Soc Psychiatry Psychiatr Epidemiol (1997) 32: 284–291

ORIGINAL PAPER

A.W. Braam · A.T.F. Beekman · T.G. van Tilburg
D.J.H. Deeg · W. van Tilburg

Religious involvement and depression in older Dutch citizens

Accepted: 30 July 1996

Abstract It has been suggested that religiosity helps prevent depression in older people. This study examines the association between religious involvement and depression in older Dutch citizens and focuses on models of the mechanism in which religious involvement has an impact on other factors related to depression. The subjects were 2,817 older adults aged 55–85 years living in the community who participated in the Longitudinal Aging Study Amsterdam. Depressive symptoms were assessed using the Center for Epidemiologic Studies Depression Scale (CES-D). Religious involvement was assessed using items on frequency of church attendance and strength of church affiliation. Further data were collected on physical health, size of social network, social support, sense of mastery and self-esteem. As in North American studies, religious involvement appeared to be inversely associated with depression, both on symptom and syndrome levels. Controlling for sociodemographics, physical impairment and network support did not substantially affect this association, particularly among subjects aged 75–85 years. The inverse association between religious involvement and depression was not selectively more pronounced among older people with physical impairments. However, the association appeared to be most specific for subjects with a small social network and those with a low sense of mastery.

Introduction

In the past decade, there has been an increasing interest in research in the relationship between religiosity and religiousness and depression, especially in North America (Bergin 1983; Larson et al. 1986; Kroll and Sheehan 1989; Pressman et al. 1990; Koenig et al. 1992; Levin 1994). Findings among older adults mainly indicate modest associations, with religiosity protecting against depression. Nevertheless, there is a lack of information about the relative contribution of religiosity to depression among other protecting and provoking factors. Perhaps this is also due to clinical practice, where discussions about religious issues are often ignored and avoided possibly because they may rouse a sense of mutual discomfort (Crossley 1995).

The interpretation of an inverse association between religiosity and depression in older persons may be complicated. First, the association may be spurious due to confounding effects caused by physical health, social integration and personality characteristics (Levin 1994). *Physical impairment* may restrict the capacity of older people to engage in church activities (Markides et al. 1987) and is also found to be associated with depression (Berkman et al. 1986). *Social integration* may be related to religiosity in its effects on depression (Levin 1994; Idler and Kasl 1992; Petersen and Roy 1985). Durkheim proposed in *Le suicide* [(1897) 1951] that social integration explains the protecting effects of religion on suicide. In depression, however, this association has not been clearly demonstrated (Idler 1987). *Personality characteristics* are also suggested to be interrelated with religiosity in its effects on depression. Religious rituals may provide structure to an individual's life and foster a sense of mastery (Idler 1987; Petersen and Roy 1985). Likewise, religious convictions may bolster feelings of self-esteem by facilitating answers to existential questions about identity, meaning of life, suffering and death (Krause 1992).

A second issue that needs consideration is the effect of *age*. Cohort effects may affect the relationship between religiosity and depression due to the secularization process (Becker and Vink 1994). Besides, there is evidence that religious coping mechanisms are more

A.W. Braam (✉) · A.T.F. Beekman · T.G. van Tilburg
D.J.H. Deeg · W. van Tilburg
Department of Psychiatry and Department of Sociology and Social Gerontology, Vrije Universiteit, Valeriusplein 7–9, 1075 BG Amsterdam, The Netherlands

important among the oldest older adults (Courtenay et al. 1992).

Models of the process through which religiosity affects mood generally reflect the stress-vulnerability model (Brown and Harris 1978). Different mechanisms have been proposed with respect to the way protecting factors relate to vulnerability factors, stressors and depression. According to the buffering model (Cohen and Wills 1985), a protecting factor is defined as a stress buffer when it is related to depression only for a person under stress. The alternative model is the main-effect model, in which a protecting factor has a beneficial effect on depression, irrespective of the presence of stress. To determine whether religiosity acts as a protecting factor, Krause and Tran (1989) have explored two examples of the stress-buffer model. In the *moderator model*, stress and religiosity are not correlated or are only slightly correlated. However, they have an interactive effect: the impact of stress on mental health is contingent on the level of current religiosity. In the second model, the *suppressor model*, stress increases religious involvement, which in turn tends to bolster mental health, thereby diminishing the negative effects of stress. The main effect model applied to religiosity is labelled by Krause and Tran (1989) as the *counterbalancing model*: stress and religiosity exert direct, opposite effects on mental health, but there is no relationship between stress and religiosity. The study by Krause and Tran has provided support for the counterbalancing model only: effects of religious involvement appeared to be non-stress-responsive.

