



Published in final edited form as:

J Behav Med. 2016 April ; 39(2): 355–363. doi:10.1007/s10865-016-9712-3.

The interrelations between spiritual well-being, pain interference and depressive symptoms in patients with multiple sclerosis

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Abstract

Depressive symptoms are common in individuals with multiple sclerosis (MS), and are frequently exacerbated by pain; however, spiritual well-being may allow persons with MS to more effectively cope with pain-related deficits in physical and role functioning. We explored the associations between spiritual well-being, pain interference and depressive symptoms, assessing each as a potential mediator, in eighty-one patients being treated for MS, who completed self-report measures: Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale, Pain Effects Scale, and Center for Epidemiologic Studies Depression Scale Revised. At the bivariate level, spiritual well-being and its subscale of meaning and peace were negatively associated with depression and pain interference. In mediation models, depression was not related to pain interference via spiritual well-being, or to spiritual well-being via pain interference. Pain interference was related to depression via spiritual well-being and meaning/peace, and to spiritual well-being and meaning/peace via depressive symptoms. Finally, spiritual well-being and meaning/peace were related to depression via pain interference, and to pain interference via depressive symptoms. For patients with MS, a multi-faceted approach to treatment that includes pain reduction and promotion of spiritual well-being may be beneficial, although amelioration of depression remains a critical task.

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Conflict of interest Sheri A. Nsamenang, Jameson K. Hirsch, Raluca Topciu, Andrew D. Goodman and Paul R. Duberstein declare that they have no conflict of interest.

Compliance with ethical standards: Human and animal rights and Informed consent All procedures followed were in accordance with ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all patients for being included in the study.

Keywords

Spiritual well-being; Pain interference; Depressive symptoms; Multiple sclerosis

Introduction

Multiple sclerosis (MS) is a chronic, neurological disorder for which there is no cure, and is estimated to affect between 250,000 and 400,000 individuals in the United States, and 2.1 million people worldwide (Devins & Shnek, 2000; Reingold, 2002). Typically, the disease is characterized by unpredictable periods of symptoms such as visual loss or numbness of the limbs, with intermittent periods of partial or full remission, occurring over one to two decades with constant progression and accumulated disability (McNulty et al., 2004). Many individuals with MS are faced with the prospect of enduring years of persisting and worsening symptoms, including pain and risk for depression and impairment in social, physical and psychological functioning (Osborne et al., 2006). Comorbid pain (affecting 44–80 % of MS patients) and depression (>50 % of MS patients) are common in patients with multiple sclerosis (Hirsh et al., 2009), with greater levels of pain severity and interference related to greater depressive symptoms (Arnett et al., 2008; Alschuler et al., 2013). Pain frequently disrupts the ability to engage in required daily routines and self-care (Osborne et al., 2006), contributes to poor quality of life (Ehde et al., 2003; Harris et al., 2003) and activity limitations (Hunfeld et al., 2001; Smith et al., 2001). Despite its neurological basis, pain is also associated with psychosocial factors (Gatchel et al., 2007).

One such factor, spiritual well-being, is defined as the benefits occurring from the “way individuals seek and express meaning and purpose and the way they experience their connectedness to the moment, to self, to others, to nature, and to the significant or sacred” (Puchalski et al., 2009), and is conceptualized as having two components: meaningfulness, or a sense of purpose in life, and faith, which refers to a sense of comfort in feeling connected with a higher power (Yanez et al., 2009). A growing body of research suggests that spiritual well-being is related to overall health (Bredle et al., 2011), decreased pain severity and better coping with chronic illness (Irvine et al., 2009; Keefe et al., 2001). The existential components of spiritual well-being (e.g., meaning and peace) are often more robustly associated with good health than traditional religious behaviors (e.g., attending church services) (Bekelman et al., 2007; Hirsch et al., 2014). Despite this, some conflicting results exist; for example, several previous studies have found no association between spiritual well-being and pain severity or interference, suggesting that other factors (e.g., variability in spiritual well-being and pain over time) may contribute to differences noted in their association (Mystakidou et al., 2007; Rippentrop et al., 2005).

