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Assessment of the Use of Nutraceuticals Among Health Practitioners in a Tertiary Hospital in Enugu State, Nigeria

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ABSTRACT

Nutraceuticals gain recognition as complements to medicine and preventative care. Despite rising patient use, Nigerian healthcare professionals' attitudes and knowledge remain unclear. A cross-sectional survey was conducted among 185 healthcare professionals. Data were collected using a structured questionnaire covering sociodemographic characteristics, knowledge, attitudes, and perceptions of nutraceuticals. Descriptive statistics were used to summarize responses, while chi-square tests assessed associations between sociodemographic variables and study outcomes at a p-value less than 0.05 considered to be statistically significant.Most respondents were female (55.7%), aged 21–35 (68.6%), and were nurses (54.1%) or pharmacists (29.2%). Good knowledge was seen in 55.1%, especially for iron/folic acid, but less for omega-3 (16.2%) and antioxidants (27.6%). Positive attitudes were held by 53.5%, agreeing on nutraceuticals' role in care/prevention, but views varied on superiority to drugs. Favorable perceptions were at 56.2%, endorsing roles in health/malnutrition, but skepticism existed for first-line use/weight loss. Knowledge linked to age (p=0.024); perception to gender (p=0.034) and profession (p=0.016). Attitudes had no sociodemographic links.Nigerian healthcare professionals mostly know about nutraceuticals, but education and regulation are needed for safe use and better patient results.

INTRODUCTION

Nutraceuticals are now at the forefront of modern medicine due to the increased interest in illness prevention, health maintenance, and individualized healthcare (Dlamini *et al.*, 2021). Food-derived products that offer physiological benefits and protection against chronic diseases are referred to as nutraceuticals, a term derived from the words "nutrition" and "pharmaceuticals"(Daliu *et al.*, 2019). These goods, which contain separated or refined food ingredients, are frequently sold as medications in the form of tablets, capsules, or powders and are not usually associated with everyday foods (Daliu *et al.*, 2019; R & Nnenna, 2022). Despite their widespread use around the world, nutraceuticals are not a separate regulatory category in nations such as the United States; rather, they are regulated by the Food and Drug Administration (FDA) under the Federal Food, Drug, and Cosmetic Act, which governs dietary supplements and food additives(FD&C Act,2008). Nutritional supplements are also defined under the Dietary Supplement Health and Education Act of 1994 as oral items that contain nutritional elements, such as vitamins, minerals, plant extracts, and amino acids, with the purpose of enhancing the human diet (Dietary Supplement Health and Education Act, 1994).

Nutraceuticals are becoming more and more popular, yet there are still serious issues with consumer safety, governmental control, and product quality(Bailey, 2018). Claims that nutraceutical products are "organic" or contain "exotic ingredients" are frequently made in the global marketplace without sufficient evidence of their safety or effectiveness (Qureshi *et al.*, 2020). Furthermore, these problems are made worse by the fact that many manufacturers put business ahead of quality(Bailey, 2018). With more than 85,000 Nutraceuticals already on the market in the United States alone and an estimated 1,000 new items added every year, healthcare professionals are frequently left to shoulder the responsibility of assuring proper administration as the industry grows (Bailey, 2018).

As health paradigms move from curative to preventive methods, nutraceuticals' inclusion into healthcare systems has accelerated(Dey *et al.*, 2018a). Increased consumer and practitioner interest in functional foods and supplements has been fueled by factors such as rising healthcare expenditures, advances in diagnostics, and the global emphasis on wellness and proactive health management (BO *et al.*, 2022; Johnston *et al.*, 2017). The active ingredients in these products, which have been connected to health benefits in ailments including diabetes, cardiovascular disease, obesity, neurological disorders, and osteoporosis, include antioxidants, phytochemicals, essential oils, vitamins, and minerals(Oluwafemi *et al.*, 2022).

To increase public awareness and stimulate demand for their products, pharmaceutical and nutraceutical companies have responded by stepping up their direct-to-consumer advertising (DTCA)(Qureshi *et al.*, 2020). While DTCA has sparked debate—some critics argue it

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promotes irrational self-medication, while others claim it enhances disease awareness and patient engagement-it has undeniably influenced health-seeking behaviors and prescription trends (Qureshi *et al.*, 2020).

