



ORIGINAL ARTICLE

Prevalence and Pattern of Traditional Herb Usage among Pregnant Women and the Adverse Outcome: A Mixed-Method Study

Oluwayemisi Grace Olasolomon*, Okumagba MT, Awunor NS and Ntaji MI

Department of Community Medicine, College of Health Sciences, Delta State University, Abraka, Delta State, Nigeria

*Corresponding author: Oluwayemisi Grace Olasolomon, Department of Community Medicine, College of Health Sciences, Delta State University, Abraka, Delta State, Nigeria, Tel: +2348035836932



Abstract

Background: The use of traditional herbs is a common practice among pregnant women to manage various diseases. However, their safety has not been well established, and their effect on mother and foetus is uncertain.

Aim: This study assessed the prevalence, pattern of use of traditional herbs, and adverse health outcomes associated with using traditional herbs amongst pregnant women in Ethiopia East Local Government in Delta State.

Methods: This was a mixed-method study (cross-sectional and ethnography involving in-depth interviews and observational studies) done in southern Nigeria. Four hundred and twenty-nine pregnant women were selected using a multistage sampling technique. Quantitative data were collected using a semi-structured interviewer-administered questionnaire. At the same time, the qualitative part of the study involved an in-depth interview and observational study with two licensed traditional medicine providers. Quantitative data were analysed using SPSS version 26, Chi-square statistic at $P < 0.05$ level of significance was utilized to examine the hypotheses for this study while the transcribed interview was managed using N-Vivo 12.

Results: An average of 47.5 pregnant women visits traditional medicine providers daily from the qualitative study. A 40.8% prevalence of the use of traditional herbs was observed in the quantitative study. The pattern of use of the herbs was mostly bathing and drinking. The commonly used herbs in Ethiopia East Local Government area include Neem leaves, goat weed leaves, chloroquine bark and roots, alligator pepper, and moringa leaves. The adverse health outcome experienced includes; miscarriages, fetal loss, excessive stooling, and vomiting. There was a statistically

significant relationship between using traditional herbs and the experience of an adverse health outcome.

Conclusion: The prevalence of using traditional herbs among the study population is high. Most of these women use traditional herbs weekly without experiencing malaria-like symptoms. A significant relationship exists between using traditional herbs during pregnancy and experiencing an adverse health outcome. More awareness programs about the adverse health outcome of using traditional herbs among pregnant women are recommended.

Keywords

Adverse Health Outcome, Malaria, Mixed-Method, Pregnancy, Traditional Herbs

Abbreviations

WHO: World Health Organization; LGA: Local Government Area; TMP: Traditional Medicine Practice; TM: Traditional Medicine; mls: Millimetres

Introduction

Malaria is a severe and widespread disease in Africa, and 90% of malaria cases worldwide occur in Sub-Saharan Africa [1]. Malaria is caused by the parasite Plasmodium, which can be transmitted to humans by a mosquito bite [2]. *Plasmodium Falciparum* is the deadliest of the five varieties of Plasmodium (*P. Falciparum*, *P. Ovale*, *P. Malaria*, *P. Vivax*, and *P. Knowlesi*), affecting about 40% of the world's population, with pregnant women and children under the age of five. Malaria infection is considered a significant threat to the lives

and well-being of pregnant women and infants [3]. It has been noted that malaria is responsible for 20 per cent of stillbirths and 11 per cent of all maternal deaths by way of spontaneous abortion, maternal anaemia, placental pathologies, infant mortality and morbidity, intrauterine growth retardation and low birth weight, threatened abortion, miscarriage, prematurity and low birth weight which all have profound public health implications for the mother, the fetus and newborn [4]. These authors explained that in Nigeria, overall malaria prevalence stood at 79.5%; in Lagos and Enugu States, the prevalence during pregnancy was reported to be 52 and 99 per cent, respectively, and having devastating effects on pregnant women, the fetus and the newborn [4].

Due to the high expense and burden of malaria treatment, particularly in rural regions of Nigeria, many people have resorted to using traditional remedies to treat the disease. Pregnant women are among those who have been recognised as taking traditional herbs for malaria treatment. According to the World Health Organization, traditional medicine is widely used in various therapies, with up to 80% of indigenous people relying on it for their main healthcare requirements [5]. According to Ernst, among traditional medicinal practices, the use of herbal medicinal preparations is defined as formulations produced from plants that claim to have healing substances, which is the most popular and widely practised by both the general public and pregnant women among the rural dwellers around the world [6]. Pregnant women take herbal remedies for various reasons; according to Henry and Crowther, the reasons for using traditional herbs include malaria treatment and pregnancy-related problems such as nausea, vomiting, and labour augmentation [7].

Pregnant women can utilize traditional medicine for ailments and conditions related to pregnancy, such as exhaustion, respiratory and skin difficulties, and nutritional benefits [8]. Gardiner, Graham, Legedza, et al. claimed that pregnant women use herbal medicines because of their wide availability, possibly better effectiveness than modern medicine, firm traditional and cultural beliefs in herbal medicines to cure malaria and other diseases and because of the relatively low cost of these herbal medicines [9]. Traditional medical practice is common in underdeveloped nations like Nigeria. It is a low-cost, readily available treatment option. Many people in rural society prefer health treatment from traditional medicine providers because it is more affordable and comfortable with their culture, beliefs, and customs [10].

