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Review

## Pain, Spirituality, and Meaning Making: What Can We Learn from the Literature?

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**Abstract:** Religion and spirituality are two methods of meaning making that impact a person's ability to cope, tolerate, and accept disease and pain. The biopsychosocial-spiritual model includes the human spirit's drive toward meaning-making along with personality, mental health, age, sex, social relationships, and reactions to stress. In this review, studies focusing on religion's and spirituality's effect upon pain in relationship to physical and mental health, spiritual practices, and the placebo response are examined. The findings suggest that people who are self efficacious and more religiously and spiritually open to seeking a connection to a meaningful spiritual practice and/or the transcendent are more able to tolerate pain.

**Keywords:** chronic pain; religion; spirituality; meaning-making

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### 1. Pain, Spirituality, and Meaning Making: What Can We Learn from the Literature?

Pain is a signal. Acute pain demands immediate attention, and serves to alert the individual that something has gone wrong. Individuals with acute pain generally seek a diagnosis from a medical expert for treatment and relief. Caudill, Holman, and Turk [1] wrote that pain that does not respond to treatment or subside sufficiently within three months may become entrenched and chronic. According

to Melzack [2], and Wachholtz, Pearce, and Koenig [3] the cyclical processing and synthesis of nerve impulses throughout the brain and body involves multiple pathways through a widespread network of neurons. Caudill [1] proposed that the spontaneous firing of damaged or regenerating nerves can create chronic neuropathic pain and Breivik and colleagues [4] reported that one in six chronic pain patients say their pain sometimes causes them to want to die. Bussing, Ostemann, Neugebauer, and Heusser [5] found that most patients reported their disease and the accompanying pain as a profound interruption of their life. Pain affects function, relationships, and behavior. Pain according to Moreira-Almeida and Koenig [6], is more than a sensory experience, it involves immune, endocrine, meaning making, emotional, and behavioral responses. Chronic pain changes one's life.

## 2. Meaning Making

Ashbrook [7] proposed that the brain has two minds, two hemispheres working step-by-step and all-at-once to take in information and send messages out. The right brain receives a stream of information from the environment into the body and the left brain makes sense of the information by breaking it down into data and organizing it into components that can be described or acted upon. The left brain builds an orderly world out of the right brain's felt meaning of a situation. d'Aquili, Newberg, and Rause [8] postulate that there are genetically programmed neural operators in the brain that carry out specific sorts of operations that compel us to believe a cause exists for every phenomenon. d'Aquili [9] called the need to order the unknown or unexplained stimuli into some sort of meaningful cognitive framework, the cognitive imperative.

Religion, spirituality, and science are three of the most commonly used methods for meaning making. In 1975, d'Aquili and Laughlin [10] proposed that all religious phenomenology arose from neuropsychology. d'Aquili and Newberg [11] suggested that "one cannot understand religion without understanding the mind and the brain" (p. 10). With the advent of technology, scientists can now examine the workings of the brain during religious and spiritual practices. One example is a study by Newberg and his colleagues [12]. When they used single photon emission tomography (SPECT) to scan the brains of Franciscan nuns as they engaged in meditative centering prayer they found increased blood flow to the prefrontal cortex, inferior parietal lobes, and inferior frontal lobes with a strong inverse correlation between the blood flow change in the prefrontal cortex and the ipsilateral superior parietal lobes. The nuns, however, described the experience captured by the brain scan as a moment of closeness to God and a mingling with Him [8]. The nuns' scans showed significant similarities and differences in the neural processing centers to the Buddhist practitioners that Newberg [13] had previously scanned, the difference occurring in the language center of the brain. The Buddhists, however, believed that the brain scans revealed the presence of the inner peace they experienced when meditating. Although the data from the scans showed striking similarities, the Buddhists and the nuns described their experiences differently. This caused Newberg to wonder if he was taking pictures of the way beliefs influence the functioning of the brain since the process of meaning making appeared to be the same for both belief systems [14]. Through technology, scientists can now catch a glimpse of the machinery of meaning making in real time.

The interaction of age, sex, ethnicity, mental health, personality, social relationships, and reactions to stress are included in the biopsychosocial model. The biopsychosocial-spiritual model adds the

human spirit, an involuntary mental drive toward meaning making [9]. Lazarus and Folkman [15] defined meaning as a search for personal significance and purpose, a causal explanation, and a coping style. The process of meaning making is imaginative and is grounded in the sociocultural and psychic contexts of the individual.

