

Knowledge, Attitude, And Use of Herbal Medicine Among Pregnant Women Attending Primary Healthcare Centers in Ondo West Local Government Area, Ondo State, Nigeria

Ibrahim Dawud Oyedemi¹, Akinniyi Rotimi Joseph², Oladejo Oluwatoyin Temitope³ Oladiran Isdaiah Olagunju⁴, Wokoma, Victoria Eleba⁵, Ibrahim Yetunde Sadiat⁶, Ojo Abel Adeniji⁷ Oladimeji Jeilat Folashade⁸

^{1-3,6} Department of Health promotion and behavioural science, University of Medical Sciences, Ondo, Ondo State, Nigeria

⁴ Department of School of Community Health, Obafemi Awolowo University Teaching Hospital Complex (OAUTHC), Ile-Ife, Osun State, Nigeria

⁵ Department of Community Health, College of Community Health Sciences, Wesley University, Ondo State.

⁷ Department of Community Health, Betsida College of Health, Ogbomoso, Oyo State, Nigeria

⁸ Department of Community Health, College of Health Sciences and Technology, Offa, Kwara State, Nigeria

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Corresponding Author:

Ibrahim Dawud Oyedemi

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ABSTRACT

Background: The use of herbal medicine during pregnancy continues to pose a significant public health challenge in many Nigerian communities. Despite widespread use across sub-Saharan Africa, empirical evidence from primary healthcare settings in Ondo West Local Government Area remains scarce. This study assessed the knowledge, attitude, and prevalence of herbal medicine use among pregnant women attending primary health centers (PHCs) in Ondo West, Ondo State, Nigeria.

Methods: A descriptive cross-sectional design was employed. Using a multi-stage sampling technique, 304 pregnant women attending antenatal care at ten selected PHCs were recruited. A structured, pretested questionnaire covering sociodemographics, knowledge, attitudes, and herbal medicine use was administered. Data were analyzed using IBM SPSS version 30, with descriptive statistics presented as frequencies and percentages.

Results: A total of 254 (83.6%) respondents had heard of herbal medicine, but only 139 (45.7%) demonstrated good knowledge. Family (31.9%) and friends (30.6%) were the primary sources of information. More than half (51.6%) held a positive attitude toward herbal medicine, driven largely by cultural acceptability (53.3% strongly agreed). The prevalence of herbal medicine use during the current pregnancy was 41.1%, with neem, bitter leaf, and ginger being the most commonly used herbs. Only 16.4% of users disclosed their use to healthcare providers.

Conclusion: Despite high awareness, knowledge of the risks of herbal medicine during pregnancy is poor. Cultural acceptability drives use, while low disclosure to healthcare providers is alarming. Integrated antenatal health education, culturally sensitive counselling, and policy regulation of traditional medicine are urgently needed to safeguard maternal and fetal outcomes.

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INTRODUCTION

The use of herbal medicine during pregnancy is a centuries-old practice that transcends cultural, geographical, and socioeconomic boundaries. In many parts of the world, particularly in low- and middle-income countries, pregnant women frequently turn to plant-based remedies to manage the physical and emotional demands of pregnancy. According to the World Health Organisation (WHO, 2019), herbal medicine encompasses herbs, herbal materials, herbal preparations, and finished herbal products that contain active ingredients derived from plant parts or combinations thereof. Globally, the WHO estimates that approximately 80% of the world's population relies on herbal medicine for some aspect of their primary healthcare, a trend especially pronounced in Africa, Asia, and Latin America.

The relevance of herbal medicine to modern healthcare cannot be dismissed. Many of today's most widely prescribed pharmaceutical agents, including aspirin (derived from willow bark), morphine (from the opium poppy), quinine (from cinchona bark), and digitoxin (from foxglove), trace their origins to plant sources (Rani & Yadav, 2018). The WHO recognised this convergence early, developing guidelines for the assessment of herbal medicine as far back as 1991. Despite this recognition, the regulatory landscape for herbal products remains fragmented, particularly in developing countries where oversight is limited. The global herbal medicine market, currently valued at over USD 62 billion, is projected to grow to USD 5 trillion by 2050, underscoring the scale and commercial momentum behind traditional plant-based healthcare (Bhattacharya et al., 2014).

Pregnancy represents a physiological state of unique vulnerability. Lasting approximately 40 weeks from the last menstrual period to delivery, the gravid period encompasses three trimesters, each marked by profound hormonal, anatomical, and physiological changes (Cunningham et al., 2022). During this period, a woman's healthcare decisions carry consequences not only for herself but for the developing fetus. Any pharmacologically active substance consumed during pregnancy, whether synthetic or herbal, has the potential to cross the placental barrier and affect embryonic or fetal development. Herbal medicines, by virtue of their plant-derived bioactive compounds, are no exception. However, a pervasive public misconception holds that 'natural' equates to 'safe,' a belief that continues to fuel widespread, often unguided self-medication with herbal products during pregnancy (Illamola et al., 2020).

