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55TH SCIENTIFIC CONFERENCE & Annual General Meeting

Theme:

Advancing Maternal, Infant, And Young Child Nutrition In Nigeria:

Innovations And Strategic Partnerships For Sustainable Impact.

CONFERENCE PROCEEDINGS:

Book of Extended Abstracts

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OCS1

Comparative Study on the Nutrients, Antinutrients, Amino Acid Profile and *In Vitro* Protein Digestibility of *Vigna unguiculata* L. Walp Sampea 20-T and *Dan misira* Cowpea

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Keywords: *Vigna unguiculata, nutrient, protein digestibility, comparative*

Highlight:

- The improvement of Sampea 20-T did not depreciate the nutritional quality
- Protein digestibility of Sampea 20-T was higher than *Dan misira* indicating higher bioavailability of the protein content

BACKGROUND AND OBJECTIVE

Cowpea (*Vigna unguiculata L.Walp*) is an important legume native to Africa, especially the sub-Saharan region [1]. It is an annual crop and a useful protein in low/middle-income countries faced with food insecurity. SAMPEA 20-T is a pod borer resistant (PBR) cowpea variety developed by the Institute for Agricultural Research (IAR), Ahmadu Bello University, Zaria through international collaboration and was released in 2019 to curb pest infestation, to increase cowpea yield and improve food security [2]. The improvement in Sampea 20-T did not particularly focus on the nutritional quality, hence, the aim of this study to compare the nutrient, anti-nutrient, protein digestibility and amino acid profile of the new cowpea cultivar Sampea 20-T and a local cowpea cultivar *Dan misira*.

MATERIALS AND METHODS

Fully mature seeds of *Vigna unguiculata L. Walp* cultivars (Sampea 20-T) identified with voucher number F/SEED 2021 were obtained from the Institute of Agriculture (IAR). The local variety of cowpea was obtained from a farmer in Samaru, zaria, and was authenticated at the herbarium laboratory, department of botany, Ahmadu Bello University, Zaria with voucher number ABU01461. The Association of Official Analytical Chemists (AOAC) method of 2006 [3] was used for the analyses. SPSS version 20 was used for statistical analyses; T-test was used to compare means.

RESULTS AND DISCUSSION

The results of proximate analysis revealed significant decrease in moisture content, crude fat and crude fiber content of *Dan misira* compared with Sampea 20-T while crude protein and carbohydrate contents were higher in Sampea 20-T. Mineral content for all minerals analysed were significantly higher in Sampea 20-T than in *Dan misira*. The result of amino acid profile showed higher values for leucine, lysine, isoluesine phenylalanine, valine, methionine and threonine in Sampea 20-T while other amino acids where higher in *Dan misira*. Protein digestibility of Sampea 20-T was seen to be 59.33±8.75, significantly ($p<0.005$) higher than 42.23±2.29 of *Dan misira*. The anti-nutrients; tannin and trypsin inhibitor of Sampea 20-T showed higher values than that of *Dan misira*. Contrarily, the phytate and oxalate contents of *Dan misira* were shown to be higher than that of Sampea 20-T.

CONCLUSION AND RECOMMENDATIONS

The result, showed that the nutritional quality of Sampea 20-T was not compromised by the modification. All nutrient analyzed were found to be at acceptable levels with mineral concentrations increasing in Sampea 20-T [4]. Protein digestibility of Sampea 20-T was higher that *Dan misira* indicating higher bioavailability of the protein content which agrees with other studies [5]. It is recommended that the improved cultivar should be embraced as good protein source and be explored for industrial production of protein rich foods.

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OCS3

Nutrient Potential of Speckled African yam bean – honey paste

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KEYWORDS: Nutrient, potential, African yam bean honey-paste.

BACKGROUND AND OBJECTIVES:
The increasing demand for nutrient dense, affordable and functional food has necessitated attention in underutilized legumes and sweeteners without artificial additives (1). African yam bean (*Sphenostylis stenocarpa*) is an underexploited legume in Africa; despite being nutrient-rich it is mostly untapped (2). Supplementing African yam bean with honey in the form of paste enhances palatability and improves the nutritional profile of both ingredients making it a newly made food product (3). This study evaluated the nutrient potential of speckled African yam bean-honey paste.

METHOD:
Speckled African yam bean seeds were processed into flour and mixed with honey in a standardized ratio (4 parts of honey) which was 504g to (1 part of speckled African yam bean flour) which was 126g. The proximate composition (moisture, fibre, ash, fat, carbohydrate, protein), minerals (iron, zinc, calcium, magnesium and potassium) and vitamins (A, C, E and B_{12}) of the samples were determined using the standard methods of analysis of the Association of Official Analytical Chemists.

RESULTS AND DISCUSSIONS:
The speckled African yam bean honey paste demonstrated moisture as (21.72%), protein content (23.89%), carbohydrates (44.02%), fibre (0.21%), fat (9.06%) and ash (1.10%) . Vitamin analysis revealed significant levels of beta carotene (221.40mg/100g), vitamin C (96.85mg/100g), vitamin E (15.32mg/100g) and vitamin B_{12} (22.09mcg). The paste was also rich in essential minerals, notably potassium (227.96mg/100g), calcium (196.82mg/100g), magnesium (55.40mg/100g), iron (0.75 mg/100g) and zinc (0.75 mg/100g).

Table 1: Proximate, vitamin and mineral composition of speckled African yam bean-honey paste per 100 g

Parameters	SAYBHP
Moisture (%)	21.72 ± 0.01
Ash (%)	1.10±0.17
Crude protein (%)	23.89± 0.04
Crude fat (%)	9.06±0.05
Crude Fibre (%)	0.21±0.00
Carbohydrate (%)	44.02±1.18
Betacarotene (mcgRAE)	221.40±0.01
Vitamin C (mg)	96.85 ± 0.02
Vitamin E (mg)	15.32±0.02
Vitamin B_{12}(mcg)	22.09±0.06
Iron (mg)	0.75±0.01
Potassium (mg)	227.96±0.02
Magnesium (mg)	55.40±0.11
Zinc (mg)	0.75±0.01
Calcium (mg)	196.82±0.02

Values are means ± Standard deviations of analysis
SAYBF: Speckled African yam bean flour
HN: Honey
SAYBHP: Speckled African yam bean honey paste
RAE: Retinol activity equivalent

CONCLUSION AND RECOMMENDATION:

Speckled African yam bean honey paste is a nutrient-dense food, providing complete plant-based protein, dietary fibre, essential micronutrients and antioxidants. Its nutritional profile makes it suitable for addressing protein-energy malnutrition and micronutrient deficiencies. Sensory evaluation is recommended to improve consumer acceptability. Promoting the paste as a functional food could enhance dietary diversity in developing countries.

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OCS8

Cookies produced from sweet potato, soybean and wheat bran composite flour blends exhibited effective *in vitro* α-amylase and α-glucosidase inhibition activities

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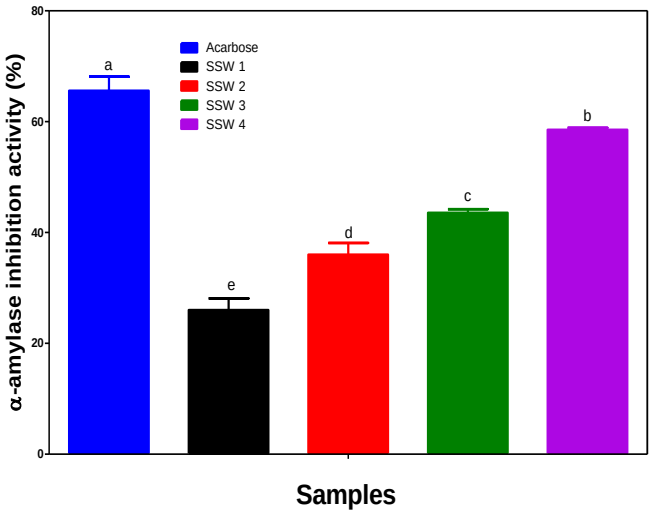
Keywords: *Chemical composition, cookies, in-vitro α-amylase and α-glucosidase inhibition*

Background: Many developing countries are facing a great problem of diet-related type-2 diabetes mellitus (T2DM) health issues due to the improper management of high blood sugars in the body [1]. The T2DM has been reported to be efficiently managed through the consumption of naturally available plant-based functional snacks such as cookies, a consumer-friendly alternative to meet the nutritional requirements for the management of several chronic diseases in the body [2].

Materials and Methods: Composite flour blends of sweet potato, soybean and wheat bran were formulated in four ratios (SSW 1, 2, 3 and 4) (100:0:0, 80:15:5, 70:20:10, 60:25:15, respectively) and evaluated against a control sample (100% wheat flour) for their α-amylase and α-glucosidase inhibition properties using their respective different standard methods according to the manufacturers' kits. The α-amylase is a prominent enzyme found in the pancreatic juice and saliva that hydrolyzed complex starches to oligosaccharides while α-glucosidase is the enzyme found in the mucosal brush border of the small intestine that hydrolyzed oligosaccharides to glucose and other monosaccharides [3].

Result and Discussion: Fig 1 showed the α-amylase inhibition abilities of the cookie samples from composite flour SSW 1-4. The percentage inhibition of the α –amylase by the cookie samples ranged from 23.58-61.73% with samples SSW 1 and SSW 4 having the significant ($p<0.05$) least and highest inhibition activities, respectively when compared to other cookie samples SSW 2 and 3. Interestingly, all the samples showed lower activities than the 70% obtained for acarbose, a common anti-diabetic drug (Fig 1). The highest α–amylase inhibition (~62%) exhibited by sample SSW 4 showcased its potential use as anti-diabetic agent with no negative side-effects. Besides, the same trend was observed in the results presented in Fig 2, which showed the potentials of the cookie samples to inhibit α-glucosidase activities. Also, the cookie samples SSW 1 and 4 had the significant ($p<0.05$) least (19.26%) and highest (45.11%) inhibition potentials when compared to other composite cookie samples SSW 2

and 3, respectively. However, the result (Fig 2) further showed that cookie sample SSW 4 had closely-related potentials (45.11%) when compared to 48.27% obtained for acarbose, a well-known anti-diabetic drug in the present study. Hence, the cookie sample SSW 4 has the potential to modulate the T2DM health issues. In the management of diabetic patients, the inhibition of α-amylase and α-glucosidase that were involved in the breakdown of carbohydrate prevented starch hydrolysis. This, thus resulted in a decreased level of glucose available for assimilation into the blood through regulation of the postprandial glycemic level [3].



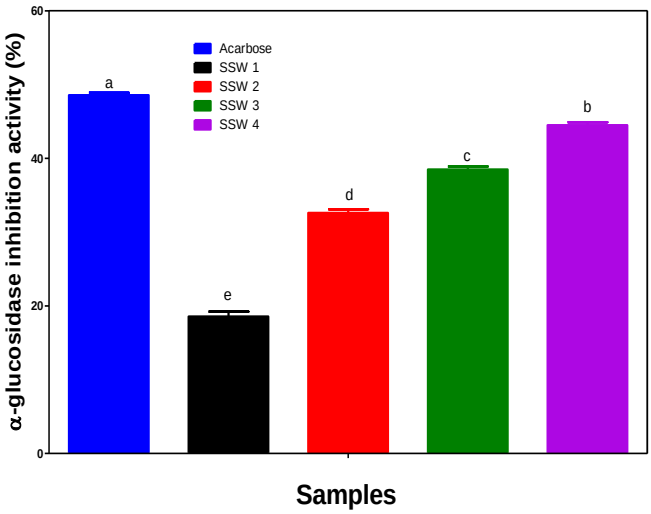


Fig 1: *In vitro* α-amylase inhibition activities of cookies **Fig 2:** *In vitro* α-glucosidase inhibition

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OCS9 Nutritional Quality of Cookies Developed From Defatted Almond Seeds, Orange-Fleshed Sweet Potato, and Wheat Flour Blends

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Keywords: Chemical composition, Defatted Almond Seeds, Orange-Fleshed, Sweet Potato, and Wheat Flour.

Background and Objective: Cookies are confectionaries dried to low moisture content. They are ready-made convenient food products usually consumed in between meals or as breakfast items among all age groups in many countries [1]. The study evaluated the nutritional quality of cookies developed from various ratios of wheat flour (WF), Defatted almond seed (DAS), and orange-fleshed sweet potato (OFSP) blends using standard methods for cookie production.

Materials and Methods: Cookie samples were produced using different blends of Wheat flour, OFSP and defatted almond as follows MPQ (90% wheat flour + 5% OFSP + 5% defatted almond), KYB (85% wheat flour + 10% OFSP + 5% defatted almond), and DHL (80% wheat flour + 10% OFSP + 10% defatted almond). A commercially obtained cookie sample made from 100% wheat flour served as a control. The proximate composition, vitamins (A, C, and E), and minerals (potassium, phosphorus, sodium, iron, calcium, and magnesium) were analyzed, along with anti-nutrient factors (phytate, tannins, and saponin), sensory qualities, and total bacterial count of the samples using standard analytical procedures (AOAC, 2005).

Result and Discussion: The crude ash, crude fat, crude fiber, and crude protein content of the cookies from the composite flour ranged from 3.98-4.50%, 17.94-19.31%, 5.05-5.18%, and 7.73-8.26%, respectively, compared to 1.70%, 17.31%, 1.30%, and 7.58% for cookies produced from 100% wheat flour. The values obtained for vitamins A, C, and E in the experimental samples ranged from 1.60-2.17 IU/100g, 0.012-0.017 mg/100g, and 1.72-2.29 mg/100g, respectively. The study found that the control sample had higher phosphorus and magnesium contents than the experimental samples, which decreased with the substitution of wheat flour with OFSP and defatted almond, while sodium, calcium, and potassium contents were significantly lower ($p>0.05$) in the control samples. Reduced moisture content enhance shelf life and prevent rapid microbial spoilage. The energy density of food products is directly influenced by their fat concentration. Crude fibre is a non-digestible carbohydrate that provides bulkiness to faecal matter, less intestinal transit and also encourages the growth of natural microbe flora in the gut [2]. Proteins are core micro-nutrients for the structural, and functional performers of different

biomolecules in humans [3]. The micro-nutrient are essential co-factor and co-enzymes for nutrient metabolism and muscle functions.

Proximate and Minerals composition of cookie samples

Samples	Moisture (%)	Ash (%)	Fat (%)	Crude Fibre (%)	Protein (%)	Carbohydrate (%)
MPQ	10.84 ± 0.00^{c}	4.12 ± 0.01^{b}	19.31 ± 0.00^{a}	5.18 ± 0.01^{b}	8.26 ± 0.01^{a}	52.28 ± 0.02^{d}
KYB	10.51 ± 0.01^{d}	3.98 ± 0.00^{c}	19.16 ± 0.02^{b}	5.05 ± 0.01^{c}	8.12 ± 0.03^{b}	53.18 ± 0.03^{c}
DHL	11.08 ± 0.01^{b}	4.50 ± 0.01^{a}	17.94 ± 0.01^{c}	6.14 ± 0.02^{a}	7.73 ± 0.03^{c}	52.61 ± 0.04^{b}
Control	16.50 ± 0.03^{a}	1.70 ± 0.03^{d}	17.31 ± 0.03^{d}	1.30 ± 0.03^{d}	7.58 ± 0.00^{d}	55.61 ± 0.06^{a}
Samples	**Phosphorus (mg/kg)**	**Sodium (mg/kg)**	**Calcium (mg/kg)**	**Potassium (mg/kg)**	**Magnesium (mg/kg)**	**Iron (mg/kg)**
MPQ	105.25 ± 0.01b	125.17 ± 0.15a	206.30 ± 0.00a	378.03 ± 0.25a	34.51 ± 0.00b	0.37 ± 0.00c
KYB	90.44 ± 0.01c	118.53 ± 0.15b	192.47 ± 0.15b	374.87 ± 0.15b	28.62 ± 0.01c	0.27 ± 0.01d
DHL	87.38 ± 0.01d	113.83 ± 0.25c	158.67 ± 0.25c	355.40 ± 0.20c	22.15 ± 0.01a	0.57 ± 0.00b
Control	116.91 ± 0.00a	16.42 ± 0.00d	13.12 ± 0.00d	141.05 ± 0.00d	54.71 ± 0.00a	2.87 ± 0.00a

Conclusion

The use of composite flour from wheat, defatted almond, and OFSP can reduce the cost of wheat flour importation and make the products commercially viable due to their high acceptability. This research could potentially reduce wheat flour import costs.

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OCS10

Evaluation of Nutritional Composition and Microbial Load of Commonly Consumed Imported Frozen and Local *Pseudotholitus Elongatus* in the South Senatorial District of Cross River State, Nigeria.

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Keywords: Nutritional composition, Microbial load, Imported vs Local fish and Food Safety and Quality.

*Local fresh *P. elongatus* showed higher nutrient content than imported frozen samples.

*Microbial load was significantly higher in local fresh fish across all test organisms.

*Study provides comparative data to guide food quality and safety policy decisions.

BACKGROUND AND OBJECTIVES: Fish is a vital source of high-quality protein and micronutrients in Nigeria, accounting for about 35% of animal protein intake and 10% of household food expenditure. Despite its nutritional importance, there is limited local research on the quality and safety of commonly consumed fish species like *Pseudotolithus elongatus* (Bobo Croaker), especially when comparing imported frozen versus locally sourced varieties. Nigeria remains one of the world's top fish importers, with imports filling the gap left by insufficient local production. However, concerns about food safety and nutrient bioavailability persist, particularly as malnutrition rates remain high. This study aims to compare the proximate composition, mineral content, presence of toxic elements, and microbial load of imported and local *Pseudotolithus elongatus* consumed in the Southern Senatorial District of Cross River State, Nigeria.

MATERIALS AND METHODS: A total of 16 croaker fish (*Pseudotolithus elongatus*), both local fresh (8 pieces) and imported frozen (8 pieces), respectively, were randomly sourced. Local samples were obtained from Watt and Nsidung beach markets in Calabar, while imported samples, shipped by Premium Sea Food Co. Inc., New York, were purchased from AFCON Investment Cold Room, Lagos Street, Calabar. All samples were aseptically packed in sterile zip-lock bags and authenticated at the Institute of Oceanography, University of Calabar. Proximate parameters—moisture, ash, protein, fat, fiber, and carbohydrates—were determined using standard methods [1]. Mineral analysis involved digestion with aqua regia (HNO_3:HCl, 1:3). Fe, Zn, Ca, Cu, Mn, Mg, Pb, and Cr were analyzed using Atomic Absorption Spectrophotometry; Na and K via Flame Photometry; and phosphorus by spectrophotometry at 660 nm [2]. Microbial load was determined using serial dilution method and Total plate count (TPC) of sample was carried in 7 different media [3]. Proximate data were analyzed using Prism 5.03 with significance set at $p<0.05$ via a two-tailed t-test. Microbial data were log-transformed and analyzed with SPSS 16.0 using ANOVA and Duncan's multiple range test.

RESULTS AND DISCUSSION: Proximate analysis showed that local Pseudotolithus elongatus had significantly higher ($p < 0.05$) moisture (72.13%), protein (17.01%), lipid (7.84%), ash (1.93%), and carbohydrate (1.09%) contents than imported frozen samples, which recorded 67.85%, 14.02%, 6.22%, 1.33%, and 0.55%, respectively. However, imported fish had slightly higher fibre content (1.03%) compared to the local (0.69%), though the difference was not statistically significant. Mineral analysis revealed significantly higher levels ($p < 0.05$) of calcium (186.63 mg/100 g), potassium (217.31 mg/100 g), magnesium (51.19 mg/100 g), and phosphorus (157.38 mg/100 g) in local fish, whereas sodium was significantly higher in imported fish (92.32 mg/100 g vs. 86.17 mg/100 g). Notably, lead (3.41 mg/100 g) exceeded safety limits in the local fish but was absent in the imported samples. Microbial load was significantly higher in local fish, with total bacterial counts of 2.4×10^6 CFU/g in gills, 2.1×10^6 CFU/g in intestine, and 1.7×10^6 CFU/g on skin, while imported samples showed much lower counts (1.2×10^4 CFU/g, 1.1×10^4 CFU/g, and 9.8×10^3 CFU/g, respectively). Although microbial levels in local fish remained within permissible limits, the presence of Vibrio and Staphylococcus species suggests the need for improved handling**.**

CONCLUSION AND RECOMMENDATION: Local fresh *Pseudotolithus elongatus* was found to be more nutritious than imported frozen fish but exhibited a higher microbial load, likely due to poor handling, lack of sanitary practices, or environmental contamination. Despite the microbial presence, levels remained within acceptable commercial standards. To enhance fish safety, especially in Nigeria's coastal regions, further research on local contamination is recommended. Authorities should enforce safe marine food handling practices, promote hygiene during home preparation, and educate fishery workers on the dangers of using polluted water in fish processing to reduce microbial risks and ensure safer consumption.

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PCS4

Nutrient Evaluation and Sensory Properties of Insect Enriched Energy Cookies

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Keywords: Functional nutrition, Alternative protein, Eco-friendly food systems, Sustainability.

Highlights

- Innovative cookie blend developed with eco-friendly insect-based protein
- Athlete-friendly snack showed high acceptability and nutrient density
- Insect substitution improved protein and micronutrient profile significantly

BACKGROUND AND OBJECTIVES

With rising global interest in functional foods and sustainable nutrition, alternative protein sources have emerged as vital innovations in the food system [1]. Athletes, who require nutrient-dense diets and increased protein intake, often consume conventional energy snacks and foods with limited sustainability. This study seeks to bridge the gap between sports nutrition and environmental impact by developing insect-enriched energy foods using *Rhynchophorus phoenicis* larvae. The objective is to assess their acceptability, nutritional composition, and potential as sustainable snack options for active populations, thus contributing to innovation in nutrition for broader public health impact [2].

MATERIALS AND METHODS

This laboratory-based food product development study involved formulating insect-enriched energy cookies. Four cookie samples were prepared: one control (CWI) containing wheat flour only, and three variants enriched at different substitution levels with defatted tigernut flour, maize flour, avocado pulp, and *Rhynchophorus phoenicis* larvae flour. Specifically, the variants (FSP, SEC, and TIS) contained 80%, 70%, 70% maize; 10%, 20%, 10% larvae flour and 5%, 5%, 10% avocado and defatted tigernut flour each, respectively. Standard baking procedures (creaming of fat and sugar, mixing of dry and wet ingredients, shaping, and baking at 180 °C for 15 minutes) were followed.

Sensory evaluation was carried out using a 9-point hedonic scale by 30 untrained student-athlete panelists from the University of Ibadan to assess attributes such as taste, texture, color, aroma, and overall acceptability. Proximate (moisture, protein, fat, ash, fiber, and carbohydrate) and selected micronutrient analyses (iron, zinc, and calcium) were performed using standard AOAC methods.

Data obtained were analyzed using SPSS version 26.0, with one-way ANOVA applied at a 5% level of significance ($p < 0.05$).

RESULTS AND DISCUSSIONS

The insect-enriched cookie samples exhibited significantly higher protein contents compared to the control (CWI: 14.92 ± 0.05%). Among the enriched variants, SEC recorded the highest protein content (19.33 ± 0.06%), followed by TIS (18.73 ± 0.04%) and FSP (16.83 ± 0.05%). This confirms that incorporation of *Rhynchophorus phoenicis* larvae flour, alongside tigernut, maize, and avocado pulp, substantially improved the protein quality of the cookies.

Micronutrient analysis further revealed notable increases in iron and zinc levels across the enriched samples. SEC had the highest concentrations (iron: 8.13 ± 0.15 mg/100 g; zinc: 6.80 ± 0.10 mg/100 g), followed by TIS (6.63 ± 0.15; 4.57 ± 0.21) and FSP (5.23 ± 0.15; 3.47 ± 0.21). The control sample (CWI) had the lowest mineral values (3.47 ± 0.21; 1.47 ± 0.10). These results demonstrate the nutritional advantage of insect enrichment, particularly in enhancing protein and micronutrient density [3].

Sensory evaluation showed that both control and insect-enriched cookies were generally well accepted by student-athlete panelists. No significant rejection was observed, suggesting that consumers were open to insect-enriched formulations, provided sensory attributes were maintained within acceptable limits.

These findings align with growing evidence that edible insects can serve as sustainable, nutrient-dense ingredients in food product development, while also meeting the nutritional demands of active individuals.

CONCLUSION AND RECOMMENDATIONS

The insect-enriched cookies demonstrated enhanced nutritional value and acceptable sensory attributes, confirming their potential as innovative, climate-smart snacks that support athletic performance. Based on these findings, we recommend promoting awareness and consumer education on the benefits of insect-based foods, as well as further research on large-scale production and product diversification to encourage wider acceptance and integration into mainstream and performance nutrition.

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PCS5

Nutritional and Micronutrient Profile of a Formulated Plant-based Breakfast Cereal

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Keywords: Plant-based, Cereal, Breakfast, Nutritional Profile

Highlight:

- The formulated cereal resulted in a balanced nutritional profile with high carbohydrates (62.75%), moderate protein (13.78%), and healthy lipid content (14.95%).
- The vitamin analysis showed significant amounts of key vitamins, including Vitamin A (12.16 µg/g), B-complex vitamins (B1, B2, B3, B6, B9), and antioxidants like Vitamins E (0.31 mg/g) and C (0.98 mg/g).
- The mineral analysis revealed notable levels of essential minerals, particularly calcium (8.49 mg/Kg), magnesium (5.07 mg/Kg), iron (1.29 mg/Kg), and zinc (0.48 mg/Kg)

BACKGROUND AND OBJECTIVES: Climate change threatens food security and nutrition, particularly in vulnerable populations such as women and children. Locally adapted, drought-resistant crops like sorghum, soybean, and plantain offer sustainable solutions for nutrient-dense food formulations that enhance dietary diversity while supporting climate-smart agriculture. The prevailing global food systems and consumption patterns are increasingly recognized as unsustainable, posing significant risks to both human and planetary health [1]. A global shift to sustainable diets, high in plant-based foods, whole grains, and low in animal products promises improved human health and environmental sustainability [1-3]. This study aimed to formulate a nutrient-dense breakfast cereal using locally adapted, drought-resistant crops (sorghum, soybean, and unripe plantain) with the objectives to contribute to the growing body of research on sustainable food systems and plant-based diets as well as to assess the potential of the cereal to address key nutrient gaps in vulnerable populations in climate-stressed regions. The findings of this study can inform the development of nutritious and sustainable breakfast options that cater to diverse dietary needs and promote overall health and well-being.

METHODOLOGY:

Major Raw Materials: The Sorghum malt, soybean and unripe plantain were purchased from the local market.

Preparation and Formulation of the cereal blend: Sorghum grains were sorted, soaked (16 h), sprouted, dried (50°C, 24 h), de-rooted, and milled into malted flour using a modified method of [3]. Soybean seeds were sorted, washed and soaked in water (8h), boiled (20min), de-hulled, sun-dried (3 days), roasted (30min), and ground into flour. The unripe plantains were washed, peeled, cut into smaller pieces, dried under the sun and powdered using an electric blender. The breakfast cereal was formulated by blending the sorghum malt, soybean, and unripe plantain flour in a 70:20:10 ratio respectively. The proximate compositions were determined according to the method of Association of Analytical Chemist, AOAC [4]. The vitamin and mineral analysis were determined using standard biochemical methods.

RESULTS AND DISCUSSIONS: The proximate analysis revealed the following composition (Table 1). The cereal demonstrated a balanced macronutrient profile (62.75% carbohydrates, 13.78% protein, 14.95% lipids). From the micronutrient analysis (Table 2), the cereal was rich in essential micronutrients such as iron for anemia prevention, zinc for immune support, and B vitamins for maternal and child growth. Vitamins A and C provide antioxidant benefits, critical for combating malnutrition in resource-limited settings.

Table 1: Proximate Composition of the Formulated Breakfast Cereal

PROXIMATE	**Breakfast Cereal**
Ash (%)	1.88 ± 0.11
Carbohydrate (%)	62.75 ± 0.02
Crude Fibre (%)	1.1 ± 0.14
Crude Protein (%)	13.78 ± 0.31
Total Lipids (%)	14.95 ± 0.07
Moisture (%)	5.55 ±0.18

Values are presented as mean ± standard deviation of duplicate values

Table 2: Vitamin and Mineral Compositions of the Formulated Breakfast cereal

Vitamins	Concentration	Minerals	Concentration (mg/Kg)
Vit A (µg/g)	12.16 ± 2.89	Zn	0.48
B1 (µg/g)	0.21 ± 0.03	Co	0.003
B2 (mg/g)	1.23 ± 0.13	Ca	8.49
B3 (mg/g)	0.06 ± 0.01	Mg	5.07
B6 (µg/g)	0.05 ± 0.01	Fe	1.29
C (mg/g)	0.98 ± 0.06	Cu	0.09
FolicAcid (mg/g)	0.07 ± 0.01	Na	5.05
Vit E (mg/g)	0.31 ± 0.04		

CONCLUSION AND RECOMMENDATION: This study successfully produced affordable, ready-to-eat breakfast cereals using locally sourced, inexpensive raw materials. The formulated cereal has a balanced nutritional profile. It highlights the potential of climate-resilient crops to strengthen local food systems by providing affordable, nutrient-packed complementary foods. Scaling such innovations can improve maternal and child health while promoting agricultural sustainability amid climate variability. However, this study is a pilot study hence, there was no comparison between the nutritional profiles of the formulated breakfast cereal with existing commercial breakfast cereals. The study did not equally evaluate the sensory characteristics (taste, texture, and aroma) of the formulated breakfast cereal. However, these are the points we noted and will be incorporated in further study. The formulation will also be varied to get the best formula that will give optimal and sustainable nutrition.

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5.

PCS6

Production and Evaluation of Protein Quality of Pumpkin Pie Produced from Wheat (*triticum aestivum*) Flour, Sorghum (*Sorghum s. bicolor*) and Pumpkin seed (*Cucurbita spp*.) Flour.

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KEYWORD: Nutritional Value, Food Formulation, Protein Quality, Dietary Intake.

HIGHLIGHTS:

- Commercially available pies are produced from mono wheat flour and sorghum flour which are of low nutritional quality such as vitamin, mineral, and some essential amino acid such as lysine and methionine.
- Therefore, fortifying pie with pumpkin puree will enhance the nutritional quality of the pie which can be used as alternative for prevention of nutritional imbalance.

BACKGROUND AND OBJECTIVE(S): Pumpkin (*Cucurbita spp*.), is one of the most popular vegetables consumed in the world and has been recently recognized as a functional food. The aim of this work was to produce a pumpkin pie from pumpkin puree. The specific objectives are; to determine the amino acid profile of the pumpkin pie and to compare the mean concentration values of the amino acid composition of the different pie produced.

MATERIALS AND METHODS: The materials were sourced from Maiduguri Custom Market and authenticated by a Botanist in Biological Science Department University of Maiduguri. Samples were grouped into A, B, C and D. Sample A (Control) is Pumpkin puree(40g), Sorghum flour(10g), Sugar(20g), Milk(12g), Egg(10g), Butter(8g) and other spices. Sample B is Pumpkin puree (40g), Wheat flour (10g), Sugar (20g), Milk (12g), Egg (10g), Butter (8g) and other spices. Sample C is Pumpkin puree (50g), Wheat flour (8g), Sugar (15g), Milk (10g), Egg (10g), Butter (6g) and other spices. Sample D is Pumpkin puree (60g), Wheat flour (8g), Sugar (10g), Milk (10g), Egg (8g), Butter (6g) and other spices. The parameters assayed include essential amino acid content and non-essential amino acid content. the amino acid content was determined using (HPLC) Chromatography. ANOVA was used to show and compare the mean.

RESULTS AND DISCUSSION: Significant differences ($P<0.05$) was observed in all the Essential amino acid composition of the samples, except for Phenylalanine where the difference was not significant ($P>0.05$). All samples were better composition of amino acid compared to the control sample A. The Non-essential amino acid also followed similar pattern to that of essential amino acid. The result showed that all samples could be suitable for intake and can enhance nutritional value. Increased in methionine and lycine content observed in sample B – D compared to sample A (Zhang *et al*., 2016). Increased in threonine, leucine and isoleucine content observed in sample B – D compared to sample A might be probably due to supplementation of wheat flour which have more protein content than sorghum in sample A as reported by (Anon., 2000).

CONCLUSION AND RECOMMENDATION

This work showed that a pumpkin pie can be produced from pumpkin puree because the supplementation of pumpkin with both essential and non-essential amino acid such as:

Lysine, Leucine, Isoleucine, Valine, Histidine, Serine, Alanine, Proline, Glycine, Tyrosine etc, has enhanced the nutritional value of the pie based on the results therefore, the pie produced can be used as snack. It's recommended that the In vivo study of pumpkin pie should be carried out in order to study the nutritional value of the pie within the system.

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PCS7

Analyzing the Impact of Nutrition Policy on Food System and Public Health Outcomes in Katsina Metropolis

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Keywords: Nutrition policy; food systems; public health,;Katsina; malnutrition

Highlights

- Majority of respondents were aware of nutrition policies, yet program coverage remains limited.
- Government nutrition policies show partial effectiveness in food system improvement.
- Public health impact is mixed due to affordability and accessibility gaps.

BACKGROUND AND OBJECTIVES

Malnutrition, including undernutrition and overnutrition, remains a public health burden in Nigeria, driven by food system inequalities and policy implementation gaps. National surveys show that 79% of Nigerian households face food insecurity [1]. Despite the introduction of several nutrition policies, effective implementation and integration into local food systems have been weak. This study aims to evaluate the influence of nutrition policies on food systems and public health outcomes in Katsina Metropolis, identify barriers, and propose actionable recommendations.

MATERIALS AND METHOD

A mixed-methods approach was adopted. Quantitative data were collected via structured household surveys (n=200), while qualitative insights were gathered from key informant interviews. Secondary data sources included the 2021 National Food Consumption and Micronutrient Survey (NFCMS) and policy reports [1]. Statistical analysis included descriptive and inferential statistics; independent samples t-test). Thematic coding was used for qualitative data to capture challenges in policy implementation.

RESULTS AND DISCUSSION

Most (72%) of respondents were aware of nutrition policies, with healthcare facilities (36%) and media (26%) being the primary sources. Only 62% reported benefiting from programs, mainly school feeding (48%) and maternal-child initiatives (26%). Despite this, 40% believed food availability had not improved, citing high prices and low productivity as key issues. Nationally, just 10% of non-breastfed children meet minimum milk frequency [1].

From a health perspective, 30% of households reported malnutrition and 26% obesity/overweight. This double burden reflects findings in similar urbanizing regions [2]. While 40% consumed balanced meals

daily, affordability was cited as a constraint. Community access to nutrition education was relatively high (88%), but program impact was unclear to many respondents, consistent with literature pointing to weak multisectoral integration [3].

Table 1: Summary of Key Survey Results from Katsina Metropolis (n = 200)

Variable	Response	Frequency (%)
Awareness of nutrition policies	Yes	72%
Benefit from government programs	Yes	62%
Most common intervention	School Feeding Program	48%
Households reporting malnutrition	Yes	30%
Households consuming balanced meals daily	Yes	40%
Belief that food availability improved	No	40%

These findings highlight a gap between policy design and local-level outcomes, emphasizing the need for stronger community engagement, better policy monitoring, and multi-sector collaboration.

CONCLUSION AND RECOMMENDATION

Nutrition policy implementation in Katsina Metropolis is undermined by low intersectoral coordination, limited reach, and weak monitoring frameworks. To Address food insecurity and malnutrition, it is recommended that nutrition-sensitive agriculture and nutrition education programs targeting women and youth be promoted, while monitoring and data systems are strengthened to guide effective policy adjustments.

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OLT4

Analyzing the Impact of Nutrition Policy on Food System and Public

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Keywords: Social media, nutritional habits, undergraduate students, digital health

HIGHLIGHTS:

- High prevalence (97.5%) of social media usage among undergraduate students, with WhatsApp as the leading platform.
- Over half of respondents follow nutrition-related social media accounts.
- Significant associations were found between social media engagement and meal patterns, water intake, and dietary diversity.

BACKGROUND AND OBJECTIVES: Social media has become a pervasive tool among young adults, shaping their behaviors including dietary habits [1]. Studies show that social media platforms can influence food choices by providing access to nutrition information, recipes, and peer support [2]. However, the impact of social media on nutritional habits varies across contexts and populations. In Nigeria, limited data exist on how social media usage affects the dietary behaviors of university students. This study aimed to investigate the relationship between social media usage and nutritional habits among undergraduates of the University of Nigeria, Nsukka.

MATERIALS AND METHODS: A cross-sectional survey design was employed. A total of 397 undergraduate of the University of Nigeria, Nsukka were selected through multi-stage sampling. Data were collected using a structured questionnaire to elicit data on socio-demographic factors, social media usage patterns, dietary preferences, and influencing factors. Data analysis were performed using SPSS version 23, with significance set at $p < 0.05$.

RESULTS AND DISCUSSION: Nearly all participants (97.5%) used social media, predominantly WhatsApp (50.2%), this finding is in consistent with its widespread use in Nigeria [3]. Over 50% followed nutrition-related accounts such as Aproko Doctor and Hilda Baci Cooks, indicating active engagement with nutrition and health content. A high rate of meal skipping (94%) was observed, with breakfast most frequently skipped (59.8%). This aligns with global trends where breakfast skipping is common among young adults and linked to adverse health outcomes [4]. Factors influencing food choices included preferences, availability, and cost, this is in line with findings from similar Nigerian studies. Significant positive relationships were found between social media usage and healthier dietary habits, such as considering nutritional information when making food choices ($p < 0.000$) and water intake ($p < 0.000$). Following nutrition-related accounts correlated strongly with considering nutritional information when choosing foods ($p < 0.001$) and higher dietary diversity scores ($p = 0.047$). These

findings support evidence that social media can be an effective channel for nutrition education and behavior change [1, 2]. Despite positive influences, the high prevalence of meal skipping suggests that social media alone may not overcome structural or personal barriers to healthy eating, such as time constraints or food access. Therefore, social media interventions should be complemented by broader public health efforts.

Table 1: Association between number of hours spent on social media and nutritional habits

	Dependent variable (average hours spent on social media)			
Independent variables	**B**	**ß**	**t**	**p-value**
Skips meals	-.110	-.025	-.420	.675
Number of meals skipped	-.083	-.057	-1.025	.306
Reasons for skipping meals	-.008	-.010	-.168	.866
Factors considered in food choices	-.023	-.025	-.508	.612
Average daily water intake	.279	.216	4.262	**.000****
Frequency of considering nutritional information when making food choices	.170	.173	3.474	**.001****
Dietary restrictions	-.164	-.055	-1.110	.268

B=Unstandardized coefficient ß=Standardized coefficient
**P < 0.01 considered highly significant t-value = Test statistics

CONCLUSION AND RECOMMENDATIONS: This study highlights the influential role of social media in shaping dietary habits among Nigerian undergraduates. Public health practitioners and content creators should harness social media platforms to disseminate engaging, evidence-based nutrition information, promote hydration, and encourage mindful eating. Nutrition influencers should emphasize diverse dietary habits to ensure adequate nutrient intake. Further research could explore longitudinal impacts and intervention effectiveness.

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OLT6

Development of nutrition mobile application to track food intake and improve nutrition knowledge of Tertiary institutions students: MEAL-STREAKS

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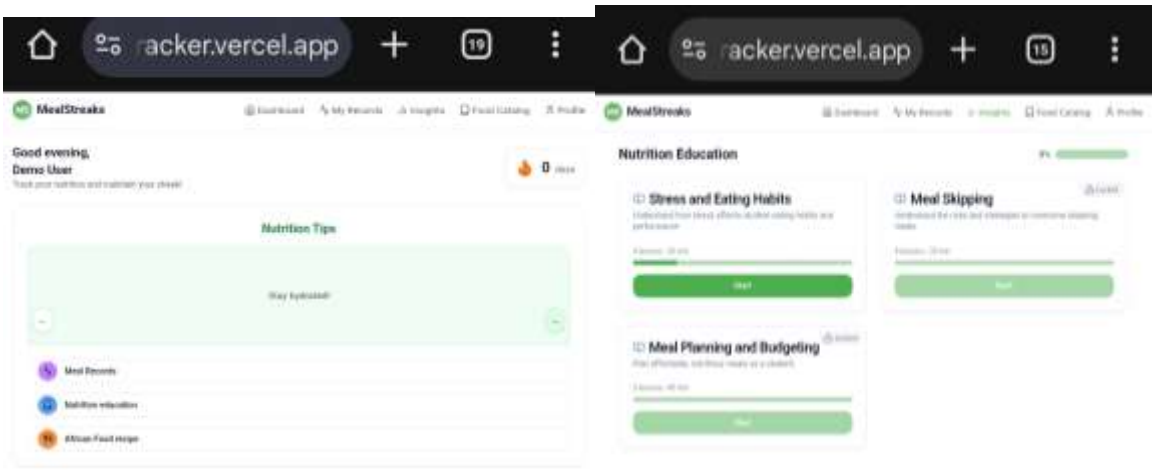
Keywords: Mhealth, nutrition technology, digital solution, dietary habits
Highlights

1. The meal tracking page encourage consistent meal logging with streak rewards
2. The nutrition education is structured into modules and daily quiz for learning
3. The African recipe page for accessing local recipe and address cooking skills

Background and Objectives: Poor dietary habits among university students globally have become a growing public health concern because dietary habits formed in school can continue to adulthood and affect their health on the long run. Given the widespread use of smartphones among students, mobile-based interventions represent an effective platform to promote healthy eating behaviors [1]. This research hereby developed a nutrition app that track the food intake and improve the nutrition knowledge of tertiary institutions students.

Materials and Method: This research adopted a design-based development methodology [2], fully centered on the design, development and internal test of a responsive mobile app named Meal-streaks. The frontend was developed using React.js enabling a responsive and dynamic user interface while the Backend was built with Node.js, for efficient server-side operation. Though no direct user data was collected during this phase, the app's content and design reflect cultural sensitivity and inclusivity. Educational material emphasizes positive reinforcement.

Results and Discussion: Meal-streaks is developed to improve on the paper-based food diary and to encourage consistent food intake record with streak based gamified feature. Additionally, most existing nutrition app are not tailored towards African context except for few like Foodimetric, however, Meal-streaks is more specific to African tertiary institutions students who are largely adolescent and young adults and are often ignored in most countries nutrition intervention program [3].



Conclusion and Recommendation: In conclusion, this newly developed nutrition mobile application is named Meal-streaks which is a culturally relevant, educational and interactive tool that is specifically targeted to address the growing public health concern of poor dietary habits among tertiary institutions students.

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OEM1

Nutritional and Functional Characterization of Rice, Beans, and Wheat Husk: Prospects for Food Security and Sustainable Agriculture

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Keywords: Agricultural by-products; Food security; Circular economy; husks

Highlights

- Rice, beans, and wheat husks are rich in macronutrients (protein, fiber) and micronutrients (iron, calcium, vitamins A, C, E), offering sustainable alternatives for food and feed.
- Underutilized agricultural by-products can mitigate environmental pollution while addressing food security and micronutrient deficiencies.
- Utilization of these by-products aligns with zero hunger (SDG 2), responsible consumption (SDG 12), and climate action (SDG 13) through circular economy practices**.**

Background and Objectives:

Agricultural by-products like rice, beans, and wheat husks are often discarded despite their nutritional potential [1]. This study evaluates their proximate composition, vitamins, and minerals to address food insecurity and micronutrient deficiencies [2], particularly in low-income communities with limited access to diverse diets [3]. However, comparative studies on the nutritional profiles of these husks are lacking, hindering their optimal utilization.

This research provides critical insights for farmers, food processors, and policymakers, supporting global efforts toward sustainability. By redefining agricultural by-products as valuable resources rather than waste, the study aligns with key Sustainable Development Goals (SDGs), including zero hunger (SDG 2), responsible consumption (SDG 12), and climate action (SDG 13). The findings contribute to both scientific literature and practical strategies for sustainable development, promoting circular economy principles in agriculture.

Materials and Methods:

The study evaluated the nutritional composition of rice husk, beans husk, and wheat husk samples sourced from Dawanau market Kano. The samples were sorted for uniformity in size and ripeness to ensure consistency. Proximate analysis, including moisture, ash, protein, fat, fiber, and carbohydrate content, was conducted using standard AOAC [4] methods. Vitamin content (A, C, and E) was determined following the procedures outlined by Rutkowski and Grzegorczyk [5]. Mineral analysis for zinc, iron, magnesium, and calcium was performed using

appropriate spectroscopic techniques. SPSS statistics Version 25 software tool (SPSS Inc., Chicago, Illinois, USA) was used to compare the nutritional data across the three husk types, with significance levels set at $p < 0.05$. Superscript letters (a, b, c) in the results denote statistically significant differences between the samples.