However, some studies have concluded that the use of traditional herbs by pregnant women to treat malaria may have harmful effects on their health, particularly for those living in Nigeria's rural areas where access to primary healthcare is poor and where there is a high

level of cultural belief in the use of traditional herbs to treat disease, particularly malaria [11]. There is a dearth of literature regarding the prevalence of traditional herbal use among pregnant women and the associated adverse health outcomes in the region where this study was done. Therefore, this study assessed the prevalence and pattern of use of traditional herbs among pregnant women and the associated adverse health outcomes during pregnancy.

Materials and Methods

Study design

This is a mixed-method study, combining qualitative and quantitative approaches in a single study. The qualitative approach was an ethnographic study which included in-depth interviews and observational study, while the quantitative approach was a cross-sectional descriptive study.

Study setting and population

This study was conducted in Abraka and Eku towns in Ethiope East Local Government Area of Delta State in south southern Nigeria. The study population comprised pregnant women attending antenatal clinics in the various health facilities in the study area and the traditional medicine providers assessable within the study area.

Sample size determination and sampling technique

Quantitative method: The minimum sample size for the quantitative study was determined using Fischer's formula. A minimum sample size of 431 was obtained, including for non-responses; however, 429 pregnant women participated in the quantitative aspect of the study. A multistage sampling technique was used. Firstly, health facilities were stratified into secondary and primary healthcare facilities in the study areas. There are four secondary health facilities and eleven primary health facilities within the study area. Then, a simple random sampling was done via balloting to pick two secondary and three primary healthcare facilities for the study. Women visiting the health facilities antenatal clinics were recruited for this study.

Qualitative method: The snowball sampling technique was used to discover traditional herbalists with whom the in-depth interviews and observational studies were conducted. About 11 traditional medicine providers were initially identified. However, only 2 of the 11 traditional medicine providers were Board certified and included in the study.

Data collection was done between April and October of 2022. However, the entire study duration was twelve months.

Inclusion criteria

The inclusion criteria for the quantitative aspect of

this study were pregnant women who:

- a. Lived within the study area and attended antenatal care meetings at the selected health facilities within the study period.
- b. Were willing to participate in the study.

However, for the qualitative aspect of the study, only those who were Board certified traditional medicine provider registered with the Delta State traditional medicine Board, noted to have adequate knowledge of herbal plant were used.

Exclusion criteria

The Exclusion criteria for the quantitative aspect of this study were pregnant women who attended the antenatal meeting but were unable to give required information due to unwillingness, mental health issues.

In the qualitative aspect of the study, traditional medicine providers who were without Board registration were excluded.

Validity of instrument

Prior to the data collection of the research, the questionnaire was projected to research experts for correction. Errors seen in the way the questionnaires were listed were corrected (visual validity). The questionnaire yielded a cronbach's alpha coefficient of 0.814 after testing suggesting good internal consistency.

Reliability of instrument

Pilot study was carried out by selecting 10 respondents outside the sample area, they were required to answer and submit the questionnaire after filling. A retest with the same group was done at a later time. The data and results were analyzed, the score gotten following application of the questionnaire in test retest method was observed. The data collated was found to be consistent and reliable.

Data collection tools

Quantitative method: A 26-item researcher-administered questionnaire was used to collect participant data. The questionnaire consisted of open-ended and close-ended questions and was pretested and modified before final administration to participants. The questionnaire had three sections: Sociodemographics, the prevalence of traditional herb usage for malaria treatment, and adverse health outcomes among pregnant women.

Qualitative method: The qualitative part of the study used in-depth interviews with an interview guide and audio recorder to collect data from the traditional medicine provider. The in-depth interviews with the traditional medicine providers were held in closed-door rooms and lasted 30 to 40 minutes. The sessions were audio recorded and transcribed verbatim, then translated from broken English, i.e. vernacular. The

observational study was done during the weekends, and observations were documented in field notes. The observations occurred during weekends for four weeks. Besides the sociodemographic details taken, see **(Box 1)** for the interview guide questions for the traditional medicine providers.

Data analysis

The collected data were analysed using Statistical Package for Social Science (SPSS) software version 26 for the quantitative method. Descriptive statistics were used to summarise the data, while inferential (Chi-square) statistics at $p < 0.05$ level of significance were used to test for association between the dependent and independent variables. The dependent variable of interest in this study was the adverse health outcomes or effects, i.e. problems associated with using traditional herbs. In contrast, the independent variable was traditional herb usage in treating malaria during pregnancy.

However, for the qualitative method, i.e. in-depth interviews, NVIVO 12 was used for data analysis, and the results were presented in themes. Also, the observations recorded in the field note were presented in themes aligned with the study's objectives. In addition, triangulation was done to compare the quantitative and qualitative data sets to show if the methods used validated each other.

Ethical consideration

Ethical approval for this study was obtained from the Health Research Ethics Committee of Delta State University Teaching Hospital, Oghara (DELSUTH HREC Approval Number: HREC/PAN/2022/078/0519). Permission was obtained from the various health facilities used in this study for questionnaire distribution. Informed consent was also obtained from all participants, i.e. the pregnant women and the traditional medicine providers.

