

## HERBAL MEDICINE SAFETY AWARENESS AMONG HEALTHCARE PROFESSIONALS IN FREETOWN SIERRA LEONE

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### Original Article

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#### ABSTRACT

**Background:** There is a pressing need to incorporate herbal medicine preventative measures into the current pharmacovigilance system, as recent evidence from the World Health Organization (WHO) shows. However, medical professionals are generally unaware of the relative safety of herbal remedies. Therefore, this research aimed to determine the awareness of herbal safety among medical professionals in Sierra Leone.

**Methodology:** In this study, we used a cross-sectional survey of medical staff (n=309) working at three of Freetown, Sierra Leone's, leading medical centers between March and April 2022. The data analysis was performed using Statistical Packages for Social Sciences (SPSS) version 28. We employed descriptive statistics to count instances of a category and assign a percentage. We used a backwards stepwise binary logistics regression to find significant associations between awareness and predictors at the 5% significance level (p0.05).

**Results:** Evidence from the study revealed that around 54.7% of respondents knew about herbal medicine safety. There is an association between the knowledge about drug-herbal interaction and the level of understanding, average observed risk (AOR) = 1.63; 95% confidence interval (CI): 1.00-2.66; however, no connection was found between years of experience and how well-known herbal remedies are safe, and finally, no association between the various departments and the level of understanding except for the outpatient department [Adjusted Odds Ratio (AOR) = 0.49; 95% Confidence Interval (CI):0.25-0.95].

**Conclusion:** Our findings reveal that medical professionals' knowledge concerning the security of herbal medicine in Freetown, Sierra Leone is unsatisfactory. Therefore, the regulatory bodies of the various healthcare cadre must promote standardised, coordinated education for all medical personnel to establish an effective pharmacovigilance framework for tracking herbal medication.

**Keywords:** Health professionals, Herbal medicine, Safety, Sierra Leone.

## INTRODUCTION

Herbal medicine employs plants and plant parts that contain the active ingredient for healing, detecting, avoiding, and keeping healthy (WHO 2001). In their raw or refined forms, it combines organic chemicals harvested from various plant parts, such as the plant's outer layers, inner layers, and its roots, flowers, and stems (Bent 2008). 85% or more of the world's population uses herbal medicine directly or indirectly through extracts or active components from medicinal plants to meet their primary healthcare needs (WHO 2005, Kifle et al. 2021, & Fong 2002). Ease of use, cost, and confidence in the treatment of disease have all contributed to the rapid rise in the use of herbs for health purposes all over the world, from the developed to the developing world. 70% to 90% of the populations of Italy, Germany, Canada, and France utilise complementary and alternative medicine for treatment (Robinson & Zhang 2011). 75% to 95% of Africans rely on traditional healing practices, such as herbal remedies, to keep themselves healthy (WHO 2002).

Though Western medicine is the primary option for treatment, traditional forms of complementary and alternative medicine (CAM) are widely practised and accepted in Sierra Leone. At least 70% of the population reportedly uses CAM, and the most popular type is a biologically based therapy. A national traditional medicine policy was developed to encourage the growth of conventional medicine, its formal incorporation into the health system, and its reasonable application by healthcare professionals (MOHS 2005). This policy was drafted in light of the declaration made in Beijing (WHO 2008). and the resolution passed by the African Regional Committee of

the World Health Organization (AFRRC50R3) (WHO 2000). To this end, healthcare providers must have an in-depth understanding of Complementary and Alternative Medicine practices and products in terms of quality, effectiveness, and safety. In Sub-Saharan Africa, herbal remedies are today's most common alternative medicine (Kretchy et al. 2014, James et al. 2016 & Erku et al.2016). Low cost, easy access, alignment with patients' religious and cultural beliefs, confidence in the treatment's effectiveness and safety, and discontent with the standard medical system are all factors in its rising popularity (Bamidele et al. 2009, Gari et al.2015, Onyapat et al.2011, Hughes et al. 2015, Opara et al. 2016 & Birhan et al. 2011). Traditional and alternative medicine is widely used, but insufficient evidence proves their safety or effectiveness. Conventional medicine is commonly used in Sierra Leone, with a sizable percentage of the population turning to it for help with everything from malaria and diarrhoea to respiratory infections and even high blood pressure (James et al. 2016, Diaz et al.2013; Ranasinghe et al.2015, James & Bah 2014 & James et al. 2018). Contrary to popular belief, most medical professionals in Sierra Leone's conventional medical system know little about complementary and alternative medicine and are reluctant to address patients' worries about their use (James et al., 2020). In addition, this is what many other research projects have found (Semple et al. 2006, Abdullah et al.2012, Naidu et al.2005, Brown et al.2011 & Brown et al. 2005). If this continues, patients may risk experiencing adverse effects or interactions with their regular medications. Therefore, medical professionals must know herbal medicine's efficacy and safety. In addition,

