GUEST EDITORIAL

Spiritual Endocrinology

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Spiritual endocrinology is an interdisciplinary science examining the interplay between spirituality, religiosity, and endocrine health. It investigates how spiritual and religious practices influence the onset of endocrine diseases, their progression, and management while exploring methods to leverage spirituality to enhance endocrine health and prevent endocrinopathy.

SPIRITUALITY AND RELIGIOSITY

Spirituality refers to concern with the human spirit or soul rather than material or physical matters[1,2]. Its definitions vary widely, as highlighted by McCarroll, who identified 27 discordant definitions[3]. Religiosity, on the other hand, relates to individual religious beliefs or practices, often tied to worship of a superhuman power, particularly God(s)[4]. Secular spirituality represents adherence to spiritual philosophies without aligning with a specific religion.

These concepts are characterized by great heterogeneity and are considered qualitative. However, validated scales have been developed to measure and monitor these phenomena. These include the Centrality of Religiosity Scale (CRS), the Dimensions of Religiosity Scale (DRS), and India Religiosity Scale (IRS) to measure religiosity, and Spirituality Scale (SS), Spiritual Assessment Inventory (SAI), and State of Spirituality (SoS) scale to assess spirituality. The Existential Well-Being (EWB) and Religious Well-Being (RWB) subscales assess 'horizontal' and 'vertical' dimensions of spirituality, i.e., sense of purpose in life, and sense of well-being in relation to God, respectively[5].

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SPIRITUALITY AND ENDOCRINOLOGY

The all-encompassing nature of spirituality mirrors the integrative role of endocrinology in regulating homeostatic processes essential for growth, metabolism, and reproduction. "*Yen sarvam idam tatam*", or "That which pervades all", a shloka from the Bhagavad Gita, adorns the logo of the Endocrine Society of India[6]. The choice of these words highlights the importance of hormones to human existence. A reading of Chapter 13 of the Bhagavad Gita, in fact, raises an interesting point. Though the text refers to Godliness, or spirituality, it can easily be interpreted as a discourse on hormones[7].

SPIRITUALITY OF SCIENCE

The concept of spirituality extends into scientific practice, fostering feelings of connection, awe, and meaning derived from research and innovation. Spirituality of science alludes to positive transcendent experiences that occur with scientific work[8]. These can be feelings of connection, meaning, and awe. Examples include a feeling of exhilaration while learning, sharing or teaching a new concept. Musa al-Khwarizmi's development of algebra demonstrates how spirituality and religion can facilitate scientific advancements. He authored his book on mathematics to elucidate the Islamic principles of inheritance. He utilized prior research from India to compose his texts on algebra and numerical systems[9].

Some physicians and researchers experience spirituality while preparing a talk or writing an article (as we have), while others do not. Those who do may enjoy benefits related to health, as well as scientific discovery.

THE RELIGIO-HORMONAL AXIS

A scientific analysis of physiology and pathophysiology reveals a strong link between spiritual or religious practices on one hand, and endocrine health or disease on the other (Table 1). Spiritually or religion-ordained practices, related to nutrition, hydration, lifestyle, and attitude towards traditional versus modern medicine, can influence endocrine health in multiple ways[10-12]. Dysglycemia and dyselectrolytemia due to religious fasting or feasting, inability to administer medication

Table 1. Spiritual Endocrinology: Scope and Spectrum

Spiritual and religious practices influencing endocrine disease and its management

- **Nutrition/hydration**
  - Dysglycemia due to fasting and feasting
  - Protein, vitamin D, B12, deficiency due to restricted diet
  - Inability to take medicines at prescribed times
- **Acceptance of therapy**
  - Non-consent for injections
  - Non-consent for blood products/organ donation/ transplant
- **Lifestyle**
  - Vitamin D deficiency due to modest clothing/lack of exposure to sunlight
  - Pilgrim's foot due to barefoot walking
  - Tailor's bunion due to prolonged cross-legged sittings
  - Obesity, precipitated by inactive lifestyle/specific diets (priests' paradox)
  - Sexual dysfunction due to female genital mutilation, breast binding

Endocrine disease influencing spiritual and religious practice

- Inability to pray due to proximal myopathy
- Inability to observe religious fasts due to risk of hypoglycemia
- Overlap of endocrine symptomatology, e.g., neuroglycopenia, hot flash, pheo crisis, carcinoid flush with religious connotations

