Short communication

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Implementability of the intervention model: microbiota-gut-brain axis in Colombia

Abstract

According to the World Health Organization (**WHO**), worldwide, the most prevalent pathologies that urgently need intervention are cardiovascular diseases (**CVD**), mental disease and, due to their health burden, neoplasms. These pathologies share a common origin associated with dysfunction of the gut-brain-nutrients-microbiota-metabolism (GBNM2) axis. Therefore, it is necessary to develop effective health care models that prevent GBNM2 axis dysfunction based on strategies such as primary health care (PHC), to promote and maintain health, intervene in risk factors that limit capital in health and prevent the appearance of chronic non-communicable diseases, which lead to these outcomes. However, countries have social determinants of health that limit its implementation, such as globalization, cultural conditions, low income, low coverage in public health policies and human talent. In this sense, the model of the GBNM2 axis and the intervention of the 7 zones proposed by Camacho is a reference to address some risk factors that lead to this problem and an alternative to encourage its applicability. This article explores the facilitators, barriers, and implementation of the model based on the theory of social determinants in the Colombian health system, led by specialties such as family medicine.

Keywords: health management, gut-brain axis, nutrients, healthcare policies, implementation

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Abbreviation:
WHO, world health organization; CVD, cardiovascular diseases; PHC, primary health care

Introduction

Through a study of the literature, Camacho found that GBNM2 axis dysfunction arises from chronic pro-inflammatory states and causes the appearance of CVD, endocrine, and metabolic risk factors such as overweight, obesity (Edmonton Obesity Staging System), type 2 diabetes mellitus; gastrointestinal pathologies such as irritable bowel syndrome, dyspepsia, musculoskeletal disorders such as fibromyalgia, mental disorders such as stress and anxiety, neurological disorders such as Alzheimer's disease and neoplastic diseases. This dysfunction manifests itself in 5 levels of dysfunction: emotional, intestinal, microbiota, nutritional, and metabolic, and it initially arises from emotional dysfunction. Chronic stress situations are known to elevate serum adrenaline and cortisol levels, affect neuroendocrine and immune pathways, promote pro-inflammatory responses and inhibit anti-inflammatory pathways, with a negative influence on the gut microbiota, and cause dysbiosis, nutritional dysfunction, eating disorders, metabolic alteration and GBNM2 axis.[1–6]

Camacho proposed the model of 7 intervention zones to manage the GBNM2 axis: Zone 1: Essence and values, the self-concept. Zone 2: Survival and neuro programming. Zone 3: Neuro transformation and resistance to change. Zone 4: Neuro design and Neuro well-being. Zone 5: Neuro connection. Zone 6: Neuro integration and Zone 7: Control of the body. Due to the high prevalence of these diseases, it is necessary to explore the applicability of the 7-zone model in terms of safety, equity, opportunity, and patient-centered medicine; to improve the effectiveness of health promotion and maintenance. The intervention in these areas corresponds to the preventive level and could be implemented through the PHC strategy, as discussed below.[1,7,8]

Primary health care strategy (PHC) in Colombia

Many academic organizations like the WHO, the United Nations, the European Society of Cardiology, the American College of Cardiology, the American Heart Association, the United States Preventive Services Task Force, the Disease Control and Prevention, the European Psychiatric Association, The American Psychiatry Association, propose the implementation of the PHC to reduce the incidence of chronic diseases. The strategy includes promotion and maintenance of health, disease prevention, timely diagnosis, treatment, rehabilitation and palliative care. Colombia followed the model of international health policies and implemented the PHC with the Comprehensive Health Care Model, the Comprehensive Health Care Routes, Territorial Action Model of Care in Colombia is currently in transition from a model that follows the PHC, although it proposes changes in financial collection.[8–12]

Promoters and barriers of the 7-zone model to intervene in GBNM2 axis dysfunction

To achieve the applicability of the 7-zone model proposed by Camacho, adequate mental health was identified as facilitators. The role of human talent in health is to guide healthy people, with risk factors or with GBNM2 axis dysfunction to cultivate the mental sphere with values, explore personal emotional information, identify predictive and defense strategies triggered by emotional stress, as well as unconscious, impulsive, reactive and defensive behavioral patterns, to advance to the self-critical level with decision to change and distancing from defensive strategies. Achieving the desired state depends on focusing on strengths and positive emotions; plan clear, measurable and achievable life goals in the short and medium term to achieve metabolic homeostasis.[1] The barriers identified in the implementation of the 7-zone model include genetic factors for endocrine-metabolic pathologies and mental health, with alterations in the transmission of calcium signals, the glutamatergic system, hormonal-neuronal regulation, mitochondrial dysfunction, and the immune system, micro-RNAs and histones; epigenetic factors such as disruption of myelination and maturation, infectious, degenerative such as loss of frontotemporal and axonal gray matter, hormonal such as postpartum depression and menopause due to decreased estrogen levels, functional deficiencies and personality disorders. In these situations, the model probably does not have the same effectiveness in the intervention.[1,13,14]

