $P = .09$, where 1 = "completely dissatisfied with financial situation" up to "10 = completely satisfied with financial situation"). Responders and non-responders appeared similar on gender (54.1% vs 51.0% female, $P > .05$) and economic class status (19.3% vs 19.4% upper or upper-middle-class, $P > .05$). Thus, based on the available data, participants were more likely to be older and were less likely to reside in Egypt (vs Tunisia and Turkey) compared to

non-responders. Participants may also have been more likely to be married, less educated, and less satisfied with their financial status, but quite similar regarding economic class status and gender, although small numbers of non-participants limit these comparisons.

Measures

Religious variables

Self-rated religiosity. Self-rated religiosity was assessed by a single question. Participants were asked: "To what extent do you consider yourself a religious person?" Response options (and actual responses) ranged from 1 ("not at all religious") to 10 ("very religious"), with a mean response of 7.1 (SD = 2.0). Of those who responded to the question, 8.2% indicated less than 5 and 23.5% indicated a 9 or 10.

Importance of God's presence. A single question also asked about the importance of God's presence in life. Participants were asked: "How important is the presence of God in your life?" Response options (and actual responses) ranged from 1 ("not at all important") to 10 ("very important"), with a mean response of 9.7 (SD = 1.0). Of those who responded to the question, less than 1% indicated less than 5 and 87.1% indicated 10.

Religious attendance. Frequency of religious attendance was also assessed by a single question. Participants in Egypt and Turkey were asked: "Apart from such religious holidays as feasts of Eid, about how often do you go to a mosque or mussalla [church (for Christian respondents)] these days?" Participants in Tunisia were asked "Apart from funerals, about how often do you go to a mosque [church (for Christian respondents)] these days?" Response options ranged from 1 ("more than once/week") to 7 ("I do not go to mosque [church (for Christian respondents)]." Responses were reverse coded so that higher scores indicated more frequent attendance. Recoding was necessary because (a) correlations could be more easily interpreted when examining the association with psychological well-being (where higher scores indicated higher levels of well-being), and (b) this was necessary in order to combine this item with other positively scored religious variables to form a "religiosity index" (see below). Of those who responded to the attendance question, 45.2% indicated weekly or more often.

Prayer. Frequency of prayer was likewise assessed by a single question. Participants were asked: "How often do you perform salat?" Response options range from 1 ("five times a day") to 9 ("never"). Responses were reverse coded so that higher scores indicated more frequent prayer. Recoding was necessary for the same reasons as indicated above for religious attendance. Of those who responded to the question, only 8.7% indicated never, whereas 66.1% indicated five times a day.

Overall religiosity. In order to create an overall religiosity variable, the four religious variables above were summed to form an index. To ensure that each of the four variables received equal weight prior to summing, a value of 3 was added to the frequency of religious attendance (whose original responses ranged from 1 to 7) and a value of 1 was added to the frequency of prayer variable (whose original responses ranged from 1 to 9) so that all variables ranged in score from 1 to 10. This created an overall religiosity index whose theoretical score ranged from 4 to 40; the distribution of participants' actual responses was 8 to 40, with a mean of 32.4 (SD = 5.4). Cronbach's alpha (raw value) for this index was .51 (n = 8936) with substituted missing values included (see below) and .49 without them (n = 8476).

When creating the overall religiosity index, missing values were handled as follows. If two or more of the four variables were missing values, the case was deleted and not included. If only one of the four variables had a missing value, then the average of the three existing variable scores was calculated and substituted for the missing variable. This process resulted in substitutions for 35 cases involving religious attendance (35/8936 or .4%), 102 cases for frequency of prayer (102/8936 or 1.1%), 296 cases for self-rated religiosity (296/8936 or 3.3%), and 34 cases for importance of presence of God (34/8936 or .4%). The mean substitution method used here has been well documented for missing values when constructing indices or scales composed of multiple variables.[19] All analyses using the religiosity index were repeated without missing value substitutions and the results, if anything, were stronger although sample sizes was reduced by 432-455 cases depending on specific analyses.

Psychological well-being. Three psychological well-being variables were included in the dataset: life satisfaction, happiness, and optimism.

Life satisfaction. A single question assessed satisfaction with life. Participants were asked: "All things considered, how satisfied are you with your life as a whole these days?" Response options (and actual responses) ranged from 1 ("completely dissatisfied") to 10 ("completely satisfied"), with a mean of 6.1 (SD = 2.5). Of those who responded to the question, 10.6% indicated a 1 or 2, whereas 17.7% indicated a 9 or 10.