The industry for nutraceuticals has seen large investments in industrialized nations, frequently outspending on traditional medications(Johnston *et al.*, 2017). However, there is still a lack of information on the use and perception of nutraceuticals in many developing nations, particularly those in South Asia and sub-Saharan Africa(Hussain *et al.*, 2020; Menon *et al.*, 2021). These areas frequently have fragmented regulatory environments, and healthcare institutions do not have the infrastructure necessary to thoroughly monitor supplement quality and usage (Hussain *et al.*, 2020; Menon *et al.*, 2021). Healthcare providers who are supposed to counsel patients on the proper use of these items are left with a knowledge gap as a result(Ajagu, 2025).

Health care providers, such as doctors, pharmacists, nurses, and dietitians, are essential in helping patients make decisions about dietary supplements and nutraceuticals(Strocka *et al.*, 2024). Patient behavior and public health outcomes can be greatly impacted by their attitudes, perceptions, and knowledge of these items(Ajagu *et al.*, 2026; Bukic *et al.*, 2018). However, research indicates that a large number of healthcare professionals could not have had formal training or have a thorough grasp of(Metwally *et al.*, 2023) nutraceuticals, which could lead to a variety of clinical practices and possibly inaccurate information (Ajagu *et al.*, 2026; BO *et al.*, 2022; Metwally *et al.*, 2023). The integration of nutraceuticals into evidence-based healthcare may be made more difficult by obstacles such patient-related variables, limited chances for ongoing education, financial limitations, and lack of access to trustworthy scientific information (Chen *et al.*, 2024; Nnenna Ajagu, 2025).

In light of these complications, it is critical to evaluate the present state of healthcare professionals' perceptions and knowledge regarding dietary supplements and nutraceuticals (Nnenna Ajagu, 2025; Strocka *et al.*, 2024). Finding gaps, guiding policy choices, and creating educational initiatives that can encourage the safe and efficient use of these items all depend on this kind of assessment. In order to improve public health outcomes by well-informed clinical guidance, this study aims to investigate healthcare professionals' knowledge, attitudes, and behaviors regarding nutraceuticals and dietary supplements.

LITERATURE REVIEW

Nutraceuticals and dietary supplements offer alternative approaches to healthcare, blurring the lines between nutrition and medicine(Sharif & Khalid, 2018). Stephen DeFelice coined "nutraceutical" in 1989 to describe food-derived substances with health benefits, including disease prevention(Dey *et al.*, 2018). Nutraceuticals encompass isolated nutrients, supplements, herbal products, functional and therapeutic foods, and fortified foods(Daliu *et al.*, 2019). Dietary supplements enhance nutrient intake, available as tablets, capsules, or powders containing vitamins, minerals, and botanicals. Unlike drugs, nutraceuticals aim to maintain physiological function, leading to less regulation and potential manufacturer claims mixing nutrition and medication(Oluwafemi *et al.*, 2022). Despite limited validation, nutraceutical demand grows due to aging populations, chronic diseases, and a focus on prevention. Functional foods, medical foods, and farmaceuticals further expand the nutraceutical category(Daliu *et al.*, 2019). Nutraceuticals may help prevent/treat diabetes, obesity, cardiovascular disease, gastrointestinal and neurological disorders, and some cancers. They can enhance immunity, regulate oxidative stress and gene expression, and improve mitochondrial function. Antioxidants combat free radicals, reducing inflammation. Probiotics improve gut health and modulate immune responses(Bailey, 2018).

MATERIALS AND METHODS

Study Design

This research is a descriptive cross-sectional investigation that was conducted in hospitals to assess the knowledge, attitudes and perception of healthcare practitioners on the use of nutraceuticals, in tertiary hospitals in Enugu State Nigeria.

Study Site

The research was conducted in tertiary hospitals in Enugu University of Nigeria Teaching Hospital, (UNTH, Ituku/Ozolla, and Enugu State University Teaching Hospital (ESUTTH), Parklane) because they ensure greater degree of representation as they have specialized and organized clinics.

Study Population and Size

According to the information from the administrative staff, at the time of conducting this research the number of staff in both hospitals consists of estimated 1,992 healthcare professionals gotten from UNTH and ESUTTH Parklane hospitals. That is 1147 in UNTH and 845 in ESUTTH Parkline. Using the sample size calculator, assuming a confidence level of 95% with a confidence interval of +/-12, a sample 175 was deemed adequate for the study. An additional 10% of the total calculated sample size (175) was added to accommodate non-usable up questionnaire due to improper filling.

