Prevalence and Determinants of Herbal Medicine Use among Adults Attending the National Health Insurance Clinic of Abubakar Tafawa Balewa University Teaching Hospital, Bauchi, Nigeria

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Abstract

Background: The use of complementary and alternative medicine (CAM) is growing worldwide, with herbal medicine often the most common CAM, especially in Sub-Saharan Africa. For optimal patient care, the clinician should know what other medications patients use and why. While many studies have been done on herbal medicine use in the general population, studies on this topic among insured patients in Nigeria are scanty, at best. Thus, there is a need for more researches in this area. **Aim:** This study aimed to assess the use of herbal medicine among patients enrolled in the National Health Insurance Scheme (NHIS). **Patients, Materials and Methods:** The participants were adult patients (at least 18 years old), of both genders, attending the NHIS Clinic of Abubakar Tafawa Balewa University Teaching Hospital, Bauchi. This was an analytical, cross-sectional study. Participants were selected by systematic random sampling. Very sick patients and those who refused to grant consent to the study were exempted. Only seven declined, giving a response rate of 98.1% (364/371). An interviewer-administered questionnaire was used to collect information on participants' biodata and the use of herbal medicine. The study was done from October 1, 2020 to December 23, 2020 over 12 weeks. **Results:** The lifetime prevalence of herbal medicine use was 76.65%. The most common herbs used were moringa (47.31%), garlic (46.95%), ginger (38.71%), lemon (36.20%), and black seed (33.69%). Most of the participants (67.4%) used herbs for treatment, and the main reason for use was their effectiveness (61.3%). Over a third of participants combined herbs and orthodox medicine, and 82.44% never told their doctors they used herbs. Marital status of the study participants was the only variable associated with herbal medicine use ($P = 0.022$ at 95% confidence level). **Conclusion:** Patients in the NHIS use herbal medicine, though the point prevalence is relatively lower than in uninsured patients. Hence, doctors should be careful to enquire about the herbs these patients use and counsel them appropriately.

Keywords: Cross-sectional studies, herbal medicine, National Health Insurance, Nigeria

INTRODUCTION

Complementary and alternative medicine (CAM) is becoming more popular worldwide.[1-3] Patients, and even countries, reach out to CAM to fulfill health needs not satisfied by orthodox medicine.[4]

Some patients believe that CAM augments orthodox medicine and that it is more cost-effective and natural, compared to orthodox medicine, with fewer side effects.[5] Many patients use CAM for "spiritual" care.[6] Consequently, CAM remains an indispensable option for many people globally.[3,7,8]

Herbal medicine is an important aspect of CAM. Herbs are "crude materials which could be derived from lichen, algae, fungi, or higher plants, such as leaves, flowers, fruit,

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fruiting bodies, seeds, stems, wood, bark, roots, rhizomes, or other parts, and may be entire, fragmented, or powdered."[9] The study of herbs is particularly important because of the possibility of innate toxicity of herbs, the potential for adverse drug–herb interaction, and the possibility of discovering new drugs from herbs.[10]

Most studies done in Nigeria on herbal medicine use have been among the general population, who pay out-of-pocket for health services.[11-13] In a developing economy, the cost of orthodox medicine may account for the popularity of herbal medicine use often noted. In Nigeria, the National Health Insurance Scheme (NHIS) is the chief regulator and the largest institution responsible for health insurance.[14] Hence, this study aimed to examine the use of herbs among enrollees in the scheme.

Studying the pattern of herbal medicine use among patients benefiting from health insurance will give a more complete view of the issues associated with herbal medicine use and CAM in general and help determine the effects of affordable health care on the use of herbs, especially as the country moves toward universal health coverage.

Patients, Materials and Methods

This was a questionnaire-based cross-sectional study carried out in the NHIS Clinic of a tertiary hospital in Northern Nigeria. The clinic is run by two consultant family physicians, two senior registrars, and three medical officers and has about 19,000 enrollees. The data collection took place from October 1, 2020, to December 23, 2020.

