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Pharmacists' Perception on Herbal-Orthodox medicine interactions in some communities of South-Eastern Nigeria

Lucy O. Nwankwo[1], Sylvester E. Aghahowa[1*]

[1]Department of Pharmacology and Toxicology, University of Benin, Benin City, Nigeria

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* *Corresponding Author:*
se-aghahowa@uniben.edu
http://orcid.org/0000-0001-6627-239X
+2348055219550

ABSTRACT

Background: Due to challenges in therapies, researchers have developed significant interest in herbal medicines during drug discovery and development programs. This study evaluates the knowledge of community pharmacists on interactions between herbal and orthodox medicines in some communities in Anambra State, Nigeria.
Method: Descriptive cross–sectional study was adopted using structured questionnaires that were distributed randomly.
Results: Male/female ratio was 1:1.2. Ages of respondents were between 21-60 years old and above. 49(31.6%) had practiced between 16 and 30 years and they were mainly first degree holders. 96(61.9%) of the respondents claimed that patients had used both orthodox and herbal medicines concomitantly. 23(14.8%) and 101(65.2%) of them agreed that patients used herbal medicine before visiting the pharmacy and they were low income earners respectively. Most patients sourced their herbal medicines from hawkers and herbalists and open markets. Few stocked in Pharmacy shops. The preparations were mainly administered orally. 78(50.3%) of the respondents agreed that there could be herb-drug interactions. The common ailments that herbal medicines were mostly used were malaria and diabetes. Frequently reported adverse effects in the use of herbal medicines were rashes, nausea and vomiting. There were significant differences in the claim of enhancing and inhibitory effect between orthodox and herbal medicines when used together ($P<0.05$). 38(34.5%) of the respondents advised their clients that herbal and orthodox medicine should not be used concomitantly. Pharmacists preferred orthodox medicines because of clearer dose, better efficacy and approval by regulatory authorities.
Conclusion: The study revealed the extent of knowledge of drug-herbal interaction and utilization among community pharmacists, and further improvement in their perception will enhance pharmaceutical care practice.

1. Introduction

The surge in the use of herbal medicines world-wide has caught the attention of researchers, healthcare practitioners and regulatory agencies[1]. Majority of people perceived herbal medicines as natural and therefore they are safe[2]. Some of the alternative approaches to the treatment of ailments include herbal medicine, homeopathy, nutraceuticals, acupuncture, bodywork and massage[3]. The likelihood of herb-to-drug interactions is higher than drug-to-drug interactions because synthetic drugs usually contain single chemical entities[4] while herbal drugs contain many compounds. Potential side effects and interactions between herbal medicines and conventional drugs have been documented[5-10]. Patient's request for a licensed herbal medicine can be approved if there is no conventional concomitant co-medication that is known or expected to interact, no contra-indication, and no other conventional treatment with a better benefit-risk ratio[11]. To encourage more patronage to this alternative means of treatment, the World Health Organization (WHO) had put in a lot of efforts and priorities in the promotion of the use of herbal medicines through the creation of awareness about efficacy and safety[12]. All herbal medicines are mixtures of more than

one active ingredient[13] and that contain a combination of pharmacologically active plant constituents that are claimed to work synergistically to produce an effect greater than the sum effects of the single constituents. Many different side effects, adverse events and herb-drug interaction had been reported and recently reviewed[4]. Current orthodox drugs have their origin from herbal medicines, but the main difference between the two is that the herbal drugs contain a large number of compounds, rather than a single pharmacologically active substance; hence components of both herbal and orthodox medicines may act on one another to moderate, oppose, or enhance an effect[14]. This study was carried out to evaluate the knowledge of community pharmacists on the interactions between herbal and orthodox medicines used in Anambra State Nigeria.