Results

The results of this study are presented in themes starting with the quantitative study, then the qualitative study, with the in-depth interview before the report from the observation study. The themes are sociodemographic characteristics, the prevalence of traditional herbs utilisation, the pattern of use of traditional herbs, adverse outcomes from traditional herbal use, the relationship between the use of traditional herbs and adverse outcomes, and emergent themes from the qualitative study.

Sociodemographic Characteristics

For the quantitative study, out of the total number of 429 pregnant women included in this study, 49.4% ($n = 212$) of the women were aged 21-30 years, 24.5% ($n = 105$) were aged 31-40 years, 21.4% ($n = 92$) were

less than 20 years, and 4.7% (n = 20) were more than 41 years. The highest proportion of the women had secondary education. The most proportion of the women was in their second trimester of pregnancy (39.2%: n = 168), compared to those in their first trimester (31.0%: n = 133) and third trimester (29.8%: n = 128), respectively. The highest proportion of the women were semi-urban residents (83.4%: n = 358), compared to those who were rural residents (16.6%: n = 71). The majority had secondary education (47.6%: n = 204), followed by tertiary education (31.7%: n = 136), compared to those who had primary education (17.9%: n = 77) and no formal education (2.8%: n = 12). Most women were married (70.2%: n = 301) and had 1 to 2 children (76.9%: n = 330) (Table 1).

For the qualitative study, two female licensed traditional herbalists, also called traditional medicine providers (TMP), 70-year-old (1st respondent) and 70+-year-old (2nd respondent), were interviewed. They have practised traditional medicine for over 30 years and over 44 years, respectively. The first traditional medicine provider had primary education, while the other had no formal education. The 1st respondent claimed she learnt traditional medicine from her mother and as a natural gift from God, while the 2nd respondent claimed she learnt from an ancestral spirit.

Table 1: Sociodemographic Characteristics of Respondents (N = 429).

Characteristics	Frequency	Percent (%)
Age (in years)		
< 20	92	21.4
21-30	212	49.4
31-40	105	24.5
> 41	20	4.7
Level of Education		
None	12	2.8
Primary	77	17.9
Secondary	204	47.6
Tertiary	136	31.7
Employment Status		
Not working	86	20.0
Working for someone	73	17.0
Working for government	28	6.5
Self-employed	242	56.4
Marital Status		
Single	74	17.3
Married	301	70.2
Widowed	1	0.2
Divorced	4	0.9
Cohabiting	49	11.4
Place of Residence		
Semi-Urban	358	83.4
Rural	71	16.6

“My mother is a traditional herbalist, though she refused to teach me, I observed and learnt from her, and it is also a natural gift from God because my mother said I can identify leaves and roots more than her” (1st respondent).

“A spirit hid me in the bush for 14 days, no food or water, telling me what to eat, teaching me which leaf is good and which is not good, if there is a hard problem, the spirit always tells me the solution” (2nd respondent).

The respondents live and practice traditional medicine in Okurekpo and Abraka in the Ethiopia East Local Government Area of Delta State, Nigeria. **Box 1** contains the interview guide questions for traditional medicine providers.

Box 1: Interview Guide Questions

1. How many patients do you attend to daily?
2. What traditional herbs do you use to treat malaria in pregnancy? In what form do you give the herbs?
3. What are the likely problems of using traditional herbs for treating malaria among pregnant women?
4. How often do you come across these problems when treating pregnant women with traditional herbs?
5. Do you refer your patients to the hospital when you discover any problem while treating a pregnant woman with traditional herbs?
6. Do you know about any problems associated with treating malaria with traditional herbs?

Prevalence of Traditional Herbs Utilisation

The quantitative study revealed a prevalence of 40.8% for the use of traditional herbs to treat malaria among pregnant women.

The in-depth interview revealed that many women patronize traditional medicine providers for their health challenges. Traditional medicine providers (TMPs) encounter between 20 and 70 patients daily, with an average of 47.5 patients consisting of both pregnant women and women trying to conceive.

“On some days, I see about 70 patients per day” (1st respondent)

“I encounter about 20 to 25 persons per day, including pregnant women and seeking mothers” (2nd respondent)

The 1st respondent female traditional medicine provider saw an average of about 40 patients throughout the day, on a Saturday, during the visit. Most of the women attended to were pregnant, while

a lesser minority were seeking help in getting pregnant. Her patients ranged across all age groups; most were between 21 and 30 years and mostly married. On the other hand, the 2nd respondent traditional medicine provider saw an average of about 25 to 40 patients during the weekend. Many women who came to the herbal home were pregnant, and most came because of symptoms like fever and nausea. Although she also treated other conditions like infertility, seizure disorder in children, circumcision, and ear piercing of newborns.

