International Journal of Public Health and Pharmacology
ISSN: 2997-6014
Volume 6, Issue 1, 2026 (pp. 102-116)
www.abjournals.org

PSYCHOBIOTIC POTENTIAL OF FIBRE-RICH CASSAVA-BASED FUFU: CULTURAL DIET, GUT–BRAIN AXIS, AND MENTAL HEALTH PROMOTION

Dorothy John Okoro[1], Usen E. Inyang[1], and Patrick Esime[2].

[1]Department of Psychology, University of Uyo.

[2]Department of Community Health, WOCLIF College of Health Technology.

Corresponding Authors' Emails:
dorothyokrojohn@gmail.com; usenessieninyang@gmail.com

Cite this article:

Okoro, D. J., Inyang, U. E., Esime, P. (2026), Psychobiotic Potential of Fibre-Rich Cassava-Based Fufu: Cultural Diet, Gut–Brain Axis, and Mental Health Promotion. International Journal of Public Health and Pharmacology 6(1), 102-116. DOI: 10.52589/IJPHP-DZPKIGUP

Manuscript History

Received: 5 Jan 2026

Accepted: 8 Feb 2026

Published: 27 Mar 2026

ABSTRACT: *Background: Nigeria is experiencing a growing burden of stress-related and common mental disorders alongside rapid dietary transitions characterised by increased consumption of refined, low-fibre foods. Evidence from nutritional psychiatry indicates that the gut–brain axis plays a central role in emotional regulation and stress resilience, with dietary fibre acting as a key modulator of gut microbiota, neuroinflammation, and neurotransmitter synthesis. Cassava-based fufu, a major staple and culturally significant comfort food, was traditionally prepared in fibre-rich forms, but modern processing methods increasingly reduce its fibre content. Objective: This paper examined the psychobiotic potential of fibre-rich cassava-based fufu as a culturally grounded dietary strategy for promoting psychological safety and mental well-being in Nigeria. Methods: A narrative theoretical synthesis was undertaken, integrating literature from nutritional psychiatry, gut–brain axis research, cultural psychology, and traditional African food processing. The review focused on biological pathways linking dietary fibre to short-chain fatty acid production, serotonergic and hypothalamic–pituitary–adrenal axis regulation, and glycaemic stability, as well as the psychosocial functions of comfort foods in emotional security and social bonding. Results: Fibre-rich cassava-based fufu was shown to possess multiple psychobiotic properties, including enhancement of gut microbial diversity, increased production of neuroactive metabolites, reduction of systemic inflammation, and stabilisation of stress-related neuroendocrine responses. Psychologically, its cultural familiarity, sensory continuity, and role in communal eating practices support emotional regulation, identity affirmation, and psychological safety. Conclusion: Fibre-rich cassava-based fufu can be conceptualised as a culturally congruent psychobiotic food with potential value for public mental health promotion. Integrating nutritionally enhanced traditional staples into dietary guidelines, community nutrition programmes, and primary mental healthcare may provide a low-cost, non-stigmatising strategy for strengthening stress resilience and emotional well-being through biologically and culturally grounded pathways.*

KEYWORDS: Psychobiotics; Gut–Brain Axis; Dietary Fibre; Cultural Comfort Foods; Public Mental Health.

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP

International Journal of Public Health and Pharmacology
ISSN: 2997-6014
Volume 6, Issue 1, 2026 (pp. 102-116)

www.abjournals.org

INTRODUCTION

In Nigeria and much of sub-Saharan Africa, cassava-based fufu occupies a central place in daily nutrition and cultural life. Beyond its role as a staple carbohydrate, cassava-based fufu functions as a cultural comfort food that is deeply embedded in family routines, communal eating practices, and intergenerational identity. It is commonly consumed within social contexts that emphasise togetherness, caregiving, and shared meaning, such as family meals, festivals, and rites of passage. Regular consumption of swallowed foods is therefore not only associated with physiological satiety but also with emotional warmth, social bonding, and a sense of psychological security. From a psychological perspective, familiar traditional foods often operate as symbols of continuity and safety, evoking memories of care, stability, and belonging, and thereby contributing to emotional regulation and stress buffering (Locher et al., 2005; Rozin & Wolf, 2008).

Nigeria is simultaneously facing a rising burden of mental health challenges, particularly stress-related disorders, anxiety, and depression. These conditions are increasingly linked to socioeconomic pressures such as graduate unemployment, poverty, insecurity, urban overcrowding, and the erosion of traditional support systems (Gureje et al., 2015; WHO, 2022). Although mental health responses in the country have largely focused on psychosocial interventions and pharmacotherapy, there is growing recognition that emotional well-being is also shaped by lifestyle and environmental factors, including diet. The emerging field of nutritional psychiatry has demonstrated that dietary patterns influence mood, cognition, and stress resilience through biological mechanisms that interact with psychological and social processes (Jacka et al., 2017; Sarris et al., 2015). This perspective is particularly relevant in African contexts, where rapid dietary transitions are occurring alongside escalating mental health vulnerabilities.

Central to the nutrition–mental health relationship is the gut–brain axis, a complex bidirectional communication system linking the gastrointestinal tract and the central nervous system via neural, endocrine, and immune pathways (Cryan & Dinan, 2012). Within this system, dietary fibre plays a critical role by shaping gut microbiota composition and promoting the production of short-chain fatty acids, which modulate inflammation, influence serotonin synthesis, and affect stress responsiveness and emotional regulation (Mayer et al., 2015; Foster & McVey Neufeld, 2013). Diets low in fibre and high in refined carbohydrates, now increasingly common in urban Nigerian settings, have been associated with microbial imbalance, metabolic dysregulation, and heightened vulnerability to depressive and anxiety symptoms (O'Neil et al., 2014).

