

Original Article

Mediating Effect of Spiritual Coping Strategies on Caregiving Burden and Mental Health in Caregivers of Iranian Patients with Dementia

Abstract

Introduction: Dementia is a common cognitive disorder among elderly people requiring special care. Family carers of people with dementia (PWD) may experience mental health issues. This study examined whether spiritual coping is a mediator between the physical function of the patients and mental health status or caregiving burden in their carers. **Methods:** The caregivers of the PWD ($n = 513$) were assessed by the Instrumental Activities of Daily Living (IADL) and Spiritual Coping Strategies (SCS) questionnaires at baseline and Zarit Burden Interview, Short Form-12 (SF-12), and Hospital Anxiety and Depression Scale questionnaires at 6 months. The proposed model to assess the mediating effect of SCS was: SCS subscales as mediators, PWD's IADL as an independent variable, and mental health components as dependent variables. Using PROCESS SPSS Macro, the indirect effects of patients' IADL score on mental health-related variables in the caregivers were examined. **Results:** There were significantly negative associations between IADL score and mental health components ($r > 0.3$). SCS scores were negatively correlated with depression, anxiety, and caregiving burden ($P < 0.001$). Four models proposed to explain the indirect effects of spiritual coping on mental health variables revealed the spirituality as a significant mediator ($0.28 \leq R^2 \leq 0.65$; $P < 0.001$). The mediation effect of religious and nonreligious coping on mental health component in SF-12 was the highest ($b = 0.57$, 95% confidence interval [CI] [0.26, 0.98], $b = 1.20$, 95% CI [0.63, 1.84], respectively). **Conclusion:** Spiritual coping may be a mediator between the physical functioning of the patients and carers' mental health status and caregiving burden in Iran. Thus, further investigation is needed to show how these mediators may affect the mental health status of the caregivers.

Keywords: Caregiver, dementia, elderly, mental health, religious coping

Introduction

Dementia is among the most common disorders among elderly people, and nearly one in six people over the age of 80 years suffer from this condition.^[1] Annually 10 million new cases of dementia are diagnosed, and currently, 50 million people suffer from this disease worldwide.^[1,2] In developed countries, such as the UK, there are nearly one million people with dementia (PWD), and in developing countries, such as China, Turkey, and India, between 15% and 25% of people over 65 years old live with dementia.^[3-5] According to the National Elderly Health Survey, 7.9% of Iranian aged ≥ 60 years have been diagnosed with dementia.^[6]

Dementia is usually a deteriorative and progressive condition that negatively affects the cognitive capability of the sufferers.

As such, the PWD have serious disabilities with thinking, orientation, calculation, and memory function.^[7] In addition, the abilities to perform social behavior and control emotions are also changed in such patients.^[8] They are normally dependent on others to meet daily needs. Therefore, the patients are overwhelmed by the dependency, and their caregivers and families are also burdened. Family carers have been identified as the most important and practical resource for these patients; they are also the most prominent determinant to obtain optimal outcomes.^[9] However, caregiving duty may negatively affect the life of the family care providers, such as employment, income, safety, spare time, and their own mental and physical health.^[10] The additional challenges in such roles, due to the resistance to care, restlessness, and the difficulties in effective communication and understanding the care recipient's needs, may further complicate

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the situation.^[11] There are several studies indicating some common psychological problems among the caregivers, including depression, anxiety, stress, as well as lower quality of life than the general population.^[12,13] A study showed that between one-fourth and one-third of family carers of the PWD meet the diagnostic criteria of major depression.^[14] Furthermore, early institutionalization of the patients along with the significant impairment of daily activity can also be associated with a high level of caregiving burden.^[15] In another study, a similar level of burden has been reported among approximately 70% of carers for the PWD.^[16] Such burden may have a negative impact on the quality of care and lead to aggressive behaviors such as vocal abuse, violence, and threatening the patients with nursing home care.^[17]