reports indicate that healthcare provider professionals lack the herbal medicine expertise to appropriately counsel on how to use herbs safely (Bharma et al. 2019). To realise the larger goal of incorporating Complementary and Alternative Medicine into the Sierra Leone health care system, it is necessary to implement programs to close the knowledge gap among health professionals.

Most studies on herbal medicine in Sierra Leone have focused on how common it is and what factors are involved in various disease conditions (James et al. 2016, James & Bah 2014 & James et al. 2018). Only one study examined healthcare professionals' perceptions of Traditional and Complementary Medicine (James et al., 2020). However, the study was qualitative and focused on the perception of medical professionals aiding those who had survived the Ebola virus using traditional medicine. Thus, there is a lack of research detailing medical professionals' safety awareness of herbal medicine. Therefore, this study aimed to evaluate the security of herbal remedies among Sierra Leonean medical professionals.

## MATERIALS AND METHODS

### Study Design and Population

We used a descriptive cross-sectional study among medical doctors, Pharmacists, Nurses and Lab technicians in Freetown, Sierra Leone. March and April of 2022 were used for the data collection of this research. Participants had to be medical professionals between the ages of 21 and 60, working at one of the participating hospitals, and from a wide range of racial and religious backgrounds. Medical professionals who had already retired were omitted.

### Study Setting

Western Area Urban in Freetown was chosen as the location for this research. There was a deliberate choice to focus on Freetown's three most prominent hospitals. The hospitals were selected on purpose as they are the primary service providers for healthcare in Freetown. These include Connaught Hospital, Princess Christian Maternity Hospital (PCMH), and Ola During Children's Hospital (ODCH).

### Sample Size and Determination

For an unspecified population, Cochran's formula was used (Cochran's Formula, Sample Size Estimator), assuming that half of the health workers know about herbal medicine based on academic study or work experience, this provides a 95 percent confidence level, plus or minus 5 percent accuracy, and a maximum variance of  $p = 0.5$ . Standard tables give us Z values of 1.96 at a 95 percent confidence level.,

- ❖  $N_0$  = expected sample size
- ❖  $e$  is the required accuracy (or error margin),
- ❖  $p$  refers to the (estimated) percentage of the population that possesses the ascribed quality,
- ❖  $q$  is  $1 - p$ .

$$n_0 = \frac{z^2 pq}{e^2}$$

$$(1.96)^2 (0.5) (0.5) / (0.05)^2 = 385.$$

We used the modified Cochran's formula for a smaller population:

$$n = \frac{n_0}{1 + \frac{n_0 - 1}{N}}$$

Hence  $n_0$  = Cochran's formula

Thus, this gives  $385 / (1 + (384 / 1000)) = 278$ . So, our sample size for this study was estimated at 278 healthcare workers, but the measure increased to 307 to compensate for statistical significance.

## Study Questionnaire

Literature from related studies conducted in Sierra Leone (James & Bah 2014) and Ethiopia (Hasen & Hashim 2021) was used to inform the development of the survey questionnaire. Three specialists reviewed it twice for accuracy focusing on the questionnaire's ease of comprehension for populations at large. The practice test was then administered to about ten people who were not medical professionals. User comments were taken into account when crafting the final survey version. The questionnaire was divided into three parts. The first part of the questionnaire details the demographic characteristics of the participants. The second section examined the respondents' use, administration, and assessment of herbal medicinal products. The third part quizzes medical professionals' understanding of the risks and benefits of herbal treatments. Because of this, all of the Likert questions were answered on a 1–5 response scale strongly agreed was (5); agreed was (4); neutral was (3); disagreed was (2), and strongly disagreed was (1). To ensure the objective, good and low levels of health professional knowledge were determined by calculating the average of all healthcare professionals' mean knowledge scores.

