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Religiousness and depressive symptoms in Europeans: findings from the Survey of Health, Ageing, and Retirement in Europe

T. Opsahl [a,*], L.J. Ahrenfeldt [b], S. Möller [c], N.C. Hvidt [a,d]

[a] Research Unit of General Practice, Department of Public Health, University of Southern Denmark, 5000 Odense, Denmark

[b] Epidemiology, Biostatistics and Biodemography, Department of Public Health, University of Southern Denmark, 5000 Odense, Denmark

[c] OPEN – Odense Patient Data Explorative Network, Odense University Hospital and Department of Clinical Research, University of Southern Denmark, 5000 Odense, Denmark

[d] Academy of Geriatric Cancer Research, Odense University Hospital, 5000 Odense, Denmark

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ABSTRACT

Objective: Religiousness has been found to protect against depression based on studies conducted in the United States, though there are limited data in the European population. We sought to evaluate the associations between religiousness and six depressive symptoms in Europeans aged 50+ years.

Study design: Longitudinal study.

Methods: Our sample consisted of participants ($n = 23,864$) in wave 1 (2004–05) of the Survey of Health, Ageing, and Retirement in Europe who were followed up in waves 2–6 (2006–07 to 2015). Analyses were conducted using multivariable logistic regression.

Results: Higher frequency of prayer was associated with lower odds of having no hopes for the future (odds ratio [OR] = 0.89, 95% confidence interval [CI]: 0.81–0.99) and of suicidal thoughts (OR = 0.84, 95% CI: 0.72–0.97). Attending religious service was associated with lower odds of having no hopes for the future (OR = 0.74, 95% CI: 0.67–0.83), of suicidal thoughts (OR = 0.69, 95% CI: 0.59–0.81), difficulty in concentration (OR = 0.80, 95% CI: 0.72–0.88), irritability (OR = 0.77, 95% CI: 0.71–0.85), fatigue (OR = 0.84, 95% CI: 0.78–0.91), and having no enjoyable activity (OR = 0.84, 95% CI: 0.76–0.94). Religious education was associated with lower odds of not having engaged in any enjoyable activities lately (OR = 0.86, 95% CI: 0.78–0.95). Restful religiousness was associated with lower odds of experiencing suicidal thoughts, of having been irritable recently, and of having experienced fatigue in the last month, compared with crisis religiousness. Crisis religiousness was associated with higher odds of having been irritable recently and of having experienced fatigue in the last month compared with non-religiousness.

Conclusions: Our findings suggest that religiousness is associated with lower odds of depressive symptoms, particularly for those who attend religious service.

* *Corresponding author*. J.B. Winsløwsvej 9B, 5000 Odense, Denmark. Tel.: +45 65 50 43 25.
E-mail address: topsahl@health.sdu.dk (T. Opsahl).

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Introduction

Depression is one of the leading causes of disability and premature death.[1] The societal costs of depression, both through direct effects such as hospitalization and through indirect effects such as sick leave and early retirement, are substantial.[2] Depression has a high prevalence in older persons,[3] and with an ageing population in Europe,[4] it is increasingly important to investigate risk factors associated with this condition.

Since the mid-90s, research into the association between health and religiousness has rapidly increased.[5] This research points to favorable outcomes across a range of both physical and mental conditions for religious individuals[6] including depression.[7] While the majority of studies on this association have been conducted in the United States of America, studies of European populations are few. When studied in a European context, religiousness tends to be associated with depression. The directions of the associations, however, are dependent on the measures employed. Attendance at religious service is inversely associated with depression in both cross-sectional[8] and longitudinal studies.[9] Cross-sectional studies examining the association between depression and frequency of prayer have mixed findings.[10–12] The literature on self-reported religious worldview is also inconsistent, with one longitudinal study finding favorable effects of religiousness on depression[13] and two cross-sectional studies finding no associations.[14,15] Overall, evidence on the association between religious measures and depression is inconsistent in the European context.

The ambiguity of the European literature could be because of the religious measures being markers of different internalizations or motivations for having religious beliefs and practices. Some literature has investigated the associations between these types of motivations and mental health. This literature has shown that the more intrinsic and self-determined the religious beliefs and practices are, the more they are associated with favorable mental health outcomes. Conversely, the more religious beliefs or practices are utilized as means to some end or are motivated by external pressures, the more are they associated with worse health outcomes.[16–21] When individuals pray without engaging in other religious activities, their religiousness may not be deeply internalized but may be spurred by adversities, with prayer as a form of reaction. In this case, prayer could (never exclusively) be a marker of crisis religiosity—religiosity that arises in response to crises.[18–21] Because prayer may be performed in response to crises, it will not consistently be associated with good mental health. In contrast, considering the generally positive association between religious service attendance and depression, attending religious service with a high frequency could be understood as an indicator of a more internalized and therefore more intrinsically motivated type of religiosity—restful religiosity.[18–21] Because the activity is not motivated by crises, it is to a lesser degree related to bad health. On the contrary, attending religious service may even carry a protective effect on development of depression because of factors such as increased social support and promotion of healthy behaviors.[22]

In an earlier study based on the Survey of Health, Ageing, and Retirement in Europe (SHARE), Ahrenfeldt et al.[18] investigated the associations between religiousness and several health variables including depressive symptoms, which they defined as experiencing four or more symptoms of depression. However, depression is comprised of quite varied symptoms, and these symptoms may individually be differentially associated with religiousness.