### 3. Biopsychosocial Model

Researchers using the biopsychosocial model have conducted numerous studies to understand pain, coping strategies, and to discover which coping strategies are most effective for reducing or tolerating pain as well as increasing quality of life. Abraido-Lanza, Vasquez, and Echeverria [16] characterized effective strategies as functioning in spite of pain, ignoring or diverting attention away from pain, staying busy and active, and ineffective strategies as restructuring activities because of pain, catastrophizing or venting emotions, and wishful thinking. Bussing [5] described active coping as problem solving, collecting information, refocusing, and emotion regulation, and passive coping as avoidance and escape.

Biopsychosocial researchers have studied the role optimism and pessimism, hope, anxiety, fear, and depression play in pain. Optimism was found to be associated with general health adaptation to chronic disease and recovery after various surgical procedures [17]. Multiple researchers [18-20] have identified that high hope people seek to actively problem solve when challenges to their life goals arise or when their original life goals are blocked. In addition, high hope individuals use more problem focused strategies such as acceptance, reframing (e.g., meaning making), and humor. Pessimists turned more to avoidant and denial coping strategies and tended to catastrophize their situation. Both Gatchel [21] and Robinson and Riley [22] found that anxiety and fear may exacerbate pain. Rudy, Kerns, and Turk [23] found that there is a cyclical pattern of chronic pain leading to depression and depression causing an increase in chronic pain, creating a mutually reinforcing relationship.

According to Unruh [24] and Wachholtz and Makowski [25], pain and suffering are not interchangeable terms. Rather, it is how individuals interpret their pain. Living with chronic pain does not necessarily lead to suffering. Meaning making, either positive or negative, may influence whether pain is experienced as suffering.

The interpretation of self efficacy appears to play an important role in pain management and the reduction of suffering. Keefe and colleagues identified that rational thinkers who felt they could actively engage in pain management were better able to reduce their pain experience [26]. Goldman, Weisenberg, Drobkin, Blittner, and Gotestam [27] tested 50 women with a cold pressor task to determine whether their ability to tolerate pain would be affected by their perceived positive or negative capability to control pain. They found no significant difference in pain ratings but those with perceived positive control were able to tolerate pain longer. Therefore, those who interpret pain as not encroaching on their autonomy are better equipped to cope with pain situations. Weisenberg [28] considered high self efficacious people more motivated to help themselves manage their pain, which in turn could affect their opioid and immune system. Bussing *et al.* [5] surveyed 579 patients with various chronic conditions using the Adaptive Coping with Disease (AKU) questionnaire to assess which coping strategies were related to life satisfaction and whether a positive interpretation of the illness was related to the appraisal process. He found that a cognitive reappraisal strategy was of outstanding

relevance and that positive attitudes contributed most to life satisfaction. According to Bussing, coping with pain is an ongoing process that requires appraisals and subsequent reappraisals of stress.

One appraisal strategy is acceptance. Van Damme, Crombez, Van Houdenhove, Mariman, and Michelsen [29] had 97 chronic fatigue patients fill out a battery of questionnaires measuring fatigue, functional impairments, psychological distress and acceptance and found that acceptance was related to more emotional stability and less psychological distress. Reappraisal along with self-efficacy, hope, and acceptance appear to lessen the impact of pain on a person's level of functioning.

#### **4. Biopsychosocial-spiritual Model**

The biopsychosocial-spiritual model seeks to discover the role religious and spiritual belief systems play in the appraisal process, the development of hope, optimism, self efficacy, and the ability to tolerate and accept disease and pain. Among the many definitions presented for spirituality, Sheehan's [30] definition seems the most comprehensive. He defined spirituality as the basic human experience of seeking understanding, meaning, strength, and transcendence, the desire to go beyond. Religiousness was defined by Peterman [31] as participation in the institutionally sanctioned beliefs and activities of a particular faith group. Pargament's definition of religion and spirituality are the most widely used in the research literature to define these two terms. Pargament defines spirituality as "a search for the sacred" (p. 12) [32], and religion as "a search for significance in ways related to the sacred" (p. 32) [33]. He views religion as a more distal reflection of the internal process of spirituality. Baldacchino and Draper [34] defined spiritual coping strategies as more than religious because they involve relationship with self, others, God, or nature. They argued that while illness takes away control, spiritual coping strategies enhance self-empowerment.