Happiness. A single question was also used to assess happiness. Participants were asked: "Taking all things together, would you say you are very happy, happy, not very happy, or not at all happy?" Response options range from 1 ("very happy") to 4 ("not at all happy"). Responses were reverse coded so that higher scores indicated greater happiness. Of those who responded to the question, 11.1% indicated not at all happy, 17.8% indicated not very happy, 56.4% indicated happy, and 14.8% indicated very happy.

Optimism. As with the other psychological well-being variables, optimism was assessed by a single question. Participants were asked: "To what extent are you optimistic/pessimistic about your future? Please use this scale where 1 means 'highly

pessimistic' and 10 means 'highly optimistic' to indicate how you feel about your future." As indicated by the question, response options ranged from 1 (highly pessimistic) to 10 (highly optimistic). Of those who responded to this question, 23.6% reported 5 or lower, 50.7% indicated 6 to 8, and 25.7% reported 9 or 10. Note that single-item measures of religiosity and psychological well-being assessed on a 1-10 scale are widely used in assessing relationships between religiosity and well-being.[20] A 10-point scale is frequently used to improve the sensitivity of responses, thus allowing for greater ease at detecting correlations between complex psychosocial variables.

Control variables. Control variables included demographic characteristics (age, gender, country, religious affiliation, marital status) and financial characteristics (education, employment status, financial satisfaction, economic class status). Age in years was assessed as a continuous variable. Gender was determined as female (2) or male (1). Country was recorded as Egypt, Tunisia, or Turkey, depending on the location where participants were sampled. Religious affiliation was assessed as Muslim (1) or non-Muslim (0), with the largest percentage of non-Muslim participants being Christian. Education level was assessed on a scale from 1 (no formal education) to 9 (university level education, with degree, including post-graduate education). Employment status was assessed as employed (1) vs not employed (0). Financial satisfaction was measured by the question: "How satisfied are you with the financial situation of your household? If '1' means you are completely dissatisfied on this scale, and '10' means you are completely satisfied, where would you put your satisfaction with your household's financial situation?" Economic class status was assessed by the question: "People sometimes describe themselves as belonging to the working class, the middle class, or the upper or lower class. Would you describe yourself as belonging to the upper class, upper middle class, lower middle class, working class, or lower class?" For analysis, responses were dichotomized into upper or upper-middle-class (1) and lower middle, working, or lower class (0).

Statistical analyses

Descriptive statistics were used to determine means and standard deviations (SD) of variables treated as continuous or ordinal (Table 1). Percent (%) and category size (n) were calculated for variables treated as categorical. Pearson correlation was used to assess bivariate associations between predictors, control variables, and the three primary dependent variables in creating a correlation matrix (Table 2). General linear models (PROC GLM in SAS) were used to control for demographic and financial characteristics when examining overall religiosity and its relationship to life satisfaction and optimism (Tables 3 and 4). Logistic regression (PROC LOGIST) was used to examine the association between overall religiosity and happiness, dichotomized into happy and very happy vs not very happy and not at all happy (Table 5). Interactions between overall religiosity and gender were also examined in all multivariate analyses.

Table 1. Characteristics of the sample (n = 8936).

Characteristic	Mean (SD, range)	% (n)
Age (mean, SD)	41.4 (16.0, 18-103)	
Gender (% female, n)		53.8 (4806)
Education (mean, SD)	4.9 (2.7, 1-9)	
Employment status (% employed, n)		40.0 (3575)
Marital status (% married, n)		68.0 (6071)
Satisfaction with financial status (% fair-good)	5.5 (2.4, 1-10)	
Class (% upper or upper middle class, n)		19.3 (1708)
Country (% Egypt, n)		37.1 (3315)
Religious affiliation (% Muslim, n)		94.7 (8882)
Self-rated religiosity (mean, SD)	7.0 (2.0, 1-10)#	
Importance of presence of god in life (mean, SD)	9.7 (.98, 1-10)	
Frequency of religious attendance (mean, SD)	4.1 (2.5, 1-7)	
Frequency of prayer (salat) (mean, SD)	7.5 (2.6, 1-9)	
Overall religiosity (mean, SD)	32.4 (5.4, 8-40)	
Life satisfaction (mean, SD)	6.1 (2.5, 1-10)	
Happiness (mean, SD)	2.7 (.8, 1-4)	
Optimism (mean, SD)	7.0 (2.2, 1-10)	

Sample size ranges from 8835 to 8,936, except # where n = 8640. SD, standard deviation. Average scores above do not include missing value substitutions except for overall religiosity.