2. Methods

The study was carried out using descriptive cross-sectional research approach among community pharmacist in some communities (Nnewi, Onitsha and Awka) of Anambra state. Nnewi is the second largest city in Anambra State in South-Eastern Nigeria. The metropolitan city encompasses two local government areas, Nnewi North, Nnewi South; Nnewi North is commonly referred to as Nnewi central, and comprises four autonomous quarters: Otolo, Uruagu, Umudim, and Nnewichi. As at 2006, Nnewi has an estimated population of 391,227 according to the Nigerian census[15].Onitsha is a city located on the eastern bank of the River Niger. A metropolitan city, Onitsha is known for its river port and as an economic hub for commerce, industry and education. In the 2006 Nigerian census, Onitsha had an estimated city proper population of over quarter a million people, and, as of 2016, had an estimated urban population of 7,425,000. The indigenous people of Onitsha are Igbos and speak the Igbo language. The Onitsha people are referred to as NdiOnicha. Awka is the capital of Anambra State, with an estimated population of 301,657 based on the 2006 Nigerian census. Sample size was calculated using formula adopted from Bartlett *et al*.[16].The total number of registered community pharmacists in Anambra State by the Pharmacists Council of Nigeria (PCN) was estimated at 250 (two hundred and fifty). Questionnaire was used as the study instrument. The questionnaire consist of sections A, B and C. Section A was used to obtain the demographic data of the community pharmacists such as gender, age, religion, qualification, location of pharmacy and years of experience; and it consisted of six (6) questions. Section B had a total twenty items used to extract related information on the orthodox/herbal medicine usage by patients who visited the pharmacy. Section C consisted of seventeen questions to assess the knowledge of the pharmacist on drug-herb interactions.

Before proceeding with the main data collection, the instrument was pre-tested among 20 respondents. This resulted in the correction of some of the wordings and grammar in order to improve the acceptability of the instrument. The final structured questionnaires were then self-administered randomly among the community pharmacists that met the inclusion criteria and retrieved after completion for statistical analysis. The non-community pharmacists and the community pharmacists that did not consent to participate were excluded from the study. Ethical approval was sought and obtained from the University Teaching Hospital Ethical Committee before the commencement of the study through approval letter reference number: *COOUTH/CMAC/ETH.C/VOL.1/0102.*

2.1 Data analysis

All the raw datasets collected from the filled and retuned questionnaires were carefully checked for completeness before they were entered into Microsoft Excel, 2010 spread sheet and subsequently transferred into **Statistical Package for Social Sciences (**SPSS) **(**version 20software (Inc., Chicago, IL, USA**)** for descriptive and inferential statistical analysis. Significance was established when *P*-value was less than 0.05.

3. Results

3.1 Demographic characteristics of respondents

A total of one hundred and fifty-five respondents participated in the study. Higher proportion were recorded in variables of females, age group 31-40 years, Christianity and BPharm degree qualification

Table 1: Demographic characteristics of respondents (N = 155)

Variables	Category	Frequency (%)
	Male	70 (45.2)
	Female	85 (54.8)
	21-30	24 (15.5)
	31-40	50 (32.3)
	41-50	33 (21.3)
	51-60	35 (22.6)
	Above 60	13 (8.4)
	Onitsha	42 (27.1)
	Awka	64 (41.3)
	Nnewi	49 (31.6)
	Christian	151 (97.4)
	Muslim	4 (2.6)
	Others	0 (0.0)
	0 – 5	48 (31.0)
	5 – 15	49 (31.6)
	15 – 30	49 (31.6)
	Missing	9 (5.8)
	B. Pharm	110 (71.0)
	M. Pharm	31 (20.0)
	Pharm. D	20 (12.9)
	PhD	7 (4.5)
	Others	30 (19.4)

Response of participants expressed in numbers and percentages.

3.2 Orthodox and herbal medicine usage

Higher proportion of respondents used both orthodox and herbal medicines before visiting pharmacy. Herbal medicines were mostly used by low income earners. Most of the respondents agreed that there might be interaction between orthodox and herbal medicines.