Eligibility Criteria

Healthcare professionals who are eligible for the study must be doctors, pharmacists, nurses working in University of Nigeria Teaching Hospital and/or Enugu State University of Science and technology, Parkline. Health professional who are working in University of Nigeria Teaching Hospital and/or Enugu State University of Science and technology, Parkline, who refused to participate are excluded.

Study Instrument

The questionnaire was adapted from Shrestha *et al.*(2021). The instrument was structured to consist of two sections. Section A which evaluates the sociodemographic characteristics of the participants. Section B was divided in to three part namely: Part 1: Which contains seven(7) questions that assessed the knowledge of health care worker on the use of nutraceuticals Part 2: Contains nine (9) questions that evaluates the participates attitude on the use of nutraceuticals, Part 3: Perception on the use of nutraceuticals was assessed with eleven(11) question. Part one is a yes and no response question, part 2 and part 3 are questions on a five likert scale of Strongly agree (SA) / Agree (A) / Neutral (N) / Strongly disagree (SD) / Disagree (D).

The instrument was face validated by four healthcare practitioners; one doctor in working in a general hospital, and three pharmacists in faculty pharmaceutical sciences. A reliability test was then carried out, which has a high Cronbach Alpha of 0.786, which is considered reliable.

Data Collection

The study instrument was presented to the participant in their respective clinical meeting when most of them will be present. When deemed essential, verbal clarifications and instructions was proffered to the participants.

Ethical Issues

Ethical approval was obtained from Enugu State University of Science and Technology Teaching Hospital parklane, with a number ESUT/HREC/2025/07/067. Informed consent was obtained from participants, and confidentiality was ensured.

Data Analysis

The data collected from the questionnaire were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistic (mean, frequencies, percentage) was used to summarize demographic data and knowledge scores. Inferential statistics (chi-square tests) was used to compare knowledge scores, practice, and attitudes among different groups of healthcare practitioners.

RESULT AND DISCUSSIONS

Sociodemographic characteristics of respondents (N=185)

Table1 shows the sociodemographic characteristics of respondents in the study. A total of 185 health practitioners participated in the study. Most of the participants are female (55.7%), also, mostof the respondents were between the age of 21-35 years (68.6%). Similarly, majority of the respondents were nurses (54.1%), followed by Pharmacists(29.2%).

Table 1: Sociodemographic characteristics of respondents (N=185)

Variables	Frequency (%)
Gender	
Male	82(44.3)
Female	103(55.7)
Age (in years)	
21-35	127 (68.6)
36-50	50(27.0)
>50	8(4.3)
Profession	
Medical officer	2(1.1)
Registrar	26(14.1)
Nurse	100(54.1)
Pharmacist	54(29.2)
Consultant	3(1.6)
Years of experience	
<1	5(2.7)
1-5	109(58.9)
>5	71(38.4)

Knowledge assessment showed that 55.1% had good knowledge. Awareness was high regarding WHO recommendations on iron (93.0%) and folic acid (91.4%) supplementation, though gaps remained in awareness of omega-3 fatty acids (16.2%) and antioxidants (27.6%) (See Table 2).

Table 2: Knowledge of health practitioners on the use of Nutraceuticals (N=185)

S/N	Questions	Correct answers
		n(%)
1	Does the WHO recommend the use of omega-3 fatty acid supplements for cardiovascular health	30(16.2)
2	Does the WHO recommend the use of antioxidant supplements (eg: vitamin C, E) for preventing chronic diseases	51(27.6)
3	According to the WHO, can certain nutraceutical (eg: curcumin, ginger) be used as adjunctive therapy for managing pain or inflammation	148(80.0)
4	Does WHO recommend iron supplements for pregnant women to prevent or treat iron-deficient anemia	172(93.0)
5	According to WHO, can folic acid supplements be used to prevent neural tube defects in newborns	169(91.4)
6	Are you aware of any regulatory body responsible for the control of nutraceutical in Nigeria	100(54.1)
7	Do you consider available information on nutraceutical sufficient for clinical decision making	127(68.6)

