



Refining the biopsychosocial model for musculoskeletal practice by introducing religion and spirituality dimensions into the clinical scenario



Rafael Zegarar-Parodi^{a,b,c,*}, Jerry Draper-Rodi^d, Francesco Cerritelli^b

^a A.T. Still Research Institute, A.T. Still University, 800 W. Jefferson St., Kirksville, MO, 63501, USA

^b Clinical-Human Research Department, Non-profit Foundation COME Collaboration, Via A. Vespucci 188, 65126, Pescara, Italy

^c Private Practice, 7 rue Georges Ville, 75116, Paris, France

^d Research Centre, University College of Osteopathy, 275 Borough High Street, London, SE1 1JE, UK

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ABSTRACT

Addressing religion and spirituality (R/S) dimensions may be uncomfortable for patients and practitioners because they refer to intimate beliefs about existence, vary across the globe and cultures, and are not routinely shared in the modern therapeutic scenario. Often, R/S dimensions are overlooked in musculoskeletal (MSK) practice despite associations with attitudes and behaviour that directly affect quality of life and health outcomes. Inclusion of basic R/S dimensions in the therapeutic alliance may optimise care and establish these dimensions as interactors within the biopsychosocial model. The purpose of this commentary was to provide practitioners with definitions of R/S that are useful for managing care of MSK patients, describe how attitudes towards R/S may be linked to health status, and indicate how R/S dimensions could be discussed in simple ways in a modern therapeutic scenario. Finally, suggestions are provided for MSK practitioners and researchers to address R/S dimensions in Western evidence-oriented healthcare.

Use of biopsychosocial model in musculoskeletal practice

Epidemiological studies suggest one in five people across Europe have persistent pain mostly from musculoskeletal (MSK) disorders, such as low back pain and osteoarthritis [1]. Persistent MSK pain increases risk of comorbid conditions like depression, obesity, heart disease, and cancer and of early mortality [1]. Since pain results from interplay of mechanical, biochemical, psychological, and social factors, guidelines for management of MSK pain recommend using a biopsychosocial (BPS) model [2]. Among non-pharmacological treatment modalities, MSK practice has endorsed this model since psychosocial variables are the best predictors of clinical outcomes for pain and disability [3,4]. Commonalities based on pain mechanisms and neurosciences have challenged purely biomechanical models of MSK practice and shape current models for clinical and therapeutic practice [5,6]. To optimise care, the BPS model shifts the emphasis from exclusive reliance on physical to psychosocial concepts that influence pain experiences and subsequent behaviour [7].

The BPS model was developed for low back pain [8] but has since expanded to the neck [9], shoulder [10], and foot/ankle [11]. The best predictors for pain and disability in non-specific low back pain include

psychological factors (yellow flags) that are intrinsic to the patient, environmental factors related to their work (blue flags) or social context (black flags), and medical or biological factors (including red flags) [4]. With its patient-centred focus, the BPS model promotes overcoming obstacles to recovery and includes education and self-management strategies [12]. Therefore, patient understanding of their condition and perceived cause of the problem is necessary to optimise management and promote tailored education and advice. To achieve this, the patient's narrative can be used for insight into the patient's personal, cognitive, and social context; understanding of their problem; and expectations of recovery [13]. This narrative is crucial for management, so patients should be consulted at the beginning of treatment instead of at the end to prevent unsuccessful treatment [13]. Manual therapy for MSK symptoms shows promising effects on psychosocial factors in patients with persistent pain [14,15], which may be related to increasing confidence of manual therapists in assessing these factors. However, the main obstacle remains discussing these psychosocial factors with patients, such as how they impact prognosis [16–18].

The BPS model is constantly being refined: some prognosis factors overlap [19] whilst others may be missing. In this commentary, we will discuss the absence of religion and spirituality (R/S) in the BPS model

* Corresponding author. Private Practice, 7 rue Georges Ville, 75116, Paris, France.

E-mail addresses: rzegararparodi@comecollaboration.org (R. Zegarar-Parodi), Jerry.Draper-Rodi@uco.ac.uk (J. Draper-Rodi), fcerritelli@comecollaboration.org (F. Cerritelli).

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for MSK management and explain why it may be useful to include in clinical practice.