Table 2: Information on orthodox/herbal medicine usage

Variables	Category	Frequency (%)
	Herbal medicine	23 (14.8)
	Orthodox medicine	32 (20.6)
	Both	96 (61.9)
	Missing	4 (2.6)
	Low income earners	101 (65.2)
	Middle class	63 (40.6)
	High Income Earners	18 (11.6)
	Strongly agree	45 (29.0)
	Agree	59 (38.1)
	Neutral	33 (21.3)
	Disagree	5 (3.2)
	Strongly disagree	3 (1.9)

	Missing	10 (6.5)
	Always	8 (5.2)
	Often	31 (20.0)
	Sometimes	79 (51.0)
	Rarely	25 (16.1)
	Never	3 (1.9)
	Missing	9 (5.8)
	Always	8 (5.2)
	Often	39 (25.2)
	Sometimes	77 (49.7)
	Rarely	20 (12.9)
	Never	2 (1.3)
	Missing	9 (5.8)
	Both medicine types work together for the management of the condition	49 (31.6)
	The combination of both forms of medicine was more effective in treating the prevailing disease condition	41 (26.5)
	Other reasons	40 (25.8)
	Missing	25 (16.1)

Numbers in parenthesis indicate response of participants expressed in percentage.

3.3 Reason of preference between orthodox or herbal medicines

Herbal medicines were mostly sourced from open marked and mainly administered orally users. Most pharmacist preferred orthodox medicines because they were better studied.

Table 3: Information on preference of orthodox/herbal medicine usage and administration

Variables	Category	Frequency (%)
	Always	16 (10.3)
	Often	23 (14.8)
	Sometimes	66 (42.6)
	Rarely	27 (17.4)
	Never	11 (7.1)
	Missing	12 (7.7)
	Herbal	10 (6.5)
	Orthodox	120 (77.4)
	Both	13 (8.4)
	Missing	12 (7.7)
	Better studied	78 (50.3)
	Approved by regulatory authority	15 (9.7)
	Clearer dosage	15 (9.7)
	Better efficacy	30 (19.4)
	Missing	17 (11.0)
	Always	15 (9.7)
	Often	32 (20.6)
	Sometimes	78 (50.3)
	Rarely	15 (9.7)
	Never	1 (0.6)

	Missing	14 (9.0)
	Highly probable	57 (36.8)
	Probable	38 (24.5)
	Possible	38 (24.5)
	Doubtful	2 (1.3)
	Missing	19 (12.3)
	Open market	88 (56.8)
	Herbalist centers	53 (34.2)
	Herbal medicine hawkers	76 (49.0)
	Pharmacy	15 (9.7)
	Self-made	52 (33.5)
	Oral	128 (82.6)
	Topical	9 (5.8)
	Intravenous	6 (3.9)
	Intramuscular	1 (0.6)
	Others	5 (3.2)
	0-5yrs	73 (47.1)
	5- 10yrs	13 (8.4)
	10yrs-above	20 (12.9)

Numbers in parenthesis indicate response of participants expressed in percentage.

4.3 Use of herbal medicines and disease conditions

Malaria was the most common disease in the use herbal medicine. Rashes and skin reactions were the most common adverse drug reaction claimed to be associated with the use of herbal medicine.

Table 4: Application of herbal medicines in disease conditions

Variables	Category	Frequency (%)
	Malaria	59 (38.1)
	Ulcer	21 (13.5)
	Infections	22 (14.2)
	Diabetes	35 (22.6)
	Hypertension	13 (8.4)
	Pains and inflammation	16 (10.3)
	Typhoid fever	29 (18.7)
	Cough	9 (5.8)
	Diarrhea	11 (7.1)
	Arthritis	10 (6.5)
	Others	130 (83.9)
	Rashes and skin reactions	36 (23.2)
	Headache	12 (7.7)
	Nausea and vomiting	20 (12.9)
	Low blood pressure	4 (2.6)
	Fever	9 (5.8)
	Diarrhea	34 (21.9)
	Constipation	8 (5.2)
	Anemia	8 (5.2)
	Others	124 (80.0)

		124 (80.0)
	Should not be used concomitantly	38 (34.5)
	Not safe	14 (9.0)
	Should be avoided	20 (12.9)
	Interactions should be studied	12 (7.7)
	Missing	71 (45.8)
	Yes	40 (25.8)
	No	73 (47.1)
	Missing	42 (27.1)
	Better studied	90 (58.1)
	Approved by regulatory authority	58 (37.4)
	Clearer dose	71 (45.8)
	Better efficacy	54 (34.8)

Numbers in parenthesis indicate response of participants expressed in percentage.

