West African Journal of Pharmacy (2026) 37 (1) 149 - 160

Concurrent use of herbal and prescribed medicines and the associated factors among the elderly with chronic diseases in Ogun State, Nigeria

Sule A. Saka and Eniola T. Oguntoyinbo

Department of Clinical Pharmacy & Bio-Pharmacy, Olabisi Onabanjo University, PMB 2022, Sagamu, Nigeria.

Corresponding author: Sule Ajibola Saka
Email: sulsak03@gmail.com; ajibola.saka@oouagoiwoye.edu.ng
Telephone: +234 805 544 8123

ABSTRACT

Background: Herbal medicine is a vital healthcare resource in many resource-limited countries, including Nigeria. Evidence suggests that elderly patients on prescribed orthodox medications may also be using herbal medicines. However, the extent of concurrent use of herbal and prescribed medicines among elderly patients in Nigeria is unknown.

Objective: This study explored the prevalence of concurrent use of herbal and prescribed medicines among elderly patients with chronic diseases in Ogun State, Nigeria.

Methods: This research was a cross-sectional survey using a 16-item validated questionnaire among purposively sampled ambulatory elderly patients aged ≥ 60 years, who had been on at least one chronic medication in 6 months preceding the study. The study was conducted at two secondary healthcare facilities in Ogun State, Southwest Nigeria. The structured questionnaire explored the participants' socio-demographic, use and experience with herbal medicines, reasons for concurrent use of herbal and prescribed medicines, and non-disclosure of concurrent use to physicians.

Results: Of the 361 participants, more than three-quarters of the participants were aged 60-69 years (271; 75.1%), 246 (68.1%) had used herbs with prescribed medications concurrently and 330 (91.4%) did not experience bad effects after the use. The majority of the participants (279;77.3%) did not inform the doctor about the concurrent use of herbal and prescribed medicines.

Conclusion: Concurrent use of herbal and prescribed medicines is rife among elderly patients with chronic diseases. However, the adverse effect from such use is not pronounced. The level of participants' disclosure of concurrent herbal and prescribed medicines use to doctors is low.

Keywords: Herbal medicine, Prescribed medicine, Elderly, Disclosure, Nigeria

Utilisation concomitante de médicaments à base de plantes et de médicaments sur ordonnance et facteurs associés chez les personnes âgées atteintes de maladies chroniques dans l'État d'Ogun, au Nigéria

Sule A. Saka et Eniola T. Oguntoyinbo

Département de pharmacie clinique et de biopharmacie, Université Olabisi Onabanjo, PMB 2022, Sagamu, Nigéria.

Auteur correspondant: Sule Ajibola Saka
Courriel: sulsak03@gmail.com ; ajibola.saka@oouagoiwoye.edu.ng
Téléphone: +2348055448123

RÉSUMÉ

Contexte: La phytothérapie constitue une ressource essentielle de soins de santé dans de nombreux pays à ressources limitées, y compris le Nigeria. Il semblerait que les patients âgés sous traitement médicamenteux conventionnel aient également recours à la phytothérapie. Toutefois, l'ampleur de l'utilisation concomitante de médicaments à base de plantes et de médicaments prescrits chez les personnes âgées au Nigeria reste peu connue.

Objectif: Cette étude a exploré la prévalence de l'utilisation concomitante de médicaments à base de plantes et de médicaments prescrits chez les patients âgés atteints de maladies chroniques dans l'État d'Ogun, au Nigéria.

Méthodes: Cette étude transversale a utilisé un questionnaire validé de 16 items auprès d'un échantillon ciblé de patients ambulatoires âgés de 60 ans et plus, ayant suivi au moins un traitement médicamenteux chronique au cours des six mois précédant l'étude. L'étude a été menée dans deux établissements de soins de santé secondaires de l'État d'Ogun, dans le sud-ouest du Nigéria. Le questionnaire structuré portait sur les caractéristiques sociodémographiques des participants, leur consommation et leur expérience des plantes médicinales, les raisons de l'utilisation concomitante de plantes médicinales et de médicaments prescrits, ainsi que la non-divulgation de cette utilisation concomitante à leur médecin.