The caregivers who are skilled in coping strategies are expected to have sufficient resources to provide effective care to the PWD. There are various types of coping strategies that caregivers may use to provide suitable care; however, there is a special type of coping strategy named spiritual coping, which has also been called “meaning-focused coping.” This type of coping strategy produces a strong feeling of motivation to overcome difficult situations,^[18] which may be considered as an integrated approach to control the emotion or generate solutions for the problem. Spirituality is the connection to something more superior to humans, which also includes religiosity. Indeed, a person who uses spiritual coping strategy (SCS) will apply spiritual beliefs, attitude, or behaviors to decrease stress level in life. People who use SCS believe in supernatural powers that give meanings to life and provide special supports to convert the stressful situation to a more bearable condition.^[19] A well-established body of literature has demonstrated that spiritual coping can improve the mental health status of the caregivers and prevent them from developing negative conditions, such as depression and unbearable caregiving burden.^[20,21]

Several studies on the caregivers of the PWD investigated the mediators of mental health problem in this group. For example, Hinton *et al.* assessed the association between psychiatric symptoms or cognitive impairment in the PWD and depression symptoms in their caregivers.^[22] They found a positive association between these two variables and other modifying factors, including the type of dependency between the patients and their carers (spouse vs. the others), the type of cognitive impairment (dementia vs. other impairments), and the age of the carers.^[22] Another study using a longitudinal design with 1-year follow-up on 130 caregivers of the PWD has recognized several factors as the modulators of depression development among the caregivers, such as self-efficacy, the control of disturbing thoughts, and the frequency of leisure activity.^[23]

Family caregivers are usually family members of the PWD who provide at least 1 h care daily for consecutive 3 months

or longer.^[24] In Asian cultures, the elderly should be respected and provided care in their homes. Therefore, the caregiving burden is substantially high for family members who take care of the PWD.^[25] In particular, in Middle-East Asia, the majority of the population are Muslims. The Islamic religion encourages respect to the elderly members in the family. Several studies on Christians have suggested the positive role of spiritual coping on reducing caregiving burden and mental health issues in the carers of people with chronic disorders.^[20,21] However, the mediating effect of spiritual coping in Muslim caregivers of the PWD is unknown. Moreover, in Iranian culture, religious coping is actively practiced. Based on the religious beliefs, by trusting the God, one can overcome any difficult situation which is considered as the opportunity for self-actualization. In addition, caregiving in the family setting is culturally recommended for elderly people in Iran. As such, it is the preferred care method than institutions or nursing homes. A few studies in East Asia countries supported the hypothesis that spiritual coping may be a vital mediator between the functional status of the dementia patients and their caregivers’ mental health status, quality of life, and caregiving burden,^[26,27] which formed the rationale of this study. As a result, we hypothesized that religious and nonreligious coping may mediate the effect of activities of daily living among PWD on mental health-related variables, such as quality of life, anxiety, depression, and caregiving burden, among the caregivers [Figure 1].

Methods

Participants

This is a longitudinal study with data collected between June 2016 and November 2017. The PWD and their caregivers were identified through the Iranian Alzheimer’s Association (IAA) in Qazvin and Tehran. IAA provides professional support and services to the PWD, patients with Alzheimer’s disease, and their families. Using a convenience sampling method, 642 caregivers of the PWD were recruited. The inclusion criteria were as follows: (a) taking care of the patients diagnosed with dementia according to the ICD-10 criteria; (b) 18 years or older; (c) providing home care for the PWD; and (d) providing written informed consent before the enrollment. The study was approved by the Ethics Committee of Qazvin University of Medical Sciences, and all the participants were provided with the informed consent form before enrolling in the study.

Procedure

Among 603 eligible caregivers, 15% refused to participate because of lacking time or interest. After signing the informed consent form, each participant completed the baseline assessments, including a sociodemographic questionnaire, Mini-Mental State Examination (MMSE), instrumental activities of daily living (IADL), and