The global burden of herbal medicine use in pregnancy is substantial. A multinational cross-sectional study conducted in 23 countries, involving 9,459 pregnant women, reported that 28.9% used herbal medicine during pregnancy, with the highest prevalence in Russia (69.0%), Poland (49.8%), and Australia (43.8%) (Kennedy et al., 2013). A more recent systematic review and meta-analysis reported a global prevalence of 32.4% (Heydarpour et al., 2022). In the Middle East, estimates range from 22.3% to 82.3%, while in Southeast Asia, such as the Philippines, approximately 60% of pregnant women use herbal remedies to manage physiological changes (Laelago et al., 2016). These figures underscore the global magnitude of the issue and the urgent need for evidence-based guidance.

In Africa, the use of herbal medicine during pregnancy is particularly pronounced, rooted in deep cultural traditions and reinforced by socioeconomic realities. A systematic review of 22,404 pregnant women across the African continent found an average prevalence of 32%-45%, with extreme variation, from 2% in Tigray Region, Northern Ethiopia, to 100% in Machakos District, Eastern Kenya (Ahmed et al., 2018). Sub-Saharan Africa, with its rich tradition of ethnobotanical medicine, exhibits among the highest rates of use globally, with estimates reaching up to 90% in some regions (Ahmed et al., 2018). Contributing factors include cultural norms, the accessibility and affordability of herbal products, perceived efficacy and safety, limited access to formal healthcare, low educational attainment, language barriers, and the influence of family members and traditional healers (Shewamene et al., 2017; Peprah et al., 2019).

Nigeria, as the most populous country in Africa, reflects these broader continental trends. A study spanning three geopolitical zones reported that 67.5% of pregnant women had used herbal medicines at some point, with 29% using them during their current pregnancy (Fakeye et al., 2009). In Ondo State, the setting of the present study, an earlier investigation at a tertiary facility found that 31% of pregnant women attending antenatal care used herbal medicines during their current pregnancy (Fakeye et al., 2009). Among the herbs most commonly reported in Nigeria are bitter leaf (*Vernonia amygdalina*), bitter kola (*Garcinia kola*), garlic (*Allium sativum*), ginger (*Zingiber officinale*), neem or dongoyaro (*Azadirachta indica*), and scent leaf (*Ocimum gratissimum*), plants embedded in both culinary and therapeutic traditions across Yoruba communities (Duru et al., 2016).

The potential harms of unregulated herbal use in pregnancy are well-documented. Adverse outcomes attributed to herbal consumption include preterm birth, low birth weight, fetal distress, miscarriage, uterine rupture, and a spectrum of congenital anomalies, including cleft lip, hypoplastic left heart syndrome, and trisomy 18 (Munoz et al., 2019; Illamola et al., 2020). Herb-drug interactions present an additional hazard: green tea consumed concurrently with folic acid, for example, significantly reduces folic acid bioavailability, an especially dangerous interaction during the first trimester when neural tube development is occurring (Nyeko et al., 2016). St. John's Wort (*Hypericum perforatum*) can undermine the efficacy of antidepressants, raising concerns for women managing prenatal mental health conditions. Despite these documented risks, many pregnant women neither seek professional advice before using herbal products nor disclose their use to healthcare providers, fearing disapproval or lacking awareness of potential interactions.

The factors that shape the use of herbal medicine during pregnancy are multidimensional. Cultural and religious beliefs often position herbal medicine as a gift from nature or from ancestral wisdom, a notion reinforced by family elders, traditional healers, and peer networks. Economic considerations are equally influential: in resource-constrained environments, where conventional antenatal care may be geographically inaccessible, financially prohibitive, or overcrowded, herbal remedies offer a readily available and culturally familiar alternative. Healthcare system barriers, including staff shortages, poor patient-provider communication, language barriers, and stock-outs of essential medicines, further push pregnant women toward traditional remedies. The role of personal experience and positive social reinforcement cannot be understated; when a woman or a community member has previously used a herb without apparent harm, the perceived risk diminishes substantially.

The Health Belief Model (HBM), originally developed in the 1950s to explain preventive health behaviours (Glanz et al., 2015), provides a robust theoretical framework for understanding the use of herbal medicine during pregnancy. The model's six constructs, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy, align closely with the motivational dynamics observed among pregnant women who use herbal remedies. A woman who perceives herbal medicine as safe and culturally validated (high perceived benefit, low perceived barrier) is more likely to use it regardless of objective risk. Conversely, a woman who perceives formal healthcare as trustworthy and accessible is more likely to seek professional guidance. By operationalising these constructs, the HBM provides a structured lens through which the knowledge, attitudes, and practices of herbal medicine use can be assessed and targeted interventions designed.