Résultats: Parmi les 361 participants, plus des trois quarts étaient âgés de 60 à 69 ans (271 ; 75.1 %). Au total, 246 participants (68.1 %) ont déclaré utiliser des plantes médicinales en association avec des médicaments prescrits, et 330 (91.4 %) n'ont signalé aucun effet indésirable après usage. La majorité des participants (279; 77.3 %) n'ont pas informé leur médecin de cette utilisation concomitante.

Conclusion: L'utilisation concomitante de plantes médicinales et de médicaments sur ordonnance est fréquente chez les patients âgés atteints de maladies chroniques. Cependant, les effets indésirables liés à cette utilisation restent peu marqués. Le taux de divulgation de cette utilisation concomitante de plantes médicinales et de médicaments sur ordonnance à leur médecin est faible.

Mots-clés: Phytothérapie, médicaments sur ordonnance, personnes âgées, divulgation, Nigéria

INTRODUCTION

Herbal medicine (HM) is an essential healthcare resource for many people in the world especially in countries where orthodox healthcare services are inadequate for the population.[1] In sub-Saharan Africa, including Nigeria, HM enjoys cultural acceptance and is widely used for prevention and management of chronic diseases especially among the aging populations.[2-4] The elderly, because of their co-morbidities, are often on chronic orthodox medications and evidence suggests that many elderly use HM and prescribed medicines (PM) concurrently.[3-5] This practice can lead to adverse effects due to interactions between HMs and PM.[6] The concurrent usage of HM with PM among the elderly with chronic diseases has been associated with poor adherence to PM, leading to treatment failure and death.[7] The extent to which elderly patients use HMs is rarely appreciated by healthcare professionals, and medical record documentation of HM use among patients is often lacking, thus less emphasis is placed on it during medication review.[8]

Patients, including the elderly that use HM often perceive it to be more cost-effective, safer, with fewer adverse effects than orthodox medicines.[4,5] However, a study in the United States showed that adverse effects of HM are responsible for many emergency visits and hospitalization in the country,[9] and elderly patients with multiple comorbidities are responsible for a large percentage of the reported adverse effects.[6] Despite the safety concerns, HM has been integrated into healthcare systems in a few countries in sub-Saharan Africa.[10]

In many countries, including Nigeria, the use of HM is poorly regulated and it is often promoted as a cure for many chronic diseases.[11] The use of HM among different populations in Nigeria has been widely explored.[12-14] However, evidence regarding the prevalence and associated demographics for concurrent use of HM with PM among elderly with chronic diseases in Nigeria is limited. This study explored concurrent use of HM and PM among elderly with chronic diseases in Ogun State, Nigeria.

METHODS

Study design and setting

This study was a cross-sectional survey among ambulatory elderly patients at Sacred Heart Hospital (SHH) and State Hospital Ijaye (SHI) in Ogun State, South-west Nigeria. The two secondary healthcare facilities are located in Abeokuta, the capital of Ogun State. The SHH was established by the Society of African Mission (SMA) of Catholic Church while the Ogun State hospital is a government owned health institution. The facilities have specialized units including Internal medicines, Psychiatry, General Outpatient Department (GOPD), Surgery, ENT and Opthalmology. However, the centres had no geriatric unit at the time of this study. The two centres are accredited for the training of healthcare professionals. The State is populated predominantly by the Yoruba, but many other ethnic nationalities co-exist with them.

Study population

The study was carried out among purposively sampled ambulatory elderly patients aged ≥ 60 years who were on chronic medications. The participants were eligible only if they had ever taken HM and had been on at least one chronic medication in 6 months preceding the study. The participants were further categorized into habitual users if they had taken the HM in the last 2 weeks prior to clinic visit. The participants were recruited at the Medical Outpatient units of the study sites between 2nd July and 19th October 2022. Terminally ill patients, those with cognitive and hearing impairments and eligible participants that were absent during the study period were excluded from the study.

