

Neurospirituality: Conceptual Foundations, Clinical Relevance, And Current Evidence

Neuroespiritualidade: Fundamentos Conceituais, Relevância Clínica E Evidências Atuais

Marleide da Mota Gomes^{1,2} , Fabricio da Costa Hampshire de Araujo³ , Henrique de Sá Rodrigues Cal⁴ , Christian Naurath⁵ 

¹Programa de Pós-Graduação em Psiquiatria e Saúde Mental, Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, RJ, Brazil.

²Laboratório de História da Psiquiatria, Neurologia e Saúde Mental, Instituto de Psiquiatria (IPUB), Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, RJ, Brazil.

³Casa de Saúde São José, Rede Santa Catarina, Rio de Janeiro, RJ, Brazil.

⁴ABRAZ-RJ, Associação Brasileira de Alzheimer – Rio de Janeiro, RJ, Brazil.

⁵Instituto Nacional de Câncer (INCA), Rio de Janeiro, RJ, Brazil; and Universidade Federal do Rio de Janeiro (UFRJ), Rio de Janeiro, RJ, Brazil.

ABSTRACT

Background: Neurospirituality is an emerging interdisciplinary framework integrating neuroscience, neurology, palliative care, and the medical humanities to address the spiritual and existential dimensions of health. Spirituality refers to meaning-making through connectedness beyond the self, whereas religiosity denotes organized beliefs, rituals, and communities.

Objective: To review the conceptual foundations, neuroscientific evidence, and clinical applications of neurospirituality in neurological disorders and palliative care.

Methods: This narrative review synthesizes evidence from neuroscience, cognitive science, neurology, palliative care, and spirituality research to examine the neural correlates, clinical relevance, limitations, and future directions of neurospirituality.

Results: Current evidence associates spiritual experiences with distributed brain networks, particularly the default mode, salience, and frontoparietal control networks, rather than discrete brain regions. These models are heuristic and suggest that domain-general cognitive processes may contribute to spiritual experiences without implying spirituality-specific neural mechanisms. Clinically, greater spiritual well-being is associated with improved coping, resilience, and quality of life, particularly in palliative care and selected neurological disorders. However, the evidence is largely correlational and limited by small samples, heterogeneous definitions, cultural variability, and scarce longitudinal data. Current clinical recommendations therefore rely mainly on expert consensus and person-centered care.

Conclusions: Neurospirituality provides an emerging translational framework linking neuroscience with the spiritual dimensions of health and neurological care. Although existing evidence supports the clinical relevance of spirituality, no universally accepted neurobiological model of spiritual experience exists. Further interdisciplinary, longitudinal, and culturally diverse research is needed to clarify underlying mechanisms and strengthen clinical translation.

Keywords: Spirituality; Religion and Medicine; Nervous System Diseases; Palliative Care; Neurosciences; Quality of Life.

RESUMO

Contexto: A neuroespiritualidade é um referencial interdisciplinar emergente que integra neurociência, neurologia, cuidados paliativos e humanidades médicas para abordar as dimensões espiritual e existencial da saúde. A espiritualidade refere-se à construção de sentido por meio da conexão para além de si mesmo, enquanto a religiosidade denota crenças, rituais e comunidades organizadas.

Objetivo: Revisar os fundamentos conceituais, as evidências neurocientíficas e as aplicações clínicas da neuroespiritualidade nos transtornos neurológicos e nos cuidados paliativos.

Métodos: Esta revisão narrativa sintetiza evidências da neurociência, da ciência cognitiva, da neurologia, dos cuidados paliativos e da pesquisa em espiritualidade para examinar os correlatos neurais, a relevância clínica, as limitações e as direções futuras da neuroespiritualidade.

Resultados: As evidências atuais associam as experiências espirituais a redes cerebrais distribuídas — em especial as redes de modo padrão, de saliência e de controle frontoparietal — e não a regiões cerebrais isoladas. Esses modelos são heurísticos e sugerem que processos cognitivos de domínio geral podem contribuir para as experiências espirituais, sem implicar mecanismos neurais específicos da espiritualidade. Clinicamente, maior bem-estar espiritual associa-se a melhor enfrentamento, resiliência e qualidade de vida, sobretudo em cuidados paliativos e em transtornos neurológicos selecionados. Contudo, as evidências são majoritariamente correlacionais e limitadas por amostras pequenas, definições heterogêneas, variabilidade cultural e escassez de dados longitudinais. As recomendações clínicas atuais baseiam-se, portanto, principalmente em consenso de especialistas e no cuidado centrado na pessoa.

Conclusões: A neuroespiritualidade oferece um referencial translacional emergente que conecta a neurociência às dimensões espirituais da saúde e do cuidado neurológico. Embora as evidências existentes apoiem a relevância clínica da espiritualidade, não há um modelo neurobiológico universalmente aceito da experiência espiritual. Pesquisas interdisciplinares, longitudinais e culturalmente diversas são necessárias para esclarecer os mecanismos subjacentes e fortalecer a translação clínica.

Palavras-chave: Espiritualidade; Religião e Medicina; Doenças do Sistema Nervoso; Cuidados Paliativos; Neurociências; Qualidade de Vida relacionada à saúde.

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Corresponding author: Fabricio da Costa Hampshire de Araujo. E-mail: fabhampshire@gmail.com

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INTRODUCTION

Spirituality is a vital yet often overlooked dimension of health, especially in neurology, chronic illness, and end-of-life care. While biomedicine prioritizes measurable biomarkers, patients experience illness as a disruption of meaning, identity, and connection. Owolabi et al.¹ include spiritual well-being as a core dimension of brain health, alongside physical, mental, social, and planetary health. However, neurological practice often focuses on lesion localization and quantifiable endpoints, neglecting existential concerns.