The Pattern of Use of Traditional Herbs

Of the 429 pregnant women who participated in the quantitative study, 175 (40.8%) women use traditional herbs to treat malaria during pregnancy. Among these women who use the traditional herbs to treat malaria during pregnancy, 36.0% (n = 63) use these traditional herbs once a week, 30.3% (n = 53) rarely use them, 25.7% (n = 45) use them once monthly, while only 8.0% (n = 14) use it every day. The highest proportion of pregnant women uses the traditional herb through bathing (52.5%: n = 92), compared to consuming the

roots (42.9%: n = 75), juicing the leaves (33.1%: n = 58), inhaling the boiling water from the leaves or roots (14.8%: n = 26), and using ground or powdered form of the herbs (1.1%: n = 2). In addition, of the 175 (40.8%) women who use traditional herbs to treat malaria during pregnancy, 48% (n = 84) combine the usage pattern, while 52% (n = 91) do not. The pattern of combination of the traditional herb for the treatment of malaria among pregnant women includes: bathing with leaves and the roots and drinking the leaves and the roots (36.9%: n = 31), drinking the leaves and roots only (21.4%: n = 18), bathing with leaves and roots (19.0%: n = 16), bathing with leaves and roots plus inhalation (14.3%: n = 12), drinking leaves and roots solution plus inhalation (7.1%: n = 6), drinking leaves and roots solution plus inhalation (14.3%: n = 12), while only 1.2% (n = 1) bath with the leaves and the roots, drink the roots and the leaves and also use incision at the same time. Most of the pregnant women (57.7%: n=) do not use traditional herbs when there is no symptom of malaria, while 42.3% (n=) do. [Table 2](#) shows the prevalence and pattern of use of traditional herbs among pregnant women.

Table 2: Prevalence and Pattern of Use of Traditional Herbs among Pregnant Women.

Characteristics	Frequency	Percent (%)
Do you take traditional herbs to treat malaria symptoms during pregnancy? (n = 429)		
Yes	175	40.8
No	254	59.2
Use of traditional herb when there is no symptom of malaria (n = 175)		
Yes	74	42.3
No	101	57.7
How often do you take traditional herbs? (n = 175)		
Every day	14	8.0
Once a week	63	36.0
Once monthly	45	25.7
Rarely	53	30.3
How do you take and consume the traditional herb? (n = 175)		
Juicy	58	33.1
Leave	63	36.0
Root	75	42.9
Bath	92	52.5
Inhale	26	14.8
Powder	2	1.1
Do you combine any of the above forms? (n = 175)		
Yes	84	48.0
No	91	52.0
Pattern of Combination (n = 84)		
Drink leaves and/or Root	18	21.4
Drink leaves and/or Roots plus inhalation	6	7.1
Bath leaves and/or Root	16	19.0
Bath leaves and/or Root plus inhalation	12	14.3
Bath leaves and/or Root plus drink leaves and/or Root	31	36.9

Bath leaves and/or Root, drink leaves and/or Root plus incision	1	1.2
Quantity of traditional herbs taken (n = 109)		
7.5 mls	3	2.9
15 mls	15	13.7
30 mls	11	10.1
50 mls	29	26.6
100 mls	17	15.5
200 mls	34	31.2

Table 3: Herbal Medicine used in Pregnancy in Ethiope East LGA, Delta State.

S/N	Plant (Botanical Name)	Local name	English Name	Part used	Function
1	<i>Azadirachta indica</i>	Dogonyaro	Neem	Leaves/Bark	Fever/Malaria treatment
2	<i>Moringa oleifera</i>	Odudu Oyibo	Brimstone tree	Leaves	Fever treatment, Breast milk production
3	<i>Cinchona officinalis</i>	Chloroquine fever tree	Chloroquine	Bark/root	Malaria treatment
4	<i>Carica papaya</i>	Eto Oyibo	Pawpaw	Leaves/fruit	Relieves morning sickness/ Malaria treatment
5	<i>Zingiber officinale</i>	Jinja	Ginger	Rhizome	Nausea
6	<i>Aframomum melegueta</i>	Ose Oji	Alligator pepper	Fruit/roots	Galactogogue, stimulates baby movement during fever
7	<i>Cymbopogon citratus</i>	Ebitie	Lemon grass	Leaves	Malaria treatment
8	<i>Ageratum conyzoides</i>	Ikpmaku	Goat weed/leaf	Leaves	Malaria treatment

The in-depth interview revealed that traditional medicine providers use leaves and roots more frequently in malaria treatment. For example, the leaves are sometimes boiled, and the water from the leaves is given to the pregnant women to bathe and drink. Furthermore, sometimes, the roots are mixed with an alcoholic drink for preservation, and two tablespoons are taken first thing in the morning before:

"I use roots, some chloroquine leaves, and Dogoyaro tree (Neem leaves)" (1st respondent)

"I use goat leaf, chloroquine root and leaves to treat fever in pregnant women" (2nd respondent)

It was observed that the 1st respondent used chloroquine roots, bark, and leaves (scientific name *Cinchona officinalis*) to treat malaria. She added neem leaves, i.e. Dogoyaro leaves (scientific name *Azadirachta indica*), and occasionally when she felt the malaria was severe based on the patient's symptoms. She was careful in preparing her herbal preparations and gave detailed instructions to patients on how herbs should be used. Most of her preparations were from drinking and boiling leaves or roots. She sometimes recommended a mix of drinking and bathing herbal water from the leaves. However, the second traditional medicine provider was not very keen on hygienic practices when making the herbal preparations as she rarely washed her hands while making the herbal medicines. Occasionally she used chloroquine leaves, roots, and goat leaves in treating malaria or fever. Table 3 below shows the herbal medicine used in pregnancy.