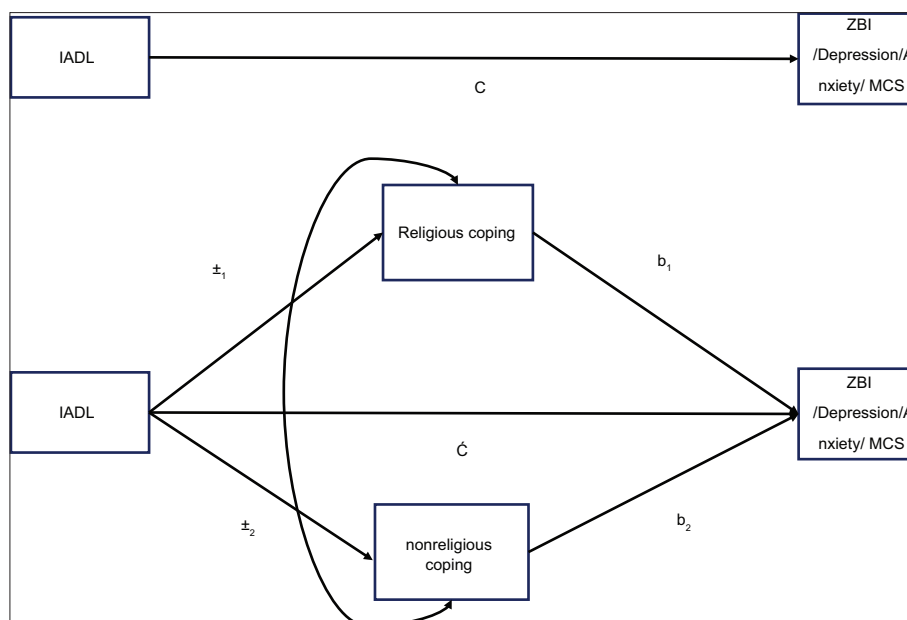


Figure 1: Proposed model of multiple mediations with religious and nonreligious copings as mediators in the effect of functional status (instrumental activities of daily living) on Zarit Burden Interview, depression, anxiety, and mental component summary in the Short Form-12

SCSs. Six months later, they completed the follow-up measurements including Zarit Burden Interview (ZBI), Hospital Anxiety and Depression Scale (HADS), and Short Form-12 (SF-12). All these measures were completed by the caregivers, except for the MMSE, which was used to evaluate the cognitive function of the PWD and indicate the degree of cognitive impairment among the PWD at baseline was. The MMSE was completed by the PWD themselves with the assistance of a trained nurse which was not used in the mediation analysis. The IADL was the only independent variable which evaluated the physical condition of the PWD that was completed by the caregivers. The MMSE and IADL provided the information of the PWD, while the other measures reflected the characteristics of the caregivers. The SCS Scale including religious and nonreligious coping was used as the mediator. The other measurements including ZBI, HADS, and SF-12 were administered to assess the mental health profile. All these measures (i.e., SCS, ZBI, HADS, and SF-12) were completed by the caregivers. Data on independent variables were collected at baseline, and those related to dependent and mediator variables were gathered at follow-up. The implementation timeline and administrators of the instruments have been demonstrated in Figure 2.

Measures

Zarit Burden Interview

The ZBI contains 22 items to measure the caregiving burden. Different factorial structures have been proposed, for example, two-factor scale including both personal and role factors. Although there are different factorial structures in ZBI, the use of ZBI as a whole to assess caregiving burden for the carers of the PWD has been highly

recommended.^[28] A higher score of ZBI indicates heavier caregiving burden. The Persian version of the ZBI has been validated with satisfactory psychometric properties of good test-retest reliability (interclass correlation coefficient = 0.78) and internal consistency (Cronbach's alpha = 0.78).^[29]

Spiritual Coping Strategies Scale

The SCS Scale contains 20 items to assess two domains of SCSs: religious coping (9 items) and nonreligious coping (11 items), with a higher score indicating better coping ability. Religious coping subscale measures the attitude toward the religion and the belief in God; nonreligious coping subscale assesses the relationships between oneself and the other people, as well as the environment. The Persian version of the SCS Scale has been validated with satisfactory psychometric properties, in which the factorial structure has been verified by confirmatory factor analysis.^[30]

Lawton Instrumental Activities of Daily Living Scale

The Lawton IADL Scale contains eight items to assess IADL, such as doing laundry, using the telephone, and managing the finance, with a higher score indicating better IADL. The Persian version of the Lawton IADL Scale has been validated with satisfactory psychometric properties of excellent test-retest reliability ($r = 0.993$) and inter-rater reliability ($r = 0.961$).^[31]

Short Form-12

The SF-12 contains 12 items to assess two domains of health-related quality of life (HRQoL) and physical and mental health composite scores (PCS and MCS). The mean score for these composite scores was 50.0 (standard