Results and Discussion: The result of the proximate composition, vitamins and minerals analysis of different husks on the nutritional composition are presented in Tables 1 and 2, respectively.

Table 1: Proximate Composition of different husks

	Moisture	Ash	Protein	Fat	Fiber	Carbohydrate
Rice Husk	8.08±1.90^{a}	20.60±0.65^{a}	16.03±1.17^{a}	4.10±0.85^{a}	32.5±3.61^{a}	18.60±5.01^{b}
Beans Husk	13.90±0.9^{c}	10.60±0.71^{b}	17.40±1.72^{a}	6.30±1.16^{b}	37.30±2.57^{a}	15.50±2.52^{a}
Wheat Husk	12.00±0.45^{b}	12.10±2.00^{c}	16.90±1.12^{a}	3.20±0.50^{c}	35.00±10.32^{a}	26.60±2.84^{c}

Table 2: Vitamins and minerals composition of husks samples

	Vitamin A (mg/100g)	**Vitamin C (mg/100g)**	**Vitamin E (mg/100g)**	**Zinc (mg/100g)**	**Iron (mg/100g)**	**Magnesium (mg/100g)**	**Calcium (mg/100g)**
Rice Husk	17.16±0.01^{a}	14.86±0.03^{a}	25.91±2.310^{a}	0.16±0.01^{a}	1.49±0.02^{a}	12.36±0.06^{a}	12.43±0.10^{a}
Beans Husk	19.51±0.01^{b}	4.45±0.053^{b}	41.05±4.16^{b}	0.16±0.00^{a}	3.35±0.02^{b}	11.96±0.06^{b}	3.03±0.06^{b}
Wheat Husk	10.38±0.29^{c}	14.05±0.04^{a}	40.55±3.03^{b}	0.49±0.00^{c}	8.65±0.04^{c}	19.23±0.04^{c}	19.71±0.05^{c}

Conclusion:

The study revealed distinct nutritional profiles among rice, beans and wheat husk. Rice husk excelled in ash (20.60%) and fiber (32.5%), beans husk in protein (17.40%) and fat (6.30%), and wheat husk in carbohydrates (26.60%), iron (8.65 mg/100g), and calcium (19.71 mg/100g). Beans husk led in vitamin E (41.05 mg/100g). These nutrient-rich husks offer sustainable solutions for food security and agriculture.

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OEM14 Micronutrient Contribution of Indigenous Nigerian Soups to the Dietary Needs of Women of Reproductive Age and Under-five Children: A Systematic Review

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Keywords: Indigenous soups, Micronutrient deficiency, Women of reproductive age, Under-five children

Highlights

- Red palm-oil and dark leafy vegetables soups exceeded the vitamin A requirements.
- There is a need to enrich indigenous soups with calcium and heme-iron rich foods.
- There is a gap in knowledge on the folate content of indigenous soups.

BACKGROUND: In low-and-middle income countries, malnutrition statistics are alarming, particularly among women of reproductive age (WRA) and under-five (U5) children. In Nigeria, indigenous soups are consumed with staples across the six geographical regions of the country [1,2], yet their roles in supporting the micronutrient needs of these vulnerable population have been underexplored.

Objective: To review and synthesize available peer-reviewed data on the micronutrient composition of Nigerian soups and their contribution to the dietary needs of WRA and U5 children.

METHODS: A comprehensive search was done on four relevant academic databases (Google Scholar, AJOL, PubMed, Science Direct) covering literature from 1980-2024. The studies included were limited to peer-reviewed, original research on nutrient composition of indigenous Nigerian soups. Based on the PRISMA 2020 guidelines [2], 22 studies were included. Nutrient contents were extracted per 100g edible portion and assessed against the WHO/FAO recommended dietary allowance (RDA) for WRA and U5 children [3].

RESULTS: Nigerian soups exhibit a wide variation in methods of preparation, condiments/additives used, and choice of protein [1,4]. Studies showed that Nigerian soups contribute significantly to the RDA for iron (bitterleaf soup, edikang ikong, banga, afang), vitamin A (edikang ikong, afang, ogbono, egusi, efo riro), calcium (afang, ofe nsala, egusi, efo riro), and zinc (edikang ikong, ogbono) of both populations [4,5]. Little data exists on folate content.

CONCLUSION: Indigenous Nigerian soups are reported to be rich in micronutrients. Their regular consumption will drastically reduce the prevalence of maternal anaemia and child malnutrition in Nigeria if promoted in nutrition education activities.

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OEM15

Health Locus of Control Domains Associated with Consumption of Fruits and Vegetables among Secondary Schools Adolescents in Umuahia North, Abia State.

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KEYWORDS: Adolescents, Health Locus of Control, Fruits and Vegetables

Highlights:

- Chance health locus of control is negatively associated with consumption of vitamin A rich fruits
- Internal health locus of control is positively associated with consumption of fruits
- No health locus of control domain is associated with consumption of vegetables

BACKGROUND AND OBJECTIVES:

Adolescence is a critical period of growth and development where consuming micronutrient rich foods, such as fruits and vegetables (F/V), is crucial for optimal health [1]. Health Locus of Control (HLOC) refers to an individual's perception of control over their health [2]. Despite the importance of HLOC in shaping dietary behaviours, its influence on F/V consumption among adolescents remains poorly understood [2]. The knowledge gap necessitated this study aimed at assessing the HLOC domains associated with the consumption of F/V among secondary school adolescents in Umuahia North, Abia State. Result from this study will inform evidence-based strategies needed for effective nutrition education to improve F/V intake and prevent micronutrient deficiencies.

MATERIALS AND METHODS:

The study adopted a cross-sectional research design using a multi-stage sampling technique. A total of 438 male and female adolescents were randomly selected from public and private secondary schools in Umuahia North LGA with consent/assent received from 431. Data on the HLOC domains (Internal, External and Chance) were obtained using a structured and validated questionnaire rated on a 5-point bipolar (-2 to +2) Likert scale. F/V consumption was measured using the Food and Agriculture Organization dietary diversity questionnaire with focus on only the different F/V groups. Relationship between the HLOC domains and consumption of the different F/V groups was determined using Point – Biserial correlation, with significance established at $P<0.05$, using IBM SPSS Statistics (version 23).

RESULTS AND DISCUSSION:

The study involved 431 adolescents with most being males (54.1%) and aged between 10 – 13 years (55.0%).

Health locus of control towards consumption of fruits and vegetables:

The mean Internal and External HLOC scores of both male and female adolescents studied were low for fruit (-0.1346) and vegetable (-0.8067) consumption, with less than half having a positive Internal HLOC for fruits (40.2%) and vegetables (37.6%), suggesting limited self-perceived responsibility. However, their mean Chance locus of control was high for both fruit (0.0193) and vegetable (0.0101) consumption. This reflects the adolescents' belief that their consumption of fruit and vegetable is largely determined by chance or circumstances beyond their control, such as availability, accessibility and affordability of F/V, rather than their own actions/decisions or the influence of others, such as parents, teachers or friends.

Consumption of Fruits and Vegetables in the past 24 hours:

Vitamin A rich fruits and green leafy vegetables were reportedly consumed by 60.5% and 72.6% of the adolescents in the past 24 hours respectively. Also 57.6% and 73.7% of them reportedly consumed other fruits and vegetables respectively in the past 24hours. Although females reportedly consumed more F/V, but significant (P>0.05) gender difference in consumption was not observed.

Table 1: Relationship between HLC Domains and consumption of F/V:

	HLOC Domains		
F/V consumption in the past 24hours	**Internal**	**External**	**Chance**
Consumed Vitamin A rich fruits	0.019 (0.69)	-0.024 (0.62)	-0.102 (0.03)*
Consumed other fruits	0.120 (0.012)*	-0.128 (0.01)**	-0.018 (0.71)
Consumed green leafy vegetables	0.043 (0.37)	-0.021 (0.66)	0.004 (0.94)
Consumed other vegetables	-0.017 (0.73)	-0.005 (0.92)	0.076 (0.11)

**Correlation significant at P<0.05* ***Correlation significant at P<0.01*

Adolescents with significantly (P<0.05) higher Chance HLOC score reported not consuming vitamin A rich foods in the past 24hours while those that reported consuming other fruits in the past 24hours had significantly lower external (P<0.01) and higher Internal (P<0.05) HLOC scores. The Internal HLOC of students has been found to be more effective than External and Chance HLOC in maintaining healthy dietary behaviours [2].

CONCLUSION AND RECOMMENDATION:

Building an internal HLOC through effective nutrition education focused on enhancing self-efficacy, providing nutrition knowledge and encouraging goal-setting can promote consumption of fruits and vegetables and reduction in micronutrient deficiency among adolescents.

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OEM18 Calcium retention in indigenous maize products, *masa* and *tuwo*

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Key Words: Calcium retention, indigenous maize products, *tuwo*, *masa*

Highlight: A high percentage of calcium was retained in the indigenous maize products (*Nixtamalization* enhances the calcium content and retention in the indigenous maize products)

BACKGROUND AND OBJECTIVES: Low calcium intake is attributed to poor availability or access to calcium rich diets, with many people at greatest risk. Many sources of calcium in the Nigerian diet are plant-based, which are low and have poor calcium bioavailability, compared to calcium from animal source foods [1]. Maize is a staple cereal crop in many Nigerian households, however, the calcium content reported is low [2]. Hence there is a need to improve its calcium content in locally available foods. This study focused on improving the calcium content of indigenous maize products *masa* and *tuwo* through food-processing techniques such as *nixtamalization* which can be adopted at household levels**.**

MATERIALS AND METHODS: The traditional Mesoamerican *nixtamalization* process was adapted in preparing *nixtamalized* maize flour (NMF) from biofortified, yellow, and white maize varieties as

described by Gwirtz and Garcia-Casal [3] at 0.0%, 1.2% and 3.0% w/v of lime solution. NMF was used for *masa* and *tuwo* prepared by traditional method. Calcium concentration was measured using Flame Photometer (Jenway Digital Flame photometer (PFP 7 Model) and apparent retention in *masa* and *tuwo* were estimated. Data were analyzed using One–way ANOVA (SPSS 27.0 version) and Duncan multiple range test for mean separation.

RESULTS AND DISCUSSION: The calcium retention levels were higher in *tuwo* compared to *masa*. This may be attributed to the cooking method, due to the fact that *masa* undergoes a more intense heat treatment (frying) compared to that of *tuwo* which just involve reconstitution in boiling water to form a gelatinized dough. However, the apparent retention values vary in all the NMF samples and across the maize varieties. These may be as a result of differences in calcium absorption rate which may be due to the influence of kernel density on calcium absorption during *nixtamalization* in the different maize varieties. Apparent retention was highest in the white maize NMF samples as the calcium concentration increased (Table 1) in WM3, (62.90%). The apparent calcium retention in the *masa* decreased as calcium concentration increased in the NMF samples from the biofortified maize variety. The calcium retention level was as low as 28.48% in BM3. Apparent calcium retention in the yellow maize *tuwo* also increased as calcium concentration increased.

Table 1: Calcium content and its retention in *masa* and *tuwo* made from the NMF samples

NMF samples	Flour (mg/100g)	*Masa* (mg/100g)	*Tuwo* (mg/100g)	*Masa* (% retention)	*Tuwo* (% retention)
BM0	0.61^{h}	0.52^{h}	2.86^{h}	85.25	468.85
BM1.2	4.07^{d}	1.49^{e}	7.20^{d}	36.61	176.90
BM3	6.39^{a}	1.82^{d}	9.57^{c}	28.48	149.77
YM0	2.41^{f}	1.00^{f}	3.65^{g}	41.49	151.45
YM1.2	3.14^{e}	1.55^{e}	5.23^{f}	49.36	166.56
YM3	6.45^{a}	2.57^{c}	10.84^{a}	39.84	168.06
WM0	1.27^{g}	0.74^{g}	3.31^{g}	58.27	260.63
WM1.2	5.31^{c}	3.14^{b}	6.65^{e}	59.13	125.24
WM3	5.66^{b}	3.56^{a}	10.17^{b}	62.90	179.68
Sig.	**0.000***	**0.000***	**0.000***		

Mean values by same superscript across the same column are not different significantly at α0.05.

Key: BM0 – 0% calcium biofortified maize ; BM1.2 – 1.2% calcium biofortified maize; BM3 - 3% calcium biofortified maize; YM0 - 0% calcium yellow maize; YM1.2 – 1.2% calcium yellow maize; YM3 - 3% calcium yellow maize; WM0 - 0% calcium white maize; WM1.2 – 1.2% calcium white maize; WM3 - 3% calcium white maize

CONCLUSION AND RECOMMENDATION: Calcium retention was higher in *tuwo* than *masa*, and in white maize samples than biofortified and yellow maize samples. Hence, the *nixtamalization* process can be leveraged as a potential food processing method for calcium improvements in indigenous staple products in Nigeria to enhance intake.

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OEM19 Nutritional Quality And Sensory Properties Of Bread Produced From Composite Flours Of Wheat, Fermented Unripe Plantain, And Soybeans

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Highlights

- Improved Nutrition: Sample E had the highest protein, crude fat and fibre while sample E had highest overall acceptability.
- Acceptability: Sample C offered the best balance of nutrition and sensory appeal.
- All the sample recorded enhanced nutritional quality and sensory attributes.

Keywords: Nutritional quality, Sensory properties, Bread, Composite flours,

Introduction

Bread is a widely consumed staple in Nigeria which is valued for its convenience, taste, and energy density. However, reliance on refined wheat flour poses nutritional concerns and economic challenges, including increased blood glucose risks and heavy import costs- which was estimated at over $2 billion in 2021[1]. This dependence strains national reserves and raises bread prices. As a solution, composite flours using local, nutrient-dense crops

like fermented unripe plantain and soybean offer a cost-effective and health-enhancing alternative. This study aims to develop and assess bread made from such composites.

Materials and method

Sample collection and preparation of composite flour

Wheat, soybeans, unripe plantain, and other ingredients were sourced from Ilaro local market, and were processed into flour according to standard methods. Wheat grains were cleaned, soaked for 1 hour, oven-dried at 60°C for 8 hours, milled, sieved, and packaged. Mature unripe plantains were peeled, sliced, oven-dried at 60°C for 48 hours, ground, and sieved and packaged. Soybeans were sorted, cleaned, dehulled, and roasted at 200°C for 40–60 minutes to $11.5 \pm 0.5\%$ moisture, cooled, milled, and sieved to uniform size. The resulting wheat, plantain, and soybean flours were combined into five blends: A (100% wheat), B (80:10:10), C (70:15:15), D (60:20:20), and E (50:25:25). The bread samples were analysed for proximate composition using standard official methods, 2 while the sensory properties was determined using 9-point hedonic scale questionnaire by trained panelists. The results were analysed using SPSS version 20.0.

Results

Proximate Composition

Table 1 show that moisture content increased from 9.04% in Sample A to 9.86% in Sample E, due to the high water absorption of plantain and soybean flours, this result is consistent with Olaoye et al. [2]. Crude fat rose from 1.24% to 2.01% with the inclusion of soybean flour, this is in line with Adebowale et al. [3]. Ash content slightly increased (1.61%–1.82%) across the samples, attributed to the mineral richness of the composite flours, as reported by Akubor and Ukwuru [4]. Crude fiber content rose significantly from 2.21% to 5.81%, which could be attributed to the high fiber in plantain and soybean. Protein improved from 10.67% to 15.24% due to soybean's high protein content, this support the report of Ijarotimi and Keshinro [5]. Also, carbohydrate content declined from 74.22% to 64.43%, this could result from increased substitution with soybeans and plantain flours.

Table 1: Proximate composition of the samples

Sample	Moisture (%)	Crude fat (%)	Ash (%)	Fiber (%)	Protein (%)	Carbohydrate (%)
A	9.04 ± 0.02^{b}	1.24 ± 0.02^{a}	1.61 ± 0.00^{a}	2.21 ± 0.01^{a}	10.67 ± 0.01^{a}	74.22 ± 0.01^{e}
B	9.07 ± 0.02^{a}	1.79 ± 0.01^{b}	1.66 ± 0.03^{b}	2.24 ± 0.01^{a}	11.53 ± 0.02^{b}	73.47 ± 0.04^{d}
C	9.51 ± 0.01^{b}	1.94 ± 0.01^{c}	1.67 ± 0.01^{b}	2.31 ± 0.01^{b}	11.86 ± 0.01^{c}	73.01 ± 0.01^{c}
D	9.84 ± 0.02^{c}	1.94 ± 0.04^{c}	1.77 ± 0.01^{c}	2.65 ± 0.01^{c}	12.86 ± 0.01^{d}	71.79 ± 0.04^{b}
E	9.86 ± 0.02^{c}	2.01 ± 0.00^{d}	1.82 ± 0.01^{d}	5.81 ± 0.01^{d}	15.24 ± 0.02^{e}	64.43 ± 0.08^{a}

(Values are expressed as mean ± standard deviation. Means with different superscripts in a column are significantly different at $p<0.05$.)

Sensory Evaluation

Table 2 shows the sensory attributes of the bread samples as evaluated by the panelist. Sample A (control) received the highest ratings in most parameters including colour, taste, aroma, texture, and overall acceptability. There was a gradual decline in acceptability with increasing substitution levels. Sample E scored the lowest in all sensory parameters. This suggests that while soybean and plantain flour improve nutritional quality, high levels may negatively affect sensory properties like flavor and appearance.

Table 2: Sensory qualities of the bread samples

Sample	Color	Taste	Flavor	Aroma	Appearance	Texture	Overall Acceptability
A	8.24±0.83^{b}	8.20±0.91^{b}	7.96±1.06^{a}	7.75±1.11^{b}	8.28±1.10^{b}	8.00±1.32^{b}	8.48±0.87^{b}
B	8.04±1.10^{b}	7.24±1.23^{a}	7.08±1.29^{a}	6.88±1.36^{a}	7.40±1.12^{a}	7.24±1.42^{ab}	7.40±1.26^{a}
C	7.84±1.07^{ab}	7.12±1.45^{a}	7.04±1.24^{a}	6.92±1.35^{a}	7.48±1.16^{a}	7.44±1.16^{ab}	7.72±1.17^{a}
D	7.72±1.14^{ab}	7.08±1.44^{a}	7.20±1.58^{a}	7.00±1.47^{b}	7.52±1.39^{a}	7.16±1.46^{ab}	7.36±1.55^{a}
E	7.24±1.45^{a}	6.60±1.58^{a}	6.84±1.52^{b}	6.72±1.59^{a}	7.04±1.40^{a}	6.88±1.59^{a}	7.08±1.50^{a}

Conclusion

This study successfully formulated and evaluated bread from composite flours of wheat, fermented unripe plantain, and soybeans. Incorporating these locally available ingredients significantly improved the bread's nutritional quality. The findings revealed that substituting wheat flour with fermented unripe plantain and soybean flours is a practical approach to boosting bread's nutritional value, enhancing consumer acceptability, and reducing reliance on imported wheat in bread production.

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OEM20 Evaluation of Nutritive Value and Acceptability of Carrot-based Jams Prepared Using Sugar and Jaggery

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Keywords: Jaggery, Carrot, Jam, Nutritional evaluation, Sensory analysis.

BACKGROUND AND OBJECTIVES: Carrot (Daucus carota) is a nutrient-rich vegetable valued for its high content of beta-carotene [1], fiber, vitamins, and minerals [2]. This study evaluated the nutritional composition and consumer acceptability of carrot-based jams formulated using sugar and jaggery.

MATERIALS AND METHOD: Two jam variants were prepared from 500 g of grated carrots, bought from the local market in Kano. To the 500g of grated carrot, 250 g of refined sugar or jaggery and lemon pulp pectin as a natural gelling agent were added, mixed and heated. The prepared jams were cooled to room temperature and nutrient compositions of the two jam variants were evaluated using proximate, vitamins and elemental analysis [3]. Furthermore, acceptability of the two different jam variants was evaluated using single sample test method of sensory evaluation. The data were analyzed using student's T-test.

RESULTS AND DISCUSSION: Proximate analysis revealed that the jaggery-based jam contained significantly higher levels of ash (1.97%), crude fiber (2.47%), and protein (1.20%) compared to the sugar-based jam. Mineral analysis showed elevated concentrations of iron, magnesium, and zinc in the jaggery-based product. Vitamin assays indicated that the jaggery jam had the highest vitamin A (450.00 µg/dl) and vitamin E (2.23 mg/dl) levels, while vitamin C levels were not significantly different between samples. Sensory evaluation showed no significant differences in sweetness and flavor, but the jaggery-based jam was rated lower in appearance, texture, and overall acceptability.

Table 1: Proximate composition of carrot –based jam prepared using sugar and jaggery

Parameter	Sugar jam (%)	Jaggery jam(%)
Moisture	30.00 ± 4.58^{a}	34.67 ± 2.52^{a}

Ash	1.00 ± 0.40[ab]	1.97 ± 0.45[b]
Crude Fibre	2.30 ± 0.66[b]	2.47 ± 0.65[b]
Crude Protein	0.90 ± 0.30[ab]	1.20 ± 0.30[b]
Fat	0.30 ± 0.10[a]	0.40 ± 0.10[a]
Carbohydrate	65.50 ± 5.84[a]	59.30 ± 4.02[a]

Data presented as mean± Standard Deviation, values with the same superscript letters across the same row are not significantly different at $p < 0.05$

CONCLUSION AND RECOMMENDATIONS: Despite its superior nutritional profile, the jaggery jam's reduced sensory appeal suggests the need for formulation optimization. The study revealed that jaggery is a viable, nutrient-enhancing substitute for sugar in carrot jam, with potential for development into a more widely accepted functional food.

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OEM21 Proximate and Sensory Properties of Chin-chin Made with Tigernut and Date Fruit

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Background: Chinchin is a snack in Nigeria made with flour, fat and sugar. It is a snack rich in carbohydrate and other nutrients like calcium, iron and vitamin E. it is nutrient dense and this makes it contribute to the health and vitality of the body. Tigernut (cyperus esculentus) is a crop reported to be high in dietary fibre content which can be used to treat many diseases like diabetes, obesity, colon cancer, gastro intestinal disorder and more. Date fruit (phoenix dactylifera) is from date palm and it has high percentage of carbohydrate (total sugar), protein, fat, essential salts and minerals, vitamins and dietary fibre (Ade-omowaya et al 2008). It is reported to have anti-oxidant, anti-microbial and anti-ulcer properties (Saafiet al 2011). Date has high fructose content and this makes it have low glycemic index. Addition of date in a diet may be of benefit in glycemic control in diabetic patients (Abubakar and Babandi 2023). Addition of tigernut and date fruit in chinchin making can improve the nutritional quality and the overall functions of chinchin to human.

Objectives: The study was carried out to determine the proximate and sensory properties of chinchin made with tigernut and date fruits.

Methods: Tiger nut and dates were purchased in the Local market in Owerri, Imo state. The tigernut and dates was sorted to remove the dirt, dried and milled. Four samples of chinchin were produced: i) sample A: control sample of which the conventional recipe is used to make. ii) sample B: chinchin made with flour, fat and dry ground tiger nut and dates. iii) sample C: chinchin made with juice of fresh tiger nut and date and sample D: made with fresh grounded tigernut and date (juice and shaft included). The four samples were subjected to sensory evaluation and laboratory analysis.

Result: Table 1: Proximate and soluble sugar composition

Sample code	Moisture %	Protein %	Crude fibre %	Fat %	Ash %	Carbohydrate %	Soluble sugar mg/g
A	$5.48^{d}\pm 0.012$	$1.06^{b}\pm 0.24$	2.40 ± 0.27	$17.21^{b}\pm 0.06$	$9.44^{a}\pm 0.13$	$64.40^{c}\pm 0.31$	$3.63^{c}\pm 0.11$
B	$6.32^{c}\pm 0.27$	$1.16^{b}\pm 0.02$	2.78 ± 0.06	$20.89^{a}\pm 0.24$	$5.49^{b}\pm 0.55$	$63.34^{c}\pm 0.01$	$4.0^{b}\pm 0.02$
C	$7.48^{b}\pm 0.13$	$1.34^{b}\pm 0.02$	1.72 ± 0.07	$17.99^{b}\pm 0.10$	$1.02^{c}\pm 0.21$	$70.44^{a}\pm 0.27$	$4.72^{a}\pm 0.05$
D	$12.43^{a}\pm 0.08$	$1.78^{a}\pm 0.02$	1.29 ± 0.10	$18.74^{a}\pm 0.24$	$0.98^{d}\pm 0.0$	$64.76^{b}\pm 0.37$	$4.47^{a}\pm 0.02$
LSD ($p<0.05$)	0.15215	0.12609	0.15600	0.18180	0.30269	0.28070	0.06467

The findings in Table 1 revealed the proximate composition of the four samples of chinchin. Sample D has the highest moisture and protein, sample B has the highest crude fibre and fat, sample A has highest ash content and Sample C has the highest content of carbohydrate and soluble sugar. The standard deviation that ranges from 0.0 to 0.55 shows that the results are close to each other.

Table 2: Sensory properties

Sample code	Appearance	Texture	Taste	Aroma	Mouth feel	Overall acceptability
A	8.80^{a}	7.30^{a}	7.70^{a}	8.10^{a}	$8.20^{a\,b}$	8.0^{a}
B	7.70^{b}	8.10^{a}	8.60^{a}	7.90^{a}	8.80^{a}	8.0^{a}
C	$8.10^{a\,b}$	7.10^{a}	7.60^{a}	7.70^{a}	7.60^{b}	8.10^{a}
D	6.60^{c}	7.30^{a}	8.10^{a}	8.0^{a}	$8.40^{a\,b}$	7.90^{a}
LSD ($p<0.05>$	0.28868	0.47140	0.44597	0.51586	0.36515	0.40689

The analysis in Table 2 revealed that the four samples of chinchin have slight differences in their sensory properties. Sample A has the highest appearance, sample B has the best texture, taste and mouth feel, sample A indicated the best aroma while sample C has the highest in overall acceptability

Conclusion: The proximate composition of samples B, C and D revealed that when tiger nut and dates were added in the chinchin making, there is additional value in terms of the nutrients when compared to sample A which is the control sample. Addition of tiger nut and date can improve the taste and nutritional composition of chinchin thereby making it acceptable and consumable by different group of people. The content of soluble sugar in the samples indicate that they can easily be absorbed in the body

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PEM3 Awareness Of Vitamin D Deficiency Impact On Women's Health

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KEYWORDS: Awareness, Deficiency impact, Female health, Nutrition, Vitamin D deficiency,

BACKGROUND AND OBJECTIVE: Vitamin D deficiency has been linked to different health problems in women, such as osteoporosis and osteopenia, cognitive decline, cardiovascular diseases, and increased risk of fractures [1]. Pregnant women and lactating women are at risk of improper fetal development and poor infant health [2], and women generally are at risk of fatigue, weakness, bone pain, osteoporosis, and depression, anxiety, and mood changes [3], among others. Despite the significant health implications of vitamin D deficiency among women, awareness of its impact is limited, as is knowledge of nutritional interventions for prevention and management. The study investigates the consumption pattern of Vitamin D-rich foods, nutritional status, state of health and possible determinants of Vitamin D deficiency among female staff in Rufus Giwa Polytechnic (RGP) Owo.

Materials and Methods:

This study used a descriptive survey design. A total of 228 respondents were selected from the female staff in RGP, Owo, using multistage sampling techniques. A questionnaire consisting of 18 items was used to solicit information from the respondents on consumption pattern of vitamin D rich foods, nutritional status, state of health concerning common vitamin D deficiency diseases and possible determinants of vitamin D deficiency among female staff of RGP Owo. The data obtained were analyzed using descriptive and inferential statistics using SPSS version 20.0.

RESULT AND DISCUSSION

The respondents mostly consume vitamin D-rich foods weekly. These foods include tuna fish (mean-2.46), sardines (mean-2.17), and cheese (2.23), more frequently than milk (1.69), and cereals (meam-1.69). Exposure to sunlight for vitamin D deficiency was low (1.57), reflecting a general deficiency in regular natural vitamin d source. Nutritional analysis revealed that 39.9% of the female staff of RGP,

Owo, had normal Body Mass index (BMI), 35.6% were overweight while 25.1% obese, which is an indication of coexistence of undernutrition and overnutrition. Common health conditions associated with vitamin D deficiency by the respondents include fatigue (yes-1.21), and bone pain (yes-1.29) were more prevalent while Other conditions, such as joint pain (mean-1.51), and muscle weakness (means-1.55) were less prevalent. Some of the possible determinants of vitamin D deficiency among female staff of RGP, includes inadequate consumption of vitamin D-rich foods (3.47), the use of protective clothing (3.49), living in areas with limited sunlight (3.13). Pregnancy and breastfeeding (3.12) equally contributes to vitamin D deficiency. Prioritizing vitamin D awareness among females, it can lead them to take proactive measures to maintain optimal health and well-being. A report by [4] stated the common symptoms of vitamin D deficiency and how to treat them.

CONCLUSION AND RECOMMENDATION(S):

The findings of this study demonstrate how crucial it is to create awareness of the impact of vitamin D deficiency on female health. The study shows low consumption of vitamin D-rich foods, which is a likely indicator of low awareness, limited access to these foods, and dietary preferences. This is an indication of the need for public health intervention to promote awareness campaigns and health interventions to promote adequate vitamin D intake, improve nutritional status, and thereby prevent health-related issues.

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PEM6 Micronutrient Composition, Anti-nutrients and Sensory Analysis of Ekuru Produced from Non-Dehulled and Dehulled Cowpea and Bambara Nuts

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Key Words: Traditional foods, legume processing, mineral retention, anti-nutritional factors, food acceptability

BACKGROUND AND OBJECTIVES:

Legumes such Cowpea (*Vigna unguiculata*) and Bambara nuts (*Vigna subterranea*) are nutrient-dense and contribute legumes that contribute to the local food system and human nutrition [1]. Ekuru, a steamed legume-based food widely consumed in West Africa, particularly in Nigeria made can be prepared from these legumes. However, the retention or removal of the seed coat has an impact on the micronutrients composition, anti-nutrient, and sensory acceptability of Ekuru produced from cowpea and Bambara nuts remains underexplored. This study aim to examine the micronutrient composition, anti-nutrient content, and sensory quality of Ekuru produced from non-dehulled and dehulled cowpea and Bambara nut.

METHODOLOGY:

The legumes were processed into non-dehulled and dehulled forms, milled, and steam-cooked to produce Ekuru [2]. The micronutrient content including, phosphorus, sulfur, and sodium, was analyzed using atomic absorption spectrophotometry as outlined by AOAC, 2020. The anti-nutrients (phytate, tannins, oxalates, lectins) were quantified through spectrophotometric, titrimetric, and hemagglutination assay. Using a 9-point hedonic scale, the sensory analysis was conducted by 20 semi-trained panelists for appearance, aroma, texture, taste, and overall acceptability [3]. Data were statistically analyzed using ANOVA ($P < 0.05$).

RESULTS: The process of dehulling reduced tannins by 50% in cowpea and phytates by 24% in both legumes, as shown with Soni et al. [4] who demonstrated that dehulling improves mineral bioavailability by lowering anti-nutrients. Also, Ekuru produced from dehulled cowpea had the highest sensory acceptability.

Table 1: Mineral Composition of Ekuru produced from Dehulled and Non-Dehulled Cowpea and Bambara nut

Micronutrient	Non-Dehulled Cowpea	Dehulled Cowpea	Non-Dehulled Bambara Nut	Dehulled Bambara Nut
Phosphorous (mg/g)	0.11±0.001	0.106±0.001	0.128±0.002	0.11±0.001
Sulfur (mg/g)	0.24±0.002	0.164±0.001	0.22±0.002	0.22±0.002

Sodium (mg/g)	0.169±0.002	0.128±0.003	0.159±0.001	0.136±0.002

CONCLUSION:

Dehulling process lowers antinutrients and enhance sensory acceptability, while retention of seed coat retains more micronutrients.

RECOMMENDATION

It is recommended that the production of Ekuru should be with partially dehulled legumes for maximum nutritional and sensory quality. These results support improving the quality of micronutrient content and consumer appeal through the optimisation of conventional food processing.

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PEM7

Assessment of Dietary Iron Content from Fatan Wake (Beans Porridge) Among Female Students In Some Selected Secondary Schools In Kano Metropolis, Kano State, Nigeria

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Key Words: Iron, Anaemia, Knowledge, Adolescent girls

Background and Objectives

Iron is an essential micronutrient crucial for growth, cognitive development, and overall health, particularly among female adolescents who are at higher risk of iron deficiency anemia due to increased physiological demands [1]. This study assessed the Iron content of 'Fatan Wake' (Beans Porridge), a commonly consumed Iron-rich food in some selected secondary schools in Kano metropolis.

Materials and Method

A cross-sectional study was conducted among 100 female students from Government Girls' Arabic College (GGAC) and Women's Teachers' College (WTC). A structured questionnaire was used to assess knowledge, while analytical method for determining micronutrient contents in food was used to determine dietary Iron in the samples [2]. Chi-square tests were used to compare knowledge differences between the schools, and an independent samples t-test was used to compare the iron content of the food samples.

Results and Discussion

The result of the finding shows that many students were unable to correctly define iron, its importance or being able to recognize symptoms of Anemia.TA significant difference ($p = 0.032$) was found in the sources of information about iron, as GGAC students relied more on school-based education, while WTC students depended more on books and parents. Another significant difference ($p = 0.038$) was observed in knowledge of iron requirements: WTC students were more likely to correctly identify that children under five require more iron.

. Dietary practices varied, with 37% of students rarely or never consuming iron-rich foods. Laboratory analysis showed a significant difference ($p = 0.005$) in the iron content of "Fatan Wake," with GGAC's sample having a higher iron concentration than WTC's.

Conclusion and Recommendation (s)

These findings highlight the need for targeted nutrition education, school-based interventions, parental involvement, and improvements in school meal programs to enhance dietary iron intake and reduce the risk of anemia among adolescent girls.

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PEM8 Nutrient and Vitamins Composition of Drinks Made from *Justicia carnea* (lyip or obora Jesus, Blood of Jesus) Leaves

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Keywords: *Justicia carnea*, micronutrients, herbal drinks, leaves extract

Highlights • Drinks contained appreciable amounts of micronutrients Sample B showed highest crude protein content (7.00%) among all formulations • Significant variations in B-complex vitamins occur across different drink formulations

BACKGROUND AND OBJECTIVES: *Justicia carnea*, commonly known as lyip or obora Jesus (Blood of Jesus), is a medicinal plant with potential nutritional benefits. Despite its traditional use, limited scientific information exists on the nutrient and vitamin composition of drinks prepared from its leaves. This study aimed to investigate the nutrient and vitamin composition of drinks made from *Justicia carnea* leaves, either alone or in combination with other ingredients, to determine their potential contribution to addressing micronutrient deficiencies.

MATERIALS AND METHOD: *Justicia carnea* leaves were collected from the University of Calabar staff quarters in June 2022. Four drink formulations were prepared: Sample A (100% *Justicia carnea*

leaves extract), Sample B (50% *Justicia carnea* juice extract and 50% beetroot), Sample C (40% *Justicia* extract, 30% beetroot and 30% date extracts), and Sample D (25% *Justicia*, 25% beetroot, 30% date and 20% pineapple juice). Proximate composition and vitamin content were determined using standard analytical methods.

RESULTS AND DISCUSSION: The moisture content varied significantly, with Sample D showing the highest value (92.41 ± 0.90%). Carbohydrate content was lowest in Sample D (86.49%) compared to other samples. Sample B recorded the highest crude protein content (7.00%), while ash and fiber were not detected in Sample A. Energy value was highest in Sample A (402.39 kcal). B-complex vitamin analysis revealed thiamin concentrations of 0.025, 0.027, 0.032, and 0.022 mg for samples A, B, C, and D respectively. Niacin content showed significant variations (0.200-0.405 mg) across samples. Sample D had the highest pyridoxine value (203.30 mg), while it was not detected in samples B and C. Vitamin B_{12} content was significantly different between samples, with Sample C showing 0.043 mg compared to 0.018 mg in Sample D. For vitamin C, Sample C had the highest value (60.45 mg), while Sample A recorded 0.16 mg [1].

CONCLUSION AND RECOMMENDATION(S): The results indicate that drinks made from *Justicia carnea* leaves contain appreciable amounts of micronutrients that could help combat micronutrient deficiency diseases. The varying nutrient profiles across different formulations suggest that blending with other ingredients can enhance the nutritional value of the drinks. It is recommended that these drinks be promoted as functional beverages for addressing micronutrient deficiencies, particularly in communities with limited access to diverse food sources.

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PEM9

Evaluation Of Nutrient And Antioxidant Profile Of Commonly Used Indigenous Spices

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Keywords: Spices; Antioxidant properties, Indigenous

Highlights:

- The calcium and potassium contents of the samples were high.
- Among the samples, *Ricinodendron heudelotti* had the highest antioxidant activity for DPPH, FRAP and total phenol content.

Background and Objectives: There is an increasing interest both in the industry and in scientific research for spices because of their strong antioxidant and antimicrobial properties, potentially surpassing the antioxidant activity of many existing natural and synthetic compounds[1]. This study evaluated the nutrient and antioxidant properties of some underutilized indigenous spices (*Chrysobalanus icaco, Ricinodendron heudelotti, Afrostyrax lepidophllus, Afromomum subsericeum and Parinari excelsa)*.

Materials and Methods: The spice samples were purchased from Ogige market, Nsukka LGA, Enugu state. Each of the spic(e) samples were sorted, dehulled, washed, blended, sieved (500 µm mesh size) and labeled. Duplicate samples of the spices were subjected to proximate, mineral and antioxidant activity analyses using standard procedures (AOAC (2010) for proximate and mineral analysis; Brand-Williams et al. (1995) method for 2, 3-diphenyi-1-poicrylhydrazyl (DPPH); Benzie and Strain (1996) method for ferric reducing antioxidant power (FRAP); Folin and Ciocalteu reagent following the method described by Singleton and Rossi (2015) for total phenol content). Data obtained were analyzed using Statistical Product and Service Solution (SPSS) for windows version 23. Data were presented using mean and standard deviation.

Results and Discussion: *Parinari excelsa* had the highest ash (3.97%), fibre (19.50%) and lowest moisture (2.6%) contents. The protein content of the samples varied with *Chrysobalanus icaco* having

the highest protein content (18.45%). *Afrostyrax lepidophllus* had the highest carbohydrate content (75.36%). The highest calcium (853.15mg) content was observed in *Parinari excelsa*. *Ricinodendron heudelotti* had the highest zinc (0.93mg) and iron (47.22mg) content whereas *Chrysobalanus icaco* had the highest potassium (404.50mg) content. *Ricinodendron heudelotti* had the highest total phenol content (0.91mg) at 400mg concentration; FRAP content (0.87mg) at 500mg concentration; and DPPH content (0.89mg) at 500mg concentration reflecting a remarkable antioxidant potential. FRAP helps to predict ability to mimic the body's endogenous antioxidants like bilirubin and uric acid in attenuating oxidative stress [2]. Research has demonstrated that antioxidant activity of plant extracts has a positive correlation with percentage radical scavenging activity [3].

Table 1: Proximate composition of the samples

Samples	Ash (%)	Moisture (%)	Fibre (%)	Protein (%)	Fat (%)	Carbohy-drate (%)
Chrysobalanus icaco	1.25±0.36	19.00±1.41	6.53±0.19	18.45±0.49	17.05±0.35	37.72±2.09
Ricinodendron heudelotti	1.74±0.37	13.95±2.87	1.94±0.00	17.00±0.70	18.60±0.49	46.77±4.22
Afrostyrax lepidophllus	1.49±0.69	7.55±1.76	4.66±0.40	8.33±0.48	2.91±0.442	75.36±0.14
Afromomum subsericeum	1.73±0.36	8.00±0.70	3.90±1.27	11.64±4.32	1.97±01.4	73.57±5.26
Parinari excelsa	3.97±1.43	2.60±0.71	19.50±0.40	13.50±2.12	3.40±0.73	57.03±2.12

Table 2: Mineral composition of the samples

Samples	Calcium (mg/100g)	Zinc (mg/100g)	Iron (mg/100g)	Potassium (mg/100g)
Chrysobalanus icaco	310.45±3.46	0.68±0.14	46.06±0.00	404.50±0.70
Ricinodendron heudelotti	660.80±35.63	0.93±0.06	47.22±1.56	351.00±1.41
Afrostyrax lepidophllus	400.00±0.00	0.09±0.56	42.31±0.64	365.00±7.07
Afromomum subsericeum	320.40±73.25	0.06±1.02	45.94±0.35	348.00±1.41
Parinari excelsa	853.15±94.82	0.16±0.75	45.52±0.49	352.50±0.70

Conclusion and recommendation: The spices are good sources of calcium, iron and potassium. The high antioxidant properties of the spice samples indicate that they are capable of scavenging free radicals. There is need to project the use of these spices in most of our local dishes and in developing food products for the general public considering their antioxidant properties.

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PEM11 Proximate and micronutrient compositions of boiled pigeon pea prepared by draining and absorption of the cooking water and the cooking water

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Keywords:*Cajanus cajan*, legumes, proximate composition, micronutrients composition

Highlights:

- Draining negatively affected the micronutrient content of the pigeon peas
- Protein was lost in the drained sample and consequently, the cooking water contained some protein

BACKGROUND AND OBJECTIVES: Pigeon pea (*Cajanus cajan*) is a common legume consumed in Nigeria especially in Enugu State. In most local dishes prepared using pigeon peas, the cooking water is draining and discarded after boiling the pigeon peas. However, this practice has proven to be detrimental since some nutrients are lost in the cooking water [1]. A method of preparation which allows the cooking water to totally dry up so that there will be no excess water to discard will improve the nutritional quality of the pigeon pea-based dishes. Hence, the need for this study. The objective of this study was to determine the proximate and micronutrient compositions of boiled pigeon pea prepared by draining and absorption of the cooking water and the cooking water.

MATERIALS AND METHODS: This study adopted an experimental design. Raw pigeon pea was purchased, cleaned and washed. Three samples of the boiled pigeon pea were analysed for nutrient content. Sample A was boiled pigeon pea with the cooking water totally absorbed (100 g of pigeon peas was boiled in 1.8 l of water and it boiled for 1 hour 20 minutes; in an aluminium pot); sample B was

boiled pigeon pea with the cooking water drained (100 g of pigeon peas was boiled in 2.4 l of water and it boiled for 1 hour 20 minutes; in an aluminium pot); while sample C was the cooking water got from sample B (50 ml of cooking water). Standard procedures were used to analyse for proximate, vitamin and mineral contents in duplicates. Data were analysed with SPSS version 23 and presented in means and standard deviation.

RESULTS AND DISCUSSION: Sample A had a higher content of protein (22.16%), crude fibre (6.83%) and carbohydrate (9.36%) compared to sample B which had 19.9%, 2.40% and 4.37% for protein, crude fibre and carbohydrate, respectively. The higher content of protein in sample A was likely due to the leaching of nutrients into the drained water in sample B as the water drained from sample B (sample C) contained some amount of protein. The protein content of the boiled pigeon pea samples in this study is comparable to the protein content of raw pigeon pea as recorded in the Nigerian food composition table (22.8 g/100 g) but quite higher than the boiled sample recorded in the same document (6.8 g/100g). However, this present study analysed boiled pigeon pea samples which is closely related to the results of Sharma et al. [2] who recorded 18.8 g/100 g protein in boiled pigeon peas. The analysis of boiled pigeon by Onu and Okongwu [3] showed 26.02% protein and 7.18% crude fibre, this is similar to the results of this study. The vitamin and mineral contents of the pigeon pea samples also showed that decantation negatively affected the nutrient content of pigeon peas as all the minerals and vitamins analysed except riboflavin were higher in sample A than sample B. This is in agreement with the results of Adepoju et al. [1] who also recorded a reduction in the above micronutrients when pigeon pea was decanted. The only exception was vitamin C which was higher in the decanted sample. The results of the iron and zinc content of boiled pigeon pea samples is closely related to the values of United States Department of Agriculture (USDA) (1.11 mg/100 g and 0.9 mg/100 g, respectively) but quite lower in terms of copper (269 µg/100g).