## DATA COLLECTION

The data was collected through a self-administered format, as all the participants were literate. The health professionals were informed of the study's goals, and those who gave consent were interviewed. All

information provided by participants was kept confidential, and they were free to stop participating in the study at any time. Study participants gave their permission by signing a consent form.

## Data Analysis

All the questionnaires were double-checked to ensure they were complete before being entered by hand and coded appropriately into SPSS 28.0 (Chicago, SPSS Inc.). Counts and percentages could be calculated with the help of descriptive statistics. We used a backwards stepwise binary logistics regression to find significant associations between awareness and predictors at the 5% probability level of significance ( $p < 0.05$ ).

## RESULTS

### Social characteristics.

The study interviewed 309 respondents and was carried out in three different hospitals; Connaught hospital (46.3%), PCMH (27.5%) and ODCH (26.2%). More females (60.5%) than males (39.5%) were interviewed, and an age variation of 26-30 (36.6%) followed by 31-35 (26.5), 36-40 (20.4%), 21-25 (11.0%), 41-45 (2.6%), 46-50 (2.6%),  $\geq 51$  (0.3%). The frequency of distribution regarding marital status indicated that 48.5% were single, 35.6% were married, 11.3% were divorced, and 4.5% were a widower. The frequency distribution based on the different cadre was 54.4% nurse, 23.3% medical doctor, 15.9% pharmacist and 6.5% lab technician. The frequency distribution based on years of experience was 65.4% have 1-5 years of working experience, 22.7% have 6-10 years of experience, and 12.0% have more than ten years of working experience (table-1).

**Table 1: Respondents' Sociodemographic Characteristics**

Characteristics	Variables	n (%)
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<b>Sex</b>	Male	122(39.5)
	Female	187(60.5)
<b>Age group (Years)</b>	21-25	34(11.0)
	26-30	113(36.6)
	31-35	82(26.5)
	36-40	63(20.4)
	41-45	8(2.6)
	46-50	8(2.6)
	51 and above	1(0.3)
<b>Marital Status</b>	Single	150(48.5)
	Married	110(35.6)
	Divorced	35(11.3)
	Widowed	14(4.5)
<b>Name of Hospital</b>	Connaught Hospital	143(46.3)
	ODCH	81(26.2)
	PCMH	85(27.5)
<b>Cadre</b>	Medical Doctor	72(23.3)
	Pharmacist	49(15.9)
	Nurse	168(54.4)
	Lab Technician	20(6.5)
<b>Year of Experience</b>	1-5 years	202(65.4)
	6-10 years	70(22.7)

	11 and above	37(12.0)
<b>Department</b>	Outpatient department/ Emergency	112(36.2)
	Internal Medicine	16(5.2)
	Laboratory	18(5.8)
	Obstetrics and Gynaecology	19(6.1)
	Paediatrics	28(9.1)
	Psychiatry	1(0.3)
	Surgery	23(7.4)
	Others (Ward)	92(29.8)

## Health Professionals Use, Application, and Supervision of Herbal Medicine.

Moreover, half of the study's participants, 59.9%, had just a basic understanding of herbal medicine, compared to 32.7% who had moderate knowledge, 7.1% who had sufficient knowledge, and 0.3 who did not know. About 53.1% of respondents said they were aware of herbal medicine and had used it, while the remaining 46.9% said they were neither aware of it nor had used it. In addition, 45.3% of respondents said they were knowledgeable about the safety of the herbal medication, while the remaining 54.7% were not. 61.5% of people do not know about drug-herbal interactions, compared to 38.5%, and 50.5% have dealt with the adverse effects of herbal medicine, compared to 49.5% who have not. During their work, the majority of respondents

66.7% learned about herbal medicine from patients, clients, and other sources (table-2)