The present study aims to answer the following questions: (1) is there an inverse association between religious involvement and depression among older adults in the Netherlands, analogous to findings from previous, predominantly North American Studies? (2) if this association exists, can it be attributed to effects of physical health, social integration or personality, or will an independent association remain? (3) which of the models introduced by Krause and Tran best explains the associations found? and (4) can subgroups, specifically age categories, be identified for which religiosity is of special relevance for depression? The strength of the association between religiosity and depression depends on the dimension of religiosity that is the subject of study (Bergin 1983). Chatters et al. (1992) distinguish between a subjective and a behavioural dimension of religiosity. Subjective aspects of religiosity are the content of belief or the salience of religion in personal life. Behavioural aspects are religious involvement (religious participation, church affiliation) and private religious activities (e.g. praying). Religious involvement is the most frequent subject of inquiry. The present study concentrates on religious involvement, using the same measure as Krause and Tran (1989), in order to compare and contribute to results about the models described above.

Methods

Sample

The present study is part of the Longitudinal Aging Study Amsterdam (LASA), a 10-year interdisciplinary study on predictors and consequences of changes in autonomy and well-being in the ageing population (Deeg and Westendorp-de Serière 1994). LASA uses the sample recruited by the NESTOR programme, Living Arrangements and Social Networks of Older Adults in the Netherlands (LSN; Knipscheer et al. 1995). LSN participants were approached for the first LASA cycle after 11 months. The LSN/LASA cohort was based on a random sample of older adults (aged 55–85 years) stratified for age, sex and expected mortality 5 years into the study. In addition, the sample was selected in such a way that, after 10 years, the number of males and females in the oldest age categories would still be large enough for study. Registers of 11 municipalities in areas in the west, north-east and south of the Netherlands provided the sampling pool, so that a sample representative of the Dutch older population with respect to geographic region and degree of urbanization could be selected. Both the LSN interview and the LASA interview were conducted in the homes of the respondents by specially trained and intensively supervised lay interviewers. All interviews were tape-recorded in order to monitor the quality of the data. Informed consent was obtained from all subjects according to approved university procedures.

The number of respondents in the LSN sample was 3,805. The response rate was 61.6% (refusal rate 28.1%; deceased/too frail/ineligible 10.3%). From these, a total of 3,107 were willing to participate in the main LASA interview, giving a response rate of 81.7% (refusal rate 10.4%; deceased/too frail/ineligible 7.9%). For respondents with severe mental or physical impairments ($n = 178$), a shortened version of the interview was available. Because some of the measures relevant to the present study were not included in this shortened version and because of item non-response, the final number of respondents was 2,817. Non-response was related to age ($chi^2 = 13$; $df = 2$; $P = 0.001$); more younger respondents participated. Non-response was not related to sex or to the interaction between age and sex (Smit and De Vries 1994).

Instruments

Depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D). This is a 20-item self-report scale developed to measure depressive symptoms in the community (Radloff 1977). Overlap with symptoms of physical illness is crucial in older adults, and has been shown to be minimal (Berkman et al. 1986). The Dutch translation has good psychometric properties (Cronbach's $\alpha = 0.87$). Items are scored on a 4-point scale (0–3) designating the frequency of occurrence in the previous week. The total score of the CES-D ranges from 0 to 60. As in earlier studies (Berkman et al. 1986; Beekman et al. 1996), scores of 16 or higher were used to indicate the presence of a clinically relevant depressive syndrome.

Religious involvement was assessed by two items: frequency of church attendance and strength of church affiliation. Frequency of church attendance was measured using a 5-point scale (0 = "once a year or less"; 1 = "several times a year"; 2 = "monthly"; 3 = "two to three times a month"; 4 = "once a week or more"). "Once a year" was considered as belonging to the zero category because religious involvement was expected to be negligible in persons scarcely attending church. Strength of church affiliation was measured using a 4-point scale (0 = "feeling no affiliation"; 1 = "mildly affiliated"; 2 = "affiliated"; 3 = "strongly affiliated"). Because the items were highly correlated ($r_{Spearman} = 0.81$), they were combined into a religious involvement index using the formula: (church attendance / 8) + (church affiliation / 6). This index ranges from 0 (very low religious

involvement) to 1 (very high religious involvement). In a number of analyses, the index scores were dichotomized: religious involvement was considered high for one-third of the respondents (score $\geqq 0.71$).

The sociodemographic characteristics included were sex, age, marital status and years of education. Self-reports were obtained for six physical chronic diseases that are most prevalent in the older population: chronic lung disease, cardiovascular disease, stroke, diabetes, cancer and arthritis (NCBS 1989). Functional limitations were considered to be present when the respondent reported experiencing difficulty when performing at least one of the following three activities: climbing stairs, using own or public transport, or cutting his or her own toenails (van Sonsbeek 1988). The reliability of this scale was satisfactory (Cronbach's $\alpha = 0.70$).