Figure 2: Study diagram

Baseline	
Measures	Administrator
Sociodemographic information	Caregiver (themselves and patients)
MMSE	Patients (with assistance of a nurse)
IADL	Caregivers (on patients)
SCS	Caregivers
↓	
Follow-up (6 months later)	
Measures	Administrator
ZBI	Caregivers
HADS	Caregivers
SF-12	Caregivers

MMSE: Mini-Mental State Examination, IADL: Instrumental activities of daily living, SCSs: Spiritual coping strategies, ZBI: Zarit Burden Interview, HADS: Hospital Anxiety and Depression Scale, SF-12: Short Form-12

deviation [SD] of the mean = 10.0) compared to the global norm. SF-12 consists of eight dimensions: physical function, role limitation due to physical impairment, role limitation due to emotional impairment, mental health (2 items per subscale), bodily pain, general health, vitality, and social function (1 item per subscale). The score ranges between 0 and 100, where a higher score indicates a better HRQoL. The Persian version of the SF-12 has been validated with satisfactory psychometric properties. Persian SF-12 can also differentiate the HRQoL between women and men and between different educational levels. In addition, the structure of Persian SF-12 was verified by confirmatory factor analysis.^[32]

Mini-Mental State Examination

The MMSE was used to assess the severity of cognitive impairment. This questionnaire can identify issues with orientation (10 points), attention and calculation (5 points), registration (3 points), recall (3 points), and language and praxis (9 points). The total score of MMSE ranges between 0 and 30, with a higher score indicating better cognitive function. The Persian version of the MMSE has been validated with satisfactory psychometric properties, which can significantly distinguish the difference in cognitive function between people with Alzheimer's disease and healthy elderly.^[33]

Hospital Anxiety and Depression Scale

The HADS contains 14 items to assess two types of emotional distress: anxiety (7 items) and depression (7 items). Each item is rated on a 4-point Likert scale (0–3) to address overt symptoms in the last week. A higher score in the HADS indicates a higher level of emotional distress. The suggested cutoff scores for emotional distress are 8–10 (mild), 11–15 (moderate), and 16 or higher (severe). The Persian version of the HADS has been validated with satisfactory psychometric properties. The construct validity

of the HADS was verified by confirmatory factor analysis and Rasch analysis.^[34]

Statistical analysis

Data were analyzed using SPSS versions 23 software (IBM, NY, USA). The results were expressed as mean and SD for continuous variables or as frequency counts and percentages for discrete data. The normal distribution of the data was checked by the Shapiro–Wilk test. Pearson correlations were used to test the correlation between the study variables. Missing data were treated using the expectation maximization imputation technique in SPSS although the percentage of missing data was small (4.7% of all variables).

Regarding mediation analysis, it was hypothesized that SCSs (i.e., religious and nonreligious coping strategies) mediate the effect of PWD's daily function (assessed by the IADL) on caregivers' burden, anxiety, depression, and cognitive function [Figure 1 for hypothesized model]. PROCESS SPSS Macro (version 2.13.2) IBM SPSS corp, New York, USA was used to examine the indirect effect of PWD's IADL (through the changes in SCSs) on caregivers' burden, anxiety, depression, and cognitive function. PROCESS is powerful to perform precise mediational analyses. It is a regression path analysis tool to assess both direct and indirect effects in single- or multiple-mediator (parallel or sequential) models. Any significant correlation between the variables included in models would be adjusted by the software. As such, two- and three-way interactions can be examined between the variables in the mediation analysis with multiple mediators. Moreover, PROCESS provides the state-of-art method to examine the mediation effects (i.e., bootstrapping). In all models, age, sex, marital status, educational level, and weekly care duration were included as covariates. To test the significance of indirect effects, we used bias-corrected bootstrap confidence intervals (CIs) with 5000 samples. If the 95% CI of the coefficient does not cover 0, this indicates a significant mediation effect. Moreover, the effect size of the indirect effects was calculated using the completely standardized effect size (CS). $P < 0.05$ was considered as statistically significant. In addition, we used the statistical method proposed by Cumming^[35] to examine whether the indirect effects of religious coping were significantly different from those from nonreligious coping. If the two 95% CIs overlap <50%, the two indirect effects are significantly different.