It is clear that the interrelations between spirituality, pain and depression are complex, with often-contradictory findings and bi-directionality; however, the linkages between these variables have not been previously examined in patients with MS. In general, spiritual well-being is related to less perceived illness uncertainty and psychological distress (McNulty et al., 2004), as well as better coping and psychosocial adjustment (Irvine et al., 2009; McNulty et al., 2004), in patients with MS. However, previous research also indicates that

pain is deleteriously associated with engagement in spiritual pursuits (i.e., negative effect of pain on ability to complete social routines; distraction) and is linked to depression risk (e.g., resulting from discomfort, isolation) (de Villiers et al., 2015; Dobratz, 2005). As well, depression is often linked to greater levels of pain (e.g., via catastrophizing, comorbid somatic symptoms) and less motivation or ability to engage in spiritual pursuits (Williams et al., 2003; Haythornthwaite et al., 1991).

Thus, the purpose of this study is to examine the interrelations between spiritual well-being, pain interference and depressive symptoms in persons with MS. We hypothesized that, at the bivariate level, spiritual well-being would be negatively, and pain interference positively, associated with depressive symptoms. In exploratory mediation models, we analyzed all potential associations between spiritual well-being, and its subscales, and depressive symptoms and pain interference, using each as a predictor, mediator and outcome variable, in turn.

Methods

Participants in this IRB-approved study were volunteers recruited from an outpatient, university hospital-based, MS clinic. Informed consent was obtained by trained research staff, and participants completed questionnaires in written format, in a private assessment room. Our sample consisted of 81 participants, ages 30–75 years old ($M = 51.12$; $SD = 9.6$), with more women ($n = 64$; 83 %) than men. The self-reported race of our sample was primarily White (91.4 %; $N = 74$), with 4.9 % Other ($N = 4$), 2.5 % Multiracial ($N = 2$), and 1.3 % Black ($N = 1$). Participants reported a mean education level of 15.44 years ($SD = 2.6$). Approximately 59 % (58.8 %; $N = 47.63$) reported current engagement in religious practice. Most participants were married (60.5 %), 14.8 % divorced, 11.1 % single and never married, 6.2 % widowed, 2.5 % legally separated, and 4.9 % with no reported marital status.

Measures

The Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale (FACIT-Sp) (Peterman et al., 2002), was developed to assess the spiritual well-being of patients with chronic illness, and includes two subscales: The Meaning and Peace subscale ($Mean = 21.24$; $SD = 7.06$), which measures feelings of inner peace and meaning (8 items; e.g., “I feel a sense of purpose in my life”), and the Faith subscale ($Mean = 8.74$, $SD = 4.60$), which measures sense of strength and comfort from one's beliefs (4 items; e.g., “I find strength in my faith or spiritual beliefs”). Items are rated on a 5-point Likert scale ranging from 0 (not at all) to 5 (very much), with higher scores indicating greater spiritual well-being (Total Range = 0–40; faith subscale = 0–20; meaning and peace subscale = 0–40). In a series of two studies, among patients with cancer, the FACIT-SP demonstrated good internal consistency for the total score ($\alpha = .87$; .86), meaning and peace subscale ($\alpha = .81$; .81), and faith subscale ($\alpha = .88$; .86) (Peterman et al., 2002). In our sample, alpha coefficients were as follows: total score ($\alpha = .88$), meaning and peace subscale ($\alpha = .91$), and faith subscale ($\alpha = .84$).

Pain interference, or the effect of pain on behavior and mood, was measured by the Pain Effects Scale (PES), which consists of 6 items, and is part of the Multiple Sclerosis Quality

of Life Inventory (MSQLI) (Ritvo et al., 1997). Participants indicated the degree to which pain interfered with their mood, ability to walk or move around, sleep, normal work, recreational activities, and enjoyment in life, on a 5-point Likert scale ranging from 1 (not at all) to 5 = (to an extreme degree); higher scores indicate greater impact of pain interference (range = 6–30). Among MS patients, the PES has demonstrated excellent internal consistency ($\alpha = .92$) (Osborne et al., 2006), which was reflected in the current sample ($\alpha = .94$).