Neurospirituality bridges this gap by applying neuroscientific insights to clinical care. Unlike the neuroscience of religion, which studies neural correlates of spiritual experiences, neurospirituality is a clinical framework integrating neurology, palliative care, and person-centered medicine to address spiritual and existential needs. Neurological diseases often reshape not only cognition or movement but also a person's sense of self, continuity, and meaning. Contemporary brain health definitions already reflect this, emphasizing adaptive functioning across cognitive, emotional, and social domains^{2,3}. Yet, neurology frequently prioritizes quantifiable metrics, leaving intangible but critical experiences - fear, hope, despair, purpose, suffering, and transcendence - underaddressed, despite their impact on coping, adherence, and quality of life⁴.

Structured tools like the HOPE questions, FICA framework, and SPIRITual history help clinicians address spirituality systematically^{5,6,7,8,9}. Neuroscientifically, research has shifted from a single "spiritual center" to distributed networks involved in self-referential thought, emotional significance, and cognitive integration, which converge during spiritual experiences^{10,11,12,13}. These models explain how general cognitive processes contribute to spiritual experiences, not as spirituality-specific mechanisms.

Table 1 summarizes the field's evolution: from 19th-century phrenology's discredited localization to William James and John Hughlings Jackson's distributed psychological perspectives. The mid-20th century saw Penfield's temporal lobe stimulation studies and clinical observations linking temporal dysfunction to hyperreligiosity. Later, Cognitive Science of Religion and neurotheology explored religious beliefs as cognitive byproducts and neural correlates of transcendence, respectively. The 2010s introduced network neuroscience, rejecting a "God spot" in favor of dynamic interactions among large-scale networks - default mode, salience, and frontoparietal systems - modulated by contemplative practice and neuroplasticity. The 2020s marked neurospirituality's emergence as a clinical framework, integrating neuroscientific insights into person-centered care, recognizing spiritual well-being as fundamental to brain health.

Table 1. Timeline of Neurospirituality: Conceptual Evolution

Period	Framework	Representative Figures & Key Contributions	Paradigm Shift
19th Century	Localizationist Origins	Gall & Spurzheim – Phrenology (faculties of veneration and religiosity)	Religiosity conceptualized within faculty psychology; explicit rejection of a singular "God spot"
Late 19th – Early 20th Century	Neurophysiological & Psychological Models	W. James – <i>The Varieties of Religious Experience</i> (1902)	Early integration of phenomenological and neurological perspectives
1930s–1970s	Electrophysiological & Lesion Studies	Penfield – Temporal lobe stimulation (evoked memories, déjà vu, sense of presence)	Temporal lobe identified as a critical hub; Penfield maintained caution regarding direct "religious" interpretations
1980s–1990s	Neurostimulation & Temporal Lobe Hypotheses	Michael Persinger	Religious and mystical experiences proposed as artifacts of temporal lobe function (not replicate).
1990s–2005	Cognitive Science of Religion (CSR)	Foundational: Boyer, Barrett, Guthrie, Whitehouse ⁵⁸	Religious cognition framed as by-product of universal cognitive mechanisms (agency detection, theory of mind, dualism)
1990s–Present	Neurotheology & Neural Correlates	Newberg & d'Aquili (2001)	Emphasis on neural substrates of transcendent experiences; supplemented by neuroscience of religion (NoR), contemplative neuroscience, and spiritual neuroscience
2010s	Network Neuroscience & Integrative Models	Menon – Triple-network model; Carhart-Harris – Psychedelics and default mode network; Vidal & Ortega; McNamara & Grafman	Decisive rejection of strict localization; adoption of large-scale systems-level network models (DMN, SN, FPN)
2020s–Present	Neurospirituality & Person-Centered Neurology (Emerging)	Owolabi et al.; Subramanian et al.; Balboni et al.; Puchalski (FICA); Holloway; Creutzfeldt et al.	Spiritual well-being is increasingly recognized as a core dimension of brain health; active efforts toward clinical translation of neuroscientific findings

References: Harper (2019); Vidal & Ortega (2017); Osler (1910); Persinger (1983); Barrett (2007); Hill & Pargament (2003); Newberg & d'Aquili (2001); Schjoedt (2009); Sayadmansour (2014); Carvour et al. (2025); McNamara & Grafman (2024); Menon (2011); Carhart-Harris et al. (2012); Egger et al. (2025); Owolabi et al. (2023); Subramanian et al. (2026); Balboni et al. (2022); Puchalski (2025); Puchalski et al. (2014); Creutzfeldt et al. (2025); Holloway et al. (2014); WHO (2022); Gorelick et al. (2017); Kestenbaum et al. (2025); Goli et al. (2024).

Clinically, spirituality's relevance is clear. Spiritual well-being appears to correlate with improved coping, resilience, and quality of life, though causal relationships remain unestablished. Evidence is strongest in stroke rehabilitation, where it enhances coping, resilience, and quality of life for patients and caregivers^{4,14,15}. In palliative care, it is central to whole-person care, particularly for existential distress^{16,17,18}. Preliminary evidence in Parkinson's, multiple sclerosis, epilepsy, and glioblastoma suggests spiritual well-being may serve as a psychological and existential resource^{19,20,21,22}. While these associations are promising, interventional studies (e.g., RCTs of spiritual care in neurology) are needed to establish causality.

However, the field faces limitations: small samples, heterogeneous definitions, cultural variability, and a lack of causal evidence, hindering consistent clinical guidelines.

Neurospirituality does not reduce spirituality to brain activity nor exclude it from science. It frames spirituality as a real dimension of human experience, expressed through brain networks, shaped by clinical context, and deeply relevant to living with neurological disease. It aligns with broader medical efforts to move beyond disease-centered models toward integrated health understandings^{1,23,24}. Public health frameworks now acknowledge spirituality as a social determinant of health²⁴.

This review clarifies neurospirituality's conceptual foundations, neuroscientific evidence, and clinical relevance

in neurological disorders and palliative care. It maps the field's current state and highlights opportunities for a more integrated, realistic, and human-centered approach to brain health. The following sections explore each component - conceptual foundations, neuroscientific evidence, and clinical applications - in detail.