Sample size estimation

The Sample size was calculated using Raosoft sample size calculator®. Based on the available statistics at the hospitals, 267 elderly patients were available at SHH and 296 at SHI. The sample size was estimated using a 5 % margin of error at 95 % confidence interval. Using the above population, a minimum sample size of 158 and 168 was calculated for each centre respectively giving a total of 326. A 10 % of the size was added for attrition resulting in a total sample size of 359.

Questionnaire design

A 16-item structured questionnaire was used to obtain information about participants' demographics,[6] experienced adverse effects of herbal medicines, and reasons for use and non-disclosure of herbal use to physicians.[7] Three questions were asked to determine the habitual users in the last 2 weeks and what they used it for. Categorical questions using "Yes or "No" with various options were used in the questionnaire. The questionnaire was designed after a review of previous studies.[12-15] Questions were modified and additional questions considered relevant to Nigerian healthcare delivery system were included. The questionnaire was

face-validated by two academia who were experts in complementary and alternative medicines and piloted among 32 patients in a nearby general hospital. The internal consistency of the final questionnaire items was tested using Cronbach alpha value which was found to be 0.83. The questionnaire was translated into the Yoruba being the dominant language spoken in the study area.

Data collection

The participants were approached for recruitment at the point of registration for consultation with the physicians. Those that consented were asked to sign or thumb print the consent form. The questionnaire was given to the participants but those who could not write were guided by the research assistant. The research assistant waited and collected the questionnaire back immediately the participants completed it.

Data management analysis

The raw data was first entered into Excel worksheet® and manually cleaned. The co-researcher double-checked the entry for errors. The data was entered into SPSS version 24 (Statistical Packages for the Social Sciences). Descriptive statistical analysis (frequencies and percentages) was initially conducted prior to conducting inferential statistics. A Pearson Chi-Square test was used to determine association between categorical variables. A p-value <0.05 was considered as statistically significant.

Ethical consideration and approval

The study was approved by the Health Research Ethics Committee (HREC), Sacred Heart Hospital, Lantoro (SHH/EC/EA/07/09/21). Permission to conduct the study was granted by the head of the State Hospital Ijaye after verifying the HREC approval from the Sacred Hospital. Permission was obtained from the physicians and nurses on duty at the GOPDs and MOPDs of the study sites before the commencement of the study. Information obtained from the participants was treated with utmost confidentiality.

RESULTS

Of the 400 questionnaires distributed, only 361 (90.3 %) were valid for analysis. The remaining 39 (9.7 %) were either not properly filled or contained missing information essential for the analysis.

Table 1 shows the socio-demographic of the participants. A total of 361 elderly patients participated in the study with female being dominant (218; 60.4 %). More than three-quarters of the participants were aged 60-69 years (271; 75.1 %).

Table 2 shows the participants' perceptions and experience with concurrent HM and PM use. Many of the participants (246; 68.1 %) had used HM with PM, 279 (77.3 %) did not inform the doctor whether they were taking HM. The majority (330; 91.4 %) did not experience bad effects after taking the HM with PM.

Table 3 revealed the prevalence of habitual use of HM among the respondents. Of the 361 participants more than half (191; 52.9 %) had used HM in the last 2 weeks preceding this study (habitual users). Of the 191 habitual users, many (115; 60.2 %) used it for blood sugar reduction.

Table 4 shows the association between participants' socio-demographics and concurrent HM and PM use. None of the participants' socio-demographic was significantly associated with concurrent HM and PM use.

Table 5 presents the association between participants' socio-demographic and reported adverse effects from concurrent HM and PM use. Marital status (p=0.035) and employment status (p=0.009) were significantly associated with reported adverse effect of concurrent HM and PM use among the participants.