The present article serves two purposes. First, to shed light on the association between religiousness and symptoms of depression in Europe. Second, to investigate how religious internalizations are associated with depressive symptoms. We hypothesize that religiousness would be associated with lower odds of depressive symptoms, particularly for those who attend religious service. With regards to the two internalizations, we hypothesized that restful religiousness would be associated with lower odds of experiencing symptoms of depression compared with crisis religiousness and non-religiousness. Similarly, we expected that crisis religiousness would be associated with higher odds of experiencing symptoms of depression compared with restful religiousness and non-religiousness.

Methods

Participants and design

We employed data from SHARE—a cross-national, longitudinal study on health, socio-economic status, and social and family networks in a sample of Europeans aged 50 years and above.[23] Data were gathered via computer-assisted personal interviews and self-administered questionnaires. Response rates, defined as the proportion of selected households including at least one person for whom an interview was successfully obtained, were lowest in Switzerland (32%) and highest in Denmark (63.2%) in wave 1.[24] Participants in the present study were individuals from 10 European countries who participated in wave 1 (2004–2005) and were followed up in wave 2 (2006–2007), wave 4 (2011–2012), wave 5 (2013), and wave 6 (2015), respectively. Wave 3 was a retrospective survey and thus did not contain data on depressive symptoms.

Measures

Religiousness

Three measures of religiousness were included: frequency of prayer, religious service attendance, and religious education. Multiple operationalizations of religiousness were employed to investigate distinctive ways in which these dimensions may be associated with depressive symptoms. Though prayer and service attendance are common measures employed in research on religion and health,[25] religious education is quite unorthodox in this field. It was included to possibly capture forms of religiousness that are internalized in one's upbringing.

Prayer and religious education were measured by a questionnaire given to participants after the interview, whereas information about religious service attendance was obtained during the interview. Prayer was measured by asking

'Thinking about the present, about how often do you pray?' Response options were as follows: more than once a day; once a day; few times a week; once a week; less than once a week; and never. The responses were dichotomized into praying vs not praying. Religious education was measured by asking the participants 'Have you been religiously educated by your parents?' with response options of 'yes' and 'no'. Religious service attendance was measured with the following question: 'Have you done any of these activities in the last month?' followed by seven answer categories, one of which being 'participate in activities in religious organizations' with the answer options 'yes' and 'no'.

Based on religiosity measures, three groups were constructed: Group 1 consisted of the restful religious participants, who reported praying, attending religious service, and were religiously educated. Group 2 consisted of the crisis religious participants, characterized by praying, but neither attending religious service nor having been religiously educated. Group 3 consisted of the non-religious participants, who did not report praying, did not attend religious service, and were not religiously educated. These groups were compared regarding depressive symptoms: the restful religious vs all other respondents (Comparison 1); the restful religious vs the crisis religious (Comparison 2); and the crisis religious vs the non-religious (Comparison 3).

Depression

To measure associations between religiousness and depressive symptoms without making the analyses overly extensive, six symptoms out of 12 from the Euro-depression (EURO-D) scale[26] were selected. These were hopes for the future, suicidal thoughts, irritability, fatigue, concentration on entertainment, and enjoyment. These symptoms were selected because of their tendency to cluster around the 'depressed affect' factor in the original development and validation study by Prince et al.[26] The selected symptoms of depression do not constitute a full diagnostic or clinical depression scale.

The questions on depressive symptoms were free response, and coders were informed to group responses into whether participants mentioned any instances of the symptom in question. Hopes for the future were measured by asking participants 'What are your hopes for the future?'. Responses were divided into whether participants mentioned any hopes vs whether they failed to do so. Suicidal thoughts were investigated by asking 'In the last month, have you felt you would rather be dead?' with responses divided into whether participants mentioned any suicidal thoughts vs no such thoughts. Concentration on entertainment was investigated by asking 'How is your concentration? For example, can you concentrate on a television program, film, or radio program?' divided into reporting difficulty in concentrating vs not reporting any difficulties. Irritability was measured by asking respondents to respond 'yes' or 'no' to the question: 'Have you been irritable recently?' In the same fashion, fatigue was measured by asking respondents to respond with 'yes' or 'no' to the question: 'In the last month, have you had too little energy to do the things you wanted to do?' Enjoyment was measured by asking respondents: 'What have you enjoyed doing recently?' divided into whether the respondent mentioned any enjoyable activities vs failed to mention any.