Despite the growing body of literature on herbal medicine use during pregnancy in Nigeria, a notable gap persists at the primary healthcare level, the tier of health service delivery most accessible to the majority of Nigerian women. Most studies have been conducted in tertiary or secondary hospitals, potentially introducing selection bias toward more educated or urban populations. Furthermore, no study to date has comprehensively investigated knowledge, attitudes, and herbal medicine use among pregnant women attending primary healthcare centres (PHCs) in the Ondo West Local Government Area (LGA), a predominantly semi-urban and rural setting with unique cultural and sociodemographic characteristics. This gap is particularly concerning given the critical role of PHCs in delivering maternal and child healthcare across Nigeria.

The use of herbal medicine among pregnant women in Ondo West Local Government Area is a prevalent yet poorly characterised public health concern, with significant implications for maternal and fetal health outcomes, driven by widespread cultural acceptance, limited knowledge of associated risks, inadequate healthcare provider communication, and the near-total absence of locally relevant empirical data from primary healthcare settings. The broad objective of this study was to assess the knowledge, attitudes, and use of herbal medicine among pregnant women attending antenatal care at selected primary healthcare centres in the Ondo West Local Government Area, Ondo State, Nigeria. The specific objectives were: (i) to assess the level of knowledge of pregnant women regarding the use of herbal medicine during pregnancy; (ii) to assess the attitude of pregnant women toward the use of herbal medicine during pregnancy; and (iii) to determine the prevalence and patterns of herbal medicine use among pregnant women.

Review

The use of herbal medicine during pregnancy has been extensively studied globally, yet knowledge levels, attitudinal stances, and usage patterns vary remarkably across geographic and cultural contexts. Several empirical investigations provide the critical backdrop against which the present study's findings should be interpreted.

A cross-sectional study by Fatmah and colleagues (2021), conducted in Riyadh, Saudi Arabia, among 400 women who were pregnant or had previously been pregnant, found that all participants lacked specific knowledge about the side effects of herbal medicine, although 63% had general awareness of herbs considered unsafe. This mirrors findings from Dim et al. (2024) in Nsukka, Enugu State, Nigeria, where 66.2% of 400 antenatal attendees demonstrated good overall knowledge of herbal medicine, while 71.2% expressed a positive attitude toward its use, underscoring how knowledge does not necessarily translate into caution. A multinational study across 23 countries by Kennedy et al. (2013) reported an overall prevalence of 28.9% among pregnant women, with family and friends consistently identified as the dominant information sources, a pattern replicated in multiple African studies.

In the African context, the systematic review by Ahmed et al. (2018) remains the most comprehensive, aggregating data from 22,404 pregnant women across the continent and documenting prevalence rates of 32% to 45%. A more recent systematic review focused on Ethiopia by Mekuria et al. (2019) confirmed that cultural beliefs, perceived efficacy, and family recommendations are the primary drivers of herbal medicine use, while healthcare barriers and socioeconomic factors serve as enabling conditions. Similarly, Laelago et al. (2016) reported a prevalence of 73% in Ethiopia, one of the highest documented, closely linked to limited access to formal healthcare. Specifically in Nigeria, Fakeye et al. (2009) documented a 31% usage rate during the current pregnancy among women attending a tertiary hospital in Ondo State and reported that 74.3% preferred self-prepared formulations. These findings highlight safety concerns regarding dosage and preparation standards.

The safety profile of herbal use in pregnancy has attracted increasing research attention. Munoz et al. (2019), in a systematic review of 74 studies encompassing 1,067,071 pregnant women, found that topical almond oil was significantly associated with preterm birth, oral raspberry leaf with caesarean delivery, and heavy liquorice consumption with early preterm birth. Nyeko et al.

(2016) documented the concurrent use of conventional medicines and herbal products in Uganda, highlighting the risk of herb-drug interactions, such as diminished folic acid bioavailability when herbal products are consumed alongside green tea. Gruber and O'Brien (2011) catalogued a range of uterotonic herbs, including black cohosh, pennyroyal, and fenugreek, that can stimulate uterine contractions, potentially precipitating premature labour or miscarriage. Despite this evidence, disclosure to healthcare providers remains alarmingly low across all studied populations, with most women refraining from informing their doctors or midwives due to anticipated disapproval or perceived irrelevance (Illamola et al., 2020). These documented gaps in knowledge, communication, and safety practice provide the empirical justification for the present study in a previously uninvestigated primary healthcare setting.