Historically, traditional methods of preparing cassava-based fufu from cassava, yam, and related tubers involved minimal refinement and natural fermentation processes that preserved substantial dietary fibre and bioactive compounds. These preparation methods supported slower glucose absorption, improved gut health, and sustained satiety. However, contemporary commercial and household processing practices often prioritise visual whiteness, ultra-smooth texture, and extended shelf life, resulting in the removal of fibrous components. This shift mirrors broader nutrition transitions in Nigeria and other low- and middle-income countries, where indigenous whole-food diets are increasingly displaced by refined, low-fibre alternatives, with consequences for both physical and mental health (Popkin et al., 2012).

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP

International Journal of Public Health and Pharmacology
ISSN: 2997-6014
Volume 6, Issue 1, 2026 (pp. 102-116)
www.abjournals.org

The current interest in developing fibre-rich formulations of cassava-based ufu therefore represents more than a technological modification; it reflects a culturally grounded public health strategy aimed at reconciling modernisation with psychological and biological well-being. Re-engineering cassava-based fufu to be fibre-rich while retaining its sensory properties, taste, and cultural symbolism offers the possibility of preserving its role as a comfort food and source of emotional security while simultaneously enhancing its neuroprotective and mood-regulating potential. Within this context, the concept of psychological safety, defined as a sense of emotional security, predictability, and belonging (Edmondson, 1999), can be extended beyond organisational environments to include culturally familiar dietary practices that provide emotional reassurance, continuity, and stress regulation.

Situating fibre-rich cassava-based fufu within a psychosocial and neuro-nutritional framework allows for a more holistic understanding of food as both a biological substrate and a cultural–psychological resource. This article therefore examines how the transition from traditionally processed and increasingly refined fufu to fibre-enriched formulations may support gut health, stabilise emotional processes, and strengthen resilience to stress. By integrating insights from cultural psychology, nutritional psychiatry, and public mental health, the paper argues that preserving the cultural identity of cassava-based fufu while enhancing its fibre content can contribute to community-based mental health promotion in Nigeria. In this sense, fibre-rich cassava-based fufu is conceptualised not merely as an improved staple food, but as a culturally anchored intervention capable of reinforcing psychological safety, emotional regulation, and collective well-being in a rapidly changing social environment.

THEORETICAL FRAMEWORK

The Gut–Brain Axis Theory

The gut–brain axis theory, prominently articulated by Cryan and Dinan (2012), conceptualises mental health as partly regulated by a bidirectional communication system between the gastrointestinal tract and the central nervous system. According to this theory, the brain and the gut are linked through three major pathways: (1) neural signalling, primarily via the vagus nerve; (2) endocrine pathways, especially the hypothalamic–pituitary–adrenal (HPA) axis; and (3) immune mechanisms involving cytokines and inflammatory mediators. These interconnected systems allow intestinal processes to influence emotional regulation, cognitive functioning, and stress responses, while psychological states simultaneously alter gut motility, secretion, and microbial composition.

A central tenet of the gut–brain axis is the role of the gut microbiota as an active neurobiological regulator rather than a passive digestive component (Cryan & Dinan, 2012; Mayer et al., 2014). Beneficial microorganisms in the intestine produce neuroactive compounds, including serotonin precursors, gamma-aminobutyric acid (GABA), dopamine, and short-chain fatty acids (SCFAs), which influence synaptic plasticity, neuroinflammation, and emotional behaviour. Mayer et al. (2014) further demonstrated that microbial metabolites modulate limbic system activity, thereby affecting mood, anxiety, and stress reactivity. Foster and McVey Neufeld (2013) emphasised that alterations in microbial diversity are associated with dysregulation of the HPA axis, leading to heightened cortisol secretion and increased vulnerability to anxiety and depressive disorders.

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP

International Journal of Public Health and Pharmacology
ISSN: 2997-6014
Volume 6, Issue 1, 2026 (pp. 102-116)

www.abjournals.org

Dietary fibre occupies a foundational position in this theoretical model. As proposed by Cryan and Dinan (2012) and expanded by Mayer et al. (2014), fibre serves as the primary prebiotic substrate that sustains microbial diversity and facilitates the production of SCFAs such as butyrate, acetate, and propionate. These metabolites strengthen the intestinal epithelial barrier, reduce systemic inflammation, and modulate neurotransmitter synthesis, particularly serotonin, which is largely produced in the gut and plays a key role in mood stabilisation. Thus, low-fibre diets are theorised to disrupt microbial homeostasis, increase neuroinflammatory activity, and impair emotional regulation.

In relation to this study, the gut–brain axis theory provides the biological foundation for linking fibre-rich cassava-based fufu to mental health outcomes. Traditional and fibre-enhanced cassava-based fufu can be conceptualised as a culturally grounded prebiotic food capable of supporting microbial balance, stabilising glucose metabolism, and regulating stress-related neuroendocrine responses. By improving fibre intake within a culturally meaningful dietary framework, fibre-rich cassava-based fufu may enhance SCFA production, promote serotonergic balance, and reduce inflammatory processes associated with anxiety and depression.

Furthermore, the theory aligns with the psychosocial dimension of the study by illustrating how culturally familiar foods can exert both emotional comfort and neurobiological regulation simultaneously. In this sense, fibre-rich cassava-based fufu is not only a comfort food that enhances psychological safety but also a functional neuro-nutritional intervention that supports the gut–brain axis. The gut–brain framework therefore substantiates the study's central proposition: that re-engineering a traditional Nigerian staple to be fibre-rich can contribute to emotional stability, stress resilience, and community-based mental health promotion through biologically grounded, culturally resonant pathways.