Participants and recruitment

The minimum sample size was determined using the Cochran's formula, $n = Z^2pq/d^2$, where n = minimum sample size, Z = confidence level at 95% (1.96), p = 0.67, being the prevalence of herbal medicine use from a previous study in Nigeria (Oreagba *et al.*), q = (1 − p), and d = level of precision (0.05).[11] The inclusion criteria were adults (at least 18 years old) who were in the clinic to consult the doctor. Very sick patients and those who refused to grant consent to the study were exempted. Prospective participants were selected through systematic random sampling, and their consent was sought and obtained. The sampling frame was 4500 (about 1500 patients attended the NHIS clinic every month for three months), giving a sampling interval of 4500/341 (sampling frame/minimum sample size) = 13.2. The first participant was decided by balloting among the first ten patients on the daily clinic list. Subsequently, every 14th patient was recruited. Only seven declined, giving a response rate of 98.1% (364/371). The questionnaire was administered while they were waiting to see the clinician.

Questionnaire

A 29-item questionnaire was administered by a trained research assistant. The first section contained questions about the biodata and family income, the second section asked about preexisting comorbidities, and the third section contained questions about use of herbal medicine and related issues. Participants were asked to choose from a list of 28 most common medical herbs in the community (identified by their local names), and, if they took herbs of unknown content, to indicate so. Participants were also asked about their reason for using herbs, their experience of side effects with herbs, whether they co-used herbs, whether they discussed their use of herbs with their doctors, and how likely they were to use herbs in the future.

Data analysis

Data analysis was done using Epi Info developed by the Centers for Disease Control and Prevention (CDC), in Atlanta, Georgia, and USA. Variables were presented as frequencies and percentages. The relationship between herbal medicine use and other variables was determined using Chi-square, at $P < 0.05$ significant level.

Results

A total of 364 participants participated in the study. The study participants were mostly below 40 years (about 60%), female (61.8%), Muslims (77.2%), and of the Hausa/Fulani tribe (56.3%). Most of the respondents were married (88.2%) and lived within Bauchi metropolis (92.9%). The main occupation was the public service (56.9%) and majority of the participants had tertiary education (63.2%) [Table 1]. One hundred and forty-three (39.3%) respondents had chronic illness, among whom 64.3% (92/143) had hypertension and 15.4% (22/143) had diabetes.

The lifetime prevalence of herbal medicine use was 76.65% [Table 2].

Majority (75.63%) of herbal medicine users reported using it "occasionally" (211/279), while 15.05% (42/279) used it "weekly/daily," and the remaining 26 (9.32%) used it "monthly."

The main reason for using herbs was that they were effective (61.29%) or natural (55.20%), though about a third and a quarter of the respondents also used herbs for cultural and religious reasons, respectively [Table 3].

Meanwhile, 23.35% (85/364) of respondents had never used herbs. The main reason for nonuse was safety concern (28.24%) [Table 4].

Of all the sociodemographic factors studied, only marital status had a statistically significant association with herbal medicine use ($P = 0.02$) [Table 5].

Herbs were used for treatment by 67.38% (188/279), for maintenance of general well-being by 17.20% (48/279), and for disease prevention by 15.41% (43/279).

The most commonly used herbs were moringa (47.31%), garlic (46.95%), ginger (38.71%), lemon (36.20%), and black seed (33.69%). However, about a third of those who used herbs did not know the constituents of the herbal mixture [Table 6].

Sixty-two percent (173) of respondents who used herbs classified the herbs used as "traditional," while the remaining 38% (106) used "Islamic" medicine.