The Center for Epidemiologic Studies Depression Scale (CES-D-R 20) was used to assess presence and severity of depressive symptoms (Radloff, 1977). Items ($N = 20$) are rated on a 4-point Likert scale ranging from 0 (rarely or none of the time) to 3 (most or all of the time), with higher scores indicating greater depressive symptoms (range = 0–60). The CES-D-R 20 has excellent internal reliability ($\alpha = .90$) among patients with MS (Verdier-Taillefer et al., 2001), as it did in the current study ($\alpha = .91$).

Statistical analyses

Bivariate analyses—Pearson's product-moment correlations were used to examine zero-order associations between spiritual well-being, the faith subscale, the meaning and peace subscale, pain interference, and depressive symptoms; no correlation exceeded the cut-off recommended for multicollinearity ($r > .80$) (Katz, 2006), except for the relation between spiritual well-being and the meaning and peace subscale which, in mediation models, were assessed independently.

Mediation analyses—Multivariate mediation analyses were conducted, consistent with Preacher and Hayes (2008a), which allow for one independent variable (IV), one dependent variable (DV), and more than one mediator variable. We examined the relation between spiritual well-being, and its subscales, and depression via pain interference; for subscale analyses, the spiritual well-being subscale not entered as the IV was covaried (see Fig. 1). We also examined the following models: relation between spiritual well-being and pain interference via depression; relation between depression and pain interference via spiritual well-being; between depression and spiritual well-being via pain interference; between pain interference and depression via spiritual well-being; and, finally, between pain interference and spiritual well-being via depression. There are several potential pathways of significance in a mediation model. The *total effect*, or (c) pathway, signifies the direct relationship between the IV and DV without controlling for possible MVs. A *direct effect*, or the (c') pathway, refers to the relation between the IV and DV after controlling for the possible effects of a MV. A *total indirect effect* (ab) refers to the role of all potential MVs on the association between an IV and a DV. Finally a *specific indirect effect* refers to the role of a particular MV(s) in the relationship between an IV and a DV. When there is a reduction in significance from the total to direct effects (c to c'), mediation is said to occur, with these common terms often applied: partial mediation (coefficient remains significant) and full mediation (coefficient is reduced to non-significance).

Compared to Baron and Kenny's (1986) approach to mediation analysis, Preacher and Hayes' (2008a) mediation techniques use bootstrap resampling to calculate more accurate

analysis of indirect effects (Hayes, 2009; Preacher & Hayes, 2008b). Bootstrapping resampling provides an estimate of indirect effects and empirical approximations of the sampling distribution of an indirect effect, by resampling a study sample k times (at least 5000 times; in the current study, 10,000 iterations) and generating confidence intervals (CIs), that permit inferences about the size of the indirect effect (Hayes, 2009); when CIs do not cross zero, the model is deemed significant. The techniques can be used on non-normally distributed data, and allow for indirect effects without the presence of direct effects. Also, the bootstrapping method permits the detection of effects even when the sample size is small (Preacher & Hayes, 2008a). In all models, age and sex were included as covariates, and the alpha (Type I error) level was set at $p < .05$. Effect sizes (percent mediation) are reported (Preacher & Kelly, 2011).

Results

In bivariate analyses, there was partial support for our hypotheses (see Table 1). Spiritual well-being ($r = -.52, p < .001$), its subscale of peace/meaning ($r = -.60, p < .05$) and pain interference ($r = .54, p < .001$) were associated with depressive symptoms; the faith subscale was not correlated with depressive symptoms. Spiritual well-being ($r = .54, p < .001$), and meaning/peacefulness ($r = .54, p < .001$), were related to pain interference, but faith was not. Spiritual wellbeing, as well as the subscale of meaning and peace, were not related to participation in religious activities; however, the faith subscale was related to engagement in religious activities ($r = .36, p < .001$).