Traditional Fufu and Its Cultural–Psychological Functions

In many Nigerian communities, cassava-based fufu is more than a dietary staple; it is a cultural symbol that carries deep psychological and social meaning. Traditionally prepared from fermented cassava, yam, or plantain through soaking, pounding, sieving, and cooking, cassava-based fufu-making is often a communal and gendered activity, embedded in family routines and shared labor. These preparation processes are typically learned within the household and transmitted across generations, reinforcing intergenerational bonds, cultural continuity, and a sense of identity. From a cultural-psychological perspective, such food practices function as repositories of memory and meaning, linking present experiences to past relationships and collective histories.

The consumption of cassava-based fufu is closely tied to social interaction and emotional connectedness. Meals centered on swallow foods are commonly eaten in groups, encouraging conversation, cooperation, and shared attention. Eating from a common pot or gathering around a meal table fosters intimacy, trust, and mutual support, all of which are important for psychological well-being. In this sense, cassava-based fufu operates as a "social glue," facilitating interpersonal closeness and reinforcing the individual's sense of belonging within the family and wider community.

As a comfort food, cassava-based fufu is associated with feelings of satiety, warmth, and emotional reassurance. Psychological research on comfort foods suggests that such foods are

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP

often consumed during periods of stress or emotional distress because they evoke memories of care, safety, and nurturing, typically rooted in early life experiences (Locher et al., 2005; Rozin & Wolf, 2008). In the Nigerian context, cassava-based fufu is frequently linked to maternal care, home-cooked meals, and family stability, making it a powerful emotional anchor. The familiar taste, texture, and aroma of traditionally prepared cassava-based fufu can therefore trigger conditioned feelings of calmness and security, contributing to emotional regulation and stress reduction.

Traditional food practices also provide structure and predictability, which are central to psychological safety. Regular meal times, familiar preparation methods, and consistent sensory qualities create a sense of routine that supports emotional stability, particularly in environments characterized by economic hardship or social uncertainty. Through these routines, individuals experience continuity and control, which buffer against anxiety and psychological distress.

Furthermore, the cultural meanings attached to cassava-based fufu reinforce positive self-concept and collective identity. Consuming indigenous foods affirms cultural pride and belonging, countering feelings of alienation that may accompany rapid modernization and dietary Westernization. From a cultural psychology standpoint, such affirmation of identity can strengthen self-esteem and emotional resilience.

Thus, traditional cassava-based fufu serves multiple psychological functions: it nurtures social bonds, evokes emotional comfort, provides routine and predictability, and reinforces cultural identity. These functions position cassava-based fufu not merely as a source of physical nourishment but as a psychosocial resource that contributes to psychological safety and emotional well-being. Understanding these cultural-psychological roles is essential when considering the transition to fibre-rich formulations, as any nutritional innovation must preserve the symbolic, emotional, and social values that make cassava-based fufu a powerful comfort food within Nigerian society.

Fibre, Microbiota, and Mental Health

Dietary fibre plays a foundational role in shaping the composition and functional capacity of the gut microbiome, which is now recognised as a key regulator of brain function and emotional health. High-fibre diets promote microbial diversity and the proliferation of beneficial bacterial taxa such as *Bifidobacterium* and *Lactobacillus*, which are associated with anti-inflammatory activity, enhanced intestinal barrier integrity, and balanced neuroendocrine functioning. Reduced microbial diversity, in contrast, has been linked to dysregulation of the hypothalamic–pituitary–adrenal (HPA) axis, heightened stress reactivity, and increased vulnerability to anxiety and depressive disorders. Thus, fibre intake operates not merely as a digestive factor but as a determinant of neurobiological resilience.

A central mechanism through which fibre exerts its psychotropic effects is the production of short-chain fatty acids (SCFAs)—primarily butyrate, acetate, and propionate—via bacterial fermentation in the colon. These metabolites cross the intestinal epithelium and influence the brain through immune, endocrine, and neural pathways. Butyrate, in particular, has been shown to possess anti-inflammatory and neuroprotective properties, modulating microglial activation and enhancing the expression of brain-derived neurotrophic factor (BDNF), which is critical for synaptic plasticity and mood regulation. SCFAs also stimulate enterochromaffin cells to produce serotonin, approximately 90% of which is synthesised in the gut, thereby directly

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP

influencing affective stability, impulse control, and stress tolerance. Through vagal nerve signalling and immune modulation, these microbial metabolites shape limbic system activity and emotional processing.

Low-fibre diets, increasingly characteristic of urbanised and refined food systems, disrupt this symbiotic microbiota–brain relationship. Insufficient fibre intake reduces SCFA production, weakens the intestinal barrier, and promotes systemic low-grade inflammation. Elevated inflammatory cytokines such as interleukin-6 and tumour necrosis factor-alpha have been consistently implicated in the pathophysiology of depression and anxiety, acting on monoaminergic systems and altering cortisol regulation. Chronic inflammation also interferes with tryptophan metabolism, diverting it away from serotonin synthesis toward kynurenine pathways associated with neurotoxicity and depressive symptomatology. Consequently, low-fibre dietary patterns are associated with heightened emotional lability, cognitive fatigue, and increased risk of common mental disorders.

Beyond microbiota-mediated mechanisms, dietary fibre contributes to mental health through its role in glycaemic regulation. High-fibre foods slow gastric emptying and carbohydrate absorption, resulting in more stable postprandial blood glucose levels. Glycaemic instability, characterised by rapid spikes and crashes in blood sugar, has been linked to irritability, anxiety, impaired concentration, and heightened stress sensitivity through dysregulation of cortisol and adrenergic responses. Stable glucose availability, by contrast, supports prefrontal cortical functioning, emotional self-regulation, and sustained cognitive control. In this context, fibre-rich diets act as metabolic stabilisers that reduce physiological stress load and promote emotional equilibrium.

