

RISE OF DIGITAL HERBALISM: EVALUATING THE PUBLIC HEALTH RISKS AND BENEFITS OF ONLINE TRADITIONAL MEDICINE SALES IN NIGERIA.

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Abstract

The rapid expansion of digital platforms in Nigeria has transformed the landscape of traditional medicine, giving rise to a phenomenon known as digital herbalism—the marketing and sale of herbal remedies through social media, e-commerce websites, and messaging apps. This study critically evaluates the public health risks and potential benefits of online traditional medicine sales in Nigeria. Employing a mixed-methods approach, data were collected through surveys (n=600), in-depth interviews (n=30), and content analysis of 100 digital herbal advertisements. Results reveal widespread use of online herbal products, with 100% of respondents reporting purchases within the past year. While the majority perceived health improvements, nearly one-third experienced adverse effects. Regulatory awareness was low, with less than 40% aware of

NAFDAC guidelines, and only 29% of online ads displayed approval numbers. The study found that while digital herbalism increases accessibility and preserves cultural health practices, it also poses significant health risks due to misinformation, self-medication, and poor regulatory enforcement. The findings underscore the need for stronger policy interventions, public health campaigns, and platform accountability to balance innovation with consumer safety in Nigeria's evolving health ecosystem.

Keywords: Digital herbalism; traditional medicine; Nigeria; public health; e-commerce; NAFDAC; herbal remedies; online health products; health misinformation; regulatory frameworks

Introduction

The digital revolution has significantly reshaped the healthcare landscape, enabling access to medical information, telemedicine, and the commercialization of health products, including traditional medicine. In Nigeria, the intersection of technology and traditional healing has given rise to *digital herbalism*—the use of digital platforms such as social media, e-commerce websites, and messaging apps for the promotion, sale, and consumption of herbal remedies (Okeke et al., 2023). This trend has been fueled by increasing internet penetration, cultural affinity for traditional healing practices, and perceived limitations of orthodox medicine, particularly in rural and underserved communities (Adewunmi & Chukwuma, 2022).

While digital herbalism presents potential benefits, such as improved access to alternative health products and the preservation of indigenous knowledge, it also raises significant public health concerns. These include the unregulated sale of herbal products, misinformation about efficacy and dosage, potential herb-drug interactions, and the absence of standardized quality control mechanisms (Iwu et al., 2023). Moreover, the anonymity and accessibility of online platforms may allow unverified practitioners

to bypass regulatory oversight, putting consumers at risk of adverse health outcomes (Nnamani & Bello, 2024).

The World Health Organization (2022) has acknowledged the role of traditional medicine in health systems but emphasizes the need for integrating safety, efficacy, and quality assurance into its practice, especially in the digital age. In Nigeria, although the National Agency for Food and Drug Administration and Control (NAFDAC) has initiated steps to regulate herbal products, enforcement challenges persist due to the sheer volume and diversity of online vendors (Eze & Ajayi, 2023).

This study seeks to evaluate the public health implications—both risks and benefits—of the growing trend of online traditional medicine sales in Nigeria. By examining consumer behavior, vendor practices, regulatory frameworks, and public health outcomes, this research aims to provide a comprehensive understanding of how digital herbalism is shaping health practices and what measures are necessary to safeguard public health.

Problem Statement

The rise of digital herbalism—the use of online platforms to market, distribute, and consume traditional herbal medicines—has

significantly altered the landscape of healthcare access in Nigeria. This emerging trend is driven by increasing internet penetration, growing public interest in natural remedies, and perceived failures of conventional healthcare systems (Adesina & Obasi, 2023). While digital platforms have democratized access to herbal remedies and traditional knowledge, they have also introduced new public health challenges, including unregulated sales, misinformation, unsafe dosages, and adverse drug interactions (Ibrahim et al., 2022).

In Nigeria, where up to 80% of the population relies on traditional medicine for primary healthcare (WHO, 2023), the unmonitored migration of these practices into digital spaces raises concerns over consumer safety and regulatory oversight. Social media platforms and e-commerce sites frequently serve as informal marketplaces for herbal products, often marketed with unverified health claims and without standardized labeling or professional supervision (Umeh & Lawal, 2023). This is particularly alarming in a country where regulatory frameworks for traditional medicine remain fragmented and poorly enforced (Nnamdi et al., 2024).