MATERIALS AND METHODS

Study Area

This study was conducted at selected Primary Healthcare Centres (PHCs) in the Ondo West Local Government Area (LGA), Ondo City, Ondo State, Nigeria. Ondo State, situated in the South-Western geopolitical zone, was created in February 1976 from the former Western State. It covers a total land area of 15,500 km², lies within latitudes 5°45' and 8°15' North and longitudes 4°45' and 6°0' East, and has a population of 3,460,877 (National Population Commission, 2006). The state is administered across 18 LGAs. Ondo West LGA, with headquarters in Ondo City, had a projected population of approximately 283,672 as of 2006 and encompasses 43 operational PHCs that deliver primary maternal and child health services to a predominantly Yoruba-speaking community.

Study Design

A descriptive cross-sectional research design was employed. This design is appropriate for estimating the prevalence of health-related conditions and assessing associated factors at a defined point in time (Grove et al., 2023). The design enabled simultaneous data collection on knowledge, attitude, and herbal medicine use from the study population without longitudinal follow-up.

Study Population, Inclusion, and Exclusion Criteria

The target population comprised all pregnant women attending antenatal care (ANC) at selected PHCs in Ondo West LGA during the study period. Eligible participants were pregnant women who were willing and able to provide informed consent and to respond to the questionnaire. Women who were unwilling to participate, unable to provide informed consent, or who had cognitive or developmental disabilities precluding meaningful responses were excluded.

Sample Size Determination

The sample size was computed using the Leslie Kish formula for populations fewer than 10,000: $n = Z^2pq/d^2$, where $Z = 1.96$ (95% confidence level), $p = 0.5$ (maximum variability), $q = 0.5$, and $d = 0.05$ (margin of error). This yielded an initial sample of 384. The Finite Population Correction (FPC) was applied with a known population of 981 eligible pregnant women (N), reducing the estimate to 276. A 10% non-response adjustment was added (28 additional respondents), producing a final adjusted sample size of 304.

Sampling Technique

A three-stage multi-stage sampling procedure was adopted. In Stage One, six of the twelve political wards in Ondo West LGA were selected by simple random sampling (ballot method). In Stage Two, ten PHCs were selected from the six wards by simple random sampling. In Stage Three, systematic random sampling was applied at each PHC during ANC clinic days: a random starting point was identified, and every 4th eligible woman on the ANC register was recruited until the required quota for each centre was reached.

Data Collection Instrument

A structured, self-administered questionnaire comprising four sections was used. Section A captured socio-demographic data (age, marital status, education, occupation, religion, gestational age, and parity). Section B assessed knowledge of herbal medicine using dichotomous (Yes/No) and multiple-choice items, scored to classify respondents as having good ($\geq 50\%$ correct responses) or poor knowledge. Section C measured attitude using a seven-item Likert scale (Strongly Agree=4, Agree=3, Disagree=2, Strongly Disagree=1). Section D elicited information on herbal medicine use, frequency, types, recommendation sources, reasons for use, side effects, and disclosure to healthcare providers. The questionnaire was developed in English and translated into Yoruba for respondents with limited English proficiency.

Validity, Reliability, and Pre-testing

Content validity was established through review by the study supervisor and subject-matter experts. The Cronbach's alpha reliability coefficient was assessed using a pre-test administered to 30 pregnant women at a PHC in Ondo East LGA (not included in the main study), and necessary revisions were made to improve clarity and internal consistency prior to the main data collection.

Ethical Considerations

Ethical clearance was obtained from the Ethics Review Committee (ERC) of the University of Medical Sciences, Ondo, and administrative approval was secured from the Ondo West LGA Primary Healthcare Coordinator and Officers-in-Charge of participating PHCs. Written informed consent was obtained from all participants prior to questionnaire administration. Anonymity and confidentiality were maintained throughout the study. Participants were informed of their right to withdraw at any time without penalty.

Data Analysis

Completed questionnaires were checked for completeness, coded, and entered into Microsoft Excel 2024 for cleaning. Statistical analysis was performed using IBM SPSS Version 30. Socio-demographic characteristics, knowledge, attitude, and herbal medicine use variables were analysed using descriptive statistics (frequencies and percentages). Knowledge was categorised as good ($\geq 50\%$) or poor ($< 50\%$). Attitude was classified as positive (total Likert score above the midpoint) or negative. Results are presented in tables with accompanying narrative.

RESULTS

A total of 304 questionnaires were distributed; all were successfully retrieved and included in the analysis, representing a 100% response rate. Results are presented sequentially in four domains: socio-demographic characteristics, knowledge of herbal medicine, attitude toward herbal medicine, and herbal medicine use during the current pregnancy.