Spiritual and religious practices as a treatment for endocrine disease

- Disciplined lifestyle
- Mindful meditation
- Coping style and skills
- Balanced diet and nutrition
- Physical activity through pilgrimage/religious walking
- Yoga

Endocrine treatment influencing spiritual and religious practice

- Flexible medication administration allowing observance of rituals
- Use of drugs with low risk of hypoglycemia/neuroglycopenia
- Risk of hypoglycemia/neuroglycopenia
- Risk of interactions between drugs and religion-mandated/folk therapy

due to dietary or other restrictions and inability to access sunlight outdoor activities because of social or cultural restrictions are some examples. Other examples of endocrine disease due to culture-bound lifestyles include pilgrim's foot or tailor's foot, female sexual dysfunction, and metabolic syndrome in monks and nuns (priests' paradox).

The religio-hormonal axis is bidirectional in nature: endocrine disease may disturb spiritual and religious health as well. Persons with proximal myopathy, due to osteomalacia, diabetes or Cushing's syndrome, may find it difficult to pray as per their custom. This can lead to social ostracization and loss of self-esteem. Persons with diabetes on intensive insulin therapy or sulfonylureas, as well as those with reactive hypoglycemia or insulinoma will not be able to fast for prolonged periods. This, too, can lead to dejection and distress, as well as social stigma.

Some endocrine symptoms may be perceived to have religious connotations. Conditions as varied as neuroglycopenia, vasomotor symptoms of menopause, carcinoid flush or pheochromocytoma crisis may be explained as paranormal or religious phenomena[13,14]. Such a belief system may prevent timely diagnosis and prorogue appropriate management.

THE POSITIVE SIDE

Spirituality, however, can be harnessed as a strong tool for the prevention and management of endocrine diseases. It is widely accepted that the modern pandemics of obesity, diabetes, polycystic ovary disease, and cardiovascular disease are fueled by a dysregulated lifestyle. Spiritual and religious beliefs, related to disciplined lifestyle, diet, and physical activity, can be used to promote health and prevent endocrine disease. Specific practices such as yoga, mindful medication, and mindful eating have been proven to enhance multiple health-related outcomes[15].

It is appropriate to mention the role of spiritual and religious wisdom in influencing modern medicine. The glossopalatal maneuver, for example, which can be used as a tool for vagal enhancement and appetite control, was originally described in the Maitri Upanishad (Book VI, Verse 20) as a method of meditation. Muraqabah, an Islamic form of meditation[16], has the potential to improve not only spiritual, but biophysical health as well. Spiritual audiotherapy has been shown to improve glycemic control and reduce glycemic variability in persons with type 2 diabetes[17].

Advances in endocrine care also facilitate observance of spiritual and religious rituals, thus enhancing emotional and social well-being. Examples include the use of long-acting preparations, drugs with flexible timings of administration, and glucose-lowering drugs with a low risk of hypoglycemia.

Table 2. Potential Indications for Integration of Spiritual Endocrinology

- Endocrine substance abuse
- Lifestyle and mindstyle modification in chronic diseases, including diabetes, hypertension, obesity
- Occurrence of complications of endocrine disease, such as end-stage kidney disease, foot ulcer requiring amputation
- Pregnancy-related endocrine disorders
- Menopause
- Geriatric endocrine disorders
- Endocrine emergencies
- Endocrine dysfunction in natural disasters
- End of life care
- Support for caregivers of persons living with endocrine disease

PRAGMATIC USAGE

Incorporating spiritual endocrinology into health care can optimize outcomes. Integration of religiosity scales in risk assessment tools has been proposed as a guide for personalized counseling for fasting during Ramadan[18]. Geriatric endocrinology, menopause management, and end-of-life care may benefit from spiritual components, enhancing patient satisfaction, and holistic well-being. Some specific examples of the utility of spiritual endocrinology are listed in Table 2.

THE WAY FORWARD

Spiritual endocrinology is a nascent, yet promising field, poised for growth. Its evolution requires an inclusive, evidence-based approach to maximize its utility across all levels of health care, from prevention to advanced care. By blending scientific and spiritual insights, spiritual endocrinology holds the potential to redefine holistic endocrine care, offering a comprehensive framework for health and wellness.

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