Results

Table 1 shows the characteristics of the PWD and their caregivers. Elderly care recipients had an average age of 70.4 (SD = 18.0) years. More than half of the patients and their caregivers were female. The average IADL score for the patients was 3.7 (SD = 1.4). The rate of comorbidity among the patients and their caregiver were 100% and

Table 1: Participants' characteristics (n=513)

Characteristics	Caregiver	Elderly
Baseline		
Age (year), mean±SD	57.64±10.65	70.36±17.96
Gender (male), n (%)	293 (57.11)	281 (54.80)
Years of education, mean±SD	6.90±3.19	3.68±2.72
Marital status, n (%)		
Single	117 (22.81)	-
Married	215 (41.91)	241 (46.98)
Widowed	181 (35.28)	272 (53.02)
Accommodation, n (%)		
Rural	92 (17.93)	103 (20.08)
Urban	421 (82.07)	410 (79.92)
Relationship to an individual with dementia, n (%)		
Spouse	138 (26.90)	-
Child	303 (59.06)	-
Others	72 (14.40)	-
Occupation, n (%)		
Employed/self-employed	291 (56.72)	-
Retired	110 (21.44)	346 (67.44)
Never been employed or others	112 (21.83)	167 (32.55)
Comorbidity (hypertension, coronary heart disease, diabetes mellitus, etc.), n (%)		
None	323 (62.96)	-
One	107 (20.86)	179 (26.96)
Two	68 (13.26)	299 (45.03)
Three and more	15 (2.92)	186 (28.01)
Duration of the caregiving, mean±SD		
Number of months	44.12±18.62	-
Hour(s) per week	71.32±22.24	-
MMSE, mean±SD	-	17.10±6.31
IADL, mean±SD	-	3.67±1.37
SCSs, mean±SD		
RC	11.69±4.07	-
NRC	16.55±8.13	-
Six months after the baseline, mean±SD		
ZBI	29.19±15.61	-
Anxiety	8.01±4.78	-
Depression	6.56±4.57	-
PCS	59.65±7.31	-
MCS	52.47±6.78	-

IADL: Instrumental activities of daily living, SF-12: Short Form-12, MCS: Mental health composite score in SF-12, MMSE: Mini-Mental State Examination, PCS: Physical health composite score, SD: Standard deviation, ZBI: Zarit Burden Interview, NRC: Nonreligious coping, RC: Religious coping, SCSs: Spiritual coping strategies

37.0%, respectively. Moreover, 82.1% of the patients and 80.0% of their caregivers were urban residents; 26.9% of the care providers were spouses, 59.1% were children, and 14.4% were "others" (siblings or friends). The results of statistical analysis for ZBI, MMSE, SCSs, anxiety, depression, and SF-12 are provided in Table 1.

Table 2 reports the zero-order correlations among the potential mediators (i.e., religious and nonreligious coping strategies), IADL, ZBI, anxiety, depression, and SF-12. Both religious and nonreligious coping strategies negatively correlated with anxiety, depression, IADL, and ZBI (all $P < 0.05$) and positively correlated with mental function ($P < 0.05$).

In the first mediation model, it was hypothesized that religious and nonreligious coping strategies would mediate the association between IADL and ZBI after controlling for demographics [Table 3, Model A]. The results revealed that the overall indirect effect of IADL on ZBI through religious and nonreligious coping strategies was significant ($b = -0.64$, 95% CI [-1.05, -0.36]). The R^2 for the model including the indirect effect was 0.28 ($F = 13.30$, $P < 0.001$). The effect size was medium to large (CS = 0.50). Moreover, the indirect effects of religious coping were significantly greater than those of nonreligious coping (overlap 95% CI = 28.4%, <50%).

In the second model [Table 3, Model B], it was hypothesized that religious and nonreligious coping strategies would mediate the association between IADL and anxiety. As indicated in Table 3, the overall indirect effect of IADL on anxiety through religious and nonreligious coping strategies was significant with a medium effect size ($b = -0.16$, 95% CI [-0.25, -0.09], CS = 0.45). The R^2 for the model including the indirect effect was 0.41 ($F = 31.73$, $P < 0.001$). These findings indicate that both religious and nonreligious coping strategies partially mediate the association between IADL and anxiety. Moreover, the indirect effects of religious coping were significantly greater than those of nonreligious coping (overlap 95% CI = 29.4%, <50%).