Model 1 examined the association between overall religiosity and psychological well-being variables. Model 2 controlled for demographic characteristics. Model 3 controlled for both demographic and financial characteristics. Finally, model 4 examined the interaction between overall religiosity and gender in predicting the psychological well-being variable. SAS (version 9.4; SAS Institute Inc., Cary, North Carolina) was used for all analyses. Due to multiple comparisons, an alpha level of <.01 was set to indicate statistical significance and .01-.05 to indicate a non-significant trend.

Results

Characteristics of the sample are displayed in Table 1. Participants ranged in age from 18 to 103, with an average age of 41.4 years (SD = 16.0). A slight majority (53.8%) were female. Most participants were Muslim (94.7%), whereas 5.2% were Christian and .08% were other or none. The average education was completion of high school (4.9 on education scale where 5.0 indicated completion of secondary school). Only a minority (40.0%) were currently employed, although this is largely due to the fact that only 24% of women were employed, compared to 75% of men. About two-thirds (67.8%) of participants were married. Of the final sample, 37.1% were from Egypt, 32.6% from Tunisia, and 30.3% from Turkey. With regard to religious variables, average self-rated religiosity was a 7.0 on a scale from 1 to 10 and importance of the

Table 2. Correlation matrix of predictors, controls, and dependent variables.

	Dependent variables		
	Life satisfaction	Happiness	Optimism
Life satisfaction	1.0		
Happiness	.53 ***	1.0	
Optimism	.31 ***	.27 ***	1.0
Age	−.04 **	−.06 ***	.04 **
Gender (female)	.05 ***	.01	.02
Education	.06 ***	.04 **	−.03 *
Employed (yes)	−.01	.02	.01
Married (yes)	.07 ***	.06 ***	.06 ***
Financial satisfaction	.44 ***	.31 ***	.29 ***
Class (upper)	.14 ***	.08 ***	.09 ***
Country (Egypt)	.05 ***	.16 ***	.17 ***
Muslim affiliation (yes)	.06 ***	−.04 ***	.02
Self-rated religiosity	.18 ***	.14 ***	.17 ***
Importance god's presence	.02 #	−.01	.08 ***
Religious attendance	.03 *	.10 ***	.08 ***
Prayer (salat)	.08 ***	.06 ***	.16 ***
Overall religiosity	.12 ***	.13 ***	.19 ***

#P .01-.05, *P < .01, **P < .001, ***P < .0001; Pearson correlation coefficient. Sample sizes range from 8835 to 8936 depending for demographic and financial control variables and psychological well-being outcomes; 8544 to 8850 for religious variables. Correlations with religious variables (except for overall religiosity) are for raw values, prior to missing value substitutions.

presence of God in life was 9.7 on scale from 1 to 10. Frequency of religious attendance averaged 4.1 overall on a scale from 1 to 7, where 4 indicated attendance only on religious holidays and 5 indicated once/month attendance. However, for men, the average was 5.5 indicating between once/month (5) and once/week (6) attendance; for women, the average was 3.0, indicating once/year attendance (women in Islam do not attend the mosque regularly, like men do). In contrast, frequency of prayer (salat) averaged 7.5 on a scale from 1 to 9, where women scored higher than men (7.8 vs 7.1, respectively). Scores on psychological outcomes (life satisfaction, happiness, and optimism) indicated values slightly above the midrange.

Bivariate analyses

Table 2 provides correlations between predictor variables, controls, and psychological well-being dependent variables. With regard to religious affiliation, Muslims (compared to other affiliations, mainly Christian) indicated significantly greater life satisfaction (r = .06, P < .0001), but less overall happiness (r = −.04, P < .001), and there was no significant association with level of optimism. Self-rated religiosity was

Table 3. Multivariate analyses examining associations between overall religiosity and psychological well-being (life satisfaction).

	Model 1	Model 2	Model 3	Model 4
	B (SE)	B (SE)	B (SE)	B (SE)
Religiosity	.06 (.005)***	.06 (.005)***	.05 (.005)***	.06 (.006)***
Demographics				
Age	—	−.01 (.002)***	−.01 (.002)***	−.01 (.002)***
Gender (female)	—	.33 (.05)***	.26 (.06)***	1.06 (.30)**
Country (Egypt)	—	.13 (.06)#	−.01 (.06)	−.02 (.06)
Muslim affiliation	—	.79 (.13)***	.68 (.11)***	.66 (.11)***
Married	—	.34 (.06)***	.32 (.05)***	.31 (.05)***
Financial				
Education	—	—	−.002 (.010)	−.004 (.01)
Employed	—	—	−.08 (.06)	−.09 (.06)
Financial satisfaction	—	—	.44 (.01)***	.44 (.01)***
Class	—	—	.04 (.07)	.04 (.07)
Interaction				
Gender x religiosity	—	—	—	−.025 (.009)*
Model R^2	.015 ***	.033 ***	.216 ***	.217 ***
N (sample size)	8835	8776	8681	8681