CONCEPTUAL FOUNDATIONS

Defining Spirituality and Religiosity: A Clinical Distinction

This framework defines spirituality as a meaning-making process involving perceived connection to something beyond the individual self - whether transcendent (e.g., divine, sacred), natural, interpersonal, or a blend of these - while distinguishing it from religiosity, which involves organized beliefs, rituals, and communities.

The definition is pragmatic, accommodating theistic and non-theistic worldviews by including non-transcendent ties (e.g., community, nature, relationships) alongside transcendent dimensions. For secular individuals, "beyond self" may reflect horizontal transcendence (connection to community, nature, or future generations) rather than vertical transcendence (connection to the divine). In African traditions, spirituality may emphasize interconnectedness with ancestors (e.g., Ubuntu philosophy), while Indigenous frameworks often center on harmony with cosmic order or natural forces. In Asian traditions, alignment with natural forces (e.g., Taoism) or interconnectedness with all beings (e.g., Buddhism) may be central. While alternative formulations exist^{25,26}, this version facilitates empirical operationalization in clinical neuroscience without claiming universal validity.

Spirituality is culturally constructed. The provided definition reflects a Western, largely Christian-influenced understanding, but in non-Western contexts, it may be conceptualized differently, such as interconnectedness with ancestors (African traditions), harmony with cosmic order (Indigenous frameworks), or alignment with natural forces (Asian traditions). Clinicians should thus approach spiritual assessment with cultural humility.

A crucial distinction is maintained: spiritual meaning refers to connection to something perceived as transcendent, sacred, or beyond the self, while existential meaning refers to purpose, dignity, and value derived from secular sources like relationships, work, or legacy. Neurospirituality complements existential care for non-theistic patients, and clinicians should assess existential concerns regardless of spiritual identification.

Choksi *et al.*⁴ define spirituality as a dynamic, intrinsic aspect of humanity, including religious forms of connection (e.g., with God or a higher power) and nonreligious forms (e.g., with oneself, community, others, nature). They distinguish spirituality (a trait or disposition) from spiritual well-being (a state of perceived alignment

with personal, communal, environmental, and transcendental elements). This review maintains this distinction, using "spirituality" for the broader construct and "spiritual well-being" for clinical outcomes.

Religiosity refers to organized beliefs, rituals, doctrines, and communities through which many express spirituality. A patient may be spiritual without religious affiliation or religiously affiliated while experiencing spiritual distress. Brewer *et al.*²⁷ operationalized religiosity in terms of religious attendance, private prayer, and religious coping, while spirituality was assessed through daily spiritual experiences with theistic and nontheistic dimensions. Spirituality concerns the search for transcendent meaning, which many expresses through religious practice, but others through nature, music, the arts, philosophy, or relationships. Though spirituality and religiosity often overlap, they are distinct. Clinicians should remain mindful of this to avoid assumptions about a patient's beliefs or practices⁸.

Neurospirituality focuses on spiritual dimensions involving perceived transcendence or connection beyond the self but recognizes that existential suffering (e.g., loss of dignity, purpose, or meaning) may occur without spirituality. Clinicians should assess existential concerns regardless of spiritual identification.

Operational Definition for Neuroscientific Investigation

For research purposes, a spiritual experience is operationalized as a subjective state meeting at least two of the following criteria: (a) self-reported sense of connection to something beyond the individual self; (b) measurable changes in self-referential processing (e.g., default mode network activity); (c) self-reported emotional responses (e.g., awe, peace, gratitude) contextually linked to meaning-making; and (d) behavioral outcomes (e.g., changes in coping, decision-making, or quality of life) attributed to spiritual or existential factors.

This operational definition is intentionally based on subjective experience, which creates a circular problem: spiritual experience is defined by the person's own report of feeling connected to something beyond themselves. There are no independent behavioral or neural markers that make this definition truly objective. To address this circularity, future research should combine subjective reports with objective measures, such as neural connectivity patterns, physiological responses (e.g., heart rate variability), or behavioral indicators. Longitudinal designs could examine whether changes in network connectivity preceded or follow shifts in spiritual well-being.

While self-reported connection beyond the self is a necessary criterion for identifying spiritual experiences, future studies should aim to identify objective correlates - such as neural connectivity patterns, physiological responses, or behavioral indicators - that do not rely solely on self-report. For example, longitudinal designs could

examine whether changes in network connectivity preceded or follow shifts in self-reported spiritual well-being, or whether physiological markers (e.g., heart rate variability, skin conductance) during contemplative practices correlate with subjective reports of transcendence. Such approaches would move toward a more robust operationalization that integrates subjective and objective measures.

The definition proposed here is intended for research use only and implies no ontological claims about the nature of spirituality or its ultimate referents. It is a heuristic tool to facilitate empirical investigation, not a statement about what spirituality "really" is. Researchers are encouraged to refine and adapt this operationalization as the field matures, incorporating culturally diverse perspectives and developing measures that are valid across religious, spiritual, and secular worldviews.

From the "God Spot" Hypothesis to Distributed Neural Systems

It is essential to clarify at the outset what neurospirituality is not. Neurospirituality is not a theory of spirituality's neural basis, nor does it claim that spiritual experiences reduce brain activity. Rather, it is a clinical framework that integrates neuroscience, palliative care, and person-centered medicine to address the spiritual and existential dimensions of health. The neural network models discussed in this section are heuristic tools - useful for understanding how general cognitive processes such as attention, self-referential thought, and salience detection might contribute to spiritual experiences. They should not be interpreted as evidence of spirituality-specific neural mechanisms or as proof that spirituality is "located" brain regions. The principal frameworks linking neuroscience, spirituality, and clinical care are compared in Table 2.