Adverse Outcome from Traditional Herb Use

Out of the 429 pregnant women who participated in the quantitative study, a higher proportion (52.7%: n = 226) opined that traditional herbs are safe for treating malaria during pregnancy, while the others (47.3%: n = 203) thought otherwise. Although the majority of the pregnant women (72%: n = 309) have never noticed adverse health outcomes from traditional herb usage among pregnant women, 28% (n = 120) have. The highest proportion of perceived adverse health outcomes among pregnant women from the use of traditional herbs to treat malaria is a miscarriage (58.1%: n = 118); others are the death of the fetus (32%: n = 65), premature labour (30.5%: n = 62) abnormal bleeding (20.6%: n = 42), heartburn (15.3%: n = 31); others (5.4%: n = 11) are yellowing of the eyes, convulsions, dizziness, drowsiness and sickness of the mother.

However, only 5.6% (n = 24) of the 429 respondent pregnant women had experienced adverse health outcomes during pregnancy; 41.7% of those who had experienced the adverse health outcome believed it was as a result of taking traditional herbs, while 58.3% believed the adverse outcome they experienced was not related to use of traditional herbs. Of the 41.7% (n = 10) who had experienced the adverse outcome believed they resulted from traditional herbs usage during pregnancy. Among the women who experienced adverse health outcomes during pregnancy, 9 (90%) had it once, while 1 (10%) had it twice. The adverse health outcomes include miscarriages (50%: n = 5), pre-

matured labour (30%: n = 3), death of the fetus (10%: n = 1), abnormal bleeding (10%: n = 1), cesarean section (10%: n = 1). Most (50%: n = 5) of those who experienced adverse outcomes in pregnancy due to the herbs used to treat malaria developed complications within 24 hours of taking the herbs, 20% (n = 2) developed complications two days after, and 10% (n = 1) within three days, while 20% (n = 2) developed complications within a week. Out of the 429 pregnant women who participated in the quantitative study, 11.7% (n = 50) claimed that they had seen a pregnant woman lose her life by using traditional herbs to treat malaria during pregnancy.

From the in-depth interview, the traditional herbalist reported that they do not have adverse outcomes frequently.

"I do not experience any challenge when treating pregnant women with herbs" (1st respondent female)

"Sometimes I encounter problems like bleeding, but I treat it myself using herbs, and it stops" (2nd respondent female)

The researcher observed that the traditional medicine provider still practised some terrible harmful practices like spitting (where leaves are chewed in the herbal healer's mouth and spat on the pregnant

woman's abdomen), rubbing alligator pepper (scientific name *Aframomum melegueta*) that has been roughly grounded to mother's abdomen when she felt the fetus was not moving well enough due to mothers ill health caused by fever (malaria). Some patients found applying alligator pepper to the abdomen uncomfortable, and their verbal complaints of discomfort evidenced this. Few also cried during the belly massages done on pregnant women. There were occasional reports of severe stooling and excessive urination after taking the herbal preparations, which the traditional herbal healer claimed was the effect of the herbs and not an adverse effect; according to her, the bad things were flushed out that way. There were cases of vomiting and stooling after herbal preparation ingestion, which were treated with salt-sugar solutions.

Relationship between the Use of Traditional Herbs and Adverse Outcome

More of those who use traditional herbs to treat malaria came down with an adverse outcome during pregnancy than those who did not use traditional herbs to treat malaria during pregnancy. A statistically significant relationship existed between using traditional herbs for malaria treatment and adverse health outcomes among pregnant women ($\chi^2 = 4.960$; $P = 0.032$) (Table 4).

Table 4: Adverse health outcomes of the use of traditional herbs for treating malaria among pregnant women.

Characteristics	Frequency	Percent (%)
Are traditional herbs safe for treating malaria during pregnancy? (n = 429)		
Yes	203	47.3
No	226	52.7
Have you experienced any adverse outcomes during pregnancy? (n = 429)		
Yes	24	5.6
No	403	93.9
If yes, did it result from using traditional herbs? (n = 24)		
Yes	10	41.7
No	14	58.3
How many times have you experienced the adverse effects of traditional herbs for treating malaria during pregnancy? (n = 10)		
Once	9	90.0
Twice	1	10.0
Adverse effects experienced from the use of traditional herbs for treating malaria during pregnancy (n = 10)		
Death of fetus	1	10.0
Abnormal bleeding	1	10.0
Caesarean section	1	10.0
Miscarriage	5	50.0
Premature labour	3	30.0
How soon after taking the herbs? (n = 10)		
Within 24 hours	5	50.0
After 2 days	2	20.0
Within 3 days	1	10.0
Within that week	2	20.0

The researcher observed a case of abnormal bleeding after ingesting the traditional medicine provider's recommended herbal preparation at the herbal home; the traditional medicine provider claimed the bleeding happened because the pregnant woman had a weak uterus. However, she mixed a leaf (Ikperowo leaf) with native chalk to halt the bleeding. However, the researcher suggested that the patient be immediately moved to the hospital for proper diagnosis and treatment. Some patients complained that the herbal preparations were harsh as they felt faint or dizzy after taking them.

Emergent Themes from the Qualitative Study

Referral to the Hospital for Complications: Both traditional medicine providers refer patients to the hospital occasionally.