In the United States, individuals living with chronic pain frequently report using religious or spiritual resources to help them cope with pain. Qiuling, Langer, Cohen, and Cleeland [35] reported on data gathered from 1,204 respondents randomly chosen in a nationwide (USA) survey conducted by ABC News, USA today, and Stanford University Medical Center during the week of April 13–19, 2005. They found that prayer was used by half of the subjects to deal with pain, and nearly half of them reported significant pain relief from praying. Glover-Graf, Marini, Baker, and Buck [36] asked 95 patients visiting an anesthesiology pain clinic what they did to cope with their pain and found that the most frequent response was to take medication (89%) and pray (61%). When asked to list the strategies, strengths, and resources they found most helpful, 26.1% of the subjects in Cigrang, Hryshko-Mullen, and Peterson's [37] study spontaneously reported relying on a religious activity or belief to help them cope. The prevalence of the use of prayer/religious activities for coping with pain suggests that chronic pain patients are experiencing some form of pain relief from these frequently used activities in addition to finding the strength to cope with their limitations.

##### *4.1. Religion, Spirituality and Physical Health*

Studies have repeatedly found a positive correlation between religious involvement, health, and quality of life [38–44]. Levin [45], who had in the past expressed reservations about the accuracy of studies on religion and health, found that 22 of the 27 studies he examined showed a significant

positive relationship between religious involvement and health with an increasing level of study quality over time.

This link between religion/spirituality and health may be partially mediated through meaning making. Bussing, Ostermann, and Matthiessen [46] wanted to know how patients find meaning and purpose in their lives in the face of life threatening disease. To that end, they tested a new version of the SpREUK on 257 subjects where they defined spirituality as “an individual and open approach in the search for meaning and purpose in life, as a search for transcendental truth which may include a sense of connectedness with others, nature and/or the divine” (p. 10). The SpREUK measures conventional religious practice, nature oriented practice, existentialistic practice, unconventional spiritual practice, and humanistic practice. Next, they measured the religious and spiritual attitudes of 129 patients with chronic pain and disease [47]. They asked patients whether they would describe themselves as religious or spiritual. Thirty-two per cent described themselves as religious and spiritual (R+S+), 35% as religious but not spiritual (R+S−), 19% as neither religious nor spiritual (R−S−), 9% as spiritual but not religious (R−S+) and 4% were not sure. The search for meaning and hope was associated more with a spiritual attitude and tended toward a more existential humanistic attitude than a religious one. Forty-six per cent said they prayed frequently but only 22% went to church. Seventy-nine per cent claimed to be working on their well-being by (a) working on their spiritual development (83%), (b) reflecting on the meaning of life (75%), (c) trying to achieve insight (67%), (d) making an effort for others (75%), (e) conveying positive attitudes and convictions to others (67%), (f) being aware of how they treat the world around them (96%) and (g) by seeking to have a healing effect on the environment (65%). Although only 22% reported attending worship services the majority of the subjects reported engaging in behaviors that most religious institutions promote and support. Their responses exhibited the desire to go beyond and transcend the nature of their illness. Illness and pain often serve as a motivation for self-reflection. Religion and spirituality provide guidelines for self and social improvement, which may provide increased meaning and purpose to the patient’s life.

#### *4.2. Religion, Spirituality and Mental Health*

Religion/spiritual beliefs appear to not only affect physical health but mental health as well in major meta-analytic papers. Larson and colleagues [48] reported on 50 studies that appeared in the American Journal of Psychiatry between 1978 and 1989 and found that thirty-six (72%) of the studies found a positive relationship between religious commitment and mental health, eight (16%) found a negative relationship, and six (12%) reported a neutral relationship. Koenig and Larson [49] systematically reviewed 850 studies and found that 80% demonstrated a positive relationship between religious beliefs and practices and greater life satisfaction. Among those studies that correlated religiosity with depression, approximately two-thirds found lower rates of depression and/or anxiety among the more religious. Hackney and Sanders [50] looked at 264 correlations in 35 studies between religiosity and everyday psychological adjustment and found that personal devotion produced the strongest positive correlations. Brady and colleagues [51] asked 1,610 cancer patients to complete quality of life and spiritual well-being assessments and found that spiritual well-being was a unique predictor of their quality of life around three core domains, physical, social/family, and emotional. Similarly, Baetz and colleagues [38] found that more frequent worship attendees had fewer depressive symptoms. Religious

and spiritual beliefs and activities may imbue everyday activities with meaning and purpose, thereby reducing anxiety and depression.