Table 1: The Socio-demographic characteristics of the Respondents(n=361)

Characteristics	Frequency	Percentage (%)
Age		
60-69	271	75.1
70-79	89	24.6
>79	1	0.3
Gender		
Male	143	39.6
Female	218	60.4
Marital Status		
Married	306	84.8
Single	55	15.2
Level of Education		
Higher Institution	118	32.7
Secondary	97	26.9
Primary	98	27.1
No Formal Education	48	13.3
Employment Status		
Employed	206	57.1
Retired	53	14.7
Unemployed	102	28.2
Diagnosis		
One chronic disease	217	60.1
2 chronic diseases	109	30.2
Multi-morbidity	35	9.7

Table 2: Participants' perceptions and experience with herbal medicine use (n=361)

Variables	Frequency	Percentage
Have you ever taken herbal medicines with your prescribed medications		
Yes	246	68.1
No	115	31.9
Did you experience any bad effects after taking the herbal medicines		
Yes	31	8.6
No	330	91.4
Headache		
Yes	11	3.0
No	350	97.0
Vomiting		
Yes	12	3.3
No	349	96.7
Fainting		
Yes	12	3.3
No	349	96.7
Dizziness		
Yes	4	1.1
No	357	98.9
Rashes		
Yes	6	1.7
No	355	98.3
Others		
Yes	9	2.5
No	352	97.5
Did you tell your doctor you used herbal medicines or not with your prescribed medicines?		
Yes	82	22.7
No	279	77.3
Why did you not disclose to your doctor?		
Fear of being abused by health workers		
Yes	52	14.4
No	309	85.6
Fear that I will not be treated		
Yes	17	4.7
No	344	95.3
I Forgot		
Yes	36	10.0
No	325	90.0
The doctor did not ask		
Yes	129	35.7
No	231	64.0
Others		
Yes	7	1.9
No	354	98.1
Have you ever received counsel about the effects of using prescribed medicine with herbal remedies?		
Yes	87	24.1
No	274	75.9
Do you think taking herbal medicines along with your doctor's prescribed medicine can harm you?		
Yes	140	38.8
No	221	61.2
Do you agree that using herbal remedies with your doctor's prescription ca n assist you to get better quickly?		
Yes	182	50.4
No	179	49.6

Table 3: The prevalence of habitual use of herbal medicines among the respondents (n=191)

Variables	Frequency	Percentage
Our country has many beneficial herbal remedies for treating various diseases, have you used any herbal medicines in the last 2weeks? (n=361)		
Yes	191	52.9
No	170	47.1
Which of the following did you use the herbal medicine for?		
Blood Cleansing		
Yes	66	34.6
No	125	65.4
High blood pressure		
Yes	62	32.5
No	129	67.5
Blood sugar reduction		
Yes	115	60.2
No	76	39.8
Constipation		
Yes	59	30.9
No	132	69.1
Others (please specify)		
Yes	80	41.9
No	111	58.1
Why did you prefer to use herbal remedies instead of coming to hospital to treat the ailment?		
The ailment is not serious		
Yes	142	74.3
No	49	25.7
Herbal medicine is more effective for the ailment		
Yes	94	49.2
No	97	50.8
Herbal medicines work well with my prescribed medicines		
Yes	76	39.8
No	115	60.2
Cost of doctor’s medicine is high		
Yes	72	37.7
No	119	62.3
Others		
Yes	16	8.4
No	175	91.6

Table 4: Association of participants' socio demographic characteristics with herbal medicine use

Variable	Yes (%)	No (%)	X^2	P-value
Age				
60-69	173 (47.9)	98 (27.1)		
70-79	65 (18.0)	24 (6.6)	4.463	0.068
>79	0(0.00)	1 (0.3)		
Gender				
Male	94 (26.0)	49 (13.6)	0.004	0.950
Female	144 (39.9)	74 (20.5)		
Marital Status				
Married	204 (56.5)	102 (28.3)	0.488	0.485
Single	34 (9.4)	21 (5.8)		
Level of Education				
Higher Institution	76 (21.1)	42(11.6)		
Secondary	62 (17.2)	35(9.7)	0.898	0.826
Primary	66 (18.3)	32(8.9)		
No Formal Education	34 (9.4)	14(3.9)		
Employment Status				
Employed	134 (37.1)	71 (19.7)		
Retired	34 (9.4)	19 (5.3)	0.293	0.864
Unemployed	70 (19.4)	33 (9.1)		
Diagnosis				
1 Chronic Disease	139 (38.5)	78 (21.6)		
2 Chronic Diseases	74 (20.5)	35 (9.7)	0.997	0.812
Multi Morbidity	25 (6.9)	10 (2.8)		