Table 1: Proximate composition of the pigeon pea samples per 100g

Nutrient	Sample A	Sample B	Sample C
Proximate (%)			
Moisture	58.50 ± 0.71	67.50 ± 0.71	92.81 ± 0.27
Ash	1.15 ± 0.07	2.93 ± 0.11	0.54 ± 0.02
Fat	2.00 ± 0.00	2.84 ± 0.23	2.88 ± 0.01
Protein	22.16 ± 0.87	19.97 ± 0.74	3.22 ± 0.14
Crude fibre	6.83 ± 0.21	2.40 ± 0.00	0.00 ± 0.00
Carbohydrate	9.36 ± 0.25	4.37 ± 0.04	0.55 ± 0.78
Vitamins (mg)			
Vitamin C	80.83 ± 2.41	79.12 ± 0.00	32.40 ± 0.71
Vitamin A (µg RAE)	22.54 ± 0.41	12.98 ± 0.29	0.00 ± 0.00
Thiamin	0.05 ± 0.00	0.04 ± 0.00	0.04 ± 0.00
Riboflavin	0.20 ± 0.00	0.23 ± 0.00	0.18 ± 0.00
Niacin	0.05 ± 0.00	0.03 ± 0.00	0.02 ± 0.01
Minerals (mg)			
Iron	2.43 ± 0.11	1.14 ± 0.01	0.22 ± 0.001
Copper	0.08 ± 0.00	0.00 ± 0.00	0.01 ± 0.001
Zinc	0.72 ± 0.01	0.56 ± 0.05	0.20 ± 0.01

Values are means ± standard deviations of duplicate nutrient analyses
Sample A = Pigeon pea boiled without discarding the water RAE = Retinol Activity Equivalent
Sample B = Pigeon pea boiled with the water discarded Sample C = Water used in cooking the pigeon pea

CONCLUSION AND RECOMMENDATIONS:

The present study shows that cooking pigeon pea using absorption method eliminated the need for draining the cooking water and enhanced retention of nutrients. Therefore, adopting the absorption cooking method is recommended in households where pigeon pea is a common staple.

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PEM12

Micronutrient Composition of Nigerian Cooked Dough Produced from Finger Millet, Pearl Millet, Quinoa, and Arrowroot Flours

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KEYWORDS: Micronutrients, Cooked Dough, Finger Millet, Pearl Millet, Quinoa

HIGHLIGHTS

- Composite dough from local grains significantly improved calcium, iron, zinc, and B-vitamin content
- Nutrient enhancement was achieved without reliance on synthetic fortification
- The optimized formulation supports food-based strategies for addressing micronutrient deficiencies in Nigeria

BACKGROUND AND OBJECTIVES

Micronutrient deficiencies remain a significant public health concern in Nigeria, especially among school-aged children and women of reproductive age [1]. Although indigenous grains are rich in micronutrients, they are underutilized in contemporary diets [2]. This study evaluated the micronutrient composition of cooked dough produced from optimized blends of these grains, highlighting their potential to address critical nutritional gaps.

MATERIALS AND METHODS

Flours from finger millet, pearl millet, quinoa, and arrowroot were formulated into composite blends using a Simplex Centroid Mixture Design consisting of 15% finger millet, 50% pearl millet, 33.4% quinoa, and 1.6% arrowroot. The control sample was a commercial product made from millet flour. Cooked dough samples were prepared from both formulations using a method described by Awoyale *et al.* [3]. Micronutrient analysis was conducted to assess vitamin and mineral content. Results were statistically analyzed to compare the micronutrient profile of the optimized and control samples.

RESULTS AND DISCUSSION

The optimized cooked dough showed improved micronutrient content compared to the control sample. Notably, calcium, magnesium, phosphorus, iron, and zinc levels were significantly higher, reaching 250.3 mg, 190.1 mg, 106.4 mg, 8.5 mg, and 4.8 mg respectively. B-complex vitamins also increased significantly, with thiamine (1.775 mg), riboflavin (0.81 mg), niacinamide (2.43 mg), and pyridoxine (3.625 mg) showing marked improvements.

These enhancements align with findings by Morakinyo *et al.* [4], who reported that many local Nigerian foods lack adequate micronutrient density. The improved profile of the optimized dough underscores its potential as a functional food for addressing such dietary gaps.

Table 4.7: Micronutrients composition of Optimized and Control Samples

Parameter	Sample TPO	Sample NOC
Retinol (mg)	13.15 ± 0.02^{b}	9.5 ± 0.01^{a}
Thiamine (mg)	1.76 ± 0.02^{b}	1.625 ± 0.02^{a}
Riboflavin (mg)	0.81 ± 0.01^{b}	0.685 ± 0.02^{a}
Niacinamide (mg)	2.43 ± 0.04^{b}	1.955 ± 0.02^{a}
Pyridoxine (mg)	3.63 ± 0.02^{b}	2.865 ± 0.02^{a}
Folic Acid (mg)	1.84 ± 0.01^{b}	1.69 ± 0.01^{a}
Cobalamin (mg)	9.4 ± 0.03^{b}	7.905 ± 0.04^{a}
Calciferol (mg)	9.99 ± 0.02^{b}	8.475 ± 0.02^{a}
Tocopherol (mg)	3.54 ± 0.01^{b}	2.505 ± 0.01^{a}
Calcium (mg)	250.3 ± 0.01^{b}	180.2 ± 0.03^{a}
Iron (mg)	8.5 ± 0.02^{b}	6.4 ± 0.01^{a}
Magnesium (mg)	190.1 ± 0.01^{b}	140.3 ± 0.02^{a}
Potassium (mg)	420.4 ± 0.04^{b}	380.5 ± 0.02^{a}
Sodium (mg)	115.6 ± 0.02^{b}	90.7 ± 0.01^{a}
Zinc (mg)	4.8 ± 0.01^{b}	3.2 ± 0.01^{a}

Note: Means in the same row sharing different superscripts are significantly different at $p<0.05$
Legend: Sample TPO is the optimized blend and Sample NOC is the control sample

CONCLUSION AND RECOMMENDATIONS

This research carried out through a collaboration between two universities and a Nigerian SME showed that composite flour from finger millet, pearl millet, quinoa, and arrowroot significantly improved the micronutrient content of cooked dough. The enhanced levels of calcium, iron, zinc, and B-vitamins position it as a functional food for vulnerable groups.

To maximize impact, such formulations should be integrated into school feeding and maternal nutrition programmes through coordinated efforts across health, agriculture, food sectors. This directly supports national nutrition, food security goals, and Sustainable Development Goal 2 (SDG 2) - Zero Hunger.

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PEM25 Habitual Intake of Avocado Enhanced Cardiovascular Function: A Comparative Analysis of Five Fruits

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Highlights:

- Avocado intake correlated with higher SV, CO, and ABPI, and lower MAP and TPR.
- FMD improved with fruit intake, especially avocado, indicating enhanced endothelial responsiveness.
- Endothelial biomarkers were lowest in avocado consumers, suggesting reduced vascular inflammation.
- PCA revealed avocado's distinct association with favorable cardiovascular and vascular function parameters.

BACKGROUND AND OBJECTİVES: Fruits are broadly recognized for their cardiovascular benefits, yet the comparative effects of individual fruits on specific hemodynamic and endothelial parameters is lacking. Fruits differ widely in their phytochemical and nutrient profiles, which may differentially influence endothelial function, blood pressure regulation, vascular resistance, and cardiac output.

Comparative studies examining whole-fruit consumption in real-world dietary patterns are limited, leaving a critical gap in evidence-based guidance on fruit-specific cardiovascular benefits.

To investigate the comparative cardiovascular and endothelial effects of habitual intake of five commonly consumed fruits, avocado, mango, orange, apple, and pineapple through comprehensive assessment of vascular hemodynamics, endothelial biomarkers, and multivariate analysis in a young adult population.

MATERIALS AND METHOD:

This cross-sectional observational study included 193 healthy adults (aged 16–30 years), each reporting habitual consumption of only one of the five target fruits over a 30-day period, as verified by a validated Food Frequency Questionnaire. Vascular assessments included flow-mediated dilation (FMD), total peripheral resistance (TPR), mean arterial pressure (MAP), stroke volume (SV), cardiac output (CO), and ankle-brachial pressure index (ABPI). Blood samples were analyzed for endothelial dysfunction biomarkers: E-selectin, soluble endoglin (sEng), soluble ICAM-1 (sICAM-1), and soluble VCAM-1 (sVCAM-1). Statistical analyses included one-way ANOVA, Pearson correlations, principal component analysis (PCA), and analysis of covariance (ANCOVA), adjusting for age, sex, BMI, smoking, alcohol use, and physical activity.

RESULTS AND DISCUSSION:

Fruit type was a significant determinant of cardiovascular function. Among the five groups, participants who consumed avocado exhibited the most favorable cardiovascular profile, with significant positive correlations between intake frequency and SV ($R = 0.45$), FMD ($R = 0.36$), CO ($R = 0.25$), and ABPI ($R = 0.22$), and negative correlations with MAP ($R = –0.29$) and TPR ($R = –0.41$). Conversely, apple and orange consumption were associated with higher vascular resistance and adhesion molecule levels. Mango and pineapple showed intermediate or variable effects. Circulating endothelial biomarkers were significantly lower in avocado consumers, including E-selectin ($R = –0.41$), sEng ($R = –0.38$), sICAM-1 ($R = –0.52$), and sVCAM-1 ($R = –0.41$), indicating reduced vascular inflammation and endothelial activation. ANCOVA confirmed fruit type as an independent predictor of all six key cardiovascular outcomes, even after controlling for confounders ($p < 0.001$). PCA biplots showed clear clustering of avocado intake with higher SV, FMD, and ABPI values, while apple and pineapple consumption aligned with elevated MAP and TPR.

CONCLUSION AND RECOMMENDATİON(S):

This study provides novel evidence that among the five fruits examined, avocado intake was most consistently associated with improved vascular resistance, endothelial function, and cardiac output.

Keywords:

Cardiovascular Function; Fruit Intake; Endothelial Biomarkers; Flow-Mediated Dilation

OSC2 The impact of Nutrition Education on Dietary Diversity of Hypertensive Adults (50-70 years) in South East Nigeria.

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Keywords: Hypertension, Adults, Dietary Diversity

Highlights

- Diet diversity showed a negative correlation with both systolic and diastolic blood pressure
- A significant difference was observed between baseline and endline diet diversity score

Background: Nutrition education programs play a crucial role in preventing chronic disease and thereby reducing non-communicable diseases globally [1]. An imbalance between calorie intake and energy expenditure leads to overweight/obesity, which is a major risk factor for chronic non-communicable diseases [2]. Increased body mass index (BMI), waist circumference, and weight gain could be attributed to dietary patterns and dietary intake, and it has been shown to be associated with increased blood pressure [3]. The aim of the study is to analyze the impact of Nutrition Education on Dietary Diversity of Hypertensive Adults in some South-Eastern States of Nigeria.

Methodology: This study is a quasi-experimental study of 720 older adults aged 50-70 years with systolic blood pressure (SBP) ≥140mmHg and/or diastolic blood pressure (DBP) ≥ 90mmHg in Abia and Ebonyi states, South-East Nigeria. A multi-stage sampling technique was used in sample selection. Participants were assigned to the treatment (TG) and control group (CG). Nutrition education (NE) was

provided to the IG twice monthly for four months. Data on demographic variables, socio-economic characteristics, personal and medical history, nutrition knowledge, dietary diversity, and blood pressure were collected at baseline (before intervention) and endline (4th month) was assessed with a validated and pretested questionnaire. Blood Pressure was screened with an OMRON digital sphygmomanometer, and Dietary diversity (DD) was assessed using a 24-hour recall. Dietary diversity data was analyzed using a range of scores of 0-10. MDD-W was classified into three levels of consumption for: Low if MDD-W is 1-4, moderate if MDD-W is 5-7, and high if MDD-W is 8-10 [4]. SPSS version 23.0, Independent t-test, Chi-square test, and Pearson product-moment correlation were used to analyze the data.

Results and Discussions: The Age of respondents was 59.3±6.3, 40.3% were males, and 79.6% were married. At baseline, 69.7% of participants in the treatment group had scores within the moderate range of 5–7. By the end line assessment, this proportion slightly increased to 73.4%, suggesting a positive shift in dietary habits. Importantly, statistical testing revealed a significant difference between baseline and end line scores within the treatment group ($t = 2.89$, $p < 0.05$), suggesting that the intervention played a role in improving dietary diversity. In contrast, no statistically significant change was observed within the control group.

Table 1

Dietary Diversity of the Respondents at Baseline and Endline

Range of Scores	**Baseline**			**Endline**				
Treatmentn=360 (%)	**Frquency (%)**	**Systolic P –value**	**Diastolic p-value**	**Frequency (%)**	**Systolic p-value**	**Diastolic p-value**	**T**	**p-value**
1-4	95(26.4)	r= -0.006 p=0.253	r=-0.030 p=0.569	67(19.0)	r=-0.613 p=0.027	r=-0.513 p=0.012	2.89	0.004
5-7	251(69.7)			260(73.4)				
8-10	14(3.7)			27(7.6)				
Mean/SD	5.35±1.30			5.63±1.34				
Total	360 (100.0)			354 (100.0)				
Control n=360 (%)								
1-4	82(22.8)	r=-0.027 p=0.613	r=-0.077 p=0.147	85(24.6)	r=-0.056 p=0.302	r=-0.046 p=0.400	0.51	0.611
5-7	267(74.2)			249(72.2)				
8-10	11(3.0)			11(3.2)				
Mean/SD	5.37±1.15			5.44±1.14				
Total	360 (100.0)			345(100.0)				

Conclusion and Recommendation: Nutrition education improved the dietary diversity of participants in the intervention group, showing that nutrition education had a positive impact on nutritional knowledge. Nutrition education programs should be implemented for adults by Nutritionists and other health professionals to prevent non-communicable diseases and also to reduce the risk of overweight, obesity, and hypertension.

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OSC3 Nutrition Knowledge and Dietary Behaviour of School-Going Adolescents in Abia State, Nigeria: A Qualitative study.

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Key words: Nutrition Knowledge, Dietary behaviour, School-going adolescents, Abia State

Highlights:

- Participants had poor nutrition knowledge
- Participants had poor dietary behaviour revealed in their intake of fruits and vegetables, sugar-rich-foods (SRFs), and skipping of meals especially breakfast.

BACKGROUND AND OBJECTIVES

Adolescence, which spans 10 to 19 years of age, is a bout of transition and transformation that is characterized by biological, psychological, and sociological changes, leading to their increased nutritional needs [1]. The current generation of adolescents in Nigeria are growing up at a time of unprecedented change in food environments, and this has led to food insecurity and its concomitant nutritional problems of micronutrient deficiency, undernutrition and overnutrition (overweight and obesity) [2]. In Nigeria, there is a growing concern on the rising incidence of malnutrition and unhealthy eating habits among adolescents which contributes to both under-nutrition and the rising burden of diet-related non-communicable diseases such as obesity and hypertension [3]. Understanding the nutritional knowledge and dietary behaviour of adolescents is therefore crucial to designing evidence-based interventions to address their nutritional needs. The objective of the study was to understand the baseline nutritional knowledge and dietary behaviour regarding consumption of sugar-rich foods (SRFs), fruits and vegetables, and meal skipping among school-going adolescents in Abia State, using qualitative method.

MATERIALS AND METHODS

A qualitative research approach was used to collect base-line data from adolescents aged 10-19 years, who were randomly selected in order to establish the initial nutritional knowledge, attitudes and dietary behaviour of the participants (ensuring mixed gender participation in every group). A total of 38 participants were randomly selected from four secondary schools in Abia State, Nigeria, consisting of 2 schools each from urban and rural areas. Focus group discussion was held in each school and audio recorded, and this was transcribed verbatim and thematically analyzed. The analysis focused on key areas including knowledge of nutrients and dietary behaviour regarding consumption of fruits and vegetables, sugar-rich foods, and meal skipping.

RESULTS AND DISCUSSION

Awareness and Knowledge of Nutrition

The result showed that participants were aware of nutrition. *"Everyone needs to take adequate nutrition in order to stay healthy" (School 4, P50)* said a participant, and another emphasized the importance of nutrition to adolescence by saying *"Adolescents need more nutrition for proper growth and development" (School 2, P19)*. However, the adolesents were unable to classify nutrients into different groups such as carbohydrates, proteins, fats/oil, vitamins and minerals, with specific examples indicating poor nutritional knowledge. Similarly, only two participants were able to correctly state the reason adequate nutrition is particularly important during the adolescent period.

Types of Food Consumed Daily

Participants loved fruits than vegetables but do not eat them regularly. One of the students reasoned that *"Fruits and vegetables are expensive, so why should we tie money we could have used in buying other foods"* (*School 1*, P10).

Consumption of Sugar-Rich Foods (SRFs)

Participants liked the taste of SRFs and were aware of the health consequences when consumed in excess. They however admitted to their inability to reduce intake as one of them said "*It is extremely difficult because I am addicted to it*" (*School 3*, P71; *School 2*. P50).

Skipping Of Meals

The adolescents had a common habit of skipping meals especially breakfast. When asked why, one of them responded; *"I use myself as a point of reference because I feel heavy when I take breakfast, so I eat my meal later as brunch" (School 3, P58).* Another responded; *"In most cases there is no food in the house, so my mother will plead with us to manage with anything we see in school until we come back in the afternoon" (School 4).*

DISCUSSION

From the results obtained, adolescents in Abia State as reported by other studies are nutritionally aware but are constrained by poor knowledge, affordability, preferences and unhealthy eating habits like skipping meals [4] and consuming SRFs [5]. It was observed that the participants do not consume food from all the five groups of food as represented in "My Healthy Plate", that are essential for adequate diet. One of the participants responded: *"My parents do not have money to buy them" (School 2, P19);* and another said, *"Some of the foods are not affordable" (School 3, P70).*

CONCLUSION AND RECOMENDATION

There is high consumption of starchy foods, sugar-rich beverages and snacks and low intake of fruits and vegetables and skipping of breakfast by the adolescents. Their dietary behaviour seemed to be influenced by diverse challenges like financial constraints, food indulgences and food availablility, affordability and accessibility. It is important to increase access to healthy and affordable foods in homes and schools by promoting programs that support food subsidies and expanding the already existing home grown school feeding program to secondary schools. Promotion of nutrition education programs should be implemented in schools and communities as necessary steps to empower adolescents to make healthy food choices. In addition, there should be policies aimed at strictly regulating the sale of nutrient-poor, sugar-rich beverages and snacks in schools.

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OSC6

Perception of Food Environment On Dietary Behaviour Among University Students In Umudike, Abia State: Examining Convenience, Advertisements And Food Quality Using Photovoice.

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KEYWORDS: Food environment, University Students, Dietary Behaviour, Photovoice.

HIGHLIGHTS

- Dietary practices among university students were largely influenced by food environment
- Photovoice method allowed students to express their perceptions effectively
- Common influences on food choices were Convenience, Advertisements, Time constraints

BACKGROUND AND OBJECTIVES: The food environment significantly influences the dietary behaviour of University students who are in a critical phase of developing long-term eating habits. Elements of food environment such as convenience, advertisements and food quality are important factor in their food choices. Many resort to fast foods, snacks, and roadside vendors which are readily available but may pose food safety and hygiene risks. Additionally, the role of food advertising especially on social media and peer recommendations cannot be ignored, as they shape students' perceptions of what is trendy or acceptable to eat.

MATERIALS AND METHODS: This study employed a cross-sectional qualitative research design using the photovoice method. Sixty undergraduate students from Universities in Abia state participated in the study. Participants were selected using purposive sampling techniques. Each participant used their mobile phones to take photographs representing their perception of food environment; convenience, quality and safety, and advertisement influence on dietary behaviour. In-depth interviews and focus

group discussions were conducted to provide narratives behind the photographs. Data were analyzed using thematic analysis and themes were generated.

RESULT

Table 1: Themes, quotes and pictorial representation gotten from some students during the research.

Themes	Quotes	Pictures
Convenience. Time saving and the role of snacking	"By the time I get back from school, I'm just too tired to cook anything. Grabbing a snack or street food is much easier when I'm low on energy".	
Convenience: Impact of food delivery Apps	"I don't even think about what I'm eating when I order from an app. I just choose what looks good, without considering if it's healthy or not."	
Advertisement targeting unhealthy foods	"Advertisements really influence what I crave. When I see a tasty burger ad, I can't help but want one, even if I wasn't hungry before."	
Advertisements: peer and social media influence (popular artists)	"Wizkid is my favourite artist whatever he posts or advertises on his page I'm definitely going to buy it"	
Food Safety and Quality: Impact of familiar brands and food labelling	" I check for expiry dates and best before dates before consuming any product"	

CONCLUSION: Convenience, advertisement, and food safety significantly influence the dietary behaviour of university students. These factors often lead to unhealthy choices despite students' awareness of the risks. There is a need for targeted, student-friendly nutrition interventions that improve food access and counter unhealthy food marketing on and around campuses.

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OSC7

Exploring The Influence Of Food Environment Perception On Dietary Behavior Among University Students: A Photovoice Study On Availability, Affordability, And Accessibility.

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KEYWORDS: Food environment, dietary behavior, photovoice, undergraduates

HIGHLIGHTS

- Limited access to healthy food options affects dietary behaviours
- Affordability remains a major barrier to healthy eating
- Photovoice as a tool for student expression

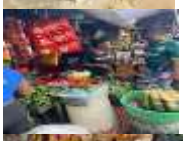
BACKGROUND AND OBJECTIVES:

Food availability, affordability and accessibility are domains of the food environment which affects the dietary behaviour of students. This transition from school life to college or University is a critical period where they begin making their own food decisions. The consequences of poor eating habits can be severe as obesity rates among university students have risen considerably in recent years, leading to an increased risk of chronic diseases such as diabetes and heart disease [1]. This study aims to investigate the perceptions of university students regarding their food environment and to analyze how these perceptions affect their dietary behavior.

MATERIALS AND METHOD:

The study was a cross-sectional study carried out among students in universities in Abia state (Michael Okpara university of Agriculture, Umudike and Abia State University extension) using the photovoice methodology of qualitative study which allows students capture photographs representing their food environment and shared narratives on how it influenced their dietary behavior. Sixty undergraduate students were selected using purposive sampling technique. The participants were asked to take photographs of their food environment based on availability, affordability and accessibility after which an audio recorded in-depth interview was conducted for each participant based on the photos collected. Thematic analysis using the Nvivo software was used to generate themes for each food environment domain.

RESULTS AND DISCUSSION:

Food environment domain	Themes	Photos
Food Availability	• Contrast between healthy and unhealthy food availability	
	• Seasonality and consistency	
Food Accessibility	• Proximity and convenience	
	• Transportation barriers and storage limitation of fresh produce	
Food Affordability	• Perception of healthy food as expensive	
	• Budget-conscious choices and resourceful substitution	

CONCLUSION AND RECOMMENDATIONS

This study highlights the complex interplay between affordability, accessibility, and convenience in shaping the dietary behaviours of university students, with many resorting to low-cost, nutrient-poor food options due to financial and environmental constraints. To improve student nutrition and well-being, targeted interventions such as establishing a campus farmers' market, increasing access to affordable healthy meals, and integrating nutrition education are recommended.

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OSC8

Anthropometric indices and food security status of adolescents 10-19 years in Ikwuano and Umuahia North LGA, Abia state.

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Keywords: Food insecurity, adolescents, underweight, overweight, stunting.

Highlights:

- Food insecurity was high among the adolescents using the Food Insecurity Experience Scale (FIES)
- Males were significantly more food insecure and stunted than the females, while overweight was higher among females

BACKGROUND AND OBJECTIVES

One of the most challenging issues in the world today is how to provide sufficient food to more than seven billion people around the globe. The Food and Agriculture Organization of the United Nations (FAO) gave a clear definition of "food security at five different levels (individual, household, national, region and global) as "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for active and healthy life" [3]. Adolescence is an intense anabolic period when requirements for all nutrients increase. About 50% of adult weight are attained, bone mass increases of 45% and dramatic bone remodeling occur and soft tissues, organs, and even red blood cell mass increase in size [1]. The objective of the study was to assess the anthropometric indices and food security status of adolescents in selected secondary schools in Ikwuano and Umuahia North local government area, Abia state, Nigeria.

MATERIALS AND METHODS

A cross sectional survey using simple random sampling was conducted among 270 secondary school adolescents (10-19 years) from two randomly selected secondary schools in Ikwuano and Umuahia North Local Government Area, Abia state. A structured questionnaire was used to collect information on the personal characteristics of the adolescents, socio economic status of the parents, anthropometric and food security status of the adolescents. Anthropometric indices were assessed with the WHO Anthro plus. The food insecurity experience scale (FIES) was used to assess the food security status of the adolescents using a structured questionnaire adapted from the Food Insecurity Experience Scale (FIES) . The food insecurity experience scale measures food insecurity at the household or individual level that relies on people's direct yes/no responses. There was eight (8) core questions regarding their access to adequate food and three other corresponding questions. Food insecurity was classified into food secure (0-2), Food insecurity without hunger (3-4), and Moderate food insecurity with hunger (5-6). Data were analyzed using descriptive statistics and chi–square for the relationship between food security status and anthropometric parameter using the SPSS version 22 at $p<0.05$.

RESULTS AND DISCUSSION

The respondents comprised mostly of male adolescents (63%), while 37% were female. The prevalence of stunting and overweight/obese were 7.8% and 2.6%, respectively. The overall prevalence of food insecurity was 43% with food insecurity without hunger, moderate food insecurity with hunger and severe food insecurity with hunger were in the proportion of 29.3%, 7.8% and 5.9%, respectively. This is similar to 54% food insecurity reported among adolescents in South West Nigeria [4]. Males were more food insecure and stunted than the females, while the females were more overweight than the males ($p<0.05$). This report contradicts findings of [Ukegbu *et al*.] [5] among university undergraduates where more females were food insecure than their male counterparts. Findings showed high prevalence of food insecurity with low prevalence of stunting and overweight/obese as 7.8% and 2.6%, respectively among the adolescents. No significant relationship was found between food security and anthropometric satatus ($p<0.05$), in agreement with findings of [Maehra *et al*] [2].

CONCLUSION

Female adolescents had higher mean weight and prevalence of obesity which was not significant, while the male had higher mean height and prevalence of stunting. Generally, findings showed low prevalence of stunting was 7.8% and overweight/obese was 2.6% in the study area. Also there was no significant relationship between food insecurity and anthropometric indicators.

Table 1: Anthropometric indices of the adolescents (N=270)

Variables	Male		Female		Total		p-value
	F	%	F	%	F	%	
HAZ for age							0.004*
Not stunted (>-2SD)	151	88.8	98	98	249	92.2	
Stunted (<-2SD)	19	11.2	2	2	21	7.8	
BAZ for age Z-score							0.011
Normal (≥ -2 - ≤+1SD)	169	99.4	94	94	263	97.4	
Overweight/obesity (>+1SD)	1	0.6	6	6	7	2.6	

* Significant using fisher's test

Table 2: Prevalence of food insecurity using the FIES

Variables	Male		Female		Total		p-value
	F	%	F	%	F	%	
Food secure	90	52.9	64	64	154	57	0.003*
Food insecurity without hunger	49	28.8	30	30	79	29.3	
Moderate food insecurity with hunger	17	10	4	4	21	7.8	
Severe food insecurity with hunger	14	8.2	2	2	16	5.9	

* Significant using fisher's test

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OSC9

Effect of Community-Based Intervention on Infant and Young Child (IYC) Nutrition Knowledge, Attitudes, and Practices (KAP) in Rimi Ward, Sumaila LGA, Kano State, Nigeria.

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Highlights

- Community-based nutrition education and food demonstrations improved mothers' knowledge and attitudes toward Infant and Child Feeding.
- Home gardening and small livestock rearing increased household access to diverse, nutritious foods.
- Significant improvements were observed in child feeding practices.

Keywords: Infant and Young Child Feeding, Nutrition Education, Home Gardening, Livestock Rearing

BACKGROUND AND OBJECTIVES: Sub-optimal infant and young child feeding (IYCF) practices, particularly in low- and middle-income countries (LMICs), remain a significant contributor to child malnutrition, which in turn increases susceptibility to disease, impair cognition, contribute to long-term poverty, and reduced productivity later in life (Victora et al., 2021). This study assessed the effect of a community-based

intervention on the knowledge, attitudes, and practices (KAP) of caregivers of infants and children aged 6–59 months in Rimi Ward, Sumaila LGA, Kano State, Nigeria.

MATERIALS AND METHODS: A pre-post intervention study was conducted with 148 mother-child dyads (6-59 months) in Rimi Ward, Sumaila LGA, Kano State, comprising six communities. Rimi Ward was purposively selected due to its high burden of child malnutrition, and participants were randomly sampled from each community after community and household mapping. Upon entering each household, data collectors screened for the presence of a caregiver with a child aged 6–59 months. If more than one eligible child was present, one was selected at random. Only one caregiver–child dyad was selected per household. The intervention comprised five days of IYCF training, including food demonstrations such as soymilk powder production. All caregivers were trained together, and the sessions also covered home gardening (spinach, sweet potatoes, tomatoes, bell peppers) and small-scale animal husbandry (chickens/goats). Seeds, farming supplies, and animals were provided to participants to support practical application of the training. Data were analyzed using descriptive statistics, paired sample t-tests, and McNemar's test.

RESULTS: The findings revealed there is an overall increase in caregiver's nutritional knowledge and there was statistical association between the baseline and endline data however, only knowledge on "Breastfeeding continuity with complementary feeding" had no significant association. In addition, there is also a significant increase and improvement in attitude to infant nutrition ($p < 0.05$).

Significant changes were also observed in feeding patterns, such as feeding a child solid food 2-4 times a day which is the current recommendation by the maternal, infant young child nutrition (MIYCN) guideline 2023. Although the overall dietary variety score increased slightly, there were significant increase ($p < 0.05$) in the intake of food groups such as cereals, roots and tubers, pulses, dairy products, meat products, eggs, and other fruits and vegetables. These findings therefore showed that integrated community-based interventions can effectively increase the knowledge attitude and practices of caregivers of children aged 6-59 months on optimal child feeding.

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OSC10

Assessing the Effects of Community-Based Maternal Nutrition Program on the Anthropometric Indices among Women of Reproductive Age (WRA) in Rimi Ward Kano State

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Keywords: Maternal Nutrition, Intervention, Anthropometric, Indices

Highlight: There is significant changes in the anthropometric indices Body Mass Index (BMI), Mid-Upper Arm Circumference (MUAC), and Waist-Hip Ratio (WHR) of the Women of Reproductive Age (WRA) of 15-49 age group post-intervention

BACKGROUND AND OBJECTIVES:

The United Nation agency indicates major gaps in achieving recommended MIYCN practices in low-income countries (UNICEF, 2021) and maternal nutrition represent an important component of malnutrition (Jeyakumar *et al*., 2025; Rezaeizadeh *et al*., 2025). Victora *et al.* (2021) shows that without attention to maternal nutrition, child nutrition outcomes will continue to lag. The main objective is to assess the impact of the nutrition interventions on the status of the WRA in the community.

MATERIALS AND METHODS:

The Rimi community was divided into six; Rimi South, North, West, East, Central and Rimin Gara where 25 Women of Reproductive Age (WRA) were selected from each wards. One-Group pretest-posttest quasi experimental study incorporate of mixed method (qualitative and quantitative) was used for this study. The baseline and endline data were collected on anthropometric indices (Weight, Height, Mid-Upper Arm Circumference, Waist and Hip Circumference), nutrition Knowledge, Attitude, Practice, Perception (KAPP), and Dietary Diversity (DD) using 24-dietary recall purposely to measure and track the impacts of the interventions at the interval of six months. The interventions provided includes 7 days training on Social Behavioral Change (SBC), 2 days training on home gardening, 2 days training for soybeans based milk productions, distribution of animals (Chickens and goats) and distribution of seeds (Amaranth, tomato, potato, red pepper, and sweet pepper).

RESULTS AND DISCUSSIONS:

Table 1. Anthropometric data of non-pregnant women

BODY MASS INDEX (BMI)	**Baseline**	**Endline**	**Mean ($\bar{X}$)**		**Pearson correlation (r)**	**Type of test**	**P-Value**
Underweight (<18.5kg/m^2)	21 (18.92)	18 (16.22)	**B***	**E****		**Sturt Maxwell's test*****	0.03
Normal (18.5-24.9kg/m^2)	61 (54.95)	74 (66.67)	20.01	25.85	0.9994	12.4	
Overweight (25-29.9kg/m^2)	22 (19.82)	12 (10.81)					
Obesity Grade I (30-34.5kg/m^2)	2 (1.80)	1 (0.90)					
Obesity Grade II (35-39.9kg/m^2)	2 (1.80)	3 (2.70)					
Obesity Grade III (>40kg/m^2)	3 (2.70)	3 (2.70)					
Total	**111**						
MID UPPER CIRCUMFERENCE (MUAC)						**McNemar's Test**	
Normal (>22.1cm)	96 (86.490	101 (90.99)	24.4	25.8	0.1155	2.72	0.099
Undernourished (<22 cm)	15 (13.51)	10 (9.01)					
Total	**111**	**111**					
WAIST HIP RATIO (WHR)						**Wilcoxon Signed Rank**	
Lower Risk (<0.85)	58 (52.25)	81 (72.97)	0.88	0.84	0.0873	2.1	0.04
Moderate Risk (0.85-0.90)	20 (18.02)	19 (17.12)					
Higher Risk (>0.90)	33 (29.73)	11 (9.91)					
Total	**111**	**111**					

Keys: *Baseline, **Endline, ***Show a significant changes between baseline and endline highlighting the p-value <0.005

CONCLUSION AND RECOMMENDATION:

The study showed significant improvements in women's nutritional status post-intervention. Normal BMI and MUAC levels increased, while rates of undernutrition, overweight, and high WHR-related health risks declined. These changes, supported by statistical significance ($p < 0.05$), highlight the intervention's positive impact on Women of Reproductive Age (WRA). These findings align with previous studies. For example, Ozyalcin and Yilmaz (2025) reported that 75% of their study population had a normal BMI, while Sharmila and Kumar (2017) documented a normal BMI prevalence of 85.6% and the positive outcome observed should encourage increased support to expand the coverage of the intervention.

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PSC1

A Hallmark of Ketogenic Diets: An Insight into Parkinson's Disease Induced by 6- OHDA & MPTP: A Systematic Review

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Key words: Parkinson's Disease; Ketogenic Diets; MPTP, 6-OHDA,

Highlights

- Therapeutic potential of KD and future directions involving dietary treatments is ascertain
- The effectiveness of KD in mitigating the symptoms of PD is evident in both 6-OHDA and MPTP

Background: Clinically, Ketogenic Diet (KD) has been established as potent and efficient in the treatment of intractable refractory epilepsy of children for over 80 years. Recently [1], KD was also found to be decisive in the treatment of neurodegenerative diseases such as Parkinson's
Disease [2]. The intensively and widely used drug in the treatment of PD is associated with disastrous side-effects on a long-term scale and therefore, a need for a more plausible and relatively safer option [3]. In view of the recent neuroprotective potentials displayed by KD, more research towards unraveling their efficacy became eminent. In essence, the main goal of this review was to assess the effectiveness of KD on Parkinson's disease induced by neurotoxin.

Methods: Twenty-five studies were systematically retrieved from 3 database (PubMed, Embase & Scopus) plus 12 additional by direct search. Studies linking PD and Alzheimer's were excluded. All the tests were conducted in an animal model induced by either 6-hydroxydopamine (6-OHDA) and1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP). Meanwhile, researches that used rotenone in combination with either 6-OHDA or MPTP were equally excluded.

Results: Five eligible studies were intuitively included after a series of exclusions. Dietary intervention (specifically, KD) was reported in each case. KD was found to be neuroprotective in four of the studies involved (Bousquet et al., 2012 being an exception). 2 of the studies assess the effectiveness of KD in motor performance only whereas, the rest investigate both motor and non-motor characteristics. The outcomes of the studies reveal the promising potential of Ketogenic Diets.

Conclusion & Recommendation: KD provide a promising future against the effect(s) of neurotoxin induced by MPTP and 6-OHDA and genetic alterations of unknown origin. Further studies should investigate and elucidate the likely mechanism behind the neuroprotective potential of KD.

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PSC16

Fish Consumption and Nutritional Implications in Selected African Populations

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Keywords: Seafood, protein, consumption,

Highlights:

- Nigerians appear to consume more of catfish than any other specie
- Family members of fish farmer met the minimum dietary recommendation for fish consumption
- The mean per capita fish consumption in Ghana met the dietary recommendation for fish consumption

BACKGROUND AND OBJECTIVES

Consumption of seafood in most African countries has been a far-cry from the minimum recommended by World Health Organization and other health bodies compared to their Western and Orient counterparts. This has been despite the numerous health goals inherent in seafood consumption such as protection from cardiovascular diseases and the development of brain function and visual effect [1]. In order to correct this trend, efforts have to be channeled towards creating more awareness on the nutritional benefits of seafood consumption, since seafood, for now, remains the major supply source of omega-3 fatty acid. One of the ways of doing this is by first having a thorough understanding of the present state of fisheries consumption in Africa. Hence, this work was set out to unravel the patterns of fish consumption and nutritional implications in selected African countries.

MATERIALS AND METHODS

The work was leveraged on secondary data obtained from peer-review and grey literature, given a general view of investigations done so far on this subject. The literature search was conducted in Science Direct, Google Scholar and Web of Science and was based on narrative review. The terms used for the literature search were “seafood consumption”, “seafood nutrition”, “nutrition Africa”, “seafood nutrition Africa”. The inclusion condition is that the work has to be peer reviewed and must be published in English and must not be published earlier than ten years. A total of forty-five journal articles were identified while only fifteen of them, centered on Nigeria, Ghana and Kenya, were reviewed.

RESULTS AND DISCUSSION

In Nigeria, within the period studied, each member of the participating families consumed approximately 300 grams of catfish within a one-week period. For families that reported that they ate tilapia, the estimated amount consumed per person is 24.8 grams [2]. For families that declared buying Mackerel in the last seven days, the mean serving per person was 33.5 grams per week.

In Western Kenya, more than half (58%) of the families of fish farmers eat fish over once in a week [3]; whereas in Ghana, 28 kg/year was the per capita fish consumption [4].

The US Dietary Guideline for Americans (USDGs) advocates the intake of 227-283 g per week of diverse seafoods by adults in order to attain the average 250 mg/d of EPA and DHA intake needed for good health. The long-chain n-3 PUFAs are related to a reduced risk of mortality and cardiovascular disease (CVD) [5].

CONCLUSION AND RECOMMENDATIONS

Nigerian participants seem to consume more of catfish than any other species of fish. In Western Kenya, family members from fishing communities were found to meet the minimum dietary recommendation for fish consumption. Ghana, average fish consumption was observed to also meet the minimum dietary recommendation for good health.

However, in order to encourage more consumption of seafood, policy makers should engage in more sensitization to make people to consume more diverse species of fishery commodities. In addition, safety and quality assurance practices should be implemented along the entire value chain of fish supply and distribution.

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PSC17

Scaling Community-Driven Multisectoral Nutrition Models to Improve MIYCN Outcomes in Fragile Humanitarian Settings in Borno and Sokoto State, Nigeria

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Keywords: Community nutrition; Tom Brown; humanitarian response; care group model

Highlights

- 97.8% moderate acute malnutrition (MAM) recovery rate achieved through integrated maternal, infant and young child nutrition (MIYCN) and Tom Brown Targeted Supplementary Feeding Programme (TSFP).
- MIYCN market-based nutrition support through E-voucher fresh food assistance.

BACKGROUND AND OBJECTIVES:

MIYCN remains a critical public health challenge in humanitarian settings, particularly in Northern Nigeria. The protracted conflicts, limited health/WASH access and food insecurity continues to exacerbate acute malnutrition thresholds accounting for an estimated 2,309,437 children under five (CU5) and 271,062 pregnant and lactating women (PLW) in need of treatment across Borno and Sokoto States [1]. This abstract showcases how Catholic Relief Services (CRS) deploys community-driven, preventive responses to improve MIYCN outcomes among vulnerable groups in six LGAs in Borno and Sokoto State, demonstrating potential for scale and sustainability in fragile context.

MATERIALS AND METHOD:

From 2022 - 2025, CRS implemented an emergency nutrition and food security response project in Borno and Sokoto State, targeting conflict-affected CU5, PLW, and nutritionally vulnerable mothers with infants under 6 months. Enrollment was based on sector-specific vulnerability and eligibility criteria e.g., mid-upper arm circumference (MUAC) <12.5cm for MAM, infants <6months at nutritional risk, PLW attending Ante-natal care (ANC) or Post-natal care (PNC), etc. The integrated community-driven nutrition package included:

- TSFP using Tom Brown (a local cereal blend) and micronutrient powder (MNP) supplementation to treat children 6-59 months with moderate acute malnutrition (MAM) [2].
- Tom Brown and Care groups incorporated MIYCN peer counselling, nutrition games, cooking demonstrations and home gardening to promote adoption of priority nutrition behaviours.

- Community-based management of small and nutritionally at-risk infants under 6 months (u6m) and their mothers (MAMI) [3].
- Targeted supplemental nutrition assistance (SNA) for children under 2 years, ANC/PNC attendees and integrated management of acute malnutrition (IMAM) program discharges [4].

Routine program monitoring employed Information, Communication and Technology for Development (ICT4D) systems to track MUAC screenings, distribution monitoring, and coverage surveys. Data were analyzed descriptively to assess service uptake, recovery, and nutritional outcomes.

RESULTS AND DISCUSSION:

- Recorded 97.8% average recovery rate among 35,574 CU5 discharges surpassing the SPHERE minimum standard of 75% for MAM recovery.
- High community acceptance, supports local markets and proven cost-effectiveness: $50-$66 per child compared to $117-$166 from the Global Nutrition Cluster. [5].
- 25% increase in exclusive breastfeeding; 56% increase in minimum dietary diversity (MDD) for children 6-23m and 32% increase in minimum dietary diversity for women (MDD-W).
- Challenges faced include recurrent displacements and unrest, inadequate stabilization centers, inflations, and initial low male participation, which required continuous adaptive strategies for effective scale-up.

CONCLUSION AND RECOMMENDATION(S):

Community-based, low-cost nutrition strategies integrated with local systems improved MIYCN outcomes and are scalable in fragile settings. Institutionalizing local TSFP models, engaging men in SBCC and building local capacity are key to sustainability. CRS is committed to addressing emergency nutrition gaps in support of Nigeria's localized nutrition efforts.

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PSC19

Do mothers really need support to breastfeed? Perception of breastfeeding mothers on Baby Friendly Community Initiative (BFCI)

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Keywords: Breastfeeding, Baby-Friendly Community Initiative, Support groups

Highlights:

- There is low awareness of Baby-Friendly Community Initiative among mothers
- Mothers show strong interest in joining community breastfeeding support groups
- Mothers need counselling, material help and flexible work conditions

BACKGROUND AND OBJECTIVES

The Baby-Friendly Hospital Initiative (BFHI) is a global effort by the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) that encourages hospitals and maternity facilities to support and promote breastfeeding [1]. While the Baby-Friendly Hospital Initiative (BFHI) has improved breastfeeding practices, sustaining breastfeeding after discharge requires additional community support. The Baby-Friendly Community Initiative (BFCI) extends BFHI by providing mother-to-mother and community support to help mothers continue breastfeeding alongside appropriate complementary feeding. This study investigated the perceptions of breastfeeding mothers on the Baby-Friendly Community Initiative.

MATERIALS AND METHODS

A mixed-methods design **(quantitative and qualitative)** was used to investigate the breastfeeding mothers' perceptions of the Baby-Friendly Community Initiative (BFCI) in Modakeke, Ife East Local Government Area, Osun State. Purposive sampling technique was used to select 8 student first time mothers, 9 pregnant mothers and 8 lactating mothers respectively permanently resident in research area, willing to participate and capable of contributing to discussion. A semi-structured questionnaire was administered to collect information on participants' age, marital status, religion, level of education, occupation, and household characteristics.". A focus group guide with nine open-ended items was used. Three focus groups (pregnant mothers, health practitioners, grandmothers, students, first-time mothers, and lactating mothers) with 6 to 10 participants each were conducted. Each focus group discussion lasted approximately 50-75 minutes and was conducted in a quiet and private setting within the community to promote open dialogue. Data was analyzed using ATLAS.ti and IBM SPSS version 26.0.

RESULT AND DISCUSSION

As shown in Table 1, most focus group participants were unaware of the Baby-Friendly Community Initiative (BFCI) but expressed strong interest in joining support groups once informed. Mothers identified counselling, material support (food, money, clothes, diapers), and flexible working conditions as key needs. Participants highlighted that BFCI should be created and led by the government, health practitioners, or capable individuals. They recommended providing support from pregnancy through six months postpartum. Major perceived challenges included funding, acceptance, and suitable meeting venues. These findings underscore the need for community-level strategies to increase awareness and participation in BFCI to promote exclusive breastfeeding, consistent with previous studies [2].