#P .01-.05, *P < .01, **P < .001, ***P < .0001. B = unstandardized estimate from generalized linear model, SE = standard error.

consistently related to greater life satisfaction (r = .18), greater happiness (r = .14), and greater optimism (r = .17), all at significant levels (P < .0001). Importance of God's presence in life was weakly correlated with life satisfaction (r = .02, P < .05), unrelated to happiness, and positively related to optimism (r = .08, P < .0001); some of the weak relationships for the latter may be due to the fact that most participants (87.1%) indicated a 10 on this scale that ranged from 1-10, resulting in little variability due to the highly skewed distribution of responses.

Frequency of religious attendance was weakly but significantly related to life satisfaction (r = .03, P < .01) but more strongly related to happiness (r = .10) and optimism (r = .08) (P < .0001 for both). Frequency of prayer (salat) was uniformly positively related to all psychological well-being variables (life satisfaction, r = .08; happiness, r = .06; and optimism, r = .016, again with alpha levels less than .0001). Overall religiosity, the primary dependent variable, was likewise uniformly related to all psychological well-being variables (Figures 1-3).

Multivariate analyses

Multivariate analyses were conducted using general linear models for continuous dependent variables (life satisfaction and optimism) and logistic regression for the

Table 4. Multivariate analyses examining associations between religious involvement and psychological well-being (optimism).

	Model 1	Model 2	Model 3	Model 4
	B (SE)	B (SE)	B (SE)	B (SE)
Religiosity	.080 (.004)***	.062 (.005)***	.054 (.005)***	.061 (.006)***
Demographics				
Age	—	.003 (.002)	.001 (.002)	.001 (.002)
Gender (female)	—	.18 (.05)***	.16 (.05)*	.66 (.28)#
Country (Egypt)	—	.72 (.05)***	.62 (.05)***	.62 (.05)***
Muslim affiliation	—	.61 (.11)***	.54 (.10)***	.53 (.11)***
Married	—	.10 (.05)#	.06 (.05)	.05 (.05)
Financial				
Education	—	—	−.05 (.01)***	−.05 (.01)***
Employed	—	—	.07 (.05)	.07 (.05)
Financial satisfaction	—	—	.25 (.01)***	.25 (.01)***
Class	—	—	.16 (.06)*	.16 (.06)*
Interaction				
Gender x religiosity	—	—	—	−.016 (.009)#
Model R^2	.037 ***	.060 ***	.133 ***	.134 ***
N (sample size)	8841	8783	8696	8696

#P .01-.05, *$P < .01$, **$P < .001$, ***$P < .0001$. B, unstandardized estimate from generalized linear model; SE = standard error.

dichotomized dependent variable (happiness). As noted earlier, controlled for in these analyses were demographics characteristics (age, gender, country, Muslim affiliation, marital status) and financial characteristics (education level, employment status, financial satisfaction, economic class). Model 3 in Table 3 indicates that overall religiosity was significantly associated with greater life satisfaction, independent of control variables (B = .05, SE = .005, $P < .0001$). Likewise, model 3 in Table 5 indicates a significant positive association between overall religiosity and happiness (OR = 1.030, 95% CI = 1.020-1.040, $P < .0001$); in other words, for every 1 point increase on the religiosity scale (which ranged from 8 to 40) there was a 3% increase in the likelihood of being happy or very happy. Finally, Model 3 in Table 4 indicates that overall religiosity was associated with greater optimism, independent of control variables (B = .054, SE = .005, $P < .0001$).