**Table 2: Health Professionals' Use, Application, and Supervision of Herbal Medicines.**

Characteristics	Variables	n (%)
<b>Knowledge of Herbal Medicine</b>	None	1(0.3)
	Basic	185(59.9)
	Moderate	101(32.7)
<b>Knowledge Source of herbal medicine Safety</b>	Advanced	22(7.1)
	Academic study	103(33.3)
<b>Use Herbal medicine</b>	Experienced	206(66.7)
	Yes	164(53.1)
<b>Experience with herbal medicine safety</b>	No	145(46.9)
	Yes	140(45.3)
<b>Keep an eye on Herbal medicine Safety</b>	No	169(54.7)
	Yes	144(46.6)
<b>Knowledge of Drug-Herbal Interaction</b>	No	165(53.4)
	Yes	119(38.5)
<b>Ever dealt with a herbal medicine side effect</b>	No	190(61.5)
	Yes	156(50.5)
	No	153(49.5)

### Medical Professionals' Knowledge of the Safety of Herbal Medicines

Moreover, on a Likert-scale questionnaire, participants were asked to rate how much they knew about herbal medicines' safety. Regarding the potential pharmacokinetics interaction with herbal medicine, 3.6% strongly agreed, 31.7% agreed, 10.7% stood neutral, 6.8 disagreed, and 47.2 strongly disagreed. Regarding whether herbal medicine may inhibit or induce drug-metabolising enzymes, 36.9%, 31.1% agreed,

21.0% were neutral, 7.8% disagreed, and 3.2% strongly disagreed. Additionally, 30.1% strongly agreed that the safety of herbal medicines is misunderstood and feared, 33.0% agreed, 15.9% were neutral while 11.7 disagreed, and 9.4 strongly disagreed. Also, regarding Herbal medicine's safety may be jeopardised by circumstances affecting its quality, 39.8% strongly agreed, 33.3% agreed, 16.8% neutral, 5.5% disagreed, and 4.5% strongly disagreed. Regarding reporting possible harmful effects of herbal medicine to the National Pharmacy Board as the responsibility of health care providers, 51.8% strongly agreed, 27.2% agreed, 11.3 % were neutral, 5.5% disagreed, and 4.2% strongly disagreed. Moreover, 57.0% strongly agreed, 24.3% agreed, 6.1% agreed, 6.1% disagreed, and 6.5% strongly disagreed on whether to notify the national pharmacy board of any possible inadequate responses to herbal medicine. Also, regarding patients who consume herbal medicine before visiting a health facility that may harm their treatment outcomes, 56.7% strongly agreed, 24.6% agreed, 12.0% were neutral, 2.6% disagreed, and 4.2% strongly disagreed (table-3).

**Table 3: Medical Professionals' Knowledge of the Safety of Herbal Medicines.**

Characteristics	Variables	n (%)
<b>Potential Pharmacokinetic s Interaction due to herbal medicine</b>	Strongly	
	Disagree	11(3.6)
	Disagree	21(6.8)
	Neutral	33(10.7)
	Agree	98(31.7)

	Strongly Agree	146(47.2)
<b>Drug-metabolising enzymes may be inhibited or induced by herbal medicine products.</b>	Strongly Disagree	10(3.2)
	Disagree	24(7.8)
	Neutral	65(21.0)
	Agree	96(31.1)
	Strongly Agree	114(36.9)
<b>Currently, the safety of herbal medicines is misunderstood and feared.</b>	Strongly Disagree	29(9.4)
	Disagree	36(11.7)
	Neutral	49(15.9)
	Agree	102(33.0)
	Strongly Agree	93(30.1)
<b>Herbal medicine's safety may be jeopardised by circumstances affecting its quality.</b>	Strongly Disagree	14(4.5)
	Disagree	17(5.5)
	Neutral	52(16.8)
	Agree	103(33.3)
	Strongly Agree	123(39.8)
<b>Reporting possible harmful effects of herbal medicine to the Pharmacy Board is the responsibility of the health care provider.</b>	Strongly Disagree	13(4.2)
	Disagree	17(5.5)
	Neutral	35(11.3)
	Agree	84(27.2)
	Strongly Agree	160(51.8)
<b>As a health professional, I have to notify the national pharmacy board of any possible inadequate responses to herbal medicine.</b>	Strongly Disagree	20(6.5)
	Disagree	19(6.1)
	Neutral	19(6.1)
	Agree	75(24.3)
	Strongly Agree	176(57.0)