Table 1: Summary of perception of Babay Friendly Community Initiative by focus group participants

Aspect	Key responses
Awareness of BFCI	Participants are largely unaware but show interest after sensitisation
Types of support needed	Counselling, food, money, clothes, diapers, flexible working hours
Who should create BFCI?	Government, health practitioners, and capable individuals
When to provide support	During pregnancy to 6 months postpartum
Likely challenges	Funding, acceptance by mothers, venue/material needs
Suggested members of the support group	Pregnant/lactating mothers, grandmothers, fathers, health workers

CONCLUSION AND RECOMMENDATION

Awareness of Baby-Friendly Community Initiative (BFCI) was low, but mothers showed strong interest in support groups when informed. They identified counselling, material support, and flexible work conditions as key needs. It is recommended that awareness of BFCI be improved and that local governments and health facilities strengthen community support structures for breastfeeding mothers.

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PSC20

Nutritional Evaluation of Potential Ready to use Therapeutic Food Produced from Sorghum, Flaxseed and Soybean Blend

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Keywords: RUTF, Malnutrition, Local ingredients

HIGHLIGHTS OF THE STUDY

- The research assessed the nutrient profile of Ready-to-Use Therapeutic Food (RUTF) prepared from locally sourced ingredients as a substitute for imported products.
- Results revealed that the proximate components particularly protein, fiber, and ash of the formulated RUTF complied with recommended nutritional standards.

BACKGROUND AND OBJECTIVES

Ready-to-use therapeutic food (RUTF) is a lipid-based product used to treat severe acute malnutrition (SAM) in under-five children at home (1). Most RUTFs are imported and made with non-local ingredients, making them costly and less accessible. This study evaluated the nutritional content of locally made RUTF using a blend of sorghum, flaxseed, and soybean.

MATERIAL AND METHOD

Raw ingredients were obtained from local markets and processed into flours following standard procedures. Three sample formulations were prepared: **Sample A** (40% sorghum, 18% soybean, 2% carrot, 10% flaxseed, 15% sugar, 15% soybean oil), **Sample B** (30% sorghum, 28% soybean, 2% carrot, 10% flaxseed, 15% sugar, 15% soybean oil), and **Sample C** (20% sorghum, 38% soybean, 2% carrot, 10% flaxseed, 15% sugar, 15% soybean oil). The local RUTF was produced, proximate and micronutrient analyses were performed according to (3) procedures, while statistical analysis was conducted using SPSS version 23, with Duncan's test applied to compare mean differences

RESULT AND DISCUSION

Results revealed that moisture levels ranged between 7.89% and 8.97%, with **Sample C** recording the highest value. **Sample B** had the greatest ash content (5.27%) and also the highest protein content (14.12%). The moisture values obtained exceeded the (1) recommended limit of 2.5% but were still lower than the 6.7–13.4% reported by (2)

Table 1: Proximate Composition of Locally made Ready to Use Therapeutic Food

Sample	Moisture (%)	Crude Fiber (%)	Total Ash (%)	CHON (%)	Fat (%)	CHO (%)
A	8.46±0.07^{b}	5.13±0.07^{b}	5.06±0.07^{ac}	12.61±0.03^{b}	4.11.±0.01^{b}	64.97±0.06^{b}
B	7.89±0.08^{a}	4.57±0.07^{a}	5.27±0.08^{c}	14.12±0.00^{c}	3.56±0.64^{a}	64.36±0.64^{b}
C	8.97±0.06^{c}	5.98±0.05^{c}	4.86±0.06^{a}	11.11±0.01^{a}	5.13±0.02^{c}	62.16±0.08^{a}

The vitamin composition of the formulated RUTF ranged from **51.0 to 159.22 mcg/100 g for vitamin A** and **417.73 to 427.72 mcg/100 g for vitamin D.** Mineral analysis showed values between **121.03 and 127.52 mg/100 g for calcium**, **131.31 and 137.73 mg/100 g for potassium**, and **7.13 to 9.17 mg/100 g for iron**. The calcium content was notably lower than the **270–2250 mg/100 g** reported by (2) for locally produced RUTF formulated with maize, soybean, banana, sugar, and soybean oil.

Table 2: Micronutrients Composition of Locally made Ready to Use Therapeutic Food

	(mg/100g)			(mcg/100g)	
Sample	**Calcium**	**Iron**	**Potassium**	**Vitamin A**	**Vitamin D**
A	121.03±1.40^{a}	8.56±0.07^{b}	131.31±1.43^{a}	151.±1.51^{b}	405.11±7.06^{a}
B	124.11±1.43^{ab}	7.13±0.01^{a}	134.82±1.42^{ab}	121.33±1.53^{a}	417.72±3.52^{ab}
C	127.52±0.0.70^{b}	9.17±0.08^{c}	137.73±0.76^{b}	159.22±1.40^{c}	427.72±3.55^{b}

CONCLUSION AND RECOMMENDATION

The study concluded that the locally produced Ready-to-Use Therapeutic Food (RUTF) met FAO and WHO requirements for nutrients such as protein, fiber, ash, potassium, and vitamin D. However, it fell short in terms of moisture, fat, vitamin A, and calcium levels. It was therefore recommended that further investigations be carried out on the local formulations to ensure they fully comply with the essential nutrient standards established by FAO and WHO.

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OSI4

Dietary Approach To Management Of Type 2 Diabetes In Nigeria: A Systematic Review

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Background: Diabetes is a metabolic illness and achieving appropriate HbA1c, cholesterol, and glycemic targets is the aim of medical nutrition therapy. This review assessed the effectiveness of dietary management of T2DM in Nigeria.

Methods: A total of 38 articles related to glycemic index of staple foods consumed among diabetes, dietary management of type 2 diabetes in Nigeria and medical nutrition therapy led by a dietitian in management of T2DM were identified using databases like PubMed, Google search, Elsevier, Cross Ref and Google scholars. **Selection criteria:** studies on observational cohort studies, cross sectional studies, randomized control trials, systematic reviews, individual researchers and recommendations with year of publication between 2014 and 2024 including patients with type 2 diabetes were selected. Thus, studies involving patients with gestational and type 1 diabetes were excluded of which eight were retained for full text eligibility assessment.

Results: The selected articles from several studies found that foods like grains, legumes like beans (43.7), Moimoi (41.14), tubers (49.81±10.38) etc are less harmful. The mean HbA1c (%) level decreased in the intervention group by 0.48 (95% CI: −0.80 to −0.16), while it increased in the control group by 0.22 (95% CI: −0.21 to 0.66). In addition, fasting blood glucose was decreased by 18.96 mg/dL (95% CI: −36.12 to −1.81; p = 0.031) after the intervention. This is evident that medical nutrition therapy led by the dietitian shown effective and improve in glycemic control.

Conclusion: Dietary management is very helpful to improve glycemic control and reduce complications among people living with type 2 diabetes in Nigeria.

Keywords: Dietary management, T2DM in Nigeria, Medical nutrition therapy, foods and diabetes, low glycemic indices foods

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OSI12

Micronutrient Status of Under-five Children Presented with Some Common Childhood Diseases at Samaru Primary Healthcare Center, Kaduna State.

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Keywords: Under-five Children, Childhood diseases, Micronutrients and Primary Healthcare Center

Highlights

- All (100%) of under-five children have sub-optimal serum vitamin A and zinc levels.
- A significant ($p = 0.024$) weak positive correlation ($r = 0.281$) between calcium and height in children with common childhood diseases was observed.
- Similarly, a significant ($p = 0.018$) weak positive correlation ($r = 0.294$) was found between zinc and height in children with common childhood diseases.

Background and objectives: Micronutrient deficiencies are a significant global health issue affecting children under the age of five. These deficiencies arise from a lack of essential vitamins and minerals vital for proper growth, development, and immune function. A hospital based cross-sectional study was carried out to determine the micronutrient status of under-five children with common childhood diseases.

Materials and methods: Using 85 randomly selected under-five children presented at Samaru PHC with common childhood diseases of malaria, diarrhoea and acute respiratory infection, a facility-based cross-sectional study was carried out. These children are matched with 30 randomly selected apparently healthy community case-control subjects. A validated semi-structured questionnaire was used to collect socio-demographic, morbidity, and mortality data from caregivers. Two milliliters of venous blood were collected from under-five children using the Helsinki protocol and the blood was used to assess the serum iron, zinc, and calcium using Atomic Absorption Spectrophotometry (AAS), and serum vitamin A using isopropanol method.

Results and discussion: The results revealed 65.9% males, 34.1% females, 32.9% 6-23 months of age, 67.1% 24-59 months of age, among which 38%, 28% and 34% had malaria, diarrhoea and acute respiratory infection, respectively. All (100%) of under-five children have sub-optimal serum vitamin A and zinc levels. Serum calcium and iron show a significant ($p<0.05$) association with malaria, diarrhoea and acute respiratory infection. The comparison of micronutrient status among under-five children in Samaru reveals significant disparities, particularly in vitamin A and zinc levels, between under-five children with common childhood diseases and their apparently healthy counterparts. The

findings highlight the urgent need for comprehensive nutrition programs, such as the "Nutrition Rebirth" initiative in Ondo State, which has shown positive impacts on reducing malnutrition among under-fives [1]. The association between common childhood diseases and micronutrient status from the study reveals a significant ($p<0.01$) association with calcium and iron, that is to say deficiency in these micronutrients could predispose a child to common childhood diseases. Correlation between micronutrient levels and anthropometric indices in under-five children who suffer from common childhood illnesses and apparently healthy children in Samaru is a critical area of study. Calcium is essential for bone development and muscle function; calcium deficiencies have been connected to poor growth outcomes in Nigerian children. A study in Kano, Northern Nigeria, found that 80% of children with protein-energy malnutrition (PEM) had calcium deficiency, compared to 55% in healthy controls [2]. This finding is similar to this work showing a significant ($p=0.024$) correlation between calcium and height, even though weak ($r= 0.281$) for children with common childhood diseases.

Conclusion and recommendation(s)

The identified deficiencies in micronutrients, particularly Vitamin A and Zinc, in both groups of under-five children highlight the critical need for targeted nutritional interventions to address the health challenges faced by all the children.

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OSI16

Determination of Energy and Nutrients Composition of Potential Ready-To-Use Therapeutic Food Formulated from Locally Available Resources.

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Keywords: Severe acute malnutrition (SAM), Ready-to-use therapeutic food (RUTF), Locally available resources.

Highlights:

- It is estimated that 2million children in Nigeria suffer from SAM.

-The energy values of the locally produced RUTF samples were in line with WHO's recommendation.

- The locally produced RUTF contained an appreciable amount of macro- and micronutrients.

BACKGROUND AND OBJECTİVES:

Severe acute malnutrition (SAM) is one of the leading causes of mortality among children under five years of age. Nigeria ranks second globally for the highest number of stunted children, with 32% of children under five affected (UNICEF, 2021).

Ready-to-use therapeutic food (RUTF) is a vital component in the treatment of SAM, designed to provide all necessary nutrients for rapid catch-up growth in children over six months old without medical complications. Despite its effectiveness, Nigeria relies heavily on imported RUTF, which poses significant challenges in addressing at scale. Logistics issues, such as shipping delays and high costs, coupled with donor fatigue, have led to RUTF shortages, threatening Nigeria's ability to meet the 2030 World Health Assembly (WHA) targets for reducing malnutrition and the Sustainable Development Goals (SDG's), particularly SDG-2, SDG-3, SDG-12 and SDG-17 (United Nations, 2015).

Local production could mitigate shortages, reduce dependency on imports, and ensure a more sustainable, cost-effective, and accessible solution.

OBJECTIVES: This study aimed to formulate RUTF using locally sourced ingredients and assess its energy and nutrient composition, comparing it to the standard commercial RUTF.

MATERIALS AND METHODS:

Three RUTF samples were formulated using locally available ingredients such as soybean, peanut, wheat, rice, baobab, brown sugar, date palm, and soybean oil. The raw soybean and peanut were evaluated for aflatoxin before the formulation. These samples were analyzed for energy content, proximate composition, vitamin and mineral content, and sensory attributes through organoleptic evaluation.

RESULTS AND DISCUSSION:

The energy values of the locally produced RUTF samples were in line with the World Health Organization's (WHO) recommendation of ≥ 500kcal per 100g. The samples produced energy values of 563.08, 503.67, and 528.98 kcal per 100g, respectively. The protein content of the samples (13.56%, 16.71%, and 14.62%) was notably higher than that of commercial RUTF, which contains 10.9%.

Table 1: Proximate composition of RUTF per 100g

Samples	Energy (kcal)	Moisture (%)	Crude protein (%)	Crude fat (%)	Crude fiber (%)	Ash (%)	Carbohydrate (%)
A	563.08 ± 0.25^{a}	1.34 ± 0.11^{b}	13.56 ± 0.75^{b}	35.84 ± 0.71^{a}	1.42 ± 0.22^{b}	1.27 ± 0.09^{b}	46.57 ± 1.48^{a}
B	503.67 ± 0.12^{a}	2.49 ± 0.97^{ab}	16.71 ± 1.12^{a}	28.15 ± 0.18^{b}	2.88 ± 1.20^{ab}	3.76 ± 0.39^{a}	45.87 ± 3.35^{a}
C	528.98 ± 0.27a	4.11 ± 0.89^{a}	14.62 ± 0.59^{ab}	34.10 ± 2.64^{a}	3.63 ± 0.33^{a}	2.64 ± 0.38^{c}	40.90 ± 2.85^{a}

Values are presented as mean ± standard deviations of triplicate readings (n=3).value within the same column bearing different superscripts letters are statistically ($p<0.05$) different.

CONCLUSION AND RECOMMENDATİON(S):

The locally formulated RUTF met the energy requirements of more than 500kal per 100g and contained an appreciable amount of macro- and micronutrients. The appearance, taste, flavor, and overall acceptability of the samples were commendable, highlighting the potential for local production to effectively combat SAM in Nigeria.

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OSI19

Knowledge, Practices Of Women Of Childbearing (19-49 Years) Toward Adequate Nutrition During Pregnancy In Urban And Rural Communities In Nsukka Local Government Area, Enugu State

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Keywords: Nutrition, Knowledge, Practice, Pregnancy

HIGHLIGHTS

- Adequate nutrition knowledge and practices is necessary for proper foetal development.
- Adequate nutrition is necessary for a healthy foetal growth and development.

BACKGROUND OF THE STUDY AND STUDY OBJECTIVE

Pregnancy refers to the period during which a foetus matures within a woman's uterus. According to Schmitt (2021) pregnancy typically spans approximately 40 weeks, slightly over 9 months, calculated from the last menstrual period to childbirth [1]. Importance of First One Thousand Days: The first one thousand days of a child's life, from fertilization to two years post-birth, are crucial for brain, body, and immune system development [2]. Maternal health, nutrition, and stress levels during pregnancy significantly influence the child's future health and development. The broad objective of the study was to assess the knowledge and practices of women of childbearing (19-49 years) toward adequate nutrition during pregnancy in urban and rural communities in Nsukka Local Government Area, Enugu State.

MATERIALS AND METHODS

The study was carried out in Nsukka local government area (LGA), Enugu state. A cross-sectional descriptive study design was adopted. The target population was women aged 19-49 years in urban and rural communities in Nsukka LGA. The sample size was determined to be 420 respondents using the Taro Yamane (1967) Formula. A multi-stage sampling technique was used to select the respondents. Respondents in the selected hospitals were residents of Nsukka Local Government (urban and rural areas), females and between the ages of 19-49 years old. Data collection was carried out using a semi-structured interviewer-administered questionnaire. The questionnaire was in English but was administered in Igbo or vernacular languages to respondents who do not understand English. Nutrition knowledge and practice was classified into three; poor (below 30%), moderate (31% - 60%) and good (61% and above). The weight of the respondents was checked using a digital weighing scale and the height was measured using stadiometer. The weight and height of the respondents were then used calculate their BMI. Data was analyzed using statistical software, known as Statistical Product for Service Solution (SPSS). The associations between variables will be tested using chi-square tests. A p-value of less than 0.05 was considered statistically significant. The findings were presented in tables and texts.

RESULTS

Nutrition Knowledge of the Respondents

Majority (91.99%) of the respondents in urban area knew that excess consumption of sugars and oil can cause chronic health problems and in rural area, 88.89% were knowlegeble about this.

Table 4.1: Overall nutritional knowledge and practices of the respondents

Knowledge	Urban Area F(%)	Rural Area F(%)	Total F(%)	Practice	Urban area F(%)	Rural area F(%)	Total F(%)
Poor knowledge (Below 30%)	26(8.33)	8(7.40)	34(8.10)	Poor Practice (Below 30%)	35(11.22)	12(11.11)	47(11.90)
Moderate Knowledge (31% - 60%)	275(88.14)	98(90.74)	373(88.80)	Moderate Practice(31 %-60%)	202(64.74)	81(75.00)	283(67.38)
Good Knowledge (61% - 100%)	11(3.53)	2(1.90)	13(3.10)	Good Practice (61%-100)	75(24.04)	15(13.89)	90(21.43)
Total	**312(100)**	**108(100)**	**420(100)**	**Total**	**312(100)**	**108(100)**	**420(100)**

F = Frequency, % = Percentage

Table 4.2 presents the Body Mass Index of the respondents. A little above a quarter (39.42% and 33.33%) of the respondents in urban and rural areas, respectively fell into the overweight range, 36.11% in rural area were within normal BMI in contrast to 32.05% in the urban area.

Table 4.2: Classification of weight of the respondents using BMI

BMI class(kg/m^2)	WHO BMI classification	Urban area		Rural area		Total	
		F	%	F	%	F	%
Underweight	<18.5	7	2.24	3	2.78	10	2.38
Normal weight	18.5 – 24.9	100	32.05	39	36.11	139	33.09
Overweight	25.0 – 29.9	123	39.42	36	33.33	159	37.86
Obese class I	30.0 – 34.9	55	17.63	23	21.29	78	18.57
Obese class II	35.39.9	22	7.05	5	4.62	27	6.43
Obese class III	≥40	5	1.60	2	1.85	7	1.67
Total		**312**	**100**	**108**	**100**	**420**	**100**

BMI = Body Mass Index, F = Frequency, % = Percentage

CONCLUSION

The results from the study showed that majority of the respondents had moderate nutrition knowledge, good nutrition attitude and moderate nutrition practices. There was evidence of overweight and obesity among the respondents and few cases of underweight, indicating a double burden of malnutrition. There was no significant association found between knowledge and practice. However, a significant association was observed between nutrition knowledge and educational levels. There existed cases of both undernutrition and overnutrition. Nutrition sensitization programmes should be planned and

implemented by the government to improve nutrition knowledge and encourage adequate nutrition practices.

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PSI3 Social-Cultural Factors and Beliefs Affecting Complementary Feeding Practices And Hygiene Practice Among Mothers With Children 6-24 Months Of Abia State

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KEYWORDS: Complementary food, Hygiene, Sociocultural, Taboos

HIGHLIGHT:

- Socio-cultural beliefs influence complementary feeding and hygiene practices.
- Positive hygiene habits such as handwashing exist despite limited resources.
- Integrating traditional beliefs with modern nutrition education can improve child nutrition

BACKGROUND AND OBJECTIVES: Complementary foods should be adequate, hygienically prepared, stored and fed with clean hands using clean utensils. This study examines how socio-cultural factors and beliefs influence complementary feeding and hygiene practices among caregivers of young children.

MATERIAL AND METHODS: The study was a descriptive cross-sectional study conducted among Mothers. Three hundred and twenty mothers were selected through a multistage sampling method from selected communities in three LGAs of Abia State. Data were collected through a mixed-methods approach, combining quantitative and qualitative research techniques. Structured closed-ended and open-ended questionnaires were used to collect data socio socio-cultural belief on complementary feeding initiation, meal frequency, dietary diversity (1) and hygiene practice. An in-depth interview was conducted among 20% of the sample population. Descriptive statistics and NVivo software was used to analyze the data.

RESULT: The study found minimal restrictive food taboos (34%), 30% have beliefs such as consuming eggs delays speech, gizzard being unsuitable for children, and snails or pork being seen as harmful. About half (55.4%) of the mothers wash their hands with soap and water after using the toilet

Table 1: Some in-depth Interview responses on sociocultural factors and beliefs on complementary foods for various thematic area

Themes	Response	Response	Response	Response
Complementary Feeding Initiation	When my baby started crawling, everyone said it was the time to give him adult foods	When my baby started teething, everyone said it was the time to give him a solid food.	In our culture, we believe that starting solid food around 2-3 months helps the baby to grow stronger	Babies can start eating as soon as they can accept the foods and have no stomach upset
Food taboos of some food groups	"Fish heads are avoided for children; it is believed they may affect their intelligence	"In our community, snails/gizzard are considered impure for young children, it may turn them to be imbecilic	It is believed that children should not eat eggs, fish or meat too early because it might make them aggressive or difficult to manage.	Giving gizzard to young children, they said is a sign of disrespect and is meant for the male adult at home"
Foods considered appropriate for complementary feeding	I always look for foods that are affordable. Pap and soya beans are cheap, and they may up without breaking the bank."	"I prefer feeding my child eba and soup because he will eat from the general family food, which ease the stress of preparing a special food for him".	"In my community, we give babies mainly foods like pap, and I introduced my baby to the same food.	I believe that if you want a child to be strong and healthy, they need to eat staple foods like cassava (Akpu) and plantains
Hygiene Practice	"I wash my hands with water after using toilet. We don't always have soap, so I use water, which I believe helps to keep my hands clean enough"	"Soap is expensive, so I usually just use water to wash my hands after toilet use"	We always cover food after cooking because it is believed that spirits can contaminate food if left open	"Not washing hands before feeding the child makes the baby sick"

CONCLUSION: Encouragingly, handwashing practices and a positive socio-cultural environment support healthy feeding habits. Recommendations include community education, engaging local leaders, and blending modern nutritional guidance with traditional beliefs to promote improved child health outcomes. No citation nor reference is listed in this abstract

1. WHO Guideline for complementary feeding of infants and young children 6–23 months of age. Geneva: World Health Organization; 2023. Licence: CC BY-NC-SA 3.0 IGO.

PSI5

Complementary Feeding Practices and Nutritional Status of Children aged 6-24 Months in Ibadan North Local Government Area, Oyo State

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KEYWORDS: Complementary feeding, nutritional status

HIGHLIGHTS

- Minimum Dietary Diversity (MDD) was significantly associated with all forms of malnutrition in the study area, including stunting (p=0.034), wasting (p=0.028), underweight (p=0.021), and overweight (p=0.046)

BACKGROUND AND OBJECTIVES:

The nutrition of infants and young children is one of the most significant determinants of their health today, as well as their future growth and illness patterns [1]. Unfavourable factors, such as inappropriate infant feeding practices, harm the health and nutritional status of children; hence, proper feeding practices are essential for a child to achieve optimal growth and development [2]. Therefore, the study examined the relationship between complementary feeding practices and nutritional status of children aged 6-24 months in Ibadan North Local Government Area, Oyo State.

METHODOLOGY:

This study was a descriptive cross-sectional design, employing a multi-stage sampling technique to select 273 mother-child pairs across five primary health centres in Ibadan North LGA. They were mothers attending the Primary Health Centers for immunization and growth monitoring of their children. An interviewer-administered questionnaire, using the KoboCollect app, was employed to collect data. Complementary feeding practices were assessed based on indicators defined by the World Health Organization. Data was analyzed using descriptive statistics, and bivariate analysis was performed using the Chi-square test to examine the association between independent and dependent categorical variables, with a level of significance set at $p < 0.05$.

RESULTS AND DISCUSSION:

The prevalence of mothers who practiced appropriate complementary feeding (CF) practices was low (26%), although the value was slightly higher than what was reported in Iseyin, Oyo State [3]. Malnutrition was seen in the study area in the form of stunting, wasting, underweight, and overweight, with stunting being the most predominant form (58.2%). The result revealed a slightly above average

percentage of mothers who met MDD, and not meeting the dietary diversity was significantly associated with all forms of malnutrition reported in the study.

Table I: Relationship between Complementary Feeding Practice and Nutritional Status

Complementary Feeding Indicators	Nutritional Status of Children 6-23 Months Old							
	Wasting		Stunting		Underweight		Overweight	
	%	p-value	%	p-value	%	p-value	%	p-value
MDD								
Met	5.1	0.028*	64.5	0.034*	18.8	0.021*	2.9	0.046*
Not met	12.6		51.9		29.6		0.0	
Overall CF Practices								
Appropriate	5.6	0.275	53.5	0.348	11.3	0.002*	4.2	0.024*
Inappropriate	9.9		59.9		28.7		0.5	

CONCLUSION AND RECOMMENDATION(S):

While a high proportion of mothers met each complementary feeding practice, very few mothers met all four recommended complementary feeding practices. Therefore, it is recommended that there should be increased nutrition education for mothers and caregivers, raising their awareness of the importance of meeting all complementary feeding practices for the health of their children. Nutrition is multi-disciplinary; hence, collaboration can be made between nutritionists, healthcare providers and community healthcare workers to promote evidence-based complementary feeding practices, such as food demonstrations carried out in PHCs to expound the importance of meeting the dietary diversification needs of the child and provide ongoing support to families.

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PSI7

A comparative study of assessment of nutritional status among female adolescents in selected public and private schools in Zaria metropolis

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Keywords: Female adolescents, nutritional status, BMI, Sociodemographic, public and private secondary school.

Background and Objectives: Adolescents form a part of the productive age group in Nigeria, and paying attention to their needs is essential for the nation's development. Assessing the nutritional status of pupils in schools could provide evidence-based information that could be used for future dietary interventions (1).

Materials and Methods: Stratified and convenient sampling was used to study and compare the BMI status among female adolescents in two selected private and two public schools in Zaria LGA, Kaduna state, Nigeria. A descriptive, cross-sectional research design was used to determine the socio-demographic factors and BMI among 318 adolescents aged between 10 and 19 years in both public and private schools. In-depth interviews and a survey guided by a semi-structured questionnaire were used to collect information. Nutritional status was assessed using anthropometric measurements.

Results: The prevalence of underweight, normal weight, overweight, and obesity among private school participants was 0.0, 93, 6, and 1% respectively, whereas that of public-school participants was 65, 35, 0.0, and 0.0, respectively. Several factors (individual, household, and contextual) have been postulated to predict the occurrence and variance in nutritional status among developing populations like the Northern Nigeria (2).

Table 1 Socio-demographic characteristics of adolescent girls in selected public and private schools of Zaria LGA.

	Public School		Private School	
Variable	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Age Group				
10-14 years	57	36	131	82
15-19 years	102	64	28	18
Total	159	100	159	100
Marital Status				
Single	157	99	159	100
Married	2	1		
Total	159	100	159	100
Type of Family				
Nuclear	63	40	98	62
Extended	96	60	61	38
Total	159	100	159	100
Family Size				
2-4	25	16	57	36
5-9	54	34	53	33
>10	80	50	49	31
Total	159	100	159	100

Table 2: Body Mass Index (BMI) of Adolescent girls in Selected Public and Private schools in Zaria LGA

	Public School		**Private School**	
Weight Status	Frequency	Percentage (%)	Frequency	Percentage (%)
Underweight	104	65	-	-
Normal Range	55	35	148	93
Overweight	-	-	9	6
Obese	-	-	2	1
Total	159	100	159	100

Conclusion: There is a prevalence of undernutrition among adolescent girls in public schools and overnutrition among adolescents in private schools. Therefore, monitoring adolescents' dietary intake and nutrition status is key in preventing adolescents' malnutrition in the short term and diet-related diseases in the long term.

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PSI8

Breastfeeding, complementary feeding and anthropometric status of children 0 to 24 months in Nkanu East LGA, Enugu State.

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Keywords: Breastfeeding, complementary feeding, anthropometric status.

Background and Objectives: The early years of life are critical for growth and development, making appropriate feeding practices essential. The World Health Organization (WHO) recommends early initiation of breastfeeding within one hour of birth, exclusive breastfeeding for the first six months of life, followed by the introduction of appropriate complementary foods while continuing breastfeeding for up to two years or beyond [1]. This study aimed to examine the breastfeeding, complementary feeding practices, and the anthropometric status of children aged 0 to 24 months in Nkanu East Local Government Area, Enugu State, Nigeria.

Materials and Methods: A cross-sectional study using multi staged sampling technique was conducted among 285 mother-child pairs. Data were collected with a structured questionnaire on the socio-demographic factors and feeding practices. Anthropometric measurements of the children were taken to assess their nutritional status. The anthropometric measurements were analyzed using WHO Anthro version 2006. Data obtained from the questionnaire were coded in an excel sheet and analyzed using Statistical package for service solution (SPSS) version 23. Both descriptive statistics and inferential statistics were employed and statistical significance accepted at $p<0.05$.

Results and Discussion: Initiation of breast milk within the first one hour of birth was recorded amongst 58.1%, the breastfeeding rate was 99.6%, 95.4% breastfed on demand, 37.2% were fed prelacteal feed, and 94.4% received colostrum. The duration of exclusive breastfeeding was found to be suboptimal, with only 13% of mothers practicing exclusive breastfeeding for the recommended 6 months and this rate falls below the exclusive breastfeeding rate (29%) reported by the Nigerian Bureau of Statistics [2].

Only 19.5% introduced complementary foods at 6 months, majority (76.3%) introduced before six months, this is consistent with findings from Ugo *et al.* (2025) [3] where 72% of the respondents introduced complementary feeding before 6 months. More than two out of every five children (48.4%) were stunted, 12.7% were underweight, and 5.3% were wasted while 37.9% and 8.2% were overweight using weight for height and weight for age classification respectively. The high prevalence of stunting (48.4%) observed indicates a serious public health concern as the World Health Organization considers a stunting prevalence of 30% or more as a very high public health problem [4].

Conclusion and Recommendations: The study concludes that the children under study have poor nutritional status as evidenced by the dual burden of malnutrition, and poor adherence to the WHO infant and young child feeding recommendations. Addressing these challenges requires a multi-sectorial approach, including strengthening infant and young child feeding education, early routine growth monitoring, and enhancing community-based nutrition interventions.

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PSI9

Complementary Feeding Knowledge, Attitudes, and Practices among Nursing Mothers in Nsukka, Southeast, Nigeria: Baseline Data for Targeted Interventions

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Keywords: Complementary feeding, Nursing mothers, minimum acceptable diet, minimum dietary diversity

Highlights

- Only 54.7% of children received the minimum acceptable diet (MAD)
- 42.1% of mothers practiced bottle feeding; 37.9% reported zero fruit/vegetable intake
- Maternal knowledge was mostly average.

BACKGROUND AND OBJECTIVES

Complementary feeding is essential to preventing undernutrition during the critical window of the first 1,000 days of life. Inappropriate feeding practices contribute significantly to child malnutrition in Nigeria, where 33.3% of children under five are stunted and 11.6% are wasted [1]. Mothers' knowledge and attitudes significantly influence feeding practices, but gaps exist particularly in semi-urban areas like Nsukka [2, 3]. This study assessed nursing mothers' knowledge, attitudes, and practices regarding complementary feeding to inform targeted interventions.

MATERIALS AND METHODS

A cross-sectional study involving 190 nursing mothers with infants aged 6-12 months was conducted in Nsukka. Participants were selected using a multi-stage sampling technique from three health facilities representing primary, secondary, and tertiary care. Data were collected using structured interviewer-administered questionnaires. Knowledge was assessed using 12 questions and scored as poor, average, or good. Attitude was evaluated with an 8-item Likert scale. Practices were assessed using WHO indicators: MDD, MMF, and MAD. Data were analysed using SPSS version 27.0.

RESULTS AND DISCUSSION

Majority (65.3%) of mothers had average knowledge, 27.4% had good knowledge, and 7.4% had poor knowledge. About 70% of respondents had positive attitudes toward complementary feeding, while 15.8% showed neutral and 14.2% negative attitudes. Only 54.7% of children met the MAD, 63.7% achieved MDD, and 65.3% met MMF. Inappropriate practices such as bottle feeding (42.1%) and zero fruit/vegetable intake (37.9%) were prevalent. Gizaw et al. [3] highlighted similar trends, emphasizing the need for targeted education to move mothers from average to good knowledge levels.

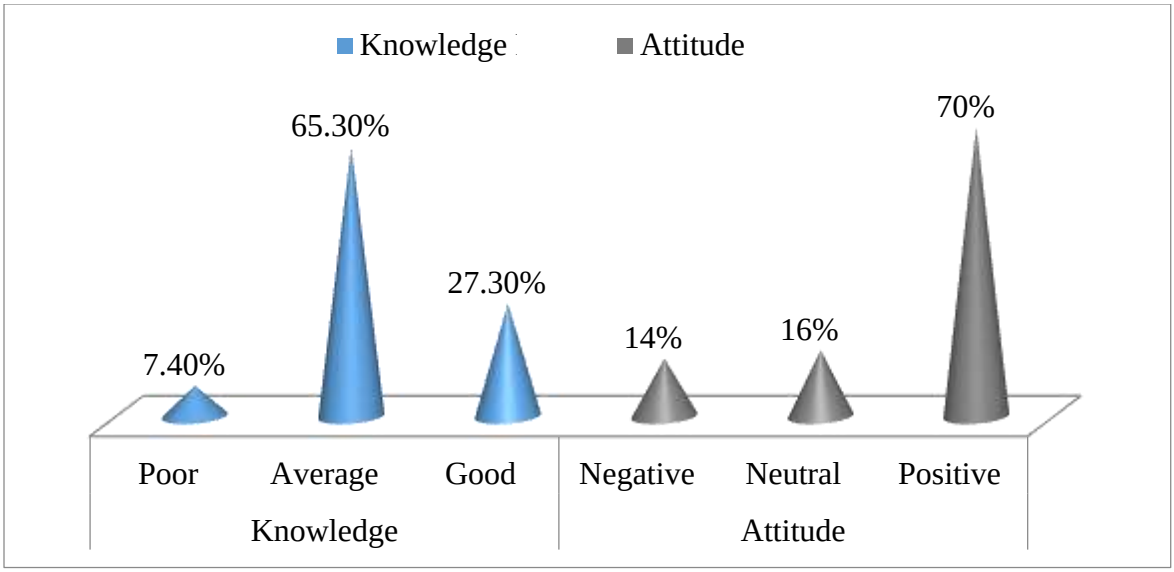

Figure 1: Knowledge and attitude categories on complementary feeding among Nursing Mothers

Table 1: Key complementary feeding Indicators among respondents (N=190)

Indicator	**% Meeting Criteria**
Minimum Acceptable Diet (MAD)	54.7%
Minimum Dietary Diversity (MDD)	63.7%
Minimum Meal Frequency (MMF)	65.3%
Bottle Feeding	42.1%
Zero Fruit/Vegetable Intake	37.9%

CONCLUSION AND RECOMMENDATION

Although mothers had generally positive attitudes and moderate knowledge, complementary feeding practices were suboptimal. Interventions should not only increase awareness but also bridge practical gaps through culturally appropriate education and improved food access.

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PSI10

Assessment of Nutrition and Health Status and Pregnancy Outcome of Mothers Attending Tertiary Hospitals in Ibadan

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Keywords:

Maternal health; Pregnancy outcomes; Nutrition; Antenatal care

Highlights:

- Majority of infants had normal birthweight and Apgar scores
- Normal maternal BP was significantly associated with full-term delivery

BACKGROUND AND OBJECTIVES:

Maternal nutrition and health are critical determinants of pregnancy outcomes particularly in low-resource settings where inadequate care can lead to complications for both mother and child. (1,2). This study assessed the influence of nutrition and health status on pregnancy outcomes among pregnant women attending government-owned hospitals in Ibadan.

MATERIALS AND METHOD:

This hospital-based cross-sectional study involved 301 randomly selected pregnant women from two teaching hospitals. Data (Socio-demographic and socio-economic, and pregnancy history) were obtained using a semi-structured questionnaire. Respondent's dietary information were obtained using Food Frequency Questionnaire. Biochemical and anthropometric data such as pre-pregnancy weight, height, PCV, blood pressure, and blood glucose levels were retrieved from the respondents' hospital case files with appropriate permission.

RESULTS AND DISCUSSION:

Respondents were 26–35 years (64.9%), married (82.9%), and had tertiary education (72.6%). Majority were multigravida (71.6%), reported multiparity (39.5%), and 25.6% had experienced complications in previous pregnancies with miscarriage being the most reported case (49.2%). Dietary patterns showed that 68.9% consumed three meals daily, and over 80% ate snacks and in-between

meals regularly. Fruits and vegetables were consumed at least 1–2 times weekly by more than half of the participants. Almost all respondents attended antenatal care, with 56.4% attending 4–8 sessions. Most infants had normal birth weight (85.5%) and full-term delivery (67.1%), with reassuring Apgar scores. Mother's with normal blood pressure significantly had babies born full term (p=0.00) and mothers with normal PCV had babies with normal PCV (p=0.00).

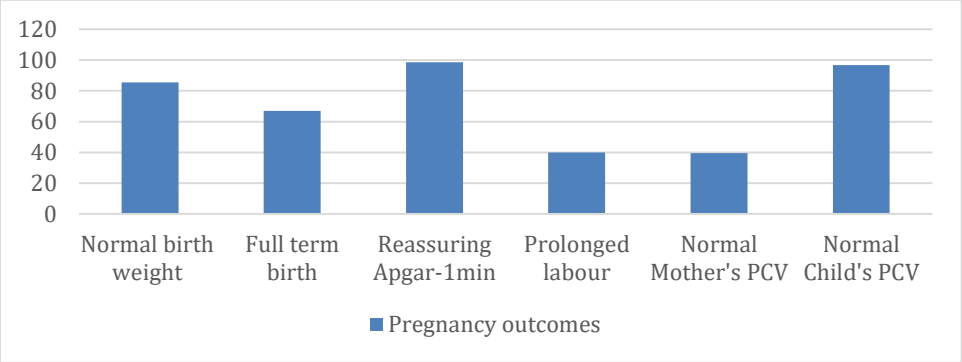

Figure 1: Pregnancy outcomes of respondents

CONCLUSION AND RECOMMENDATION:

Maternal blood pressure and PCV levels are crucial indicators of healthy pregnancy outcomes. It is therefore imperative to strengthen antenatal care services with targeted nutritional education and regular monitoring to improve maternal and neonatal health outcomes.

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OBG2

Knowledge, attitude and Consumption Patterns of non-nutritive sweeteners among University Staff in Abia State

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Keywords: Adults, Artificial ssweeteners, consumption, Non-nutritive sweetener, knowledge
Highlights:

- Consumption of NNS- containing products through commonly available processed foods is prevalent.
- Socio-demographic factors significantly influenced individuals' knowledge and use of NNS

BACKGROUND AND OBJECTIVES

The rise in overweight and obesity among working adults has become a global public health concern. These conditions increase the risk of developing type 2 diabetes, coronary heart disease, and stroke, which results in high medical expenses, decreased work productivity, and lost wages due to incapacity [1]. Also, the increasing global prevalence of non-communicable diseases has led to a surge in the availability and consumption of non-nutritive sweeteners (NNS) as sugar alternatives [2]. However, understanding their use, public perception, and actual consumption patterns within specific Nigerian populations remains limited. This gap in local evidence hinders the development of targeted, evidence-based public health guidance and policy. This study aimed to bridge this gap by examining the knowledge, attitudes and consumption patterns of NNS-containing products among staff at Michael Okpara University of Agriculture, Umudike (MOUAU), Abia State.

MATERIALS AND METHODS

A cross-sectional descriptive study design was employed, involving 384 staff members of MOUAU selected through random sampling. Data were collected using a pre-tested, self-administered questionnaire covering socio-demographic characteristics, NNS knowledge (categorized as poor <50%, fair 50-70%, good >70%), attitude (negative <50%, neutral 50-70%, positive >70%), perception (low <50%, moderate 50-70%, high >70%), and consumption frequency of NNS-containing products. Descriptive statistics (frequencies, percentages) were used for data summarization, and Chi-squared tests were utilized to determine associations between socio-demographic factors and NNS consumption, knowledge, and attitude, with statistical significance set at $p \leq 0.05$.

RESULTS AND DISCUSSION

Participants were predominantly aged 36-45 years (41.1%), females (56.5%), married (71.6%), and resided in rural areas (64.8%). While a notable proportion (40.1%) demonstrated good knowledge of NNS, with 69.8% correctly identifying NNS as having fewer calories than sugar, and 56.3% perceiving a low cancer risk, significant misconceptions existed for instance 68.5% doubted NNS reduce food cravings. A study [3] found that many participants had a high-risk perception of NNS and lacked knowledge about their benefits, including their low-caloric content. The findings suggest that effective communication strategies are needed to educate consumers about the advantages of using NNS over traditional sugars. Attitudes towards NNS were largely negative (46.9%), with 53.1% expressing reluctance towards regular NNS use, although 62.5% supported substituting sugar with NNS and 52.6% valued checking food labels. Awareness levels were generally high (53.6%), with 74.2% able to identify common foods containing NNS. Daily consumption of NNS-containing products was notable for cocoa products (28.9%), carbonated drinks (23.3%), milk (24.0%), cereals (16.1%), and biscuits (20.2%). Significant associations were observed between various socio-demographic factors (including age, location, education, work type, marital status, and health conditions) and NNS knowledge, attitude, and perception ($p<0.05$). Specifically, age and present disease condition were significantly associated with attitudes towards NNS ($p<0.05$).

Table 1: Knowledge of participants about Non-Nutritive Sweeteners (NNS)

Variable	Frequency	Percentage (%)
Poor knowledge (<50%)	140	36.5
Fair knowledge (50 - 70%)	90	23.4
Good knowledge (>70%)	154	40.1

Table 2: Attitude of participants towards Non-Nutritive Sweeteners (NNS)

Variable	Frequency	Percentage (%)
Negative attitude (<50%)	180	46.9
Neutral attitude (50 - 70%)	115	29.9
Positive attitude (>70%)	89	23.2

CONCLUSION

This study reveals a complex interplay of relatively good knowledge but predominantly negative attitudes and mixed perceptions regarding NNS among University staff in Abia State. Despite reluctance towards direct NNS use, consumption through commonly available processed foods is prevalent. Socio-demographic factors significantly influence individuals' understanding and disposition towards NNS.

Implications for Policy and Practice: These findings underscore a critical gap between NNS availability, consumer understanding, and informed choice. They provide essential local evidence for "Bridging Gaps in Nutrition Research and Development For Evidence-Based Policy." There is a clear need for targeted health education initiative and transparent food labeling policies to empower consumers, address misconceptions, and foster more positive and informed attitudes towards NNS. This research contributes to the evidence base required for developing nuanced public health strategies and regulatory frameworks concerning NNS consumption in Nigeria. Further longitudinal research is recommended to explore long-term health impacts.

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OBG4

Nutrient composition, sensory evaluation and glycemic effect of biscuit made from composite blends of wheat, unripe plantain (*Musa paradisiaca)* and cowpea (*Vigna sinensis*) flour

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Keywords: Biscuit, plantain, cowpea, glycemic index, diabetes

HIGHLIGHTS:

- Nutrient analysis showed improved protein and fiber content in composite biscuits compared to wheat-only biscuits.
- Glycemic index (GI) values of composite biscuits were low, indicating suitability for diabetic diets.
- Composite biscuits significantly lowered postprandial blood glucose levels.

BACKGROUND AND OBJECTİVES: The prevalence of diabetes mellitus is rising globally, with diet playing a critical role in the management and prevention. Foods with low glycemic index and high fiber content are recommended to control blood glucose levels. Composite flours combining cereals and legumes have been shown to enhance nutritional quality and functional properties of food products. Unripe plantain (*Musa paradisiaca*) and cowpea (*Vigna sinensis*) are rich in dietary fiber, resistant starch, and protein, which may contribute to lower glycemic responses [1]. This study aimed to develop biscuits from composite blends of wheat, unripe plantain, and cowpea flours, evaluate their nutrient composition and glycemic effects to assess their potential for managing diabetes.

MATERIALS AND METHOD: Wheat, unripe plantain, cowpea, and date palm were processed into flours. Composite flours were formulated as wheat-unripe plantain (WUP) and wheat-cowpea (WCP) blends, with date palm flour added for sweetness. Biscuits were baked from these blends, each supplying 50g available carbohydrates. Proximate, mineral, and vitamin composition were determined using AOAC standard methods [2]. Sensory evaluation was conducted using a 9-point hedonic scale by thirty trained panelists. Twelve healthy adults participated in the glycemic response study, with blood glucose measured at baseline and intervals post-consumption. Data were analyzed using SPSS, version 23 at $p < 0.05$ significance.