"Patients I treat do not have further complications, but I send them to the hospital for tests, and the diagnosis is always the same as mine. For example, children in abnormal position diagnosed by me, is the same diagnosis in the hospital, and I treat them with leaves" (2nd respondent).

"Yes, when the placenta is down, I always refer them; I do not use herbs to treat that one" (1st respondent)

Religious and Spiritual Influence: Both traditional medicine providers believe spiritual prayers are essential to their herbal treatment.

"Immediately I give the herbs; I pray for the woman" (1st respondent)

Additional observation: Both traditional medicine providers displayed some harmful practices such as spitting herbal leaves chewed in the mouth all over the pregnant woman's belly, alligator pepper massage on the belly pregnant woman's belly, and using alcohol to make herbal preparations for pregnant women. Vigorous belly massages were occasionally done on pregnant women whenever the patient complained of abdominal pain. A traditional medicine provider also manipulated breech babies to cephalic (external cephalic version). These were risky and uncalled for as this could cause cord problems/accidents like cord entanglement or result in bleeding from uterine rupture. However, the traditional medicine providers had a calm, friendly disposition to patients at the herbal homes, and most pregnant women were sent there based on referrals from previous clients. In addition, the patients placed high importance on the prayers received from the traditional herbalists, as most believed in the efficacy of the prayers to protect them from evil spirits and people generally.

Discussion

Prevalence of Traditional Herbs Utilisation among Pregnant Women

This study revealed that the prevalence of women who used traditional herbs in pregnancy was significant,

as it was close to half of the respondents. The findings from the study's quantitative and qualitative aspects were triangulated and similar, depicting that many pregnant women use traditional herbs despite regular antenatal visits. Traditional herbs have become very common among pregnant women in Nigeria. Given the dire state of health care, there is concern that pregnant women may endanger their lives with this practice. The traditional herbalists from the qualitative aspect of this study admitted to seeing many patients daily, with a large portion of their patients consisting of pregnant women with malaria-like symptoms, e.g. fever. The influx of patients into traditional homes who lack basic health amenities spells ignorance and tells of the deplorable state of the health care system in Nigeria, characterised by a brain drain of health workers and long waiting times to see the doctor.

The prevalence from this study at 40.8%, agrees slightly with Ajuzie, et al., who noted that 51.3% of pregnant women used herbal medicine to treat malaria [11], compared to Mothupi's study, which revealed that only 12% of women used herbal or traditional medicine during their most recent pregnancy [12]. On the contrary, the study by Chidinma, et al. and Babalola, et al. revealed a higher prevalence of 93.5% and 71.7%, respectively [13,14]. The high prevalence of pregnant women who use these traditional herbs for malaria treatment highlights the importance of ensuring that the traditional herbs are correctly prepared and adequately dosed to prevent fatal complications in both mother and child. To a large extent, poor education, culture, and religion influence pregnant women's care-seeking patterns in rural areas.

The Pattern of Use of Traditional Herbs in the Treatment of Malaria

This study revealed that among the pregnant women who use herbs to treat malaria, a few used it daily, over one-third used it weekly, one-quarter used it monthly, and more than a quarter rarely used it. This finding contradicts the study of Chidinma, et al., who reported that most pregnant women used herbs to treat malaria monthly [13]. The decrease in the use of herbs to treat malaria may be due to the respondents' education level, as pregnant women who have attained tertiary education are less likely to use herbal medicine during pregnancy [15]. Educated women may also be concerned about the safety of the herbal medication and may desist from using it. Most pregnant women in this study who use traditional herbs reported taking about a glass (200 ml) daily, which is significant in pregnancy. This finding suggests that pharmaceutical guidelines do not regulate the dosage of these herbal medicines, hence the belief that a higher dosage may mean higher efficacy. However, this high dosage may cause debilitating problems for pregnant women and the fetus in the long term.

The traditional medicine provider in this study employed a range of herbs to treat malaria, which include the Dogoyaro or Neem leaves and the goat leaf. A similar study has implicated these leaves in the treatment of malaria [16]. Findings from this study showed that pregnant women used traditional herbs in bathing more than any other use pattern, while less than half took roots, about one-third took leaves and a small percentage. In addition, this study revealed that most women only used traditional herbs to treat malaria when there were symptoms. In contrast, over one-third used traditional herbs to treat malaria, even without symptoms. The increase in the use of herbal medication to treat malaria upon symptom presentation shows an increased perception and knowledge towards the common symptoms of malaria [17]. However, clinical diagnosis of the malaria parasite, absent in traditional settings, remains vital as many other illnesses present with malaria-like symptoms. Most respondents noted that they do not use traditional herbs to treat malaria outside pregnancy, while less than half the respondents used traditional herbs to treat malaria outside pregnancy. This finding slightly differs from Nergard, et al.'s study, which reported other commonly treated conditions such as urinary tract infections, headaches, and others [18].