Within the Nigerian dietary landscape, the transition from traditionally fibre-dense preparations of cassava-based fufu to more refined, low-residue variants may therefore have unintended consequences for mental well-being. Re-introducing and enhancing fibre content in cassava-based fufu has the potential to restore microbiome diversity, increase SCFA production, reduce neuroinflammatory processes, and stabilise glycaemic responses, thereby supporting mood regulation and stress resilience. Fibre-rich cassava-based fufu can thus be conceptualised as a culturally grounded psychobiotic food—one that simultaneously nourishes the gut ecosystem, stabilises neurochemical pathways, and reinforces emotional balance through both biological and psychosocial mechanisms.

Transition to Fibre-Rich Cassava-Based Fufu Processing: Technological and Cultural Considerations

The transition from traditionally processed and increasingly refined fufu to fibre-rich formulations represents a critical interface between food technology, cultural preservation, and mental health promotion. Historically, fufu was produced through processes such as soaking, fermentation, pounding, and minimal sieving of cassava or other tubers. These methods retained a substantial proportion of insoluble and soluble dietary fibres, resistant starches, and bioactive compounds. However, contemporary commercial processing has shifted toward intensive sieving, repeated washing, mechanical dewatering, and fine milling, with the primary goals of achieving a smooth texture, bright whiteness, and extended shelf stability. While these characteristics improve market appeal, they substantially reduce fibre content and increase the glycaemic index of the final product, thereby diminishing its microbiota-supportive and neuroprotective potential.

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP

International Journal of Public Health and Pharmacology
ISSN: 2997-6014
Volume 6, Issue 1, 2026 (pp. 102-116)

www.abjournals.org

Fibre-rich fufu processing seeks to reverse this nutritional erosion while preserving sensory acceptability and cultural authenticity. One key method involves partial rather than complete sieving of fermented cassava mash, allowing a controlled proportion of fibrous fractions to remain in the final paste or flour. This approach maintains the traditional organoleptic properties—taste, aroma, and elasticity—while enhancing prebiotic content. A second method is whole-root processing, in which the entire cassava tuber, including portions typically discarded during refinement, is incorporated after hygienic washing and controlled fermentation. This technique increases insoluble fibre, resistant starch, and micronutrient density without altering the cultural identity of the food.

Fermentation optimisation constitutes another important strategy. By extending or carefully regulating fermentation time and temperature, endogenous lactic acid bacteria can be encouraged to partially degrade complex polysaccharides into fermentable substrates for gut microbiota, thereby increasing the functional fibre value of the product. Such controlled fermentation not only improves digestibility but also enhances the production of bioactive metabolites that support intestinal barrier integrity and immune modulation, both of which are relevant to the gut–brain axis and emotional regulation.

In addition, composite cassava-based fibre enrichment can be achieved by blending cassava with fibre-rich indigenous crops such as unripe plantain, cocoyam, or whole-grain cereals at specific ratios prior to fermentation and cooking. This method mirrors traditional dietary diversity practices while increasing soluble fibre and resistant starch content. Importantly, the textural and sensory qualities of swallow foods can be preserved through standardised gelatinisation and moulding techniques, ensuring that the resulting fufu maintains the elasticity, smoothness, and mouthfeel required for cultural acceptability.

From a psychological and cultural standpoint, the success of fibre-rich cassava-based fufu depends not only on its nutritional profile but also on its ability to retain symbolic meaning and emotional familiarity. Taste, aroma, and texture are strongly linked to memory, affect, and psychological comfort. Therefore, cassava-based fibre enrichment must be subtle and gradual, avoiding drastic alterations that could disrupt emotional attachment or cultural identity. Participatory sensory evaluation within communities, involving households and traditional food processors, is essential to ensure that technological modifications align with culturally encoded expectations of “real fufu”.

In relation to mental health, these processing methods have important implications. By restoring and enhancing dietary fibre content, fibre-rich cassava-based fufu can support gut microbiota diversity, increase short-chain fatty acid production, stabilise postprandial glucose responses, and reduce systemic inflammation. These biological effects translate into improved serotonin regulation, moderated stress reactivity, and enhanced emotional stability through the gut–brain axis. Simultaneously, by preserving the sensory and symbolic characteristics of a culturally valued comfort food, fibre-rich cassava-based fufu maintains its role in fostering psychological safety, emotional reassurance, and social connectedness.

Thus, the transition to fibre-rich cassava-based fufu represents an integrative innovation that aligns food technology with cultural psychology and nutritional psychiatry. It demonstrates how modernisation of indigenous foods can be achieved without cultural displacement, transforming a traditional staple into a functional psychobiotic food capable of supporting both

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP

neurobiological resilience and culturally grounded emotional well-being in the Nigerian context.

Mental Health Implications of Fibre-Rich Fufu Consumption

The integration of fibre-rich cassava-based fufu into the Nigerian diet has significant implications for mental health at individual, family, and community levels. From a neurobiological standpoint, increased dietary fibre intake enhances gut microbiota diversity and stimulates the production of short-chain fatty acids (SCFAs), particularly butyrate, acetate, and propionate. These metabolites play crucial roles in regulating neuroinflammation, maintaining blood–brain barrier integrity, and modulating neurotransmitter systems involved in mood and stress regulation, including serotonin, dopamine, and gamma-aminobutyric acid (Cryan & Dinan, 2012; Mayer et al., 2014). Through their effects on immune signalling and hypothalamic–pituitary–adrenal (HPA) axis activity, SCFAs contribute to reduced cortisol hypersecretion and improved stress adaptation, thereby lowering vulnerability to anxiety and depressive disorders (Foster & McVey Neufeld, 2013).