Interactions with gender

Given possible gender differences in religiosity and its effects on well-being among Muslims, the interaction between overall religiosity and gender was examined for each indicator of psychological well-being. For life satisfaction, Model 4 in Table 3 indicates a significant interaction between overall religiosity and gender (B = −.025, SE = .009, $P = .007$). When analyses were stratified by gender, the association between religiosity and
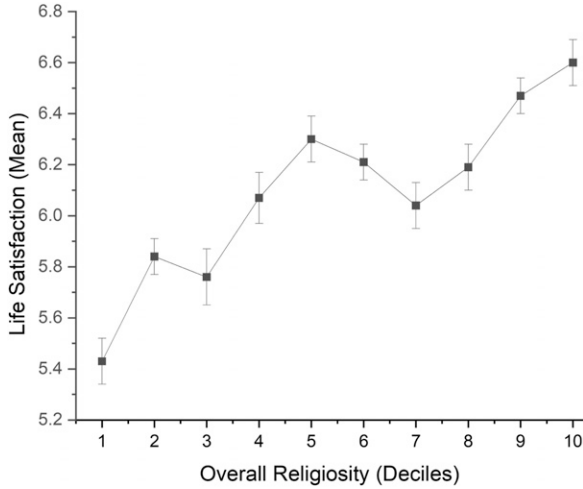
Figure 1. Overall religiosity and life satisfaction (bars represent standard errors).
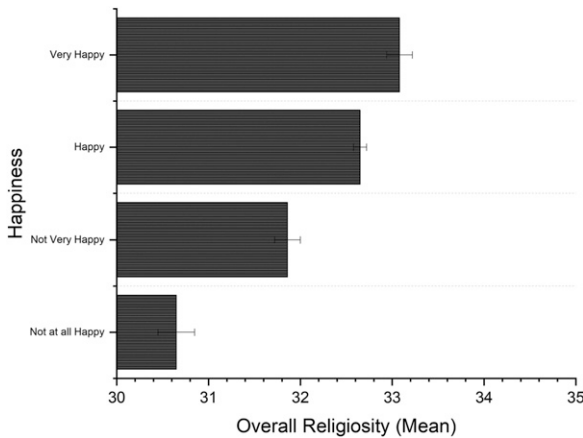
Figure 2. Overall religiosity and happiness (bars represent standard errors).

life satisfaction was almost twice as strong in men (B = .058, SE = .007, P < .0001, n = 4006) than in women (B = .030, SE = .007, P < .0001, n = 4675), although as noted, the relationship was highly significant in both genders.

For happiness, a similar effect was found, although it did not reach statistical significance. Model 4 in Table 5 indicates a non-significant interaction between overall religiosity and gender (OR = .984, 95% CI = .967-1.002, P = .09). For optimism
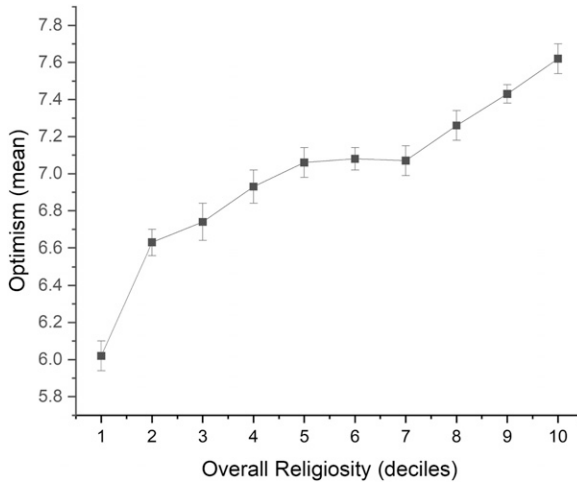
Figure 3. Overall religiosity and optimism (bars represent standard errors).

(vs pessimism), a similar effect was again found, although again did not reach statistical significance. Model 4 in Table 4 indicates a non-significant interaction between overall religiosity and gender (B = −.016, SE = .009, P = .07).

Discussion

The benefits of religious faith to emotional well-being have been emphasized since the beginning of Islam. In Prophetic Medicine, a treatise written in the 14th century, Al-Dhahabi[21] notes:

> "Prayers often produce happiness and contentment in the mind; they suppress anxiety and extinguish the fire of anger. They increase love for truth and humility before people; they soften the heart, create love and forgiveness and dislike of the vice of vengeance. Besides, often sound judgment occurs to the mind [due to concentration about difficult matters] and one finds correct answers [to problems]. One also remembers forgotten things…. One can discover the ways to solve matters worldly and spiritual. And one can effectively examine oneself -- particularly when one strenuously exercises oneself in prayers" (p 140).

The present study found a consistent positive correlation between religiosity and all three measures of psychological well-being, including greater life satisfaction, happiness, and optimism in random population-based samples of adult Muslims in Muslim-majority countries where Islam is the social norm. Religious "social norms" (informal rules that govern behavior in groups and societies) are very strong in Muslim-majority countries such as Egypt, Turkey, and Tunisia. In a study examining relationship between religiosity and well-being using data from the World and European

Table 5. Logistic regression analyses examining associations between overall religiosity and psychological well-being (happiness).