There is a similarity in the quantitative and qualitative aspects of this study as the different patterns of administration the herbal medicine mostly involved bathing and drinking boiled water from roots and leaves. However, this finding differs from the study of Oladeji, et al., who reported that leaves and barks were the most common part of traditional herbs taken [17]. It also differs from the study by Omagha, et al., who noted that the predominant mode was administering traditional herbs through drinking [19]. Both quantitative and qualitative aspects of this study also revealed that the quantity of the herbal preparations prescribed and administered orally is almost the same, i.e. a dose of about one glass (200 mls); therefore, the triangulation of both the quantitative and qualitative aspects of this study. The large number of herbal preparations given to pregnant women for treating malaria pregnancy should be a source of concern as there is no standard guideline for the preparations of the herbs, and most of the means of preparations are shrouded in mystery. This large dose could cause adverse health outcomes.

Adverse Outcome from Traditional Herb Use for Treatment of Malaria among Pregnant Women

From the quantitative aspect of this study, about half of the respondents opined that traditional herbs were safe for treating malaria during pregnancy compared to Nergard, et al., who reported that almost 90% of respondents believed that traditional herbs had no adverse effects on pregnant women [18]. It is worrisome that most of the herbal preparation made for the

treatment of malaria has yet to establish clear evidence of safety and efficacy [20]. A WHO report showed that in Africa, 30 million pregnant women living in malaria-endemic areas become pregnant each year, and 10% of those who used traditional herbs have experienced adverse health challenges due to herbal preparation use [21]. This study's finding is close to the WHO report, with about 6% of the respondents having adverse outcomes while taking herbs during pregnancy [21]. However, only half of these affected women believed that herbal use during pregnancy was the cause of the adverse health challenge. This notion may be due to ignorance about the harmful effect of traditional herbs and the placebo effect derived from them.

Interestingly, the traditional medicine practitioner denied any adverse outcomes experienced by patients throughout their practice. However, the observation study refuted this claim as there were examples of patients complaining of severe stooling, dizziness and a case of severe bleeding after taking herbal drugs prepared by the traditional medicine provider. This study's qualitative and quantitative aspects indicate some adverse effects of traditional herb use in malaria treatment in pregnancy; there is significant triangulation. This finding is corroborated by the study of Babalola, et al., who investigated the antiplasmodial activity and abortifacient properties of three commonly indigenous plants used for malaria (*Cymbopogon citrates* (lemon grass), *Enanthia Chlorantha* (African yellow wood), and *Morinda Lucinda* (brimstone leaf) can cause induced abortion [22]. There is a need to explore this association further and hopefully discover the active ingredients responsible for these adverse outcomes.

Using traditional herbs with unknown physiochemical properties without safety and efficacy studies may cause congenital abnormalities and unfavourable birth outcomes in pregnant women. This finding is also corroborated by the study of Kamantasi, et al., whose study revealed that the use of traditional herbs in different forms, such as ingestion of herbs, and use of scarification marks, can cause potential implications for interactions and interference with routine antenatal drugs causing health challenges like pregnancy loss [23]. Chidinma, et al. also stated that using traditional herbs during pregnancy could cause difficulty breathing in newborns, resulting in a fatality [13]; this could also corroborate the death of babies expressed by some respondents.

Relationship between the Use of Traditional Herbs for Malaria Treatment and Adverse Outcomes among Pregnant Women

This study's qualitative and quantitative aspects revealed an association between the use of traditional herbs in malaria treatment and adverse pregnancy outcomes. This was evidenced by the number of

pregnant women who testified to having experienced an adverse outcome personally or seen someone who experienced an adverse outcome following the use of traditional herbal medicine for malaria treatment in pregnancy. This finding was corroborated during the observational studies where abnormal bleeding was observed following ingesting traditional herbs at the traditional herbal home. The number of fetal losses was also significant. There was triangulation because the qualitative and quantitative parts have similar findings; the quantitative aspect of this study revealed a significant association between the use of traditional herbal medicine for malaria treatment and adverse outcomes in pregnancy. The findings from this study are similar to previous studies, which reported the prevalence of abortion following the use of traditional herbs ranging from 4.2% to 20% [24]. Babalola, et al. also observed that low birth weight and stillbirth were slightly higher among those that use herbs to manage malaria in pregnancy [25].

Conclusion

This study assessed the prevalence and pattern of the use of traditional herbs and adverse health outcomes associated with the utilisation of traditional herbs for treating malaria amongst pregnant women. The prevalence of traditional herbs is 40.8%, and the forms in which these herbs are used include bathing, drinking, and juicing. Most of these women use traditional herbs weekly and utilise them, even without experiencing malaria-like symptoms. A significant relationship exists between using traditional herbs during pregnancy and experiencing an adverse health outcome.

Recommendations

Health promotion and education campaigns are recommended to enlighten women on the effect of various traditional herbs on pregnancy outcomes. There should be active monitoring of herbal drugs/mixture production by regulatory agencies; also, the indiscriminate sale of traditional herbal drugs in public places by unlicensed traditional medicine providers should be banned. There should be a significant improvement in health care services in affected Local Government Areas to encourage pregnant women further to adopt conventional care. These can be done by reducing the waiting hour in the antenatal clinics, employing more health workers, and improving health workers' attitudes towards pregnant women.

Limitation of Study

This study did not assess the factors that influence pregnant women's use of traditional herbs. This study also did not assess the herbs used by pregnant women in the qualitative aspect of the research.

Authors' Contribution

This work was done in collaboration with all the

authors. All authors fully read and approved the final manuscript.

Funding

There is no funding to declare.

Disclosure

The authors have no conflicts of interest to declare in this research.