Table 1: Sociodemographic characteristics of study participants (*n*=364)

Variables	Frequency, *n* (%)
Age	
18-39	216 (59.34)
40-59	140 (38.46)
≥60	8 (2.20)
Sex	
Female	225 (61.81)
Male	139 (38.19)
Ethnic group	
Hausa/Fulani	205 (56.32)
Igbo/Yoruba	15 (4.12)
Others	144 (39.56)
Religion	
Christianity	83 (22.80)
Islam	281 (77.20)
Marital status	
Married	321 (88.19)
Single	37 (10.16)
Widowed	6 (1.65)
Education	
No formal education	19 (5.22)
Primary	16 (4.40)
Secondary	99 (27.20)
Tertiary	230 (63.19)
Occupation	
Artisan/trader	46 (12.64)
Housewife	66 (18.13)
Public servant	207 (56.87)
Student	41 (11.26)
Unemployed	4 (1.10)

Table 2: Prevalence of herbal medicine use (*n*=364)

Prevalence	Frequency, *n* (%)*
Lifetime prevalence	279 (76.65)
Point prevalence (current users)	79 (21.70)
12-months prevalence	95 (26.10)
Prevalence of inactive use (above 12 months)	105 (28.85)

*Percentages may not add up to 100%

Two hundred and thirty (82.44%) of those who used herbs never discussed this with their doctors. The main reasons given were that the doctors did not ask (58.26%) or the respondents did not think it was important to let the doctors know (25.22%). Although 58.78% (164/279) of the participants were aware that combining herbal medicine with orthodox medicine could cause harm, 34.05% (95) admitted to have combined both classes of medications at some time. Thirty-nine (13.98% of 279) of those who used herbs reported side effects, with gastrointestinal symptoms constituting about 80% (52/67) of these side effects [Table 7].

Comparing the effectiveness of herbal medicine and orthodox medicine, about two-thirds (188/279) believed that orthodox

Table 3: Reason for herbal medicine use (*n*=279)

Reason	Frequency, *n* (%)*
Effective	171 (61.29)
Natural	154 (55.20)
Cultural recommendation	93 (33.33)
Easily available	87 (31.18)
Religious recommendation	69 (24.73)
Cheap	63 (22.58)
Safe	58 (20.79)
Better than nothing	37 (13.26)

*Percentage may not add up to 100% as respondents may have more than one reason to use herbal medicine

Table 4: Reason for not using herbal medicine (*n*=85)

Reason	Frequency, *n* (%)
Not safe	24 (28.24)
Never considered	17 (20.00)
Prefer orthodox	9 (10.59)
Not effective	5 (5.88)
Others	10 (11.76)
No reason	20 (23.53)

medicine was more effective, about one-eighth (36/279) held that herbal medicine was more effective, and almost a fifth (55/279) were undecided. Regarding the probability of using herbs in the future, about half (141/279) stated that they were "very likely," 37.28% (104/279) were "somewhat likely," while only 12.19% (34/279) were "unlikely" to use herbs in the future. Finally, 55.60% (154/279) of herbal users would like herbal medicine incorporated into the hospital system, 19.49% (54/279) wanted herbs to be kept out of the hospital, and 24.91% (69/297) were not sure.

DISCUSSION

Most respondents were below 40 years, had tertiary education, and were public servants [Table 1]. This is because the Nigerian NHIS predominantly enrolls people in active public service, a good number of whom have tertiary education. Most respondents were Hausa/Fulani by tribe, mainly Muslims, and mostly married [Table 1], since Bauchi, the study setting, is a Hausa/Fulani city, and, therefore, predominantly Muslim. The "Others" tribe comprised mainly people from over 55 tribes indigenous to Bauchi town and its surrounding communities. The majority of respondents, being public servants, live in Bauchi, the capital city, where they work. There were more women in the study than men because, apart from attending the NHIS clinic for their own personal complaints, more often than men, women also accompany children to the clinic. More than a third of the respondents had a chronic illness, with hypertension and diabetes being the most prevalent in this group (64.34% and 15.38%, respectively). Arising from the foregone, in this population, as in other parts of the world, hypertension and diabetes are major causes of chronic morbidity, which should be tackled effectively.[15]

Table 5: Relationship between variables and use of herbal medicine (*n*=364)