Religion/spirituality: a missing part in musculoskeletal practice

Definitions in healthcare

Relationships between spirituality, religion, and medicine have been described since antiquity. Despite differences in history, society, economy, and culture, human communities share a common belief that R/S plays an important role in healing [20]. R/S are constantly interpreted and reinterpreted and cannot be understood in isolation from cultural contexts [21]. Religion (eg, religious affiliation and service attendance) and spirituality (eg, connection to a source larger than oneself and feelings of transcendence) are important aspects of everyday life for many people; 59% worldwide describe themselves as religious regardless of whether they attend religious services [22]. In healthcare, religious beliefs typically refer to belief in supernatural beings, as in traditional religious communities. In contrast, spiritual beliefs refer to individual and personalised beliefs about the transcendent or sacred, and are often based on personal experience [23]. Another definition to consider is that of the soul, which is described as the spiritual, non-physical part of an individual that is the centre of emotions, feelings, and spirit [24]. Because R/S entail a range of beliefs, practices, and experiences that sometimes overlap, we have grouped these aspects as R/S for clarity.

Surprisingly, R/S dimensions are rarely discussed in MSK practice [4,25] despite positive associations between them and health outcomes [22,26,27]. In the discipline of occupational therapy, R/S has been discussed as a contextual factor in MSK management that would enable a truly holistic approach. Although occupational therapy used to include R/S, it may have gotten lost in the biomedical assessment and management of patients [28]. Ultimately, R/S inclusion into MSK care should require practitioners to first understand R/S, including their own perspectives on the matter [28]. Other professions have described the role of R/S to better address patient needs [29], and different types of MSK management have been proposed [30,31] that implicitly include R/S for holistic care [32]. Similar manual techniques may be included in different therapeutic scenarios whether the focus is on the body to improve range of motion and decrease pain, the body/mind to improve psychosocial components [30,33], or the body/mind/spirit to improve overall well-being [34,35]. In the American osteopathic profession, R/S was limited to history-taking and physical examination, not to manual therapy application; thus, previous reports are not generalisable to non-medical MSK care providers [35].

Although this lack of an operational definition of R/S in MSK care, coupled with lack of topical research, limits practical use in Western MSK management, the literature provides definitions from traditional medicines [36]. In the Native American tradition, individuals thought to be ‘dispirited’ may seek shamanic healing [24], which focuses on the patient’s experience of their disorder. In a shamanic worldview, illnesses may arise from spiritual and non-spiritual factors [24] similar to vitalistic approaches described by early Western MSK practitioners [37,38]. In a healthcare environment shaped by evidence, clarification is needed from practitioners extending their scope of practice beyond the MSK field [39]. In this commentary, we discuss how inclusion of R/S dimensions in the current BPS model for MSK care can positively impact MSK practice.

Relevance in modern musculoskeletal therapeutic practice

R/S has been mostly studied in palliative and end-of-life care where patients tend to reflect on life and life’s purpose [40,41]. In one study, 69% of cancer patients reported praying for their health; only 45% of the general US population did [22]. R/S has also been studied in chronic illnesses where patients think about life and the experience of

disease [40]. Factors associated with these illnesses may present as anxiety, pain, loneliness, or deprivation resulting in challenges to values and beliefs [40]. Because R/S care is important to patients [42], it can no longer be overlooked in MSK practices claiming a holistic approach. Patient beliefs and values have to be considered and incorporated into treatment in combination with the best available evidence and the practitioner’s experience to optimise outcomes [2].

In one review, R/S dimensions were associated with physical disability, pain, somatic symptoms, and mental health outcomes [26]. Another study found R/S dimensions influenced health behaviours, such as physical activity, smoking habits, and diet [23]. Individuals who place more importance on R/S have better mental health and adapt more quickly to health problems than others. These benefits to mental health and well-being have physiological consequences, affect risk of disease, and influence response to treatment [26]. Overall, R/S dimensions have direct/indirect and positive/negative impacts on health habits and outcomes and have applicability in the design of tailored MSK programs.

Relevance of biopsychosocial model for musculoskeletal practice

Because R/S dimensions impact health and treatment outcomes [26], opportunities to discuss them in the clinical scenario should be pursued, especially since they may be directly/indirectly associated with some of the 55 BPS factors (19 biological, 13 psychological, and 23 social factors) described in a recent review of non-specific low back pain [4]. In the BPS model, potential interactions between R/S dimensions could be described within a holistic body/mind/spirit paradigm of holistic MSK care (Fig. 1). These associations between prognostic factors (flags) and R/S dimensions are useful for identifying obstacles and individuals needing additional help [4]. To facilitate measurements in a clinical setting, the affective, behavioural, and cognitive dimensions have also been used to conceptualise R/S [27]. Affective R/S assess spiritual well-being, distress, and experiences (eg, I feel deep inner peace or harmony). Behavioural R/S assess public and private religious activities and positive religious coping. Cognitive R/S assess specific beliefs or perceptions. Additionally, dimensions of R/S can be categorised as other R/S, such as general religiousness, religious affiliation, and religious social support [27]. These classifications may help unfamiliar MSK practitioners better understand the meaning of R/S in each patient’s life and the relevance of an updated BPS model for MSK care.