	Model 1	Model 2	Model 3	Model 4
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Religiosity	1.045 (1.037-1.054)***	1.038 (1.028-1.047)***	1.030 (1.020-1.040)***	1.053 (1.025-1.082)**
Demographics				
Age	—	.989 (.986-.992)***	.989 (.985-.992)***	.989 (.985-.992)***
Gender (female)	—	1.165 (1.060-1.281)*	1.140 (1.018-1.277)#	1.873 (1.044-3.361)#
Country (Egypt)	—	1.827 (1.630-2.048)***	1.737 (1.542-1.958)***	1.733 (1.538-1.953)***
Muslim affiliation	—	1.216 (.963-1.536)	1.170 (.920-1.489)	1.156 (.908-1.472)
Married	—	1.275 (1.150-1.414)***	1.271 (1.140-1.418)***	1.265 (1.134-1.411)***
Financial				
Education	—	—	.994 (.973-1.016)	.993 (.971-1.015)
Employed	—	—	.958 (.852-1.077)	.954 (.848-1.073)
Financial satisfaction	—	—	1.312 (1.283-1.342)***	1.313 (1.284-1.343)***
Class	—	—	.886 (.769-1.022)	.888 (.770-1.023)
Interaction				
Gender x religiosity	—	—	—	.984 (.967-1.002)#
Likelihood ratio (df) (X^2)	109.8 (1)***	332.6 (6)***	989.9 (10)***	992.8 (11)***
N (sample size)	8886	8829	8732	8732

#P .05-.10, *P < .01, **P < .001, ***P < .0001; OR, odds ratio; CI, confidence interval (Wald).

Values Studies in 64 countries (n = 101 682), Stavrova et al[22] found that in countries where religiosity is the social norm, there was a strong relationship between personal religiosity (attendance, subjective religiosity, importance of God) and both happiness and life satisfaction; however, in countries where fewer people were religious, the relationship was much weaker or non-existent.

This may also be true for Muslims from countries such as Egypt, Turkey and Tunisia, where a large majority of the populations indicate that religion is very important in their lives. According to the World Values Survey, when participants were asked how important God is in your life with responses on a 1-10 scale ranging from not important at all (1) to very important (10), among 1200 respondents in Egypt, 96.8% indicated a 10; this was true for 44.7% of 2415 respondents from Turkey and 66.5% of 1208 respondents from Tunisia.[23] When participants were asked how often they pray, 79.5% of respondents in Egypt indicated several times a day, whereas 41.1% of respondents in Turkey and 71.4% of respondents in Tunisia indicated the same. These are very religious countries where religious social norms dominate the culture and likely impact the effects of religious involvement on psychological well-being.

The findings also indicated that effects of religiosity were greater in males than in females, at least for life satisfaction (with similar trends for happiness and optimism). A number of other studies demonstrate this as well.[24,25] Muslim-majority countries tend to be patriarchal societies, in which men tend to benefit more from religious beliefs than women.[26] Men engage more in social religious meetings than women (as we found for religious attendance) and attend prayers at the mosque, which is obligatory for men, but not women in Islam.

Given the complexity of the relationship between religiosity and psychological well-being, both of which are influenced by a wide range of confounding factors in the Middle East that are likely to increase measurement variability, it can be quite difficult to detect even small correlations between variables such as these.[27] Thus, although the correlations identified in the present study were relatively small, even small effects in studies examining complex psychosocial variables such as religiosity often translate into substantial clinical effects. For example, Pearson correlations of .12 to .19 identified in the present study between religiosity and psychological well-being variables translate into odds ratios of 1.54 to 2.00. Doubling the likelihood of an effect would certainly argue for the clinical significance of the findings reported here.

Study limitations

First, only participants from three Middle Eastern countries made up the sample, limiting generalizability of these results to the entire Middle East. Second, the cross-sectional nature of these analyses prevent determination of causal inference, making it impossible to decipher whether religiosity increased psychological well-being or whether psychological well-being increased religiosity. Third, the method of calculating missing values may have reduced variability in the primary predictor variable, overall religiosity; however, substitutions made up only .4% to 3.3% of cases (and

results were similar or even stronger when only cases with responses to all religious variables were used). Fourth, Cronbach's alpha for the overall religiosity index was low at .51. As an index made up of a variety of beliefs and practices, the stringent internal reliability criteria for a scale (alpha > .70) may not be as applicable. Finally, of the total of 12 093 participants from the three countries, only 8936 (73.9%) were included in analyses due to missing values on variables, and this number was reduced further to 8681-8732 in regression models controlling for possible confounders. However, when comparing demographic and financial characteristics of study participants with those of non-participants, while participants were older and less likely from Egypt, and possibly more likely to be married and less well educated, few differences were identified. This study also has many strengths, including the nationally representative samples and overall large sample size, the examination of three indicators of psychological well-being (with consistent findings), and the careful control of possible confounders in multivariate analyses.