Table 2. Major Conceptual Frameworks Linking Neuroscience, Spirituality, and Clinical Care

Framework	Primary Level	Central Question	Primary Focus	Representative References	Principal Methodologies	Primary Outcome
Neuroscience of Religion (NoR)	Basic Research	What neural mechanisms underlie religious and spiritual experiences?	Neural and cognitive correlates of religious/spiritual phenomena	Cristofori et al. (2022); Ferguson et al. (2022); Carvour et al. (2025)	Neuroimaging, lesion studies, neuropsychological testing, behavioral experiments	Scientific understanding
Neurotheology	Interpretive Framework	How should neuroscientific findings on spirituality be interpreted?	Integration of neuroscience with theology and philosophy	Newberg & d'Aquili (2001); Harper (2019); Sayadmansour (2014)	Neuroimaging with philosophical and theological analysis	Interpretation of meaning
Spiritual Care	Clinical Practice	How can spiritual needs be assessed and addressed?	Spiritual assessment and patient support	Puchalski et al. (2014); Anandarajah (2001); Maugens (1996); Puchalski (2025)	Spiritual history tools, chaplaincy, counseling, interdisciplinary care	Improved well-being
Palliative Care	Clinical Care	How can multidimensional suffering be relieved?	Holistic care for serious illness	Connor (2020); WHO (2022)	Symptom management, advance care planning, family and spiritual support	Relief of suffering
Neurospirituality	Emerging Framework	How can neuroscience inform spiritual aspects of neurological care?	Integration of neuroscience, spirituality, and brain health	Subramanian et al. (2026); McNamara & Grafman (2024); Carvour et al. (2025)	Neuroimaging, clinical assessment, mixed methods	Translation to neurological care

Note: The frameworks overlap conceptually and should be viewed as complementary rather than mutually exclusive. Neuroscience of Religion focuses on empirical investigation, Neurotheology on interpretation, Spiritual Care and Palliative Care on clinical practice, and Neurospirituality on integrating neuroscience with person-centered neurological care. The distinctions presented are heuristic and intended to clarify their primary aims and applications.

Our understanding of religious and spiritual experiences in the brain has undergone a profound transformation over the past two centuries. Early localizationist perspectives sought to identify a single "God spot" or sacred center - most often in the temporal lobe - that could account for religious experiences. This view has been thoroughly superseded by neurophysiological models and functional neuroimaging studies revealing that contemplative practices, prayer, and spiritual states engage multiple cortical and subcortical areas distributed across the brain^{12,13,28}.

Parallel to these neurobiological advances, the Cognitive Science of Religion (emerging in the 1990s and 2000s) provided a complementary theoretical framework. Rather than localizing religion in the brain, this approach demonstrated how universal cognitive processes - such as agency detection, theory of mind, and social cognition - contribute to the formation of religious beliefs and experiences without requiring purely neurobiological explanations^{33,34}. These cognitive accounts emphasize that religious thought is not a distinct faculty but emerges from the ordinary operation of human cognition.

The trajectory of these converging lines of inquiry has culminated in contemporary integrative models that articulate biological, cognitive, embodied, and cultural levels of analysis^{33,34}. In this view, spiritual experiences are understood to emerge from the dynamic interplay of systemic and contextual factors - including neural activity, cognitive processes, bodily states, and cultural frameworks - rather than from a single neural substrate. This shift from a localized "God spot" to distributed, context-sensitive networks represent not merely a refinement of neuroanatomical knowledge but an epistemological transformation: from fixed localizations to emergent, relational processes embedded in lived experience and cultural meaning.

The shift to a large-scale neural network perspective conceived religious and spiritual experiences as resulting from dynamic interactions among distributed neural systems, including the prefrontal cortex (cognitive control, self-regulation), temporal regions (memory, semantic processing), parietal lobe (spatial orientation, self/non-self-distinction), insula (interoception, emotional awareness), and limbic structures (amygdala, hippocampus, brainstem)^{12,13,28}. This architecture does not imply a dedicated "spiritual circuit" but reflects the recruitment of general cognitive processes (attention, memory, emotional regulation, social inference) interpreted as transcendence or sacred connection in specific cultural and subjective contexts^{13,31}.

The transition from the "God spot" to network models represents an epistemological shift from fixed localizations to emergent, contextual processes. Table 1 outlines this conceptual evolution.

Neuroimaging evidence suggests spirituality and religiosity have measurable neural correlates, though these

should be interpreted cautiously. For example, Miller et al.²⁹ found that the personal importance of religion or spirituality was associated with thicker cortices in parietal and frontal regions in 103 adults at high and low familial risk for depression, with stronger effects in high-risk individuals. However, these findings are correlational and do not establish whether structural differences reflect spirituality-specific mechanisms or broader cognitive, emotional, or lifestyle factors.

Large-Scale Neural Networks: Heuristic Models

As outlined in the preceding section, the engagement of large-scale networks - such as the DMN, SN, and FPN - during spiritual practices likely reflects the recruitment of general cognitive processes. The triple-network model has been proposed as a heuristic for understanding how neural systems may interact during spiritual and contemplative experiences, though no empirical validation exists for spirituality-specific mechanisms.

Here, we briefly elaborate on the triple-network model as a heuristic framework¹⁰, acknowledging its speculative nature and lack of empirical validation as a spirituality-specific mechanism. The DMN, SN, and FPN support general cognitive processes, including self-referential thought, attention, and salience detection. Their engagement during spiritual practices does not demonstrate spirituality-specific networks but reflects an interpretive domain applied post hoc to general cognitive activity¹³.

While the triple-network model provides a useful framework for understanding how general cognitive processes (e.g., attention, self-referential thought) might contribute to spiritual experiences, no empirical evidence currently validates it as a spirituality-specific mechanism. Its application to neurospirituality remains hypothesis-generating rather than explanatory.

The triple-network model has been proposed as a heuristic for understanding how neural systems may hypothetically interact during spiritual and contemplative experiences^{10,13}. In this view, the DMN (self-referential processing, identity narratives) may hypothetically interact with the SN (detecting salient stimuli, including emotional states or perceptions of meaning), while the FPN might regulate cognitive integration, enabling belief reappraisal and sustained attention during meditation or prayer. However, this model is speculative and not empirically validated. No neurobiological model of spiritual experience has been corroborated by longitudinal or controlled experimental data¹³, so its value is strictly hypothesis-generating.