Socio-Demographic Characteristics of Respondents

Table 1: Socio-Demographic Characteristics of Respondents (n=304)

Demographic Variable	Category	Frequency (n=304)	Percentage (%)
Age	Under 20 years	24	7.9%
	20–24 years	48	15.8%
	25–29 years	162	53.3%
	30 years and above	70	23.0%
Marital Status	Single	67	22.0%
	Married	198	65.1%
	Divorced/Separated	26	8.6%
	Widowed	13	4.3%
Educational Level	No formal education	92	30.3%
	Primary	60	19.7%
	Secondary	74	24.3%
	Tertiary	78	25.7%
Occupation	Trader	86	28.3%
	Artisan	73	24.0%
	Civil servant	65	23.4%
	Unemployed	32	10.5%
	Student	48	15.8%
Religion	Christianity	197	64.8%
	Islam	80	26.3%
	Traditional	27	8.9%
Gestational Age	< 13 weeks	47	15.5%
	13–27 weeks	104	34.2%
	28–40 weeks	153	50.3%
Gravida (Pregnancies)	1	74	24.3%
	2–3	112	37.0%
	4–5	93	30.6%
	More than 5	25	8.1%
Parity (Children)	0	27	8.9%
	1–2	112	36.8%
	3–4	93	30.6%
	More than 4	25	8.2%

Table 1 presents the socio-demographic profile of the 304 respondents. The largest age cohort was 25–29 years (53.3%, n=162), followed by those aged 30 years and above (23.0%, n=70). The youngest group (under 20 years) accounted for 7.9% (n=24). The majority were married (65.1%, n=198), while 22.0% were single (n=67). Regarding educational attainment, the largest single category was no formal education (30.3%, n=92), followed by tertiary education (25.7%, n=78), secondary (24.3%, n=74), and primary (19.7%, n=60). Traders constituted the largest occupational group (28.3%, n=86), followed by artisans (24.0%, n=73), civil servants (23.4%, n=65), students (15.8%, n=48), and unemployed (10.5%, n=32). Christianity was the dominant religion (64.8%, n=197), followed by Islam (26.3%, n=80) and traditional religion (8.9%, n=27). Half of the respondents (50.3%, n=153) were in their third trimester (28–40 weeks). Most had between 2–3 pregnancies (37.0%, n=112), and 36.8% (n=112) had 1–2 living children.

Knowledge of Herbal Medicine Among Respondents

Table 2: Knowledge of Herbal Medicine Among Respondents (n=304)

Question / Item	Response Category	n (%)
Have you ever heard of herbal medicine?	Yes	254 (83.6%)
	No	50 (16.4%)
Source of information about herbal medicine	Family	97 (31.9%)
	Friends	93 (30.6%)
	Media	62 (20.4%)
	Others	44 (14.5%)
	Health workers	8 (2.6%)
Are herbal medicines effective in managing pregnancy conditions?	Yes	102 (33.6%)
	No	176 (57.9%)
	Not sure	26 (8.6%)
Herbs recognised (multiple response)	Neem (Dongoyaro)	70 (22.8%)
	Bitter leaf	67 (22.0%)
	Ginger	64 (21.1%)
	Garlic	55 (18.1%)
	Scent leaf	38 (12.5%)
	Castor oil	10 (3.3%)
Are herbal medicines safer than orthodox medicine?	Yes	106 (34.9%)
	No	146 (48.0%)
	Not sure	52 (17.1%)
Aware of the side effects of herbal medicine in pregnancy?	Yes	132 (43.4%)
	No	172 (56.6%)
Side effects recognised (among the aware)	Abdominal pain	70 (22.8%)
	Vomiting	67 (22.1%)
	Dizziness	64 (21.1%)
	Nausea	55 (18.1%)
	Allergic reactions	38 (12.5%)
	None identified	10 (3.3%)
Received formal education/training on herbal medicine?	Yes	103 (33.9%)
	No	201 (66.1%)
Overall Knowledge Level	Good knowledge	139 (45.7%)
	Poor knowledge	165 (54.3%)

Table 2 presents the knowledge profile of respondents regarding herbal medicine. The vast majority (83.6%, n=254) had heard of herbal medicine. The leading sources of information were family members (31.9%, n=97) and friends (30.6%, n=93), with media accounting for 20.4% (n=62). Health workers were the least-cited source, at only 2.6% (n=8). Regarding perceived effectiveness, 57.9% (n=176) disagreed that herbal medicines were effective for managing pregnancy-related conditions, while 33.6% (n=102) agreed, and 8.6% (n=26) were unsure. The most frequently recognised herbs were neem/dongoyaro (22.8%, n=70), bitter leaf

(22.0%, n=67), ginger (21.1%, n=64), garlic (18.1%, n=55), scent leaf (12.5%, n=38), and castor oil (3.3%, n=10). On the question of comparative safety, 48.0% (n=146) disagreed that herbal medicines were safer than orthodox medicine during pregnancy, while 34.9% (n=106) agreed, and 17.1% (n=52) were unsure. The majority (56.6%, n=172) were unaware of any side effects of herbal medicine in pregnancy, while 43.4% (n=132) acknowledged some awareness. Among those aware of side effects, abdominal pain (22.8%) and vomiting (22.1%) were most frequently cited. Only 33.9% (n=103) had received formal education or training in the use of herbal medicine. Overall, 45.7% (n=139) had good knowledge, while 54.3% (n=165) had poor knowledge. Attitude of Respondents toward Herbal Medicine.