Bacon and Roe [43] suggested MSK practice may include a spiritual dimension emphasising non-physical aspects of the patient/practitioner interaction, but a scientific frame for their interpretation was not provided. Some practitioners describe their MSK management as holistic, but this concept can be difficult to balance with modern knowledge [44]. Wallden and Chek [25] suggested MSK practice should combine ancient medical wisdom with current clinical technologies since some traditional medicines already include R/S dimensions. However, Thomson et al. [45] reported too many flaws with this method for relevance in an evidence-based environment. Combinations of traditional and modern approaches should rely on strong foundations, and overlooked literature should be considered to optimise treatment and promote critical thinking [45]. As such, implementation of an evidence-based, BPS-spiritual model that includes R/S dimensions may improve MSK care.

Smith [46] proposed a model for an osteopathic BPS approach that included spiritual needs. This approach would incorporate empathetic listening, investigate meaning and purpose and their impact on symptoms, incorporate pain-related beliefs into cognitive behavioural therapy and explore connections with others [46]. Such a model may allow patients to interpret physical complaints as expressions of emotional, psychosocial, and spiritual concerns while providing real holistic MSK care.

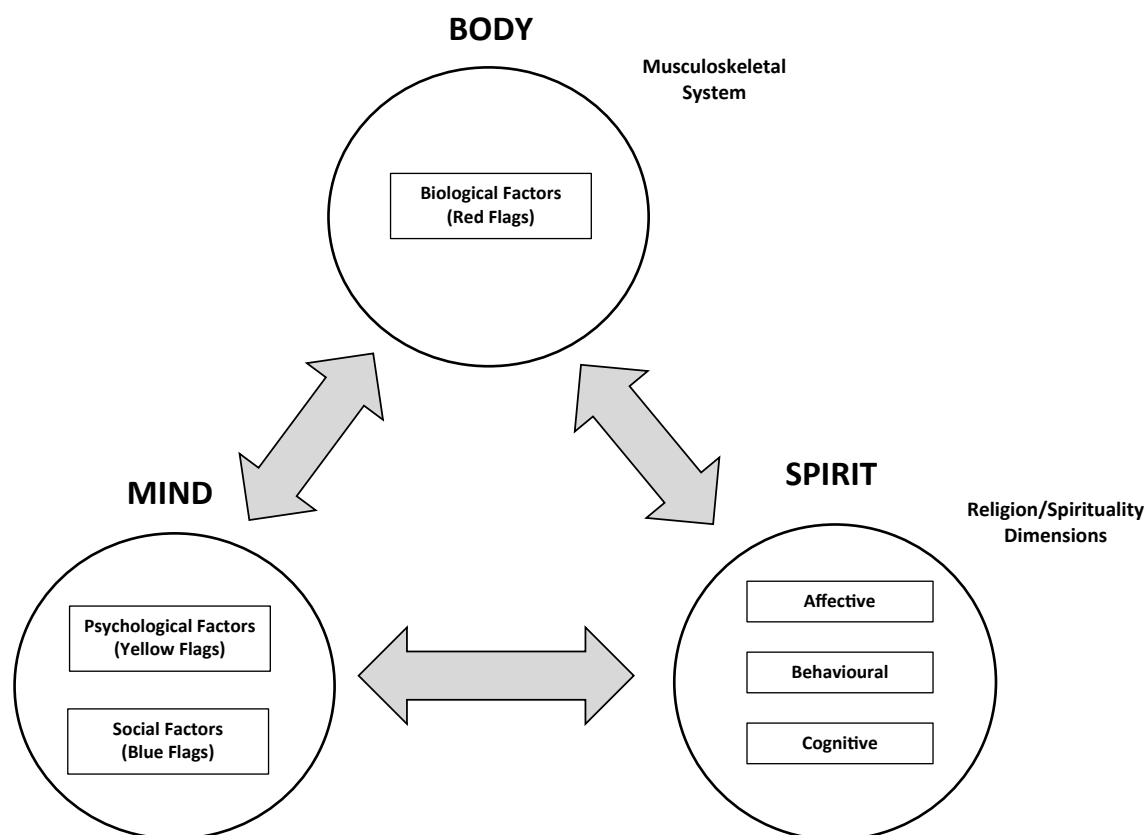


Fig. 1. Biopsychosocial prognostic factors and potential interactors from religion/spirituality dimensions within the holistic body/mind/spirit approach of musculoskeletal care. Religion/spirituality are conceptualised in affective, behavioural, and cognitive dimensions as proposed by Salsman et al. [27].