Early studies with psilocybin showed altered connectivity in DMN and SN during psychedelic states¹¹, recently extended by Egger et al.³⁰, who demonstrated that meditation and psychedelics induced significant resting-

state functional connectivity alterations across large-scale networks associated with self-processing and cognitive integration. While psychedelic-induced states may share neural signatures with spiritual experiences, their cultural and contextual dependence (e.g., set/setting in psychedelic therapy) limits direct extrapolation to spontaneous spiritual practices. Replication in diverse, non-WEIRD populations is essential.

While preliminary, this supports the hypothesis that self-transcendent experiences may emerge from dynamic shifts in global brain connectivity rather than dedicated "spiritual" substrates. Replication in diverse populations is essential.

EVIDENCE AND METHODOLOGICAL LIMITATIONS

Current Evidence and Methodological Limitations

The study of neurospirituality faces recurring and interrelated methodological constraints that temper the interpretation of current evidence. These limitations are not merely technical but reflect deeper epistemic challenges in bridging neuroscientific methods with subjective, culturally embedded spiritual experiences.

Correlational Evidence and Causal Inference.

Most available evidence is correlational, precluding causal inferences about whether neural changes cause spiritual experiences, vice versa, or both arise from shared third factors (e.g., attention, emotional arousal, expectation). Longitudinal designs and randomized controlled trials are urgently needed to test whether spiritual interventions produce measurable improvements in clinical outcomes, yet such studies remain scarce.

Heuristic Nature of Network Models. The triple-network framework (default mode, salience, and frontoparietal control networks) applied to spirituality remains heuristic and speculative rather than empirically validated. Engagement of these networks during spiritual practices likely reflects the recruitment of general cognitive processes - such as attention, self-referential thought, and salience detection - rather than spirituality-specific neural mechanisms. No neurobiological model of spiritual experience has been corroborated by longitudinal or controlled experimental data¹³, so its value is strictly hypothesis-generating.

Cultural and Demographic Biases. Research has relied heavily on WEIRD (Western, Educated, Industrialized, Rich, Democratic) populations, with Christian prayer and Buddhist meditation constituting the predominant paradigms in the neuroscience of religion, thereby limiting generalizability to non-Western, secular, and non-theistic populations^{31,32,33}. Studies involving Indigenous communities, Global South populations, and diverse secular frameworks remain comparatively scarce, raising concerns that culturally specific expressions of spirituality may be

inadvertently treated as universal. Addressing this limitation will require expanding neurospirituality research across diverse cosmologies and healthcare settings. In Brazil, for example, neurological practice occurs within a highly syncretic religious landscape encompassing African-derived religions (Candomblé and Umbanda), Indigenous traditions, European Catholicism, Kardecist Spiritism, and evangelical Christianity, underscoring the importance of culturally sensitive spiritual assessment approaches and further validation of assessment tools across diverse cultural contexts¹⁸.

Methodological Artifacts and Ecological Validity.

Laboratory-based methods may fail to capture the embodied, ritualized, and context-dependent nature of spiritual practices³⁴. Common issues include small sample sizes, poor ecological validity, problematic contrast conditions, and absence of neutral baselines³¹. These methodological shortcomings are particularly consequential in spirituality research, as experiences are profoundly shaped by cultural, linguistic, and symbolic frameworks that are difficult to replicate in scanner environments.

The Need for Methodological Pluralism.

Exclusively laboratory-based or neuroimaging-driven approaches may fail to capture the phenomenological richness of spiritual life. Integration of qualitative, ethnographic, and phenomenological methodologies is essential to complement neuroscientific findings and to ground neural correlates in lived experience^{34,35,36}.

Priority Gaps for Future Research. Beyond these general limitations, several pressing gaps merit prioritization: (a) causal studies employing longitudinal designs or RCTs to test whether spiritual interventions improve clinical outcomes; (b) non-WEIRD populations, including Indigenous, global South, and secular communities; (c) developmental neurospirituality, investigating how spiritual cognition emerges across childhood and adolescence; and (d) negative spiritual experiences, including spiritual struggle, doubt, and crisis, which remain understudied despite their clinical relevance.

Table 3 summarizes findings across multiple levels of analysis and their epistemic caveats, illustrating the methodological diversity and predominantly correlational nature of current evidence. No validated neurobiological model of spiritual experience currently exists. These limitations do not invalidate the field but underscore the need for cautious interpretation and for research designs that can address causal questions, cultural diversity, and phenomenological depth.

Table 3. Current Evidence Base for Neurospirituality

Evidence Source	Main Findings	Key Limitations	Overall Evidence	Supporting References
Pharmacological & Neuroimaging Studies	Self-transcendent experiences associated with alterations in large-scale brain networks.	Predominantly correlational; causal mechanisms uncertain.	Moderate	Carhart-Harris et al. (2012); Egger et al. (2025); Schjoedt (2009); Carvour et al. (2025); Newberg & d'Aquili (2001)
Lesion Studies	Spiritual cognition involves distributed networks, not single regions.	Small samples; lesion heterogeneity; limited reproducibility.	Moderate	Cristofori et al. (2022); Ferguson et al. (2022); McNamara & Grafman (2024)
Network Neuroscience	DMN, SN, and FPN proposed to support self-related and spiritual processes.	Heuristic models; limited causal evidence.	Moderate	Menon (2011); Carhart-Harris et al. (2012); McNamara & Grafman (2024)
Experimental Models	Presence-like and self-transcendent experiences can be experimentally manipulated.	Lab paradigms incompletely capture lived experience.	Moderate	Persinger (1983); Schjoedt (2009); Egger et al. (2025)
Clinical Studies	Greater spiritual well-being associated with better coping, QoL, and patient outcomes.	Confounding and reverse causality may influence associations.	Moderate	Balboni et al. (2022); Goli et al. (2024); Choksi et al. (2026); Pucciarelli et al. (2020); Prizer et al. (2020); Dinapoli et al. (2024); Hajibabaei et al. (2020); Subramanian et al. (2026)
Developmental Studies	Parental religiosity in early adolescence associated with alterations in large-scale brain networks and cognitive performance; small effect sizes ($d \sim 0.2-0.4$).	Cross-sectional; youth beliefs unavailable; correlational; small effects.	Limited (emerging)	Brooks et al. (2022)
Systematic Reviews & Meta-analyses	Reviews exist for meditation, religious experience, and mystical states; no comprehensive neurospirituality synthesis.	Heterogeneous populations, methods, and outcomes.	Low to Moderate (fragmented)	McNamara & Grafman (2024); Carvour et al. (2025); Ambrosca et al. (2024); Lucchetti et al. (2021)