Background variables

Educational level, marital status, employment, long-term illness, European region, age at interview, and gender were included as covariates (Table 1). The educational level of participants was classified into three groups based on the Standard Classification of Education[27] (i.e. lower, medium, and higher). Marital status was classified into married or registered partnership, unmarried/divorced, and widowed. Employment was divided into whether the participants were employed, unemployed/sick, or retired/homemaker. Long-term illness was measured by a 'yes' or 'no' to the question about having a long-term or chronic health problem, illness, disability, or infirmity. Similar to previous studies,[18–20] European region was divided into Western (Austria, Belgium, Germany, Switzerland, and the Netherlands), Northern (Denmark and Sweden), and Southern (Italy and Spain) Europe. Age was included as a continuous variable.

Statistical analysis

Associations between religiousness and depressive symptoms were investigated using logistic regression models estimating odds ratios (ORs) with 95% confidence intervals (CIs). In the overall model, we included participants from wave 1, who were followed up in at least one of waves 2, 4, 5, and 6. The models were adjusted for region, gender, age, educational level, marital status, employment, and long-term illness. We repeated the overall model examining possible interactions between religiosity measures and gender and between religiosity measures and European region, respectively. We also performed an interaction model, including an interaction term between wave and religiosity measures, estimating the associations between religiousness and depressive symptoms in the individual follow-up waves. In addition, we performed a cross-sectional analysis, investigating the associations between religiousness and depressive symptoms using data from wave 1 only. In all longitudinal analyses, we utilized robust standard errors for clustered analyses to take into account repeated measurements from individuals participating in more than one wave of SHARE.[28] In the cross-sectional model, we applied the calibrated cross-sectional weights provided by SHARE. The analyses were corrected for multiple testing because of the six outcomes and six religious exposures using the Holm-Bonferroni method via R version 3.3.1. Stata version 14.2 was used for all other analyses.

Results

Overall, 23,864 individuals from 10 European countries were included in wave 1. Among those, a total of 69.2% were followed up in wave 2, 44.1% were followed up in wave 4, 40.7% were followed up in wave 5, and 38.7% were followed up in wave 6. Descriptive statistics of sociodemographic characteristics, measures of religiousness, and symptoms of depression are shown in Table 1. Results from logistic regression analyses are reported in Fig. 1 and Table 2. Interactions with gender and European region are presented in Supplementary Tables 1 and 2, respectively.

Table 1 – Baseline characteristics of participants from 10 European countries in the Survey of Health, Ageing and Retirement in Europe wave 1 and of participants in wave 1, who were followed up in waves 2, 4, 5, and 6, respectively.

Characteristic	Wave 1 (2004–2005)	Wave 2 (2006–2007)	Wave 4 (2011)	Wave 5 (2013)	Wave 6 (2015)
Background variables					
Numbers	23,864	16,509 (69.2)[a]	10,518 (44.1)[a]	9715 (40.7)[a]	9246 (38.7)[a]
Age, mean (SD) [years]	64.6 (10.0)	64.1 (9.7)	63.3 (8.9)	62.6 (8.5)	62.1 (8.2)
Female	12,918 (54.1)	9004 (54.5)	5812 (55.3)	5414 (55.7)	5139 (55.6)
Level of education					
Lower	12,434 (52.6)	8576 (52.3)	5226 (50.1)	4806 (49.9)	4656 (50.7)
Medium	6920 (29.3)	4717 (28.8)	3043 (29.2)	2770 (28.8)	2645 (28.9)
Higher	4294 (18.2)	3098 (18.9)	2163 (20.7)	2055 (21.3)	1875 (20.4)
Marital status					
Married	17,497 (73.4)	12,145 (73.6)	8011 (76.2)	7455 (76.8)	7097 (76.8)
Unmarried/divorced	2732 (11.5)	1882 (11.4)	1224 (11.6)	1149 (11.8)	1077 (11.7)
Widowed	3604 (15.1)	2474 (15.0)	1277 (12.2)	1105 (11.4)	1069 (11.6)
Employment					
Employed	6449 (27.5)	4597 (28.3)	3129 (30.3)	3088 (32.3)	3009 (32.9)
Unemployed/sick	1510 (6.5)	1010 (6.2)	682 (6.6)	642 (6.7)	539 (5.9)
Retired/homemaker	15,467 (66.0)	10,639 (65.5)	6527 (63.1)	5819 (60.9)	5590 (61.2)
Long-term illness					
Yes	11,669 (49.0)	7878 (47.8)	5110 (48.6)	4615 (47.6)	4190 (45.4)
No	12,133 (51.0)	8619 (52.3)	5398 (51.4)	5089 (52.4)	5047 (54.6)
Measures of religiousness					
Belong to a religion					
Protestant	4442 (27.3)	3084 (26.3)	2247 (29.6)	2036 (29.0)	1668 (24.8)
Catholic	7362 (45.3)	5199 (44.3)	3976 (52.3)	3722 (53.0)	3107 (46.1)
Other (Orthodox, Jewish, Muslim, or other, etc.)	2181 (13.4)	1832 (15.6)	204 (2.7)	185 (2.6)	1181 (17.5)
None	2278 (14.0)	1623 (13.8)	1169 (15.4)	1076 (15.3)	783 (11.6)
Pray	11,137 (68.9)	8132 (69.6)	5006 (66.2)	4632 (66.3)	4756 (70.8)
Attend religious services	2823 (12.0)	2135 (13.0)	1085 (10.4)	1048 (10.8)	1327 (14.4)
Religiously educated	12,378 (76.1)	8999 (76.8)	5688 (75.0)	5238 (74.5)	5.163 (76.8)
Comparisons					
Restful religiousness[b]	1887 (8.3)	1478 (9.3)	723 (7.1)	703 (7.5)	913 (10.3)
Crisis religiousness[c]	1222 (19.5)	869 (19.7)	578 (18.4)	551 (19.0)	514 (20.8)
Non-religious[d]	2435 (14.3)	1699 (13.9)	1224 (15.5)	1144 (15.7)	947 (13.4)
Outcomes					
Hopes for the future[e]	20,405 (86.7)	14,309 (87.8)	8936 (86.5)	8280 (87.2)	–
Suicidal thoughts[e]	1519 (6.5)	954 (5.9)	648 (6.3)	641 (6.8)	–
Difficulties in concentration	3187 (13.5)	2030 (12.4)	1359 (13.1)	1316 (13.8)	1294 (14.6)
Irritability recently	5232 (22.2)	3617 (22.2)	2530 (24.5)	2292 (24.1)	2097 (23.6)
Fatigue recently	7371 (31.3)	5164 (31.6)	3687 (35.6)	3414 (35.9)	3303 (37.2)
Enjoyment recently	20,264 (86.1)	14,182 (87.0)	8941 (86.5)	8266 (86.9)	7715 (86.9)

