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TRADITIONAL YORUBA MEDICINE AND PLANT-BASED THERAPIES IN THE MANAGEMENT OF NEURODEGENERATIVE DISORDERS: EVIDENCE, CHALLENGES AND FUTURE PROSPECTS

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ABSTRACT

Neurodegenerative disorders are a growing cause of public health challenge globally, especially in low and middle income countries where access to healthcare is limited. In South west Nigeria, the traditional Yoruba people have for a long time relied on plant-based therapies for the management of conditions associated with memory loss, seizures, insomnia, anxiety and other neurological disturbances. This review examines the role of traditional Yoruba medicine in the management of neurodegenerative disorders based on ethnobotanical documentation and scientific studies published from 2000 to present. Ethnobotanical evidence shows that plants such as *Spondias mombin*, *Bacopa floribunda*, *Garcinia kola*, *Rauvolfia vomitoria* and *Moringa oleifera* are commonly used traditionally for neurological and psychological conditions. Preclinical studies conducted on these plants reports their antioxidant, anti-inflammatory, anticonvulsant, anxiolytic and cholinesterase inhibitory activities, which are mechanistically relevant to neuroprotection and cognitive function. The reported effects are attributed to the plants' bioactive phytochemicals such as flavonoids, phenolic acids, alkaloids, saponins and trpenoids. Despite increasing pharmacological interest, challenges such as variability in plant preparation, lack of standardised dosing, limited toxicity data and scarcity of clinical trials have hindered their transformation into conventional medicine. This review thus highlights the therapeutic potential and limitations of the traditional Yoruba herbal medicine, emphasizes the need for scientific validation, safety assessment and interdisciplinary collaboration. Integrating ethnobotanical knowledge with modern neuroscience and pharmacology may contribute to the development of affordable, effective and culturally acceptable interventions for neurodegenerative disorders.

Keywords: *Neurodegeneration, Ethnobotany, Plant-Based Therapy, Acetylcholinesterase*

INTRODUCTION

Neurological disorders are recognized as major contributors to global disease burden, especially among ageing populations. Disorders such as Alzheimer's, Parkinson's, epilepsy, anxiety disorders, depression and age-related cognitive impairment are associated with progressive neuronal dysfunction, behavioural changes and declining quality of life. The World Health Organization reported an increase in these conditions especially in low and middle income countries where access to specialized neurological care is limited (WHO, 2013; 2019).

In many African settings, traditional medical systems remain central to healthcare delivery and represents long established frameworks for disease prevention and management that are culturally embedded and widely accepted

(Fabricant and Farnsworth, 2001). Traditional medicine thus plays a particularly important role in the management of disease conditions, including those affecting the nervous system. The traditional Yoruba medicine practiced predominantly in the Southwestern Nigeria, is one of the most structured indigenous medical systems in West Africa as it adopts a holistic understanding of health, viewing illness as a disruption of balance involving physical, psychological, environmental, and spiritual elements. The foundation of these therapeutic practice is formed on the use of medicinal plants as they are extensively used for conditions characterized by memory loss, seizures, insomnia, anxiety, mood disturbances and behavioural abnormalities (Odugbemi, 2008).

Recently, advances in pharmacology and neuroscience have renewed interest in

medicinal plants as potential sources of neuroprotective agents. Experimental studies increasingly report that plants used in traditional medicine contain compounds capable of modulating oxidative stress, inflammation, neurotransmitter activity and enzymatic pathways implicated in neurodegeneration and mental disorders (Howes and Houghton, 2012; Akinyemi et al., 2013). This review thus synthesizes ethnobotanical and experimental evidence on plant-based therapies used in traditional Yoruba medicine for neurodegenerative disorders, highlighting their therapeutic relevance, limitations and future research potential.

Scope and Sources of Literature

This review is based on peer-reviewed publications between 2000 and 2024. Relevant studies were identified through searches of PubMed, Scopus, Google Scholar and ScienceDirect using a combination of search terms such as Yoruba Traditional medicine, ethnobotany, neurodegenerative diseases, mental disorders, medicinal plants and neuroprotection. Priority was given to ethnobotanical surveys documenting traditional use and experimental studies evaluating phytochemical composition and neuropharmacological activity. Due to the limited clinical trials involving traditional herbal therapies for neurological disorders, evidence discussed is derived from in vitro and in vivo assays. To ensure reliability, studies lacking clear botanical identification or methodological detail were excluded.

Traditional Yoruba Perspectives on Neurological Disorders

In Yoruba medical philosophy, health is perceived as a state of harmony between the individual and their internal and external environments while disease is understood as a disturbance of this equilibrium and may

arise from physical, psychological, social or spiritual factors. Neurological disorders are often interpreted as conditions affecting the mind (opolo), the spirit (emi) or the individual's alignment with spiritual forces, although physical causes such as ageing and injury are also recognized (Odugbemi, 2008). Despite the spiritual dimension of Yoruba medicine, observation plays an important role in diagnosis and treatment. Symptoms such as seizures, tremors, memory loss, insomnia, hallucinations, anxiety and abnormal behavior are recognized and addressed using specific herbal remedies. Treatment approaches typically involve the use of medicinal plants prepared as decoctions, infusions, powders or topical applications, sometimes in combination with dietary or behavioural prescriptions (Okigbo and Mmeka, 2006). This holistic approach partly aligns with modern understandings of neurological disorders as multifactorial conditions influenced by genetic, biochemical, environmental and psychosocial factors. Therefore, the Yoruba ethnomedical knowledge provides a valuable framework for identifying plant species with potential neurotherapeutic relevance.