Variable	Ever used herbal medicine		χ^2	P
	Yes (%)	No (%)		
Age (years)				
<40	163 (75.5)	53 (24.5)	0.417	0.518
≥40	116 (78.4)	32 (21.6)		
Sex				
Female	172 (76.4)	53 (23.6)	0.014	0.907
Male	107 (77.0)	32 (23.0)		
Ethnic group				
Hausa/Fulani	156 (76.1)	49 (23.9)	0.080	0.778
Non-Hausa/Fulani	123 (77.4)	36 (22.6)		
Religion				
Christianity	62 (74.7)	21 (25.3)	0.228	0.633
Islam	217 (77.2)	64 (22.8)		
Marital status				
Currently married	252 (78.5)	69 (21.5)	5.232	0.022
Currently not married	27 (62.8)	16 (37.2)		
Address				
Outside Bauchi	21 (80.8)	5 (19.2)	0.266	0.606
Within Bauchi	258 (76.3)	80 (23.7)		
Education				
Tertiary level	171 (74.3)	59 (25.7)	1.847	0.174
Below tertiary level	108 (80.6)	26 (19.4)		
Occupation				
Public servants	159 (76.8)	48 (23.2)	0.007	0.933
Others	120 (76.4)	37 (23.6)		
Chronic illness				
Yes	110 (76.9)	33 (23.1)	0.010	0.921
No	169 (76.5)	52 (23.5)		
Monthly income (N)				
<30,000	32 (78.0)	9 (22.0)	1.679	0.795
30,000-100,000	100 (73.5)	36 (26.5)		
>100,000	41 (75.9)	13 (24.1)		
Prefer not to say	42 (77.8)	12 (22.2)		
Unknown	64 (81.0)	15 (19.0)		

Table 6: Commonly used herbs and the frequency of use (*n*=279) (see appendix for the complete table)

Herb	Frequency, *n* (%)*
Zogale (*Moringa*)	132 (47.31)
Tafarnuwa (Garlic)	131 (46.95)
Citta (Ginger)	108 (38.71)
Lemuntsami (Lemon)	101 (36.20)
Habatusawda (Black seed)	94 (33.69)
Unknown herb	88 (31.54)
Zaytun (Olive oil)	84 (30.11)
Kankana (Water melon)	80 (28.67)
Kananfari (Cloves)	79 (28.32)
Mankadai (Sheabutter oil)	77 (27.60)
Namijingoro (Bitter cola)	69 (24.73)
Rake (Sugarcane)	68 (24.37)
Gayenzobo (Roselle)	68 (24.37)
Hulba (Fenugreek)	66 (23.66)
Kwakwa (Coconut)	65 (23.30)
Aya (Tiger nuts)	64 (22.94)
Na-na (Mint leaves)	62 (22.22)
Guaba (Guava)	60 (21.51)
Ararabi (*Boswellia dalzielli*)	55 (19.71)
Isauri (Lemon grass)	51 (18.28)
GarinKuka (Baobab powder)	51 (18.28)
Dogon yaro (Neem)	50 (17.92)

*Percentage may not add up to 100% as respondents may have more than one reason to use herbal medicine

Marital status was associated with herbal medicine use, which corroborates a study in a primary health-care clinic in Uyo, Nigeria.[20] However, other studies reported different predictors of herbal medicine use. In a community-based study in Lagos, Nigeria, respondents' occupation was associated with herbal medicine use, and in Ghana, number of years at work, not marital status, predicted use of herbs among the insured.[11,17] Consequently, the study setting largely predicts herbal medicine use.

In this study, most respondents used herbs because it was effective (61.29%) and for treatment. Effectiveness was the main reason observed in a study among rural farmers in Ekiti, South-West Nigeria (39.6%), who used herbs majorly for musculoskeletal pain.[21] This is similar to findings in other studies in Nigeria and Europe.[7,11] Conversely, in Uyo, Nigeria, herbs were commonly used for health maintenance and prevention.[20] The main reason given by nonusers of herbal medicine in this study was that herbs were not safe (28.24%), which was the major reason cited by respondents who did not use herbs in Ekiti, Nigeria.[21] Importantly, safety concerns, and not inefficacy, are major reasons for abstaining from herbal medicine in Nigeria [Table 4].