Introducing religion and spirituality into the biopsychosocial model for musculoskeletal management: clinical impacts and benefits

Identifying religion and spirituality dimensions in the patient's life

Medicine and R/S intersect in at least four areas: (1) meanings of health and illness; (2) relation of health to other human values; (3) attitudes towards the aged, incurable, and weak; and (4) attitude towards nature [35]. Related attitudes and behaviour directly affect quality of life and health outcomes [26], so they are important to identify in a clinical scenario. Evaluating R/S dimensions in modern and holistic MSK practice implies the need for practitioners to access useful information to address all patient needs, especially for those who have BPS-spiritual interpretations of physical symptoms. This proposed approach can be challenging since individual interpretations of R/S can change over time and are shaped by ideas, practices, values, and stories of different cultures. Further, ethnicity, gender, sexuality, and socioeconomic class are influencing factors in R/S [21].

Whether discussed spontaneously by patients or through appropriate practitioner management, R/S dimensions are relevant because they directly or indirectly interfere with symptoms and care. For example, patients may experience greater meaning and peace (ie, affective R/S), attend religious services (behavioural R/S), and perceive God as benevolent (ie, cognitive R/S) [22]. This approach also allows patients to interpret R/S dimensions through their culture and beliefs outside the clinical setting [35]. However, a distinction should be made between an interfaith, generic, or multifaith approach where spiritual care is provided to patients of all faiths and a faith-specific approach where care is provided to only those of similar faith [47]. In a broad sense, interfaith spiritual care describes a therapeutic alliance where practitioner and patient have different spiritual, religious or non-

spiritual, or non-religious worldviews. However, personal and ethical concerns of practitioners in relation to R/S dimensions should be considered because it can be challenging to have to also include this approach in the clinical setting [47]. For patients to hear a meaningful story about R/S, practitioners need to understand the patient's narrative and relate information to that narrative to ensure patients understand it, remember it, and are able to use it. The flexibility to combine practitioner knowledge, attitude, and skills to optimise care while accounting for different R/S practices and beliefs evokes cultural competence, which is defined as 'a set of consistent behaviours, attitudes and policies that enable a system, agency or individual to work within a cross-cultural context or situation effectively' [48]. In multicultural societies, cultural competence may increase equity of access and address social injustices by promoting recognition and acceptance of the impact of cultural differences, racism, and discrimination on health and healthcare [49].

Facilitating and improving communication

A recent systematic review examined methodological quality and effectiveness of interventions for improving patient-practitioner communication during treatment decisions [50]. Little high-level evidence exists to support recommendations about best practices for this communication despite treatment decisions potentially having long-lasting adverse effects [50]. According to a literature review on cancer care, R/S conversations increased patient satisfaction with care and improved well-being, but nurses had to consciously practice self-awareness and spiritual care communication strategies [41]. Even for MSK practitioners, communication styles regarding R/S may impact treatment outcome. Bornet et al. [51] described four models to make sense of R/S in general practice: (1) negation where R/S does not exist in the current medical field, (2) narrative where R/S is approached without explicitly

naming it, (3) spiritual screening where practitioners have an active interest in R/S, and (4) collaborative where R/S is part of whole-person care. The narrative model is dominant in current allopathic practice; thus, patients of Western MSK practitioners are used to discussing R/S in less direct ways, which offers practitioners an opportunity to start discussing this information with appropriate communication style and wording. To promote this approach, Spaeth [35] described five aptitudes that practitioners should master to address the R/S needs of patients: (1) be trustworthy, (2) treat the patient as a person, (3) be kind, (4) maintain hope, and (5) assist the patient in determining what it means to live.

An evidence-based BPS-spiritual approach for MSK management may facilitate communication about other health models where manual techniques are mostly described through metaphors. For example, introduction of R/S in modern MSK management may make patients more comfortable discussing past experiences of altered states of consciousness [52], such as comas, near-death experiences, and vivid dreams, that remain unexplained or traumatic and impact how patients interpret physical symptoms. A recent systematic review suggested routine inclusion of R/S dimensions for treating post-traumatic stress disorders in veterans [53]. Practitioners should also consider patients may have visited traditional medicine healers or participated in spiritual practices associated with mystical experiences, such as the experience of profound unity, a felt sense of sacredness, a fundamental sense of truth and reality, or transcendence of time and space [54]. When faced with patient descriptions of these experiences, MSK practitioners should address them appropriately and ethically. Perhaps reintroducing these experiences in healthcare instead of using metaphors or, worse, ignoring them may be a good starting point.

In pain medicine, negative and neurological metaphors can be detrimental, so other metaphors and realisation of the contribution of narrative are necessary [55]. Similarly, potential misuse of vocabulary for MSK management [56] may overlap with patients' cognitive R/S dimensions. As in other medical fields, use of such wording may not be optimal [57]. Therefore, spending time with patients is an opportunity for MSK practitioners to allow patients to express experiences. MSK pain modulation is conceptualised as the net result of complex neural interactions where physiological and psychological information is integrated into individual pain experience [58] modulated by each individual's R/S dimensions. Thus, manual therapy techniques may influence these interactions, triggering a cascade of neurophysiological events from mechanical stimulation of the MSK system [59].