The social networks of people with whom the respondents maintained an important and frequent relationship were determined by using a procedure based on the findings of Cochran et al. (1990; van Tilburg 1994). In each of seven categories (persons living in the same household, children and children-in-law, other relatives, neighbours, people with whom one is working or studying, contacts in organizations and other contacts), the respondents were asked to name people above the age of 18 years who were important to them and with whom they were regularly in touch. The size of the network was determined by the number of people named in the seven categories. Questions about instrumental and emotional support were directed toward a maximum of nine relationships, other than that of spouse or partner, with the highest contact frequency. For each of the nine, or for all relationships if there were fewer, the following questions were asked: "How often in the past year did you tell X about your personal experiences and feelings?" (emotional support); "How often in the past year did *X* help you with daily chores in and around the house, such as preparing meals, cleaning the house, transport, making small repairs or filling in forms?" (instrumental support). The four answers to choose from were: "never" (0), "seldom" (1), "sometimes" (2) and "often" (3). The mean of each form of support across the various relationships was computed for each respondent. This resulted in two scales ranging from 0 (no support) to 3 (maximum support).

Sense of mastery was measured using a five-item version of the Mastery Scale (Pearlin and Schooler 1978). A characteristic item of this scale is: "I have little control of things that happen to me". Answering categories range from 1 "strongly disagree" to 5 "strongly agree". Total scores range from 5 to 25. The internal consistency of the scale was adequate (Cronbach's $\alpha = 0.69$). Self-esteem was assessed using an eight-item scale adapted from Rosenberg (1965). A central item in this scale is: "Generally speaking, I am pleased with myself". There are three answer categories (1 = "no", 2 = "more or less" or 3 = "yes"). Total scores range from 8 to 24. The reliability of this scale was adequate (Loevingers homogeneity 0.33, reliability ρ 0.76).

Data analysis

The dependent variable was depression, evaluated both on the symptom level (total CES-D score) and on the syndrome level (dichotomized CES-D scores, < 16 and ≥ 16). The main independent variable was religious involvement. Parameters were tested at the 0.01 significance level.

First, bivariate analyses were performed in order to examine how religious involvement and depression related to demographic, physical health, social integration and personality variables. In this way, any confounding variables could be identified. For categorical variables (sex, marital status), a *t*-test and analysis of variance were used. Pearson correlations were computed for associations with the other variables. Second, bivariate analyses were performed for associations between the independent and dependent variables – both on the symptom level, using Pearson correlation, and on the syndrome level, computing the odds ratio.

In the next step, depression scores were regressed on the religious involvement index using multiple regression analysis, controlling in hierarchical order for any confounding variables. In an analogous model, presence of a high depression score (≥ 16) was regressed on religious involvement using logistic regression analysis. In this way, we evaluated whether the association between religious involvement and depression remained an independent association or, instead whether it was largely determined by other factors. In order to examine the need for separate analyses in the oldest age cohort, the presence of an interaction effect between religious involvement and age cohort (55 –74) versus 75 – 85 years) was tested.

Subsequently, the three models of mechanisms for religiosity and depression (Krause and Tran 1989) were explored. *Moderator* effects were ascertained using analysis of variance, testing for interaction terms. In these analyses, independent variables were dichotomized on one-third of their range, identifying the subgroups that are probably most vulnerable to depression. Consequently, the variables – size of social network, instrumental and emotional support, mastery and self-esteem – were considered low for 33% of the respondents. *Suppressor* effects were assessed by regression analysis for stressors or chronic strains that were positively associated with religiosity; the estimated direct effect of the stressor on depression should increase when the effect of religiosity is controlled for (Wheaton 1985). Effects of the *counterbalancing* type were established when no moderator or suppressor effects could be found. All models proposed were tested controlling for effects by confounding variables; mean CES-D scores were adjusted accordingly.

Finally, the impact of religious involvement on depression was assessed in stratified analyses for subgroups that were of particular interest. These subgroups were identified in the multivariate analyses and in the analyses exploring moderator and suppressor effects; they involved a category from the physical health, social network or personality variables.

Results

Sample characteristics and basic associations

Characteristics of the study sample are presented in the first column of Table 1. Due to the sampling procedure, men and women were fairly evenly represented. Half of the sample (51%) had at least one chronic physical disease and 39% reported at least one functional limitation. This shows that attrition did not reduce the sample to a selection of healthy older individuals. CES-D scores were high (≥ 16) for 13.4% of the sample.