#### 4.3. Religion, Spirituality and Pain

There appears to be a relationship between religious activity and lower chronic pain levels. Baetz and Bowen [52] examined data from 30,859 individuals from a 2002 Canadian Community Health Survey of individuals 15 years or older. Thirty-seven per cent attended religious services once a month or more, 63% said that spiritual values played an important role in their life, 35.7% attended religious services once a month or more and believed spiritual values were important, 35.5% endorsed spiritual values as important but did not attend services, 28.8% did not endorse spiritual values or attend religious services, and 2% of respondents were religious but not spiritual. After controlling for baseline health, worship attendance was associated with a lower level of chronic pain and fatigue and with better psychological well-being. Among those with chronic pain and fatigue, being religious but not spiritual was associated with better psychological well being. Both the religious and the spiritual groups were more likely to use positive coping mechanisms, which appeared to be related to better pain tolerance. While chronic pain and fatigue sufferers were more likely to endorse the use of prayer and spiritual help seeking, they were also more likely to endorse the use of medications and alcohol/drugs to help them cope with pain and fatigue. Chronic pain sufferers will seek relief through whatever gives them the ability to reduce their suffering, since for pain sufferers their primary goal would be to reduce their experience of pain

Quality of life has not always correlated positively with religious activities. Prayer and worship frequency have been found in some studies to correlate with higher levels of psychopathology, disability, poorer quality of life, and higher levels of pain [53-58]. Rippentrop *et al.* [54] assessed the relationship of pain to the spiritual and religious beliefs, practices, and experiences of 122 participants and found that personal prayer, bible study, and meditation were used more frequently by people in poor physical health. Long-lasting, intense pain resulted in more religious negative coping methods, feeling punished or abandoned by God, and a less forgiving attitude toward others. Fitchett [55] found that negative religious coping predicts poorer recovery of activities in daily living. Whitford [56] questioned 449 Australians with pain and fatigue symptoms and found that the low faith group appeared to enjoy their life more than the high faith group. Beliefs about the nature of God run the gamut between a loving and a punishing God. Future research should include not only the presence or absence of a belief in a higher power, but also the type of beliefs the participant holds about God, since the valence of belief can affect mental and physical health outcomes. According to Newberg and Waldman, negative beliefs and attitudes stimulate intense activity in the limbic system resulting in a flood of chemicals that often trigger feelings of fear, anger, and feelings of disconnection [14]. Negative meaning making appears to diminish resilience leading to poorer coping abilities.

The valence of spiritual and religious coping is critical to meaning making and a patients' ability to cope with chronic pain. While prayer is often considered a positive coping strategy, the content and valence of prayer can impact outcomes. Prayer, when used as a means to relinquish control and responsibility for pain solutions, can negatively impact disability and perceived self control [53]. O'Connell-Edwards, *et al.* [58] found that the highest levels of psychopathology and affective

reactions to pain were found in the highest frequency of church attendees and that moderate church attendees experienced a lower intensity of pain and psychopathology. It may be that the moderate use of religion/spirituality resources are a more effective tool for treating pain when the individual still retains some form of self efficacy and responsibility, but also feels supported by their higher power. Balance is needed between self efficacy and the relinquishment of control to an outside party, whether that outside force is religious/spiritual or medical/pharmacological. The best treatment outcomes may be experienced when an individual's meaning making system includes responsibility for some sort of self efficacy in the treatment process.

When people cannot find relief from the medical profession for intense and debilitating pain they are likely to turn to an alternative source for help in coping. Bussing and colleagues used the Spiritual and Religious Attitudes in Dealing with Illness (SpREUK) questionnaire and the Adaptive Coping with Disease (AKU) questionnaire to discover if spirituality/religiosity is a relevant resource for 580 patients coping with chronic pain conditions [59]. Fifty-eight per cent were in search of grounding and meaning but not in the context of religion or spirituality. Fifty per cent claimed they were not religious, 32% religious but not spiritual, 8% spiritual but not religious and 18% both religious and spiritual. Stepwise regression analysis revealed that the internal sources of disease control such as Conscious and Healthy Way of Living and Positive Attitudes were the strongest predictors of a patient's reliance on spirituality/religiosity. Additionally, religious patients valued the Reappraisal dimension of Illness as Chance, and Positive Disease Interpretation. Non-religious and non-spiritual patients had significantly lower internal or behavioral coping styles, which may be related to a more closed minded attitude toward possibilities, less meaning and/or purpose seeking behavior, lower self efficacy, and a more negative approach towards life's challenges.