Note: Statistical significance, $p<0.05$

Table 5: Association of participants' socio demographic with reported adverse experience

Variables	Yes (%)	No (%)	X^2	P-value
Age				
60-69	55 (15.2)	216 (59.8)		
70-79	13 (3.6)	76 (21.1)	1.651	0.438
>79	0 (0.0)	1 (0.3)		
Gender				
Male	32 (8.9)	111 (30.7)	1.942	0.163
Female	36 (10.0)	182 (50.4)		
Marital Status				
Married	52 (14.4)	254(70.4)	4.463	0.035*
Single	16 (4.4)	39(10.8)		
Level of Education				
Higher Institution	18 (5.0)	100 (27.7)		
Secondary	25 (6.9)	72 (19.9)	4.625	0.201
Primary	18 (5.0)	80 (22.2)		
No Formal Education	7 (1.9)	41 (11.4)		
Employment Status				
Employed	32 (8.9)	173 (47.9)		
Retired	18 (5.0)	35 (9.7)	9.452	0.009*
Unemployed	18 (5.0)	85 (23.5)		
Diagnosis				
1 Chronic Disease	43 (11.9)	174 (48.2)		
2 Chronic Diseases	21 (5.8)	88 (24.4)	1.406	0.495
Multi-Morbidity	4 (1.1)	31 (8.6)		

Note: Statistically Significant at $p<0.05$

DISCUSSION

This study evaluated the concurrent use of HM and PM among elderly patients with chronic diseases and found that many of the participants had used HM concurrently with PM, but only a few had experienced bad effects from such use. In this study, more than two-thirds of the participants had used HM with prescribed medications. This observation is higher than 56.9 % pooled estimate reported among Ethiopians but comparable to 65.2 % among the general populations in Nigeria.[16,17] The elderly tend to be more culturally attached to HM than the younger adults that dominate the general population of sub-Saharan Africa, including Ethiopia and Nigeria, and they tend to suffer more from co-morbidities and terminal illnesses like cancer which may increase their propensity for the use of HM.[18]

This study observed that despite the high prevalence of concurrent use of HM with PM, only a few of the participants (8.6 %) reported bad effects from such use. The reported bad effect in this study was lower than previously reported among the general population and among the insured patients in Nigeria.[14,19] However, a similar study in Korea reported above 50 % among the general population.[20] It is possible some of the bad effects associated with concurrent use of HM and PM had been overlooked by the participants due to their being "too minor" as long as such use was considered "effective".

The majority in this study did not disclose to doctors that they were using HM with PM similar to reports among adult patients in Nigeria and Malaysia.[14,15] The reason for

this was largely due to the fact that the doctors did not ask about it. Many reports corroborate this study's finding that doctors do not often ask patients about HM use.[5,7,14,15] It is important that doctors consider HM use as a part of patients' medication history to be documented, and they should routinely inquire about its use especially among elderly patients. In this study, most of the habitual users of HM were using it to reduce blood sugar (diabetes). This finding is similar to the observation of a study in Saudi Arabia and Iran.[21,22] This calls for concern because some of the conventional anti-diabetes are known to interact with HM.[23]

The importance of counselling about HM cannot be overemphasized especially among elderly patients with chronic diseases. This is because of some of the patients' beliefs reported in this study can be deleterious to their health. In this study, many did not believe using HM with PM can harm them, but rather, it will assist them to get better quickly. This observation has been previously reported among Ethiopians.[21] These misconceptions can only be corrected with adequate counselling and professional knowledge rooted in the cultural understandings of the HM use.

Of all the socio-demographics assessed, none was significantly associated with concurrent HM and PM use in contrast to similar studies that associated HM use with demographics including gender, age and multiple comorbidities.[4,18,24,25] The finding of this study indicates the overwhelming acceptance and wide use of HM among the participants, irrespective of demographics. However, this study observed that marital and employment status were associated with reported bad effects of HM.