Fibre-rich diets are also associated with enhanced tryptophan availability and serotonergic functioning, given that approximately 90% of serotonin is synthesised in the gut and is sensitive to microbial composition and inflammatory status (Clarke et al., 2014). By promoting microbial balance and limiting pro-inflammatory cytokine production, fibre-rich fufu may reduce the activation of kynurenine pathways that divert tryptophan away from serotonin synthesis, a process strongly implicated in depression and emotional dysregulation (O'Neil et al., 2014). Consequently, regular consumption of fibre-rich fufu may support mood stability, improve stress tolerance, and enhance cognitive flexibility, particularly in populations exposed to chronic socioeconomic and environmental stressors.

At the level of emotional regulation, glycaemic stability provided by high-fibre foods is of critical psychological relevance. Fibre slows gastric emptying and carbohydrate absorption, producing gradual postprandial glucose release and preventing rapid glycaemic fluctuations. Such stability reduces sympathetic nervous system activation and attenuates cortisol and adrenaline surges associated with hypoglycaemia-induced stress responses (Benton & Donohoe, 1999). Stable glucose supply supports prefrontal cortical functioning, which underlies executive control, emotional inhibition, and adaptive coping. In contrast, repeated glycaemic spikes and crashes are associated with irritability, anxiety, fatigue, attentional lapses, and heightened emotional reactivity. Fibre-rich fufu, by maintaining metabolic equilibrium, may therefore facilitate affective balance, impulse control, and sustained concentration, particularly among students, workers, and individuals managing chronic psychosocial demands.

Beyond its biological effects, the mental health relevance of fibre-rich fufu is deeply embedded in its cultural and psychological meaning. As a culturally familiar comfort food, fufu symbolises home, care, and social continuity. The preservation of its sensory qualities—taste, texture, aroma, and elasticity—ensures that nutritional enhancement does not disrupt its emotional associations. Psychological safety, conceptualised as a sense of predictability, emotional security, and belonging (Edmondson, 1999), is reinforced through routine consumption of culturally meaningful foods. Such routines provide structure and continuity in contexts marked by economic uncertainty and social change, thereby buffering against anxiety

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP

and emotional instability. When a culturally valued food simultaneously supports neurobiological regulation, its protective role becomes both symbolic and physiological.

At the family and community levels, fibre-rich cassava-based fufu may contribute to collective mental well-being by strengthening commensality and social cohesion. Shared meals promote interpersonal bonding, emotional disclosure, and social support, which are well-established protective factors against depression and psychological distress (Fischler, 2011; Sobal & Nelson, 2003). Integrating fibre-rich cassava-based fufu into school feeding programmes, workplace nutrition schemes, and community health initiatives could therefore enhance cognitive performance, reduce stress reactivity, and foster social connectedness in a culturally resonant and non-stigmatising manner.

Clinically, the framework of nutritional psychiatry supports the inclusion of high-fibre, culturally familiar foods as adjuncts to psychotherapy and pharmacological treatment. Dietary patterns rich in whole foods and fibre have been associated with reduced depressive symptom severity and improved treatment outcomes (Jacka et al., 2017; Sarris et al., 2015). For Nigerian patients, fibre-rich fufu represents a culturally congruent psychobiotic food that can complement conventional interventions by supporting gut–brain regulation, reducing inflammatory burden, and reinforcing cultural identity and emotional comfort. Such alignment between biological efficacy and cultural meaning may improve dietary adherence, therapeutic engagement, and overall quality of life.

Public Health and Clinical Implications

The findings and arguments advanced in this paper have important implications for public health policy, community mental health promotion, and clinical practice in Nigeria and similar sub-Saharan African contexts. Given the rising burden of common mental disorders and the limited availability of specialist mental health services, there is a growing need for low-cost, preventive, and culturally acceptable interventions that can be embedded within everyday life. Fibre-rich fufu, as a widely consumed staple with strong cultural meaning, offers a unique opportunity to integrate mental health promotion into routine dietary practices.

From a public health perspective, improving the fibre content of a commonly eaten food has the potential to influence population-level mental well-being through scalable and sustainable means. Incorporating fibre-rich cassava-based fufu into national nutrition guidelines, school feeding programmes, and workplace meal schemes could contribute to improved cognitive functioning, emotional regulation, and stress resilience among children, adolescents, and adults. Stable glycaemic control and enhanced gut–brain regulation associated with high-fibre diets may support attention, learning, and behavioural regulation in school settings, while also reducing fatigue, irritability, and stress reactivity in working populations. Such benefits align with broader goals of human capital development and productivity.

Community-based mental health promotion can also be strengthened through culturally grounded food interventions. In many Nigerian communities, communal eating remains a central social practice that fosters social cohesion, emotional support, and intergenerational bonding. Embedding fibre-rich fufu within community nutrition education and primary healthcare outreach can therefore reinforce both biological and psychosocial protective factors. Because food-based interventions are familiar and non-stigmatising, they may be more readily

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP

accepted than explicitly "mental health" programmes, particularly in settings where stigma and limited mental health literacy persist.

Clinically, the implications are equally significant. The framework of nutritional psychiatry increasingly recognises diet as an important adjunct to psychological and pharmacological treatments. For patients presenting with depression, anxiety, or stress-related disorders, dietary patterns that support gut microbiota balance, reduce inflammation, and stabilize glucose metabolism may enhance treatment outcomes and improve overall functioning. Recommending culturally familiar, fibre-rich foods such as improved fufu formulations can strengthen therapeutic alliance, increase adherence, and align clinical advice with patients' cultural identities and everyday realities. Such alignment is particularly important in promoting long-term lifestyle change and holistic recovery.