Moreover, the lack of reliable information and the proliferation of self-medication via online herbal products can lead to negative health outcomes such as toxicity, delayed treatment of serious illnesses, and harmful interactions with prescribed medications (Eze & Akpan, 2023). While digital herbalism offers potential benefits—such as increased healthcare accessibility and cultural preservation—it also poses substantial risks that have not been adequately studied in the Nigerian context.

Despite its growing relevance, academic and policy discourse on digital herbalism in

Nigeria remains sparse. Existing studies have largely focused on either traditional medicine or digital health innovations in isolation, failing to critically examine the intersection of the two. Consequently, there is a pressing need to evaluate both the health benefits and public health risks associated with the rise of digital herbalism in Nigeria. This research seeks to fill that gap by assessing the implications of online traditional medicine sales on consumer safety, regulatory effectiveness, and health outcomes.

Literature Review

1. Introduction to the Concept of Digital Herbalism

Digital herbalism refers to the integration of digital technologies such as e-commerce platforms, mobile applications, and social media tools in the promotion, distribution, and consultation of herbal and traditional medicines (Adeleke & Yusuf, 2023). This concept has emerged as part of the broader digital health movement, which is revolutionizing how healthcare services and products are accessed, especially in underserved regions. Globally, digital herbalism has gained traction as consumers seek natural remedies and alternative health practices online, often bypassing conventional healthcare systems (Kumar et al., 2022).

In Nigeria, traditional medicine has been deeply rooted in cultural practices and remains a primary health resource for many, especially in rural communities. Historical records show that prior to colonial rule, various ethnic groups in Nigeria developed indigenous healthcare systems based on herbal medicine, spiritual healing, and ancestral knowledge (Okafor, 2021). Despite the introduction of Western medicine during

the colonial period, traditional medicine has continued to thrive and coexist with modern practices (Ogundipe et al., 2022).

The rise of digital platforms has transformed how herbal products are marketed and accessed. Social media platforms such as Instagram, Facebook, and WhatsApp are now popular channels for herbal practitioners to reach consumers, promote testimonials, and sell products directly (Eze & Oladipo, 2023). Similarly, e-commerce sites like Jumia and Konga in Nigeria now offer a wide range of traditional remedies, from immune boosters to fertility enhancers, with home delivery options. This digital shift not only increases accessibility but also introduces new concerns related to product authenticity, dosage standardization, and health misinformation (Nwachukwu & Ibrahim, 2023).

Studying the phenomenon of digital herbalism is particularly urgent from a public health perspective. While digital access can democratize health services, unregulated herbal medicine marketing poses serious risks including self-medication, delayed treatment of serious illnesses, and potential toxicological effects (WHO, 2023). In Nigeria, where public health systems are often overstretched, there is a critical need to understand and regulate this emerging interface between technology and traditional medicine to safeguard public health (Adeyemi & Chukwu, 2024).

2. Traditional Medicine in Nigeria: Cultural and Health Relevance

Traditional Medicine as an Integral Part of Nigeria's Health System

Traditional medicine (TM) in Nigeria constitutes a vital component of the

healthcare system, especially in rural and peri-urban communities where access to modern healthcare remains limited. The World Health Organization (WHO, 2023) emphasizes that traditional medicine is an essential health resource, particularly in countries with pluralistic medical systems like Nigeria. TM encompasses a wide range of practices, including herbal remedies, spiritual healing, and indigenous diagnostic techniques that have been passed down through generations.

In Nigeria, traditional healers often serve as the first point of contact for health-related issues due to their deep-rooted presence in local communities and the trust they command among the people. Nnamdi et al. (2024) highlight that approximately 70% of the Nigerian population relies on traditional medicine either as a primary or complementary treatment option. This high usage underlines TM's embeddedness in Nigeria's healthcare delivery landscape and its potential for integration with orthodox practices through policy frameworks and capacity development.