RESULTS AND DISCUSSION: The WCP biscuit sample had the highest moisture (5.80%), crude fiber (8.40%), and ash (5.92%) content, consistent with the high fiber and mineral content of cowpea flour [3]. The WUP biscuit showed the highest protein (16.42%) content, reflecting the complementary

amino acid profiles of unripe plantain and wheat. Wheat-only biscuits had higher fat (19.88%) and carbohydrate (52.21%) content, this is in line with typical wheat flour composition [4]. Sensory evaluation favored wheat-only biscuits, likely due to familiar taste and texture, but composite biscuits were acceptable, indicating potential consumer acceptance with further optimization. The glycemic index values for all biscuits were below 55, classifying them as low-GI foods, which are beneficial for glycemic control [5]. The glucose group showed significantly ($p < 0.05$) higher postprandial glucose levels compared to biscuit groups at 30, 60 and 90 minutes. WUP biscuits group had the most significant reduction in postprandial glucose at 60 and 90 minutes (Figure 1), possibly due to the resistant starch and fiber content of unripe plantain that slows glucose absorption. The similar effect of WCP biscuits supports the role of legume proteins and fibers in modulating glycemic response [6].

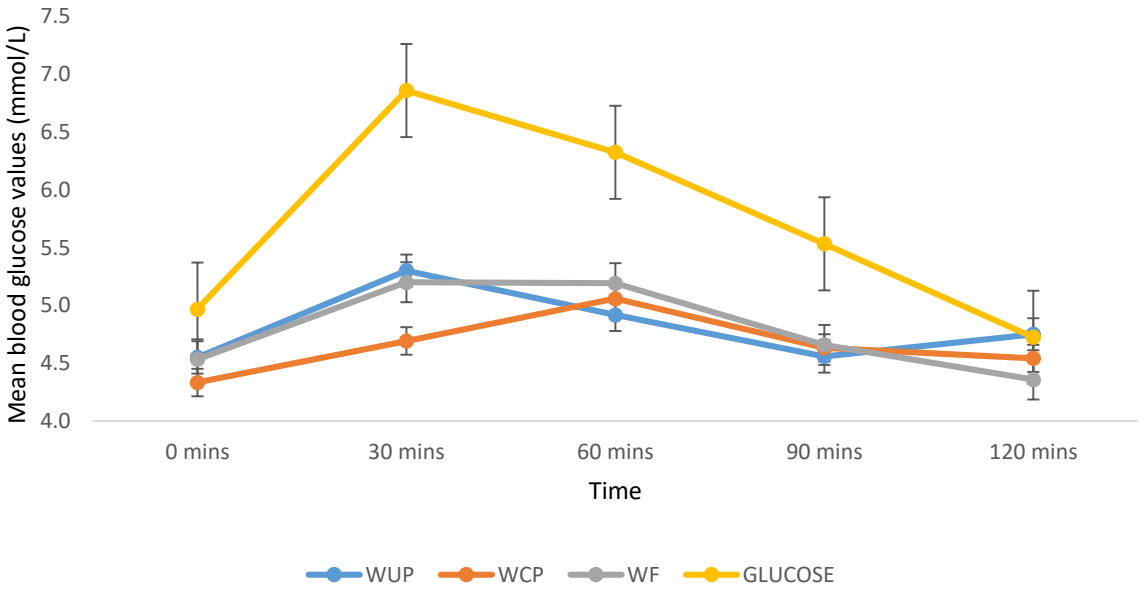

Figure 1: Mean blood glucose response of the biscuit samples and glucose

CONCLUSION AND RECOMMENDATİON: Incorporating unripe plantain and cowpea flours into wheat flour improved the nutritional profile of biscuits without significantly increasing glycemic response, indicating their suitability as diabetic-friendly snacks. Further studies could optimize sensory qualities and explore long-term health benefits.

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OBG5 Impact of Poor Electricity Supply on Dietary Choices, Lifestyle Habits and Food Waste in Calabar South, Cross River State.

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Keywords: *Poor electricity, Dietary choices, Lifestyle habits, Food waste, Health*

Highlights:

- Poor electricity supply significantly affects food choices, dietary and lifestyle habits, leading to increased stress and disrupted routines.
- Majority (87.5%) of the participants reported increased spoilage of perishable, protein-rich foods, causing reliance on staples and potential nutrient deficiencies.
- Participants advocate for government-subsidized alternative energy sources like solar panels to reduce food waste, enhance food security, and improve quality of life.

Background and Objectives: Inadequate electricity supply remains a significant challenge in many developing countries, including Nigeria, with profound implications for food security, dietary habits, and overall wellbeing [1]. Reliable electricity is essential for food preservation, particularly for perishable items such as meat, fruits, and vegetables [2]. This study assessed the impact of poor electricity supply on dietary choices, lifestyle habits, and food waste among residents of Calabar South Local Government Area in Cross River State, Nigeria.

Methodology: A cross-sectional survey was conducted involving 300 participants selected through a multi-stage sampling technique. Data were collected using a structured questionnaire and analysed using SPSS version 25.0, employing descriptive statistics such as frequency distributions and bar charts.

Results and Discussion: Findings revealed that persistent power outages significantly influenced respondents' food choices, meal timing, sleeping patterns, and work productivity. A substantial proportion (87.5%) reported increased food wastage, particularly of protein-rich foods such as meat and fish (72%), leading to decreased consumption of these essential food groups. Up to 81% admitted having to adjust their food consumption due to power outages. Consequently, many respondents relied heavily on staple foods such as rice, yam, and garri, potentially increasing the risk of malnutrition. In addition, frequent power outages contributed to elevated stress levels, disrupted daily routines, and increased dependence on processed and street foods.

Table 1: Dietary habits of the study respondents

Variable	Sub-variable	n	%
Poor electricity supply affect food choices	Does not affect	33	11
	Affects	254	84.7
	Not sure	13	4.3
Finds it more challenging to maintain a balanced diet	No	129	43.3
	Yes	169	56.7
	Total	298	100
Had to change food consumption pattern	No	57	19
	Yes	243	81
Food preparation influenced by electricity black out	No	24	8
	Yes, slightly	171	57
	Yes, greatly	105	35
Experienced less access to food during power outage	No	122	42.1
	Yes	168	57.9
Experience food wastage due to intermittent power outage	No	32	12.5
	Yes	224	87.5
Foods discarded most	Fruits & Vegs	184	61.3
	Meats & fish	216	72
	Juices & drinks	82	27.3
	Ice cream	63	21
	Cooked meals	187	62.3
Level of impact poor electricity supply on sleep pattern	No impact	54	18
	Mild impact	155	51.67
	Severe disruption	91	30.33
Physical health issues (eg. eye strain, headaches) due to poor electricity supply	Yes	175	58.33
	No	125	41.67

Conclusion and Recommendation: Participants recommended energy conservation measures such as turning off unused electrical devices and lights. Furthermore, appeals were made for government intervention in subsidising the importation of alternative power sources like solar panels and generators. These could mitigate the adverse effects of power shortages on household food security, reduce food wastage, and enhance the quality of life in affected communities. This study shows the link between electricity availability and nutritional/general wellbeing, highlighting the need for sustainable energy policies in low-resource settings.

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OBG6 Phytochemical Profiling and Evaluation of the Antimicrobial Activity of *Cassia siamea* Lam.

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Keywords: *Cassia siamea* Lam., phytochemicals, antimicrobial activity, ammonium sulphate.

Highlights:

- Among the samples tested in this study, the crude extract (CS1) displayed the strongest antimicrobial effect, especially against *Escherichia coli* (20.00 ± 0.06 mm).
- Moderate activity was noted against *Salmonella typhi*, *Bacillus subtilis*, and *Candida albicans*, while *Staphylococcus aureus* showed complete resistance to all treatments, including the control antibiotic.
- Phytochemical screening confirmed the presence of various active compounds such as alkaloids, flavonoids, saponins, tannins, steroids, glycosides, and anthraquinones.
- Quantitative assays revealed high levels of flavonoids (29.80 ± 0.06 mg/g), saponins (28.73 ± 0.01 mg/g), and alkaloids (0.290±0.00%).
- These findings support the therapeutic promise of Cassia siamea, especially in its crude form, as a source of potent natural antimicrobial agents and protein-based bioactives.

BACKGROUND AND OBJECTIVES

Medicinal plants serve as a valuable reservoir of bioactive substances known as secondary metabolites including compounds like flavonoids, alkaloids, tannins, terpenoids, saponins, steroids, and essential oils. These natural products have been shown to exert a wide range of therapeutic effects [1]. The growing global reliance on herbal remedies is linked to factors such as rising healthcare costs, limited access to pharmaceuticals, and increasing resistance of pathogens to synthetic drugs. In light of these challenges, plant-based treatments are being reconsidered as reliable alternatives or supplements to conventional medicine [2], [3]. Given its traditional use in treating microbial infections, this study aims to scientifically assess the antimicrobial and phytochemical characteristics of aqueous extracts from the leaves of *Cassia siamea* Lam.

MATERIALS AND METHODS

All chemicals and reagents used in this study were of analytical grade and sourced from BDH Chemicals, England.

Fresh leaves of *Cassia siamea* Lam. were collected around old G. R. A, Maiduguri, Borno State, Nigeria.

Standard procedures by Trease and Evans (2002) and Harborne (1984) were employed for qualitative screening to identify the types of secondary metabolites present in the aqueous leaf extract. Alkaloid levels were measured following Harborne (1973). Flavonoid content was assessed using methods by Ejikeme *et al.* (2014) and Boham and Kocipai (1994). Saponin concentration was determined based on protocols by Evans (2002) and Awe & Sodipo (2001).

The antimicrobial properties were evaluated through the disc diffusion technique to determine the inhibitory effect of the extracts against selected pathogenic organisms.

RESULTS AND DISCUSSION

The phytochemical screening revealed that the leaf extract contains numerous biologically active compounds alkaloids, flavonoids, saponins, tannins, glycosides, steroids, and free anthraquinones all known for their potential therapeutic effects. Among the three extract fractions: CS1 (crude extract) showed the strongest activity, particularly against E. coli (20.00±0.06 mm), followed by moderate inhibition of *S. typhi, B. subtilis,* and *C. albicans*. The crude extract (CS1), solubilized ammonium sulphate precipitate (CS2) showed reduced but noticeable effects, while it's supernatant (CS3) had the least activity. *Staphylococcus aureus* demonstrated resistance to all test samples and the standard antibiotic (Ampicloxacillin), suggesting inherent resistance. Protein quantification showed that CS3 had the highest protein concentration (42.50±0.06 µg/ml), followed by CS2 (4.50±0.06 µg/ml) and CS1 (3.00±0.03 µg/ml). These findings suggest that *Cassia siamea* leaf extract, particularly in its crude form, contains potent antimicrobial compounds and proteins with broad-spectrum activity. The study supports the traditional use of *C. siamea* in herbal medicine and highlights its potential as a natural source for antimicrobial agents.

CONCLUSION AND RECOMMENDATION

The study supports the traditional use of *C. siamea* in herbal medicine and highlights its potential as a natural source for antimicrobial agents. Further studies should evaluate the toxicological effect of the plant extract.

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OBG10 Acceptability And Proximate Composition Of Chips Produced From High Quality Cassava Flour (Hqcf) - Tigernut Blends

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Keywords: High-quality cassava flour, tiger nut, proximate composition, sensory evaluation.

Highlights

- HQCF–tiger nut chips showed high acceptability and strong sensory appeal.
- Nutritional value varied by blend ratio, affecting fibre and energy yield.

Background and Objectives

High-quality cassava flour (HQCF) has emerged as a valuable gluten-free alternative in food systems, offering functional properties suitable for a variety of processed products [1]. Tiger nut (*Cyperus esculentus L.*), an underutilised crop, is notable for its nutritional and functional attributes. [2]

Although both HQCF and tiger nut flour possess desirable nutritional and functional qualities, there is a paucity of research exploring their combined use in the development of snack products.

This study developed gluten-free chips from high-quality cassava flour-tigernut blends and assessed the acceptability and the proximate composition of the product.

Materials and Methods

The tiger nut-based paste was prepared by blending cleaned tiger nut seeds, tatashe, rodo, onions, and water to achieve a smooth consistency. The resulting paste was then mixed with High-Quality Cassava Flour (HQCF) obtained from the International Institute of Tropical Agriculture (IITA) and salt to form a uniform dough, which was subsequently extruded into strips, deep-fried in vegetable oil, and packaged in air-tight bags. Three formulations were prepared using different blend ratios of tiger nut paste and

HQCF. Sample A: 50g tiger nut seeds, 450g HQCF, Sample B: 75g tiger nut paste, 425g HQCF, Sample C: 100g tiger nut paste, 400g HQCF.

The proximate composition of the samples was determined using standard AOAC methods, while a panel of 30 individuals evaluated the sensory attributes. Data obtained was subjected to analysis of variance (ANOVA) using SPSS version 25.0, and the differences between significant mean values were evaluated at a $p < 0.05$ probability level using Duncan's Multiple Range Test.

Results and Discussions

The overall acceptability shows that Sample C demonstrated the highest values of all the sensory attributes, while Sample B has a better nutritional value from the proximate result. Protein contributions from the samples ranged from 15.48% to 17.88% of the daily RDA, indicating improved nutritional quality compared to HQCF alone, and aligning with values reported for legume-enriched cassava snacks. [3]

Table 1: Proximate composition of HQCF Tiger nut mixed chips

Sample	Moisture Content (%)	Crude Protein (%)	Crude Fat (%)	Crude Fibre (%)	Total Ash (%)	Carbohydrate (%)	Gross Energy (kcal/100g)
A	1.50^{b}±0.02	8.71^{a}±0.04	43.91^{c}±0.02	1.04^{a}±0.02	1.55^{a}±0.01	43.28^{a}±0.10	643.69^{c}±10.52
B	2.18^{c}±0.04	10.01^{b}±0.05	30.75^{a}±0.08	1.20^{b}±0.02	2.94^{c}±0.02	52.91^{c}±0.24	567.02^{a}±16.07
C	1.18^{a}±.04	8.67^{a}±0.03	37.75^{b}±0.07	1.14^{b}±0.02	2.49^{b}±0.02	48.75^{b}±0.16	608.47^{b}±22.51

Values are means ± SD of duplicate determinations. Means in the same column with different superscripts are significantly ($p<0.05$) different.
Note: Sample A (90% HQCF, 10% tigernut), Sample B (85% HQCF, 15% tigernut), Sample C (80% HQCF, 20% tigernut)

Table 2: Sensory Evaluation of HQCF with Tigernut Mixed Chips

Samples	Colour	Texture	Taste	Flavour	Overall Acceptability
Sample A	7.23±1.43	6.77±1.61	6.40±1.22	6.33±1.21	6.83±1.34
Sample B	7.40±1.25	6.83±1.51	6.93±1.14	7.10±1.52	7.53±1.07
Sample C	7.40±1.52	7.17±1.37	7.37±1.43	7.23±1.61	7.60±1.27

Note: Sample A (90% HQCF, 10% tigernut), Sample B (85% HQCF, 15% tigernut), Sample C (80% HQCF, 20% tigernut)

Conclusion and Recommendation.

The chips produced from the inclusion of tiger nuts with HQCF show promise for commercial applications and may contribute to dietary diversification and food system resilience. The findings support the use of local ingredients, such as tiger nuts, to enhance the functionality of food products. Increasing the proportion of tigernut to >40% can significantly boost the fibre content.

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OBG13 Improving Adolescent Diet Quality and Nutrition Outcomes Through Collaborative Learning Approach Using Health Belief Model

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Keywords:
behaviour modification, dietary quality, school-based intervention

Highlights

- Health Belief Model-based nutrition education improved dietary outcomes among adolescents
- Collaborative learning increased risk perception and reduced barriers to healthy eating
- Public and private school students showed significant improvement in diet quality and nutrition knowledge

BACKGROUND AND OBJECTIVE:

Adolescents in Nigeria experience significant nutritional challenges, including poor diet quality, limited nutrition knowledge, and rising dual burdens of malnutrition (1). Although nutrition education is critical in modifying dietary behavior, many interventions lack behavioral theory foundations (2). This study assessed the effect of a collaborative learning-based nutrition education intervention guided by the Health Belief Model (HBM) on adolescents' diet quality and nutrition outcomes.

METHODOLOGY

A quasi-experimental study was conducted in four secondary schools (two public, two private) in Odeda LGA, Ogun State, using multistage sampling to select 315 students (150 public, 165 private). The sample size, calculated using Cohen's $d = 0.30$, $\alpha = 0.05$, and 80% power, required 174 participants, increased to 193 after 10% attrition adjustment, and further expanded to 315 after applying a design effect (DEFF = $1 + (m - 1)\rho$) for clustering. Only 284 participants completed both assessments (completion rate 90.2%). Data on socio-demographics, nutrition knowledge, dietary behaviour, and anthropometry were collected at baseline and endline using structured questionnaires. Intervention schools received eight

weeks of interactive nutrition education delivered through collaborative learning strategies tailored to school type, while control schools received the standard curriculum in a didactic format over the same period. Analyses included paired and independent t-tests, Mann–Whitney U, Wilcoxon Signed-Rank tests, chi-square, and MANCOVA.

RESULTS AND DISCUSSION:

Significant improvements in diet quality and nutrition knowledge were observed. In public schools, intervention students meeting dietary recommendations rose from 15% to 45%, compared to 39% to 41% in controls. Private school intervention groups improved from 19% to 50%, versus 26% to 30% in controls. Mean Dietary Diversity Score increased by 1.48 in public school interventions (control: 0.09) and by 0.42 in private school interventions (control: 0.05). Global Dietary Recommendation Score (GDRS) improved by 3.84 (public) and 4.97 (private) in interventions. Public school BMI-for-age Z-scores improved by 0.23 ($p = 0.005$). HBM construst revealed perceptions of diet-related risk severity, self-efficacy, and barrier significantly improved ($p < 0.001$). These findings are consistent with prior studies highlighting the importance of theory-based interventions [1–2].

Figure 1: Change in Diet Quality indicator

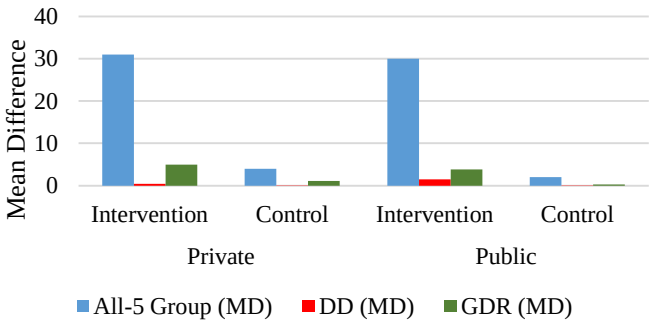
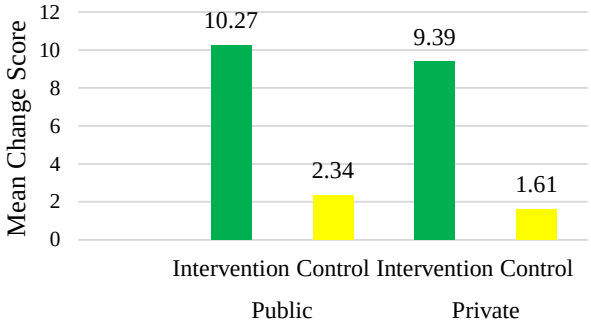


Figure 2: Change in Nutrition Knowledge



CONCLUSION AND RECOMMENDATIONS:

This study conclude that HBM-informed collaborative learning intervention produced meaningful improvements in adolescent diet quality, and nutrition knowledge. School-based nutrition education should adopt theory-driven and interactive models rather than didactic approach.

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OBG17 Situation Analysis of Health Workers' Implementation of the Baby-Friendly Hospital Initiative (BFHI) and Breastfeeding Practices of Nursing Mothers in Selected Healthcare Facilities in Ibadan, Nigeria.

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Keywords: Skin-to-skin contact, Antenatal and Postnatal care, Maternal and Child Health

Highlights

- Less than half (47.6%) of the mothers practised early initiation of breastfeeding within one hour after delivery, and only 57.5% of the infants were exclusively breastfed
- Only 21.2% of the mothers received information on support groups, and just a few (14.6% and 27.4%, respectively) received counselling on the use and risk of teats and pacifiers from the health workers.

BACKGROUND AND OBJECTİVES: Breastfeeding is recognized as a foundational public health intervention due to its significant role in preventing diseases and reducing mortality rates among infants and children. Despite the many advantages of breastfeeding for both mother and child, its practice remains poor. The BFHI was developed by UNICEF and WHO to address this challenge, and evidence shows improved breastfeeding practices through positive changes in the attitudes and knowledge of health workers with successful implementation of the BFHI (1). However, there is limited knowledge on implementing the BFHI and breastfeeding practices in some areas, including Ibadan, Nigeria. The objective of this study was to assess health workers' implementation of the BFHI and its association with the breastfeeding practices of nursing mothers in selected health facilities in Ibadan.

METHODOLOGY: A descriptive cross-sectional study using a mixed-methods approach involving quantitative and qualitative data collection methods. The study was conducted among 212 nursing mothers and 10 health workers in selected private, tertiary, and secondary healthcare facilities in Ibadan metropolis. A multistage sampling technique was used. The quantitative data were collected using a semi-structured questionnaire and analysed using descriptive statistics, Chi-square tests and logistic regression at $p<0.05$. The qualitative data were collected using a key informant interview guide, and thematic analysis was done using NVIVO 14.

RESULTS AND DISCUSSION

Figure 2: Breastfeeding Practices of Mothers

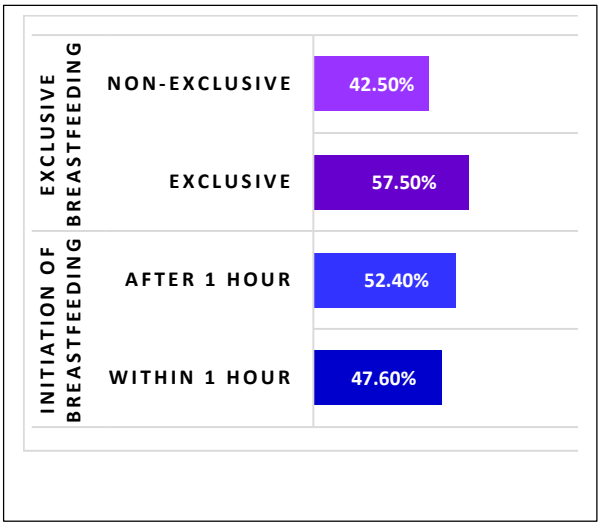
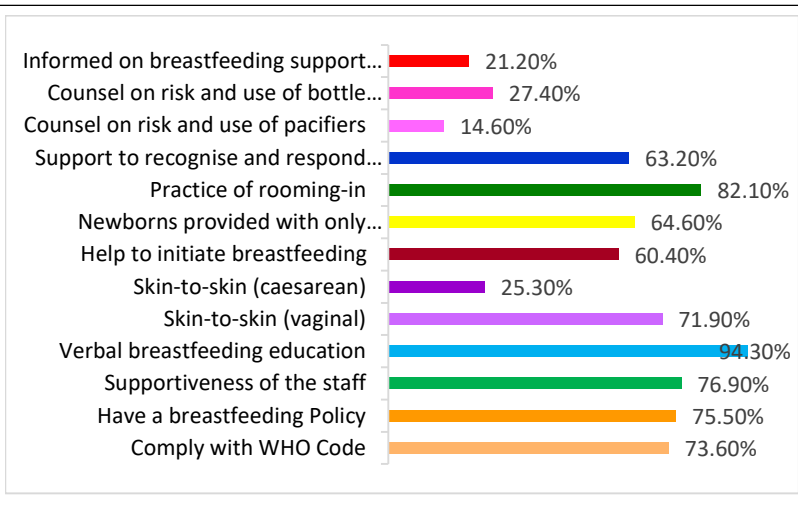


Figure 2: Health workers' implementation of the BFHI



Early initiation of breastfeeding was 47.6% and only 57.5% of the mothers practised exclusive breastfeeding. Practice of rooming-in was 82.1%, however counsel on risk and use of bottle (27.4%) and risk and use of pacifiers (14.6%) was low. Health workers identified several barriers hindering their ability to fully implement the Baby-Friendly Hospital Initiative (BFHI): to include **insufficient training and knowledge gaps, staffing shortages and high caseloads, high caesarean section rates** which often disrupts the immediate mother-infant bonding process and early breastfeeding initiation, core components of the BFHI**, and lack of structured postnatal support systems. These barriers** impede consistent application of BFHI practices, delay or prevent critical interventions like skin-to-skin contact and timely breastfeeding initiation support and limiting ongoing breastfeeding support after discharge [2].

"Only some of us have attended formal training on breastfeeding." Health worker 1

"When there are too many patients, we can't attend to all mothers quickly," - Health worker 2

CONCLUSION AND RECOMMENDATİON:

Early initiation of breastfeeding and exclusive breastfeeding practices remains low and are driven by gaps in in the implementation of the Baby-Friendly Hospital Initiatives such as **inadequate staff training, staffing shortages and lack of structured postnatal support systems. There is a need to strengthen** Baby-Friendly Hospital Initiatives in Ibadan by investing in health worker capacity building, adequate staffing levels, and improving the referral and follow-up mechanisms**.**

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OBG19 Nutritional composition and sensory evaluation of wheat-based doum palm fruit-fortified functional food products

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Keywords: Dietary management, Diabetes mellitus, Doum palm fruit, Functional food

Highlights: - Doum palm fruit-fortified products had improved fiber, fat, and mineral content

- Diabetic patients preferred doum palm fruit-fortified products at 20% inclusion.

Background and Objectives: Type 2 Diabetes Mellitus (T2DM) constitutes a significant public health concern, with a principal contributor being the pervasive consumption of refined, high-glycemic cereal products, which adversely affect glycemic regulation [1]. Consequently, the emergence of functional foods fortified with plant-derived bioactive compounds has garnered considerable interest as a plausible dietary intervention [2]. Doum palm fruit (*Hyphaene thebaica*), rich in fiber, vital minerals, and phytochemicals, offers a promising fortificant for glycemic-friendly products [3]. Thus, this study evaluated the nutritional composition and sensory acceptability of wheat-based functional products fortified with Doum Palm Fruit (DPF).

Materials and Methods: Wheat-based bread and snack bar products were developed with DPF at 10%, 15%, and 20% substitution levels. A total of six functional food products (three breads and three snack bars) were developed. Proximate composition was determined using standard methods. Calcium, magnesium, potassium, sodium, phosphorus, iron, manganese, copper, and zinc were also determined using atomic absorption spectrophotometry after the samples were dry-ashed. A sensory evaluation was conducted among a panel of 25 diabetic individuals using a structured 9-point hedonic scale to assess appearance, aroma, taste, texture, and overall acceptability.

Results and Discussion: Fortification with DPF (10–20%) improved the ash and fiber contents, indicating contributions of mineral and dietary fiber, especially in 20% bread (1.45% ash, 0.93% fiber) and 20% snack bar (2.32% ash, 2.46% fiber). Protein content remained relatively consistent across all products (Tables 1a and 1b). The DPF significantly enhanced the mineral content of the bread and snack bars, exhibiting elevated levels (mg/100 g wet weight) of calcium (24.15-35.78), magnesium (41.69-57.53), potassium (197.96-343.04), phosphorus (141-160), iron (0.70-1.28), manganese (0.96-1.35), copper (0.22-0.32), and zinc (1.40-2.50).

Table 1a: Proximate composition and energy value of doum palm fruit (DPF)-fortified bread

Parameters	10% DPF	15% DPF	20% DPF	Commercial Bread
Moisture (%)	36.83 ± 0.48 [a]	38.04 ± 0.49 [a]	38.09 ± 0.12[a]	35.06 ± 0.20 [b]
Total Ash (%)	1.27 ± 0.01 [a]	1.34 ± 0.11 [a]	1.45 ± 0.01 [a]	1.09 ± 0.01 [a]
Crude fat (%)	8.67 ± 0.11 [a]	6.82 ± 0.30 [b]	7.86 ± 0.42 [b]	2.47 ± 0.14 [c]
Protein (%)	4.43 ± 0.30 [b]	4.07 ± 0.03 [b]	4.34 ± 0.01 [a]	5.26 ± 0.41 [a]
Crude fibre (%)	0.74 ± 0.10 [a]	0.83 ± 0.01 [a]	0.93 ± 0.11 [a]	0.44 ± 0.01 [b]
Carbohydrate (%)	48.09 ± 0.02 [b]	48.19 ± 0.04 [b]	47.35 ± 0.63 [b]	55.71 ± 0.46 [a]
Energy (Kcal)	287. 96 ± 2.21[a]	273.30 ± 2.98 [b]	277.48 ± 1.24 [b]	266.03 ± 1.42 [c]

Data presented as Mean ± SEM; n=3; Values with different superscripts on the same row are significantly different ($p < 0.05$)

Fortification with DPF resulted in higher sensory acceptability across all bread and snack bar samples. In breads, the 15% and 20% formulations received higher ratings for taste, texture, and overall acceptability, with the 20% bread scoring highest overall (7.60). For snack bars, sensory scores improved consistently with higher DPF levels, with the 20% snack bar rated highest across all attributes, including overall acceptability (8.50). These findings corroborate previous reports that functional fortification can enhance or maintain consumer preference when appropriately formulated [2].

Table 1b: Proximate composition and energy value of doum palm fruit (DPF)-fortified snack bar

Parameters	10% DPF	15% DPF	20% DPF	Commercial Snack Bar
Moisture (%)	12.90 ± 0.30 [a]	12.46 ± 0.45 [a]	13.27 ± 0.46 [a]	5.30 ± 0.10 [b]
Total Ash (%)	2.03 ± 0.01 [b]	2.34 ± 0.01 [b]	2.32 ± 0.02 [b]	1.58 ± 0.00 [a]
Crude fat (%)	16.03 ± 0.41 [a]	16.81 ± 0.96 [a]	14.75 ± 0.25 [b]	16.67 ± 0.02 [a]
Protein (%)	5.33 ± 0.39 [a]	4.78 ± 0.93 [a]	4.93 ± 0.40 [a]	5.39 ± 0.01 [a]
Crude fibre (%)	2.03 ± 0.01 [a]	2.04 ± 0.01 [a]	2.46 ± 0.13 [a]	0.31 ± 0.00 [b]
Carbohydrate (%)	61.69 ± 0.52 [b]	61.58 ± 0.39 [b]	62.29 ± 0.08 [b]	70.76 ± 0.08 [a]
Energy (Kcal)	412.29 ± 3.15 [c]	416.71 ± 6.50 [c]	401.54 ± 3.48 [b]	454.70 ± 0.34 [a]

Data presented as Mean ± SEM; n=3; Values with different superscripts on the same row are significantly different ($p < 0.05$)

Conclusion and Recommendation: In conclusion, wheat-based functional products of DPF are nutrient-dense, highly acceptable, and could be tailored for the dietary management of T2DM.

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OBG21 Low-Calorie Sweetener Consumption Pattern, Anthropometric Indices, and Nutritional Status among Adults in Calabar Municipality, Nigeria.

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Keywords: Low-calorie sweeteners, Anthropometric indices, Nutritional status, Socio-demographics

Highlights:

• Moderate consumption (58.1%) of low-calorie sweeteners, mainly from carbonated beverages

• Aspartame was the most common LCS; age, income, and BMI predicted consumption

• Significant association exists between LCS intake and BMI

BACKGROUND AND OBJECTIVES:

Low-calorie sweeteners (LCS) are increasingly consumed worldwide, including Nigeria, as substitutes for sugar in beverages and foods. Concurrently, overweight and obesity rates are rising, with Nigeria reporting 27.6% overweight and 14.5% obesity in 2020. Evidence on the relationship between LCS use and anthropometric indices is inconsistent. This study aimed to investigate LCS consumption patterns and their association with anthropometric indices and nutritional status among adults in Calabar Municipality, Nigeria.

MATERIALS AND METHOD:

This cross-sectional analytical study involved 335 adults (20–75 years) in Calabar Municipality. Multistage sampling selected 5 wards, 5 roads per ward, and 10 residences per road. Data were collected using semi-structured questionnaires (socio-demographics, LCS intake via 24-hour recall) and anthropometric measurements (weight, height, BMI, waist and hip circumferences). A market survey identified LCS-containing products. Data were analyzed using SPSS 19.0. Descriptive statistics, Chi-square tests, and logistic regression were applied, with significance at $p \leq 0.05$. Ethical approval was obtained from the University of Calabar Teaching Hospital Ethics Committee.

RESULTS AND DISCUSSION:

Of the 335 participants, 75.4% were aged 20–35 years, 54.0% were single, 38.2% unemployed, and 28.4% earned < ₦20,000 (monthly). BMI categories were: 3.9% underweight, 65.7% normal, 28.1% overweight, and 2.3% obese. Significant gender differences in mean BMI were observed (22.6±0.9 kg/m² for men vs 21.0±1.0 kg/m² for women, p=0.05). Over 40 LCS-containing products were identified, with Aspartame (14 products) most common. Carbonated beverages were the primary LCS source, consumed more than once weekly by 68.1% of

users. Overall LCS consumption prevalence was 58.1%. There was a significant association between LCS consumption and BMI (p=0.05). Regression analysis identified gender, age, income, and BMI as significant predictors of LCS intake. Female adults, younger age (20–35 years), higher income, and overweight individuals were more likely to consume LCS.

CONCLUSION AND RECOMMENDATION(S):

Moderate LCS consumption was observed, with higher prevalence among women, younger adults, and those with higher income or overweight status. LCS intake was significantly associated with BMI. Public health interventions should include targeted nutrition education and further research on long-term health effects of LCS consumption.

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OBG22 Nutritional knowledge, diet quality, and nutritional status among late adolescents (16–19 years) at Ladoke Akintola University of Technology (LAUTECH), Ogbomoso, Oyo State, Nigeria

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Key words: Adolescence, diet quality, nutritional status, nutritional knowledge

Introduction: Adolescence represents a critical period for establishing lifelong dietary habits, particularly in Nigeria where rapid nutrition transitions may exacerbate health risks [1]. Nutritional knowledge plays an important role in influencing healthy food habits which improves the diet quality and ensures meeting the nutrient needs during adolescence and later life [2].

Objective: This study assessed nutritional knowledge, diet quality, and nutritional status among late adolescents (16–19 years) at Ladoke Akintola University of Technology (LAUTECH), Nigeria, and evaluated their interrelationships.

Methodology: Using a cross-sectional design, 430 randomly selected undergraduates were assessed with a validated interviewer-administered questionnaire featuring the GAROTA nutrition knowledge

test [3], a Nigerian-adapted Diet Quality Index-International (DQI-I) [4], and anthropometric measurements (BMI classified per WHO standards). Analysis employed descriptive statistics, chi-square tests, and multi-variable regression adjusted for allowance, sex, and age using SPSS v20.0 (α=0.05), with ethical approval secured.

Results and Discussions: Participants had a mean age of 17.7 years and average monthly allowance of ₦26,079. Nutrition knowledge was predominantly poor (49.3%), with fair (33.5%) and good (17.2%) levels observed similar to the poor GAROTA test (46.3%) revealed from previous study [5]. Diet quality was critically low (mean DQI-I: 43.8%, globally classified as "poor"), showing high vitamin C adequacy (93.2%) but severe deficits in other micronutrients, this aligned with previous study [5], while extremely low fruit and vegetable intake supports on parental influence. Nutritional status distribution included normal weight (70.9%) underweight (13.3%), overweight (15.3%), and obesity (0.5%) which was similar to the previous study having 80% as their normal weight among the respondents [6]. No significant association existed between nutrition knowledge and diet quality after confounder adjustment (p=0.539).

Conclusion: Declarative nutrition knowledge alone is insufficient to drive healthy dietary behavior in Nigerian adolescents. The universally poor diet quality underscores an urgent need for skills-based nutrition education integrated into academic curricula and policy reforms targeting food environments.

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OBG24 Proximate Composition and Amino Acid Profile of *Ekuru* Produced from Dehulled and Non-dehulled Bambara Nut.

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Key Words: Bambara nut, Traditional food, Protein quality, *Ekuru*

Background and Objective: Bambara nut (*Vigna substerranea*) is an indigenous underutilized legume with high nutritional value, including macronutrients and micronutrients [1]. *Ekuru*, a steamed, legume-based traditional food widely consumed in West Africa, particularly in Nigeria, also provides essential nutrients [2]. The production process of *Ekuru*, which involves the removal of the seed coat has an effect on its proximate composition and amino acid profile. This study investigated the proximate composition and amino acid profile of *Ekuru* produced from dehulled and non-dehulled Bambara nuts.

Methods: Bambara nuts were sorted, soaked in non-dehulled and dehulled forms, wet-milled, and steam-cooked into *Ekuru*. Proximate analysis was conducted to determine the basic composition of both samples using standard AOAC procedures. Amino acid profiling was performed using High-Performance Liquid Chromatography (HPLC) after acid hydrolysis [3]. Data were analyzed using ANOVA with significance set at $P<0.05$.

Results: The results from the proximate analysis revealed that *Ekuru* produced from dehulled Bambara nut has higher content of carbohydrate (27.98%), crude protein (0.22%), ash content (2.06%), and fat (0.09%). On the other hand, *Ekuru* produced from non-dehulled Bambara nut has higher content of moisture content (69.64%) as shown in Table 1.

Table 1: Proximate Composition of *Ekuru* produced from Dehulled and Non-Dehulled Bambara nut

Samples	CHO	Moisture	Protein	Fiber	Ash	Fat
Dehulled	27.98±0.03	68.55±0.03	0.22±0.01	1.1±0	2.06±0.07	0.09±0
Non-dehulled	27.03±0.49	69.64±0.55	0.19±0.01	1.13±0.06	1.95±0.01	0.06±0

It was observed that the process of dehulling enhanced the amino acid content, particularly lysine (0.96±0.004) and glutamic acid (0.98±0.006). However, non-dehulled samples showed higher sulfur-containing amino acid, cysteine (0.12±0.006), possibly due to contributions from the seed coat. These findings are similar to reports that dehulling enhances protein bioavailability but reduces fiber and moisture content in Bambara nut-based products [4].

Conclusion: This study shows that the removal of the Bambara nut seed coat in the preparation of Ekuru improves its protein content and amino acid availability. It is recommended that the production of *Ekuru* from Bambara nut should be dehulled for maximum nutritional quality. Further research should explore consumer acceptability of the dehulled and non-dehulled samples.

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OBG25

Prevalence of Undernutrition among children U-5 in Rural Ogbomosho

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Keywords: Undernutrition, Children U-5, Rural

Highlights

- Stunting is the most prevalent form of undernutrition among children U-5.
- 2 in 10 children U-5 resident in rural Ogbomosho are underweight.

BACKGROUND AND OBJECTIVES:

Undernutrition is a prevalent public health issue. It is one of the leading causes of death among children under-5 globally, including Nigeria [1,2]. Rural populations are often sidelined in nutrition researches due to various factors including logistical and accessibility challenges. This study assessed the prevalence of undernutrition among children U-5 in rural and urban Ogbomosho, Oyo state, Nigeria.

METHODOLOGY:

This study was carried out among 385 children U-5 years old and their primary caregivers in rural communities of Ogbomosho in Oyo State. Socio-demographic and anthropometric data (weight, height) were collected using a structured questionnaire, digital scale and stadiometer respectively. Data collected was analyzed using SPSS version 27.

RESULTS AND DISCUSSION:

Anthropometric data shows that 12% of children U-5 are either moderately or severely wasted, over half (55%) of the U-5 population sampled are either moderately (24%) or severely stunted (31%) while 24.1% are either moderately (17.5%) or severely (6.6%) underweight. This could lead to impaired physical growth, cognitive development, educational achievements, economic productivity, an increased risk of chronic diseases in adulthood and death [1,3].

Table 1: Prevalence of Undernutrition among children U-5 in Rural Ogbomoso

Variable	Form of Undernutrition	Prevalence (%)
WASTING	Not wasted	88.2
(weight-for-height)	Moderate (-3 to < -2 Z score)	5.8
	Severe (< -3 Z score)	6.2
STUNTING	Not stunted	44.4
(height-for-age)	Moderate (-3 to < -2 Z score)	24
	Severe (<-3 Z score)	31
UNDERWEIGHT	Not underweight	75.9
(weight-for-age)	Moderate (-3 to < -2 Z score)	17.5
	Severe (<-3 Z score)	6.6

CONCLUSION AND RECOMMENDATION:

Stunting is the most prevalent form of undernutrition among children U-5 in rural Ogbomosho, Oyo state. This may be due to factors such as chronic poverty, food insecurity, poor infant and young child feeding (IYCF) practices, and limited access to quality health services amongst others; all of which are common with rural communities [4]. Thus, a comprehensive, context-specific approach is required in addressing poverty, poor nutrition, poor maternal health and education and inappropriate feeding practices in rural Ogbomosho.

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PBG1

Role of Bacteriocin As A Nutritionally Safe Biopreservative In Extending The Shelf-Life Of Tiger Nut Juice (Kunun Aya) Through Antibacterial Mechanisms

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Background of the Study

Food safety and food security have become a worldwide concern. Food spoilage caused by bacteria poses a significant challenge of food safety and economic losses in the food industry. Despite the use of chemical preservatives and refrigeration, bacteria resistance and the emergence of new spoilage organism continue to threaten food quality (Mustapha *et al.,* 2018). Bacteriocin, which are antimicrobial peptides produced by bacteria, offer a promising alterative as natural preservative (Aisha *et al.,* 2022). Despite the fact that Tiger nut drink (*Kunun Aya*) has many health benefits microbial contamination as well as short shelf life, if not refrigerated, has been a limitation. This research work focused on the bacteriocin production using Lactobacillus spp. and evaluated its antimicrobial activity against foodborne pathogens and its preservative properties on Tiger nut drink (*kunun aya*).

Materials and Method

Samples of *Nono* were aseptically collected in sterile bottles from commercial producers at Hotoro market. All the samples were transported to the laboratory in ice packs for analyses. The *Lactobacillus* species were isolated from the *Nono* sample using serial dilutions method and characterized morphologically and biochemically using Gram staining, catalase test, and motility test**.** Crude bacteriocin was produced using overnight grown culture of isolated *Lactobacillus* in 100ml of De Man Rogosa and Shape broth (MRS broth) at 37ºC for 48 hours anaerobically. Centrifuged at 20,000rpm for 20 minutes at 4°C and then sterilized by filtration through 0.22µm Syringe filter to remove the bacterial cells. Adjustment of pH using catalase to eliminate hydrogen peroxide. The crude extract of bacteriocins was tested for Antibacterial activity (Mustapha *et al.,* 2018). The antibacterial activity of bacteriocin was determined using Agar well diffusion method by inoculating the target food spoilage bacteria into the well and filled with the crude bacteriocin. Food spoilage bacteria were isolated from a cooked rice showing visible signs of spoilage and inoculated into a solidified nutrient agar plate using a striking method. A sterile cork borer of 6mm diameter was used to bore 4 wells on the nutrient agar into which 100 µL of the crude bacteriocins were filled as described by Rukayyah (2023), incubated for 24hrs at 37ºC. The prepared tiger nut juice (*Kunun aya*) was prepared and serially diluted at 10^6. A portion (control) of diluted sample of the juice was examined initially for total plate count and the plates were incubated at 37ºC for 24 hrs. The other portion of diluted juice was added with 5% crude bacteriocin

and refrigerated for 24 hrs. Then the colony counts of both the test (with bacteriocin) and the control (without bacteriocin) were recorded and compared as described by Shaokat *et al.*, (2016).

Results and Discussion

Lactobacillus spp selectively isolated on MRS agar appeared as creamy, smooth and round colonies. Their microscopic appearance revealed them as gram positive rod shape. The result shows that Catalase was observed to be negative (-ve), while the Motility shows nonmotile and gram staining was observed to be positive (+ve).

Figure I: Produced bacteriocin using Lactobacillus

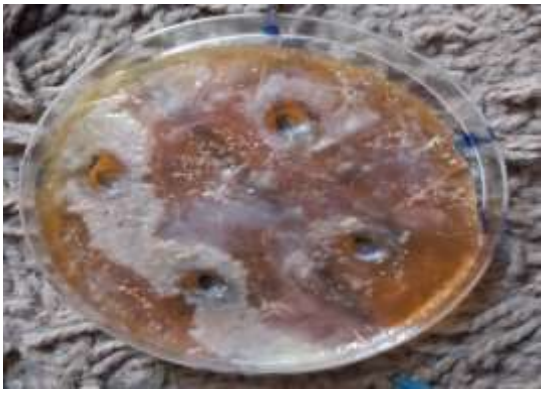

Figure II: Agar well diffusion plate identified the inhibition zone

The present study revealed that the isolated *lactobacillus spp* has ability of bacteriocin production with anti-bacterial activity against some food spoilage bacteria. This study is related to the work done by Rukayya (2023) which revealed that the isolated *Lactobacillus* spp has ability of bacteriocin production with high antibacterial activity against *S. aureus* and *E. coli*.