Challenges for musculoskeletal practitioners

Because historical, cultural, social, and political considerations shape perspective [21], R/S is difficult to handle in routine care for uninformed or untrained practitioners. Every source of knowledge, including R/S, should be rooted in a particular context and situated to that place. In the BPS model, social context considers socioeconomic status, social network, and legal and compensatory systems that influence patient understanding of symptoms and chances of recovery [4]. Inclusion of R/S dimensions into the classical BPS model requires specific training to improve care [42].

A qualitative study explored perceived nature, role, function, and value of spirituality within osteopathic practice from a practitioner's perspective [43]. Three themes arose from semi-structured interviews: holistic approach to wellbeing (body/mind connection and belief in self-healing), therapeutic relationship (practitioner self-awareness and sense of connectedness), and intuitive engagements (transpersonal connection through touch and intuition) [43]. Rosmarin et al. [60] recommended practitioners ask patients whether they want to discuss R/S in the context of treatment and, if affirmative, ask them if they consider R/S relevant to symptoms or treatment. Discussing these physiological processes associated with R/S in a modern and evidence-based therapeutic setting remains challenging [51]. Testa and

Rossetini [61] described contextual factors of MSK management—practitioner's features, patient's features, patient/practitioner relationship, characteristics of the treatment, and overall healthcare setting—that influenced clinical outcomes. They also recommended managing these factors in manual therapy to improve placebo effects and avoid detrimental nocebo effects [61]. Because unfamiliar R/S dimensions may be challenging for some practitioners, resulting in reluctance to address patient needs, practitioners should consider R/S dimensions as a contextual factor with potential placebo or nocebo effects [51].

Future perspectives

Incorporating R/S into health and medicine may foster a more holistic, ethical, and compassionate practice of medicine [62]. Some practitioners may be reluctant to include R/S in patient care [51] since R/S dimensions are part of traditional medicines and esoteric healing traditions [36], but this requirement is part of the professional osteopathic practice standards in the UK [63]. Osteopaths are expected to deliver ethical, competent, and safe osteopathic care taking in account the patients' needs and values including religion [63]. However, R/S dimensions could be introduced in a modern and holistic clinical scenario as interactors with known prognostic factors for MSK recovery. Implicitly, if human experiences can be described then measured, R/S dimensions can shift from an esoteric to an evidence-based paradigm. Using self-report and practitioner-administered measures, Austin et al. [40] identified 25 measures used to evaluate levels of spirituality, spiritual well-being, spiritual distress, spiritual needs, religiosity, and religious beliefs in clinical settings that may be useful to evaluate outcomes related to R/S dimensions in MSK care.

The purpose of this commentary was to update the BPS model for MSK care by including R/S dimensions (affective, behavioural, and cognitive) to optimise the therapeutic alliance. Like the pain experience, R/S experiences may follow similar brain physiological processes [23] but be interpreted differently depending on age, medical history, culture, traditions, and education [21]. A scientific paradigm accounting for these experiences physiologically perceived by the human brain that is interpreting R/S experiences may be useful to facilitate neutral and ethical inclusion of R/S dimensions into modern and holistic MSK management for therapeutic purposes only. Following on these seminal considerations, testing is warranted to evaluate the potential clinical value of incorporating R/S dimensions into the current BPS model for MSK practice.

References

- [1] Marley J, Tully MA, Porter-Armstrong A, et al. The effectiveness of interventions aimed at increasing physical activity in adults with persistent musculoskeletal pain: a systematic review and meta-analysis. *BMC Musculoskelet. Disord.* 2017;18:482. <https://doi.org/10.1186/s12891-017-1836-2>.
- [2] National Institute for Health and Care Excellence. Low back pain and sciatica in over 16s: assessment and management. 2016 <https://www.nice.org.uk/guidance/ng59>, Accessed date: 11 January 2019.
- [3] Chou R, Qaseem A, Snow V, et al. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Ann Intern Med* 2007;147:478–91.
- [4] Draper-Rodi J, Vogel S, Bishop A. Identification of prognostic factors and assessment methods on the evaluation of non-specific low back pain in a biopsychosocial environment: a scoping review. *Int J Osteopath Med* 2018;30:25–34. <https://doi.org/10.1016/j.ijosm.2018.07.001>.
- [5] Fryer G. Integrating osteopathic approaches based on biopsychosocial therapeutic mechanisms. Part 2: clinical approach. *Int J Osteopath Med* 2017;26:36–43. <https://doi.org/10.1016/j.ijosm.2017.05.001>.
- [6] Lederman E. A process approach in osteopathy: beyond the structural model. *Int J Osteopath Med* 2017;23:22–35. [10.1016/j.ijosm.2016.03.004](https://doi.org/10.1016/j.ijosm.2016.03.004).
- [7] Meints SM, Edwards RR. Evaluating psychosocial contributions to chronic pain outcomes. *Prog Neuro-Psychopharmacol Biol Psychiatry* 2018;87:168–82. <https://doi.org/10.1016/j.pnpbp.2018.01.017>.
- [8] Waddell G. Biopsychosocial analysis of low back pain. *Bailliere's Clin Rheumatol* 1992;6:523–57.
- [9] Letzel J, Angst F, Weigl MB. Multidisciplinary biopsychosocial rehabilitation in