Socio-Cultural, Economic, and Accessibility Importance

Traditional medicine holds immense socio-cultural significance in Nigeria. It is closely tied to the belief systems, rituals, and indigenous knowledge of various ethnic groups. The use of herbs and spiritual consultations are often integrated with cultural ceremonies and rites of passage, reaffirming TM's role in preserving cultural identity (Nnamdi et al., 2024). Furthermore, ethnobotanical surveys indicate that traditional medical knowledge is a key element of intangible cultural heritage in many Nigerian communities (WHO, 2023).

Economically, TM supports local livelihoods, especially for traditional healers, herbalists, and traders in medicinal plants. The informal sector benefits from the widespread use and commercialization of traditional remedies, providing employment and income for thousands of Nigerians. TM is also cost-effective compared to conventional healthcare, making it highly accessible to low-income populations who may not afford hospital treatments (Nnamdi et al., 2024).

From an accessibility standpoint, traditional medicine offers a decentralized and community-based healthcare solution. In many underserved rural areas, it fills critical gaps left by the public health system. A 2023 ethnobotanical study conducted in Southwestern Nigeria revealed that over 60% of respondents preferred traditional treatments for common ailments due to proximity, affordability, and perceived efficacy (WHO, 2023).

Major Types of Traditional Remedies and Their Health Applications

Traditional medicine in Nigeria includes a broad spectrum of remedies derived mainly from plants, minerals, and animal products. Herbal medicine is the most prevalent form, with remedies prepared as infusions, decoctions, or topical applications. These are used to treat various ailments such as malaria, diarrhea, hypertension, skin infections, and infertility (Nnamdi et al., 2024).

Examples of commonly used medicinal plants include:

- **Azadirachta indica** (Neem): Used for malaria, fever, and skin conditions.

- **Vernonia amygdalina** (Bitter leaf): Utilized for diabetes management, malaria, and gastrointestinal issues.
- **Zingiber officinale** (Ginger): Applied in treating respiratory and digestive disorders.

Spiritual healing and divination are also integral to TM, especially among practitioners of traditional African religions. These practices often involve rituals, incantations, and the use of symbolic objects for diagnosis and healing, believed to address both physical and metaphysical causes of illness (WHO, 2023).

3. Rise of Online Platforms in Herbal Medicine Distribution

The advent of digital technology has transformed the way herbal medicines are marketed, accessed, and consumed. Online platforms such as **Jumia, Instagram, Facebook, and WhatsApp** have become critical channels for the promotion and distribution of herbal products in developing regions, especially in Africa and Asia. These platforms offer a direct-to-consumer model, enabling herbal vendors to bypass traditional retail systems and engage with customers more personally and interactively (Afolabi et al., 2022).

Jumia, one of Africa's leading e-commerce platforms, has created a specific niche for health and wellness products, including herbal supplements and traditional remedies. Meanwhile, social media platforms like **Instagram and WhatsApp** allow individual sellers and small-scale producers to market their products through influencer collaborations, storytelling, and user testimonials, building emotional appeal and social proof (Oyekan & Ahmed, 2023).

Drivers of Digital Herbalism

Several factors contribute to the growing popularity of herbal medicine through online platforms. **First**, increased internet penetration across Africa and other developing regions has enhanced access to information and e-commerce services (GSMA, 2023). Smartphone affordability and mobile-friendly platforms have further facilitated this trend.

Second, the **growing distrust in modern medicine**, often due to concerns about side effects, cost, and accessibility, has led many consumers to explore alternative therapies. In particular, people who perceive modern healthcare as elitist or ineffective tend to seek natural and traditional remedies which they feel offer a holistic approach (Nduka et al., 2024).

Third, the **economic factor** plays a significant role. Herbal medicines are generally perceived as more affordable and accessible than conventional pharmaceuticals, especially in low-income communities. Online platforms make it easier for these groups to find and purchase herbal remedies at competitive prices (Chukwu et al., 2023).

Consumer Behavior, Trust, and Beliefs

Consumer trust is a key determinant of online herbal purchases. Many buyers rely heavily on **peer reviews, testimonials, influencer endorsements**, and visual content to make decisions. Unlike traditional pharmacies, these platforms do not always offer verified certifications, leading to a heavy reliance on social validation and community-based trust (Bello & Lawal, 2022).

Belief systems also play a crucial role. In regions where traditional medicine is deeply rooted in cultural and spiritual practices, online platforms serve not just as marketplaces but as digital extensions of indigenous knowledge systems (Ezeanya-Esiobu, 2023). Buyers often believe that herbal products provide a "natural cure" and strengthen the body in ways modern drugs cannot.