SD, standard deviation.
Numbers are N (%) unless stated otherwise
[a] Proportion of participants from wave 1, who were followed up in the specific wave.
[b] Praying, attending religious service, and religiously educated.
[c] Praying, not attending religious service, and not religiously educated.
[d] Not praying, not attending religious service, and not religiously educated.
[e] Responses on hopes for the future and suicidal thoughts and feelings were not collected in wave 6.

In the overall model, higher frequency of prayer was associated with lower odds of having no hopes for the future (OR = 0.89, 95% CI: 0.81–0.99) and of experiencing suicidal thoughts (OR = 0.84, 95% CI: 0.72–0.97) (Fig. 1A, Table 2). When examining interactions with gender, lower odds of not having engaged in any enjoyable activities were found for men who reported praying (OR = 0.81, 95% CI: 0.72–0.92), whereas no association was found for women (OR = 1.07, 95% CI: 0.95–1.22) (Supplementary Table 1).

Attendance at religious services was associated with all six depressive symptoms in the overall model; that is, lower odds of having no hopes for the future (OR = 0.74, 95% CI: 0.67–0.83), of experiencing suicidal thoughts (OR = 0.69, 95% CI: 0.55–0.81), of having difficulties in concentrating (OR = 0.80, 95% CI: 0.72–0.88), of having been irritable recently (OR = 0.77, 95% CI: 0.71–0.85), of having experienced fatigue in the last month (OR = 0.84, 95% CI: 0.78–0.91), and of not having engaged in any enjoyable activities lately (OR = 0.84, 95% CI: 0.76–0.93) (Fig. 1B, Table 2). When an interaction term between religious service attendance and gender was introduced in the overall model, we found lower odds of irritability for women who attended religious service (OR = 0.70, 95% CI: 0.62–0.78), whereas no association was found for men (OR = 0.92, 95% CI: 0.80–1.06) (Supplementary Table 1).