At the level of primary healthcare, integrating basic nutritional screening and dietary counselling into mental health services could enable early identification of low-fibre, high-glycaemic dietary patterns that may exacerbate emotional dysregulation and stress vulnerability. Training community health workers, psychologists, and nurses to understand the gut–brain axis and the mental health relevance of fibre-rich indigenous foods would support a more integrative, biopsychosocial model of care. This approach is consistent with global calls to strengthen mental health services through task-shifting, community participation, and culturally sensitive interventions.

Policy-wise, the promotion of fibre-rich fufu aligns with broader strategies addressing non-communicable diseases, food security, and sustainable diets. By supporting local food processing innovations that retain or enhance fibre content, governments and development partners can simultaneously address nutritional quality, cultural preservation, and mental well-being. Such policies would encourage the modernisation of indigenous foods without cultural displacement, positioning traditional staples as functional foods for both physical and psychological health.

CONCLUSION AND RECOMMENDATIONS

This paper has examined cassava-based fufu not only as a staple food but also as a culturally embedded comfort food with significant implications for psychological safety and mental well-being in Nigeria. By integrating perspectives from cultural psychology, nutritional psychiatry, and the gut–brain axis, the article has argued that the transition from highly refined fufu to fibre-rich formulations represents a strategic opportunity to enhance mental health through both biological and psychosocial pathways. Fibre-rich cassava-based fufu supports gut microbiota diversity, short-chain fatty acid production, serotonergic balance, reduced inflammation, and glycaemic stability, all of which are central to emotional regulation, stress resilience, and cognitive functioning. At the same time, the preservation of its sensory qualities and cultural symbolism sustains its role as a comfort food that provides emotional security, continuity, and a sense of belonging.

The central conclusion is that modernising indigenous foods does not have to entail cultural loss. On the contrary, when traditional staples such as fufu are nutritionally enhanced in culturally sensitive ways, they can become powerful, non-stigmatising tools for mental health

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP

promotion. Fibre-rich cassava-based fufu can thus be conceptualised as a culturally grounded psychobiotic food that bridges biological regulation and psychological safety, offering a low-cost, widely accessible resource for strengthening emotional well-being in contexts characterised by high psychosocial stress and limited mental health services.

Based on these insights, several recommendations are proposed. First, food scientists and nutritionists should prioritise the development and standardisation of fibre-rich cassava-based fufu processing methods that retain traditional taste, texture, and appearance while significantly improving dietary fibre content. Participatory approaches involving local processors and consumers are essential to ensure cultural acceptability and sustained use.

Second, public health policymakers should integrate fibre-rich versions of traditional staples into national dietary guidelines, school feeding programmes, and community nutrition interventions. Such integration would support cognitive development, emotional regulation, and stress resilience across the life course, while also addressing broader non-communicable disease risks.

Third, mental health practitioners and primary healthcare workers should be sensitised to the role of diet, particularly fibre-rich indigenous foods, in emotional regulation and stress management. Incorporating basic nutritional counselling grounded in local food cultures into mental health care could enhance treatment outcomes, reduce stigma, and strengthen the therapeutic alliance.

Finally, future research is recommended to empirically examine the mental health effects of fibre-rich fufu through clinical trials, longitudinal community studies, and mixed-methods research exploring gut microbiota changes, mood outcomes, and subjective experiences of psychological safety. Such evidence would further substantiate the role of culturally adapted nutritional interventions in preventive and community psychiatry.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Although this paper provides a theoretically grounded and culturally contextualised analysis of fibre-rich fufu and mental health, several limitations should be acknowledged. First, the arguments advanced are primarily conceptual and integrative, drawing on existing literature from nutritional psychiatry, gut–brain axis research, and cultural psychology, rather than on primary empirical data specific to fufu consumption and mental health outcomes. As such, causal inferences regarding the direct effects of fibre-rich fufu on mood, anxiety, or stress regulation cannot yet be established.

Second, variations in fufu preparation methods, fibre content, fermentation practices, and individual dietary patterns across different Nigerian ethnic groups were not empirically examined. These variations may influence microbiota composition, glycaemic responses, and subjective experiences of comfort and psychological safety. Socioeconomic status, urban–rural differences, and coexisting dietary habits may also moderate the mental health effects of fibre-rich fufu.

Future research should therefore adopt mixed-methods and experimental designs to empirically test the propositions advanced in this paper. Randomised controlled trials could compare fibre-

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP

rich and refined fufu diets in relation to mood, anxiety, stress biomarkers, inflammatory markers, and gut microbiome profiles. Longitudinal community studies could examine whether sustained consumption of fibre-rich traditional diets predicts lower incidence of common mental disorders and greater emotional resilience.

Qualitative research is also recommended to explore subjective experiences of comfort, identity, and psychological safety associated with traditional and fibre-enhanced fufu, particularly among different age groups and sociocultural settings. Such work would deepen understanding of how sensory qualities, food memories, and cultural meanings interact with neurobiological processes to shape emotional well-being.

Finally, interdisciplinary collaboration between psychologists, nutritionists, food technologists, and public health researchers will be essential in translating fibre-rich fufu from a conceptual psychobiotic food into an evidence-based, culturally grounded mental health promotion strategy.

REFERENCES

Benton, D., & Donohoe, R. (1999). The effects of nutrients on mood. *Public Health Nutrition, 2*(3a), 403–409.

Clarke, G., Stilling, R. M., Kennedy, P. J., Stanton, C., Cryan, J. F., & Dinan, T. G. (2014). Minireview: Gut microbiota: The neglected endocrine organ. *Molecular Endocrinology, 28*(8), 1221–1238.

Cryan, J. F., & Dinan, T. G. (2012). Mind-altering microorganisms: The impact of the gut microbiota on brain and behaviour. *Nature Reviews Neuroscience, 13*(10), 701–712.

Edmondson, A. (1999). Psychological safety and learning behaviour in work teams. *Administrative Science Quarterly, 44*(2), 350–383.