However, challenges persist. The unregulated nature of online herbal medicine markets raises concerns about **product safety, misinformation, and counterfeit goods**. Despite these risks, the convenience and perceived authenticity of social media-based commerce continue to fuel the growth of digital herbalism (WHO, 2023).

4. Benefits of Digital Herbalism

Digital herbalism, the integration of digital technologies in the identification, dissemination, and commercialization of herbal and traditional medicine, presents significant benefits for healthcare delivery, cultural preservation, and economic empowerment, particularly in developing regions.

Improved Accessibility to Traditional Remedies

Digital platforms such as mobile health (mHealth) apps, e-commerce websites, and AI-driven diagnostic tools are revolutionizing access to traditional herbal remedies, especially in rural and underserved areas. With the proliferation of smartphones and internet access, individuals in remote communities can now access validated herbal knowledge and even consult traditional healers virtually (Adekunle et al., 2023). This digital integration supports **health equity** by

bridging healthcare gaps where conventional medical infrastructure is lacking.

Promotion of Indigenous Knowledge Systems

Digital herbalism plays a crucial role in documenting, preserving, and disseminating indigenous knowledge that is often transmitted orally. Through digitized databases, online herbal encyclopedias, and social media platforms, traditional medicine practices are being cataloged for both local and global use (Chinweuba & Obinna, 2022). This not only preserves cultural heritage but also legitimizes and uplifts indigenous science in the global knowledge economy.

Empowerment of Traditional Healers and Small-Scale Herbal Entrepreneurs

Digital tools empower local herbalists by providing platforms for marketing their products, reaching wider audiences, and acquiring modern business skills. Mobile payment systems, social media marketing, and virtual training workshops help these entrepreneurs grow their businesses sustainably (Ibrahim & Musa, 2024). This fosters **entrepreneurship in traditional medicine**, creating job opportunities and supporting local economies, especially among women and youth.

Global Reach and Export Potential

Digital herbalism also opens pathways for international trade. Herbal products can now be marketed globally via e-commerce platforms, enabling small-scale producers to tap into the booming global herbal medicine market projected to reach \$187 billion by 2027 (MarketWatch, 2024). The global visibility also encourages compliance with international standards, enhancing the quality

and credibility of traditional remedies (Oladipo et al., 2023).

5. Public Health Risks of Online Herbal Medicine Sales

The growing popularity of online herbal medicine sales, while enhancing accessibility, also presents significant **public health challenges**. These concerns stem from issues around product regulation, consumer safety, and the lack of professional oversight.

Risks of Self-Medication, Misdiagnosis, and Lack of Professional Consultation

One of the primary public health risks associated with online herbal medicine is the ease of self-medication without professional guidance. Consumers often rely on online forums, advertisements, or user reviews to make health decisions, which increases the likelihood of misdiagnosis and inappropriate treatment (Nguyen et al., 2023). Without consultation from trained healthcare providers or licensed herbalists, users may overlook serious underlying health conditions or misuse the products altogether, leading to delayed treatment or worsening of symptoms (Folarin & Uche, 2024).

Unregulated Product Quality, False Claims, and Absence of Dosage Information

Online platforms are flooded with herbal products that often bypass stringent regulatory checks. Many of these products make **unverified health claims**, lack standardized dosage guidelines, or contain undisclosed ingredients (WHO, 2022). In low-regulation environments, counterfeit and substandard herbal medicines proliferate, posing serious health risks (Okonkwo &

Bello, 2023). The absence of credible quality assurance measures undermines the safety and efficacy of these treatments.

Toxicity, Side Effects, and Interactions with Conventional Drugs

Herbal products, though perceived as "natural," can be toxic when consumed improperly or in combination with conventional drugs. Studies have documented adverse effects ranging from liver toxicity to allergic reactions (Zhang et al., 2023). Additionally, herb-drug interactions are a growing concern, especially among patients using medications for chronic conditions like hypertension, diabetes, or HIV/AIDS. These interactions can either reduce drug efficacy or increase toxicity, posing a threat to patient safety (Kassim & Olayemi, 2024).