Open mindedness may be a predictor of well being. Dezutter, Luyckx, Bussing, and Hutsebaut [60] sent questionnaires to 155 chronic pain patients and 166 healthy controls to compare their relationship between religious attitudes and subjective well-being by using a Literal Inclusion-Exclusion scale and a Symbolic Inclusion-Exclusion scale. Literal Inclusion individuals define religious contents in a closed minded dogmatic fashion and Literal Exclusion individuals reject the possibility of religious reality. Symbolic inclusion individuals are more open minded and assume that several interpretations of religious content is possible, and Symbolic Exclusion individuals are less judgmental toward religiosity but do not think they need religiosity to find meaning for their life. Higher levels of well-being in the chronic pain sample were significantly related to Symbolic Inclusion and Symbolic Exclusion and lower levels of well-being were significantly related to Literal Exclusion, suggesting that a more open minded attitude toward religion and what lies beyond the ordinary might buffer the effects of chronic pain by offering meaning making, purpose, and hope.

Pain and disease can challenge one's belief system, although individuals experiencing chronic pain are more likely to become religious/spiritual after the onset of their condition [36]. Chronic pain may cause people to turn to the practices that religious and spiritual institutions advocate for better psychological, mental, and even physical health.



#### 4.4. Pain and Spiritual Practices

Meditation is a spiritual mind training discipline and researchers have often used religious or spiritual meditators to explore differences in coping responses to pain. Perlman, Salomons, Davidson, and Lutz [61] compared two types of meditation strategies in coping with pain: focused attention (FA) and open monitoring (OM). Focused attention brings attention to the area of pain and open monitoring involves a non-reactive, non-judgmental awareness of the pain. Nine long-term Zen Buddhist meditators were matched with ten non-meditating controls. The ten control subjects learned and practiced a meditation technique for seven days prior to participating in the experiment. A painful stimulus was administered through a TSA-2001 thermal stimulator consisting of 32 trials broken up into eight runs of four trials each, while subjects meditated using either FA or OM. Although long-term meditators reported experiencing less unpleasantness than the novice meditators in both types of meditation, open monitoring produced a more significant reduction than focused attention. The study supports the findings from Arntz, Dreesen, and Meickelbach [62] who found that attention to pain was related to a stronger pain impact, and from Kingston, Chadwick, Meron and Skinner [63] who found decreased pain ratings and an increased ability to tolerate a cold pressor pain stimulus after subjects participated in a mindfulness training program that taught them to cultivate an open non-judgmental, non-reactive response to pain. Interestingly, these forms of meditation suggest decreased cognitive interaction with pain, (e.g., decreased meaning making), resulting in a positive reduction in the pain experience for the individual.

Brown and Jones [64] hypothesized that Buddhist mindfulness meditation would reduce the emotional appraisal of pain or other stressful events by withdrawing attention away from unpleasantness. To test their hypothesis, they used high density electrophysiology (EEG) to record how much pain 12 experienced and 15 non-experienced meditators felt when they were given anticipatory cues before they experienced a laser stimuli on their forearms. Pain unpleasantness was lower in the most experienced meditators. Furthermore, their EEG showed lower anticipatory activity in the right inferior parietal cortex and midcingulate cortex, suggesting that cultivating an attitude of acceptance promotes cognitive control by reducing engagement with an emotional appraisal of perceived events. Spiritual practices that promote the non-judgmental acceptance of life events appear to promote pain tolerance. Although untested, the observed improved pain coping through Buddhist meditation may be related to interpreting the meditation technique as a means to increased feelings of control over the pain and pain self-efficacy.