Strength and limitations

This study contributes to the knowledge of herbal medicine use among a vulnerable group of patients (the elderly) that has hitherto been overlooked in previous studies. Many studies have evaluated the use of HM among general populations and pregnant women in sub-Saharan Africa. To the best of our understanding, this is perhaps the first study that explored the concurrent use of HM and PM among elderly patients in Nigeria.

However, the study has limitations, including being a cross-sectional study which may prevent the determination of causation. The study is limited to two healthcare facilities in Ogun State, this may limit the generalization of the study findings to Nigeria. Due to a dearth of studies among the study population, comparison with previous studies was limited. The study was based on recall, and patients may not accurately report past events.

CONCLUSION

Many elderly patients used herbal medicine concurrently with prescribed medications for the treatment of their chronic diseases, but only a few claimed to have experienced bad effects from such use. The majority of the participants did not disclose herbal use to their doctors. The participants had some misconceptions about the concurrent use of herbal medicines with prescribed medications. Healthcare professionals should always inquire about herbal use among elderly patients and document such. A national study to determine the constituents, adverse effects and possible drug-herb interactions of herbal medications commonly used by elderly patients in Nigeria is advocated.

ACKNOWLEDGEMENT

The authors are grateful to the management and staff of State Hospital Ijaye and Sacred Heart Hospital, Abeokuta.

CONFLICT OF INTEREST

We declare no conflicting interest

REFERENCES

1. Li S, Odedina S, Agwai I, Ojengbede O, Huo D, Olopade OI (2020). Traditional medicine usage among adult women in Ibadan, Nigeria: a cross-sectional study. *BMC Complementary Medicine & Therapy* 20:93. doi: 10.1186/s12906-020-02881-z
2. WHO. WHO global report on traditional and complementary medicine 2019. World Health Organization, editor. WHO. (2019) 1-226. Available at: https://www.who.int/publications/i/item/978924151536 . Accessed January 24th 2025.
3. Agbabiaka TB, Wider B, Watson LK, Goodman C (2017). Concurrent use of prescription drugs and herbal medicinal products in older adults: a systematic review. *Drugs Aging*. 34(12): 891-905. doi: 10.1007/s40266-017-0501-7.
4. Ananchaisarp T, Rungruang S, Theerakulpisut S, *et al.* (2021). Usage of herbal medicines among the elderly in a primary care unit in Hat Yai, Songkhla province, Thailand. *Asian biomedicine: research, reviews and news* 15(1):35-42. doi:10.2478/abm-2020-0005