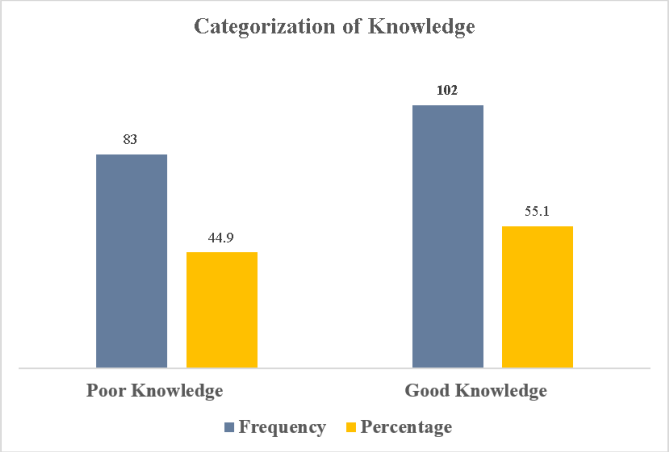

Figure 1: Knowledge of health practitioners on the use of Nutraceuticals (N=185)

Attitude analysis revealed that 53.5% demonstrated positive attitudes, with most agreeing that nutraceuticals play a role in patient care and preventive healthcare, though opinions were divided on their superiority to conventional medicines (See Table 3).

Table 3: Attitude of health Practitioners on the use of Nutraceuticals with Sociodemographic (N=185)

S/N	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean±SD
1	I believe nutraceuticals have a significant role in patient care	-	-	2(1.1)	74(40.0)	109(58.9)	4.58±0.517
2	Nutraceuticals are valuable addition to conventional treatment option	2(1.1)	2(1.1)	16(8.6)	78(42.2)	87(47.0)	4.33±0.769
3	I am enthusiastic about incorporating nutraceutical into my practice	-	-	41(22.2)	72(38.9)	72(38.9)	4.17±0.765
4	Nutraceuticals can improve patient's outcome in my specialty	-	-	42(22.7)	73(39.5)	70(37.8)	4.15±0.765
5	Nutraceuticals are more beneficial than conventional medications for certain conditions	20(10.8)	36(19.5)	63(34.1)	45(24.3)	21(11.4)	3.06±1.152
6	I feel comfortable discussing nutraceutical with my patients	-	4(2.2)	30(16.2)	97(52.4)	54(29.2)	4.09±0.732
7	Nutraceuticals can help reduce healthcare cost in the long run	5(2.7)	13(7.0)	39(21.1)	60(32.4)	68(36.8)	3.94±1.051
8	I believe nutraceutical have a place in preventive healthcare	-	2(1.1)	11(5.9)	78(42.2)	94(50.8)	4.43±0.656
9	patients are informed about potential side effects or ADRs of nutraceutical	18(9.7)	25(13.5)	70(37.8)	47(25.4)	25(13.5)	3.19±1.135

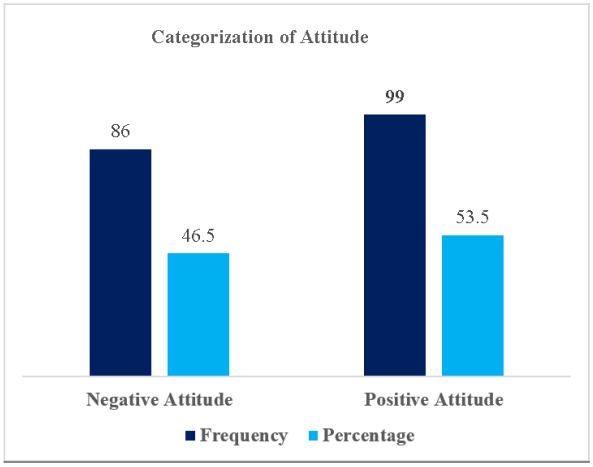

Figure 2: Attitude of health Practitioners on the use of Nutraceuticals with Sociodemographic

Perceptions were favorable in 56.2% of respondents, with many endorsing their role in maintaining health and addressing malnutrition, but skepticism persisted regarding their use as first-line therapies or for weight reduction (see table 4)

Table 4: Perception of health Practitioners on the use of Nutraceuticals with Sociodemographic (N=185)