The preservative effect of produced bacteriocin was tested with freshly prepared *Kunun aya* juice. In the test (Juice with bacteriocin) the maximum reduction of colony was observed at 5% concentration of bacteriocin and in control (Juice without bacteriocin) no population reduction was observed. This result is in agreement with the findings of Shaokat *et al.*, (2016). Furthermore, the results indicated that the microbial count drastically decreased in the *Kunun aya* juice.

Conclusion

The flame of this work is to investigate the potential of bacteriocins producing bacterial as a natural preservative against food spoilage bacteria. it was demonstrated that it exhibits significant antimicrobial activity against common food spoilage organism and may be considered potential to be used as natural biopreservative as well as antibacterial agent in food preservation to enhance the shelf life and safety of food products. Different bacteriocin exhibit different inhibition profiles on food spoilage pathogenic therefore they could serve as natural replacement for synthetic food preservative.

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PBG3 Nutritional Status, Snacks, And Soft Drink Consumption Pattern Among Teenagers In Ondo West Local Government Area Of Ondo State.

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Introduction

Teenage nutrition is a public health concern globally, particularly in low- and middle-income countries where the dual burden of malnutrition—undernutrition and overnutrition—is rising (1). Adolescents are at a critical developmental stage with increased nutritional needs, yet their dietary patterns are increasingly dominated by unhealthy snacks and sugar-sweetened beverages (2). This study investigates the nutritional status, snack behaviors, and soft drink consumption patterns among teenagers in Ondo West Local Government Area (OWLGA) of Ondo State, Nigeria. The research further explores influencing factors and effective interventions to promote healthier eating habits.

Methodology

The study adopted a descriptive survey design and targeted senior secondary school students in OWLGA. A total of 235 respondents were selected through simple random sampling from five public secondary schools. Data collection tools included structured questionnaires and anthropometric assessments (height and weight) for calculating Body Mass Index (BMI). The questionnaire was validated by experts in Home Economics Education. Data were analyzed using descriptive statistics such as frequencies, means, and standard deviations.

Results and Discussion

The analysis showed that 63.83% of teenagers had a normal BMI, 19.15% were overweight, 6.38% obese, and 10.64% underweight, indicating the coexistence of undernutrition and overnutrition. Snacking between meals was highly prevalent (mean = 3.45), with teenagers preferring unhealthy snacks

like chips and candies (mean = 4.10 and 4.00, respectively) over healthier alternatives like fruits (mean = 3.20) and vegetables (mean = 2.80).

Soft drink consumption was also notably high. Teenagers reported daily intake (mean = 4.20) and high consumption during social events (mean = 4.10), often preferring soft drinks to water (mean = 3.90). Despite moderate awareness of the health risks (mean = 3.30), consumption remained consistent.

Interventions perceived as most effective included:

- Nutrition education in schools (mean = 4.30),
- Healthier snack options in school canteens (mean = 4.10), and
- Parental regulation of snack intake (mean = 4.00).

These findings affirm existing literature that highlights that knowledge alone does not necessarily translate into behavior change, and that multifaceted, environmental interventions are critical (3, 4).

Conclusion

The study underscores significant nutritional challenges among teenagers in OWLGA. While a majority maintain normal weight, a notable proportion faces overweight, obesity, or undernutrition. Unhealthy snacking and high soft drink consumption are common, driven by taste preference, peer influence, and environmental availability. Effective interventions must involve a combination of school-based nutrition education, healthier food environments, and active parental involvement. Policymakers, educators, and health professionals must act collaboratively to promote sustainable dietary changes among adolescents in Nigeria.

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PBG7

Elevated Blood Pressure and Eating Out Behaviour Among Students in University of Medical Sciences Ondo City, Ondo State

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KEYWORDS: elevated blood pressure, eating out, students.

HIGHLIGHTS:

- A total of 28.3% of the respondents had elevated blood pressure.
- Most students perceived that stress from academic or personal life influenced eating-out habits.
- Majority (52.3%) reported eating out 1-3 days in a typical week.

BACKGROUND AND OBJECTIVES: Elevated blood pressure is one of the most important risk factors for ischemic heart disease, stroke, other cardiovascular diseases (CVDs), chronic kidney disease and dementia [1]. Eating Away from Home (EAFH) has been documented to decrease the intake of whole grains, the number of servings of vegetables and milk, and replaced by energy-dense foods with high fat, added sugar, and increased sodium [2]. This research project aims to explore the relationship between high blood pressure and eating out among undergraduates in the study area.

MATERIALS AND METHOD: A cross-sectional study was conducted among 304 students selected by simple random sampling method, a method where every student has an equal chance of being selected to reduce bias and ensure representativeness, cutting across all faculties in University of Medical Sciences, Ondo State. A questionnaire was developed to obtain information on socioeconomic status, knowledge on impact of eating out and high blood pressure, and dietary habits of students that eat out frequently. Data was statistically analyzed using Statistical Package for Social Science (SPSS) Version 26. The level of statistical significance (alpha error) for the test was set at $p<0.05$.

RESULTS AND DISCUSSION: This study showed that 52.3% of the respondents eat out 1-3 days in a typical week, 11.8% eat out every day, and 23.0% don't eat out at all. A similar study also found that 55.8% of participants eat out at least two to three times per week and 13.6% eat out daily [3].

	Frequency	Percentage
How often do you eat out in a typical week		
1-3 days	159	52.3
3-5 days	29	9.5
5-7 days	10	3.3
Everyday	36	11.8
Never	70	23.0

More than two-third (71.7%) of the respondents fall in the normal range of blood pressure and 28.3% have elevated blood pressure. Findings in this study showed that the mean Systolic Blood Pressure (SBP) level is 108.85mmHg and Diastolic Blood Pressure (DBP) level is 75.25mmHg, values that are similar to a previous study that reported the mean of SBP and DBP were 114.08 mmHg and 70.92mmHg respectively [4].

No significant relationship was found between the frequency of eating out among university students and elevated blood pressure (p=0.17). This finding indicates that other factors may play a more important role in determining blood pressure among university students.

CONCLUSION AND RECOMMENDATIONS: No significant relationship was established between the frequency of eating out and elevated blood pressure among the university students, however the study observed that over 20% of them had elevated blood pressure. Further research needs to be conducted to unravel other factors that may contribute to elevated blood pressure among university students.

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PBG9

Knowledge and Attitude of Women of Reproductive Age (15–49 years) on Maternal Capabilities and Infant Nutrition in the First 1000 Days of Life in Umuahia South.

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Keywords: infant nutrition; maternal capabilities; women of reproductive age; first 1000 days.

Highlights

- There was strong relationship between unemployment and social support;
- Higher income level contributed to maternal self-efficacy; and
- Negative attitude was linked to low self-efficacy among the respondents.

BACKGROUND AND OBJECTIVES

Maternal capabilities refer some of the attributes such as decision-making autonomy, gender-norm attitude, social support and self-efficacy, possessed by mothers to adequately care for themselves and their children. The first 1000 days of life, from conception to age two, offer critical window of opportunity to prevent the long-term effects of under-nutrition. The global importance of maternal knowledge, attitudes, and child-feeding practices cannot be overstated [1]. This paper assessed the maternal capabilities, knowledge, and attitudes of women of reproductive age (WRA) regarding infant nutrition during the first 1000 days of life in Umuahia South Local Government Area (LGA).

MATERIALS AND METHOD

A community-based cross-sectional design was used to collect quantitative data on maternal capabilities, knowledge, and attitudes of women of reproductive age (WRA) (15–49 years) on infant nutrition. The study population was 212 WRA living in communities in Umuahia South LGA. The study sample size was determined using Cochran's formula described by Araoye [2]. Households with WRA were identified in six communities selected randomly out of 12 communities. Systematic random sample of every 5th household, while in households with multiple eligible WRA, simple random sampling by balloting without replacement was used to select one respondent. A validated and pretested semi-structured questionnaire was used to collect data on knowledge, attitudes and maternal capabilities. The study achieved 88% response rate (186 WRA). Regression analysis was conducted to examine the influence of socioeconomic characteristics on maternal capabilities, knowledge of, and attitudes towards

infant nutrition. A significance difference was declared at $p < 0.05$. The IBM-SPSS software version 27 was used for the analysis.

RESULTS AND DISCUSSION

Table 1: The influence of socioeconomic characteristics on maternal capabilities, knowledge and attitude of women of reproductive age on infant and young child feeding

Variables		Unstandardized Coefficients		R square	t	Sig.
		B	Std. Error			
	(Constant)	2.028	0.123		16.538	0.000
Social support	Unemployed	-0.219	0.126	0.027	-2.148	0.033
	(Constant)	9.653	1.101		8.771	0.000
Mental health	Unemployed	-2.465	0.915	0.042	-2.693	0.008
	(Constant)	1.808	0.147		12.284	0.000
Self-efficacy	Higher income level	0.210	0.104	0.132	2.026	0.040
	(constant)	0.973	0.014		70.731	0.000
Knowledge	Employed	0.027	0.011	0.048	2.317	0.022
	(constant)	4.138	1.157		3.577	0.000
Self-efficacy	Negative attitude	-4.801	1.083	0.781	-4.431	0.003

Unemployment had significant influence ($p < 0.05$) on both social support and mental health. Higher income statistically influences ($p < 0.05$) maternal self-efficacy, with 21% variability., Unemployment, low income and negative attitudes can restrict maternal capabilities such as mental health, leading to suboptimal infant nutrition. Previous studies have also reported lower socioeconomic conditions, poor social support and experiencing physical violence as contributing factors to high prevalence of maternal mental health in developing countries [3, 4]. More research is necessary to explore maternal capabilities and infant nutrition practices in Nigeria. This will inform the development of targeted frameworks and interventions that enhance women's abilities and promote better feeding practices, ultimately improving the health and well-being of infants and young children.

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PBG12

Nutritional Status of Under-five Children Presented Common Childhood Diseases at Samaru Primary Healthcare Center, Kaduna State

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Keywords: Malnutrition, under-five children, childhood diseases, and primary healthcare

Highlights

- The majority (89.4%) of the study population regularly consume cereals and their products.
- A total of 39.3%, 46.4%, and 39.3% of children aged 6-23 months at the primary healthcare centre (PHC) surprisingly had better minimum dietary diversity (MDD), minimum meal frequency (MMF), and minimum acceptable diet (MAD), respectively than apparently healthy children from Samaru community.
- A significant ($P<0.05$) association between household size and dietary diversity was observed in both groups.

Background and objectives

Common childhood diseases compromise nutritional intake, absorption, and utilization, leading to a cycle of malnutrition and increased vulnerability to infections [1]. The interplay between these diseases and nutritional status is complex, and continuous assessment is essential for effective intervention strategies. The study was carried out to evaluate the nutritional status of under-five children presented at Samaru primary healthcare center (PHC) with common childhood diseases of malaria, diarrhoea and acute respiratory infection.

Materials and method

A facility-based cross-sectional study design was carried out using 85 randomly selected under-five children presenting with common childhood diseases (malaria, diarrhoea and acute respiratory infection) at Samaru PHC. A validated semi-structured questionnaire was used to collect socio-demographic, morbidity and mortality data from caregivers. Anthropometric measurements of the under-five children were taken according to WHO standards. Food frequency questionnaire and 24-hour dietary recall were used to collect data on food consumption.

Results and discussion

Table 1: Demographic and Clinical Characteristics of Under-five Children Attending Samaru PHC in Sabon Gari LGA, Kaduna State

Variables	Frequency (n=85)	Percentage (%)
Sex		
Male	56	65.9
Female	29	34.1
Age (months)		
6-23	28	32.9
24-59	57	67.1
Diagnosis of Children		
Malaria	32	37.7
Diarrhoea	24	28.2
Acute Respiratory Infection	29	34.1

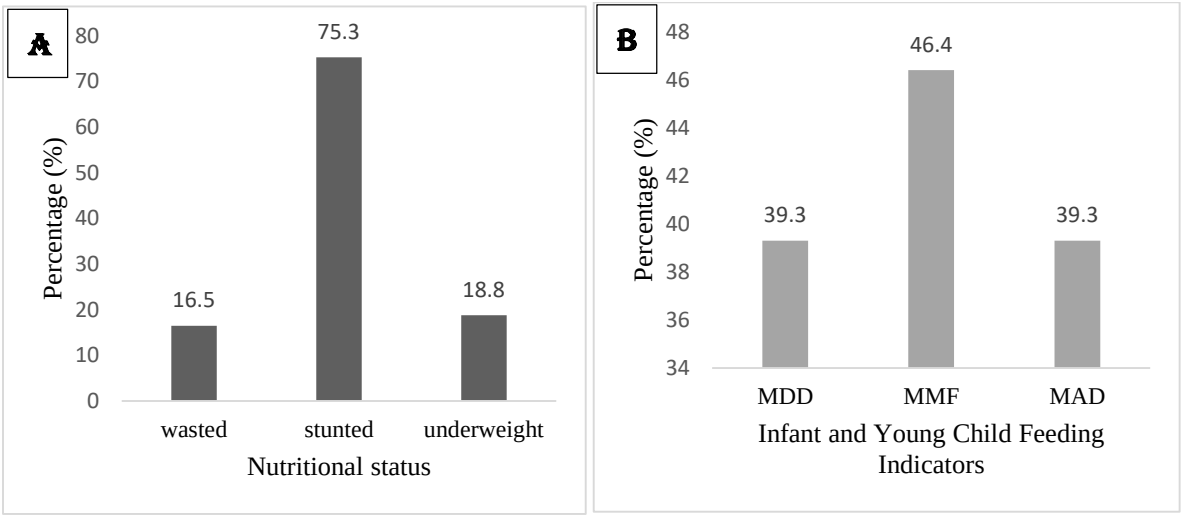

Figure 1:

(A) Nutritional status of under five children with common childhood diseases at Samaru PHC

(B) IYCF indicators of under five children with common childhood diseases at Samaru PHC

The results revealed that 65.9% of the children were males while 34.1% were females. A total of 32.9% and 67.1% were 6-23 months and 24-59 months of age, respectively. Among the children, 38%, 28% and 34% had malaria, diarrhoea and acute respiratory infection, respectively. Nutritional status indicators reveal a concerning prevalence of malnutrition among under-five children at Samaru PHC with 16.5%, 75.3% and 18.8% being wasted, stunted and underweight, respectively. The high rates of wasting and stunting in both sexes indicate not only acute but also chronic malnutrition issues that could have long-term developmental consequences. The trends of under-nutrition in Kaduna state from 2018

to 2023-4 according to Nigerian Demographic and Health Survey (NDHS), shows an increase in wasting and underweight from 4.8% to 5.9% and 22.1% to 24.7%, respectively, with a decrease in stunting from 48.1% to 40.7%. Studies indicate that in early life, malnutrition can cause impaired cognitive development and increased susceptibility to diseases, further exacerbating health disparities in low-resource settings like Nigeria [2]. This aligns with this study showing that children with common childhood diseases have a higher prevalence of under-nutrition as compared to apparently healthy under-five children. Infant and Young Child Feeding (IYCF) indicators from this study showed that children with common childhood diseases had MDD (39.3%), MMF (46.4%) and MAD (39.3%). The presence of childhood illnesses often prompts caregivers to adhere more strictly to feeding guidelines, potentially explaining the IYCF indicators among sick children in the Samaru community [3]. These findings are similar to this research showing children with common childhood diseases having better IYCF.

Conclusion and recommendation(s)

The nutritional status of under-five children with some common childhood diseases indicates under-nutrition with wasting, underweight, and stunting in specific age and sex groups.

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PBG14

Evaluating the Association Between Dietary Habits, Oral Hygiene Practices, and Dental Problems Among Patients Attending a Private Dental Clinic in Abuja, FCT, Nigeria

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KEYWORDS: Diet, Habits, Oral, Hygiene, Tooth.

BACKGROUND AND OBJECTIVE:
A dental problem refers to any condition or disorder affecting the teeth, gums, or surrounding oral tissues, such as tooth decay, periodontal disease, or other oral health issues (1). Dietary habits and oral hygiene practices play a crucial role in its development, with far-reaching impacts extending beyond teeth to overall health.

Therefore, this study assessed the association between dietary habits, oral hygiene practices, and dental problem.

MATERIALS AND METHODS: This study involved patients attending a private dental clinic in Utako, FCT, Abuja. A sample of 203 respondents was calculated using (2) formula. Data were collected via a structured, validated questionnaire that underwent pilot testing. The questionnaire sought information on dietary habits such as sweets, sweetened foods, ice cream, and drinks consumption, oral hygiene practices, and dental problems. Analysis was performed using SPSS version 21.0, with results presented as frequency tables and percentages. Chi-square tests assessed association between variables, with $p < 0.05$ indicating statistical significance

RESULTS AND DISCUSSION: Findings of the study reveals that dental problem was found to be 62.6% among the respondents and ranged from pain/toothache to sensitivity of teeth gum, pain in the mouth, bad breath, bite changes, loose teeth, and painful chewing with a combination of four to five different problems seen in an individual. It was observed that majority of the respondents cleaned their teeth and practiced hygiene by replacing their toothbrushes at least quarterly. Reported dental problems were pain/toothache to sensitivity of teeth gum (12.8%), pain in the mouth (5.9%), bad breath (4.4%), bite changes, loose teeth, and painful chewing with a combination of four to five different problems seen in an individual. It was observed that 35.5% of the respondents consumed sweets, sweetened food, ice cream, and drinks once a week; 17.7% consumed it daily, while 5.9% consumed it less than once a week which is a poor dietary habit, with more than half (62.6%) of the respondents not rinsing their mouth/brush their teeth after taking sugary foods/ drinks which is a poor oral hygiene practices that affects dental health.

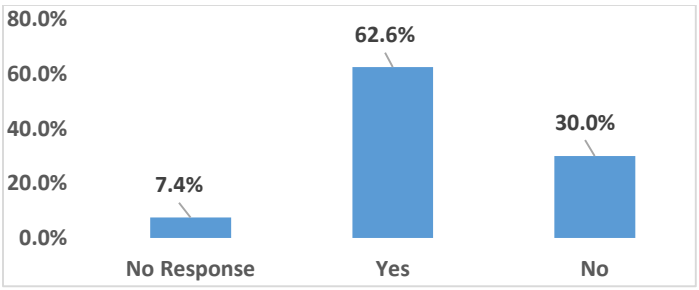

Figure 1: Prevalence of Dental Problems among the Respondents

Table 1: Dietary Habits and Oral Hygiene of the Respondents

Variables	Frequency	Percentage
Do you smoke		
No response	10	4.9
Yes	42	20.7
No	151	74.4
Total	203	100.0
How often do you consume sweets, sweetened food, ice cream, and drinks		
No response	11	5.4
Daily	36	17.7
At least once a week	72	35.5
Less than once a week	12	5.9
Not often	72	35.5
Total	203	100.0
Do you rinse your mouth/brush your teeth after taking sugary foods/drinks		
No response	12	5.9
Yes	64	31.5
No	127	62.6
Total	203	100.0

Table 2: Association Between Dietary Habits, Oral Hygiene and Prevalence of Dental Problem among the Respondents

	Prevalence of Dental Problem		
Dietary Habits Variables/Oral Hygiene	**X^2**	**P-value**	**Decisions**
Smoking Status	18.776	0.001*	Significant
Consumption of Fibrous Fruits	18.441	0.001*	Significant
Frequency of sweet, ice cream & drinks consumption	15.980	0.043*	Significant
Rinsing mouth/brush teeth after taking sugary foods	17.415	0.002*	Significant
Changes in Dietary Pattern	21.231	0.000*	Significant
Observed changes in Dietary Patterns	25.030	0.002*	Significant
Application of tobacco/ snuff on teeth	25.623	0.000*	Significant
Opening bottle cork with teeth	39.310	0.000*	Significant
Drinking alcohol	40.203	0.000*	Significant
Grinding with teeth as a habit	32.579	0.000*	Significant
Chewing ice blocks	51.256	0.000*	Significant
Toothpick usage	32.703	0.000*	Significant
Dental floss usage	43.283	0.000*	Significant

Statistically Significant at p< 0.05. NS= Not Significant

CONCLUSION AND RECOMMENDATIONS:
A statistically significant association ($p<0.05$) was observed between the observed variables. Regular teeth checkup to ensure healthy teeth is very necessary, there is need for enlightenment program on dietary habits and oral hygiene practices to prevent dental problems.

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PBG15 Comparative Analysis Of The Nutrient Composition Of White And Yellow Maize (Zea Mays L.) Cultivated In Northern Nigeria.

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Keywords: Nutrient composition; White maize; Yellow maize;

BACKGROUND AND OBJECTIVES:
Maize (Zea mays L.) is a staple cereal crop in Nigeria, contributing significantly to food security and serving as a major source of calories, protein, and micronutrients for millions. Among the available varieties, white and yellow maize are widely consumed, each possessing unique nutritional and functional properties. White maize is generally preferred for traditional dishes, while yellow maize is known for its higher carotenoid content.

The increasing demand for biofortified crops and nutrient-dense food sources necessitates a comparative analysis of these maize types. Understanding the nutrient composition of both varieties is essential for food processing industries, dietitians, and policy makers. This study aims to compare the mineral and proximate composition of white and yellow maize cultivated in northern Nigeria using standard analytical techniques.

MATERIALS AND METHODS:

White and yellow maize samples were obtained from a local farm in Kano State, Nigeria. The samples were cleaned, air-dried, and milled into fine flour for analysis. Standard AOAC (2019) procedures were followed for determining crude protein, crude fibre, fat, moisture, ash, and carbohydrate content (by difference). The concentrations of Zn, Fe, Mg, Ca, and Mn were measured using Atomic Absorption Spectrophotometry (PerkinElmer PinAAcle 900H). Triplicate readings were taken for accuracy, and mean values were computed along with standard deviation (SD) and relative standard deviation (%RSD).

RESULTS AND DISCUSSION:

White maize exhibited slightly higher values in protein (9.20 %), fibre (3.50%), fat (4.40%), and ash (1.06%) compared to yellow maize, whereas yellow maize recorded higher moisture content (11.48%). The carbohydrate content was nearly identical in both varieties.

Mineral analysis showed that white maize contains higher levels of all the assessed elements than yellow maize, particularly iron and zinc, which are essential micronutrients for immune function and development. This finding is consistent with previous literature suggesting varietal differences in micronutrient uptake and storage.

CONCLUSION

The study revealed that both white and yellow maize varieties are nutritionally rich, though white maize had comparatively higher concentrations of essential minerals and macronutrients except moisture. These results reinforce the role of maize in addressing micronutrient deficiencies and highlight the importance of varietal selection in food processing and dietary planning.

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PBG16

Glycemic Index And Glycemic Load Of Commonly Consumed Cassava Varieties

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Keywords: Cassava, Glycemic index, Glycemic load

Highlight:

- The samples were all classified as high GI and high GL foods
- The vitamin A bio-fortified cassava had lower post prandial glucose and better glycemic control

BACKGROUND AND OBJECTIVES:

Cassava (*Manihot esculenta*, Crantz), is an energy giving staple root crop in Nigeria which has some inherent characteristics which makes it attractive [1]. It is primarily carbohydrate-based, which raises important questions about its impact on blood glucose regulation. The study seeks to evaluate and compare the glycemic index (GI) and glycemic load (GL) of commonly consumed cassava varieties.

MATERIALS AND METHODS:

Quasi-experimental study design was used for this study and the Cassava varieties (UMUCASS 36 and TME 419) were procured from the Cassava Programme, National Root Crop Research Institute, Umudike, Ikwuano Local Government Area, Abia State. The *fufu* and *garri* were processed from cassava roots following standard methods while FAO/WHO [2] protocol was utilized in determining the glycemic index and load which were categorized as follows: For GI ≤ 55 as low, 56–69 as medium and ≥70 as high while for GL ≤ 10 as low, 11–19 as medium and ≥ 20 as high [3].

RESULTS AND DISCUSSION:

Energy content of the samples ranged from (352.32-353.74) kcal in white garri and (181.02-187.95) kcal in yellow fufu. Carbohydrates levels of the two garri varieties (82.96± 0.06-84.42 ± 0.07 g/100g) was higher that observed for fufu samples (43.04-44.03g/100g). The GI and GL values obtained ranged from 80.6-96.0 and 40.3-48.0 were high. There was an increase in the post-prandial blood glucose after administration of the test foods at 60 minutes, while at 90 minutes, all blood glucose level significantly dropped in all test foods except in pro vitamin A fufu and garri.

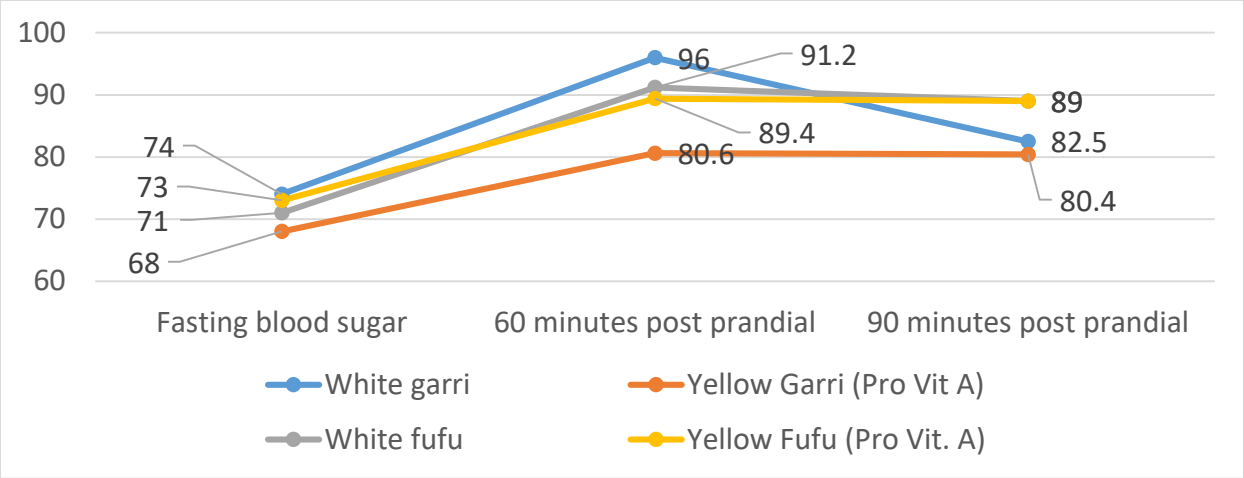

Fig 1: Graphical representation of the glucose response area for test foods

CONCLUSION AND RECOMMENDATION:

The vitamin A bio-fortified cassava had lower post prandial glucose and better glycemic control than the non-bio-fortified conventional products. Hence, efforts to increase awareness, advocacy, availability and consumption of pro vitamin A fortified cassava production by Nigerians will assist in reducing the burden of type 2 diabetes mellitus and other metabolic diseases.

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OGM2

Assessment of Body Fat and Dietary Diversity Score of Primary School Children (6 to 9 years) in urban Communities in Abia State

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Keywords: Body fat percentage, anthropometric status, dietary diversity score, childhood obesity/overweight.

Highlights:

- Dietary diversity was high indicating consumption of foods from various food groups
- About a quarter of the children have high body fat

BACKGROUND AND OBJECTIVES

Obesity is a major public health problem worldwide in the 21st century owing to its high prevalence and consequential morbidity and mortality; it affects all age groups including very young children and pre-schoolers. [1] Obesity is a condition of excess body fat often associated with a large number of devastating and life-threatening disorders. In developing countries like Nigeria, a lot of attention has been paid to nutrition and assessment of body fat among children under the age of five, indicating that nutrition in school-aged children has received less attention and scrutiny [2] The objective of the study was to assess the body fat among primary school children 6 to 9 years in urban communities in Abia State, Nigeria.

MATERIALS AND METHODS

A cross-sectional survey using a multi-stage sampling technique was carried out. Cochran formula was used to obtain a sample size of 207 among primary school children (6-9) years from five (5) primary schools in Umuahia North, South and Ikwuano Local Government Areas. A structured questionnaire was used to collect information on the personal characteristics, feeding habits and anthropometric measurements. Body fat percentage was assessed with Omron BF-511 body composition monitor along with their height and weight measurements. Body fat percentage among the children was classified into low, normal and high. Dietary diversity was assessed using 24-hour dietary recall. Information obtained was classified based on FAO recommendations using 12 food groups.

RESULTS AND DISCUSSION

Males were 52.3%, while 47.7% were females. Majority (62.7%) of the children were within the ages of 9 years. The commonly consumed food groups were cereals (92.8%), vegetables (82.2%), fish and other sea foods (89.1%). Consumption of cereals is conventional among children aged 6-9 years, since parents tend to buy cereals because of their ease of preparation and children tend to crave and enjoy it more [3]. Result from the anthropometric indices of the participants show's that the prevalence of

wasting, stunting, overweight/obesity, MUAC and high body fat was 3.2%, 3.6%, 13.2%, 15.5% and 19.1% respectively. This is contrary to the study conducted by the Nigeria Demographic Health Survey where the prevalence of stunting, wasting and underweight among children were 37%, 7% and 22.1% respectively [4]. The children had high dietary diversity score (93.6%). This disagrees with the findings of a similar study conducted by Uzosike *et al*., [5] indicating low DDS (46.0%), moderate DDS (54.0%) and no high DDS (0.0%) among participants.

Table 1: Dietary Diversity Score of School Children ages 6 to 9 years.

Dietary diversity score	Males		Females		Total		p-value
	F	%	F	%	F	%	
Low (<5)	4	3.5	8	7.6	12	5.5	0.233
Moderate (6-8)	96	83.5	79	75.2	175	79.5	
High (>9)	15	13	18	17.1	33	15	

CONCLUSION

The prevalence of dietary diversity was remarkably high among the school children, however, no significant difference was found between dietary diversity and body fat of the school children. This shows that while dietary diversity is valuable in assessing the quality of diet, it however may not be the sole determinant of body fat among school children.

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OGM8

Impact of Community Outreach on Identification and Management of Children Under Five Years with Severe Acute Malnutrition in Anguwan Maigari Zango Aya, Igabi Local Government Area, Kaduna State

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Key words: Severe Acute Malnutrition, Community Outreach, Integrated Management of Acute Malnutrition.

Highlights:

- Screening Programs: Community health workers conduct MUAC screenings in the community, allowing for rapid identification of children at risk of or suffering from SAM.
- Nutritional Supplement Distribution: These programs typically include the distribution of ready-to-use therapeutic foods (RUTF) and supplementation, directly addressing nutritional deficiencies.
- Referral Systems: Effective outreach includes establishing referral pathways to the nearest health facilities for further treatment, ensuring continuity of care.

Background and Objectives: Malnutrition is a pressing issue that impacts the development and survival of children in northern Kaduna, particularly in regions struggling with poverty and limited access to healthcare (Marmot, 2005). In Igabi LGA, the rates of malnutrition, especially severe acute malnutrition, have raised alarms among health professionals and policymakers. The Anguwan Maigari Zango Aya community in Igabi Local Government Area exemplifies the challenges faced by local populations in addressing this critical health issue. The primary objectives of this study are as follows:

1. To assess the effectiveness of community outreach programs in identifying children under five with severe acute malnutrition cases (SAM).
2. To evaluate the management strategies employed by caregivers following community intervention.
3. To evaluate the management outcomes for children with SAM following community outreach initiatives.
4. To explore the challenges faced by health workers and caregivers in managing SAM.

Material and Method: This write-up is based on a qualitative analysis of existing community outreach programs specifically targeting SAM in Anguwan Maigari Zango Aya. Data collection methods included interviews with community health workers, focus group discussions with caregivers, and reviews of health records from local clinics.

Results and Discussion: The quantitative results indicated that the identification rate of SAM in children under five increased from 30% to 70% following the outreach program. Treatment success rates also improved significantly, with a rise from 40% to 85% in fully treated cases. Qualitative data revealed that community awareness of SAM increased, with many parents reporting greater recognition of malnutrition signs and symptoms. The findings suggest that community outreach programs can effectively enhance the identification and management of SAM among children under five. Increased awareness and screening led to earlier interventions, contributing to higher recovery rates.

S/N	Description	Number of children 6-59 month
1	Total population of Children 6-59 months in the study area	7586
2	Number of children screen for malnutrition	600(7.9%)
3	Number of children identified with SAM (MUAC >11.5cm)	155(2.0%)
4	Number of Children identified with Moderate Acute Malnutrition (MAM) (MUAC <11.5-12.5cm)	80(1.0)
5	Number of children with normal >12.5cm	365(4.8%)
6	Number of children defaulted	62(0.7%)
7	Number of children recovered	93(1.3%)
8	Number of children died	1(0.01%)

Conclusion: In conclusion, community outreach plays a vital role in the identification and management of children under five years with SAM in Anguwan Maigari Zango Aya. Through effective education and mobilization of community resources, there is potential for improved health outcomes and decreased incidence of SAM.

Recommendation:- Sustained Outreach Programs: Continued funding and support for community outreach initiatives are essential for long-term success, training Community Health Workers: Investing in the training of local health workers can increase the capacity for effective outreach and service delivery, Community Engagement: Involving community leaders and members in program design and implementation for greater ownership and sustainability, Policy Advocacy: Advocating for policies that support community-based health interventions at local and national levels.

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OGM10 Breastfeeding Knowledge, Attitude, and Intention among Female Human Nutrition and Dietetics Students of a Private University in Ibadan, Nigeria.

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Keywords: Breastfeeding, Maternal and Child Nutrition, Female Students, Knowledge, Attitudes, and Intention

Highlights

• Respondents had good knowledge, attitude and intention to breastfeed.

• Respondents with good knowledge had positive attitude towards breastfeeding.

• Respondents with good knowledge had good intentions to breastfeed.

BACKGROUND AND OBJECTİVES:

Inadequate breastfeeding contributes to 16% of child death (1). In Nigeria, only 28.8% of infants (<6 months) are exclusively breastfed, and 26.1% continue breastfeeding up to 2 years of (2) both bellow the 2030 target of 70% and 60%, respectively. Promoting breastfeeding awareness and education, especially before motherhood, highlights the link between knowledge and the intention to breastfeed (3,4). University students, especially young women, provide a significant demographic for addressing myths and misconceptions that may hinder breastfeeding practices. Hence, this study aimed to assess the breastfeeding knowledge, attitude, and intention of nutrition students in Nigeria.

MATERIALS AND METHODS:

This cross-sectional study involved 154 proportionately selected students (100-400 level) from the Department of Human Nutrition and Dietetics, Lead City University, Ibadan. Data were collected using a structured, web-based self-administered questionnaire, adopted from previous literature and divided

into four sections. Responses were scored, categorized, and analysed using IBM-SPSS v.26, with results expressed as frequencies, percentages, means and standard deviations. Chi-square test assessed associations at $p<0.05$. Ethical approval was obtained from the Lead City University Research Ethics Committee with approval number LCU-REC/24/026.

RESULTS AND DISCUSSION:

The respondents had a mean age of 20.97±2.90 years, with majority being above 20years, consistent with previous similar studies (3-5). The mean intended age of marriage was 25.81±1.84 years, with 79.3% intending to get married at ≥25 years- reflecting an average marital delay of about 5 years exceeding the one-year reported finding of Leshi et al. (4). Regarding breastfeeding, 89.9% had good knowledge, 93.5% showed positive attitude, and 69.8% had good intention (Figure 1), notably higher than findings from previous studies (4,5). Among nursing students, although 81.0% had good breastfeeding knowledge, the attitude and intention were poor (3). These disparities can be associated to the level of awareness and knowledge acquired by these different group of people compared to the nutrition students in this study. A significant relationship was found between breastfeeding knowledge and both attitude and intention (Table 1).

Fig1: Breastfeeding Knowledge, Attitude, and Intention of Respondents

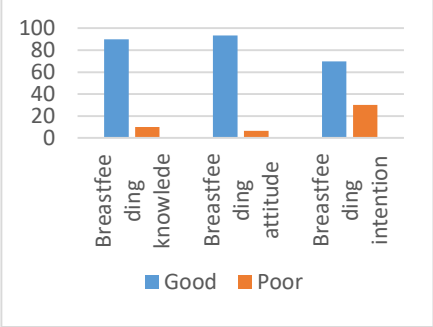

Table 1: Relationship between breastfeeding knowledge and breastfeeding attitude and intention

Breastfeeding knowledge	Breastfeeding attitude		Breastfeeding intention	
	Negative attitude	Positive attitude	Poor intention	Good intention
Poor knowledge	5 (29.4%)	12 (70.6%)	12 (70.6%)	5 (29.4%)
Good knowledge	6 (3.9%)	146 (96.1%)	39 (25.7%)	113 (74.3%)

P=0.000

CONCLUSION AND RECOMMENDATION

This study revealed that the exposure and knowledge acquired by the students influence their attitude and intention to breastfeed.

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OGM11 A Scientific Review of Fenugreek as a Herbal Galactagogue and its role in Lactation Enhancement.

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Keywords: Herbal galactagogue, Fenugreek, lactation.

Highlights:

- One of the herbal galactagogues that nursing women use the most frequently is fenugreek.
- Fenugreek seeds stimulate hormone precursors which results in increased milk production.
- The presence of phytoestrogens and diosgenin in fenugreek is also suggested to be a possible explanation for the increase in breast milk production

BACKGROUND: Each year, over 130 million babies are born globally, underscoring the critical need to support maternal health during pregnancy and lactation. One of the most frequent challenges faced by new mothers is reduced or insufficient breastmilk production [1]. To address this issue, a variety of approaches have been employed, among which galactagogues – substances, foods or herbs that promote lactation – are commonly used. Plants such as fenugreek, fennel, anise, lemon balm, thyme, cumin and milk thistle are widely recognized for their lactation-enhancing properties [1].

OBJECTIVES This study aims to review and consolidate existing research on the effectiveness of fenugreek as a herbal galactagogue.

MATERIALS AND METHODS: Drawing from various data sets, this paper offers a description of the effectiveness of fenugreek in the enhancement of lactation.

RESULTS AND DISCUSSION: These herbs are typically consumed as part of the diet or in the form of herbal teas, prepared through various extraction methods [2,3]. While these plants offer additional health benefits, their primary role in this context is to help initiate, sustain, or increase breast milk supply,

either individually or in combination [1,2,3]. One of the galactagogues that nursing women use the most frequently is fenugreek [4]. Fenugreek is a herb from the pea family and is most popularly used herbal galactagogue throughout the world [1,4,5]. It is enlisted in the FDA's list of herbs usually considered safe. It has been found that fenugreek is a potent stimulator of breast milk production that appears to be safe for mother and baby [5]. It is relatively easy to obtain, inexpensive and requires no major preparation. Fenugreek seeds stimulate hormone precusors which results in increased milk production. The presence of phytoestrogens and diosgenin in fenugreek is also suggested to be a possible explanation for the increase in breast milk production [4,1,2].

CONCLUSION AND RECOMMENDATIONS: Fenugreek, a widely used herbal galactagogue shows significant potential in enhancing lactation. Its availability, affordability and natural composition makes it a practical solution to addressing insufficient lactation. Based on this research, it is recommended to; promote awareness of the benefits of fenugreek in boosting milk production; Integrate the use of fenugreek into public health strategies particularly in low resource setting; Conduct more research and clinical trials to standardize dosages, train health care providers on its proper use (indications, preparation methods and contraindications) and ensure quality control and regulations by the appropriate authorities.

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OGM15

Assessment of Micronutrient Deficiencies among Women of Reproductive age in Selected Urban and Rural Areas of Birnin Kebbi LGA, Nigeria

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Keywords: Micronutrient deficiencies, women of reproductive age, iron deficiency, dietary diversity

Highlights:

- Iron deficiency is prevalent in both urban and rural women
- Urban women have higher dietary diversity score

Background and Objectives:

Micronutrient deficiencies, particularly iron, zinc, and calcium, pose significant risks to maternal and child health, affecting over 2 billion people globally, with 38% of pregnant women experiencing iron deficiency anaemia [1]. In Nigeria, low dietary diversity and socio-economic barriers exacerbate these deficiencies [2].

Materials and Method:

A cross-sectional study was conducted in three urban (Gwadangaji, Takalau, Badariya) and three rural (Zauro, Ambursa, Maurida) communities of Birnin Kebbi LGA, involving 120 pregnant women (60 urban, 60 rural) selected via simple random sampling. Data were collected using structured questionnaires. Biochemical analyses of blood samples were assessed using Atomic Absorption Spectrophotometry (AAS), vitamin A via spectrophotometry, and total protein using Lowry's method. Data were analysed using Excel (version 2002), with chi-square tests for associations ($p < 0.05$).

Results and Discussion: Iron deficiency is prevalent in both groups (urban: 4.59 ± 0.91 µmol/L; rural: 3.43 ± 0.51 µmol/L). Zinc deficiency was widespread (urban: 4.18 ± 0.39 µmol/L; rural: 4.08 ± 0.43 µmol/L). Calcium levels were low (urban: 1.04 ± 0.21 mmol/L; rural: 1.11 ± 0.24 mmol/L). Vitamin A levels were adequate (urban: 1.49 ± 0.15 µmol/L; rural: 1.43 ± 0.17 µmol/L compared to normal: >1.05 µmol/L), likely due to supplementation programs [3]. Iron deficiency was associated with low education, consistent with findings linking socio-economic factors to nutritional status [4].

Table 1: Average Micronutrients levels of the Participants in Selected Urban and Rural Areas

Group	Iron (umol/L)	Zinc (umol/L)	Calcium (mmol/L)	Vitamin A (umol/L)
Urban	4.59 ± 0.91	4.18 ± 0.39	1.04 ± 0.21	1.49 ± 0.15
Rural	3.43 ± 0.51	4.08 ± 0.43	1.11 ± 0.24	1.43 ± 0.17

Values are mean ± standard deviation across all groups for micronutrients

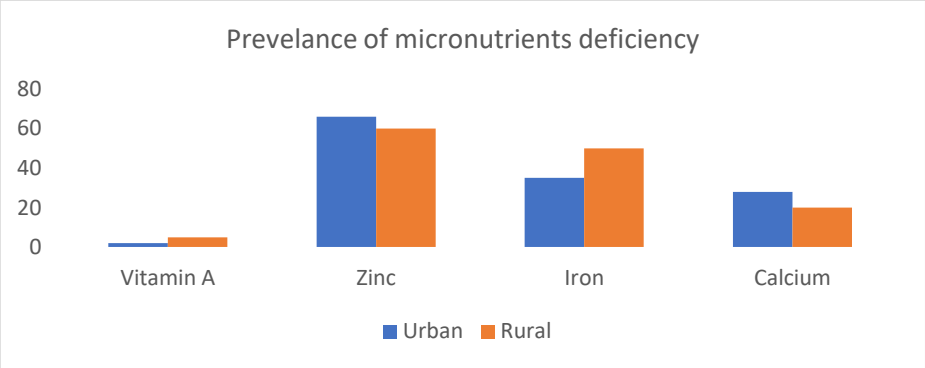

Figure 1. Prevalence of micronutrients deficiency by percentage in 3 urban and 3 rural areas of the study

Conclusion and Recommendation(s):

The study highlights significant micronutrient deficiencies among women of reproductive age in Birnin Kebbi LGA, with rural women facing higher iron deficiency and urban women showing elevated calcium deficiency. Interventions should include iron and calcium supplementation, nutrition education, and promotion of dietary diversity through community gardening and biofortification.

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OGM16 Problems Associated with The Introduction of Complementary Foods to Breastfed Infants in Ibadan North Local Government Area, Ibadan.

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KEYWORDS: Breastfed infants, Coping strategies, Introduction of complementary foods, Problems.

Background and Objectives: The complementary feeding period represents a critical phase characterized by rapid changes in nutritional requirements that significantly influence infant growth and development [1]. This period also plays a pivotal role in shaping lifelong flavor preferences and dietary habits, which can impact long-term health outcomes. In Nigeria, several studies have identified various factors limiting optimal breastfeeding practices, factors like misconceptions about breast milk adequacy, inadequate support from health facilities [2], socio-cultural influences, family income [3], maternal stress [4], but there is limited information on problems associated with the introduction of complementary foods to exclusively and non-exclusively breastfed infants. This study examined the challenges encountered during the introduction of complementary foods, whether these challenges are unique to exclusively breastfed infants, and the coping strategies employed by mothers.