- chronic neck pain: a naturalistic prospective cohort study with intraindividual control of effects and 12-month follow-up. *Eur J Phys Rehabil Med* 2018. <https://doi.org/10.23736/S1973-9087.18.05348-0>.
- [10] George SZ, Wallace MR, Wu SS, et al. Biopsychosocial influence on shoulder pain: risk subgroups translated across preclinical and clinical prospective cohorts. *Pain* 2015;156:148–56. <https://doi.org/10.1016/j.pain.0000000000000012>.
 - [11] Cahalan R, Purtill H, O'Sullivan K. Biopsychosocial factors associated with foot and ankle pain and injury in Irish dance: a prospective study. *Med Probl Perform Ar* 2017;32:111–7. <https://doi.org/10.21091/mppa.2017.2018>.
 - [12] Foster NE, Anema JR, Cherklin D, et al. Prevention and treatment of low back pain: evidence, challenges, and promising directions. *Lancet* 2018;391:2368–83. [https://doi.org/10.1016/S0140-6736\(18\)30489-6](https://doi.org/10.1016/S0140-6736(18)30489-6).
 - [13] Tyreman S. Evidence, alternative facts and narrative: a personal reflection on person-centred care and the role of stories in healthcare. *Int J Osteopath Med* 2018;28:1–3. <https://doi.org/10.1016/j.ijosm.2018.04.005>.
 - [14] Hill JC, Whitehurst DG, Lewis M, et al. Comparison of stratified primary care management for low back pain with current best practice (STarT Back): a randomised controlled trial. *Lancet* 2011;378:1560–71. [https://doi.org/10.1016/S0140-6736\(11\)60937-9](https://doi.org/10.1016/S0140-6736(11)60937-9).
 - [15] Saracutu M, Rance J, Davies H, Edwards DJ. The effects of osteopathic treatment on psychosocial factors in people with persistent pain: a systematic review. *Int J Osteopath Med* 2018;27:23–33. <https://doi.org/10.1016/j.ijosm.2017.10.005>.
 - [16] Delion TPE, Draper-Rodi J. University College of Osteopathy students' attitudes towards psychosocial risk factors and non-specific low back pain: a qualitative study. *Int J Osteopath Med* 2018;29:41–8. <https://doi.org/10.1016/j.ijosm.2018.04.006>.
 - [17] Formica A, Thomson OP, Esteves JE. 'I just don't have the tools'- Italian osteopaths' attitudes and beliefs about the management of patients with chronic pain: a qualitative study. *Int J Osteopath Med* 2018;27:6–13. <https://doi.org/10.1016/j.ijosm.2017.11.001>.
 - [18] Zangoni G, Thomson OP. 'I need to do another course': Italian physiotherapists' knowledge and beliefs when assessing psychosocial factors in patients presenting with chronic low back pain. *Musculoskelet Sci Pract* 2017;27:71–7. <https://doi.org/10.1016/j.msksp.2016.12.015>.
 - [19] Campbell P, Bishop A, Dunn KM, Main CJ, Thomas E, Foster NE. Conceptual overlap of psychological constructs in low back pain. *Pain* 2013;154:1783–91. <https://doi.org/10.1016/j.pain.2013.05.035>.
 - [20] Romeo N, Gallo O, Tagarelli G. From disease to holiness: religious-based health remedies of Italian folk medicine (XIX-XX century). *J Ethnobiol Ethnomed* 2015;11:50. <https://doi.org/10.1186/s13002-015-0037-z>.
 - [21] edX. Religious literacy: traditions and scriptures. <https://www.edx.org/course/religious-literacy-traditions-and-scriptures>. Accessed date: 11 January 2019.
 - [22] Jim HS, Pustejovsky JE, Park CL, et al. Religion, spirituality, and physical health in cancer patients: a meta-analysis. *Cancer* 2015;121:3760–8. <https://doi.org/10.1002/cncr.29353>.
 - [23] van Elk M, Aleman A. Brain mechanisms in religion and spirituality: an integrative predictive processing framework. *Neurosci Biobehav Rev* 2017;73:359–78. <https://doi.org/10.1016/j.neubiorev.2016.12.031>.
 - [24] Vuckovic NH, Williams LA, Schneider J, Ramirez M, Gullion CM. Long-term outcomes of shamanic treatment for temporomandibular joint disorders. *Perm J* 2012;16:28–35.