S/N	Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean±SD
1	Nutraceuticals are needed when a person feels tired and rundown	2(1.1)	25(13.5)	38(20.5)	78(42.2)	42(22.7)	3.72±0.998
2	Nutraceuticals help in increasing one's physical health	-	2(1.1)	21(11.4)	92(49.7)	70(37.8)	4.21±0.692
3	Nutraceuticals can be used as first line of treatment for certain health conditions	26(14.1)	46(24.9)	53(28.6)	41(22.2)	19(10.3)	2.90±1.200
4	One can skip meals and just take nutraceuticals (dietary supplements)	5(2.7)	5(2.7)	33(17.8)	85(45.9)	57(30.8)	3.99±0.918
5	Body fat can be lost by taking certain type of nutraceutical combined with exercise	61(33.0)	59(31.9)	41(22.2)	20(10.8)	4(2.2)	2.17±1.075
6	Patients are adequately informed about the benefit and risks of nutraceutical	13(7.0)	34(18.4)	49(26.5)	65(35.1)	24(13.0)	3.29±1.122
7	Nutraceutical hold great potential for future because they are convenient for today's lifestyle	-	-	23(12.4)	98(53.0)	64(34.6)	4.22±0.651
8	Nutraceutical supplementation can play a role in treating malnutrition in the impoverished population	3(1.6)	2(1.1)	22(11.9)	92(49.7)	66(35.7)	4.17±0.800
9	By using nutraceutical, it may be possible to eliminate the need for conventional medications, reducing the chances of any adverse effect	20(10.8)	13(7.0)	60(32.4)	67(36.2)	25(13.5)	3.35±1.137
10	Healthy individuals should take nutraceuticals to maintain health	1(0.5)	5(2.7)	8(4.3)	89(48.1)	82(44.3)	4.33±0.733
11	There is a lack of awareness about nutraceutical supplements and a range of supplements available in the market	8(4.3)	29(1.1)	11(5.9)	69(37.3)		4.30±0.959

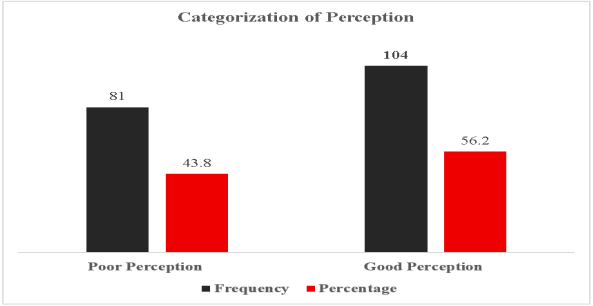

Figure 3: Perception of health Practitioners on the use of Nutraceuticals with Sociodemographic

Association of Knowledge of health Practitioners on the use of Nutraceuticals with Sociodemographic

In terms of age, a higher proportion of health Practitioners aged 36-50 had a better knowledge on the use of Nutraceuticals compared to those aged above 50 (64.0% Vs 12.5%). Despite the difference, the association between age and knowledge was statistically significant ($\chi2$ =7.501, p=0.024). Similarly, the Registrars and a better knowledge compared to Consultants and Pharmacists (69.2% Vs 66.7% Vs 57.4%). While this may suggest that profession may enhance knowledge of nutraceuticals, the association was not statistically significant ($\chi2$ =3.450, p=0.486). This is an indication that age rather than profession contributes more to knowledge of health practitioners on the use of nutraceuticals (See table 5).

Table 5: Association of Knowledge of health Practitioners on the use of Nutraceuticals with Sociodemographic (N=185)

Variables	Poor Knowledge	Good Knowledge	χ2(df)	p-value
Gender	n (%)	n (%)	0.055(1)	0.814
Male	36(43.9)	46(56.1)		
Female	47(45.6)	56(54.4)		
Age (in years)			7.501(2)	0.024
21-35	58(45.7)	69(54.3)		
36-50	18(36.0)	32(64.0)		
>50	7(87.5)	1(12.5)		
Profession			3.450(4)	0.486
Medical officer	1(50)_	1(50)		
Registrar	8(30.8)	18(69.2)		
Nurse	50(50.0)	50(50.0)		
Pharmacist	23(42.6)	31(57.4)		
Consultant	1(33.3)	2(66.7)		
Years of experience			0.494(2)	0.781
<1	3(60.0)	2(40.0)		
1-5	48(44.0)	61(56.0)		
>5	32(45.1)	39(54.9)		

Association of Attitude of health Practitioners on the use of Nutraceuticals with Sociodemographic