Associations between religious involvement and sociodemographics, physical health, social integration and personality variables are given in the second column of Table 1. Male respondents, divorcees, the younger old and the more educated tended to have lower scores on the religious involvement index than women, non-divorcees, the older old and the less educated. The low degree of religious involvement among divorcees probably reflects a lower acceptance of divorce in traditional religious communities. Because the present study did not intend to also consider moral issues, the effects for marital status in further analyses were considered by distinguishing between married and not married. Religious involvement was inversely correlated with chronic diseases ($P = 0.011$), but had no significant association with functional limitations. Religious involvement was positively correlated with size of social network and the social support

Table 1 Correlations with religious involvement and depression ($n = 2817$; *CES-D* Center for Epidemiologic Studies Depression Scale)

Categorical variables	%	Religious involvement mean	CES-D total score[a] mean
Sex		$t = -3.5$ (0.000)	$t = -9.4$ (0.000)
Male	49%	0.39	6.3
Female	51%	0.45	8.9
Martial status		$F = 11.3$ (0.000)	$F = 52.1$ (0.000)
Married	65%	0.42	6.4
Never married	6%	0.48	8.8
Divorced	4%	0.23	9.6
Widowed	25%	0.44	10.3
Continuous variables	**Mean (SD)**	$r_{Pearson}$ (P)	$r_{Pearson}$ (P)
Age	70.2 (8.68)	0.07 (0.000)	0.12 (0.000)
Years of education	8.87 (3.31)	−0.08 (0.000)	−0.11 (0.000)
Major chronic diseases	0.76 (0.95)	−0.05 (0.011)	0.21 (0.000)
Functional limitations	1.34 (2.27)	0.03 (0.120)	0.32 (0.000)
Size of social network	13.9 (8.31)	0.16 (0.000)	−0.16 (0.000)
Instrumental support	0.80 (0.73)	0.11 (0.000)	0.11 (0.000)
Emotional support	1.72 (0.76)	0.07 (0.001)	−0.04 (0.049)
Sense of mastery[b]	12.4 (3.25)	−0.01 (0.530)	−0.46 (0.000)
Self-esteem[c]	21.3 (2.93)	−0.01 (0.562)	−0.38 (0.000)
Religious involvement	0.419 (0.406)		−0.09 (0.000)

[a] Overall mean = 7.7 SD = 7.6
[b] $n = 2755$
[c] $n = 2600$

indices. There was no significant association between religious involvement and mastery or self-esteem. Therefore, they were not expected to influence the association between religious involvement and depression.

The last column in Table 1 presents associations with CES-D scores. Except emotional support, all variables included had significant associations with depression. Emotional support was therefore omitted as a control variable in multivariate analyses.

Religious involvement had a significant inverse linear association with CES-D scores ($r_{Pearson} = -0.09$; linearity: Mantel–Haenszel $\chi^2 = 21$, $df = 1$, $P < 0.001$). Respondents with low (≤ 0.67) religious involvement had higher average CES-D scores (8.1) than respondents with high (≥ 0.71) religious involvement (6.8; $t = -4.4$, $P < 0.001$). Similarly, those with low religious involvement were at higher risk of having a CES-D score of 16 and higher (OR = 1.49; 99% CI = 1.08 – 2.07). Therefore, as in the North American studies, religious involvement was inversely associated with depression.

Is there an independent association

The second question is whether an association between religious involvement and depression should be attributed to effects of physical health, social integration or personality characteristics. Results of multiple regression analyses are shown in Table 2. The personality variables were not included in the regression model because they were not associated with religious involvement. Neither sociodemographics, physical impairment, size of social network nor support reduced the effects of religious involvement to insignificance. There was a significant interaction effect of religious involvement and age categories (above/below 75 years). This finding justifies separate analyses for the oldest age category. In subsequent regression analyses, the effects of religious involvement were more pronounced among the older old (75–85 years), among whom religious involvement added 1.9% to the variance explained in the CES-D scores ($\beta = -0.14$; $P < 0.001$). Among the younger old (55–74 years), religious involvement did not contribute significantly to the variance explained ($\beta = -0.05$; $P = 0.025$).

Considering CES-D scores of 16 and higher, the results of logistic regression analysis for the total sample were similar: odds ratio for having a clinically relevant depression remained significant despite control for sociodemographics, physical health and social integration. For the younger age category, 55–74 years, the odds ratio was only 1.33 (CI = 0.85 – 2.11). For the oldest old, the odds ratio amounted to 2.03 (CI = 1.20 – 3.42).