3.5 Knowledge of Pharmacist on drug interactions

Pharmacist claimed to have had knowledge of drug interaction between orthodox and herbal medicines in form of inhibition and enhancement

Table 5: Knowledge of Pharmacist on drug interactions (N =155)

Drug-Herb Interaction	None	Inhibition	Enhancement	Missing
Warfarin +Garlics	12 (7.7)	15 (9.7)	29 (18.7)*	99 (63.9)
Digoxin + Ginger	12 (7.7)	9 (5.8)*	29 (18.7)	105 (67.7)
Warfarin + Green tea	12 (7.7)	12 (7.7)*	25 (16.1)	106 (68.4)
NSAID +Ginkgo	14 (9.0)	12(7.7)	23 (14.8)*	106 (68.4)
Anti retroviral + St John's wort	7 (4.5)	29 (18.7)*	11 (7.1)	108 (69.7)
Chemotherapy + Cranberry	10 (6.5)	13 (8.4)*	18 (11.6)	114 (73.5)
Glibenclamide + Ginger	12 (7.7)	15 (9.7)	16 (10.3)*	112 (72.3)
Phenothiazine+Evening prime rose oil	11 (7.1)	13 (8.4)*	15 (9.7)	116 (74.8)
Omeprazole + Ginkgo	8 (5.2)	22 (14.2)*	12 (7.7)	113 (72.9)
Anti Diabetic drugs + Ginkgo	8 (5.2)	14 (9.0)*	23 (14.8)	110 (71.0)
Clopidogrel + Garlic	5 (3.2)	11 (7.1)	35 (22.6)*	104 (67.1)
Aspirin + Ginger	10 (6.5)	7 (4.5)	31 (20.0)*	107 (69.0)
Anti retrovirals + Garlic	8 (5.2)	18 (11.6)*	17 (11.0)	112 (72.3)
Statins + Grape fruit juice	9 (5.8)	20 (12.9)	21 (13.5)*	105 (67.7)
Warfarin + Ginseng	10 (6.5)	14 (9.0)*	20 (12.9)	111 (71.6)
NSAID +Garlic	8 (5.2)	10 (6.5)	31 (20.0)*	106 (68.4)
Warfarin +Ginger	8 (5.2)	11 (7.1)	30 (19.4)*	106 (68.4)

Asterisks(*) indicate correct response of participants to drug-herbal interaction effects.

3.6 Significant differences in demographic characteristics among pharmacists

Out of six demographic variables, significant differences were observed in the gender, religion and qualifications of pharmacists.

Table 5: Knowledge of Pharmacist on drug interactions (N =155)

Drug-Herb Interaction	None	Inhibition	Enhancement	Missing
Warfarin +Garlics	12 (7.7)	15 (9.7)	29 (18.7)*	99 (63.9)
Digoxin + Ginger	12 (7.7)	9 (5.8)*	29 (18.7)	105 (67.7)
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Chemotherapy + Cranberry	10 (6.5)	13 (8.4)*	18 (11.6)	114 (73.5)
Glibenclamide + Ginger	12 (7.7)	15 (9.7)	16 (10.3)*	112 (72.3)
Phenothiazine+Evening prime rose oil	11 (7.1)	13 (8.4)*	15 (9.7)	116 (74.8)
Omeprazole + Ginkgo	8 (5.2)	22 (14.2)*	12 (7.7)	113 (72.9)
Anti Diabetic drugs + Ginkgo	8 (5.2)	14 (9.0)*	23 (14.8)	110 (71.0)
Clopidogrel + Garlic	5 (3.2)	11 (7.1)	35 (22.6)*	104 (67.1)
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Warfarin +Ginger	8 (5.2)	11 (7.1)	30 (19.4)*	106 (68.4)

Asterisks(*) indicate correct response of participants to drug-herbal interaction effects.