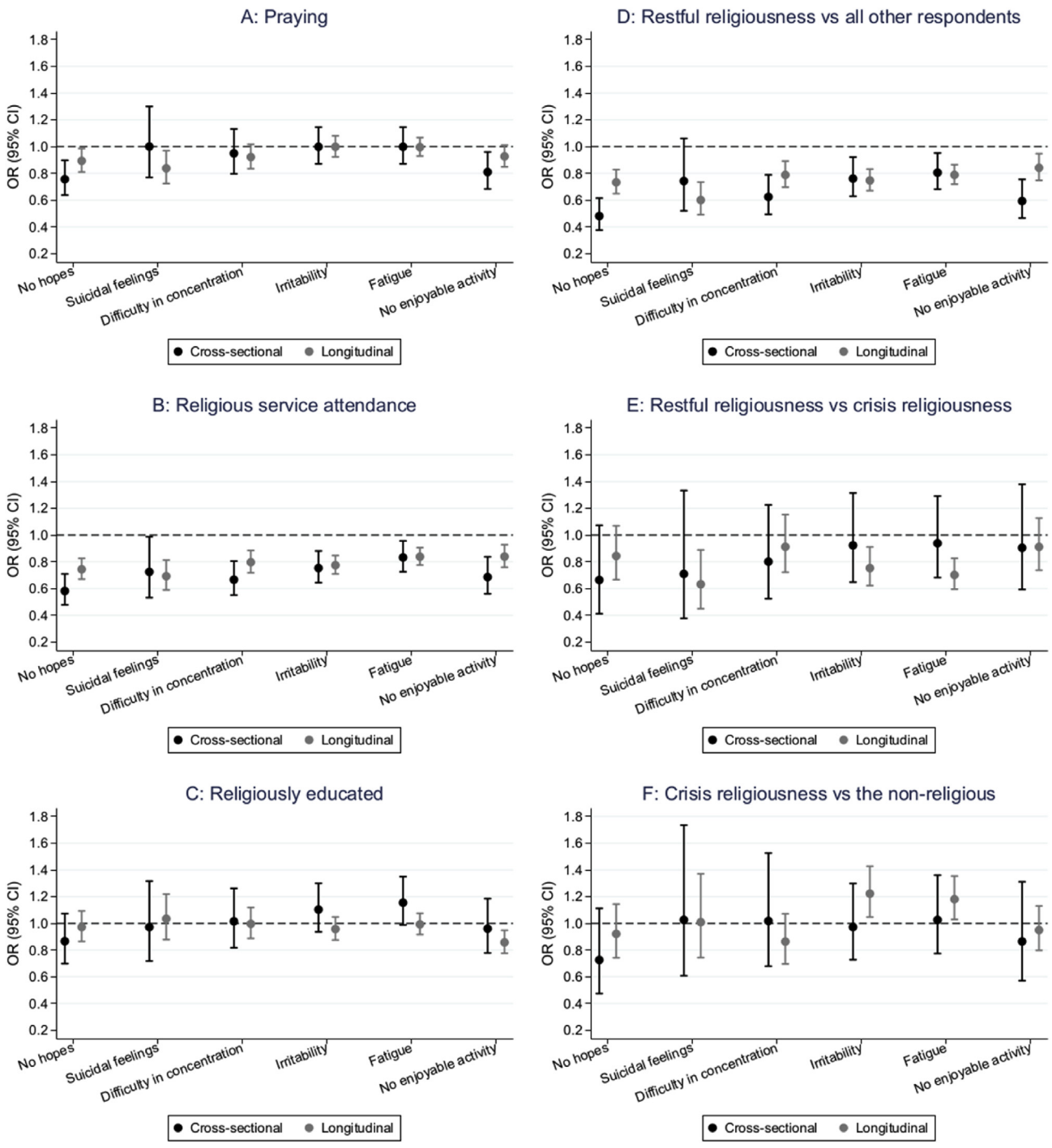

Fig. 1 – Associations between religiosity measures (A-F) and depressive symptoms in a cross-sectional and an overall longitudinal setting, respectively, based on wave 1 participants (2004–05) from SHARE, who were followed up in at least one of waves 2 (2006–07), 4 (2011), 5 (2013), and 6 (2015), adjusted for European region, gender, age at interview, education, marital status, employment, and long-term illness. SHARE, Survey of Health, Ageing, and Retirement in Europe; OR, odds ratio; CI, confidence interval.

Religious education was associated with lower odds of not having engaged in any enjoyable activities lately in the overall model (OR = 0.86, 95% CI: 0.78–0.95) (Fig. 1C, Table 2); however, there was a significant interaction with gender, with lower odds of not having engaged in enjoyable activities for men, who were religiously educated (OR = 0.72, 95% CI: 0.63–0.82), but no association for women (OR = 1.01, 95% CI: 0.89–1.16). Furthermore, we found an interaction between gender and having no hopes for the future, with lower odds for men who were religiously educated (OR = 0.85, 95% CI: 0.72–0.99), but no association for women (Supplementary Table 1).

Table 2 – Associations between religiosity measures and depressive symptoms in a cross-sectional and a longitudinal setting, respectively based on wave 1 participants (2004–05) from SHARE, who were followed up in at least one of waves 2 (2006–07), 4 (2011), 5 (2013), and 6 (2015), adjusted for European region, gender, age at interview, education, marital status, employment, and long-term illness.