Evaluating models

The third question concerns the pathways through which religious involvement is associated with factors that have an impact on depression. The models offered

Table 2 Results of multiple regression analyses of total CES-D scores on religious involvement, and of logistic regression of CES-D scores ≥ 16 (*OR* odds ratio, *CI* confidence interval)

$n = 2817$	Total CES-D score	
	β[a]	*P*
Sex (female vs male)	0.11	0.000
Age	−0.04	0.031
Unmarried (vs married)	0.12	0.000
Education	−0.02	0.192
Chronic diseases	0.12	0.000
Functional limitations	0.22	0.000
Size of social network	−0.09	0.000
Instrumental support	0.08	0.000
Religious involvement × age category	−0.05	0.004
Religious involvement	−0.10	0.000
r^2 total	17.1%	
r^2 added by religious involvement	0.9%	
	CES-D score ≥ 616	
	OR	(99% CI)
Sex (female vs male)	1.47	(1.06–2.06)
Age ≥ 75 years	0.81	(0.57–1.44)
Unmarried (vs married)	2.03	(1.46–2.83)
Low education	1.16	(0.85–1.59)
≥ 1 chronic disease	1.80	(1.30–2.50)
≥ 1 functional limitation	2.53	(1.79–3.57)
Small social network	1.35	(0.99–1.85)
High instrumental support	1.20	(0.88–1.63)
Religious involvement × age-category	1.48	(0.75–2.95)
Low religious involvement	1.59	(1.13–2.23)[b]

[a] Betas final equations; tolerance for age was 0.76, for functional limitations, 0.68, for all other variables, tolerance > 0.80

[b] Wald = 12.3, $P < 0.001$

by Krause and Tran were used as guidelines. To detect *moderator* effects in the relationship with depression, the existence of interaction effects was examined for religious involvement, on the one hand, and the variables that were associated with depression, on the other (chronic disease, functional limitations, size of social network, instrumental support, mastery and self-esteem). Analyses were controlled for sociodemographic variables and, when possible, for chronic diseases and functional limitations. Two significant interaction terms were found for religious involvement: with size of social network ($F = 7.3$; $df = 2814, 1$; $P = 0.007$) and with mastery ($F = 9.2$; $df = 2752, 1$; $P = 0.002$). As illustrated in Fig. 1, the differences in depression scores between those with low and those with high religious involvement were most pronounced for respondents with a small network and with a low sense of mastery. These effects are also illustrated for the oldest old, although among them, religious involvement did not significantly moderate the effects of the size of social network ($F = 1.6$; $df = 981, 1$; $P = 0.201$), and only slightly, the effects of mastery ($F = 6.4$; $df = 981, 1$; $P = 0.012$). Religious involvement did not moderate the effects on depression of chronic diseases ($F = 1.2$; $df = 2814, 1$; $P = 0.269$), functional limitations ($F = 0.84$; $df = 2814, 1$; $P = 0.361$) , instrumental support ($F = 0.45$; $df = 2814, 1$; $P = 0.500$) and self-esteem ($F = 0.80$; $df = 2597, 1$; $P = 0.371$).

In the *suppressor* model, the stressor is associated with both depression and religiosity. The only variable that met this condition was instrumental support (Table 1). The direct effect of instrumental support on depression remained essentially the same when religious involvement was controlled for (results not presented). That is why suppressor effects could not be ascertained.

Consequently, we concluded that religious involvement did not buffer the effects of chronic physical disease, functional limitations, instrumental support or low self-esteem. This implies that for these variables the *counterbalancing* model, which indicates a main effect, remained as a model to explain the causal mechanism.

Relevance of religious involvement for vulnerable subgroups

The estimated direct effect of religious involvement on depression was examined further for respondents with a small social network and for respondents with a low sense of mastery. Regression analyses controlling for sociodemographics and physical impairment were performed among the oldest old (aged 75 years and older) for the pertinent subgroups (Table 3). The percentage of variance explained in depression amounted to 2.6% for respondents with a small social network. When the beta of religious involvement was compared with betas of other predictors in this equation, the value was as high as the beta of being married and was more substantial than the beta of the other demographic factors. Only the beta value of physical impairment exceeded that of religious involvement. The odds ratio of having a high CES-D score (≥ 16) was no longer significant at the 0.01 level. Among the oldest old with a low sense of mastery, religious involvement added 3.6% of the variance explained in the CES-D. The beta value of religious involvement exceeded those of all other variables. The odds ratios for having a clinically relevant depression remained highly significant.