The third model [Table 3, Model C] examined the indirect effects of patients' IADL and caregivers' depression symptoms through using religious and nonreligious coping strategies by the caregivers. The results showed that both religious and nonreligious coping strategies can independently mediate the association between IADL and depression symptoms ($b = -0.20$, 95% CI [-0.29, -0.11], CS = 0.28). The R^2 for the model including the indirect effect was 0.52 ($F = 59.10$, $P < 0.001$). Moreover, the indirect effects of religious coping were significantly greater than those of nonreligious coping (overlap 95% CI = 31.6%, <50%).

In the last model [Table 3, Model D], it was hypothesized that religious and nonreligious coping strategies would mediate the association between IADL and mental function (MCS). The results indicated that the indirect effect of IADL on mental function (MCS) through religious and nonreligious coping strategies was significant with a large effect size ($b = 1.78$, 95% CI [1.10, 2.50], CS = 0.59). The R^2 for the model including the indirect effect was 0.65 ($F = 118.43$, $P < 0.001$). The specific indirect effects

Table 2: Zero-order correlations for spiritual coping strategies, anxiety, depression, functional status, and quality of life

	IADL	RC	NRC	ZBI	Anxiety	Depression	PCS	MCS
IADL	-	0.19**	0.14**	-0.16**	-0.30**	-0.38**	0.05	0.37**
RC	-	-	0.49**	-0.22**	-0.29**	-0.35**	-0.06	0.51**
NRC	-	-	-	-0.16**	-0.19**	-0.26**	0.08	0.36**
ZBI	-	-	-	-	0.37**	0.40**	0.04	-0.37**
Anxiety	-	-	-	-	-	0.70**	-0.37**	-0.60**
Depression	-	-	-	-	-	-	-0.24**	-0.71**
PCS	-	-	-	-	-	-	-	0.33**
MCS	-	-	-	-	-	-	-	-

**0.001. IADL: Instrumental activities of daily living, SF-12: Short Form-12, MCS: Mental health composite score in SF-12, PCS: Physical health composite score, ZBI: Zarit Burden Interview, NRC: Nonreligious coping, RC: Religious coping

Table 3: Models of the effect of patient's daily living activities on caregiving burden and mental health with spiritual coping strategies as the mediators

Path	DV							
	Model A: ZBI				Model B: Anxiety using HADS			
	Standardized coefficient	Unstandardized coefficient	SE (Boot SE)	P (95% CI)	Standardized coefficient	Unstandardized coefficient	SE (Boot SE)	P (95% CI)
Total IADL effect on DV	-0.16	-2.07	0.57	<0.001	-0.30	-0.75	0.11	<0.001
Direct IADL effect on RC	0.19	0.81	0.19	<0.001	0.19	0.83	0.20	<0.001
Direct IADL effect on NRC	0.13	0.54	0.18	0.003	0.12	0.53	0.19	0.010
Direct IADL effect on DV	-0.11	-1.43	0.56	0.012	-0.23	-0.59	0.11	<0.001
Total indirect IADL effect on DV	-0.05	-0.64	0.17	-1.05--0.36	-0.06	-0.16	0.04	-0.25--0.09
Indirect IADL effect on DV via RC	-0.03	-0.44	0.14	-0.79--0.20	-0.05	-0.11	0.04	-0.19--0.05
Indirect IADL effect on DV via NRC	-0.02	-0.20	0.09	-0.41--0.05	-0.02	-0.05	0.02	-0.10--0.02

Path	DV							
	Model C: Depression using HADS				Model D: MCS			
	Standardized coefficient	Unstandardized coefficient	SE (Boot SE)	P (95% CI)	Standardized coefficient	Unstandardized coefficient	SE (Boot SE)	P (95% CI)
Total IADL effect on DV	-0.38	-0.91	0.10	<0.001	0.37	5.40	0.60	<0.001
Direct IADL effect on RC	0.18	0.79	0.19	<0.001	0.19	0.82	0.19	<0.001
Direct IADL effect on NRC	0.13	0.54	0.19	0.010	0.14	0.58	0.19	<0.001
Direct IADL effect on DV	-0.30	-0.72	0.10	<0.001	0.25	3.62	0.51	<0.001
Total indirect IADL effect on DV	-0.08	-0.20	0.05	-0.29--0.11	0.12	1.78	0.35	1.10-2.50
Indirect IADL effect on DV via RC	-0.03	-0.13	0.04	-0.21--0.06	0.08	1.20	0.31	0.63-1.84
Indirect IADL effect on DV via NRC	-0.05	-0.07	0.03	-0.12--0.02	0.04	0.57	0.19	0.26-0.98