Variables	Cross-sectional model	Overall longitudinal model	Interaction model			
	OR (95% CI)	OR (95% CI)	Wave 2 OR (95% CI)	Wave 4 OR (95% CI)	Wave 5 OR (95% CI)	Wave 6 OR (95% CI)
Praying						
No hopes for the future	0.76 (0.64–0.90)[a]	0.89 (0.81–0.99)	0.79 (0.68–0.91)[a]	0.90 (0.76–1.05)	0.98 (0.82–1.16)	0.97 (0.82–1.16)
Suicidal thoughts	1.00 (0.77, 1.30)	0.84 (0.72, 0.97)	0.85 (0.71, 1.03)	0.93 (0.74, 1.16)	0.91 (0.73, 1.14)	0.64 (0.51, 0.82)[a]
Difficulty in concentration	0.95 (0.80, 1.13)	0.92 (0.84, 1.02)	0.77 (0.67, 0.88)[a]	0.92 (0.78, 1.08)	1.01 (0.86, 1.20)	1.12 (0.94, 1.33)
Irritability	1.00 (0.87, 1.15)	1.00 (0.92, 1.08)	0.86 (0.77, 0.95)	1.08 (0.96, 1.22)	1.16 (1.02, 1.32)	0.99 (0.87, 1.14)
Fatigue	1.00 (0.87, 1.15)	1.00 (0.93, 1.07)	0.88 (0.80, 0.97)	1.06 (0.95, 1.18)	1.10 (0.98, 1.24)	1.01 (0.89, 1.13)
No enjoyable activity	0.81 (0.68, 0.96)	0.93 (0.85, 1.01)	0.81 (0.71, 0.92)[a]	1.11 (0.95, 1.30)	0.88 (0.75, 1.03)	0.99 (0.83, 1.18)
Religious service attendance						
No hopes for the future	0.58 (0.48, 0.71)[a]	0.74 (0.67, 0.83)[a]	0.62 (0.53, 0.73)[a]	0.79 (0.64, 0.97)	0.77 (0.62, 0.96)	0.88 (0.75, 1.05)
Suicidal thoughts	0.72 (0.53, 0.99)	0.69 (0.59, 0.81)[a]	0.70 (0.56, 0.87)[a]	0.71 (0.53, 0.96)	0.67 (0.50, 0.91)	0.68 (0.51, 0.90)
Difficulty in concentration	0.67 (0.55, 0.81)[a]	0.80 (0.72, 0.88)[a]	0.68 (0.58, 0.79)[a]	0.90 (0.74, 1.10)	0.86 (0.70, 1.05)	0.86 (0.73, 1.05)
Irritability	0.75 (0.64, 0.88)[a]	0.77 (0.71, 0.85)[a]	0.68 (0.60, 0.77)[a]	1.02 (0.87, 1.18)	0.91 (0.77, 1.07)	0.65 (0.56, 0.76)[a]
Fatigue	0.83 (0.72, 0.96)	0.84 (0.78, 0.91)[a]	0.71 (0.64, 0.79)[a]	0.93 (0.81, 1.07)	1.02 (0.88, 1.17)	0.84 (0.74, 0.96)
No enjoyable activity	0.69 (0.56, 0.84)[a]	0.84 (0.76, 0.93)[a]	0.71 (0.61, 0.82)[a]	1.24 (1.04, 1.49)	0.76 (0.62, 0.95)	0.83 (0.69, 0.99)
Religiously educated						
No hopes for the future	0.87 (0.70, 1.07)	0.97 (0.87, 1.09)	0.92 (0.78, 1.09)	0.90 (0.75, 1.07)	1.04 (0.85, 1.28)	1.08 (0.88, 1.33)
Suicidal thoughts	0.97 (0.72, 1.32)	1.04 (0.88, 1.22)	1.14 (0.91, 1.42)	0.98 (0.77, 1.25)	1.18 (0.91, 1.54)	0.81 (0.62, 1.06)
Difficulty in concentration	1.02 (0.82, 1.26)	1.00 (0.89, 1.12)	0.93 (0.80, 1.09)	0.85 (0.71, 1.02)	1.12 (0.92, 1.35)	1.20 (0.98, 1.47)
Irritability	1.10 (0.94, 1.30)	0.96 (0.88, 1.05)	0.87 (0.77, 0.97)	1.03 (0.90, 1.18)	1.14 (0.98, 1.31)	0.86 (0.74, 1.00)
Fatigue	1.16 (0.99, 1.35)	0.99 (0.92, 1.08)	0.92 (0.83, 1.02)	1.04 (0.92, 1.17)	1.06 (0.93, 1.20)	1.00 (0.88, 1.14)
No enjoyable activity	0.96 (0.78, 1.19)	0.86 (0.78, 0.95)[a]	0.83 (0.71, 0.96)	0.86 (0.73, 1.02)	0.86 (0.72, 1.03)	0.91 (0.76, 1.10)