Many religious and spiritual practices are intended to help the practitioner experience feelings of spiritual support. Wiech, Farias, Kahane, Shackel, and Tracey [65] used Functional Magnetic Resonance Imaging (fMRI) to study the key areas in the brain for modulating pain intensity. Twelve practicing Catholics and 12 non-religious, non-spiritual subjects were shown two pictures of women in a similar pose, the Virgin Mary and an unknown woman, while they received a repetitive noxious electrical stimulation. Both groups were equally sensitive to the pain but the religious group reported less pain when looking at the picture of the Virgin Mary while the non-religious group reported the same amount of pain. The non-religious group preferred the picture of the other woman although the picture did not lessen their pain. The Catholic participants reported being in a calm, meditative state when presented with the religious image. Wiech *et al.* [65] found that the right ventrolateral prefrontal

cortex (VLPFC) cluster in the brain was specifically activated in the religious, but not in the non-religious sample when looking at the Virgin Mary. The VLPFC is also involved in other cognitive processes from long-term memory and working memory maintenance. Post scan reports suggested that the Catholic sample used a strategy known as self focused reappraisal that allowed them to down regulate the perceived intensity of the pain when presented with a religious image. The image of the Virgin Mary for many Catholics projects a calming presence of understanding and support that allows these individuals to feel supported by their higher power.

Meaning making words can affect pain tolerance. Wachholtz and Pargament [66] randomly assigned 84 college students to one of three groups, relaxation, secular meditation, and spiritual meditation. Participants filled out psychological and spiritual assessments prior to learning their technique. After practicing their technique for 20 minutes a day for two weeks, each individual placed their hand up to their wrist in a cold water bath and held it there for as long as they could. Psychological and spiritual assessments were completed again. The spiritual meditation group reported significantly more mystical experiences than the other two groups and a greater increase in closeness to God. Furthermore, although they reported the same subjective level of pain as the other groups, they were able to endure the pain level almost twice as long as the other two groups. Meaningful spiritual words made the difference.

The effect of spiritually meaningful words was described again in 2008 by Wachholtz and Pargament [67] when they reported their effect on 83 participants who met the criteria for vascular headache. The participants were randomly assigned into four groups, Spiritual Meditation, Internal Secular Meditation, External Secular Meditation, and Relaxation. They were assessed through a pre-test on headache frequency and severity, affect, anxiety, depression, quality of life, self efficacy, religious demographics, spiritual well-being, and spiritual experiences. Following one month of 20 minutes a day practice, the participants returned to the lab to practice their technique followed by placing their hand in a cold pressor bath. Next they completed the second assessment packet. The Spiritual Meditation group reported a significantly greater reduction in headaches and greater pain tolerance in comparison to the other groups as well as an increase in existential well-being.

The spiritual meditators in both the 2005 and the 2008 study by Wachholtz and Pargament [66,67] focused on one of four phrases; “God is peace”, “God is joy”, “God is good”, or “God is love.” All four phrases express a sense of goodness, support and comfort similar to what the participants in the Wiech *et al* study may have experienced when they viewed a picture of the Virgin Mary [65]. Words and images that evoke the presence of love, support, and/or comfort appear to have a salutary effect on pain. Repeating these phrases, or using visual stimuli can make these spiritual resources more salient to individuals who are experiencing pain.

#### 4.5. Meaning-making as a Placebo Response?

Words have a powerful effect on expectation. Their meaning may create fear or hope. Jokic-Begic, Ivanec, and Markanovic [68] compared two pain coping strategies, distraction and focused attention, on 82 subjects using a cold pressor to test pain intensity and tolerance. Distraction deflects attention away from pain onto another object and a redefining strategy focuses attention on the pain in a non-distressing manner. They hypothesized that individuals with a high internal locus of control (person

determined fate) would have a higher pain tolerance and a more positive response to pain than individuals with a low external locus of control (fate determined person). No significant difference was found in either pain tolerance or pain intensity between the two groups. Since both groups were told the strategy they employed would help their pain, perhaps, the researchers suggested, the strategy may be less important than the patient's beliefs about the efficacy of the technique.

Expectation may be responsible for the results of the study by Abbot, Harkness, Stevinson, Marshall, Conn, and Ernst [69] in which they recruited 120 patients from a pain management clinic with at least a six month duration of frequent or persistent pain who were open to a trial method of healing. They randomly assigned them to a group with a healer who reported success in healing patients or a volunteer who only simulated healing by counting backwards. Both groups were told there was a need for quiet and relaxation for the healing to occur. The subjects participated for eight weeks in face to face healing for 30 minutes a week followed by eight weeks of distant healing through a one way mirror once a week for 30 minutes. During the distant healing trial no healer was actually present for the non-healer group, only the dim presence of a chair. Both groups reported significant improvements in pain but not in quality of life. The subjects receiving healing from the healers reported significantly more unusual experiences, twitching, seeing colors or light, than the subjects receiving healing from the volunteer non-healers or no-healer. The researchers cited the placebo effect as the reason for the reduction in pain. Interestingly, almost all of the patients said they would use this type of healing again.