 - [25] Wallden M, Chek P. The ghost in the machine: is musculoskeletal medicine lacking soul? *J Bodyw Mov Ther* 2018;22:438–48. <https://doi.org/10.1016/j.jbmt.2018.02.019>.
 - [26] Koenig HG. Religion, spirituality, and health: the research and clinical implications. *ISRN Psychiatr* 2012;2012:278730. <https://doi.org/10.5402/2012/278730>.
 - [27] Salsman JM, Pustejovsky JE, Jim HS, et al. A meta-analytic approach to examining the correlation between religion/spirituality and mental health in cancer. *Cancer* 2015;121:3769–78. <https://doi.org/10.1002/cncr.29350>.
 - [28] Jones J, Topping A, Wattis J, Smith J. A concept analysis of spirituality in occupational therapy practice. *J Study Spiritual* 2016;6:38–57. <https://doi.org/10.1080/20440243.2016.1158455>.
 - [29] Steinhorn DM, Din J, Johnson A. Healing, spirituality and integrative medicine. *Ann Palliat Med* 2017;6:237–47. <https://doi.org/10.21037/apm.2017.05.01>.
 - [30] Paris SV. A history of manipulative therapy through the ages and up to the current controversy in the United States. *J Man Manip Ther* 2000;8:66–77. <https://doi.org/10.1179/106698100790819555>.
 - [31] Pettman E. A history of manipulative therapy. *J Man Manip Ther* 2007;15:165–74. <https://doi.org/10.1179/106698107790819873>.
 - [32] Vernon H. Historical overview and update on subluxation theories. *J Chiropr Humanit* 2010;17:22–32. <https://doi.org/10.1016/j.echu.2010.07.001>.
 - [33] World confederation for physical therapy. Scope of practice. 2016. <https://www.wcpt.org/node/29535>. Accessed date: 11 January 2019.
 - [34] Rogers FJ, D'Alonzo Jr. GE, Glover JC, et al. Proposed tenets of osteopathic medicine and principles for patient care. *J Am Osteopath Assoc* 2002;102:63–5.
 - [35] Spaeth DG. Spirituality in history taking. *J Am Osteopath Assoc* 2000;100:641–4.
 - [36] Levin J. Esoteric healing traditions: a conceptual overview. *Explore* 2008;4:101–12. <https://doi.org/10.1016/j.explore.2007.12.003>.
 - [37] Palmer DD. *The chiropractor*. Los Angeles, CA: Beacon Light Printing; 1914.
 - [38] Still AT. *Philosophy of osteopathy*. Kirksville. MO: A.T. Still; 1899.
 - [39] Goncalves G, Le Scanff C, Leboeuf-Yde C. Effect of chiropractic treatment on primary or early secondary prevention: a systematic review with a pedagogic approach. *Chiropr Man Ther* 2018;26:10. <https://doi.org/10.1186/s12998-018-0179-x>.
 - [40] Austin P, Macdonald J, MacLeod R. Measuring spirituality and religiosity in clinical settings: a scoping review of available instruments. *Religions* 2018;9:70. <https://doi.org/10.3390/rel9030070>.
 - [41] Ellington L, Billitteri J, Reblin M, Clayton MF. Spiritual care communication in cancer patients. *Semin Oncol Nurs* 2017;33:517–25. <https://doi.org/10.1016/j.soncn.2017.09.002>.
 - [42] Austin P, McLeod R, Siddall P, McSherry W, Egan R. Spiritual care training is needed for clinical and non-clinical staff to manage patients' spiritual needs. *J Study Spiritual* 2017;7:50–63. <https://doi.org/10.1080/20440243.2017.1290031>.
 - [43] Bacon SW, Roe CA. Investigating practitioners' perceptions of the role of spirituality in osteopathic practice using Interpretative Phenomenological Analysis. *Int J Osteopath Med* 2018;29:3–9. <https://doi.org/10.1016/j.ijosm.2018.07.005>.
 - [44] Turner PWD, Holroyd E. Holism in osteopathy - bridging the gap between concept and practice: a grounded theory study. *Int J Osteopath Med* 2016;22:40–51. <https://doi.org/10.1016/j.ijosm.2016.05.002>.
 - [45] Thomson OP, Abbey H, Tyreman S, Draper-Rodi J, Evans DW, Vogel S. The ghost in the machine: but whose ghost is it and what machine? A response to Wallden and Chek's editorials. *J Bodyw Mov Ther* 2018;22:1022–4. <https://doi.org/10.1016/j.jbmt.2018.07.003>.