Note: No validated neurobiological model of spiritual experience currently exists. Most findings remain correlational, heuristic, and interpretive. Network-based models are useful conceptual frameworks but are not diagnostic. Future studies should employ longitudinal, culturally diverse, and interdisciplinary designs to establish causal mechanisms and clinical utility.

CLINICAL APPLICATIONS

The Clinical Role of Spirituality in Neurology

Spirituality is gaining recognition as a vital dimension of neurological care in person-centered models that view illness as more than biological dysfunction. Neurological conditions often disrupt identity, autonomy, agency, hope, purpose, and existential meaning - factors shaping adaptation and treatment response^{37,38}. Though evidence is correlational, it underscores potential benefits of addressing spiritual needs.

Spiritual well-being appears to correlate with improved coping, resilience, and quality of life, though causal relationships remain unestablished. Research links spiritual well-being to psychological resilience, adaptation, and improved quality of life in serious illnesses. In palliative care, existential and spiritual well-being is consistently associated with better coping, emotional adjustment, and overall well-being²³. Public health frameworks now

acknowledge spirituality as a social determinant of health²⁴. Table 4 summarizes the main clinical concerns, current evidence, recommended approaches, and assessment tools across neurological conditions.

Table 4. Clinical Applications of Spirituality in Neurological Disorders

Condition	Main Concerns	Current Evidence	Recommended Approach	Assessment Tools	Validation in Neurology
Stroke	Identity loss, meaning-making, autonomy	Relatively strongest evidence; observational studies & expert consensus	Spiritual screening & referral to chaplaincy or palliative care	FICA, HOPE	Used in stroke populations but not specifically validated; expert consensus supports use
Parkinson's Disease	Loss of autonomy, caregiver burden, existential distress	Limited-to-moderate evidence; observational studies & limited interventional data	Integrated palliative care & routine spiritual assessment	FICA, HOPE	Limited validation in Parkinson's; extrapolated from palliative care studies
Epilepsy	Spiritual distress, stigma, negative religious coping, suicide risk	Preliminary; cross-sectional studies	Assess spiritual distress & mental health support; distinguish negative spiritual coping from psychopathology	FICA, SPIRIT	No specific validation in epilepsy; clinical judgment recommended
Multiple Sclerosis	Meaning, purpose, existential concerns	Limited observational evidence	Existential & spiritual interventions	HOPE, Open Invite	No specific validation; used in chronic illness contexts
Glioblastoma	Mortality, dignity, fear of death	Preliminary; single observational study	Early palliative care & dignity-centered interventions	Patient Dignity Question, FACIT-Sp	FACIT-Sp used in oncology; limited neurological validation
Neuropalliative Care	Total suffering (physical, psychological, social, spiritual)	Strongest evidence base; expert consensus & WHO guidelines	Routine spiritual assessment & interdisciplinary care	FICA, HOPE, SPIRIT, Patient Dignity Question	Tools widely used in palliative care; neurological validation ongoing

Screening vs. Research Tools:

Clinical Screening (Brief): FICA (2–5 min), HOPE (3–5 min), Open Invite (5–10 min).

Comprehensive Assessment: SPIRIT (>10 min).

Research Instruments: FACIT-Sp (5–10 min; measures spiritual well-being in research & quality-of-life studies).

Key References: Holloway et al. (2014); Puchalski et al. (2014); Kluger et al. (2020); Prizer et al. (2020); Goli et al. (2024); Creutzfeldt et al. (2025); Subramanian et al. (2026).

Abbreviations: FICA = Faith, Importance, Community, Address; HOPE = Sources of Hope, Organized Religion, Personal Spirituality and Practices, Effects on Care; FACIT-Sp = Functional Assessment of Chronic Illness Therapy–Spiritual Well-Being.

Note: Recommendations reflect expert consensus, palliative care principles, and observational evidence. No spiritual intervention has yet demonstrated disease-modifying effects in neurological disorders. All assessment tools require clinical judgment and cultural sensitivity in interpretation.

Neurospiritual Palliative Care: An Emerging Framework

Neurodegenerative and chronic neurological disorders challenge not only physical and cognitive functioning but also meaning, identity, purpose, dignity, and existential well-being. Conditions like Parkinson's, ALS, epilepsy, stroke, dementia, and brain tumors often raise existential questions about meaning, suffering, mortality, and dignity preservation. Neurospiritual care requires distinguishing between disease (diagnoses, motor/cognitive symptoms) and the person (life history, values, meaning)⁴⁰. The central challenge is preserving the person's essence and dignity even as the brain fails.

A gap exists in neurospiritual palliative care: 77% of patients desire it, but only 10–20% of healthcare professionals routinely discuss it^{9,40}, often due to lack of time, training, or fear of proselytism or intrusiveness. This disparity is not unique to neurology; across mental health

settings, patients consistently express spiritual needs that they wish to be addressed by health professionals, yet few clinicians bring up spirituality/religiousness (S/R) issues during clinical encounters⁴¹. The "Patient Dignity Question" - "What do I need to know about you as a person to give you the best care possible?" - helps professionals see beyond the medical chart, identifying what truly matters to patients in vulnerability^{9,40}. The principal spiritual assessment tools for clinical use are compared in Table 5.