Age, sex, marital status, years of education, and hour (s) per week of care were adjusted for all the models. CI: Confidence interval, 95% CI: 95% CI using 5000 bootstrap samples, SE: Standard error, Boot SE: Bootstrapping SE, HADS: Hospital Anxiety and Depression Scale, IADL: Instrumental activities of daily living, SF-12: Short Form-12, MCS: Mental health composite score in SF-12, NRC: Nonreligious coping, RC: Religious coping, DV: Dependent variable, ZBI: Zarit Burden Interview

of IADL on MCS through religious and nonreligious coping strategies were also significant ($b = 0.57$, 95% CI [0.26, 0.98], $b = 1.20$, 95% CI [0.63, 1.84], respectively). Moreover, the indirect effects of religious coping were significantly greater than those of nonreligious coping (overlap 95% CI = 22.2%, <50%).

Discussion

In the current study, we found significant mediation effects of SCSs on caregiving burden and mental health status in the carers of PWD. As expected, the daily living activity of the PWD can have indirect effects on the dependent variables (i.e., caregiving burden, anxiety, depression, and mental health component of the SF-12) through spiritual coping, including both religious and nonreligious strategies. A model on the mediation effect of spiritual coping between IADL and mental health (MSC) showed the highest predictability ($R^2 = 0.65$).

One new finding of the current study was that spiritual coping significantly mediated the association between illness severity of the PWD and caregiving burden. Given that taking care of a PWD is a tremendous challenge for the carer, previous studies have proposed that coping and emotional support are significant mediators in the association between illness severity (e.g., neuropsychiatric functions in PWD) and caregiver's burden.^[36,37] Specifically, coping and emotional support can promote the carer's capacity to deal with difficult situations (e.g., the illness severity of PWD in our study). Therefore, spiritual coping, as a format of the combination of coping and emotional support, has been suggested a significant mediator in our study. Although the mediators (i.e., religious and nonreligious coping strategies) may be considered as the tool to modify the interactions where significance exists in this study, further investigations are needed to confirm the effect of interventions that modify spiritual coping on the correlation between impaired physical function of the PWD and the mental health outcomes in their caregivers. In other words, further studies may consider to design and implement effective interventions to improve spirituality among the caregivers of the PWD (e.g., by training them to use spiritual coping methods) and examine whether the improvements in spirituality and the use of spiritual coping methods can consequently improve their mental health status, including depression, anxiety, and subjective burden.

There are limited studies in the literature that examined the association between spiritual coping and mental health issues in PWD's caregivers. In a pilot study, a spiritual counseling program showed a positive impact on depression treatment in the caregivers of the PWD.^[20] In a qualitative study on family carers of dementia people, spirituality has also been identified as the main factor that can ameliorate depressive symptoms in the caregivers.^[38] These studies are consistent with our findings emphasizing the potential

effects of spirituality via SCSs to improve psychological status in the caregivers.

The mediating effect of religiosity/spirituality was assessed on caregiving burden and depression in 476 carers of the PWD in Korea.^[39] This study confirmed the positive mediating roles of spirituality in the impact of IADL on caregiving burden. However, we added new factors in our design, including anxiety, quality of life, mental health profile, as well as coping strategies. Moreover, our method allows us to measure the indirect effect and effect size in each model that also provides a clear comparison between the models.

Some evidence shows that the physical function of the PWD is correlated to the mental health of their caregivers with spiritual/religious component playing a role in such association. For example, Yoon *et al.* found that religiosity may modify the negative association between daily activities of the PWD and caregiving burden.^[39] Furthermore, the study by Lee *et al.* has indicated that those caregivers of the PWD with greater impairment in conducting routine daily activities displayed a higher degree of depressive symptoms.^[40] In the current study, we also find such associations that the MCS of the caregivers was significantly related to the IADL that assessed for PWD.