3.6 Significant differences in demographic characteristics among pharmacists

Out of six demographic variables, significant differences were observed in the gender, religion and qualifications of pharmacists.

Table 6: Significant differences of demographic characteristics of Pharmacists (N =155)

Variables	Category	Average score (Mean ± SD)	*P*- values
	Male	3.28 ± 4.06*	
	Female	1.14 ± 2.20	
	21-30	1.21 ± 2.25	
	31-40	1.70 ± 2.94	
	41-50	3.24 ± 4.25	
	51-60	3.11 ± 3.91	
	Above 60	2.23 ± 3.61	
	Onitsha	2.79 ± 3.80	
	Awka	2.10 ± 3.05	
	Nnewi	2.18 ± 3.81	
	Christian	2.39 ± 3.54*	
	Muslim	0.00 ± 0.00	
	Others	-	
	0 – 5	1.81 ± 2.84	
	6 – 15	2.39 ± 3.55	
	16 – 30	2.96 ± 4.16	

	Yes (2.61 ± 3.64) No (1.6 ± 3.06)
	Yes (4.06 ± 4.43*) No (1.88 ± 3.1)
	Yes (3.45 ± 4.56) No (2.15 ± 3.31)
	Yes (2.00± 3.42) No (2.33 ± 3.52)
	Yes (1.3 ± 2.48*) No (2.56 ± 3.68)

Values are presented as. *P<0.05

4. Discussion

The surge in the use of herbal medicines world-wide has caught the attention of researchers, healthcare practitioners and regulatory agencies[1]. The study has revealed the extent of perception among community pharmacists and consolidated the claim that herbal medicines are natural and could be safe[2].Some of the alternative approaches to the treatment of ailments[3]mayhave necessitated most residents of the community to the used of the claimed herbal medicines. Therefore they could have been prone to the likelihood of herb-to-drug interactions rather than drug-to-drug interactions due to varied components of chemical entities[4]. Since potential side effects and interactions between herbal medicines and conventional drugs have been documented[11], this can provide the basis for the caution in the use herbal medicine. Moreso, since this has been documented; it could have built in confidence by the pharmacist and herbal users. To encourage more patronage to this alternative means of treatment, the World Health Organization had put in a lot of efforts and priorities in the use of herbal medicines among consumers[12]. Despite this effort and priorities, individual irrationally use herbal medicines whenever they are faced with challenge of treating ailment, they self-diagnosed irrespective of the strata in the society as seen in Table 2. Since all herbal medicines are mixtures of more than one active ingredient[13], this may have led to respondents claiming that there may be possible interaction with co-administered drugs. This phenomenon may not be limited to drugs but can also be influenced by food[5-8]as reported. Thus, herbal medicines contain a combination of pharmacologically active plant constituents that are claimed to work synergistically to produce an effect greater than the sum of the effects of the single constituents. The side effects such as rash, nausea and vomiting that were reported as in Table 4 are like previous side effects due to herb-drug interaction[4-10]. Interactions[11] that are common with specific orthodox drugs as claimed pharmacists in this study may be traceable compared with herbal drugs that have complex composition[13]. Therefore, adequate labeling is recommended for herbal drug in case of any adverse events.