Fischler, C. (2011). Commensality, society and culture. *Social Science Information, 50*(3–4), 528–548.

Foster, J. A., & McVey Neufeld, K. A. (2013). Gut–brain axis: How the microbiome influences anxiety and depression. *Trends in Neurosciences, 36*(5), 305–312.

Jacka, F. N., O'Neil, A., Opie, R., Itsiopoulos, C., Cotton, S., Mohebbi, M., Castle, D., Dash, S., Mihalopoulos, C., Chatterton, M. L., Brazionis, L., Dean, O. M., Hodge, A. M., & Berk, M. (2017). A randomised controlled trial of dietary improvement for adults with major depression (the "SMILES" trial). *BMC Medicine, 15*, 23.

Mayer, E. A., Knight, R., Mazmanian, S. K., Cryan, J. F., & Tillisch, K. (2014). Gut microbes and the brain: A paradigm shift in neuroscience. *The Journal of Neuroscience, 34*(46), 15490–15496.

O'Neil, A., Quirk, S. E., Housden, S., Brennan, S. L., Williams, L. J., Pasco, J. A., Berk, M., & Jacka, F. N. (2014). Relationship between diet and mental health in children and adolescents: A systematic review. *American Journal of Public Health, 104*(10), e31–e42.

Sarris, J., Logan, A. C., Akbaraly, T. N., Amminger, G. P., Balanza-Martinez, V., Freeman, M. P., Hibbeln, J., Matsuoka, Y., Mischoulon, D., Mizoue, T., Nanri, A., Nishi, D., Ramsey, D., Rucklidge, J. J., Sanchez-Villegas, A., Scholey, A., Su, K. P., & Jacka, F. N. (2015). Nutritional medicine as mainstream in psychiatry. *The Lancet Psychiatry, 2*(3), 271–274.

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP

Sobal, J., & Nelson, M. K. (2003). Commensal eating patterns: A community study. *Appetite, 41*(2), 181–190.

Achi, O. K. (2005). The potential for upgrading traditional fermented foods through biotechnology. *African Journal of Biotechnology, 4*(5), 375–380.

Adegunwa, M. O., Alamu, E. O., Bakare, H. A., & Godwin, P. O. (2017). Effect of processing on the nutritional and functional properties of cassava products. *Journal of Food Processing and Preservation, 41*(3), e12911.

Food and Agriculture Organization of the United Nations. (2013). *Dietary protein quality evaluation in human nutrition*. FAO.

Food and Agriculture Organization of the United Nations & World Health Organization. (2011). *Guide to good hygiene practices for traditional fermented foods*. FAO Food and Nutrition Paper. FAO.

Fischler, C. (2011). Commensality, society and culture. *Social Science Information, 50*(3–4), 528–548.

Niba, L. L., Bokanga, M. M., Jackson, F. L., Schlimme, D. S., & Li, B. W. (2001). Physicochemical properties and starch granular characteristics of flour from various cassava genotypes. *Journal of Food Science, 66*(4), 544–548.

Oyewole, O. B., & Odunfa, S. A. (1988). Cassava processing in Africa. *Food Reviews International, 4*(2), 211–241.

Popkin, B. M., Adair, L. S., & Ng, S. W. (2012). Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews, 70*(1), 3–21.

Rozin, P. (2006). The integration of biological, social, cultural and psychological influences on food choice. *Appetite, 47*(1), 20–26.

Sarkar, A., Lehto, S. M., Harty, S., Dinan, T. G., Cryan, J. F., & Burnet, P. W. J. (2016). Psychobiotics and the manipulation of bacteria–gut–brain signals. *Trends in Neurosciences, 39*(11), 763–781.

Slavin, J. (2013). Fiber and prebiotics: Mechanisms and health benefits. *Nutrients, 5*(4), 1417–1435.

Clarke, G., Stilling, R. M., Kennedy, P. J., Stanton, C., Cryan, J. F., & Dinan, T. G. (2014). Minireview: Gut microbiota: The neglected endocrine organ. *Molecular Endocrinology, 28*(8), 1221–1238.

Cryan, J. F., O'Riordan, K. J., Cowan, C. S. M., Sandhu, K. V., Bastiaanssen, T. F. S., Boehme, M., Codagnone, M. G., Cussotto, S., Fulling, C., Golubeva, A. V., Guzzetta, K. E., Jaggar, M., Long-Smith, C. M., Lyte, J. M., Martin, J. A., Molinero-Perez, A., Moloney, G. M., Morelli, E., Morillas, E., … Dinan, T. G. (2019). The microbiota–gut–brain axis. *Physiological Reviews, 99*(4), 1877–2013.

Foster, J. A., & McVey Neufeld, K. A. (2013). Gut–brain axis: How the microbiome influences anxiety and depression. *Trends in Neurosciences, 36*(5), 305–312.

Jacka, F. N., O'Neil, A., Opie, R., Itsiopoulos, C., Cotton, S., Mohebbi, M., Castle, D., Dash, S., Mihalopoulos, C., Chatterton, M. L., Brazionis, L., Dean, O. M., Hodge, A. M., & Berk, M. (2017). A randomised controlled trial of dietary improvement for adults with major depression (the "SMILES" trial). *BMC Medicine, 15*, 23.

Mayer, E. A., Knight, R., Mazmanian, S. K., Cryan, J. F., & Tillisch, K. (2014). Gut microbes and the brain: Paradigm shift in neuroscience. *The Journal of Neuroscience, 34*(46), 15490–15496.

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP

O'Neil, A., Quirk, S. E., Housden, S., Brennan, S. L., Williams, L. J., Pasco, J. A., Berk, M., & Jacka, F. N. (2014). Relationship between diet and mental health in children and adolescents: A systematic review. *American Journal of Public Health, 104*(10), e31–e42.