In mediation models, we first examined the relation of spiritual well-being to depression via pain interference (see Fig. 1). Significant total and direct effects for spiritual well-being ($c = -0.67, p < .0000$; $c' = -0.49, p = .0002$) and the meaning and peace subscale ($c = -1.04, p < .0000$; $c' = -0.78, p = .0000$) on depressive symptoms were observed; although the total indirect effect for the faith subscale was not significant [Percent Mediation effect size (Pm) = .35], there was an initial direct effect between faith and depression ($c = -.73, p = .03$). The indirect effect of spiritual well-being on depressive symptoms through pain interference was statistically significant ($ab = -0.18, CI = -0.37$ to -0.05 ; $Pm = .27$). Greater spiritual well-being was associated with less perceived pain inference ($a = -0.27, p = .0005$) which, in turn, was associated with fewer depressive symptoms ($b = 0.68, p = .0008$). The indirect effect of the meaning and peace subscale on depressive symptoms through pain interference was also significant ($ab = -0.26, CI = -0.57$ to -0.06 ; $Pm = .25$). Greater meaning and peace was associated with lower levels of perceived pain inference ($a = -0.42, p = .0002$) which, in turn, was associated with less depressive symptoms ($b = 0.62, p = .002$).

We also examined the effect of spiritual well-being on pain interference via depressive symptoms. Significant total, but not direct, effects for spiritual well-being ($c = -0.27, p < .0005$; $c' = -0.11, p = .20$) and the meaning and peace subscale ($c = -0.42, p < .0002$; $c' = -0.16, p = .20$) on pain interference were observed, indicating full mediation. The indirect effect of spiritual well-being on pain interference through depressive symptoms was statistically significant ($ab = -0.16, CI = -0.27$ to -0.07 ; $Pm = .60$). Greater spiritual well-being was associated with fewer depressive symptoms ($a = -0.67, p < .0000$) and, in turn, to less pain interference ($b = 0.24, p = .0008$). The indirect effect of the meaning and peace

subscale on pain interference via depressive symptoms was also significant ($ab = -0.42$, $CI = -0.63$ to -0.21 ; $Pm = .61$). Greater meaning and peace was associated with less depression ($a = -1.04$, $p < .0000$) which, in turn, was related to less pain interference ($b = 0.25$, $p = .002$). Although the total and direct effects of the faith subscale on pain interference were not significant, an *indirect only* effect was indicated; that is, no initial relation exists between faith and pain interference, but this association manifests only via the impact of faith on depressive symptoms ($ab = -.21$, $CI = -.45$ to $-.04$). Faith was negatively related to depressive symptoms ($a = -0.73$, $p < .05$), although depressive symptoms were, in turn, consistently related to greater pain interference ($b = .29$, $p < .001$).

Our next series of models examined the relation between pain interference and depression via spiritual well-being, and between pain interference and spiritual well-being via depressive symptoms. A significant total and direct effect for pain interference on depression was observed, via spiritual well-being ($c = 0.99$, $p < .0000$; $c' = 0.68$, $p = .0008$) and the meaning and peace subscale ($c = 1.01$, $p < .0000$; $c' = 0.63$, $p < .01$). The indirect effect of pain interference on depression through spiritual well-being was statistically significant ($ab = 0.31$, $CI = 0.13$ – 0.64 ; $Pm = .32$). Greater pain interference was related to less spiritual well-being ($a = -0.64$, $p = .0005$) which, in turn, was associated with fewer depressive symptoms ($b = -.48$, $p = .0002$). The indirect effect of pain interference on depression via the meaning and peace subscale was also significant ($ab = 0.38$, $CI = 0.18$ – 0.73 ; $Pm = .38$). Greater pain interference was related to less meaning and peace ($a = -0.49$, $p = .0002$) which, in turn, was related to more depressive symptoms ($b = -.78$, $p = .0000$). Analyses examining the faith subscale were not significant ($Pm = .06$).