Discussion

This study among older Dutch citizens confirmed the inverse association between religious involvement and depression previously found in North American studies. The association remained significant in a multivariate analysis, although the variance explained in

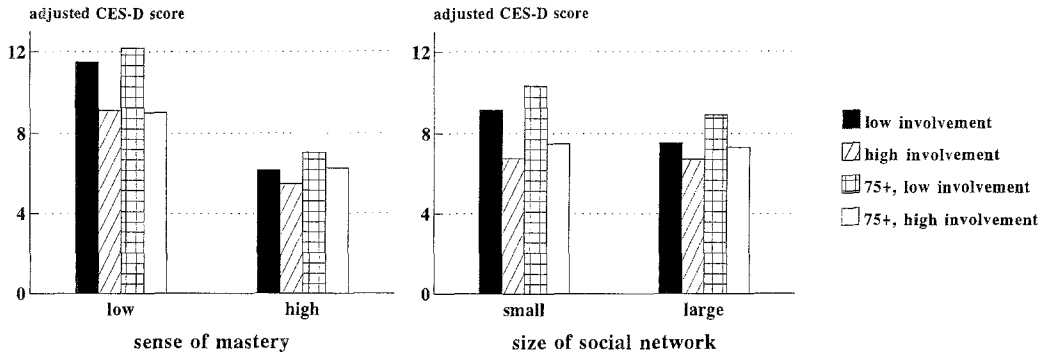

Fig. 1 Mean Centre for Epidemiologic Studies Depression Scale (CES-D) scores, adjusted for effects of sociodemographics and physical impairment, comparing low and high religious involvement, both in the total sample and in the oldest old (75 +) within the subgroups with a small and with a large social network and with a low and with a high sense of mastery

Table 3 Results of multiple regression analyses of total CES-D scores on religious involvement and results of logistic regression of CES-D scores ≥ 16, for two subgroups in the oldest age category

	Total CES-D score			
	Small network, age 75 + $n = 419$		Low mastery, age 75 + $n = 433$	
	β^a	P	β^a	P
Sex (female vs male)	0.04	0.373	0.12	0.026
Age	0.03	0.576	0.07	0.162
Unmarried (vs married)	0.17	0.000	0.15	0.003
Education	− 0.04	0.448	− 0.01	0.0853
Chronic diseases	0.12	0.016	0.05	0.271
Functional limitations	0.23	0.000	0.18	0.000
Religious involvement	− 0.16	0.000	− 0.19	0.000
r^2 total	16.7%		14.5%	
r^2 added by religious involvement	2.6%		3.6%	
	CES-D ≧ 16			
	Small network, age 75 + $n = 419$		Low mastery, age 75 + $n = 433$	
	OR	(99% CI)	OR	(99% CI)
Sex (female vs male)	1.32	(0.63–2.75)	1.61	(0.83–3.11)
Unmarried (vs married)	2.31	(1.05–5.10)	1.94	(0.98–3.83)
Low education	1.36	(0.66–2.77)	1.15	(0.62–2.13)
≥ 1 chronic disease	1.55	(0.75–3.21)	1.35	(0.71–2.60)
≥ 1 functional limitation	3.52	(1.39–8.89)	2.96	(1.25–7.01)
Low religious involvement	1.74	(0.82–3.66)[b]	2.29	(1.17–4.48)[c]

[a] Betas final equations
[b] Wald = 3.7, $P = 0.055$
[c] Wald = 10.4, $P = 0.001$

depression remained small. This is consistent with other studies. Idler (1987) has found a similar result for CES-D scores among older women, controlling for physical health, social contact and intimacy, optimism and pessimism. In a sample of white United States citizens, Ellison (1995) has found a similar inverse association between church attendance and number of Diagnostic Interview Schedule (DIS) depressive symptoms, controlling for physical diseases and subjective social support.

Considering the models previously offered to explore the association between religious involvement and depression, suppressor effects for religiosity were not established. Religious involvement seemed to exert only counterbalancing effects in the association between major chronic disease and functional limitations and depression, which is a replication of the findings presented by Krause and Tran (1989), who used the same measure for religiosity. The present study expanded an earlier studies by finding two moderator effects for

religiosity: in the association between size of social network and depression and in the association between mastery and depression. Therefore, two subgroups were identified for whom religious involvement was of particular interest in attenuating depression: older adults with a small social network and those with a low sense of mastery.

On the syndrome level, the associations remained significant, also with multivariate control. Respondents with little religious involvement had a likelihood of clinically relevant depression that was 1.5 times as high as those with high religious involvement; in respondents aged 75–85 years the likelihood was twice as high. The effect of religious involvement was strongest among the oldest old with a low sense of mastery. However, probably due to the smaller size of the subsample, there was no significant effect among the oldest respondents with small social networks.

It should be noted that the strength of the association between religious involvement and depression was not impressive, and the variance explained was small. Nevertheless, for two reasons the associations described contribute to the importance of religious involvement as a sociocultural factor in the epidemiology of depression. First, the findings provided insight into religiosity as a coping mechanism with respect to depression in later life and, on a more fundamental level, into theories regarding the psychology of religion. Second, other epidemiological factors, such as marital status and social support, which are generally viewed as determinants of depression, did not contribute substantially more, and in some subgroups even less, to the variance explained of depression.