Comparison 1: restful religiousness vs all other participants						
No hopes for the future	0.48 (0.32, 0.62)[a]	0.73 (0.65, 0.83)[a]	0.58 (0.48, 0.70)[a]	0.83 (0.65, 1.06)	0.71 (0.55, 0.93)	0.92 (0.76, 1.11)
Suicidal thoughts	0.74 (0.52, 1.06)	0.60 (0.49, 0.73)[a]	0.62 (0.47, 0.81)[a]	0.60 (0.41, 0.88)	0.55 (0.37, 0.81)	0.62 (0.44, 0.86)
Difficulty in concentration	0.62 (0.49, 0.79)[a]	0.79 (0.70, 0.89)[a]	0.61 (0.51, 0.74)[a]	0.89 (0.70, 1.14)	0.92 (0.73, 1.16)	0.90 (0.74, 1.10)
Irritability	0.76 (0.63, 0.92)	0.75 (0.67, 0.83)[a]	0.63 (0.55, 0.74)[a]	0.96 (0.80, 1.15)	0.96 (0.80, 1.16)	0.62 (0.51, 0.74)[a]
Fatigue	0.81 (0.68, 0.95)	0.79 (0.72, 0.86)[a]	0.63 (0.55, 0.71)[a]	0.87 (0.73, 1.03)	0.98 (0.81, 1.19)	0.85 (0.73, 0.99)
No enjoyable activity	0.59 (0.47, 0.76)[a]	0.84 (0.75, 0.95)	0.63 (0.53, 0.76)[a]	1.40 (1.13, 1.74)	0.69 (0.53, 0.91)	0.94 (0.77, 1.15)
Comparison 2: restful religiousness vs crisis religiousness						
No hopes for the future	0.66 (0.41, 1.07)	0.84 (0.67, 1.07)	0.69 (0.49, 0.97)	0.85 (0.58, 1.24)	0.84 (0.55, 1.30)	1.09 (0.74, 1.59)
Suicidal thoughts	0.71 (0.38, 1.33)	0.63 (0.45, 0.89)	0.71 (0.45, 1.11)	0.61 (0.36, 1.04)	0.56 (0.32, 0.97)	0.62 (0.36, 1.07)
Difficulty in concentration	0.80 (0.52, 1.23)	0.91 (0.72, 1.15)	0.75 (0.54, 1.05)	0.84 (0.59, 1.22)	1.16 (0.78, 1.73)	1.02 (0.71, 1.49)
Irritability	0.92 (0.65, 1.31)	0.75 (0.62, 0.91)	0.61 (0.48, 0.78)[a]	0.94 (0.71, 1.25)	1.12 (0.84, 1.51)	0.53 (0.40, 0.72)[a]
Fatigue	0.94 (0.68, 1.29)	0.70 (0.60, 0.89)[a]	0.56 (0.45, 0.69)[a]	0.70 (0.54, 0.90)	0.94 (0.72, 1.22)	0.75 (0.58, 0.96)
No enjoyable activity	0.90 (0.59, 1.38)	0.91 (0.74, 1.13)	0.73 (0.54, 1.00)	1.21 (0.86, 1.70)	0.78 (0.53, 1.14)	1.01 (0.70, 1.45)
Comparison 3: crisis religiousness vs the non-religious						
No hopes for the future	0.73 (0.47, 1.11)	0.92 (0.74, 1.14)	0.88 (0.64, 1.21)	0.97 (0.68, 1.37)	0.94 (0.64, 1.40)	0.91 (0.61, 1.36)
Suicidal thoughts	1.03 (0.61, 1.73)	1.01 (0.74, 1.37)	1.00 (0.66, 1.54)	0.97 (0.62, 1.54)	1.27 (0.78, 2.08)	0.83 (0.50, 1.37)
Difficulty in concentration	1.02 (0.68, 1.53)	0.86 (0.70, 1.07)	0.79 (0.58, 1.07)	0.92 (0.66, 1.29)	0.78 (0.54, 1.14)	1.02 (0.70, 1.50)
Irritability	0.97 (0.73, 1.30)	1.22 (1.05, 1.43)	1.17 (0.93, 1.43)	1.23 (0.96, 1.58)	1.14 (0.88, 1.48)	1.41 (1.08, 1.83)
Fatigue	1.03 (0.77, 1.36)	1.18 (1.03, 1.35)	1.15 (0.95, 1.38)	1.37 (1.10, 1.71)	1.11 (0.88, 1.40)	1.11 (0.88, 1.40)
No enjoyable activity	0.86 (0.57, 1.31)	0.95 (0.80, 1.13)	0.93 (0.71, 1.22)	1.09 (0.80, 1.48)	0.85 (0.60, 1.18)	0.94 (0.66, 1.35)