<b>Patients who consume herbal medicine before visiting a health facility may harm their treatment outcomes.</b>	Strongly Disagree	13(4.2)
	Disagree	8(2.6)
	Neutral	37(12.0)
	Agree	76(24.6)
	Strongly Agree	175(56.6)
	Agree	175(56.6)

## Health Care Providers' Knowledge of the Risks Associated with Herbal Medications.

The study revealed that there was a high level of awareness of herbal medicine safety among the respondents with an overall mean score of 4.04(0.75) and was taken as the cut-off point with a percentage frequency of 54.7% high level and 45.3% low level of awareness (figure-1; table-4).

### Table 4: Health Care Providers' Knowledge of the Risks Associated with Herbal Medications.

Awareness status	n (%)
High	169(54.7)
Low	140(45.3)

Note: Overall mean =4.04(0.75) was taken as the cut-off point. A respondent with a mean value of  $\geq 4.04$  was considered to show high awareness of herbal medicine safety, while those with a mean value of  $< 4.04$  were considered to show low awareness.

### Risks and Benefits of Herbal Medicinal Products that People Tend to Know About

With regards to the factors associated with high awareness regarding the safety of herbal medicine based on backwards stepwise binary logistics regression, it indicated that there is an association between the knowledge about drug Herbal Interaction and the level of Awareness [AOR = 1.63;95%CI:1.00–2.66], but there is no

association between years of experience and the level of awareness, and finally no association between the various department and the level of awareness except for the department of Outpatient [AOR = 0.49;95%CI:0.25–0.95] (table-5).

**Table 5: Risks and benefits of Herbal medicinal products that people tend to know about based on backward stepwise binary logistics regression (The most parsimonious model was used)**

Characteristics	Vari- able s	AOR (95%CI )	P- val ue
Year of Experience	1-5	1	
	6-10	0.58(0.32-	0.072
	Abo- ve 10	0.49(0.23-	0.058
		1.03)	
Department	othe- rs	1	
	Eme- rgen- cy	0.76(0.37-	0.449
	Outp- atien- t	<b>0.49(0.25-</b>	<b>0.034</b>
		<b>0.95)</b>	
Knowledge about Drug Interaction	No	1.51(0.84-	0.172
	Yes	<b>1.63(1.00-</b>	<b>0.048</b>
		<b>2.66)</b>	

## DISCUSSION

From our study, 59.9% of the medical professionals had just a basic understanding of herbal medicine, while 7.1% had sufficient knowledge. It's very similar to the findings of (Hilal & Hilal 2017) physicians in Bahrain which 64.4% had a basic knowledge of herbal medicine, and 2.1 % had sufficient knowledge. This implies that patients may not get the proper direction and advice when using herbal medicines. Still, the overwhelming tendency to learn more about herbal medicines showed that the participating medical professionals had a favorable outlook on them. It appears that medical professionals are eager to improve their capabilities for the benefit of their patients. Similar studies have found results consistent with ours, such as (Awodele et al. 2012), for resident doctors in Nigeria, (Clement et al. 2005) for physicians in Trinidad, and (Ghia et al. 2012) for Indian medical professionals. The desire of doctors to learn more about herbal treatments is further evidence for including them in medical school curriculums at the undergraduate level. This agrees with the findings (James et al. 2014 & Hassan et al. 2011).

It was anticipated that doctors' limited familiarity with herbal remedies would reduce their reliance on them. A startling 53.1% of the participating medical professionals were using herbal medicines; this finding is consistent with other studies that report widespread use of herbal therapy among medical professionals (Naidu et al. 2015, Koh et al. 2003 & Welna et al.2003), Many people are leaving Western medicine in favour of alternative practices like acupuncture and homoeopathy because they believe Western medicine doesn't treat the whole person (Dutta et al. 2003). The



common perception is that herbal medicine is less artificial than conventional pharmaceuticals. Contrary to popular belief, not all herbal remedies are harmless. A World Health Organization report confirms that some herbal medicines can have strong effects. Furthermore, they pose a threat when mixed with contemporary medications (WHO 2004). Overall, 45.3% of participating doctors felt that herbal therapy was safe, which is consistent with the results of a comparison study (Welna et al. 2003).