The result generally indicates no statistically significant association, as all reported p-value were greater than 0.05. Majority of the health practitioners who are either medical officer/consultants had a better attitude on the use of nutraceuticals compared to the ones who were registrars and nurses (100% Vs 57.7% Vs 52.0%). Despite these differences, the association between profession and attitude was not statistically significant ($\chi2$ = 4.886, p =0.299). Also, heath practitioners aged 36-50 had a better attitude on the use of nutraceuticals compared to those aged 21-35 (62.0 Vs 52.0;). The association is not statistically significant ($\chi2$ =4.184, p= 0.123) see table 6

Table 6: Association of Attitude of health Practitioners on the use of Nutraceuticals with Sociodemographics (N=185)

Variables	Negative Attitude	Positive Attitude	χ2(df)	p-value
Gender	n (%)	n (%)	0.312(1)	0.577
Male	40(48.8)	42(51.2)		
Female	46(44.7)	57(55.3)		
Age (in years)			4.184(2)	0.123
21-35	61(48.0)	66(52.0)		
36-50	19(38.0)	31(62.0)		
>50	6(75.0)	2(25.0)		
Profession			4.886(4)	0.299
Medical officer	0(0.0)	2(100)		
Registrar	11(42.3)	15(57.7)		
Nurse	48(48.0)	52(52.0)		
Pharmacist	27(5.0)	27(5.0)		
Consultant	0(0.0)	3(100)		

Years of experience			2.576(2)	0.276
<1	4(80.0)	1(20)		
1-5	48(44.0)	61(56.0)		
>5	34(47.9)	37(52.1)		

Association of Perception of health Practitioners on the use of Nutraceuticals with Sociodemographic (N=185)

Most of the health Practitioners who were females had a better perception on the use of Nutraceuticals compared to the male's counterpart (63.1% Vs 47.6%), this difference was statistically significant ($\chi 2$ =4.483, p=0.034). Likewise, majority of the health Practitioners who were either consultant/medical officers had a better perception on the use of Nutraceuticals compared to the ones who were Registrar (100% Vs 73.1% Vs 63.0%), the association between profession and perception was statistically significant ($\chi 2$ =12.136, p=0.016). This indicates that there's an association between sociodemographic and perception of health practitioners on the use of nutraceuticals (Table 7).

Table 7: Association of health Practitioners on the use of Nutraceuticals with Sociodemographic (N=185)

Variables	Poor Perception	Good Perception	χ2(df)	p-value
Gender	n (%)	n (%)	4.483(1)	0.034
Male	43(52.4)	39(47.6)		
Female	38(36.9)	65(63.1)		
Age (in years)			1.215(2)	0.545
21-35	55(43.3)	72(56.7)		
36-50	21(42.0)	29(58.0)		
>50	5962.5)	3(37.5)		
Profession			12.136(4)	0.016
Medical officer	0(0.0)	2(100)		
Registrar	7(26.9)	19(73.1)		
Nurse	54(54.0)	46(46.0)		
Pharmacist	20(37.0)	34(63.0)		
Consultant	0().0)	3(100)		
Years of experience			1.272(2)	0.529
<1	3(60.0)	2(40.0)		
1-5	50(45.9)	59(54.1)		
>5	28(39.4)	43(60.6)		

Discussion

This study assessed the knowledge, attitudes and perception level of healthcare practitioners in Enugu state on the use of nutraceuticals. Most of the health practitioners studied have a good knowledge on the use of Nutraceuticals, they showed a positive attitude as well as a good perception on the use of nutraceuticals.

Knowledge of healthcare practitioners; The findings indicate a significant majority of this study participants showed a good understanding of nutraceuticals, with a greater awareness of iron and folic acid supplements than of antioxidants or omega-3 fatty acids. This incomplete understanding is consistent with Shrestha *et al.*(Shrestha *et al.*, 2021), who found that despite high rates of consumption, nearly half of patients in Nepal lacked sufficient knowledge about nutraceuticals, indicating that awareness is frequently biased toward supplements like vitamins and minerals that are frequently promoted. Similar to the current study's result of low regulatory awareness, Hussain *et al.*(Hussain *et al.*, 2020) noted knowledge gaps among Pakistani doctors and patients, particularly with reference to adverse effects and dosage techniques. In contrast, Strocka *et al.*(Strocka *et al.*, 2024)reported that a larger proportion of healthcare professionals in Poland claimed knowledge of dietary supplements, though variation existed between professions and their primary sources of information. These differences may reflect disparities in national health policies, educational exposure, and availability of official guidelines.