6. Regulatory Frameworks and Gaps in Digital Herbalism

The regulation of traditional medicine in Nigeria, especially with the recent digitization of herbalism, remains a complex challenge. Despite institutional efforts, several gaps persist in enforcement, surveillance, and coordination among relevant agencies.

Overview of Current Nigerian Regulatory Structures

In Nigeria, the **National Agency for Food and Drug Administration and Control (NAFDAC)** and the **Federal Ministry of Health (FMoH)** are the primary bodies overseeing traditional medicine. NAFDAC is responsible for the registration, regulation, and quality assurance of herbal products, ensuring they meet safety and efficacy

standards (NAFDAC, 2023). Meanwhile, the FMoH supports policy development and integration of traditional medicine into the national healthcare system through its Department of Traditional, Complementary and Alternative Medicine (TCAM).

However, while these institutions have developed some frameworks, digital herbalism is still largely unregulated, particularly in online sales and teleconsultation by traditional healers (Okonkwo et al., 2023).

Challenges in Enforcement, Digital Surveillance, and Inter-Agency Coordination

One of the main challenges is **weak enforcement mechanisms**, especially for online platforms that sell unregistered herbal products. The rapid growth of e-commerce and social media marketing of herbal remedies has outpaced regulatory control (Ibe & Adeyemo, 2024). There is a lack of digital surveillance tools and human capacity within agencies to monitor and verify the authenticity of digital herbal practices.

Furthermore, **inter-agency coordination is fragmented**. NAFDAC, the FMoH, and other stakeholders such as the Nigerian Natural Medicine Development Agency (NNMDA) often operate in silos, resulting in overlapping roles and inconsistent policies (Akinyemi & Danjuma, 2022). This disjointed approach undermines comprehensive regulation and creates loopholes exploited by unlicensed practitioners.

Comparisons with Regulatory Practices in Other Developing Nations

Countries such as **India and South Africa** offer useful contrasts. India's **Ministry of**

AYUSH (Ayurveda, Yoga, Unani, Siddha, and Homeopathy) has established clear digital regulations, quality standards, and licensing procedures for traditional medicine practitioners and online platforms (Ministry of AYUSH, 2023). Similarly, South Africa has adopted a hybrid model where traditional medicine is regulated under both public health and intellectual property frameworks to protect indigenous knowledge and consumer rights (Mokoena & Pretorius, 2023).

Nigeria could benefit from adopting similar models by formalizing the digital ecosystem of herbalism, enhancing capacity for digital surveillance, and establishing a unified regulatory body or coordination council to oversee all aspects of traditional medicine.

Methods

Study Design

This study employed a mixed-methods approach, integrating both quantitative and qualitative data to comprehensively evaluate the public health risks and benefits associated with online traditional medicine sales in Nigeria. The research design included an online survey, in-depth interviews, and content analysis of digital herbal product advertisements.

Study Area and Population

The study was conducted across five major urban centers in Nigeria—Lagos, Abuja, Port Harcourt, Enugu, and Kano—chosen for their high internet penetration and active digital marketplaces. The target population included three main groups:

1. Consumers who had purchased herbal products online within the past 12 months.
2. Online herbal medicine vendors operating on social media and e-commerce platforms.
3. Public health officials and regulatory stakeholders (e.g., NAFDAC personnel, herbal regulation experts).

Sample Size and Sampling Technique

A total of **600 survey respondents** were recruited through purposive and snowball sampling techniques, focusing on individuals who had demonstrably engaged in digital herbalism. For the qualitative component, **30 in-depth interviews** were conducted: 15 with consumers, 10 with vendors, and 5 with regulatory stakeholders. Additionally, **100 online herbal advertisements** were selected for content analysis based on engagement metrics and product diversity.

Data Collection Instruments and Procedures

1. Online Survey: A structured questionnaire was developed and administered via Google Forms and WhatsApp. The questionnaire consisted of five sections:

- Demographic information
- Types and frequency of herbal purchases
- Perceived benefits and side effects
- Sources of product information
- Awareness of health risks and regulations

2. In-Depth Interviews (IDIs):

Semi-structured interview guides were used to gather rich, contextual insights from consumers, vendors, and regulators. Interviews were conducted via Zoom or in-person depending on participants' preferences and lasted 30–60 minutes. All interviews were audio-recorded with consent.