A theoretical implication for the epidemiology of religiosity and depression is that religious involvement seems to compensate for the small networks of older adults by offering an effective network substitute, which consists of the religious community. Similarly, religious involvement compensates for a low sense of mastery, possibly by offering structure to personal life. Another explanation might be that low mastery is a specific characteristic of religiously involved persons: the deity is related to from a position of inferiority, which could be in line with Freud's perception of religious involvement as a form of infantile dependence [Freud (1927) 1962]. Other researchers argue that such dependence might be functional and could provide comfort beliefs (Neeleman and Persaud 1995). It should be noted that a large social network and a high sense of mastery could be a substitute for religious involvement as well. Nevertheless, the issue of causality cannot be addressed by these cross-sectional data.

Religious involvement did not buffer, but only counterbalanced, the depressogenic effects of physical impairment. This seems to be in contrast with evidence of a disease-buffering effect by the subjective dimension of religiosity (Koenig et al. 1992), and implies that the association between religiosity and depression may depend on the dimension of religiosity under assessment. In the present study, religious involvement was assessed only with a two-item measure, which had the advantage that the results could be compared with other studies. One may ask in which respect the results would be different if a more elaborate measure of religious involvement had been used, which, for example, would also include private religious behaviour. According to Cohen and Wills (1985), stress-buffer effects generally occur between specific stressors and specific buffers. The risk of failing to detect stress-buffering effects is possibly higher when stressors and protective factors are assessed less precisely. Therefore, the finding that religious involvement only counterbalanced (not buffered) the effect of physical impairment on depression could be due to the rather crude assessment procedure. On the other hand, stress-buffer effects of the moderating type were clearly demonstrated for religious involvement with mastery and size of social network and were apparently not obscured by the globality of assessment.

To obtain a better understanding of how religiosity affects depression, subjective dimensions of religiosity should be included in future epidemiological research. For example, contents of belief and salience of religion may predict the compensating effect of religion in situations of loss (Stark and Bainbridge 1985; Braam et al. 1994). Tornstam (1994) has generated a tentative hypothesis, based on Jung's ideas (1931), that in growing older, many older adults shift their orientation in life from a materialistic and rational perspective to a more transcendent one. When such a development or compensation is not possible, the risk of depression may be increased. Alternatively, depression may hamper this development.

The present study, in which the relevance of religion for specific groups vulnerable to depression was substantiated, presents starting points for further research. This may offer possibilities for clinicians. The basis of establishing mutual trust with older patients could be strengthened if the issue of religion was not ignored. Besides, religiosity could be incorporated into aspects of treatment, such as activation or volunteer work, for depressed older adults for whom religion is of special importance.

Acknowledgements This study was conducted as a part of the Longitudinal Aging Study Amsterdam (LASA), which is funded by the Dutch Ministry of Health, Welfare and Sports.

References

Becker JW, Vink R (1994) Secularization in the Netherlands, 1966–1991 (in Dutch). Social and Cultural Studies, 19. Sociaal Cultureel Planbureau, Rijswijk, The Netherlands

Beekman ATF, Deeg DJH, Limbeek J van, Braam AW, Vries MZ de, Tilburg W van (1996) Criterion validity of the Center for Epidemiologic Studies Depression Scale (CES-D): results from a community-based sample of older subjects in the Netherlands. Psychol Med (in press)