Table 3: Attitude of Respondents toward Herbal Medicine Using Likert Scale (n=304)

Statement	SA n(%)	A n(%)	D n(%)	SD n(%)
Herbal medicines are more effective than modern medicine during pregnancy	59 (19.4%)	87 (28.6%)	65 (21.4%)	93 (30.6%)
I trust traditional healers more than health workers	74 (24.3%)	25 (8.2%)	93 (30.6%)	112 (36.8%)
I prefer using herbal medicine before trying modern medicine	78 (25.7%)	74 (24.3%)	60 (19.7%)	92 (30.3%)
I would recommend herbal medicine to other pregnant women	70 (23.0%)	24 (7.9%)	48 (15.8%)	162 (53.3%)
I am confident in preparing and using herbal medicines myself	48 (15.8%)	32 (10.5%)	86 (28.3%)	138 (45.4%)
Herbal medicines are culturally acceptable and encouraged	162 (53.3%)	70 (23.0%)	24 (7.9%)	48 (15.8%)
I feel safe using herbal medicines during pregnancy	60 (19.7%)	74 (24.3%)	78 (25.7%)	92 (30.3%)

[SA=Strongly Agree; A=Agree; D=Disagree; SD=Strongly Disagree]

Table 3 presents respondents' attitudinal responses toward herbal medicine. The most notable finding was that 53.3% (n=162) strongly agreed that herbal medicines are culturally acceptable and encouraged, the only statement yielding majority strong agreement. In contrast, 53.3% (n=162) strongly disagreed that they would recommend herbal medicine to other pregnant women, and 45.4% (n=138) strongly disagreed that they were confident in preparing and using herbal medicines themselves. Substantial proportions strongly disagreed that herbal medicines were safer to use during pregnancy (30.3%, n=92), that they preferred herbal medicine before modern medicine (30.3%, n=92), and that they trusted traditional healers over health workers (36.8%, n=112). In aggregate, 51.6% (n=157) of respondents demonstrated a positive overall attitude toward herbal medicine. In comparison, 48.4% (n=147) had a negative attitude, a near-even split that reflects the coexistence of cultural acceptance and personal scepticism. Prevalence and Patterns of Herbal Medicine Use

Table 4: Prevalence and Patterns of Herbal Medicine Use Among Respondents (n=304)

Question / Item	Response Category	n (%)
Used any herbal medicine during the current pregnancy?	Yes	125 (41.1%)
	No	179 (58.9%)
Used herbal medicine together with modern medicine?	Yes	102 (33.6%)
	No	176 (57.9%)
	Not sure	26 (8.6%)
Frequency of herbal medicine use	Rarely	120 (39.5%)
	Occasionally	72 (23.7%)
	Weekly	68 (22.4%)
	Daily	44 (14.5%)
Types of herbs used (multiple response)	Neem (Dongoyaro)	70 (22.8%)
	Bitter leaf	67 (22.0%)
	Ginger	64 (21.1%)
	Garlic	55 (18.1%)

	Scent leaf	38 (12.5%)
	Castor oil	10 (3.3%)
Who recommended herbal medicine?	Family	86 (28.3%)
	Self	65 (21.4%)
	Partner/Spouse	62 (20.4%)
	Traditional healer	45 (14.8%)
	Friend	41 (13.5%)
	Health worker	5 (1.6%)
Purpose of use	General well-being	195 (64.1%)
	Body pain	45 (14.8%)
	Morning sickness	42 (13.8%)
	Infection	12 (3.9%)
Experienced any side effects after use?	No	217 (71.4%)
	Yes	87 (28.6%)
Side effects experienced (among those affected)	Abdominal pain	83 (27.3%)
	Allergic reactions	60 (19.7%)
	Dizziness	52 (17.1%)
	Nausea	44 (14.5%)
	Vomiting	40 (13.2%)
	None/Unspecified	25 (8.2%)
Informed the healthcare provider about herbal use?	No	246 (80.9%)
	Yes	58 (16.4%)