A significant total effect for pain interference on spiritual well-being was observed ($c = -0.64$, $p < .0005$), but this reduced in significance with the inclusion of depression as a mediator, indicating full mediation ($c' = -0.25$, $p = .19$). The indirect effect of pain interference on spiritual well-being via depression was statistically significant ($ab = -0.40$, $CI = -0.68$ to -0.22 ; $Pm = .62$). Greater pain interference was related to more depression ($a = 0.99$, $p = .0000$) which, in turn, was related to less spiritual well-being ($b = -.40$, $p = .0002$).

A significant total effect of pain interference on the meaning and peace subscale was also significant ($c = -0.49$, $p = .0002$), but this was reduced to non-significance with the inclusion of depressive symptoms ($c' = -0.17$, $p = .19$), indicating full mediation. The indirect effect of pain interference on meaning/peace was significant ($ab = -0.32$, $CI = -0.53$ to -0.18 ; $Pm = .66$); greater pain interference was related to more depressive symptoms ($a = 1.01$, $p = .0000$) which, in turn, was related to less meaning and peace ($b = -.31$, $p = .0000$). Analyses examining depression as a mediator of the linkage between pain interference and faith were not significant ($Pm = .69$).

Finally, we examined a series of models of the association between depression and pain interference via spiritual well-being, and of the relation between depression and spiritual well-being via pain interference, finding that neither model was significant for mediation effects.

Discussion

In support of our hypotheses, at the bivariate level, we found a significant, negative association between spiritual well-being, and its subscale of meaning and peace, and depressive symptoms, and a significant positive association between pain interference and depressive symptoms. In exploratory mediation models examining all potential associations between spiritual well-being, pain interference and depressive symptoms, we found the following associations in order of robustness (*Pm*): (1) pain interference was related to peace/meaning and spiritual well-being via depression; (2) spiritual well-being and meaning/peace was related to pain interference via depression; (3) pain interference was related to depression via spiritual well-being and meaning/peace; and, (4) spiritual well-being and meaning/peace were related to depression via pain interference. The faith subscale was not a significant mediator in any of the model series.

Our results support the notion that the relations between spiritual well-being, pain interference and depression are complex, and are multi-directional in nature. The relation between pain interference and spiritual well-being via depression, which was our most robust finding, is an association that is often overlooked in the literature; however, a growing body of work suggests that, in addition to contributing to reduced motivation to engage in religious/spiritual pursuits, depression may also result in “spiritual disconnection,” and feelings of anger toward God or feeling unloved by God (Sorajjakool et al., 2008; Koenig, 2007).

Alternatively, we also found that pain interference is related to depression via spiritual well-being, providing insight into a potential mechanism of action for the pain-depression linkage. In yet another relatively unexplored area of research, preliminary findings suggest that, health stressors such as pain, chronic illness and terminal illness can challenge (e.g., questioning suffering; doubting God's existence) and/or distract from (e.g., discomfort; inability to participate) expression of religious and spiritual beliefs, or engagement in spiritual activities (Dobratz, 2005; de Villiers et al., 2015). In a reciprocal manner, patients with MS who experience pain-related disruptions to daily activities may experience depression as a result of reduced ability to engage in spiritual or personally-meaningful pursuits and, as well, the pain-related depressive symptoms experienced by these individuals may reduce efficacy and motivation to fulfill spiritual needs.

We also found that spiritual well-being, overall, but primarily carried by the weight of meaningfulness/peace-fulness, was related to less pain interference via depressive symptoms, which was our second most-robust finding, and that spiritual well-being was related to less depressive symptoms via pain interference. Faith was not significantly associated with pain interference or depression, across most analyses. This pattern of associations is consistent with prior research indicating the benefits of existential spirituality for physical and mental health (Koenig et al., 2001), but is in contrast to findings suggesting that ritualistic religious activities promote wellbeing (Yanez et al., 2009). Indeed, at the bivariate level, we found that faith was related to increased levels of pain and poorer spiritual well-being. It may be that, for patients with MS or others with chronic illness, faith-

based activities, which are often socially-involved and based outside of the home, may be difficult to engage in.