Ethnobotanical Plants Used in the Management of Neurodegenerative Disorders

Ethnobotanical surveys conducted in Southwestern Nigeria have documented a wide range of medicinal plants used in traditional Yoruba medicine for neurological conditions. Commonly cited species include *Spondias mombin*, *Garcinia kola*, *Bacopa floribunda*, *Rauvolfia vomitoria*, *Moringa oleifera*, and *Ocimum gratissimum* (Adebesin et al., 2001; Odugbemi, 2008).

Spondias mombin is traditionally used to manage nervous disorders, insomnia, and age-related cognitive decline. Experimental studies have reported anticonvulsant, anti-

inflammatory, and antioxidant activities of its leaf extracts, providing partial support for its ethnomedical use (Adebesin et al., 2001; Adebayo et al., 2010). Preclinical studies on *Garcinia kola*, widely used as stimulant and cognitive enhancer, have demonstrated acetylcholinesterase inhibitory activity and antioxidant effects in brain tissue, suggesting potential relevance for cognitive impairment (Ojewole, 2004; Akinyemi, et al., 2013). Antioxidant and acetylcholinesterase activities of *Bacopa* species, traditionally associated with memory enhancement, was also exhibited in experimental models (Akinyemi, et al., 2015). Although traditional use does not constitute proof of clinical efficacy, these ethnobotanical records provide a rational basis for pharmacological investigation and drug discovery (Fabricant and Farnsworth, 2001).

Phytochemical Constituents and Neuroprotective Mechanisms

Phytochemical analyses of medicinal plants used in Yoruba traditional medicine reveal a diverse array of bioactive compounds, including flavonoids, phenolic acids, alkaloids, tannins, saponins and terpenoids (Adesina, 2005; Benzie and Wachtel-Galor, 2011). These compounds are known to exert biological activities relevant to neuroprotection and mental health.

Oxidative stress plays an important role in the pathogenesis of neurodegenerative disorders and it contributes to neuronal damage and cognitive decline. Many plant-derived polyphenols exhibit strong antioxidant properties by scavenging reactive oxygen species and reducing lipid peroxidation in neural tissue (Kaur and Kapoor, 2001; Liu et al., 2018). Anti-inflammatory effects are also important, as chronic neuroinflammation has been implicated in the progression of Alzheimer's disease and other neurodegenerative conditions. Extracts of

several medicinal plants used in Yoruba medicine have been reported to possess acetylcholinesterase inhibitory properties. This inhibitory mechanism is particularly relevant to cognitive disorders, as reduced acetylcholine levels are associated with memory impairment (Akinyemi et al. 2013; Oboh et al., 2012). The anticonvulsant and anxiolytic activities observed in animal models also support the traditional use of certain plants for epilepsy and anxiety related conditions (Ojewole, 2004)

Preclinical Evidence Supporting Neuroprotective Effects

Experimental studies support the neuroprotective potential of medicinal plants used in traditional Yoruba medicine. In vivo studies using rodent models have reported improvements in behavioural performance, reductions in oxidative damage, modulation of neurotransmitter systems and attenuation of inflammatory responses following administration of plant extracts (Akinmoladun et al., 2007; Akinyemi et al., 2015). In vivo studies have further demonstrated the ability of plant extracts to inhibit lipid peroxidation, scavenge free radicals and modulate enzyme activity relevant to neuronal function. Although these findings are promising, the lack of clinical trials limits the direct application of these findings to human health, underscoring the need for further research (Howes and Houghton, 2012).

Challenges and Limitations of Traditional Herbal Therapies

Despite increasing pharmacological interest, several challenges limit the translation of traditional Yoruba herbal medicine into clinically validated therapies. Variability in plant species identification, differences in preparation methods, and lack of standardised dosing complicate reproducibility and safety assessment.

Additionally, toxicological data for many medicinal plants remain incomplete, raising concerns about long-term use and potential adverse effects (Chan, 2003; Ernst, 2002). Herb–drug interactions present another significant challenge, particularly as patients may concurrently use traditional remedies and conventional pharmaceuticals. The scarcity of controlled clinical trials further constrains evidence-based integration into modern healthcare systems (WHO, 2019). Future research should prioritise systematic ethnobotanical documentation, rigorous phytochemical characterization and comprehensive safety evaluation. Interdisciplinary collaboration among ethnobotanists, pharmacologists, neuroscientists, and clinicians is essential for translating traditional knowledge into validated therapeutic options (Fabricant and Farnsworth, 2001; Howes and Houghton, 2012). Establishing standardisation protocols

and conducting well-designed clinical trials will be critical for advancing plant-based neurotherapeutics.

CONCLUSION

Traditional Yoruba medicine represents a valuable repository of ethnobotanical knowledge relevant to the management of neurodegenerative disorders. Preclinical evidence supports the neuroprotective potential of several medicinal plants through antioxidant, anti-inflammatory, and neuromodulatory mechanisms. However, translating traditional practices into clinically applicable therapies requires rigorous scientific validation, standardisation, and safety assessment. Integrating ethnobotanical knowledge with modern neuroscience and pharmacology may contribute to the development of affordable and culturally acceptable interventions for neurological conditions.

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