 - [46] Smith D. Reflecting on new models for osteopathy: it's time for change. *Int J Osteopath Med* 2018. <https://doi.org/10.1016/j.ijosm.2018.10.001>.
 - [47] Liefbroer AI, Olmsen E, Ganzevoort RR, van Etten-Jamaludin FS. Interfaith spiritual care: a systematic review. *J Relig Health* 2017;56:1776–93. <https://doi.org/10.1007/s10943-017-0369-1>.
 - [48] Watt K, Abbott P, Reath J. Developing cultural competence in general practitioners: an integrative review of the literature. *BMC Fam Pract* 2016;17:158. <https://doi.org/10.1186/s12875-016-0560-6>.
 - [49] Watt K, Abbott P, Reath J. Cultural competency training of GP registrars: exploring the views of GP supervisors. *Int J Equity Health* 2015;14:89. <https://doi.org/10.1186/s12939-015-0226-3>.
 - [50] Grady A, Carey M, Bryant J, Sanson-Fisher R, Hobden B. A systematic review of patient-practitioner communication interventions involving treatment decisions. *Patient Educ Counsel* 2017;100:199–211. <https://doi.org/10.1016/j.pec.2016.09.010>.
 - [51] Bornet MA, Edelmann N, Rochat E, Cornuz J, Poncin E, Monod S. Spiritual care is stagnating in general practice: the need to move towards an embedded model. *Br J Gen Pract* 2019;69:40–1. <https://doi.org/10.3399/bjgp19X700613>.
 - [52] Boly M, Seth AK, Wilke M, et al. Consciousness in humans and non-human animals: recent advances and future directions. *Front Psychol* 2013;4:625. <https://doi.org/10.3389/fpsyg.2013.00625>.
 - [53] Smith-MacDonald L, Norris JM, Raffin-Bouchal S, Sinclair S. Spirituality and mental well-being in combat veterans: a systematic review. *Mil Med* 2017;182:e1920–40. <https://doi.org/10.7205/MILMED-D-17-00099>.
 - [54] Barrett FS, Johnson MW, Griffiths RR. Validation of the revised Mystical Experience Questionnaire in experimental sessions with psilocybin. *J Psychopharmacol* 2015;29:1182–90. <https://doi.org/10.1177/0269881115609019>.
 - [55] Neilson S. Pain as metaphor: metaphor and medicine. *Med Humanit* 2016;42:3–10. <https://doi.org/10.1136/medhum-2015-010672>.
 - [56] McPartland JM, Skinner E. The biodynamic model of osteopathy in the cranial field. *Explore* 2005;1:21–32. <https://doi.org/10.1016/j.explore.2004.10.005>.
 - [57] Fetterman AK, Bair JL, Werth M, Landkammer F, Robinson MD. The scope and consequences of metaphoric thinking: using individual differences in metaphor usage to understand how metaphor functions. *J Personal Soc Psychol* 2016;110:458–76. <https://doi.org/10.1037/pspp0000067>.
 - [58] Voogt L, de Vries J, Meeus M, Struyf F, Meuffels D, Nijs J. Analgesic effects of manual therapy in patients with musculoskeletal pain: a systematic review. *Man Ther* 2015;20:250–6. <https://doi.org/10.1016/j.math.2014.09.001>.
 - [59] Bialosky JE, Bishop MD, Price DD, Robinson ME, George SZ. The mechanisms of manual therapy in the treatment of musculoskeletal pain: a comprehensive model. *Man Ther* 2009;14:531–8. <https://doi.org/10.1016/j.math.2008.09.001>.
 - [60] Rosmarin DH, Forester BP, Bjorgvinsson T. Spirituality and religion: initiating a discussion with patients. *Psychiatr Serv* 2016;67:359. <https://doi.org/10.1176/appi.ps.670301>.
 - [61] Testa M, Rossetini G. Enhance placebo, avoid nocebo: how contextual factors affect physiotherapy outcomes. *Man Ther* 2016;24:65–74. <https://doi.org/10.1016/j.math.2016.04.006>.
 - [62] Chattopadhyay S. Religion, spirituality, health and medicine: why should Indian physicians care? *J Postgrad Med* 2007;53:262–6.
 - [63] General Osteopathic Council. Updated osteopathic practice standards. 2018. <https://www.osteopathy.org.uk/news-and-resources/document-library/osteopathic-practice-standards/updated-osteopathic-practice-standards/>. Accessed date: 21 March 2019.