Materials and Methods: A multi-stage sampling technique was used to select 200 mothers attending selected primary health centers in Ibadan North Local Government. A pretested semi-structured interviewer-administered questionnaire was distributed to the mothers, and three focus group discussion sessions were conducted with 24 mothers to enhance, as well as clarify the quantitative results generated. Quantitative data was analyzed using descriptive statistics and Chi-square test at p=0.05, while qualitative data was analyzed thematically.

Results and Discussion: Findings from this study revealed that one of the major challenges mothers' experience during introduction of complementary foods is food refusal as seen in 27.5% of respondents. Though infants who were exclusively breastfed refused foods for longer periods, there was no statistically significant difference in food refusal between exclusively breastfed and non-exclusively breastfed infants (X^2 = 6.893; P =0.075). Other challenges are time constraints and maintaining good hygiene. Mothers employed positive coping strategies like singing to engage the child's attention and negative coping strategies like force-feeding to ensure the child eats.

Table 1: Comparison in difficulties experienced in introducing complementary foods to exclusively breastfed and non-exclusively breastfed infants

Variables	Exclusive Breastfeeding		Pearson's X^2	P value
	Exclusively breastfed Frequency(%)	Non-exclusively breastfed Frequency(%)		
How did your child react during this period				
Crying	3 (3.9)	2 (1.6)	6.379[a]	0.095
Vomiting	0 (0.0)	2 (1.6)		
Refusal	27 (34.6)	27 (22.1)		
No reaction	48 (61.5)	91(74.7)		
If the child reacted, how long did it continue				
One week	13 (40.6)	16 (55.2)	6.893[a]	0.075
Four weeks	7 (21.9)	10 (34.5)		
Six weeks	1 (3.1)	0 (0.0)		
>six weeks	11 (34.4)	3 (10.3)		

Conclusion and Recommendation: Food refusal was reported in both exclusively and non-exclusively breastfed infants. However, exclusively breastfed infants refused foods for longer periods. Raising awareness on the hurdles caregivers may face during introduction of complementary foods and educating mothers on the gentle re-introduction of complementary foods is important. Nutrition intervention should also address the risk of force-feeding in this study population.

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PGM12

Knowledge, Attitude and Practice of Exclusive Breastfeeding Amongst Mothers in Akamkpa Local Government Area of Cross River State

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Keywords: Exclusive Breastfeeding, Maternal Health, Infant Nutrition, Public Health Intervention

Highlights

- 64% of mothers had good EBF knowledge, but only 39% practiced it fully.
- Cultural beliefs and poor support limited sustained exclusive breastfeeding.
- A marginally significant link found between maternal education and EBF practice.

BACKGROUND AND OBJECTIVES

Exclusive breastfeeding (EBF) defined as feeding an infant only breast milk for the first six months of life without any additional food or drink is one of the most effective interventions for reducing infant morbidity and mortality globally [1]. Despite the known benefits, the prevalence of EBF in Nigeria remains suboptimal, with national averages fluctuating around 29% to 39%, far below the global target of 50% set by WHO [2]. The persistence of low EBF rates in Nigeria is attributed to various barriers including cultural myths, maternal workload, lack of partner and community support, misinformation, and inadequate health education [3,4]. Akamkpa Local Government Area (LGA) in Cross River State, despite hosting several primary health centers and participating in national maternal and child health campaigns, has little to no published data assessing EBF knowledge, attitudes, and practices among mothers. This study was initiated following gaps identified during the 2024 Maternal, Infant and Young Child Nutrition (MIYCN) State Training Course, which signaled the urgent need for localized evidence to inform policy and intervention. Understanding how mothers in Akamkpa perceive and practice exclusive breastfeeding will provide vital data for designing culturally appropriate strategies that promote maternal and child health.

The main objective of this study was therefore to assess the knowledge, attitude, and practice of exclusive breastfeeding among mothers in Akamkpa Local Government Area of Cross River State, Nigeria.

MATERIALS AND METHOD

This study adopted a descriptive cross-sectional survey design conducted among mothers of infants aged 0–12 months in Akamkpa Local Government Area of Cross River State. A total of 200 participants were selected using a multistage sampling technique from primary healthcare centers across various wards in the LGA.

Data were collected using a structured and pretested questionnaire consisting of both closed- and open-ended questions. The instrument was designed to gather data on demographic characteristics, cultural beliefs, knowledge of EBF, attitude towards EBF, and actual breastfeeding practices.

The questionnaire items were validated by nutrition and maternal health experts, and reliability was tested using a pilot sample with a Cronbach's alpha score of 0.78. Ethical approval was obtained from the Cross-River State Ministry of Health, and informed consent was secured from each participant.

Data were analyzed using descriptive statistics (frequencies, percentages, means, and standard deviations) and inferential statistics such as One-way ANOVA to determine influence of Maternal Education on Exclusive Breastfeeding Practice at a significance level of 0.05.

TABLE 1: One-Way ANOVA Result: influence of Maternal Education on Exclusive Breastfeeding Practice

Source of Variation	SS	Df	MS	F	p-value
Between Groups	832.0	3	277.33	0.4687	0.367
Within Groups	21,302	36	591.72		
Total	22,134	39			

DISCUSSION OF RESULT.

Out of 200 surveyed mothers, 64% had good knowledge of exclusive breastfeeding, yet only 52% showed a positive attitude, and just 39% practiced it exclusively for six months. Common barriers included cultural beliefs, delayed initiation, and economic demands. One-way ANOVA indicated that there is a marginally significant difference between Maternal Education on Exclusive

Breastfeeding Practice ($p = 0.367$), suggesting that while knowledge exists, it slightly translate into practice, reflecting weak promotion and adoption of EBF in the study area.

CONCLUSION:

There is a marginally statistically significant difference in the mean responses to the influence of Maternal Education on Exclusive Breastfeeding Practice attitude in the research area. This result indicates that exclusive breastfeeding is not strongly practiced in the study area, consistent with the low practice rate of 38.5%.

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PGM13

Chemical Composition and Sensory Evaluation Of Complementary Gruels Produced From Sorghum, Bambara Nut And Orange-Fleshed Sweet Potato Flours

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Keywords: Complementary food; Orange-fleshed sweet potato flour; Sorghum flour; bambara nut flour

Highlights:

- Protein content of the gruels were within recommendation for complementary foods.
- The gruels contained appreciable vitamin contents.

Background and Objectives: The first-line complementary food which is cereal gruel do not contain enough essential nutrients to meet daily requirements for infant and young children. To improve the quality of cereal-based complementary foods, there is need to include foods from different food groups. This study was carried out to evaluate the chemical composition and sensory evaluation of complementary gruels produced from sorghum, bambara nut and orange-fleshed sweet potato flours.

Materials and Methods: The study adopted an experimental design. Sorghum and bambara nut were purchased from Ogige market in Nsukka Local Government Area, Enugu State and orange-fleshed sweet potato was purchased from Otukpo, Benue State. They were processed into flours and blends were formulated from flours in the ratio of 70:30:0, 70:20:10, 60:30:10 and 50:30:20 (protein basis) of sorghum, bambara nut and orange-fleshed sweet potato flours, respectively. Gruels were prepared from the flours and the proximate, vitamin and mineral compositions of the gruels were determined using standard procedures. The complementary gruels were also tested for sensory properties. Data obtained were analysed using Statistical Product and Service Solution (SPSS) version 27. Data were presented as means and standard deviation. Analysis of Variance (ANOVA) was used to separate the means and Duncan's New Multiple Range Test (DNMRT) was used to compare the means at $p < 0.05$.

Results and Discussion: The proximate composition of the gruels showed that protein values ranged from 6.51% (70:30:0) - 9.59% (70:20:10), carbohydrate from 2.62% (70:20:10)-11.25% (50:30:20), crude fat 1.97% (50:30:20) - 8.33% (70:30:0). Crude fibre contents of the complementary gruels (0.40% (70:30:0 and 50:30:20) - 0.70% (70:20:10)) were within recommended allowance of crude fiber in the

complementary food which is <5% [1]. The energy content ranged from 360.89kcal (50:30:20) - 547.74kcal (70:20:10). Beta-carotene content ranged from 92.50µg (70:30:0) -663.00µg (50:30:20), folate from 6.65 µg (70:30:0) - 9.60 µg (50:30:20) and vitamin C from 139.32mg (50:30:20) - 156.52mg (70:30:0). Zinc content ranged from 0.39mg (60:30:10) - 0.52mg (50:30:20), iron 1.00mg (70:30:0) - 2.35mg (70:20:10) and calcium from 380.00mg (70:30:0) - 444.00mg (50:30:20). All sensory attributes were above 5 on the 9-point hedonic scale, showing that the complementary food blends were well-accepted.

Table 1: Proximate composition of complementary foods made from sorghum, Bambara nut and orange fleshed sweet potato

Sample	Moisture (%)	Crude protein (%)	Crude fat (%)	Ash (%)	Crude fibre (%)	Carbohydrate (%)	Energy (kcal)
CF A	76.77±0.69^{b}	6.51±0.07^{a}	8.33±0.69^{b}	1.98±0.00^{a}	0.40±0.00^{a}	6.06±0.07^{b}	443.89±17.28^{b}
CF B	77.00±0.00^{b}	9.59±0.11^{c}	7.21±0.29^{b}	2.88±0.12^{b}	0.70±0.14^{a}	2.62±0.67^{a}	547.74±10.81^{b}
CF C	74.21±0.04^{a}	7.36±0.52^{b}	7.12±0.90^{b}	2.75±0.35^{b}	0.50±0.14^{ab}	8.05±0.15^{c}	454.45±1.71^{c}
CF D	76.61±0.54^{b}	7.77±0.17^{b}	1.97±0.01^{a}	1.99±0.14^{a}	0.40±0.00^{b}	11.25±0.33^{d}	360.89±7.49^{a}

Values are mean ± standard deviation of duplicate determination. Mean values on the same column with different superscripts are significantly different at $p < 0.05$

Key: CF A: Complementary food made from 70% sorghum, 30% bambara nut flours (control)
CF B= Complementary food made from 70% sorghum, 20% bambara nut and 10% orange-fleshed sweet potato flours
CF C= Complementary food made from 60% sorghum, 30% bambara nut and 10% orange-fleshed sweet potato flours
CF D= Complementary food made from 50% sorghum, 30% bambara nut and 20% orange-fleshed sweet potato flours

Conclusion and Recommendation: The study showed that complementary foods produced were a good source of some micronutrients required for the growth and development of children. There is need for increased awareness on the use of locally produced food in the production of complementary foods.

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PGM14

Socio-Cultural Factors, Knowledge, and Practices of Mothers on Maternal, Infant, and Young Child Nutrition in Selected Hospitals in Ilorin, Kwara State, Nigeria

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Keywords: breastfeeding, complementary feeding, socio-cultural factors, Maternal Nutrition Knowledge

Abstract

Background and Objective: Optimal infant and young child feeding (IYCF) practices are critical for child survival and growth, yet socio-cultural norms, maternal knowledge, and economic constraints shape these practices in Nigeria [1]. This study assessed the socio-cultural factors, maternal knowledge, and feeding practices impacting the nutritional status of under-two children in Ilorin Metropolis, Nigeria.

Methodology: A descriptive cross-sectional study was conducted among 350 mothers of children aged 0–24 months attending selected hospitals in Ilorin, Kwara State. Participants were recruited through simple random sampling from six healthcare facilities. Data collection involved the use of structured interviewer-administered questionnaires, anthropometric measurements, and four focus group discussions (FGDs) to explore maternal practices and socio-cultural influences. Mothers' knowledge was assessed across three domains: maternal nutrition, breastfeeding, and complementary feeding, in line with WHO and UNICEF guidelines. Feeding practices were evaluated using Infant and Young Child Feeding (IYCF) indicators based on the WHO (2021) standards. Anthropometric measurements of mothers and children were carried out using standard protocols. The FGDs provided qualitative insights into cultural beliefs, food taboos, and family dynamics affecting MIYCN. Data analysis was conducted using SPSS version 27.0, applying descriptive statistics (frequencies, percentages, means, standard deviations), chi-square tests, and logistic regression to identify significant predictors of nutritional practices.

Results:

Infant and Young Child Feeding Indicators: Most mothers (98.7%) breastfed, with 82.8% practicing exclusive breastfeeding (EBF) under six months and 46.7% initiating breastfeeding within one hour of birth. However, 26.3% gave water/herbs in the first two days. For complementary feeding, 59.1% introduced solids at 6–8 months, 78.3% met minimum dietary diversity, but 62.4% of children consumed no vegetables/fruits, and 44.1% consumed sweet beverages (Table 1).

Maternal Knowledge: Adequate knowledge was reported for maternal nutrition (50%), breastfeeding (60%), and complementary feeding (45.1%).

Anthropometric Status: Among children, 12.3% were wasted (3.4% severe), 19.7% were stunted (7.7% severe), and 16.6% were underweight (5.7% severe), with 8.9% overweight. Among mothers, 11.2% had moderate to severe malnutrition (MUAC <23 cm).

Socio-Cultural Factors: Cultural taboos (e.g., avoiding eggs, snails) and low income limited dietary diversity. Younger mothers adhered to taboos, while husbands' budget control prioritized male portions.

Factors Associated with Feeding Practices: Logistic regression showed adequate EBF knowledge (AOR 3.10, p<0.001), younger age (18–24; AOR 2.00, p=0.028), and civil servant status (AOR 1.90, p=0.017) predicted EBF, while no formal education (AOR 0.42, p=0.021) reduced adherence. Adequate complementary feeding knowledge (AOR 2.75, p<0.001) and civil servant status (AOR 1.70, p=0.037) improved minimum acceptable diet, with low education (AOR 0.35, p=0.002) as a barrier.

Table 1: Infant and Young Child Feeding Indicators Among Respondents

Indicator	Age (Months)	Frequency	Percent
Ever breastfed (n=350)	0–24	345	98.7
Early initiation of breastfeeding within one hour of birth (n=350)	0–24	163	46.7
Exclusive breastfeeding for the first 2 days after birth (n=350)	0–24	258	73.7
Exclusive breastfeeding under 6 months (n=87)	0–5	72	82.8
Mixed milk feeding under 6 months (n=87)	0–5	38	43.7
Continued breastfeeding at one year (n=203)	12–23	112	55.2
Complementary Feeding Indicator (n=263)			
Introduction to solid, semi-solid, or soft foods (6–8 months)	6–8	155	59.1
Minimum dietary diversity met	6–23	206	78.3
Minimum meal frequency	6–23	198	75.3
Minimum acceptable diet	6–23	206	78.3
Egg and/or flesh food consumption	6–23	134	51.0
Sweet beverage consumption	6–23	116	44.1
Zero vegetable or fruit consumption	6–23	164	62.4
Bottle feeding	0–23	62	17.7

Conclusion and Recommendation: Although the rate of exclusive breastfeeding (EBF) among mothers was relatively high, its positive impact was significantly diminished by substantial gaps in maternal knowledge, cultural taboos, and economic barriers, contributing to malnutrition. Interventions should include targeted nutrition education, culturally tailored campaigns, engagement of elders and husbands, workplace breastfeeding support, and improved access to nutrient-rich foods to enhance Maternal, Infant, and Young Child Nutrition outcomes in Ilorin.

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PGM21

Pre-conception nutrition: effect of chronic consumption of Kola fruit on sex hormones

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Keywords: testosterone, luteinizing hormone, follicle stimulating hormone, kola

Highlights

- An increase in serum testosterone concentration accompanied by a decrease in luteinizing hormone (LH) and follicle-stimulating hormone (FSH) levels in male albino Wistar rats.

BACKGROUND AND OBJECTIVES: Preconception nutrition focuses on optimizing nutrient intake for both partners to enhance fertility and support a healthy pregnancy [1]. Hormonal balance can be influence by diet. While kola seeds (*Cola acuminata, Cola nitida* and *Garcinia kola*) are commonly used for their perceived health benefit, limited research exists on their long term consumption on sex hormones. The objective is to investigate the effect of chronic consumption of varying dietary supplementation of kola seeds on sex hormones i.e. follicle stimulating hormones, luteinizing hormone and testosterone.

MATERIALS AND METHOD:

Collection and identification of plant material: Kola nut seeds were purchased from Okon Oyom market in Akpabuyo LGA of Cross River State and authenticated by a botanist in the Department of Botany, University of Calabar, Calabar.

Collection of experimental animals: Fifty (50) male Wistar rats (120-150g) were obtained from the animal house of Faculty of Basic Medical Sciences, University of Calabar. They were acclimatized for two weeks before the start of the feeding experiment. All procedures followed the guidelines of Institutional Animal Ethics Committee.

Diet formulation and feeding of experimental rats: *Cola acuminata, Cola nitida and Garcinia kola* seeds were peeled, washed, cut and dried at 60^{o}C for 12 hours and ground. The powders were mixed in the rats' diet at 5%, 10% and 20% respectively. The feeding continued for 12weeks.

Sample collection: Rats were anesthetized, sacrificed and blood samples collected. Dry sample containers were used to collect serum and stored frozen for hormonal profile analysis.

Serum hormonal assay: Hormonal assay were measured using ELISA

Statistical analysis: Data were expressed as mean ± S.E.M and analyzed using one-way ANOVA (SPPS 23) version. Student *t*-test was used for pair-wise comparison with significant at $P< 0.05$.

RESULTS AND DISCUSSION

Hormonal profile changes of the experimental animals

In *C. acuminata*-fed rats, testosterone (T) significantly increased ($p < 0.05$), while luteinizing hormone (LH) and follicle-stimulating hormone (FSH) significantly decreased across all test diets. In *C. nitida*, T showed a non-significant decrease in the low-dose group and non-significant increases at higher doses; LH and FSH significantly decreased in all groups. For G. kola, T significantly increased, while LH and FSH significantly decreased in all test diets.

These findings suggest that kola species, particularly G. kola and *C. acuminata*, have aphrodisiac potential by elevating testosterone levels, consistent with previous studies [2,3]. The reduction in LH and FSH may be a feedback response to elevated testosterone. The paradoxical increase in T despite reduced gonadotropins could indicate impaired hepatic clearance, leading to hormone accumulation. Chronic consumption may thus disrupt hormonal balance, raising concerns about long-term effects on male reproductive health.

CONCLUSION AND RECOMMENDATION

This study showed an increase in testosterone level on administration of different kola species. The hormones luteinizing hormone (LH) and follicle stimulating hormone (FSH) showed a decrease in serum concentration of the different kola species.

The study should be extrapolated on the female sex hormones before pre-conception and conception to determine how altered androgen levels influence ovarian function, hormonal balance (FSH, LH, estrogen, progesterone), ovulation, fertilization, and implantation success

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PGM23

Proximate and Sensory Analyses of Complementary Foods Made from Blends of Rice, Soybeans and Dates

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Keywords: complementary foods, proximate analysis, sensory analysis.

Highlights:

- As soybean inclusion increased, there was a notable rise in fat, ash, and protein contents, indicating more nutrient-dense formulations with benefits for infant growth and development.
- Samples C, D, and E had significantly higher protein contents surpassing the RDA requirement for infants aged 12 months.

BACKGROUND AND OBJECTIVES: Complementary foods are liquids, semi-solids, and solids foods other than breast milk given to an infant to provide nutrients [1]. The introduction of complementary foods is recommended, as breast milk does not meet all the nutritional needs of infants. Malnutrition peaks during the period of complementary feeding from 6 to 24 months of age [2] caused mostly by poor diets, which lack nutrients. There is a need for nutritionally adequate complementary foods to be formulated from locally sourced foods, as a strategy to address malnutrition among infants. Therefore, the objective of this work is to determine the proximate and organoleptic properties of complementary food made from the combinations of rice, soybean and date palm flours.

MATERIALS AND METHODS: Rice, soybean and date palm fruit were processed into flours separately, the flours were blended in varying proportion to obtain five formulated complementary diets (A-E). The proximate and sensory analyses of complementary foods were determined using standard procedures.

RESULTS AND DISCUSSION: Tables 1 and 2 show proximate and sensory analyses of complementary foods. The protein content of the complementary food samples reported in this study is higher than the protein content of maize, plantain and soybean complementary food reported by Noah [3] which ranged from 10.64% to 15.86%. Protein is essential for tissue replacement, growth and development in infant and young children. The variation in the protein content could be due to differences in crops and their combination ratios. The protein content of the samples when compared to the Recommended Dietary Allowance (RDA) value of 13-14g/day [4] for infants up to 1 year equivalent for sample C, D and E made from 20%, 30% and 40% soybean respectively. Sample E made from the

blend of 50% rice, 40% soybeans and 10% dates had highest organoleptic ratings and overall acceptability.

Table 1: Proximate analysis (%) of complementary food

Samples	Moisture	Ash	Fat	Crude Fiber	Crude Protein	Carbohydrate
A	10.19±0.01^{a}	1.25±0.07^{e}	1.14±0.07^{e}	0.66±0.01^{e}	6.11±0.01^{a}	80.64±0.01^{a}
B	9.79±0.07^{b}	1.49±0.07^{d}	2.51±0.01^{d}	0.79±0.07^{d}	13.31±0.01^{a}	73.08±0.02^{b}
C	9.59±0.01^{c}	1.80±0.07^{c}	4.11±0.01^{c}	1.04±0.07^{c}	15.50±0.07^{a}	67.94±0.01^{c}
D	9.30±0.07^{d}	2.11±0.01^{b}	5.81±0.01^{b}	1.25±0.07^{b}	12.33±13.4^{a}	62.92±0.03^{d}
E	9.01±0.01^{e}	2.41±0.01^{a}	7.31±0.01^{a}	1.51±0.01^{a}	18.62±0.02^{a}	57.54±0.6^{e}

Sample A 100% Rice; Sample B-80%Rice:10%Soybean:10%Date; Sample C-70% Rice:20%Soybean:10% Date; Sample D- 60% Rice: 30% Soybean: 10% Date; Sample-E 50% Rice: 40% Soybean: 10% Date.

Table 2: Sensory analysis of complementary food

Samples	Color	Taste	Flavor	Aroma	Appearance	Texture	Overall acceptability
A	8.00±0.6^{b}	7.70±0.9^{ab}	7.43±1.3^{a}	7.65±1.07^{a}	8.17±0.8^{a}	7.57±1.08^{b}	8.09±0.9^{a}
B	7.52±0.7^{b}	7.83±1.02^{ab}	7.74±0.7^{a}	7.65±0.9^{a}	7.89±0.6^{a}	7.70±0.8^{ab}	8.22±0.7^{a}
C	7.78±0.9^{b}	7.35±0.9^{b}	7.61±0.8^{a}	7.65±0.8^{a}	7.96±0.5^{a}	7.96±0.8^{ab}	8.09±0.7^{a}
D	7.74±0.8^{b}	7.83±1.02^{ab}	7.78±1.08^{a}	8.04±0.5^{a}	8.09±0.9^{a}	8.00±0.8^{ab}	7.91±1.08^{a}
E	8.52±0.6^{a}	8.22±0.9^{a}	7.96±0.8^{a}	8.13±1.2^{a}	8.13±0.8^{a}	8.22±0.7^{a}	8.43±0.6^{a}

Sample A 100% Rice; Sample B-80%Rice:10%Soybean:10%Date; Sample C-70% Rice:20%Soybean:10% Date; Sample D- 60% Rice: 30% Soybean: 10% Date; Sample-E 50% Rice: 40% Soybean: 10% Date.

CONCLUSION AND RECOMMENDATİON(S): This study has shown that the blends of rice, soybean, and date improved the protein, fat, and ash contents and sensory attributes of the complementary food formulations. The determination of micronutrient contents of the formulated complementary foods is recommended.

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OWN3

Nexus between morbidity incidence/growth patterns and exclusive breastfeeding of infants 0-36 weeks in Benue state metropolis, Nigeria

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Background: Growth faltering in infants and young children less than 2 years of age is a common problem in Nigeria and exclusive breastfeeding (EBF) for the first 6 months and continued breastfeeding with complementary feeding have been shown to be ameliorating factors. These in turn, reduce childhood morbidity and promote optimal growth.
Objective: The study assessed the nexus between morbidity incidence/growth pattern and exclusive breastfeeding among infants 0-36 weeks in urban areas of Benue state, Nigeria.
Methodology: The cross-sectional/prospective cohort study targeted mother/child pairs attending health facilities in the state. The sample size of 409 mother-pairs was determined with the Cochran formula on a 40.9% EBF prevalence in Benue state. Purposive sampling was employed to select 409 mother-child pairs who were willing to participate in the study, out of which 150 infants participated in anthropometry. A structured-interviewer administered questionnaire used to collect data on socio-demographic and economic characteristics of mothers, EBF practices, morbidity incidence and growth rates of the infants. Data from the anthropometry were used to derive anthropometric indices which were compared with standards while those from the questionnaire were analyzed using SPSS soft version 25 at univariate and bivariate levels. $P < 0.05$ was considered significant.
Results: The peak (80.7%) of EBF was at 0-6 weeks and 54% were exclusively breastfed for up to the 24th week. Malaria (24.85%) and diarrhoea (14.28%) had the highest morbidity rates. Common cold (8.7%), malaria (6.7%) and diarrhea (4.7%) were the 1st, 2nd and 3rd most recurring illnesses among the infants. There was a positive significant ($x^2 = 12.282$; $P = 0.015$) association between the recurring morbidity incidence and EBF of infants in the study area. The growth patterns of the 0-24 weeks old infants were adequate in both male (88%) and female (85%). The prevalence of growth faltering observed before (10.29%) and after (5.88 %,) 6 months among non-EBF cohorts was higher than their EBF counterparts (4.87% and 3.65%, respectively), though, the relationship between exclusive breastfeeding and growth faltering was not significant ($x^2 = 1.605$; $p= 0.205$). The rate of weight gain decreased mostly at 10-14 weeks in both male and female cohorts from 0-36 weeks.
Conclusion: The study showed a nexus between exclusive breastfeeding, morbidity incidence and growth, therefore underscores the role of EBF in promoting immunity and optimal growth in infants.
Keywords: Morbidity incidence Growth pattern, Exclusive breastfeeding, Infants, Nexus

PWN2

Comparison of Nutritional Composition and Sensory Properties of Home-Made and Commercial Complementary Foods

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Keywords: complementary food, nutritional composition and sensory properties

Highlight

- Poor nutrition can lead to immediate health problems
- Quality of complementary foods is a challenge to achieving adequate nutrition.
- Homemade complementary food is nutrient dense.

Background: In many developing regions, the quality of complementary foods remains a major challenge to achieving adequate nutrition among children aged 6–23 months (WHO, 2023). Poor nutrition at this critical stage can lead to immediate health consequences, including increased morbidity and mortality, as well as long-term developmental delays in the brain and nervous system (Soliman *et al.*, 2021).

Objectives: This study developed, assessed, and compared the nutritional composition and sensory attributes of a homemade complementary food blend—comprising sweet potato, dried mackerel fish, and banana—with a commercial complementary food product.

Materials and Methods: The homemade formulation was prepared by peeling, washing, and oven-drying sweet potato and banana at 55°C for 9 hours and 8 hours, respectively. These were then combined with dried mackerel fish and blended using an electric blender. The final mixture consisted of 60% sweet potato, 20% banana, and 20% dried mackerel fish. The macro nutrients were determined by proximate analysis while the micro nutrients were determined using spectrophotometric method. Sensory evaluation was done on a five-point hedonic scale. Data was statistically analysed using ANOVA ($p<0.05$).

Results: Results showed that the homemade and commercial complementary foods had the following respective values: moisture content 7.84g and 7.60g, ash content 6.93g and 6.43g, crude protein 13.42g and 6.86g, crude fat 5.83g and 5.23g, crude fibre 3.30g and 3.63g, carbohydrate 62.57g and 70.16g, vitamin A 25.90mg/100g and 17.83mg/100g, vitamin B6 5.15mg/100g and 4.92mg/100g, vitamin B12 4.92mg/100g and 2.88mg/100g, vitamin C 10.61mg/100g, vitamin D 5.65mg/100g and 4.41mg/100g, iron 19.69mg/100g and 48.14mg/100g, selenium 0.07mg/100g and 0.05mg/100g, potassium 0.28mg/100g and 0.12mg/100g, and zinc 29.79mg/100g and 21.06mg/100g. There was a statistically significant difference in means ($p<0.05$) of the nutrients except potassium. Sensory evaluation revealed that 46.7% of respondents disliked the homemade complementary food very much, while only 3.3% liked it very much.

Nutrients (%)	**Homemade Complementary Food (Mean±SD)**	**Commercial Complementary Food (Mean±SD)**	**F**	**P-value**
Carbohydrate	62.57±0.05	70.16±0.05	0.00	0.00
Crude Protein	13.42±0.12	6.86±0.12	0.00	0.00
Crude Ash	6.93±0.14	6.43±0.11	0.39	0.01
Fat	5.83±0.11	5.23±0.11	0.00	0.00
Crude Fibre	3.30±0.17	3.63±0.05	6.40	0.03
Moisture content	7.84±0.05	7.61±0.03	1.24	0.00

Significance at $p<0.05$

In conclusion, the homemade complementary food demonstrated a superior nutritional profile compared to the commercial alternative.

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OCS11 Nutrient Content, Sensory Properties and Glycaemic Response Of Biscuits Produced From Flour Blends Of Tigernuts And Plantain

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Keywords: Plantain flour, tigernuts flour, glycaemic index, healthy snack.

Highlights:

- The glycaemic test provides evidence that the test biscuits can be classified as low GI and low GL foods.

BACKGROUND AND OBJECTİVES

The growing market demand for easy fast foods/ on-the-go snacks has drawn the attention of research scientists to the development of innovative foods made from nutrient-rich and well-balanced plant materials, ensuring no adverse health effects. It has been discovered that a composite flour composition of tigernuts and plantains can improve the nutritional content of biscuit (dietary fibre and minerals

contents) [1]. However, there is limited research on the actual glycaemic response to snacks made from composite flour of tigernuts and plantain in individuals. The aim of the study was to examine the nutrient content, sensory properties, and glycaemic response (glycaemic index and glycaemic load) of biscuits made from various formulations of tiger nut flour (TNF) and semi-ripe plantain flour (PF) blends.

MATERIALS AND METHOD

The study was an experimental study involving four phases. This involved the processing of slightly yellow plantain (stage 3 ripeness) and tiger nut into flours, and formulation of biscuits containing varying ratios of plantain flour (PF) and tigernuts flour (TNF), determining the proximate content of the biscuits, evaluating sensory characteristics and testing for glycemic response (glycaemic index and glycaemic load) using apparently healthy participants. The test foods included biscuits produced from ratios (50:50, 100:0, and 0:100) of tigernuts and plantain flour and a commercially marketed 'no sugar' biscuit made from whole wheat flour was selected as control. Descriptive statistics using means and standard deviation was used to analyse the data and calculate AUC for test and reference foods. The GL is calculated by multiplying the GI of the food by the amount of available carbohydrate in a serving divided by 100. Values are being classified as ≤10 for low GL foods, 11-19 for medium GL, and ≥20 for high GL [2]. Analysis of variance ($p < 0.05$) was used to express the statistical differences between the means obtained for all biscuit samples analysed and blood glucose values.

RESULTS

Proximate composition of biscuit from different formulations of tigernuts and plantain flour

Proximate Composition of biscuits made from different formulations of tigernuts and plantain flour is illustrated in Table 1. There was significant differences ($p<0.05$) in the proximate content of the different formulations for all the measured food properties.

Table 1: Proximate composition of biscuits from plantain and tigernuts composite flour

Sample	Moisture Content (%)	Crude Protein (%)	Crude Fat (%)	Total Ash (%)	Crude Fibre (%)	Total Carbohydrate (%)
CONTROL	5.32±0.01^{a}	13.72±0.07^{c}	19.39±0.01^{b}	2.28±0.02^{b}	0.82±0.02^{a}	59.29±0.06^{c}
PF_{50}:TNF_{50}	7.22±0.01^{c}	8.83±0.07^{b}	23.42±0.01^{c}	2.24±0.01^{b}	13.41±0.01^{c}	58.28±0.06^{b}
PF_{0}:TNF_{100}	5.99±0.01^{b}	8.91±0.07^{b}	30.40±0.01^{d}	1.66±0.01^{a}	16.53±0.03^{d}	53.05±0.09^{a}
PF_{100}:TNF_{0}	11.27±0.02^{d}	7.29±0.07^{a}	19.30±0.01^{a}	2.72±0.02^{c}	2.62±0.02^{b}	59.43±0.10^{c}

Values are means of triplicate determinations. Mean values with different superscripts within a column are significantly different ($p<0.05$)

Glycaemic Index and Load of Biscuits from Plantain and Tigernut Composite Flour

Table 2 shows the glycaemic load of the test biscuits. The biscuit sample with flour ratio PF_0:TNF_{100} has the lowest glycaemic index and glycaemic load. Low-GI foods (55 or less) have a minimal effect, medium-GI foods (56 to 69) have a moderate effect, and high-GI foods (70 to 100) have a significant effect on post prandial blood glucose levels respectively [3].

Table 2: Glycaemic index and load of biscuits samples.

Food Samples	Glycaemic Index	Glycaemic Load
PF_{50}:TNF_{50}	34	15
PF_0:TNF_{100}	16	6
Control (commercial low-sugar wheat biscuit)	50	30

CONCLUSION AND RECOMMENDATİON(S)

The study shows that the biscuits made from ratios of tigernuts flour and plantain flour were found to be nutritious. The glycaemic test provides evidence that the test biscuits can be classified as low GI and low GL foods. It promises to be an effective vehicle for glycaemic control, can serve as a healthy snacking option for people managing metabolic diseases and as healthy replacement for wheat biscuits as a gluten free snack option that can be adopted for children and adults alike who want to opt for sugar free snacks.

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OCS13 Household Water Security Status and Food Safety Practices of Adults in Selected Slum Urban Areas in Ibadan North East Local Government Area, Oyo State, Nigeria.

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Keywords: Water security, Food safety knowledge, attitude, and practice

Highlights

- One-third of the adults did not have enough water to drink at least once in the last 30 days.
- About 7 out of 10 adults were water secure based on the household water insecurity scale.
- One-half of the adults practised safe food handling, personal hygiene and water sanitation.

BACKGROUND AND OBJECTİVES: Adherence to food safety guidelines by everyone who handles food at home is a key component in the prevention of food-borne illnesses and nutrient malabsorption triggered by unsafe food consumption. Low food safety practices and poor access to a constant supply of clean water has adverse impacts on health, particularly women and children, leading to poor nutrition, stunting in children and cycle of infection. This study assessed the household water security status and food safety knowledge, attitudes, and practices of adults in selected slum urban areas of Ibadan North East Local Government Area in Oyo State.

METHODS: The study adopted a descriptive cross-sectional design. A multistage sampling method was used to select three out of the twelve wards in the local government area and purposive sampling was then used to select 2 areas from each ward. Simple random sampling was used to recruit 365 adults in the six selected areas. An interviewer-administered questionnaire was used to obtain data on socio-demographic characteristics, household water insecurity experience and food safety knowledge, attitude and practice [1,2]. Descriptive statistics were used to analyse household water security status and food safety KAP using SPSS version 27.

RESULTS AND DISCUSSION: The study recorded a high positive attitude on food safety (90.3%), yet the appropriate food safety practices was 47.2% while the knowledge on food safety was 66%. The

water security status in this study indicated that only 7 out of 10 adults were water secure based on the household water insecurity scale. Also, this study showed that there were more people in the category of not having enough water to drink when compared to other items on household water insecurity. It is similar to a study done by Drakopoulos [3], which showed that only about 70% of Nigerians had access to portable water. Water insecurity increases the odds of stunting in children under 5 years of age [4]. Children and women are often more at risk of malnourishment due their vulnerability of getting ill as a result of compromised food safety and hygiene practices.

Table 2: Respondents' Food Safety Knowledge, Attitude and Practice

Food Safety Knowledge, Attitude and Practice	Percentage (%)
Average knowledge on food handling	57.6
Average knowledge on personal hygiene	90.2
Average knowledge on water sanitation	50.1
Total knowledge on food safety	**66**
Average positive personal hygiene attitude	98.9
Average positive attitude towards water sanitation	83.2
Average positive attitude towards safe food handling	88.9
Total positive attitude towards food safety	**90.3**
Average appropriate practice food handling practice	62.9
Average appropriate practice personal hygiene practice	27.4
Average appropriate practice water sanitation	51.23
Total appropriate food safety practice	**47.2**

CONCLUSION AND RECOMMENDATION(S):

The study revealed significant gaps in food safety practices in key areas like water purification, hand washing steps and knowledge on safe food handling. Due to the water insecurity detected, water security programs should be strengthened as women and children are often most affected. Improvement in water security will reduce physical and psychological stress on women caused by the search for water which will positively improve their health while also improving their WASH practices. It is also crucial to implement educational and training programs that target adults who often handle food at home in order to promote safe food handling and water sanitation practices; this will reduce water and food-borne illness in household and also reduce deaths caused by diarrhea in children which is as a result of poor food safety practice.

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OCS15 Production of Complementary Food from Germinated Corn-Soybean Composite Flour Enriched with Bonga Fish and Crayfish Flours.

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Keywords: Calcium, Iron, Vitamin A, Zinc

Highlights

- Complementary food with enhanced micronutrients.
- Use of locally sourced ingredients.

BACKGROUND AND OBJECTIVES

Complementary feeding is recommended to begin at 6 months to about 2 years of infants' age where they are fed with liquid and soluble solid foods along with breast milk. Malnutrition at this early stage could cause impairment of their intellectual capabilities, stunted growth and wasting. The aim of this study was to produce complementary foods with germinated maize-soybean composite flours enriched with blends crayfish, bonga fish and carrot flours to enhance the densities of vitamin A, calcium, zinc and iron.

MATERIALS AND METHODS

Maize and soybean seeds were germinated separately. The seeds were disinfected by soaking in sodium hypochlorite solution for 15 min, and thereafter, rinsed with distilled water. The grains were soaked in distilled water (1:5, w/v) at ambient temperature (30±2^{o}C) for 12 h and then spread between thick layers of jute bag to germinate for 48 h. Distilled water was sprinkled every 6 h to moisten the seeds. After germination, the seed coats were removed and the decoated seeds were steamed for 10 min, dried at 50°C in an oven (ModelIH-150; Gallenkamp, England) for 24 h and finally milled into flour. Carrots were sorted, washed in potable water, air dried for 48 h and milled to flour. Crayfish and bonga fish were sorted and milled to flour. Carrot, bonga fish and crayfish flours were blended in the ratio of 2:1:1 (w/w) to form the "fortificant." Two blends of complementary foods were made by blending germinated corn, soybean and "fortificant" in the ratios of 70:30:0% w/w (Blend 1) and 50:30:20% w/w (Blend 2). The proximate composition, energy value, vitamin A content and mineral (iron, zinc and calcium)

contents of the produced complementary food were compared with that of Cerelac - a product of Nestle (Nigeria) PLC.

RESULTS AND DISCUSSION

Nutritional composition is presented in Table 1. The energy content ranged 403.49-412.79 kCal/100g. No significant ($p>0.05$) difference was observed between the formulated blends and cerelac. Fats (9.63-12.60%), fibre (3.25-6.46%), ash (2.80-4.81%) and protein (13.17-19.30%) contents were significantly higher ($p>0.05$) in the blend that contained the "fortificant." The oil-dense soybeans could be responsible for the higher fat values in the formulated blend while the protein content could be contributed by bonga fish and crayfish in the "fortificant."

Table 1: Nutritional composition of the formulated complementary food and Nestle cerelac

Nutrients	Blend 1	Blend 2	Nestle Cerelac
Energy (kCal/100g)	403.49^{a} ±15.67	412.79^{a} ±10.43	408.71^{a} ±12.31
Carbohydrate (%)	56.88^{b} ±2.41	65.68^{a} ±3.21	63.02^{a} ±1.32
Crude fats (%)	11.55^{b} ±0.40	12.60^{a} ±0.46	9.63^{c} ±0.42
Crude proteins (%)	13.17^{c} ±0.05	19.30^{a} ±0.01	15.85^{b} ±0.31
Ash (%)	2.75^{b} ±0.03	4.81^{a} ±0.02	2.80^{b} ±0.01
Crude fibre (%)	4.10^{b} ±0.02	6.46^{a} ±0.01	3.25^{c} ±0.11
Moisture (%)	5.41^{a} ±0.10	4.31^{b} ±0.10	2.75^{c} ±0.02
Calcium (mg/100g)	417.34^{b} ±0.19	620.12^{a} ±0.21	419.41^{b} ±0.01
Iron (mg/100g)	9.15^{c} ±0.02	14.25^{a} ±0.02	11.23^{b} ±0.01
Zinc (mg/100g)	6.20^{c} ±0.12	10.67^{a} ±0.13	7.81^{b} ±0.15
Vitamin A (μg RE/100g)	387.67^{c} ±0.18	610.52^{a} ±0.10	400.42^{b} ±0.11

Values with same superscript letter along each row is not significantly different ($p>0.05$).
Blend 1: 70% germinated corn flour, 30% germinated soybean flour
Blend 2: 50% corn flour, 30% germinated soybean flour and 20% "fortificant" which comprised carrot, bonga fish and crayfish blended in the ratio of 2:1:1 (w/w).

The minerals (mg/100g) which included calcium (417.34-620.12), iron (9.15-14.25) and zinc (6.20-10.67) and Vitamin A (387.67-610.52 μgRE/100g) contents were significantly higher in the blend that contained the "fortificant" which could be due to inclusion of bonga fish and crayfish which are good sources of these nutrients.

CONCLUSION

Complementary food formulated with 50% germinated corn flour, 30% germinated soybean flour and 20% "fortificant" which comprised bonga fish, crayfish, and carrot (1:2:1 v/v) had shown to contain higher levels of protein (21.77%), calcium (47.86%), iron (26.89%), zinc (36.62%) and vitamin A (52.47%) compared to Nestle Cerelac. Therefore, household especially those in the riverine communities could adopt this formulation to produce complementary food for infants.

OCS17

Nutrient Composition and Sensory Evaluation of Complementary Food Made from Varied Compositions of Yellow Maize, Cowpea, Dates, Carrot And Red Palm Oil

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Key words: complementary food, Nutrient composition, Sensory evaluation, varied composition.

Highlights

- Samples are made from yellow maize, cowpea, dates, carrot, red palm oil, the sample in the ratio of 42:41:4:4:9 had an improved protein quality and general acceptability.
- Sample with the ratio 70:13:4:4:9 had the highest energy, Fat and moisture content.

BACKGROUND AND OBJECTİVES: Over 50% of infants are given complementary foods before 6 months, and these foods are often of poor nutritional value, mostly inadequate in terms of energy, protein and micronutrients such as iron, zinc, iodine and vitamin A (Federal Ministry of Health (FMOH), 2005). Most mothers have poor knowledge of food diversification and give their children a monotonous diet with lesser nutrient content (Amadi *et al*., 2017). Therefore, the present study aimed to address it.

MATERIALS AND METHOD: This study used yellow maize, cowpea (black-eyed bean), date, carrot, and red palm oil. The materials were sorted and processed into various flours except the red palm oil, which maintained its liquid state. The complementary foods were produced in different ratios: MC1 70:13:4:4:9, MC2 52:31:4:4:9, and MC3 41:42:4:4:9. They were formulated using a Pearson formula based on targeted protein levels of 11%, 13%, and 15%, and were subjected to proximate, vitamin, mineral, phytochemical, and antinutrient analysis. **RESULTS AND DISCUSSION**: **Table 1: Energy and proximate composition of the complementary foods on a dry weight basis per 100 g**

This study observed that sample MC3 had the higher protein value which is attributed to 15% targeted protein base used and also high betacarotene, zinc, iron, alkaloids, phenols, and flavonoids value The samples meet the WHO (1998) recommended minimum energy densities for well-nourished infants: 24 kcal/100 g for ages 6–8 months and 38 kcal/100 g for ages 9–11 months, assuming four meals per day and continued breastfeeding. MC3 also ranked highest in general acceptability.