Having a sense of meaning and purposefulness in the context of chronic illness may help to counteract the negative emotional states, such as hopelessness and helplessness, that often accompany pain-related disability and which may contribute to depressive symptoms (O'Connor et al., 2008; Tan et al., 2008; McNulty et al., 2004; Johnson et al., 2011). For example, individuals with greater spiritual well-being may believe that their pain is part of a "larger plan" or a "test of faith," and a common spiritual coping mechanism is to release or "turn over" a stressor, such as pain, to a higher power (Bussing et al., 2009; Glover-Graf et al., 2007). Spiritual contemplative practices such as prayer, meditation and mindfulness may also promote acceptance and management of the emotional components of pain (Wachholtz et al., 2007; Morone et al., 2008).

In our study, contrary to some previous research (Baetz & Bowen, 2008), the relationship between faith and depressive symptoms was not statistically significant, perhaps due to limited power as a result of small sample size. It may also be that the faith-based component of spiritual well-being, assessed by items regarding finding strength or comfort in faith or spiritual beliefs, and the relation between illness and the strengthening of faith or spiritual beliefs, is more aligned with formal religious beliefs and practices (e.g., church attendance, prayer) which often, in the abstract, are unrelated to health outcomes (Bekelman et al., 2007). On the other hand, attempting to find peace of mind, harmony and meaning, or extracting a purpose from one's experience of pain-induced limitations, may evoke more effective and adaptive forms of cognitive, emotional and behavioral coping (Mohr et al., 1999).

In addition to our specific patterns of results, it is important to consider our findings within the context of the extant, and often-mixed, literature on the association between spirituality and pain (Rippentrop et al., 2005; Baetz & Bowen, 2008). In our sample of patients with MS, we found an essentially reciprocal relationship between pain interference and spiritual well-being via the common factor of depression. In contrast, depression, as an independent variable, was not significantly related to pain interference (via spiritual well-being) or spiritual well-being (via pain interference). In simplified terms, depression, in isolation, may not exacerbate pain interference enough to disturb spiritual well-being and, similarly, may not impair spiritual well-being to the extent that psychological distress occurs. Yet, depressive symptoms appear to play a critical role in the linkage between pain and spiritual well-being, and between spiritual well-being and pain interference. Intuitively, and in support of spirituality-based protective theories, we found that spiritual well-being and, in particular, meaningfulness and peacefulness, were related to less depression and, in turn, to less pain interference. Our finding suggests a basic association between spiritual well-being and lower levels of pain that might be routed through psychopathology, solidifying the need for a psychosocial approach to the treatment of pain. On the other hand, we found that pain is directly related to mood dysfunction and, in turn, to reduced spiritual well-being; thus, initial treatment of pain may be necessary to facilitate the ability to engage in activities that promote psychological and spiritual well-being (Pakenham, 2008). Future prospective research, both mechanistic and interventional, is necessary to better understand the temporal

relations between spiritual well-being, pain and depression, and to determine the best therapeutic approaches (e.g., focus on pain reduction versus promotion of spiritual well-being, or a multi-focused strategy) for improving health-related quality of life in patients with chronic illness.

Limitations

Given the cross-sectional design, causal inference is not permitted and bi-directionality is a possibility, which we examined. Additionally, pain interference was only a partial mediator. Presumably there are other psychosocial or biological factors, including severity of pain, not available for examination in this secondary analysis, that also affect the relation between spiritual well-being and depression (Mofidi et al., 2007). One such factor is cognitive decline, which is an insidious contributor to decreased well-being and functionality in patients with MS, and for which we did not have available data. Given that meaning-making and purposefulness are predicated on cognitive-emotional ability (Wilson et al., 2013), and considering that persons with MS may have impairments to emotional reactivity, decision making and abstract reasoning, future research should consider the impact of cognitive decline on the ability to engage in, and benefit from, meaning-making activities and spiritual coping (Kleeberg et al., 2004; Rogers & Panegyres, 2007). Finally, our small sample primarily included patients with relapsing-remitting MS, which may limit generalizability to patients with progressive MS. Small sample size may have also contributed to underpowered statistical analyses. Prospective research with larger and more diverse samples, and which assesses a wider array of potential mediating factors, is needed.