Table 5. Comparison of Spiritual Assessment Tools for Clinical Use

Tool	Domains	Time	Validation	Cultural Fit	Limitations	Best Use
FICA	Faith, Importance, Community, Address in care	2–5 min	Widely used in clinical settings; Puchalski (2014)	Adaptable; requires cultural sensitivity	Brief, may miss nuanced distress	Routine screening in outpatient neurology
HOPE	Sources of Hope, Organized religion, Personal spirituality, Effects on care	3–5 min	Anandarajah & Hight (2001)	Good for diverse spiritual backgrounds	Less detailed on community aspects	Initial assessment in hospital settings
SPIRIT	Spiritual belief system, Personal spirituality, Integration, Rituals/practices, Implications, Terminal events	>10 min	Maugans (1996)	Comprehensive but time-intensive	Too long for routine use; may feel intrusive	In-depth assessment when distress is identified
Open Invite	"What gives your life meaning?" "What helps you cope?"	5–10 min	Emerging approach; face validity in clinical settings	Excellent for secular/atheist patients	Non-standardized; relies on clinician skill	Patients who decline structured tools
FACIT-Sp	Meaning, peace, faith	5–10 min	Extensively validated in oncology research; limited neurological validation	Widely used in oncology; requires adaptation for neurology	Research instrument; not designed for rapid clinical screening	Research and quality-of-life studies

Recommendation: For routine clinical use in neurology, start with FICA (2–5 min) or HOPE (3–5 min). Reserve SPIRIT for in-depth assessment when significant distress is identified. Use FACIT-Sp primarily for research purposes rather than routine clinical screening. Adapt questions for secular patients using the Open Invite approach.

Note: All tools require clinical judgment and cultural sensitivity in administration and interpretation. No spiritual assessment tool has been specifically validated for routine use across all neurological populations; selection should be guided by clinical context, patient preference, and available time.

For instance, a stroke patient might respond to the Patient Dignity Question by revealing that their faith community is a primary source of support. The clinician could then use the FICA tool to explore:

- **Faith:** "What gives your life meaning?"
- **Importance:** "How does your faith influence your healthcare decisions?"
- **Community:** "Do you have a spiritual community you'd like involved in your care?"
- **Address:** "How can we address these needs in your treatment plan?"

This question originates in dignity therapy and has been adapted for neurological and palliative care.

Brief descriptions of interventions mentioned:

- **Meaning-Centered Therapy:** Helps patients with serious illness maintain or enhance meaning and purpose by exploring sources of meaning, legacy, and life narrative.

- **Dignity Therapy:** Helps patients reflect on what matters most, creating a legacy document for loved ones to address existential distress by affirming worth and purpose.
- **Spiritual Sensory Stimulation:** Engages senses (music, nature sounds, guided imagery, tactile objects) to evoke spiritual or transcendent experiences, particularly in patients with limited cognitive or verbal capacity⁴⁰.

Patients with greater spiritual strength exhibit higher quality of life and spiritual coping capacity, which is inversely correlated with anxiety and depression in chronic conditions, acting as a protective factor⁴⁰. Conversely, spiritual distress - loss of meaning, hopelessness, guilt, or belief conflicts - is a risk factor for depression and increased pain perception^{18,40,42}. Notably, negative religious/spiritual coping - such as feeling abandoned or punished by God - affects approximately 7-15% of patients across medical settings and is consistently associated with worse mental health outcomes, including greater depressive symptoms, anxiety, sleep disturbance, and suicidality⁴¹.

In epilepsy, patients may interpret seizures as divine punishment or a sign of demonic possession, leading to stigma, treatment refusal, or social isolation⁴³. Clinicians should screen for such beliefs and collaborate with chaplains to reframe them in a non-judgmental, culturally sensitive manner. While spiritual struggle (e.g., loss of meaning, divine abandonment) is a normal part of existential processing, pathological spiritual experiences (e.g., delusions of divine punishment in psychosis) require psychiatric evaluation. Clinicians should differentiate between the two to avoid over-medicalizing normal spiritual distress.

Negative spiritual experiences, such as divine abandonment, spiritual struggle, or fear of damnation, are clinically significant forms of distress embedded in theological or cultural frameworks⁴¹. While future neuroscientific investigations might explore potential correlates involving networks subserving self-referential thought or salience detection, these remain entirely speculative¹³. Currently, no empirical data link these specific experiences to dysregulated circuits in a causally validated manner^{13,32}. Clinically, therefore, management should prioritize chaplaincy support, culturally sensitive psychotherapy, and non-judgmental validation of the patient's belief system^{40,45,46}. The primary goal is to alleviate existential suffering through person-centered spiritual care without prematurely reducing these experiences to neurobiological mechanisms⁴⁰. Neurological evaluation becomes particularly important when spiritual experiences are accompanied by features suggesting an underlying neurological disorder - such as new-onset seizures, psychosis, or other focal neurological symptoms - recognizing that conditions including temporal lobe epilepsy may occasionally present with alterations in religious experience^{43,44}.

Red Flags for Spiritual Distress: Clinicians must watch for acute existential and spiritual distress indicators: treatment refusal based on magical cure beliefs disregarding clinical necessity; negative spiritual coping; attributing illness to divine punishment or guilt; isolation from faith communities; eschatological anxiety; and conflicts between diagnosis and spiritual identity⁴⁰. Care includes assessment (verifying spirituality's importance and whether it aids or hinders coping) and therapeutic interventions (integrating spirituality into treatment, offering presence and compassion)⁶. Complex theological conflicts and deep existential crises should be managed collaboratively with chaplains, psychologists, or religious leaders^{45,46}. As highlighted in the World Psychiatry Association's Position Statement, psychiatrists and other mental health providers should routinely consider S/R in history taking, work together with chaplains and religious leaders, demonstrate respect and sensitivity for patients' S/R beliefs, and explore both the positive and potentially negative aspects of S/R on mental health⁴¹. These principles apply equally to neurological and palliative care settings.