The herbs used included locally grown plants such as moringa, as well as exotic herbs like black seed (*Nigella sativa*). While moringa, lemon and many other herbs used in the study are from the local environment, and are therefore regarded as traditional medicine, black seed and olive oil are common

Although the lifetime prevalence of herbal medicine use in this study was high (76.65%), the point prevalence and the 12-month prevalence were relatively low (21.7% and 26.1%, respectively). This is corroborated by the fact that most respondents who used herbs perceived their use as "occasional" (75.63%). Although this prevalence is higher than that reported in Cambodia (12%) among patients attending primary health-care centers, it is lower than what has been reported in many other studies.[16] For example, a study in Ghana found a 12-month prevalence of 85.3% among insured patients.[17] Furthermore, a study among farmers in Southwest Nigeria found a point prevalence and a 12-month prevalence of herbal use of 37.5% and 83.8% among uninsured farmers, and in a general practice in Norway, the point prevalence was 44%.[18,19] The relatively low prevalence in this study might be because the NHIS provides affordable and accessible care to these respondents, therefore reducing their need to resort to herbal medicine.

Side effect	Frequency, *n* (%) (*n*=279)	Most implicated herbs/percentage of users of that herb with the side effect	Least implicated herbs/percentage of users of that herb with the side effect
Diarrhea	22 (7.89)	Mankadai (Sheabutter oil)/10.39	Gayenzobo (Roselle)/5.88
Vomiting	13 (4.66)	Guaba (Guava)/10.00	Unknown herb/3.41
Nausea	11 (3.94)	Isauri (Lemon grass)/7.84	Unknown herb/1.14
Dizziness	7 (2.51)	GarinKuka (Baobab powder)/7.84	Unknown herb/1.14
Abdominal pain	6 (2.15)	Kwakwa (Coconut)/6.15	Ararabi (*Boswellia dalzielli*)/0.00
Headache	5 (1.79)	Namijingoro (Bitter cola)/4.35	Gayenzobo (Roselle)/1.47
Skin rash	3 (1.08)	Dogon yaro (Neem)/4.00	Mankadai (Sheabutter oil)/0.00

Table 7: Frequency of reported side effects (overall and herb-specific) associated with the use of herbal medicine

among Muslim communities because the Islamic literature authenticates their health benefits.[22,23] These therefore are examples of Islamic medicine. The topic of Islamic medicine, noted in this study, is common among the Muslim North of Nigeria, and has seldom been discussed in the Nigerian medical literature. We hope that this study will encourage research in this aspect of CAM.

As high as a third of the respondents used herbs whose contents were not known. This poses great danger to patients and makes it difficult for the doctor to advise such patients about the use of such herbs, given the potential toxicity of some herbal products, and the possible drug–herb interactions that could dangerously amplify or reduce the potency of coadministered conventional medicines.[24] The danger is emphasized by the fact that more than a third (34.05%) of the respondents co-used herbal medicine and orthodox medicine, which is similar to the prevalence reported by Osemene *et al.* (31%) in a national study, and Okoronkwo *et al.* (40%) for co-use of CAM in Enugu, Nigeria, though remarkably lower than that reported in Jamaica (70.8%), among patients with health insurance.[25-27]

Of note, the incidence of reported side effects was relatively low among herbal medicine users (14%), despite the high number of herbs used and the significant rate of co-use of herbal medicine and orthodox medicine (34.05%). This is lower than the rate reported from studies in Lagos (20.8%) and Korea (52.2%), both of which also found a predominance of gastrointestinal symptoms among herbal users.[11,21,28] On the other hand, AbdulRahman and Aziz in Malaysia found that skin complications were the most common side effects.[29] The low incidence of side effects found in this study could be due to the edible and, hence, presumably safe nature of most of the herbs used. The most common side effects were gastrointestinal, likely because most herbs are administered orally.[30-32] Herbs of unknown origin had the least frequencies for a number of side effects [Table 7] probably because these herbs were prescribed by sources more knowledgeable than the users, for example, herbal practitioners, or procured from herbal shops, with assumedly better awareness of herbal medicine safety. Importantly, Mankadai (Sheabutter oil) was not associated with skin rash, which explains its popular traditional use both for skin diseases and for cosmetics.