Clinical implications

The findings from this study have a number of implications for clinicians caring for Muslim patients both in Muslim-majority countries and, to some extent, for Muslim patients living in Western countries who may be recent immigrants. Particularly important is that clinicians should take a spiritual history in Muslim patients. If religious involvement is associated with greater psychological well-being, then those who care for Muslim patients should consider addressing it as part of holistic healthcare. When encountering those who are less religious, it may be important to inquire non-judgmentally whether they may have had experiences that have adversely affected their religious beliefs and practices, and perhaps explore possible avenues where they may be able to regain their faith. Among Muslim patients who are religious, but who may be misunderstanding or misinterpreting Islamic teachings, referral to a Muslim chaplain or pastoral counselor may be a prudent action to take. A more comprehensive list of clinical applications may be found elsewhere.[28] Note that the above comments were not directly examined in the present study; however, the results connecting religious involvement with mental health help to justify the taking of a spiritual history and the addressing of these issues in clinical practice when indicated.

Conclusions

In this large random sample of adult Muslims from three Muslim-majority countries, we found significant positive associations between religiosity (beliefs and practices) and psychological well-being. Multivariate analyses indicated a significant positive relationship between overall religiosity and life satisfaction, happiness, and optimism. The findings also demonstrated a significant interaction between gender and religiosity, such that the association with life satisfaction was stronger in males than in females (and a similar trend for happiness and optimism that did not reach statistical

significance). Frequent prayer, attendance at mosque services, and devout religious beliefs (particularly valuing the presence of God in life) may help to neutralize feelings of stress and distress, thereby enhance well-being and happiness. Islamic teachings clearly set the bar high in terms of ethical values and behavioral expectations, promising dire consequences in the hereafter for those who fail to reach that bar. Nevertheless, adult Muslims who abide by Islamic teachings appear to have greater life satisfaction, happiness, and a more optimistic view of life, particularly those living in Muslim-majority countries such as Egypt, Turkey, and Tunisia.

These findings provide important information that policymakers, healthcare professionals, and spiritual leaders can utilize to improve individual health and public health of these communities by developing culturally appropriate interventions and policies that are friendly towards religion. In the West, and to a lesser extent in the Middle East as countries have become more secular, religious involvement has often been considered neurotic (based on the teachings of Sigmund Freud) and unscientific, and at times has been discouraged by mental health professionals. Furthermore, lawmakers have passed laws that conflict with long-held religious beliefs, not understanding the positive effects that religious involvement may have on population health.[29] The findings here indicate that, if anything, religious involvement is associated with better not worse mental health, and therefore should not be necessarily discouraged by mental health professionals or interfered with by public policymakers.

Declaration of conflicting interests

Funding

ORCID iD

Harold G Koenig 🆔 https://orcid.org/0000-0003-2573-6121

References

1. Hackett C and McClendon D. *Christians Remain World's Largest Religious Group, but They Are Declining in Europe*. Washington, DC: Pew Research Center; 2017. Retrieved on 4-13-23 from https://www.pewresearch.org/fact-tank/2017/04/05/christians-remain-worlds-largest-religious-group-but-they-are-declining-in-europe/

2. Lipka M and Hackett C. *Why Muslims Are the World's Fastest-Growing Religious Group*. Washington, DC: Pew Religion Research Center; 2017. Retrieved on 5-2-23 from https://www.pewresearch.org/short-reads/2017/04/06/why-muslims-are-the-worlds-fastest-growing-religious-group/

3. Hackett C, Cooperman A and Ritchey K. *The Future of World Religions: Population Growth Projections, 2010-2050*. Washington, DC: Pew Research Center; 2015. Retrieved on 4-13-23 from https://www.pewresearch.org/religion/2015/04/02/religious-projections-2010-2050/#beyond-the-year-2050

4. Hodge DR, Zidan T and Husain A. Depression among Muslims in the United States: examining the role of discrimination and spirituality as risk and protective factors. *Soc Work*. 2016;61(1):45-52.

5. Amer MM and Hovey JD. Anxiety and depression in a post-September 11 sample of Arabs in the USA. *Soc Psychiatr Psychiatr Epidemiol*. 2012;47(3):409-418.

6. Abu-Ras W and Abu-Bader SH. Risk factors for depression and posttraumatic stress disorder (PTSD): the case of Arab and Muslim Americans post-9/11. *J Immigr Refug Stud*. 2009;7(4):393-418.

7. Abdel Haleem MAS. *The Qur'an (Oxford World Classics)*. New York, NY: Oxford University Press; 2004.

8. Koenig HG, King DE and Carson VB. *Handbook of Religion and Health*. 2nd ed.. New York, NY: Oxford University Press; 2012.