Our findings may also have clinical implications for therapeutics research. Interventions that aim to promote spiritual well-being, particularly the search for meaning and purpose, may beneficially influence the perception of pain-related impairment and depressive symptoms. Spiritual well-being may aid in coping with the effects of pain by allowing a reframing of the pain-related experience and by promoting problem solving and goal-motivation (Keefe et al., 2001; Baetz & Bowen, 2008; Simoni & Ortiz, 2003). A sense of meaningfulness and peace may help to promote acceptance of pain interference (Braams et al., 2012), or distract from a focus on bodily pain and its consequent limitations, thereby increasing pain tolerance (Wachholtz et al., 2007). Interventions such as spiritual or mindfulness meditation may facilitate reflection on meaning and purpose in life, and are related to increased pain tolerance, positive mood and better health-related quality of life (Delaney et al., 2011; Wachholtz & Pargament, 2005). Furthermore, a brief spiritual well-being intervention—the Short-Term Life Review, which permits patients to create a narrative about proud and important roles, events, and memories in life, is noted to increase spiritual well-being and decrease depressive symptoms (Ando et al., 2010), and could be readily implemented in treatment settings. Research on the effects of meaning-oriented interventions that is designed to uncover mechanisms of action would be useful.

Conclusion

In our sample of patients with MS, the capacity to find meaning and purpose was associated with less pain interference and less severe depressive symptoms. This cross-sectional study

suggests that the capacity to find meaning and purpose is associated with decreased pain interference and decreased depression severity. Prospective studies are needed, including intervention research. Clinical interventions which increase meaningfulness and purpose in life may allow patients with multiple sclerosis to overcome some of the perceived deficits associated with pain, thereby reducing depressive symptoms.

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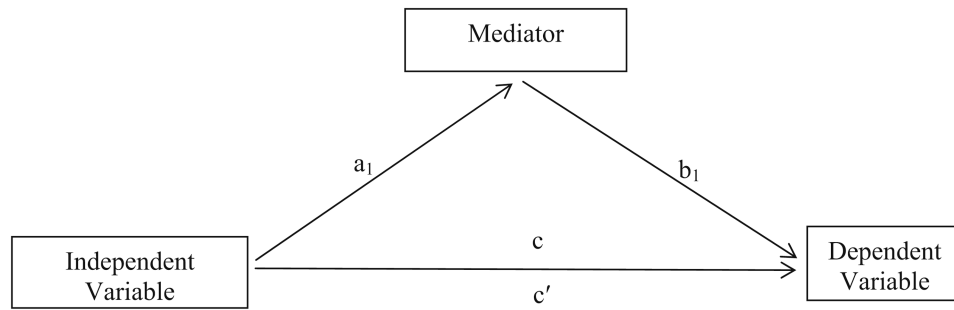


Fig. 1.

Illustration of indirect effects models for multivariable mediation. *Note:* a = direct effect of IV on mediator; b = direct effect of mediator on DV; c = total effect (IV affects DV without accounting for mediator); c' = direct effect (IV affects DV when accounting for mediator); ab = total indirect effect (IV affects DV through mediator). Adapted from Preacher and Hayes (2008a)

Table 1

Means, standard deviations, and correlations

Variable	M	SD	1	2	3	4
1. Spiritual well-being	29.69	9.89	–			
2. Meaning and peace	21.25	7.06	.91**	–		
3. Faith	8.74	4.60	.76***	.40**	–	
4. Pain Interference	13.64	7.06	-.36**	-.42**	-.13	–
5. Depressive symptoms	15.93	11.79	-.52**	-.60*	-.21	.54**

Spiritual Well-Being, Meaning and Peace, Faith = Functional Assessment of Chronic Illness Therapy—Spiritual Well-Being Scale (FACIT-Sp); Pain Interference = Pain Effects Scale (PES); and Depressive Symptoms = Center for Epidemiologic Studies Depression Scale (CES-D-R 20)

* *p* .05;

** *p* .01