Like in many other studies in Sub-Saharan Africa, most of the respondents who used herbs never discussed it with their doctors (82.44%).[3] This agrees with the finding among patients who used herbal medicine in a primary care practice in Malaysia, where 90.6% of the patients never disclosed to the doctors.[33] As in this study, one main reason was that the doctors never asked.[19] The other reason was that many respondents felt it was not important, in spite of the fact that most of the respondents were aware of the harm inherent in co-use of orthodox medicine (58.78%). This portrays a gap between patients' knowledge and health practices and is a cause for concern.

Most respondents used herbal medicine despite believing that orthodox medicine was more effective. This could be because patients sometimes use herbal medicine to augment the potency of orthodox medicine or switch to herbal medicine when orthodox medicine fails to yield a satisfactory response, and *vice versa*.[5] Sometimes, patients have resorted to CAM because they believe that the CAM practitioners are more skilled in managing a particular disorder than orthodox medical practitioners.[34]

Most respondents who used herbs said they would "very likely" (50.54%) or "somewhat likely" (37.28%) use herbs in future. This is similar to a study in Ghana, in which 58.1% who combined herbs and orthodox medicine were willing to continue the practice and an additional 25.8% were undecided about stopping the practice.[5] This supports the argument that herbal medicine has come to stay, and that doctors must increase their knowledge of herbal medicine, through active learning and research. This will help them improve the management of their patients, most of whom use herbs, and will continue to use them in the foreseeable future, as corroborated by the fact that herbal medicine users (55.60%) would rather have it dispensed in the hospitals, under the auspices of orthodox medical practitioners, who have often discredited it.[35] The desire to have herbs and other CAM incorporated into the orthodox health systems has been similarly expressed by patients in other studies.[17,36]

Although Nigeria has a traditional medicine policy, in line with the WHO mandate for member states, herbal medicine is yet to be integrated into the orthodox medical practice and is still not accepted by a significant number of orthodox medical practitioners.[35,37] The integration of traditional medical system into the orthodox health system is crucial to the provision of the

universal health coverage and provides culturally acceptable primary health care.[38] It stands to reason, therefore, that it should receive due attention from all stakeholders.

Strength

To the best of the knowledge of the authors, this is the first study in Nigeria to examine the use of herbs among patients enrolled in managed care, particularly the NHIS. It, therefore, provides vital data on the health practices of this patient population.

Limitation

In a study like this, there is a risk of recall bias. Some participants who said that they had never used herbs may have used them while they were too young to remember, as herbs are a part of the cultural first aid for ailments in many African homes. However, this group of patients were not active users and were few and, therefore, would not likely impact significantly on the outcome of the study. On the other hand, the division of the time frame of herbal medicine use into current users, those who used within 1 year of the study, and those who last used over a year ago is likely to aid recall and, hence, be more accurate because of the distinct intervals.

Second, this study may not be generalizable to other countries, or even other regions in Nigeria. However, it is very likely to reflect the herbal use among patients in Northern Nigeria, where the study was situated, because of the homogeneity of the culture, religion, and flora of the people here.

CONCLUSION

Although the point prevalence of herbal medicine use in this population is lower than that in many other studies, it is still significant, especially with the high rate of co-use of herbal medicine and orthodox medicine, which amplifies the risk of herb–drug toxicity, more so that about a third of the participants could not identify the herbs they consumed. Doctors attending to these patients should ask them about their pattern of herbal use and encourage them to identify the herbs they consume.

More research needs to be carried out about the types of herbal medicine used by patients in different clinical settings, the toxicity, potency, as well as about the determinants of herbal medicine use. This will assist health-care workers in providing relevant guidance to patients and increasing the quality of health care.

Finally, the findings in this study suggest that even with affordable/free orthodox medicine, patients will continue to use herbs and other forms of CAM. Advisedly, efforts at unraveling the issues of CAM use among patients should proceed in tandem with the national efforts toward achieving universal health coverage.

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Conflicts of interest

There are no conflicts of interest.

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