9. Koenig HG and Al Shohaib S. *Health and Well-Being in Islamic Societies: Background, Research, and Applications*. Cham, Switzerland: Springer International; 2014:172.

10. Adam Z and Ward C. Stress, religious coping and wellbeing in acculturating Muslims. Adolescents. *Sch Psychol Q*. 2016;31(2):198-212.

11. Molsa M, Kuittinen S, Tiilikainen M, Honkasalo ML and Punamäki RL. Mental health among older refugees: the role of trauma, discrimination, and religiousness. *Aging Ment Health*. 2017;21(8):829-837.

12. Ayten A and Korkmaz S. The relationships between religiosity, prosociality, satisfaction with life and generalised anxiety: a study on Turkish Muslims. *Ment Health Relig Cult*. 2019;22(10):980-993.

13. Abu-Raiya H and Ayten A. (2020). Religious involvement, interpersonal forgiveness and mental health and well-being among a multinational sample of Muslims. *J Happiness Stud*. 2020; 21(8): 3051-3067.

14. Khan ZH, Watson PJ and Chen Z. (2011). Differentiating religious coping from Islamic identification in patient and non-patient Pakistani Muslims. *Ment Health Relig Cult*. 2011; 14: 1049–1062.

15. Goforth AN, Oka ER, Leong FTL and Denis DJ. Acculturation, acculturative stress, religiosity and psychological adjustment among Muslim Arab American adolescents. *J Muslim Ment Health*. 2014;8(2):3-19.

16. Goforth AN, Pham AV, Chun H, Castro-Olivo SM and Yosai ER. Association of acculturative stress, Islamic practices, and internalizing symptoms among Arab American adolescents. *Sch Psychol Q*. 2016;31(2):198-212.

17. Giuliani C, Tagliabue S and Regalia C. Psychological well-being, multiple identities, and discrimination among first and second generation immigrant Muslims. *Eur J Psychol*. 2018; 14(8):66-87.

18. Moaddel M, Ajrouch K, Mneimneh Z and de Jong J. *Middle eastern values panel study*. 2021. Dataset retrieved on 11-7-2022 from https://thearda.com/data-archive?fid=MCPS16

19. Elliott P, Hawthorne G and Elliott P. (2005). Imputing cross-sectional missing data: comparison of common techniques. *Aust N Z J Psychiatr*. 2005; 39(7): 583-590.

20. Abdel-Khalek AM. *Religiosity and Subjective Well-Being in the Arab Context*. Newcastle Upon Tyne, UK: Cambridge Scholars Publishing; 2019.

21. Al-Dhahabi MI. Al-tibb al-nabawi (prophetic medicine). Cairo: mutafā al-halabī , 1961 [cited in Rahman F. *Health and Medicine in the Islamic Tradition*. Chicago, IL: ABC International Group, Inc.; 1998:44-45.

22. Stavrova O, Fetchenhauer D and Schlosser T. Why are religious people happy? the effect of the social norm of religiosity across countries. *Soc Sci Res*. 2013;42:90-105.

23. World Values Survey. *Joint EVS/WVS Variable Report – Tables*; 2017. Retrieved on 4-13-23 from https://europeanvaluesstudy.eu/methodology-data-documentation/survey-2017/joint-evs-wvs/data-and-documentation-joint-evs-wvs/

24. Haneef Khan Z and Watson PJ. Religious orientation and the experience of Eid-ul-Azha among Pakistani Muslims. *J Sci Stud Relig*. 2004;43:537-545.

25. Khan ZH, Watson PJ, Naqvi AZ, Jahan K and Chen ZJ. Muslim experiential religiousness in Pakistan: meaning in life, general well-being and gender differences. *Ment Health Relig Cult*. 2015;18(6):482-491.

26. Carrigan T, Connell B and Lee J. Toward a new sociology of masculinity. *Theor Soc*. 1985; 14:551-604.

27. Koenig HG, Hill TD, Pirutinsky S and Rosmarin DH. Commentary on "Does spirituality or religion positively affect mental health?". *Int J Psychol Relig*. 2021;31(1):27-44.

28. Koenig HG and Al Shohaib S. *Islam and Mental Health: Beliefs, Research, and Applications*. Seattle, WA: Kindle/Amazon; 2017:50-60.

29. Koenig HG, VanderWeele T and Peteet J. Health policy implications (Ch 33). In: Koenig et al, *Handbook of Religion and Health*. 3rd ed. New York, NY: Oxford University Press; 2023.