5. Ameade EP, Ibrahim M, Ibrahim HS, Habib RH, Gbedema SY (2018). Concurrent use of herbal and orthodox medicines among residents of Tamale, Northern Ghana, who patronize hospitals and herbal clinics. *Evidence Based Complementary and Alternative Medicine* 2018: 1289125.
6. Agbabiaka TB, Spencer NH, Khanom S, Goodman C (2018). Prevalence of drug-herb and drug-supplement interactions in older adults: a cross-sectional survey. *British Journal of General Practice.* 68(675):e711-e717. doi:10.3399/bjgp18X699101
7. Koohestani HR, Baghcheghi N (2022). The Relationship Between the Use of Medicinal Plants and Medication Adherence in the Elderly with Chronic Diseases (2020) (Persian)]. *Iranian Journal of Ageing* 17(2): 276-289.
8. Boadu AA, Asase A (2017). Documentation of herbal medicines used for the treatment and management of human diseases by some communities in southern Ghana. *Evidence Based Complementry and Alternative Medicine* 2017: 3043061.
9. Hassen G, Belete G, Carrera KG, Iriowen RO, Araya H, Alemu T, Solomon N, Bam DS, Nicola SM, Araya ME, Debele T, Zouetr M, and Jain N (2022). Clinical Implications of Herbal Supplements in Conventional Medical Practice: A US Perspective. Cureus, 14(7), e26893. https://doi.org/10.7759/cureus.26893.
10. Ampomah IG, Ampomah GA, Emeto TI (2024). Integrating modern and herbal medicines in controlling malaria: experiences of orthodox healthcare providers in Ghana. *Archives of Public Health* 82(1):240. doi:10.1186/s13690-024-01472-5
11. Osunyikanmi, P. (2024). An Assessment of the Regulatory Framework for African Traditional Medicinal Practice in Nigeria. *European Journal of Medical and Health Research* 2(5): 268-275.
12. Oreagba IA, Oshikoya KA, Amachree M (2011). Herbal medicine use among urban residents in Lagos, Nigeria. *BMC Complementary and Alternative Medicine* 11: 117.
13. Fakeye TO, Adisa R, Musa IE (2009). Attitude and use of herbal medicines among pregnant women in Nigeria. *BMC Complementary and Alternative Medicine* 9: 53.
14. Maiyegun AA, Mutalub YB, Muhammad AA, Akangoziri MD (2022). Prevalence and determinants of herbal medicine use among adults attending the National health insurance clinic of Abubakar Tafawa Balewa university teaching hospital, Bauchi, Nigeria. *Nigerian Journal of Medicine* 31: 417-423. S
15. Wahab MSA, Zaini MH, Ali AA, *et al* (2021). The use of herbal and dietary supplement among community-dwelling elderly in a suburban town of Malaysia. *BMC Complementary Medicine and Therapy* 21(1): 110. doi:10.1186/s12906-021-03287-1
16. Tassew WC, Assefa GW, Zeleke AM, Ferede YA (2024). Prevalence and associated factors of herbal medicine use among patients living with chronic disease in Ethiopia: A systematic review and meta-analysis. *Metaboisml Open.* 21:100280. doi:10.1016/j.metop.2024: 100280
17. Okenwa SC, Ofili SC, Ekweozor CA, Onyishi E, Eze I, Odor CR, *et al* (2023). Prevalence and Perception of Herbal Medicine Use among Patients with Chronic Diseases in a Nigerian Teaching Hospital. *Asian Journal of Research in Medical and Pharmaceutical Sciences* 12 (3): 28-38.
18. Poli MA, Hossain MJ, Kholil I, Yasmin S, Bhowmick B and Kundu LR (2025) Traditional medicine use and associated factors in chronic patients in Jamalpur, Bangladesh: a cross-sectional study. *Frontier Public Health* 13: 1548728. doi: 10.3389/fpubh.2025.1548728
19. Aina O, Gautam L, Simkhada P, Hall S (2020). Prevalence, determinants and knowledge about herbal medicine and non-hospital utilisation in southwest Nigeria: A cross-sectional study. *BMJ Open* 10: e040769.
20. Jang S, Kim KH, Sun SH, Go HY, Lee EK, Jang BH, *et al* (2017). Characteristics of herbal medicine users and adverse events experienced in South Korea: A survey study. *Evidence Based Complementary and Alternative Medicine* 2017: 4089019.
21. Alghamdi, S. (2021) "The Use and Potential Interactions of Herbal Medicines among Diabetic Patients in Saudi Arabia: A Cross-sectional Study", *Journal of Pharmaceutical Research International,* 33(53A): 226-234.
22. Khoshnoud MJ, Hajian A, Asemani O (2025). Drug counseling for herbal medicines: patients' perspectives on the professional performance of pharmacists in urban pharmacies. *BMC Complementary Medicine and Therapy* 25(1): 335. doi:10.1186/s12906-025-05079-3
23. Meshesha SG, Yeshak MY, Gebretekle GB, Tilahun Z, and Fenta TG (2020). Concomitant Use of Herbal and Conventional Medicines among Patients with Diabetes Mellitus in Public Hospitals of Addis Ababa, Ethiopia: A Cross-Sectional Study. *Evidence-Based Complementary and Alternative Medicine* (1): 4871459. https://doi.org/10.1155/2020/4871459

24. Ekpor E, Osei E, Akyirem S (2023). Prevalence and predictors of traditional medicine use among persons with diabetes in Africa: a systematic review. *International health* 16(3): 252-260. https://doi.org/10.1093/inthealth/ihad080.

25. Pradipta IS, Aprilio K, Febriyanti RM, *et al.* (2023). Traditional medicine users in a treated chronic disease population: a cross-sectional study in Indonesia. *BMC Complementary Medicine and Therapy* 23(1): 120. doi:10.1186/s12906-023-03947-4.