OR, odds ratio; CI, confidence interval; SHARE, Survey of Health, Ageing, and Retirement in Europe.
[a] Significant after correcting for multiple testing.

In the overall model, when comparing the group of restful religious vs all other respondents (Comparison 1), the restful religious had lower odds of having no hopes for the future (OR = 0.73, 95% CI: 0.65–0.83), of experiencing suicidal thoughts (OR = 0.60, 95% CI: 0.49–0.73), of having difficulties concentrating (OR = 0.79, 95% CI: 0.70–0.89), of having been irritable recently (OR = 0.75, 95% CI: 0.67–0.83), of having experienced fatigue in the last month (OR = 0.79, 95% CI: 0.72–0.86), and of not having engaged in any enjoyable activities lately (OR = 0.84, 95% CI: 0.75–0.95) (Fig. 1D, Table 2). A significant interaction was found for irritability, showing lower odds of having been irritable recently for women who were restfully religious (OR = 0.64, 95% CI: 0.56–0.74), whereas no association was found for men (OR = 0.96, 95% CI: 0.81–1.13) (Supplementary Table 1).

When comparing the restful religious and the crisis religious (Comparison 2), the overall model showed that the restful religious had lower odds of experiencing suicidal thoughts (OR = 0.63, 95% CI: 0.45–0.89), of having been irritable recently (OR = 0.75, 95% CI: 0.62–0.91), and of having experienced fatigue in the last month (OR = 0.70, 95% CI: 0.60–0.89) (Fig. 1E, Table 2). When compared with the non-

religious (Comparison 3), the crisis religious had higher odds of irritability (OR = 1.22, 95% CI: 1.05–1.43) and of having experienced fatigue in the last month (OR = 1.18, 95% CI: 1.03–1.35) (Fig. 1F, Table 2).

Most of the reported results below are significant after correction for multiple testing using the Holm-Bonferroni correction (Table 2).

When investigating interactions between religiosity measures and regions, only few interactions were found (Supplementary Table 2). For Western and Northern European participants, most associations were non-significant, whereas lower odds of depressive symptoms were found for Southern European participants for most of the associations (Supplementary Table 2).

Discussion

The present study served to shed light on the associations between religiousness and symptoms of depression and to investigate how measures of religious internalizations were associated with depressive symptoms.

As hypothesized, religiousness was associated with fewer depressive symptoms, which was true for all measures of religiousness, but most pronounced for religious service attendance. Attending religious service was associated with lower odds of all outcome variables, also after correcting for multiple testing, and thus can be considered protective against depressive symptomatology. This is in line with previous research conducted in Europe.[8,9] Potential explanations for the protective effect of attendance at religious service may be that it provides structures for coping with stress, as well as community and social support.[22,29–31] Prayer was only associated with two of six symptoms (lower odds of having no hopes for the future as well as lower odds of experiencing suicidal thoughts). Consequently, it does not contribute quite as clearly as attendance, which is in agreement with previous studies.[10–12] Nonetheless, prayer may produce its favorable effects because of its capability to generate hope and trust that a higher being is in control of the situation.[32] Prayer may also promote a feeling of connectedness and a sense of belonging to some significant other, which has been found to constitute a protective factor against suicidal thoughts.[33] No clear patterns were identified with respect to regional differences.

This study is the fourth in a series investigating the associations between religiousness and health using longitudinal models.[18–20] The studies share a common design and data set; however, they investigate different outcomes. Religious service attendance was associated with good health outcomes across all four studies, whereas the findings for prayer were mixed; in one study, prayer was associated with worse health,[20] whereas in another one, it was associated with better health.[19] In a third study, no association between prayer and health was found.[18] The findings for religious education were also rather mixed across the four studies, but a tendency toward lower odds of adverse health outcomes were found for people who were religiously educated.[18–20] In concert with earlier studies of the middle-aged and older European population, we found only limited evidence that crisis religiousness was associated with worse health outcomes, which was in accordance with findings from the earlier studies.[18–20] Nonetheless, these findings lend support to the distinction between two different religious internalizations, which are differently associated with health.[16–21]

A strength of this study is the very large sample, as well as the longitudinal design. While we cannot rule out the possibility of reverse causality (e.g. that people who become depressed stop attending church, which may lead to negative associations between church attendance and depressive symptoms), having the opportunity to follow participants up after 2, 7, 9, and 11 years, and controlling for potential confounders may help in suggesting the direction of causality.[34] A limitation of the study is the relatively low response rate in wave 1 and attrition from the sample.[23] Another limitation was the fact that one-third of responses were missing on prayer and religious education. Although we have adjusted for a range of potential confounders, we cannot exclude that the results may suffer from unmeasured confounding effects such as differences in religious activity and population composition in the different European countries. Also, the measures of religious internalizations were not based on validated psychometric scales; rather, they consisted of crude combinations of religious characteristics. Future studies should seek to develop valid scales to measure these internalizations of religiousness.

In conclusion, our findings suggest that religiousness is associated with lower odds of developing symptoms of depression, particularly for those who attend religious service. If the association is truly causal in the presented direction, encouraging older persons—who are religious—to maintain their religious practices and attend religious services may be advisable. In addition, these findings may suggest that researchers should seek to understand the active mechanisms of religious participation and find ways to offer similar services in a non-religious format to older individuals not affiliated with religion.

Author statements

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Ethical approval

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Competing interests

The authors declare no conflicts of interests.

Author contributions

L.J.A. and N.C.H. conceptualized and designed the study. T.O drafted all versions of the manuscript. L.JA. and S.M. performed data analyses. All authors helped interpreting the data and critically revised the manuscript. All authors approved the final version of the manuscript.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.puhe.2019.07.011.