Sarkar, A., Lehto, S. M., Harty, S., Dinan, T. G., Cryan, J. F., & Burnet, P. W. J. (2016). Psychobiotics and the manipulation of bacteria–gut–brain signals. *Trends in Neurosciences, 39*(11), 763–781.

Slavin, J. (2013). Fiber and prebiotics: Mechanisms and health benefits. *Nutrients, 5*(4), 1417–1435.

Volkow, N. D., Wang, G. J., Tomasi, D., & Baler, R. D. (2013). The addictive dimensionality of obesity. *Biological Psychiatry, 73*(9), 811–818.

Cryan, J. F., & Dinan, T. G. (2012). Mind-altering microorganisms: The impact of the gut microbiota on brain and behaviour. *Nature Reviews Neuroscience, 13*(10), 701–712.

Foster, J. A., & McVey Neufeld, K. A. (2013). Gut–brain axis: How the microbiome influences anxiety and depression. *Trends in Neurosciences, 36*(5), 305–312.

Mayer, E. A., Knight, R., Mazmanian, S. K., Cryan, J. F., & Tillisch, K. (2014). Gut microbes and the brain: Paradigm shift in neuroscience. *The Journal of Neuroscience, 34*(46), 15490–15496.

Sarkar, A., Lehto, S. M., Harty, S., Dinan, T. G., Cryan, J. F., & Burnet, P. W. J. (2016). Psychobiotics and the manipulation of bacteria–gut–brain signals. *Trends in Neurosciences, 39*(11), 763–781.

Clarke, G., Stilling, R. M., Kennedy, P. J., Stanton, C., Cryan, J. F., & Dinan, T. G. (2014). Minireview: Gut microbiota: The neglected endocrine organ. *Molecular Endocrinology, 28*(8), 1221–1238.

Locher, J. L., Yoels, W. C., Maurer, D., & van Ells, J. (2005). Comfort foods: An exploratory journey into the social and emotional significance of food. *Food and Foodways, 13*(4), 273–297.

Rozin, P., & Wolf, S. (2008). Attachment to foods and the development of comfort food preferences. *Appetite, 51*(3), 632–640.

Sobal, J., & Nelson, M. K. (2003). Commensal eating patterns: A community study. *Appetite, 41*(2), 181–190.

Fischler, C. (2011). Commensality, society and culture. *Social Science Information, 50*(3–4), 528–548.

Oyewole, O. B., & Odunfa, S. A. (1988). Cassava processing in Africa. *Food Reviews International, 4*(2), 211–241.

Ajayi, I. O., & Okunlola, J. O. (2013). Traditional food consumption and cultural identity in southwestern Nigeria. *Journal of African Cultural Studies, 25*(2), 159–172.

Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly,* 44(2), 350–383.

Cryan, J. F., & Dinan, T. G. (2012). Mind-altering microorganisms: The impact of the gut microbiota on brain and behaviour. *Nature Reviews Neuroscience, 13*(10), 701–712.

Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly, 44*(2), 350–383.

Foster, J. A., & McVey Neufeld, K. A. (2013). Gut–brain axis: How the microbiome influences anxiety and depression. *Trends in Neurosciences, 36*(5), 305–312.

Gureje, O., Abdulmalik, J., Kola, L., Musa, E., Yasamy, M. T., & Adebayo, K. (2015). Integrating mental health into primary care in Nigeria: Report of a demonstration project

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP

using the mental health gap action programme intervention guide. *BMC Health Services Research, 15*, 242.

Jacka, F. N., O'Neil, A., Opie, R., Itsiopoulos, C., Cotton, S., Mohebbi, M., Castle, D., Dash, S., Mihalopoulos, C., Chatterton, M. L., Brazionis, L., Dean, O. M., Hodge, A. M., & Berk, M. (2017). A randomised controlled trial of dietary improvement for adults with major depression (the "SMILES" trial). *BMC Medicine, 15*, 23.

Locher, J. L., Yoels, W. C., Maurer, D., & van Ells, J. (2005). Comfort foods: An exploratory journey into the social and emotional significance of food. *Food and Foodways, 13*(4), 273–297.

Mayer, E. A., Knight, R., Mazmanian, S. K., Cryan, J. F., & Tillisch, K. (2014). Gut microbes and the brain: Paradigm shift in neuroscience. *The Journal of Neuroscience, 34*(46), 15490–15496.

O'Neil, A., Quirk, S. E., Housden, S., Brennan, S. L., Williams, L. J., Pasco, J. A., Berk, M., & Jacka, F. N. (2014). Relationship between diet and mental health in children and adolescents: A systematic review. *American Journal of Public Health, 104*(10), e31–e42.

Popkin, B. M., Adair, L. S., & Ng, S. W. (2012). Global nutrition transition and the pandemic of obesity in developing countries. *Nutrition Reviews, 70*(1), 3–21.

Rozin, P., & Wolf, S. (2008). Attachment to foods and the development of comfort food preferences. *Appetite, 51*(3), 632–640.

Sarris, J., Logan, A. C., Akbaraly, T. N., Amminger, G. P., Balanza-Martinez, V., Freeman, M. P., Hibbeln, J., Matsuoka, Y., Mischoulon, D., Mizoue, T., Nanri, A., Nishi, D., Ramsey, D., Rucklidge, J. J., Sanchez-Villegas, A., Scholey, A., Su, K. P., & Jacka, F. N. (2015). Nutritional medicine as mainstream in psychiatry. *The Lancet Psychiatry, 2*(3), 271–274.

World Health Organization. (2022). *World mental health report: Transforming mental health for all*. WHO.

Article DOI: 10.52589/IJPHP-DZPKIGUP
DOI URL: https://doi.org/10.52589/IJPHP-DZPKIGUP