The high levels of patronage in the open market as observed in Table 3 may be linked to low cost and availability. Since pharmacists are custodians of drugs and drugs related products such as herbal products and are in a better position to advise patients on the use of herbal medicines hence, there is a need for training and retraining to upgrade of knowledge for better pharmaceutical care practice. In addition to this, the training and retraining has to be adopted in the PharmD and Post-graduate curricula to improve acceptability of services rendered as seen in Tables 1 and 6.Pharmaceutical care focuses on orthodox medicine by community pharmacists there is need to include herbal medicine practice. It is pertinent to note that therapeutic failures can arise in drug-herb interactions, therefore the knowledge have to be expanded to distinguish therapeutic failure that may arise due to drug-herb interaction and sub-standard dosing in orthodox medicine. This study revealed that community Pharmacists exhibited very poor knowledge on drug-herbal interactions related to earlier opinions[17].Majority of patients, 61.9% that visited pharmacy outlets in the study locations used both orthodox and herbal medicine, while only few of them (20.6%) used only orthodox medicine, and even fewer proportion, 14.8% used only herbal medicine. This response rate above 50% indicates the acceptability of herbal medicine among patients in Anambra State. Patronage of herbal medicine by low income earners 101 (65.2%)as in Table 2, represents willingness to go for cheaper remedies compared to orthodox remedies, Only few, 18 (11.6%) of patients who patronize orthodox and herbal medicine were high income earners, suggesting that high income earners prefer orthodox medicine. Studies have shown that community pharmacists are mostly involved in the supply of herbal medicine[18] that was why some herbal preparations were procured by pharmacist. Also, the availability of herbal medicine over-the-counter can prompt most patients to seek advice and information on herbal medicine use, side effects and interactions. Although most pharmacists agreed that interactions were observed in patients that used herbal and orthodox medicines, patients did not always admit to concurrent use of herbal and orthodox medicines. This is an indication that fewer patients combined both agents and