The current study revealed a generally favorable attitude toward nutraceuticals, with many participants appreciating their benefits in preventative care but being cautious about substituting them for traditional medicines. The results of Wagner *et al.*(Wagner *et al.*, 2024)in Germany, where the majority of general practitioners acknowledged the value of nutritional supplements in practice and believed in their effectiveness, but also demanded more medical education and established protocols, are similar to this cautious optimism. The professional differences seen in the current study, where pharmacists showed more positive perspectives, were further supported by Bukic etal.(Bukic *et al.*, 2018), who found that pharmacy students

had higher knowledge and more positive attitudes than dental or medical students. The overall balance between acceptance and caution also resonates with Wierzejska *et al.*(Wierzejska *et al.*, 2018), who found that although future healthcare professionals in Poland were familiar with dietary supplements, they acknowledged the need for stronger educational grounding.

Regarding attitudes, this study found that medical experts acknowledged the benefits of nutraceuticals in enhancing physical health, reducing malnutrition, and fostering wellness, but they were dubious about its application as first-line treatments or for weight loss. This is in line with Menon *et al.*(Anushka Menon *et al.*, 2021), who discovered that while views of efficacy differed among product categories, customer desire to utilize nutraceuticals was influenced by characteristics like affordability, occupation, and the COVID-19 epidemic. Similar to the current study's emphasis on evidence-based evaluation, Strocka et al(Strocka *et al.*, 2024) reported that Polish healthcare professionals ranked supplement composition as the most important consideration when making recommendations. Meanwhile, Wagner *et al.* reported that self-use of dietary supplements strongly shaped physicians' perceptions, paralleling findings from Bukic *et al.*(Bukic *et al.*, 2018), where prior personal use influenced willingness to recommend supplements. This suggests that experiential familiarity, alongside professional training, may shape healthcare professionals' perceptions across contexts.

These trends were further supported by sociodemographic variables. Significant relationships between knowledge and age, as well as between attitudes, gender, and profession, were found in this study; pharmacists and female respondents expressed more positive opinions. These results are consistent with Bukic et al and Ajagu N,(Bukic *et al.*, 2018; Nnenna Ajagu, 2025) who emphasized the professional distinctions between medical, dentistry, and pharmacy students, and Hussain *et al.*(Hussain *et al.*, 2020), who emphasized the significance of physician training to fill in knowledge gaps Strocka et al and Abasie et al(R & Nnenna, 2022; Strocka *et al.*, 2024) on the other hand, found that variations were more noticeable between professional groups than between demographic traits like gender, indicating that context-specific factors influence variation.

All things considered, the current study contributes to the global literature by verifying that medical professionals typically have positive attitudes and favorable impressions about nutraceuticals, although they frequently lack thorough information, particularly in areas that public health programs place less emphasis on. Similar to earlier research(Hussain *et al.*, 2020; Shrestha *et al.*, 2021; Wagner *et al.*, 2024), it emphasizes the critical need for organized instruction, transparent regulations, and evidence-based recommendations to improve medical professionals' capacity to provide patients with effective counseling. However, the results also show distinct trends in Nigeria, where there is a significant dependence on understanding of iron and folic acid but a low awareness of regulatory control. This disparity is less noticeable in European environments where official norms are more well-established.

CONCLUSION

This study done in Enugu among healthcare practitioners shows that although there are still significant gaps in some areas, such as knowledge of WHO recommendations on omega-3 fatty acid use, antioxidant use, and the regulatory framework in Nigeria, this study showed that healthcare professionals had moderate to good knowledge, generally positive attitudes, and favorable perceptions regarding the use of nutraceuticals and dietary supplements. Although the majority of respondents recognized the value of nutraceuticals as dietary supplements, preventative healthcare, and patient care adjuncts, they were cautious about using them in place of first-line treatments or traditional medication. Demographic characteristics that may influence professional attitudes and therapeutic procedures are highlighted by the significant correlations found between knowledge and age, as well as between perception and gender and profession. All things considered, the results highlight the necessity of improved instruction, regulatory knowledge, and evidence-based recommendations to assist the safe and efficient incorporation of nutraceuticals into healthcare delivery, improving patient outcomes and bolstering preventive health initiatives.

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