3. Content Analysis:

Online advertisements were collected from Instagram, Facebook, and Jumia using keywords such as “herbal remedy,” “natural cure,” “digital herbalist,” and “online traditional medicine.” A coding framework was developed to analyze claims made, dosage instructions, presence of health disclaimers, and regulatory approval status.

Data Analysis

Quantitative

Survey responses were exported to SPSS (Version 26) for descriptive and inferential analysis. Frequencies, percentages, chi-square tests, and logistic regression models were used to identify relationships between demographics and awareness of public health risks.

Qualitative

Interview transcripts were analyzed

Data:

thematically using NVivo software. Themes such as trust in traditional medicine, perceived efficacy, side effects, and regulatory concerns were identified through open and axial coding.

Content

Each online advertisement was scored based on a checklist that included:

Analysis:

- Use of scientific language
- Mention of side effects
- Approval by NAFDAC or other bodies
- Health claims (e.g., “cures diabetes” or “boosts immunity”)

Ethical Considerations

Ethical approval for the study was obtained from the Research Ethics Committee of the University of Nigeria, Nsukka (Ref No: UNN/REC/2024/112). Informed consent was obtained from all participants prior to their involvement. Data confidentiality and anonymity were maintained throughout the study.

Data Analysis and Results

1. Demographic Characteristics of Respondents (n = 600)

Variable	Frequency	Percentage (%)
Gender		
Male	310	51.7
Female	290	48.3
Age Group (Years)		
18–25	110	18.3

26–35	220	36.7
36–45	165	27.5
46 and above	105	17.5
Location		
Lagos	150	25.0
Abuja	120	20.0
Port Harcourt	110	18.3
Enugu	110	18.3
Kano	110	18.3

2. Online Herbal Product Purchase Behavior

Item	Frequency	Percentage (%)
Purchased herbal products online (last 12 months)	600	100.0
Frequency of Purchase		
Once	85	14.2
Occasionally (2–3 times)	295	49.2
Frequently (4+ times)	220	36.6
Preferred Platform for Purchase		
Instagram	250	41.7
WhatsApp	180	30.0
Facebook	95	15.8
Jumia/Konga	75	12.5

3. Perceived Benefits and Health Risks

Statement	Strongly Agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly Disagree (%)
Herbal products improved my health	32.5	41.2	14.3	8.5	3.5
I experienced no side effects after use	29.1	35.6	12.0	15.4	7.9
I had adverse reactions after using herbal products	10.4	19.2	16.0	31.7	22.7
Online vendors provided sufficient health information	12.8	28.3	21.0	26.1	11.8
I trust herbal remedies more than orthodox medicine	20.2	33.5	17.8	18.7	9.8

4. Awareness of Regulations and Safety Information

Item	Frequency	Percentage (%)
Aware of NAFDAC regulations for herbal products	225	37.5
Look for NAFDAC number before buying	198	33.0
Have read safety disclaimers on online herbal ads	160	26.7
Know someone who suffered complications after herbal use	145	24.2

5. Content Analysis of 100 Online Herbal Product Advertisements

Feature Observed	Frequency	Percentage (%)
Used scientific/medical language	58	58.0
Included dosage information	47	47.0
Displayed NAFDAC registration number	29	29.0
Included health disclaimers	21	21.0
Made exaggerated/unverified health claims	66	66.0
Promoted “cure-all” products	38	38.0

6. Thematic Findings from In-Depth Interviews

Themes Identified:

- **Trust and Cultural Affinity:** Many consumers cited cultural beliefs and trust in ancestral healing methods as their motivation for using herbal medicine.
- **Digital Convenience:** Vendors highlighted the reach and convenience of online platforms in reaching customers across Nigeria.
- **Regulatory Concerns:** Regulators expressed challenges in monitoring online herbal markets due to the informal and dispersed nature of sales.
- **Misinformation and Health Risks:** Both consumers and regulators acknowledged that misinformation, particularly around dosage and side effects, was a major public health concern.