Table 4 presents the herbal medicine use profile. Forty-one per cent (n=125) of respondents reported using herbal medicine during their current pregnancy, while 58.9% (n=179) had not. Among those who used herbal medicine, 33.6% (n=102) also used modern medicine concurrently—a practice of medical pluralism, while 57.9% (n=176) did not combine the two and 8.6% (n=26) were unsure. Regarding frequency, the most common pattern was rare use (39.5%, n=120), followed by occasional (23.7%, n=72), weekly (22.4%, n=68), and daily use (14.5%, n=44). The most commonly used herbs were neem/dongoyaro (22.8%, n=70), bitter leaf (22.0%, n=67), ginger (21.1%, n=64), garlic (18.1%, n=55), scent leaf (12.5%, n=38), and castor oil (3.3%, n=10). The primary source of recommendation was family (28.3%, n=86), followed by self (21.4%, n=65), partner/spouse (20.4%, n=62), traditional healer (14.8%, n=45), friend (13.5%, n=41), and health worker (1.6%, n=5). The most commonly reported reason for use was general well-being (64.1%, n=195), followed by body pain (14.8%, n=45), morning sickness (13.8%, n=42), and infection (3.9%, n=12). The majority (71.4%, n=217) reported no side effects after using herbal medicine, while 28.6% (n=87) experienced adverse effects, most commonly abdominal pain (27.3%, n=83), allergic reactions (19.7%, n=60), dizziness (17.1%, n=52), nausea (14.5%, n=44), and vomiting (13.2%, n=40). Alarmingly, 80.9% (n=246) of respondents who used herbal medicine did not inform their healthcare provider, while only 16.4% (n=58) disclosed their use.

DISCUSSION

Socio-Demographic Characteristics

The socio-demographic profile of respondents in this study reflects the broader maternal healthcare population in semi-urban and rural Nigeria. The predominance of women aged 25–29 years (53.3%) aligns with the recognised peak of reproductive activity among Nigerian women and is consistent with findings from studies in Nigeria and Ghana (Onyechi et al., 2022; Amoah et al., 2021). The high proportion of married women (65.1%) mirrors findings from Oluwatosin et al. (2021), who noted that marital status significantly influences maternal health decisions, with married women often subject to spousal and familial health directives that, in many traditional settings, promote herbal medicine use. The finding that 30.3% had no formal education, alongside 25.7% with tertiary education, reflects educational heterogeneity in the study population. This spectrum is significant because, as Umeokonkwo et al. (2020) demonstrated, lower educational attainment is a consistent predictor of reliance on herbal medicine. In contrast, higher education correlates with greater critical appraisal of healthcare options. Traders (28.3%) and artisans (24.0%) formed the majority of occupational categories, informal sector workers documented in Nigerian studies as more prone to herbal medicine use due to financial constraints and cultural familiarity (Yakubu & Salihu, 2020). Half of respondents (50.3%) were in their third trimester, a finding consistent with Ameh et al. (2023), who documented elevated herbal medicine use in the later stages of pregnancy to manage fatigue, pain, and labour preparation. This pattern carries significant feto-maternal risk given the pharmacological activity of uterotonic herbs.

Knowledge of Herbal Medicine

The high level of awareness of herbal medicine (83.6%) observed in this study reflects the deep cultural integration of traditional remedies in Yoruba communities. This finding is consistent with Onyechi et al. (2022), who reported 87.5% awareness among pregnant women in South-Eastern Nigeria. However, awareness should not be conflated with knowledge, as only 45.7% of respondents demonstrated good knowledge overall. This discrepancy—widespread awareness alongside inadequate substantive knowledge— is a critical finding with direct implications for health education. The heavy reliance on family (31.9%) and friends (30.6%) as primary information sources, with health workers cited by a mere 2.6%, corroborates the findings of Umeokonkwo et al. (2020) and Amoah et al. (2021), who consistently demonstrate that informal social networks dominate information-sharing about herbal medicine. This pattern is both culturally entrenched and clinically concerning, as family knowledge is rarely evidence-based and may perpetuate misinformation across generations.

The finding that 57.9% of respondents disagreed that herbal medicines are effective for pregnancy-related conditions contrasts with Danladi et al. (2022), who reported a majority-positive perception of efficacy. This disparity may reflect regional differences in healthcare exposure, educational composition, and the increasing penetration of biomedical discourse into community health belief systems in Ondo West. Notably, 56.6% of respondents were unaware of any potential side effects of herbal medicine in pregnancy, a finding that echoes Ameh et al. (2023) and highlights critical gaps in health literacy. The limited awareness of herb-specific risks is particularly alarming given the documented teratogenic and uterotonic properties of commonly used herbs such as neem, castor oil, and bitter leaf. Only 33.9% of women had received any formal education on the use of herbal medicine, underscoring the inadequacy of current antenatal health education curricula in addressing traditional medicine practices.