SYNTHESIS AND FUTURE DIRECTIONS

The field of neurospirituality remains in a phase of theoretical and methodological consolidation. Future research must address current limitations while expanding its scope across populations, methodologies, and clinical applications.

Strategies for Global Inclusion Bridging the Generalizability Gap

Current neurospirituality research has disproportionately focused on WEIRD (Western, Educated, Industrialized, Rich, Democratic) populations, overlooking the rich diversity of spiritual experiences worldwide. To advance the field equitably and ethically, future studies must prioritize underrepresented groups - such as Indigenous communities, Global South populations, and non-theistic or secular frameworks. This shift is not only a methodological necessity but also an ethical imperative, ensuring the field accurately reflects global spiritual diversity while avoiding the perpetuation of colonial or Eurocentric biases.

To achieve this, researchers should:

- **Collaborate with local experts** in the Global South to co-design culturally grounded studies.
- **Revise assessment tools** (e.g., FICA, HOPE) to incorporate culturally relevant dimensions, such as ancestral connections or harmony with nature.
- **Adopt community-based participatory research (CBPR)** to ensure cultural validity and mutual benefit.

Methodological Pluralism. Neurobiological measures alone cannot capture the fullness of spiritual life.

Mixed methods design combining brain imaging, physiological recordings, ethnographic observation, narrative interviews, and first-person reports are essential to do justice to the multidimensional nature of spiritual experience.

Developmental Trajectories. Little is known about how spiritual and religious cognition emerges through childhood and adolescence or how the supporting neural networks mature. Developmental neurospirituality remains a largely uncharted territory.

Intervention Research. Rigorous randomized controlled trials are needed to evaluate spiritual care interventions - such as meaning-centered therapy or dignity therapy - in neurological and seriously ill populations, with diverse cohorts including non-religious individuals. While meta-analyses have shown promising effects of spirituality/religiosity-adapted psychotherapies for depression, anxiety, stress, and eating disorders, the evidence base in neurology remains limited⁴¹. While these associations are promising, interventional studies (e.g., RCTs of spiritual care in neurology) are needed to establish causality.

Training and Implementation Science. Spiritual assessment skills are rarely included in neurology training, despite patient valuation and evidence that such training reduces clinician burnout⁴⁰. Psychiatry residency programs have increasingly incorporated spirituality/religiosity training over recent decades, with professional organizations such as the World Psychiatry Association now urging the inclusion of these dimensions in clinical encounters and training⁴¹. Neurology training programs should follow this precedent by developing curricula that equip neurologists to address spiritual and existential dimensions of care. Science is needed to identify effective strategies for integrating spiritual assessment into routine neurological practice, addressing barriers such as time constraints, lack of training, and fear of intrusiveness.

Negative Spiritual Experiences. The study of negative spiritual experiences - struggle, doubt, and crisis - remains neglected. Research should delineate their neural correlates, clinical course, and responsiveness to interventions such as spiritually adapted cognitive-behavioral therapy. Given that negative religious coping affects 7-15% of patients and is linked to worse outcomes including suicidality and post-traumatic stress⁴¹, understanding how to prevent and treat spiritual struggles should be a high priority.

Cost - Effectiveness and Health Services Research. Prospective outcomes research must examine whether routine spiritual screening and referral improve patient-centered outcomes - quality of life, psychological adjustment, goal-concordant care - and justify resource allocation in healthcare systems.

Across all priorities, equity must be central. Underrepresented groups - Indigenous peoples, global South communities, and secular individuals - must be active

participants in study design and execution to avoid perpetuating WEIRD biases. As McNamara and Grafman¹³ observe, progress will depend less on pinpointing brain localizations and more on understanding how neural networks, cultural contexts, and meaning structures dynamically co-construct spiritual experience. This demands interdisciplinary collaboration and theoretical humility.

Training in spiritual care benefits not only patients but also professionals. Evidence suggests it reduces occupational stress, strengthens human connection, and buffers against burnout^{40,47}.

CONCLUSION

Neurospirituality - bridging neuroscience of religion, palliative care, and person-centered neurology - offers a renewed orientation for clinical attention, assessment, and research. Its distinction between spirituality (meaning making through perceived connection beyond the self) and religiosity (organized beliefs and practices) is not merely academic but clinically useful and must be preserved to avoid conflating related but distinct domains.

The strongest evidence, in stroke rehabilitation and palliative care, supports the relevance of spiritual assessment to coping, quality of life, and goal-concordant care. Yet this evidence remains largely correlational and hypothesis-generating. Establishing causality and translating findings into definitive clinical practices will require rigorous, multidisciplinary investigation. Despite promising findings, the evidence base is largely correlational, and clinical recommendations are based on expert consensus rather than definitive trial data. The proposed framework should be viewed as hypothesis-generating and practice-oriented, not evidence-based in the traditional sense.

Neurospirituality does not supplant scientific neurology - it expands it. The framework invites clinicians to hold objective data alongside lived experience, biomarkers alongside biography, and disease modification alongside meaning making. In doing so, it redefines brain health not merely as neural function preservation but as the whole person's capacity to live, adapt, connect, and flourish even in vulnerability. The brain, in this view, becomes the embodied locus of meaning, connection, and transcendence - and the physician's role transforms from treating a diseased organ to caring for the person who inhabits it⁴⁰.

As neurological disorders rise globally, they bring profound existential questions about identity, purpose, and dignity. Neurospirituality responds with a timely, humanistic vision - one that does not reject neuroscience's rigor but recognizes that healing extends beyond the brain to the person who lives through it. In that recognition lies not just a research agenda but a deeper commitment to medicine that is both scientifically grounded and profoundly humane.

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