Summary of Findings

The study found that while many Nigerians perceive online herbal products as beneficial, there is significant public health risk stemming from poor regulation, limited consumer awareness, and the presence of unverified health claims in digital

advertisements. The majority of users do not verify the authenticity of products and are unaware of potential side effects, highlighting the urgent need for stronger policy interventions.

Discussion

The results of this study underscore the dual nature of digital herbalism in Nigeria—offering both potential public health benefits and notable risks. The high rate of engagement (100% of survey respondents having purchased herbal products online) suggests that digital platforms have become integral to how Nigerians access traditional medicine. Platforms like Instagram and WhatsApp dominate the market, demonstrating how social media has enabled widespread, informal access to herbal remedies.

Perceived Benefits vs. Public Health Risks

Over 70% of participants believed that herbal products improved their health, which aligns with longstanding cultural trust in traditional medicine. However, this perceived benefit coexists with a lack of standardization and limited safety awareness. While 64.7% reported no side effects, a significant 29.6% admitted to having experienced adverse reactions. This discrepancy raises concerns about underreporting and misattribution of negative outcomes, particularly in the absence of professional medical guidance.

Regulatory Gaps and Consumer Awareness

Only 37.5% of respondents were aware of NAFDAC regulations, and less than a third actively checked for approval before making purchases. The content analysis revealed that fewer than one-third of online advertisements displayed NAFDAC registration numbers, and many made exaggerated health claims. These findings reflect a regulatory vacuum in the online herbal market, where vendors operate without consistent oversight. Regulators also acknowledged these

challenges during interviews, citing limited capacity to track and enforce compliance across digital platforms.

Digital Platforms as Double-Edged Swords

Although digital platforms have democratized access to herbal medicine, they have also enabled the proliferation of misinformation. Thematic findings from interviews revealed that consumers often relied on testimonials and promotional content rather than verified medical evidence. This situation is exacerbated by a lack of health disclaimers and improper dosage instructions in many online advertisements.

Recommendations

To mitigate the public health risks while preserving the cultural and economic benefits of digital herbalism, the following recommendations are proposed:

1. Strengthen Regulatory Frameworks

- a) **NAFDAC** should expand its digital surveillance capacity by partnering with tech platforms to flag and review herbal product advertisements.
- b) Introduce a **mandatory online certification badge** for verified herbal vendors, similar to "verified seller" tags on e-commerce platforms.

2. Launch Public Health Campaigns

- a) Conduct **nationwide sensitization programs** on the risks of unregulated herbal medicine, focusing on social media literacy.

- b) Promote **community education** on how to identify NAFDAC-approved products and report suspicious vendors.

3. Integrate Traditional Medicine into Primary Healthcare

- a) Encourage collaboration between **licensed herbal practitioners and healthcare professionals** to standardize dosage and safety guidelines.
- b) Provide subsidies and incentives for herbal vendors to **register and certify their products** under formal health schemes.

4. Support Further Research and Monitoring

- a) Establish a **National Herbal Product Database** with consumer feedback and safety monitoring.
- b) Encourage academic partnerships to evaluate the long-term effects of frequently purchased digital herbal products.

5. Platform Accountability

- Require social media and e-commerce platforms to **comply with local health advertisement laws**, including removal of unverified health claims and displaying user safety warnings.

Conclusion

The findings of this study underscore the rapidly growing influence of digital herbalism in Nigeria's public health landscape. As more Nigerians turn to online platforms for herbal remedies, the sector offers both opportunities and challenges. On one hand, it democratizes access to traditional medicine, fosters cultural continuity, and provides perceived health benefits to many users. On the other hand, the unregulated nature of digital herbal sales poses significant public health risks, including misinformation, lack of proper dosage guidance, absence of safety disclaimers, and limited regulatory oversight.

With less than 40% of consumers aware of NAFDAC regulations and only a fraction of online vendors displaying official approvals, the digital herbal marketplace remains largely informal and potentially hazardous. This situation is further complicated by the trust consumers place in personal testimonials and culturally ingrained beliefs, often at the expense of scientific scrutiny.

Ultimately, this study highlights the urgent need for a robust regulatory framework, digital consumer education, and collaborative governance involving health authorities, technology platforms, and traditional medicine practitioners. If well-regulated and properly integrated into the formal healthcare system, digital herbalism can evolve into a safe and culturally relevant component of Nigeria's public health strategy.

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