Contextual barriers include institutional deficit of human talent in health for the comprehensive approach of the model, medicalization and polypharmacy, disarticulation in the network of the information system of medical records, inadequate follow-up to therapeutic plans, deficient comprehensive care, low empowerment in mental health; globalization, cultural conditions, low coverage in public health policies. In addition, chronic exposure to unfavorable socioeconomic, geopolitical, and environmental circumstances, poverty, illiteracy, unemployment, violence, inequality, climate crisis, environmental deprivation, unsafe and risky environments, natural disasters, humanitarian emergencies, forced displacement, and inadequate nutritional cultural patterns generate insecurity due to difficulties in acquiring healthy products for consumption and the family basket.[8,15,16]

Implementation of the 7-zone model based on the theory of social determinants

The social determinants of health are the conditions in which people live and develop. To implement the 7-zone model, it is necessary to include individual determinants, such as:

I. Nutritional guidelines to promote the consumption of natural, whole grain products, fiber, grains, vegetables (2.5-3 cups/day without starch), whole fruit (2 cups/day), fish, milk, probiotics, prebiotics, and limit fat intake (saturated, trans), salt, juices; sausages, red meat, ultra-processed, stimulating drinks, added sugars or high glycemic index.[1,9–11]

II. Avoid a sedentary lifestyle and promote physical activity and exercise. The American College of Sports Medicine recommended in adults and the elderly 3.5-7 hours/week or 30-60 minutes/day; aerobic (150 minutes/week of moderate intensity or 75 vigorous minutes); of strengthening and resistance (2 times/week); and 7.500 steps by age. In child 60 minutes/day; aerobic, of strengthening and resistance, moderate to vigorous intensity, every week; and 13.000 steps by age.[17–19]

III. Sleep hygiene through fixed sleep times, appropriate environment, previous relaxing activities such as taking a warm shower.[8,13]

IV. Limit exposure time to electronic devices, screens and technology and increase contact with nature and healthy interpersonal relationships.[8,13]

V. Do not expose yourself to tobacco or cigarettes in any of its forms; consume a maximum of 100 grams of alcohol per week to avoid socioemotional dysfunction, impulsivity, and dysfunction of the GBNM2 axis.[1,9–11]

VI. Attend medical check-up for prevention and early detection: keep abdominal circumference measurements below 94 cm in men and 90 cm in women, with a normal body mass index (18.5-24.9kg/m2).[1,9–11]

Interpersonal determinants help adopt individual determinants and include **a.** Individual and family education on the negative consequences of harsh parenting, abuse (physical, verbal, psychological, terrorizing, and/or neglect), childhood adversity, and emotional trauma. **b.** Caregiver overload screening and intervention. **c.** Mental health screenings in the medical and psychology consultation. The above conditions generate structural damage to the cerebral amygdala, the amygdala-hippocampus-prefrontal cortex-limbic system pathways and loss of homeostasis of the GBNM2 axis.[13–16]

Contextual determinants facilitate compliance with the above and include:

I. Strengthen public policies with leadership and governance aimed at implementing healthy lifestyles that include promotion of physical activity, food safety, regulation of the sale of ultra-processed foods, with excess saturated fats, refined carbohydrates, favorable, affordable, safe environmental environments, and sustainable.

II. Research and management of population risk, including the reduction of barriers to access to health services Strengthen the educational level of human talent in the detection and approach of risk factors in mental health by life course and caregiver overload.

III. Promote preconception evaluation consultation for the detection and intervention of fetal risk factors that affect the GBNM2 axis in utero.

IV. Articulate the information network of the medical records system to avoid data loss.[8,11,15,17,20,21]

The family physician has a coordinating role in the comprehensive approach to patients with risk factors for dysfunction of the GBNM2 axis from the model of the 7 zones and the theory of social determinants of health to promote empowerment in mental health. It is the role of the state to promote the applicability of these programs under public policies that allow evaluating their implementation in terms of cost effectiveness, coverage, and safety.

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Conflicts of interest

The author declares there is no conflict of interest in this job.

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