In the above studies, the participants may actually have tapped into the relaxation response, the mind-body healing approach advocated by Benson [70]. Benson asserted that a patient's belief in a strategy, called the placebo effect by the medical community, can bring about healing through the mind-body mechanism. The subjects in both the Jokic-Begic *et al.* and the Abbot *et al.* studies were led to believe they would experience a reduction in pain and they did [68,69]. However, the relaxation response does not completely explain the unusual experiences reported by the subjects who received healing from the self reported healers or the reduction in headaches and greater tolerance to pain reported by the subjects who practiced a spiritual meditative mantra *versus* a secular mantra [65-67]. The penetration into the mind and body of the meaning of words that describe a caring transcendent power may create what Fabrizio Benedetti calls "molecules of hope." Benedetti [71] analyzed placebo and placebo-related effects and has uncovered specific mechanisms that effect pain at both the biochemical and cellular level. Similarly, cognitive therapy—the changing of emotions by changing meanings—has documented a greater degree of change in persons who are depressed and/or anxious when they engaged in cognitive therapy *versus* behavioral or other therapies, even pharmacotherapy [72-76]. Meaning-making and meaning-changing appears to play a significant role in the mind-body response to events across physical, mental, and spiritual domains.

## 5. Conclusions

Participation in religious activities, particularly worship attendance, is related to lower amounts and better tolerance of pain, better relationships and psychological well-being, and greater satisfaction with life. Koenig, Cohen, George, Harp, Larson, and Blazer [77] suggested that the lower levels of inflammatory cells and proteins found in persons who attend religious services regularly may be the

result of stress reduction. Lower inflammation translates into lower pain levels. Furthermore, religious and spiritual meaning seeking behaviors appear to offer the opportunity to draw strength from a limitless transcendent source and to draw upon a greater intensity of positive emotions [78]. Lipsey [79] noted that spirituality is an awareness of something sacred beyond the physical that can be shared and witnessed. Newshan [80] believes it is related to love, connection, meaning, and hope. Studies have found that when people connect to a meaningful source of care, comfort, and love, they are more able to tolerate pain [65-67]. Melzack [2] considered the brain an active system that filters, selects, and modulates inputs, and Benedetti [71] has uncovered specific mechanisms at both the biochemical and cellular level for activating the opioid system. Technology has opened a window into the mechanisms of the brain and body when a spiritual or religious seeker experiences a connection with meaning and/or the transcendent. Glover-Graf [36] wondered what it is about religion that allows people to have a better psychological adjustment to pain. Perhaps the answer can be found in the seeking of understanding, meaning, strength, and transcendence, the desire to go beyond.

The brain's natural tendency to seek a cause for every phenomenon drives us to make meaning out of the stream of information we receive from our bodies and our environment. Religious and spiritual belief systems along with science are our most favored systems for establishing order and creating meaning. Religious and spiritual belief systems advocate self reflection, awareness of one's impact upon others, the seeking of strength from a source greater than oneself, overcoming obstacles, and letting go of the negative. They encourage thinking of other's needs and feelings and not dwelling on one's self. Religious and spiritual beliefs can inspire confidence, hope, and persistence. Both positive and negative beliefs create a cascade of neural activity. The meaning assigned to any event profoundly influences the body's emotional and physical functioning.

Pain is a condition that will affect all individuals sometime during their lifetime. Inner convictions may be the underlying cause of adaptive or maladaptive pain responses. Beliefs, words and images that evoke a source of love, support, and comfort appear to reduce stress and exert a salutary effect upon specific body mechanisms. Pain, disability, and isolation may cause people to increasingly seek support and strength from the practices religious and spiritual institutions advocate. Religion and spirituality do not cause or worsen pain for individuals who seek or believe in a benevolent universe or God. However, fearful or pessimistic individuals may experience a worsening of their pain if they believe in a retaliating or punishing universe or God. Further research is needed to study the effect of religious and/or spiritual meaning making practices on pain intensity and/or tolerance.

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