Bergin AE (1983) Religiosity and mental health: a critical reevaluation and meta-analysis. Profess Psychol 14: 170–184
Berkman LF, Berkman CS, Kasl S (1986) Depressive symptoms in relation to physical health and functioning in the elderly. Am J Epidemiol 124: 372–388
Braam AW, Beekman ATF, Deeg DJH, van Tilburg W (1994) Religiosity and depressive symptoms among elderly persons; a study among elder inhabitants of Sassenheim (in Dutch). Tijdschr Psychiatr 36: 509–519
Brown GW, Harris TO (1978) Social origins of depression. Tavistock, London
Chatters LM, Levin JS, Taylor RJ (1992) Antecedents and dimensions of religious involvement among older black adults. J Gerontol Soc Sci 47: 269–278
Cochran M, Larner M, Riley D, Gunnarson L, Henderson CR (1990) Extending families: the social networks of parents and their children. Cambridge University Press, Cambridge
Cohen S, Wills TA (1985) Stress, social support and the buffering hypothesis. Psychol Bull 98: 310–357
Courtenay BC, Poon LW, Martin P, Clayton GM, Johnson MA (1992) Religiosity and adaptation in the oldest old. Int J Aging Hum Dev 34: 47–56
Crossley D (1995) Religious experience within mental illness, opening the door on research. Br J Psychiatry 166: 284 –286
Deeg DJH, Westendorp-de Serière M (eds) (1994) Autonomy and well-being in the aging population. I. Report from the Longitudinal Aging Study Amsterdam 1992–1993. VU-Publishers, Amsterdam
Durkheim E ([1897] 1951) Suicide. Free Press, New York
Ellison CG (1995) Race, religious involvement and depressive symptomatology in a southeastern U.S. community. Soc Sci Med 40: 1561–1572
Freud S ([1927] 1962) The future of an illusion. In: Standard Edition, vol 21. Hogarth Press, London, pp 3–5c
Idler EL (1987) Religious involvement and the health of the elderly: some hypotheses and an initial test. Soc Forces 66: 226–238
Idler EL, Kasl SV (1992) Religion, disability, depression, and the timing of death. Am J Sociol 97: 1052–1079
Jung CG (1931) Die Lebenswende. In: Seelenprobleme der Gegenwart, Vorträge und Aufsätze; Psychologische Abhandlungen, Vol III. Rascher Verlag, Zürich Leipzig
Knipscheer CPM, Jong Gierveld J de, Tilburg TG van, Dykstra PA (1995) Living arangements and social networks of older adults. VU University Press, Amsterdam
Koenig HG, Cohen HJ, Blazer DG, Pieper C, Meador KG, Shelp F, Goli V, Dipasquale B (1992) Religious coping and depression among elderly, hospitalized medically ill men. Am J Psychiatry 149: 1693–1700
Krause N (1992) Stress, religiosity, and psychological well-being among older blacks. J Aging Health 4: 412–439
Krause N, Tran TV (1989) Stress and religious involvement among older blacks. J Gerontol Soc Sci 44: 4–13
Kroll J, Sheehan W (1989) Religious beliefs and practices among 52 psychiatric inpatients in Minnesota. Am J Psychiatry 146: 67– 72
Larson DB, Pattison EM, Blazer DG, Omran AR, Kaplan BE (1986) Research on religious variables in four major psychiatric journals. Am J Psychiatry 143: 329–334
Levin JS (1994) Religion and Health: is there an association, is it valid, and is it causal? Soc Sci Med 38: 1475–1482
Markides KS, Levin JS, Ray LA (1987) Religion, aging, and life satisfaction: an eight year, three-wave longitudinal study. Gerontologist 27: 660–665
Neeleman J, Persaud R (1995) Why do psychiatrists neglect religion? Br J Med Psychol 68: 169–178
Netherlands Central Bureau of Statistics (1989) Health interview questionnaire. Heerlen, The Netherlands
Pearlin LI, Schooler C (1978) The structure of coping. J Health Soc Behav 19: 2–21
Petersen LR, Roy A (1985) Religiosity, anxiety, and meaning and purpose: religion's consequences for psychological well-being. Rev Relig Res 27: 49–62
Pressman P, Lyons JS, Larson DB, Strain JJ (1990) Religious belief, depression and ambulation status in elderly women with broken hips. Am J Psychiatry 147: 758–760
Radloff LS (1977) The CES-D scale: a self-report depression scale for research in the general population. Appl Psychol Meas 1: 385–401
Rosenberg M (1965) Society and the adolescent self-image. Princeton University Press, Princeton
Smit JH, Vries MZ de (1994) Procedures and results of the field work. In: Deeg DJH, Westendorp-de Serière M (eds) Autonomy and well-being in the aging population. I. Report from the Longitudinal Aging Study Amsterdam 1992–1993. VU University Press, Amsterdam, pp 7–13
Sonsbeek JLA van (1988) Methodological and substantial aspects of the OECD indicator of chronic functional limitations. Maandbericht Gezondheid (Central Bureau Statistics) Heerlen, The Netherlands 88: 4–17
Stark R, Bainbridge WS (1985) The future of a religion. University of California Press, Berkeley
Tilburg TG van (1994) Social network size and support. In: Deeg DJH, Westendorp-de Serière M (eds) Autonomy and well-being in the aging population. I. Report from the Longitudinal Aging Study Amsterdam 1992–1993. VU University Press, Amsterdam, pp 79–88, VU University Press, Amsterdam
Tornstam L (1994) Gerotranscendence – a theoretical and empirical exploration. In: Thomas LE, Eisenhandler SA (eds) Aging and the religious dimension. Greenwood Publishing Group, Westport, pp 203–225
Wheaton B (1985) Models for the stress-buffering functions of coping resources. J Health Soc Behav 26: 352–364