References

1. WHO (2020) Global trends in the burden of malaria. Vol. 1 World Malaria Report 18-34.
2. Girma BG, Haileab FW, Adhanom B (2020) Prevalence and associated factors of malaria among pregnant women in Sherkole district, Benishangul Gumuz regional state, West Ethiopia. *BMC Infect Dis* 20: 573.
3. World Health Organization web site, authors (2009) Global Malaria Programme: Pregnant women and infants.
4. Omang J, Ndep AO, Offiong D, Otu F, Onyejose K (2020) Malaria in pregnancy in Nigeria: A literature review. *Int Healthcare Research J* 3: 346-348.
5. WHO Report (2008) Fact Sheet- Medic Center- Traditional Medicine.
6. Ernst E (2002) Herbal medicines are put into context. *Br Med J Pub Group* 327: 881-882.
7. Henry A, Crowther C (2000) Patterns of medication use during and prior to pregnancy: The MAP study. *Aust N Z J Obstet Gynaecol* 40: 165-172.
8. Fakeye TO, Adisa R, Musa IE (2009) Attitude and use of herbal medicines among pregnant women in Nigeria. *BMC Complement Altern Med* 9: 53.
9. Gardiner P, Graham R, Legedza AT, Ahn AC, Eisenberg DM, et al. (2007) Factors associated with herbal therapy use by adults in the United States. *Altern Ther Health Med* 13: 22-29.
10. Hoff W (1997) Traditional practitioners as Primary Health Care Workers. *Trop Doct* 1: 52-55.
11. Ajuzie GC, Waxon NO, Onwuka OM (2022) Herbal Medicine Usage in Malaria Treatment during Pregnancy: Practical Matters and Danger Perception among Pregnant Women in Ahoada Town of Nigeria. *J Dis Global Health* 15: 14-20.
12. Mothupi MC (2014) Use of herbal medicine during pregnancy among women with access to public healthcare in Nairobi, Kenya: A cross-sectional survey. *BMC Complement Altern Med* 14: 432.
13. Chidinma EI, Duru AC, Ingwu JA, Arinze JC, Chikeme PA, et al. (2019) Use of traditional Medicines in Treatment of Malaria among Pregnant Women in two Urban slums in Enugu State, Nigeria. *J Public Health Dis* 2: 24-31.
14. Babalola AS, Idowu OA, Ademolu KO (2021) Utilisation of herbs with abortifacient potentials to prevent Malaria in pregnant women in Southwestern Nigeria: A random survey. *Ethnobotany Research & Applications* 21: 46.
15. Ibanda HA, Ntuyo P, Mubiru F, Namusoke F (2021) Prevalence and factors associated with use of herbal medicine among pregnant women in an urban tertiary hospital in Uganda: Cross-sectional survey. *Int J Herb Med* 9: 33-37.
16. Ukaga CN, Nwoke BE, Onyeka PI, Anosike JC, Udujih OS,

- et al. (2006) The use of herbs in malaria treatment in parts of Imo State, Nigeria. *Tanzania Health Res Bull* 8: 183-185.
17. Oladeji OS, Oluyori AP, Bankole DT, Afolabi TY (2020) Natural products as sources of antimalarial drugs: Ethnobotanical and ethnopharmacological studies. *Scientifica (Cairo)* 2020: 7076139.
18. Nergard CS, Ho TPT, Diallo D, Ballo N, Paulsen BS, et al. (2015) Attitudes and use of medicinal plant during pregnancy among women at health care centres in three regions of Mali, West Africa. *J Ethnobiol Ethnomed* 11: 73.
19. Omagha R, Idowu ET, Alimba CG, Otubanjo AO, Adeneye AZ (2021) Survey of ethnobotanical cocktails commonly used in the treatment of malaria in southwestern Nigeria. *Future J Pharmaceut Sci* 7: 152.
20. James PB, Bah AJ, Tommy MS, Wardle J, Steel A (2018) Herbal Medicines use during Pregnancy in Sierra Leone: An exploratory Cross-Sectional Study. *Women Birth* 31: e302-e309.
21. World Health Organization (2007) Guidelines for Assessing Quality of Herbal Medicines with References to Contaminants and Residues.
22. Babalola SA, Idowu OA, Ademolu KO, Olukunle J, Rahman SA (2020) Anti plasmodial activities and abortifacient properties of three commonly used African indigenous anti-malarial plants in *Plasmodium berghei* infected pregnant mice: Implication for maternal and fetal health. *Bulletin of the National Research Centre* 44: 153.
23. Kamatenesi-Mugisha M, Oryem-Origa H (2007) Medical Plants used to induce Labour during Childbirth in Western Uganda. *J Ethnopharmacol* 109: 1-9.
24. Adeniran A, Goodman OO, Olatona FA, Oluwole EO (2016) Malaria prevention in pregnancy among traditional birth attendants in rural Lagos, Nigeria. *J Community Med Primary Health Care* 28: 8-16.
25. Babalola AS, Idowu OA, Sam-Wobo SO, Fabusoro E (2017) Antenatal care attendance, intermittent preventive treatment and occurrence of malaria parasite infection at parturition in Abeokuta, Nigeria. *Int J Trop Dis Health* 21: 1-10.