In the current study, there were no significant correlations between the physical component of the SF-12 (PCS) in the caregivers and the other variables, except for depression, anxiety, and MCS. The lack of correlation between spiritual coping and PCS may be justified by the fact that spiritual coping itself is generally a psychological concept that may interact with the other psychological concepts such as depression, anxiety, and caregiving burden. We also found that the PCS had no significant correlation with the caregiving burden. This may be due to that caregiving burden may not significantly affect the physical component of the quality of life. Therefore, many caregivers may encounter psychological problems such as anxiety, depression, and caregiving burden, while their physical fitness may be less affected than mental health issues. In addition, the PCS and IADL were not significantly correlated to each other because they were measured in different groups (IADL in the patients and PCS in the caregivers). However, the negative association between PCS and anxiety/depression in the carers suggests that mental disorders may also affect physical functions. It also should be noted that mental health issues are intertwined with both measures (i.e., MCS and PCS), that is, when a person suffers from disorders such as anxiety and depression, the quality of life in both physical and mental components may be affected. This issue has been previously identified among the caregivers.^[41] In addition, we found significantly stronger correlations between religious coping and mental health

measurements (including ZBI, HADS subscales, and MCS) than nonreligious coping in our models. This means that this type of spirituality may be more important in maintaining mental health status in the caregivers. However, we could not find a similar study using SCS in other cultures or people with different religions. Whether religious coping correlates with psychological measurements the same way in other populations as that in Muslims requires further investigation. It needs to be noted that there are only 20 items in the coping measure in our study (SCS): 9 items for religious coping and 11 for nonreligious. Other researchers have described multiple positive and negative types of nonreligious coping. Hence, it seems that the nonreligious scale is performing quite well given its heterogeneity across only 11 items. Therefore, this should be taken into consideration when comparing religious and nonreligious coping.

All models in this study can significantly predict the outcomes. However, spiritual coping showed lower predictability than the others in the association between IADL and ZBI, while the R^2 value for the mediation effect of spirituality between IADL and MCS was the highest with a powerful effect size. This suggests that the ability of daily living activities may be better mediated by spiritual coping in mental health status than other psychological variables (e.g., anxiety, depression, or stress due to caregiving). In other words, mental health may be a more generic concept than specific mental disorders, and spiritual coping may have a positive impact on most aspects of mental health as measured by MCS. The weak correlation between ZBI and MSC versus strong correlations between anxiety/depression and MCS may also indicate that the predictability of IADL-SCS-ZBI model may be weaker than the other models. This is because the concept of ZBI is not as generic as MCS. In addition, the strong association between general mental health and spiritual health in the caregivers recognized in previous studies may also prove this hypothesis.^[20,21]

Limitations

There were some limitations in our study. First, our participants were only caregivers of the patients referred to our data collection sites. Thus, we did not have a representative sample for all Iranian caregivers of PWD. Using a multicenter approach will help to overcome this limitation in future studies. Second, different sets of variables were measured at the baseline and 6-months follow-up. Therefore, we could not assess the changes in the same variable over time, which may also provide information on the long-term effect of spiritual coping on caregivers' mental health status. With this regard, using a cross-sectional design may not be a preferred design. Therefore, future studies may assess the same sets of variables at baseline as well as follow-up. Third,

although we assessed the physical component of the HRQoL (PCS) at follow-up, because this study only aims to investigate the mediating effects on mental health-related variables, we did not include the PCS in our mediation models, which can be included in future studies to provide new associations between the variables. Fourth, testing alternative hypotheses (e.g., assigning IADLs as a mediator) can be considered in further studies focusing on the physical status of the PWD using different models, which is beyond the scope of this study. Fifth, the main independent variable of our study IADL was not independent of the caregiver's state. Hence, the perception of the caregivers regarding the IADL of the PWD may vary from reality, which needs further education. Finally, there are other variables such as self-efficacy, self-esteem, and self-concept related to SCSs that may also influence the mental health outcome. These factors can be included in future studies.

Conclusion

This study confirmed the significant mediation role of spiritual coping in the association between physical function of the PWD and mental health status of their carers. As such, further study is needed to investigate whether improving spiritual coping skills among the caregivers of such patients can alleviate their psychological disorders (such as anxiety/depression) and modify caregiving burden in the carers. This may also, in turn, improve the care quality provided to the patients by their caregivers and improve the relationship between the caregivers and care-recipients. Investigation of individual effects of religious or nonreligious coping on the other mediators may be considered in future studies.

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Conflicts of interest

There are no conflicts of interest.

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