Attitude toward Herbal Medicine

The attitudinal findings present a nuanced picture. While 53.3% of respondents strongly agreed that herbal medicines are culturally acceptable and encouraged, reflecting the deep-rooted normalisation of traditional medicine in Yoruba communities (Bello et al., 2021), an equally striking 53.3% strongly disagreed that they would recommend herbal medicine to other pregnant women. This attitudinal paradox, in which cultural endorsement coexists with personal reluctance to advocate, suggests an emerging tension between traditional norms and growing awareness of potential risks. Oluwatosin et al. (2021) similarly documented ambivalent attitudes among hospital attendees in Nigeria, where women acknowledged herbal medicine's cultural place while expressing personal reservations. The strong disagreement with trusting traditional healers over health workers (36.8% strongly disagreed) indicates that formal healthcare providers retain a degree of authority and trust that, if leveraged appropriately, could be channelled toward more effective counselling on safe pregnancy practices. The finding that 51.6% held a positive overall attitude underscores the continued cultural salience of herbal medicine and the importance of culturally sensitive—rather than dismissive—health education approaches.

Prevalence and Patterns of Herbal Medicine Use

A prevalence of 41.1% herbal medicine use during the current pregnancy places the study population within the middle range of documented African estimates (32–73%), consistent with Yakubu and Salihu (2020), who reported approximately 43% among pregnant women in Northern Nigeria. The substantial concurrent use of herbal and orthodox medicine (33.6%) exemplifies medical pluralism, a phenomenon well documented by Amoah et al. (2021) in Ghana, where women frequently alternate between or combine healthcare systems—often without disclosing this to either provider. The pharmacological risks of herb-drug interactions in such combined regimens are significant and underappreciated (Nyeko et al., 2016). The predominant role of family in recommending herbal medicine (28.3%) reinforces the social ecology of traditional health practices identified in Umeokonkwo et al. (2020) and Danladi et al. (2022), in which familial guidance serves as a trusted, readily accessible healthcare channel that often outpaces formal medical advice.

The overwhelming use of herbal medicine for general well-being (64.1%) rather than specific pathological conditions suggests that many women use herbal remedies prophylactically or as health tonics, a practice lacking clinical evidence and carrying undefined risk. The side effect profile documented in this study, abdominal pain (27.3%), allergic reactions (19.7%), dizziness (17.1%), nausea (14.5%), and vomiting (13.2%), mirrors adverse effects documented by Chidiebere et al. (2020) and is consistent with the known pharmacological actions of neem, bitter leaf, and ginger at non-standardised doses. Perhaps the most alarming finding is the disclosure rate: only 16.4% of herbal medicine users informed their healthcare providers. Bello et al. (2021) attribute this to anticipated disapproval, while Illamola et al. (2020) emphasise the structural failure of antenatal consultations to inquire about the use of traditional medicine routinely. This gap represents a critical missed opportunity for clinical intervention and patient safety counselling.

CONCLUSION

This study provides the first systematic evidence on knowledge, attitudes, and herbal medicine use among pregnant women attending primary healthcare centres in the Ondo West Local Government Area. The findings reveal that while awareness of herbal medicine is high (83.6%), the majority of pregnant women in this setting have poor knowledge (54.3%), particularly regarding safety and side effects. Cultural acceptability is a powerful driver of both positive attitudes and actual use, with 41.1%

of women using herbal medicine during their current pregnancy. The near-total failure to disclose herbal use to healthcare providers (80.9% did not disclose) poses a serious and under-recognised patient safety risk. The dominance of family and friends as information sources, at the expense of health professionals, underscores structural gaps in antenatal health education and patient-provider communication. Collectively, these findings demand an integrated, culturally sensitive, and multilevel public health response to ensure that the widespread use of herbal medicine among pregnant women in Nigeria does not continue to jeopardise maternal and fetal health outcomes.

RECOMMENDATIONS

Based on these findings, the following evidence-based recommendations are proposed. First, healthcare providers at primary health centres should routinely and non-judgmentally inquire about herbal medicine use at every antenatal visit, creating a safe environment for disclosure and targeted counselling. Second, antenatal health education curricula should be expanded to include structured, accessible content on the risks and interactions of commonly used herbs, delivered in both English and Yoruba to maximise reach. Third, national and state health authorities should strengthen the regulatory framework governing the production, labelling, and sale of herbal products, with specific attention to products marketed for use during pregnancy. Fourth, formal collaboration between biomedical and traditional health practitioners should be institutionalised to standardise safer practices and improve referral pathways. Fifth, academic and research institutions should prioritise longitudinal studies examining the relationship between specific herbal exposures and pregnancy outcomes in Nigerian populations, to generate the local evidence base currently lacking. Sixth, community health extension workers and ward-based maternal health champions should be deployed to deliver evidence-based messaging on the safety of herbal medicine within the cultural frameworks of local communities.

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