there is every possibility of less cases of interaction occurring in a practical point of view. Minority of respondents 16 (10.3%) often stated that patients intend to stop concurrent use of herbal and orthodox medicines. Few of the respondents also stated that the symptoms presented by the patients could be due to herb-drug interactions. This lower response rate suggests lesser patients' compliance on concurrent use of orthodox and herbal medicine. Majority of pharmacist 57 (36.8%) opined that it is highly probable that patients who used herbs alongside orthodox medications are more predisposed to drug-herb interactions, but it was not well reflected in their practice. Furthermore, they opined that majority of these herbal medicines are sourced from "open market, herbalist centers, herbal medicine hawkers, self- made" when compared to low proportions 15(9.7%) which are sourced from pharmacy, suggesting that community pharmacist have lesser transaction with patients using both herbal and orthodox medications. This could also be responsible for their poor knowledge on herbal-drugs interactions. Aspect of the study clearly revealed poor performance of community pharmacist on the knowledge of herbal-drug interactions. For instance, less than 50% 29(18.7%) of them correctly attempted that "Warfarin + Garlics" produce an enhancing effect as documented[5-10] as in Table 5 reflected that majority had no knowledge of the combination. This poor performance was also noticed among other interactions occurring between herbal and orthodox medicine as revealed in results of the study. Minority of pharmacists 40 (25.8%) claimed to stock herbal medicines, this buttress pharmacist support for the use of mainly orthodox medicines as conventional items for treating ailment because they are better studied as claimed in Table 4. These less number lends credence to their little practical knowledge on herbal-drug concomitant patronage among patients in the study locations. The knowledge of community pharmacists were compared with various demographic variables such as age, gender, location of pharmacy, religion, duration of practice, and qualification. It revealed that demographic variables (except gender, religion, and qualification) did not affect knowledge (average score) of community physicians on herbal-drugs interaction. Higher mean scores recorded in males compared to females suggests that males in the study locations have more knowledge on drug herbal interaction than females. In terms of religion, only four (4) pharmacists were Muslim. Although some religions advocate the use of herbal drugs, the claim in this study is insufficient to support the use of herbal drug for treatment. Therefore larger scope of study is recommended to know the fate of drug interaction between herbal and orthodox medicine interaction in religious perspective. Lower proportion of muslim population in the study may influence their poor knowledge when compared to majority of Christians having higher knowledge as in Tables 1 and 6. Respondents with M.Pharm qualification had higher mean score than those having other qualifications. This may be associated with their exposure to pharmacognosy and other related courses that are connected with drugs herbal interactions in post graduate programs. Similar findings has been observed among community Pharmacists in other countries, such as Kuwait[19]and Saudi Arabia[20], where pharmacists showed poor knowledge of the indications, contraindications, interactions and adverse effects of herbal medicines which included ginseng, gingko, and St. John's wort[18]. The study carried out on knowledge, attitudes and awareness of community pharmacists towards the use of herbal medicines in Muscat region revealed that pharmacists had more knowledge therapeutic applications of herbal medicine, but lack sufficient knowledge on drug-herb interaction or side effects[18].The study carried out on about the commonly supplied herbal medicines in south-western Nigeria the revealed that few respondents possessed adequate knowledge of the indications, adverse effects and potential interactions of herbal medicine that they supplied[18].Majority of respondents admitted that herb-herb interaction occurs whenever herbal medicine was used with conventional medicines. Other studies have also substantiated this fact[21]. Previous study[22] revealed that most have little knowledge on herbal remedies, especially drug-herbs interactions. This poor performance is out to tune with responsibility of pharmacists as custodians of knowledge to understand the role of drug-herbal interaction asdocumented[23]. Poor performance of pharmacist on the knowledge of drug-herbal interaction is not uncommon as revealed in this study. Although they admitted that co-administration of herbal and orthodox medicine produce risks, benefit, and potential interaction. It would be necessary to educate them on the relevance of interactions which might between both orthodox and herbal medicine. It was observed that herbal medicines had multiple uses in various disease conditions, such as malaria, ulcer, infections, diabetes, among others as well as associated side effects. This may also reflect the pattern of diseases that are substantially reported in the area as in Table 4. It also justifies the use of herbal medicines before reporting to the clinic. Arising from this anomaly, there can also be serious therapeutic failure or adverse drug reaction during this event. Interestingly, majority of community pharmacists stated clearly that herbal and orthodox medications should not be used concomitantly mainly because of the possible herbal-drug interactions that may be prominent. Reasons such as approval by regulatory authority, better efficacy, clearer dosage and better research for pharmacist preference of orthodox medication to herbal medicine substantiates the limitations posed by herbal remedies. Although they admitted that co-administration of herbal and orthodox medicine risks, benefit, and potential interaction, it is wise to educate them on the relevance of interactions which might between both categories. Earlier authors[24] suggested the review and upgrading of courses that would establish the role of pharmacology and pharmacognosy in drug herbal interaction by regulatory bodies. The content, quality and duration of this training of pharmacists are also important in distinguishing interaction and possible safety profile. A posited[25], proper knowledge of community Pharmacists on drug herbal interaction would make them to be able to advise patients appropriately[26].In a related study carried out in South Western Nigeria[26], there was low knowledge of pharmacists and physicians in the pharmacology and potential interaction of herbal medicines. The cadre and years of

practice were found to have significant effects on their knowledge on drug-herbal interaction as in Tables 1 and 6.It was recommended that there is an urgent need for the inclusion of pharmacology of common herbal medicines in medical and pharmacy curricula. Findings[27] suggest that the practical knowledge community pharmacists did not agree with standard rated knowledge of herbal medicines as in earlier opinions[28], therefore there is need for improvement.

5. Conclusion

The study revealed poor knowledge among community pharmacists on drug-herbal interaction. This poor knowledge observed could limit the positive impact of pharmaceutical care practice in community pharmacies. It is therefore recommended that organization of continuous education and other upgrading assessment programs for practicing pharmacists should be adopted in reducing the poor knowledge on drug-herbal interaction. This will further enhance the performance of the pharmacists and also add value to the clinical outcome of therapy on the patients. In the foregoing, there is a need for information on herbal-drug-interaction to be included in the undergraduate and postgraduate pharmacy curricula in Nigeria.

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