In addition, 66.7% of doctors said that personal experience was the most important factor in determining the safety of herbal medicines. Given that most participants had no formal training in herbal medicines during their academic study, this finding is unsurprising, given that practical experience is a useful source of knowledge. As few as 38.5% of doctors were aware of potential drug-herb interactions. It is the responsibility of medical professionals to inform their patients about the risks associated with taking certain medications together with certain herbs.

Our study revealed a high awareness of herbal medicine safety among medical professionals, with an overall mean score of 4.04(0.75). It was taken as the cut-off point with a frequency of 54.7% high level and 45.3% low level of awareness. However, our study found a lower level of understanding of the safety of herbal medicine compared to a survey conducted in Malaysia (Silvanathan et al. 2015), which had a higher level of awareness among health professionals. This difference might be attributable to the fact that different research methods were used to determine the level of knowledge (Chyung et al. 2017).

Our study it is indicated that there is an association between the knowledge about drug Herbal Interaction and the level of Awareness [AOR = 1.63;95%CI:1.00–2.66], but there is no association between years of experience and the level of awareness, and finally, no association between the various department and the level of awareness except for the department of Outpatient [AOR = 0.49;95%CI:0.25–0.95]. We believe it is critical to enhance primary care and general medical professionals' knowledge, attitudes, and perceptions of herbal medications and to strengthen communication between doctors and their patients. More pharmacokinetic research, studies involving pharmacogenomics (the analysis of how genes can affect an individual's response to drugs) and adverse drug events, offering continuing medical education credits for alternative medicine courses, and encouraging active collaboration between conventional medical providers and CAM providers are all ways to integrate herbal and alternative medicine into mainstream conventional medicine (Bell et al. 2002).

This study may have been limited because health professionals' responses were not independently verified to guarantee that their genuine attitudes toward herbal medicine were included. While more investigation is undoubtedly required, the findings of our study could provide a baseline for discussing herbal medicine safety among Sierra Leonean medical professionals. There is a possibility for recall bias as data was collected based on self-report, and no causal effect can be inferred as the study employed a cross-sectional design. Also, the findings from this study cannot be generalised for the whole population of healthcare

professionals since it the conducted in three public hospitals in Freetown.

## CONCLUSIONS

Based on the current study results, it is clear that healthcare professionals in the study area do not have a high level of awareness about the safety of herbal medicines. Therefore, the Pharmacy Board should ensure that all healthcare professionals receive consistent and coordinated education to establish a practical pharmacovigilance framework for tracking herbal medicine. In addition, the results suggest further research is needed into how medical professionals handle herbal medicine before hospital arrival.

## ABBREVIATIONS

SPSS- Statistical Packages for Social Sciences  
CAM- Complementary and Alternative Medicine

ODCH- Ola During Children's Hospital

PCMH- Princess Christian Maternity Hospital

WHO- World Health Organization

## Ethical Approval and Informed Consent

The Njala University Research and Ethics Committee in Sierra Leone approved the research. The health professionals were informed of the study's goals, and those who gave consent were interviewed. All information provided by participants was kept confidential, and they were free to stop participating in the study at any time. Study participants gave their permission by signing a consent form.

## Data availability

This study's supporting materials can be obtained from the corresponding author.

## Funding

No funding was obtained for this study.

## Competing interests

The authors report no financial or other biases.

## Authors' contributions

AO conceived the study, designed the study, interpreted the results, and drafted the initial version of the manuscript. PBJ and CB both made significant contributions to the study's design, analysis, interpretation of results, and manuscript writing. SMTW, AK and AL contributed to the final editing and interpretation of the results. Everyone involved has reviewed the final draft and given their stamp of approval.

## Acknowledgements

To whom the authors of this piece are most indebted, healthcare professionals and the administration of the hospitals where the research was conducted. We appreciate the help of all the research assistants who contributed to the data collection phase of this project.

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