Table 1: Energy and proximate composition of the complementary foods on dry weight basis per 100 g

Samples	Energy(Kcal)	Moisture (%)	Protein (%)	Fat (%)	Carbohydrate (%)	Fibre (%)	Ash(%)
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
MC1	$380.29^{c} \pm 0.71$	$10.11^{c} \pm 0.04$	$8.11^{a} \pm 0.11$	$8.87^{c} \pm 0.06$	$67.02^{c} \pm 0.14$	$3.36^{a} \pm 0.04$	$2.53^{a} \pm 0.01$
MC2	$369.53^{a} \pm 0.14$	$9.62^{b} \pm 0.09$	$13.78^{b} \pm 0.12$	$6.81^{a} \pm 0.03$	$63.28^{b} \pm 0.22$	$3.90^{b} \pm 0.05$	$2.61^{b} \pm 0.03$
MC3	$374.40^{b} \pm 0.00$	$8.09^{a} \pm 0.04$	$15.89^{c} \pm 0.04$	$7.90^{b} \pm 0.03$	$59.93^{a} \pm 0.10$	$4.97^{c} \pm 0.02$	$3.22^{c} \pm 0.02$

CONCLUSION AND RECOMMENDATION: The study observed that nutrient-dense complementary food could be formulated from yellow maize, cowpea, date, carrot, and red palm oil to meet the nutritional needs of the infants and young children. Hence, there is a need to educate mothers on the adoption of variety in homemade complementary food, as this will help combat malnutrition in children.

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OCS18 Optimising The Nutritional and Textural Properties of Biscuits Through Incorporation of Soyabean Residue.

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Keywords: Soybean residue, Okara, Biscuits formulation, Waste utilisation in food

Highlights:

- Incorporating okara flour into biscuits increased protein, fat, calcium, iron, vitamins B1–B3, dietary fibre, and phytochemicals (tannin, oxalate, phytate, flavonoids) while lowering carbohydrate content.
- These phytochemicals remained within safe limits. Sensory evaluation favoured the 100% wheat sample (A) and those with 10% and 30% okara flour (B and D).
- The 50% wheat–50% okara sample (F) demonstrated the best overall chemical properties.

Background and objectives:

Biscuits are widely consumed globally for their affordability, long shelf life, and appeal to all age groups [1]. Conventional varieties made mainly from refined wheat flour are typically low in protein and dietary fibre, offering limited nutritional benefits [2]. Okara, a by-product of soymilk and tofu production, is rich in dietary fibre, protein, and micronutrients [3], yet it is often discarded, causing environmental issues [3]. Incorporating okara into biscuit formulations enhances nutritional value, supports environmental sustainability, and adds economic value [3]. The study aimed to optimise the nutritional and textural qualities of biscuits by incorporating soybean residue. The specific objectives include to:

1. Ascertain the proximate composition of a biscuit made from soybean residue.

2. Analyse the minerals (calcium and iron) composition of a biscuit made from soybean residue.

3. Determine the dietary fibre composition of the biscuits made from soybean residue.

Materials and Methods:

The study adopted an experimental research design, and the raw materials were purchased from Itam market, Itu Local Government Area, Akwa Ibom State. The soybean was taken to the Department of Agronomy, Michael Okpara University of Agriculture, Umudike for Identification and was processed into okara flour and was then combined with wheat flour for the production of the biscuits.

Results and Discussion:

(i) Mineral composition of biscuits made from soybean residue.

Sample	Calcium (mg/100g)	Iron (mg/100g)
Sample A	$60.13^{e} \pm 0.03$	$0.94^{e} \pm 0.03$
Sample B	$62.92^{d} \pm 0.03$	$1.08^{d} \pm 0.02$
Sample D	$70.21^{c} \pm 0.04$	$1.29^{c} \pm 0.01$
Sample F	$85.42^{a} \pm 0.04$	$2.48^{a} \pm 003$
Sample G	$74.85^{b} \pm 0..03$	$1.91^{b} \pm 0.02$

Key: Samples: A - Soy Okara Flour: 0%, Wheat Flour: 100%; B - Soy Okara Flour: 10%, Wheat Flour: 90%, D - Soy Okara Flour: 30%, Wheat Flour: 70%, F - Soy Okara Flour: 50%, Wheat Flour: 50%, G - Soy Okara Flour: 90%, Wheat Flour: 10%

These results indicate that the incorporation of soy okara flour markedly improves the mineral profile of biscuits, particularly enhancing calcium and iron content [1].

(ii) Dietary fibre composition of biscuits made from soybean residue.

Sample	Insoluble dietary fiber (%)	Soluble dietary fiber (%)	Total dietary fiber (%)
Sample A	$0.17^{e} \pm 0.03$	$0.95^{d} \pm 0.03$	$1.12^{e} \pm 0.00$
Sample B	$0.84^{c} \pm 0.04$	$1.32^{b} \pm 0.03$	$2.16^{c} \pm 0.01$
Sample D	$0.75^{d} \pm 0.01$	$1.24^{c} \pm 0.04$	$1.99^{d} \pm 0.03$
Sample F	$2.13^{b} \pm 0.03$	$1.02^{d} \pm 0.01$	$3.15^{b} \pm 0.01$
Sample G	$3.21^{a} \pm 0.01$	$1.46^{a} \pm 0.02$	$4.67^{a} \pm 0.01$

The inclusion of okara increased the total dietary fibre in samples B, D, F and G while sample A (100% wheat flour) had the lowest [4]

Conclusions and Recommendations

The study demonstrates that incorporating okara flour into wheat-based biscuits produces products that are visually appealing, palatable, and nutrient-rich. Among formulations tested, the 50:50 wheat–okara blend (Sample F) exhibited superior chemical composition. The biscuits provide substantial macro- and micronutrients, offering potential as a functional food to combat malnutrition across all age groups. Nutritionally, okara enrichment enhances protein, fibre, and mineral content, while its use supports waste valorization and promotes a circular economy by converting a by-product into a valuable food ingredient.

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PCS12 Glycemic Index and Fiber Profile of Dough Meals from Water Yam–Unripe Plantain Flour Blends

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Keywords: Functional foods, Glycemic index, Dietary fiber, Blood glucose regulation

Background and Objective

In the pursuit of functional foods that contribute to sustainable health and nutrition, particularly in regions grappling with non-communicable diseases and food insecurity, evaluating local crop-based meals is critical. Underutilized crops with enhanced nutrition and health value could be reintroduced to the diet as a promising intervention to meet global food and nutrition challenges. Considering the alarming rise in non-communicable diseases and persistent poverty, dietary choices must be re-evaluated [1]. This study assessed the glycemic index (in-vivo and in-vitro) and dietary fiber profile of dough meals made from blends of water yam (*Dioscorea alata*) and unripe plantain (*Musa paradisiaca*) flours, targeting low-glycemic food development to support SDG 3 (Good Health and Well-being) and SDG 2 (Zero Hunger).

Materials and Methods

Flour blends were formulated in three ratios: 50:50, 60:40, and 70:30 (water yam:unripe plantain) and used to prepare dough meals following standard culinary procedures. The in-vivo glycemic index was evaluated using nine healthy male Wistar rats, with glucose (50 g/L) serving as the reference food. Blood glucose levels were measured at 0, 15, 30, 60, 90, and 120 minutes post-consumption. In-vitro glycemic index and dietary fiber fractions (total, soluble, and insoluble) were determined using standardized protocols outlined by the Association of Official Analytical Chemists [2]. Statistical analyses were conducted using one-way ANOVA, with significance set at $p < 0.05$.

Results

The in-vitro glycemic index (GI) values of the sample blends ranged from 58.85 to 63.89, classifying them as medium-GI foods. Total dietary fiber content ranged from 12.73% to 15.19%, with soluble fiber reaching its highest level in the sample containing 70% water yam and 30% unripe plantain (12.55%).

This indicates that the combination of water yam, which is relatively lower in fiber, with unripe plantain, which is naturally high in resistant starch and soluble fiber, enhanced the overall fiber profile of the blends. The in-vivo blood glucose response curves showed peak levels at 30 minutes post-ingestion, followed by a gradual decline, confirming a moderated glycemic response. The observed significant differences ($p < 0.05$) in dietary fiber fractions across the blends suggest that samples richer in unripe plantain had higher soluble fiber, which likely contributed to their lower glycemic index values. This finding highlights the role of unripe plantain as a functional ingredient in improving fiber content and attenuating postprandial glycemia when blended with water yam

Table 1: Glycemic Index and Fiber Composition of Dough Meals

Samples	In-vitro GI	Total Fiber (%)	Soluble Fiber (%)	Insoluble Fiber (%)
		Mean±SD		
WY50:UP50	63.89 ± 0.23^{a}	12.73 ± 0.02^{c}	9.88 ± 0.01^{c}	2.84 ± 0.02^{a}
WY60:UP40	60.41 ± 0.35^{b}	13.85 ± 0.03^{b}	10.40 ± 0.03^{b}	3.11 ± 0.01^{a}
WY70:UP30	58.85 ± 0.29^{c}	15.19 ± 0.01^{a}	12.55 ± 0.02^{a}	2.64 c0.02^{b}

Values with different superscripts in a column are significantly different ($p < 0.05$)

Conclusion

The dough meals exhibited low-to-moderate glycemic indices and appreciable fiber content, supporting their potential role in dietary glycemic regulation. These blends offer a culturally acceptable and health-promoting alternative staple, contributing to the prevention of non-communicable diseases (SDG 3) and improved nutritional security (SDG 2).

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PCS14

Chemical Evaluation of Two Varieties of Cooked Bitter Yam (*Dioscorea Dumetorum*) Flour and Their Effects On Alloxan -Induced Diabetic

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KEYWORDS: *Dioscorea dumetorum*, Diabetes mellitus, liver enzymes, Allozan.

HIGHLIGHTS:

- Therapeutic potential of *Dioscorea dumetorum* in the prevention and treatment of metabolic disorders
- The hepatoprotective effect of *Dioscorea dumetorum* has been attributed to its antioxidant properties.

BACKGROUND AND OBJECTIVE

Dietary control remains a highly desirable avenue for both preventing and managing chronic degenerative diseases. Medicinal plant has a vast potential in the treatment of various diseases due to the presence of secondary metabolite with therapeutic properties (1). Improving local food system are integral to food security, providing fresh and diverse food that are essential for maternal and child nutrition. Native foods, which were once widely used to manage diabetes, are now mostly ignored and in danger of being extinct (2). The focus of this present study is to evaluate the effect of both varieties of *Dioscorea dumetorum* on diabetics induced adult male Wister rat.

MATERIALS AND METHOD:

The two varieties of the tubers of *Dioscorea dumetorum* was obtained from two different States. The tubers were properly washed free of dirt under running tap water, cut, and boiled for three (3) hours. The boiled tubers were peeled carefully and thinly sliced and then sun-dried for about six (6) hours. The dried pieces of the tubers were milled into flour and stored in airtight labeled container prior to analysis. Thirty-five (35) adults male Wister rats weighing between 150-200 g were used, grouped based on their body weight into 7 different groups (A, B, C, D, E, F and G) comprising of five rats each. upon. Administration was oral for 14 days. *Biochemical indices of study rat were assessed.*

RESULT AND DISCUSSION

Liver is the central metabolic organ in the body responsible for glucose and lipid homeostasis, diabetes leads to hepatic dysfunction. The elevation of plasma concentrations of hepatic tissues enzymes AST, ALT, and ALP in Group B (diabetic rats) is an indicator of hepatic damage. Administration of *Dioscorea dumetorum* (Group D-G) significantly restored in the activities of AST, ALT, and ALP activity was

observed. These results revealed that the two varieties of *Dioscorea dumetorum* species were found to possess good effects on the biochemical parameters on alloxan-induced diabetic adult male Wister rats, used in the management of diabetes.

GROUPS	Aspartate aminotransferase (AST), (IU/L)	Alanine aminotransferase (ALT) (IU/L)	Alkaline phosphatase (ALP) (IU/L)
Group A	32.00± 2.55^{bc}	19.00± 2.24^{ab}	52.00± 3.74^{bc}
Group B	50.60± 2.41^{d}	27.80± 1.92^{d}	86.20± 2.28^{d}
Group C	32.40± 2.07^{bc}	18.20± 1.48^{a}	55.40± 4.45^{c}
Group D$_{W200}$	33.20± 3.96^{bc}	21.40± 1.95^{bc}	46.60± 4.67^{ab}
Group E$_{W400}$	33.60± 1.14^{c}	22.00± 1.58^{c}	43.40± 1.67^{a}
Group F$_{Y200}$	30.00± 1.58^{ab}	21.60± 2.07^{bc}	53.80± 5.97^{c}
Group G$_{Y400}$	27.40± 2.41^{a}	20.20± 1.92^{abc}	47.60± 4.04^{ab}

Results are expressed in Means ± SD (n = 5)
Mean values with different letters as superscripts across the column are considered significant at $p < 0.05$
Group A: Normal Control, (no treatment) fed with rat chow and water *adlibitum*
Group B: Alloxan-induced diabetes without treatment
Group C: Alloxan-induced diabetes +5mg/kg BW. of glibenclamide (standard drug)
Group D: Alloxan-induced diabetes + 200mg/kg BW of white specie of *Dioscorea dumetorum*
Group E: Alloxan-induced diabetes + 400mg/kg BW of white specie of *Dioscorea dumetorum*
Group F: Alloxan-induced diabetes + 200mg/kg BW of yellow specie of *Dioscorea dumetorum*
Group G: Alloxan-induced diabetes + 400mg/kg BW of yellow specie of *Dioscorea dumetorum*

CONCLUSION

Dioscorea dumetorum helps in parenchymal cell regeneration in liver, thus protecting membrane integrity and thereby minimizing enzyme leakage. The result of the study concluded that *Dioscorea dumetorum* possess potential hepato regenerating activity.

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PCS16

Proximate and Sensory Evaluation of Soup Produced from Scent Leaf (*Ocimum gratissimum*) and Melon Seed (Epi Ereru) Processed in Different Forms for Postpartum Mothers

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Keywords: Scent Leaf, Postpartum Nutrition, Sensory Evaluation, Proximate Analysis

Highlights

- Freshly blended scent leaf soup had the best nutritional and sensory scores
- Soup processing method significantly affected nutrient and anti-nutrient composition
- Dried powdered leaves had highest carbohydrate and sodium content

Background and Objectives

Postpartum recovery requires nutrient-dense foods that support healing and lactation. Epi ereru is a traditional soup made with Ocimum gratissimum (scent leaf) and melon seed, often consumed by postpartum women in Nigeria. However, scientific data on its composition based on scent leaf processing method is limited. This study aimed to assess the proximate, anti-nutrient, mineral content, and sensory quality of Epi ereru prepared using three different scent leaf forms—freshly blended, freshly shredded, and dried powdered.

Materials and Methods

Three soup samples were prepared using a fixed recipe containing 100 g melon seed, 50 g of scent leaf (in three forms), 50 g locust bean, 50 mL palm oil, salt, pepper, crayfish, and local spices. AOAC (2019) procedures were used to determine proximate composition. Anti-nutrients (oxalates, saponins, alkaloids, phytates, flavonoids) and mineral elements (Ca, Mg, Fe, Na, P, K) were analyzed using spectrophotometry. Sensory attributes were evaluated by 15 panelists using a 9-point hedonic scale. Data were analyzed using ANOVA at $p < 0.05$. Freshly blended leaf had highest fat and fiber; dried powdered had higher ash and carbohydrate.

Results and Discussion

Freshly blended soup had the highest alkaloid (7.81 mg/100 g), oxalate (71.11 mg/100 g), and saponin content (6.30 mg/100 g), suggesting less degradation of bioactive compounds. Dried powdered leaves had more phytates (0.18 mg/100 g) and flavonoids (70.48 mg/100 g), which

concentrate as moisture is removed. Findings support the antioxidant and anti-inflammatory properties of Ocimum gratissimum described [2]. The *Epi ereru* prepared with freshly blended scent leaf was most preferred tor taste, texture, and overall acceptability. Dried powdered form consistently received lowest scores. Indicate reduced consumer appeal due to loss of flavor and aroma compound when drying. These highlight importance of minimal processing in preserving the sensory quality of traditional soups intended for postpartum nutrition [2] [3]

Table 1: Anti-Nutrient Composition of Soup Produced from Scent Leaf Processed in Different Forms

Component	Freshly Blended	Freshly Shredded	Dried Powdered
Alkaloid	7.81 ± 0.01^{a}	5.43 ± 0.02^{b}	3.24 ± 0.03^{c}
Oxalate	71.11 ± 0.01^{a}	68.21 ± 0.01^{b}	60.33 ± 0.02^{c}
Phytate	0.11 ± 0.01^{c}	0.14 ± 0.01^{b}	0.18 ± 0.01^{a}
Flavonoid	55.60 ± 0.01^{b}	48.10 ± 0.01^{c}	70.48 ± 0.01^{a}
Saponin	6.30 ± 0.01^{a}	4.12 ± 0.01^{b}	3.06 ± 0.02^{c}

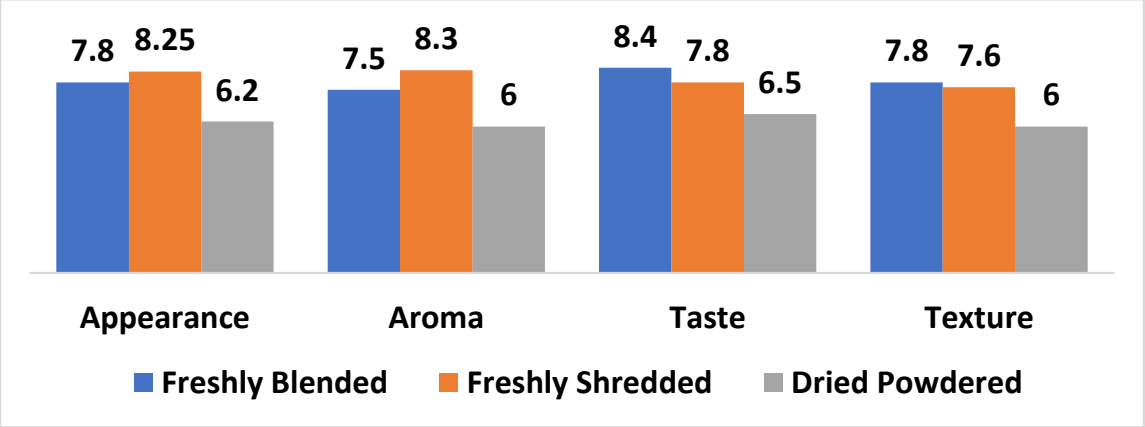

Figure 1: Sensory Attribute of Soup Produced from Scent Leaf Processed in Different Forms

Conclusion and Recommendations

Scent leaf processing methods significantly influence the nutrient and sensory quality of Epi ereru soup. Freshly blended leaves preserved nutritional and sensory integrity best. Recommended that postpartum mothers be encouraged to consume freshly blended scent leaf in soup preparation to promote recovery, lactation, and overall health.

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PCS19

Chemical Composition of (Fluted Pumpkin (*Telfairia Occidentalis*), Water Leaf (*Talinum Triangulare*), Bitter Leaf (*Vernonia Amygdalina*) Wild Spinach *(Gnetum Africanum)* From Two Different Locations

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Keywords: Chemical composition and green leafy vegetables

Background: Vegetables are known to be important sources of protective foods [1]. Green leafy vegetables are succulent plants grown in gardens and consumed as a side dish or soup with starchy staples among the tribes in Nigeria [1]. The importance of dietary components of leafy vegetables is significant in African population since generally they are comparatively rich in fibre while cereals, root vegetables and other foodstuff are relatively poor sources [2].

Materials and Methods: The proximate analysis was carried out using the standardize procedure of (AOAC, 2000) while mineral content was determined by dry ash extraction method following which for specific mineral element, about 2.0g of the samples was burnt to ashes in a muffle. The Folin-Denis Colorimetric method as described by Kirk and Sawyer (1998) was used for the determination of anti-nutrient and phytochemical content. Proximate analysis was carried out on fresh samples of the leafy vegetable to determine the moisture, protein, ash, fat, crude fibre, energy value and carbohydrate content following standard procedures. All analysis was carried out in duplicate.

Table 4.1a: Proximate and Mineral composition of selected green leafy vegetables in Umuahia and Ado (%)

Vegetables	Location	Moisture content	Crude Protein	Fat content	Crude fibre	Ash content	CHO
T. triangulare	Umuahia	80.93^{bc} ±0.45	1.84^{d} ±0.21	5.03^{a} ±0.51	6.98^{c} ±0.53	2.65^{b} ±0.12	2.59^{C} ±0.21
	Ado	84.34^{b} ±1.96	3.17^{b} ±0.24	1.29^{da} ±0.00	1.74^{e} ±0.09	1.96^{c} ±0.08	7.51^{b} ±2.38
G. africanum	Umuahia	67.50^{d} ±0.27	2.54^{bc} ±0.40	3.88^{b} ±0.02	22.07^{b} ±0.33	1.93^{c} ±0.17	2.09^{c} ±0.27
	Ado	46.39^{c} ±0.66	3.91^{a} ±0.46	4.21^{b} ±0.25	25.32^{a} ±0.13	6.59^{a} ±0.31	13.60^{a} ±1.18
V. amygdalina	Umuahia	80.96^{bc} ±2.79	1.96^{cd} ±0.15	0.68^{e} ±0.15	2.02^{d} ±0.37	2.92^{b} ±0.11	11.47^{ab} ±3.27
	Ado	78.08^{c} ±2.18	2.10^{cd} ±0.11	2.33^{c} ±0.66	1.79^{cd} ±0.56	2.98^{b} ±0.27	12.73^{a} ±1.30
T. occidentalis	Umuahia	93.24^{a} ±0.29	1.10^{c} ±0.18	1.02^{ef} ±0.15	2.45^{d} ±0.59	1.52^{d} ±0.04	0.69^{c} ± 0.59
	Ado	90.75^{a} ±2.04	1.17^{c} ±0.30	1.77^{d} ±0.12	0.87^{c} ±0.02	2.20^{c} ±0.02	3.27^{c} s±1,86
Sample	**Location**	**Calcium**	**Magnesium**	**Iron**	**Sodium**	**Potassium**	**Zinc**
T. occidentalis	Umuahia	12.51^{d} ±0.00	23.52^{c}±1.07	86.76^{a}±0.00	106.47^{b}±1.65	99.25^{d}±0.00	86.02^{b}±1.30
T. occidentalis	Ado	29.83^{b} ±0.04	31.76^{a}±0.01	31.32^{d}±0.01	42.03^{d}±0.04	43.51^{e}±0.03	24.86^{d}±0.04
T. triangulare	Umuahia	12.49^{d} ±0.00	19.85^{d}±1.07	72.38^{b}±2.65	85.99^{c}±1.62	113.38^{c}±0.00	87.28^{b}±1.28
T. triangulare	Ado	32.53^{a} ±0.03	29.66^{b}±0.04	31.73^{d}±0.03	44.38^{d}±0.08	38.92^{e}±0.03	24.73^{d}±0.04
V. amygdalina	Umuahia	11.27^{a} ±1.77	25.18^{b}±0.00	60.66^{c}±2.85	124.42^{ab}±3.33	186.95^{a}±1.66	91.10^{a}±1b.30
V. amygdalina	Ado	31.30^{d} ±0.01	30.43^{ab}±0.16	31.63^{d}±0.01	49.61^{d}±0.57	42.10^{e}±0.01	25.51^{d}±0.01
G. africanum	Umuahia	19.89^{c} ±0.00	13.77^{e}±1.06	60.05^{c}±2.83	132.01^{a}±1.55	132.75^{b}±1.55	57.79^{c}±1.26
G.africanum	Ado	28.85^{b} ±0.06	31.02^{ab}±0.05	31.54^{d}±0.01	49.60^{d}±0.04	48.52^{e}±0.01	26.23^{d}±0.04

CHO= carbohydrate, Means along the column with the different superscript are significantly different by DMRT ($p<0.05$), (*T. triangulare= Talinum triangulare, G. africanum= Gnetum africanum, V. amygdalina= Vernoni a amygdalina, T. occidentalis= Telfairia occidentalis*

Result and Discussion

G. africanum from Ado had the highest carbohydrate (13.60%) and crude fibre (25.32%) content, while T. triangulare from Ado had the lowest crude fibre (1.74%). V. amygdalina from Ado and Umuahia also had high carbohydrate levels (12.73% and 11.47%). T. occidentalis from Umuahia had the highest moisture content (93.24%), while G. africanum from Ado had the lowest (46.39%). Crude protein was highest in G. africanum from Ado (3.91%) and lowest in T. occidentalis from Umuahia (1.10%). Carbohydrates aid biosynthetic processes, dietary fibre influences nutrient absorption, and high moisture supports metabolic activity. However, none of the vegetables provide adequate daily protein requirements [3].

Conclusion: Anti-nutrient levels were within safe limits (except oxalate), and antioxidants were moderate. Overall, the vegetables are good sources of micronutrients and fibre.

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OLT7 Comparative Phyochemical Analysis, Mineral Constituents and *In Vitro* Antioxidant Activity Of Ethyl Acetate Extract Of Brown And Yellow Tiger Nut (*Cyperus Esculentus*)

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Keywords: Brown and yellow tiger nut; ethyl acetate extract; phytochemicals and minerals.

BACKGROUND AND INTRODUCTION

Tiger nut (Cyperus esculentus) is a major source of food and income for Nigeria and Africa as a whole [1]. Phytochemical analysis of tiger nut helps us to understand its nutritional and therapeutic value [2]. The aim of this study is to investigate and compare the phytochemicals, mineral constituents, and antioxidant activity present in ethyl acetate extract of brown and yellow tiger nuts.

MATERIALS AND METHODS:

The dried tiger nut was pulverized and extracted with ethyl acetate by maceration. Qualitative and quantitative analysis of phytochemicals was carried out using standard methods. Mineral constituent determination was carried out using atomic absorption spectrophotometry and flame photometry and the in vitro antioxidant activity was performed using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) method.

RESULTS AND DISCUSSION:

The phytochemical assay revealed the presence of saponins alkaloids, glycosides and flavonoids and quantitative analysis shows that alkaloids and flavonoids are high in concentration in ethyl acetate extract of the yellow tiger nut while the amount of saponins is higher in ethyl acetate extract of brown tiger nut. The mineral constituents of ethyl acetate extract of yellow tiger nut indicated that calcium and sodium are high in concentration in ethyl acetate extract of yellow tiger nut while magnesium is high in concentration in ethyl acetate extract of brown tiger nut. The ethyl acetate extract of brown tiger nut showed higher scavenging activity of 78.74% at 500ug/ml compared to yellow tiger nut (68.54% at 500ng/ml).

CONCLUSION AND RECOMMENDATION:

This study shows that the ethyl acetate extract of brown and yellow tiger nut is rich in phytochemical components and reveals high scavenging activity. Therefore, tiger nut plant may have great potential of reducing the risk of getting cancer, diabetes and cardiovascular diseases. Presence of these secondary metabolites in this plant might be responsible for the nutritional and therapeutic value.

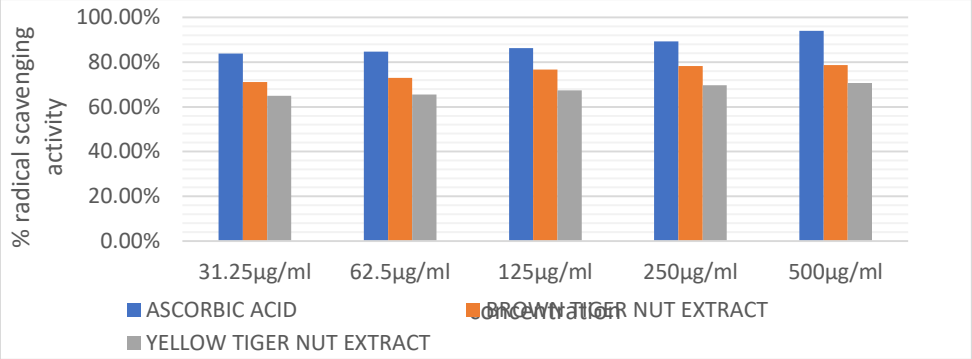

Figure: 3 %Radical scavenging activity of ethyl acetate extract of brown and yellow tiger nut.

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OEM31 The effect of Artificial Ripening agent on the Nutrient composition of Plantain in Nsukka Local Government Area, Enugu State.

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Keys words: Artificial ripening, Polyethylene bag, Micronutrients, Plantain

Highlights

- Calcium carbide reduced ash and fiber content in plantains.
- Polyethylene bag ripening better preserved moisture, ash, and fiber.
- Vitamins and iron were concentrated due to moisture loss.

Background: Artificial ripening of fruits, especially plantain, has become increasingly common due to its ability to enhance appearance and marketability. However, these methods pose significant concerns regarding nutrient depletion and potential health risk to consumers. The study investigated the effects of artificial ripening agents on the nutritional composition of plantains in Nsukka Local Government Area, Enugu State.

Methodology: Unripe plantains were sourced and separated into three experimental groups. The control group (PAN) ripened naturally at room temperature over 7 days. The second group was artificially ripened using calcium carbide (PAC) over 2 days, and the third group was ripened in an enclosed polyethylene bag (PAP) over 4 days. After ripening, all plantain samples were prepared for analysis. Proximate analysis (moisture, crude protein, crude fat, ash, crude fiber, and total carbohydrate) was performed using standard methods from the Association of Official Analytical Chemists [1]. Vitamin B6, and B9 content were determined spectrophotometrically. Mineral content for magnesium (Mg), potassium (K), and iron (Fe) was quantified using Inductively Coupled Plasma Mass Spectrometry (ICP-MS) and Atomic Absorption Spectroscopy (AAS) after acid digestion. All analyses were conducted in triplicate, and statistical differences were identified using a one-way ANOVA followed by Duncan's multiple range test ($p < 0.05$).

Results and Discussion:

Table 1: Effect of artificial ripening agent on the proximate composition of plantain

Sample	Moisture (%)	Crude protein (%)	Crude fat (%)	Ash (%)	Crude fibre (%)	Carbohydrate (%)
PAN	$16.62^{b} \pm 0.04$	$8.54^{a} \pm 0.18$	$2.00^{a} \pm 0.00$	$4.88^{b} \pm 0.03$	$4.24^{b} \pm 0.03$	$63.72^{b} \pm 0.08$
PAP	$17.49^{c} \pm 0.04$	$8.89^{a} \pm 0.06$	$1.97^{a} \pm 0.01$	$4.98^{c} \pm 0.03$	$4.34^{b} \pm 0.04$	$62.35^{a} \pm 0.02$
PAC	$15.09^{a} \pm 0.04$	$8.97^{a} \pm 0.18$	$2.03^{a} \pm 0.04$	$3.90^{a} \pm 0.03$	$3.39^{a} \pm 0.03$	$66.63^{c} \pm 0.24$

Values are mean ± standard deviation of duplicate determination. Mean values on the same column with different superscripts are significantly different at $p<0.05$.
Key: PAN= Naturally ripened plantain; PAP= Plantain ripened in polyethylene bag; PAC= Plantain ripened with calcium carbide

The analysis revealed significant differences in the nutritional composition of plantains based on their ripening method. The polyethylene bag-ripened samples (PAP) had the highest moisture content (17.49%), Conversely, total carbohydrate content was highest in PAC (66.63%). Ash content was highest in PAP (4.98%) and lowest in PAC (3.90%), with a similar trend observed for crude fiber. Artificial ripening with calcium carbide (PAC) resulted in the highest concentrations of Vitamin B6, Vitamin B9. Notably, the naturally ripened samples (PAN) had the lowest levels of these vitamins. Magnesium and potassium levels were highest in the PAP group. Iron content, however, was highest in the PAC samples and lowest in the naturally ripened ones. The method of ripening had a significant and direct impact on the nutritional quality of plantain. While artificial ripening with calcium carbide appeared to increase some vitamins and iron, this could be attributed to moisture reduction, which concentrates the nutrients without actually adding any. The study also found that this method significantly decreases the levels of ash and crude fiber, which are essential for mineral intake and digestive health. This aligns with other studies that have linked calcium carbide to poor enzymatic nutrient metabolism and potential chemical interactions [2; 3].

Conclusion: The study showed that the calcium carbide ripened plantain contained significantly the highest total carbohydrate, vitamin B_6, vitamin B_9, vitamin C and iron contents while the polyethylene ripened plantain contained the highest moisture, ash, crude fibre, magnesium and potassium contents

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OEM32

Knowledge, Attitudes, and Practices Regarding Fortified Food Consumption Among Women in Kaduna North LGA

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Keywords:

Fortified foods, KAP, Food fortification, Consumer behavior

Highlights:

- General knowledge of food fortification was low.
- Attitudes and willingness to buy varied by consumer status.
- Fortification logos affected purchase decisions.

BACKGROUND AND OBJECTIVES:

Nigeria continues to struggle with high rates of micronutrient deficiencies [1]. The industrial fortification was developed as a strategy to prevent and reduce the prevalence of micronutrient deficiencies [2]. Despite decades of implementation of the large-scale food fortification program in Nigeria [2], there are limited independent information on consumers' awareness on fortified foods. This study aims to assess the Knowledge, Attitude, and Practice (KAP) of women who consume fortified foods in Kaduna North LGA.

MATERIALS AND METHODS:

A descriptive cross-sectional study was conducted among women residing in selected communities in Kaduna North LGA. Using a simple random sampling method, 271 women who met the inclusion criteria were recruited to participate. Data were collected with an interviewer-administered questionnaire adapted from the NFCMS 2021 and the Fortification Assessment Coverage Toolkit [1] [4]. Data were analyzed with IBM SPSS Statistics version 27 using descriptive statistics and Chi-square tests, with significance set at $p < 0.05$.

RESULT AND DISCUSSIONS:

Table 1: Association between consumption status and knowledge, attitudes, and practices of fortified foods.

Variables	% Women consuming fortified foods (n=252)	% Women not consuming fortified foods (n=19)	x^2	df	*p*-value
Knowledge					
Heard about food fortification	29.4	26.3	0.080	1	0.778
Knowledge of added nutrients	80.6	73.7	13.873	4	0.008*
Attitudes					
Use nutrition information in purchase decision	36.9	78.9	13.028	1	<0.001*
Willing to pay for fortified products	57.9	73.7	4.542	3	0.209
Practices					
Confirm fortified products using logo	54.4	84.2	13.149	3	0.004*

*p < 0.05 indicates statistically significant association.

In a research by Olugbenga *et al*. [2], 66.7 % of respondents had seen a fortified product and 78.6 % could identify one by its logo. In this study, only 29.4 % of women consuming fortified foods had heard about fortification, and 54.4 % could identify a fortified food using the logo on the packaging.

CONCLUSION:

This study revealed significant gaps in awareness of fortified foods among women, despite the mandatory food fortification program. This indicates that the benefits of fortification may not be fully reached

RECOMMENDATION:

Public health campaigns should be strengthened. Collaboration between government agencies, and food producers is essential.

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OEM34

Vitamins, Antinutrient and Sensory Attributes of Chin chin Made From Composite Flours of Wheat, Orange-fleshed sweet potatoes, and Soybean.

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Keywords: OFSP, Soybean, Nutritional composition, Sensory attributes

Highlights

- OFSP and Soybean blends increased Vitamin Composition of chinchin
- OFSP and Soybean blends increased the antinutrient composition of chinchin
- Composite chinchin retained acceptable sensory qualities at moderate levels of substitution.

BACKGROUND AND OBJECTIVES:

Chinchin is a popular deep-fried snack widely consumed in West Africa, particularly in Nigeria (1). Many people depend on staple foods such as wheat flour, which can result in diets that are high in calories but low in essential nutrients (2). This contributes to widespread Vitamin A deficiency and protein- energy malnutrition. This study assessed the Vitamin, antinutrient, and sensory attributes of chinchin made from composite flours of wheat, orange-flesh sweet potato, and soybean.

MATERIALS AND METHOD:

An experimental design was used for this study where five (5) different formulations (CPR1-CPR5) were prepared with different proportions of wheat, soybean, and OFSP composite flours with the following formulations CPR 1: (Wheat flour 20% soybean 20% OFSP 60%) CPR 2: (wheat 20% soybean 60% OFSP 20%) CPR 3: (wheat 20% soybean 40% OFSP 40%) CPR4: (wheat 0% soybean 50% OFSP 50%) CPR5: (Wheat flour 100%, soybean 0%, OFSP 0%) which served as a control. Analysis was conducted using IBM SPSS version 27.0, and Duncan Multiple Range Test (DMRT) method was used to compare the means of experimental data.

RESULTS AND DISCUSSION:

Table 1: Vitamin composition of chinchin made from wheat, soybean, and OFSP flour.

Sample	Vitamin B1 (mg/100g)	VitaminB2 (mg/100g)	VitaminB3 (mg/100g)	VitaminE (mg/100g)	Carotenoid (µg/100g)
C1	$0.32^{b} \pm 0.02$	$0.22^{b} \pm 0.02$	$1.93^{d} \pm 0.01$	$1.19^{c} \pm 0.02$	$4820.07^{a} \pm 0.01$
C2	$0.32^{b} \pm 0.02$	$0.19^{b} \pm 0.02$	$2.07^{b} \pm 0.02$	$1.21^{c} \pm 0.03$	$1640.31^{d} \pm 0.02$
C3	$0.34^{b} \pm 0.02$	$0.21^{b} \pm 0.01$	$1.97^{c} \pm 0.02$	$1.54^{b} \pm 0.02$	$3230.17^{c} \pm 0.01$
C4	$0.37^{a} \pm 0.02$	$0.27^{a} \pm 0.02$	$2.43^{a} \pm 0.01$	$1.88^{a} \pm 0.02$	$4035.23^{b} \pm 0.03$
C5	$0.23^{c} \pm 0.02$	$0.12^{c} \pm 0.01$	$1.36^{e} \pm 0.02$	$1.13^{d} \pm 0.02$	$50.03^{e} \pm 0.02$

Values are mean ± standard deviation of samples.

[a-e] Means with similar superscripts within the same column are not significantly different ($p>0.05$).

The result of the study indicated that sample C4 (wheat 0% soybean 50% OFSP 50%) had the highest content of Vitamin B1, B2, B3 and Vit E. The carotenoid content was highest (4820.07ug/100g) in the sample in C1 (Wheat flour 20% soybean 20% OFSP 60%). The control (C5) which does not contain OFSP contained the lowest carotenoid and vitamin levels. This showed the results are directly linked to the proportion of OFSP in the product. The inclusion of OFSP significantly enhanced pro-vitamin A content of the chinchin.

Table 2: Antinutrients of chinchin made from wheat, soybean, and OFSP flour.

Sample Safe limits	Oxalate (mg/100g) 3 mg/100g	Phytate (mg/100g)6 3 mg/100g	Tannins (mg/100g) 2 - 3 mg/100g
C1	$0.15^{b} \pm 0.01$	$0.24^{d} \pm 0.02$	$1.32^{b} \pm 0.01$
C2	$0.28^{a} \pm 0.01$	$0.47^{a} \pm 0.02$	$1.77^{ab} \pm 0.04$
C3	$0.23^{a} \pm 0.03$	$0.33^{c} \pm 0.03$	$1.53^{b} \pm 0.03$
C4	$0.24^{a} \pm 0.03$	$0.41^{b} \pm 0.02$	$2.01^{a} \pm 0.56$
C5	$0.14^{b} \pm 0.05$	$0.27^{d} \pm 0.03$	$1.44^{b} \pm 0.03$

Values are mean ± standard deviation of samples. [a-c]Means with similar superscripts within the same column are not significantly different ($p>0.05$).

All formulated samples showed an increase in oxalate and phytate content compared to the control. However, these values remained within the acceptable dietary limits, suggesting no adverse nutritional implications for consumers.

While tannin content of the composite chin-chin flour ranged from 1.32 to 2.01mg/100g. There was no significant $p>0.05$ difference between samples C1, C2 and C3 and C5. Even though the tannin content increased in the formulated samples, only Sample C4 exceeded the permissible limit. Elevated tannin levels may interfere with protein and mineral absorption, and thus, the formulation of C4 may require adjustment to optimize nutritional quality.

CONCLUSION

This study explored the vitamin, Antinutrient and sensory attributes of chinchin made from composite flours of wheat, soybean, and OFSP. Chinchin made from this composite flours demonstrates increased vitamin and anti nutrient content. However, the antinutrient levels generally remain within acceptable limits except tannins content of Sample C4.

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OEM36 Fish Consumption Patterns and Dietary Diversity Among Women of Reproductive Age (WRA) and Their Infants and Young Children (IYC) in Delta State, Nigeria.

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Keywords: Fish consumption pattern, Dietary diversity, Women of Reproductive Age, Infants and Young Children.

Highlights

• The fish species most commonly consumed were predominantly wild-caught or imported.

• Over 90% and 61% WRA and IYC, respectively met the minimum dietary diversity score.

*More WRA consumed fish than other animal sourced proteins (meat, egg & milk) , while 70% and 75% of IYC consumed fish and milk, respectively compared to egg (25%) and meat (36%).

BACKGROUND AND OBJECTIVES:

Malnutrition contributes significantly to maternal and child mortality, with Women of Reproductive Age (WRA) and Infants and Young Children (IYC) particularly vulnerable to poor diets and micronutrient deficiencies. Fish, a nutrient-rich and affordable protein, can improve their nutrition, yet

data on its consumption in Nigeria and Delta State particularly are scarce. This study assessed the types, frequency, and forms of processed fish consumed, and dietary diversity among WRA and IYC, to inform nutrition-sensitive interventions.

MATERIALS AND METHODS:

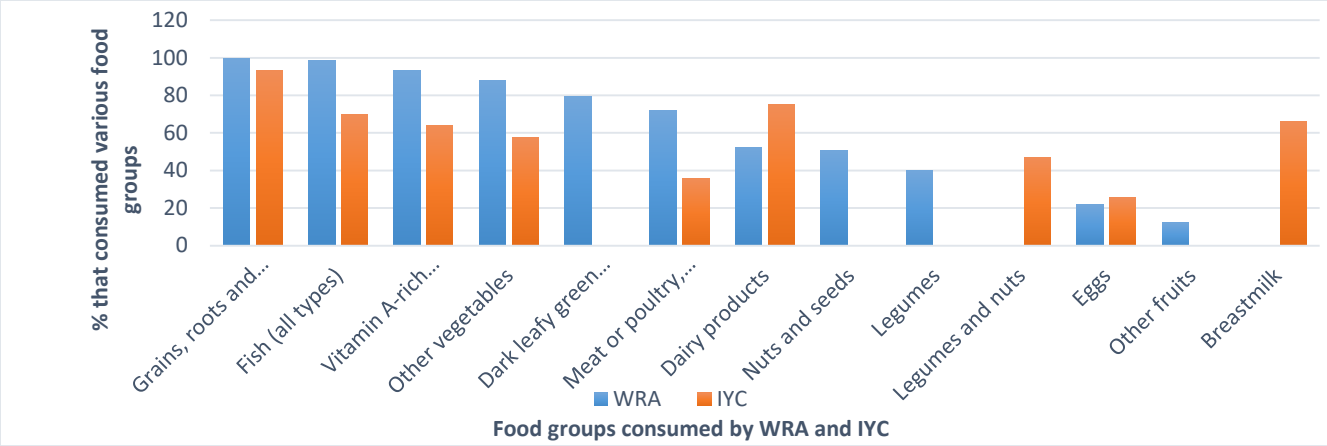
A descriptive cross-sectional survey was conducted among 300 WRA with infants aged 6–23 months in twelve purposively selected LGAs representing geographic and socio-economic diversity. In each LGA, the main immunization health facility served as the data collection site, and convenience sampling identified eligible mother–child pairs. Data on fish consumption patterns and 24-hour dietary diversity were collected and analyzed in SPSS version 21 using descriptive statistics.

RESULTS AND DISCUSSION:

Table 1**:** Most commonly consumed fish species, main forms, and frequency among WRA and IYC in Delta State, Nigeria

Fish species	% WRA consuming	WRA most common form	IYC most common form	Main frequency (WRA)
Crayfish (Procambarus clarkia)	98.7	Dried	Powdered	>3×/week
Stockfish* (Merluccius capensis, Merluccius merluccius)	94.6	Dried, Smoked	Fillet, Boiled & Mashed	>3×/week
Catfish (Clarias gariepinus)	91.6	Fresh, Dried	Fillet, Boiled & Mashed	>3×/week
Sardine (Sardinella fimbriata)	84.2	Fresh, Canned, Smoked	Fillet, Boiled & Mashed	<2×/week
Prawn/Shrimp (Macrobrachium spp, Farfantepenaeus aztecus)	83.8	Fresh, Dried	Powdered, Fillet, Boiled & Mashed	>3×/week
Atlantic & Horse mackerel (Scombia scombrus, Trachurus trachurus)	83.7	Smoked, Fresh	Fillet, Boiled & Mashed	>3×/week
Bonga (Ethmalosa fimbriata)	77.5	Dried	Fillet, Boiled & Mashed, Powdered	>3×/week
Clupeids (Clupea harengus)	45.1	Dried	Fillet, Flaked	<2×/week
Tongue sole (Cynoglossus senegalensis)	44.6	Dried	Fillet, Boiled & Mashed	<2×/week
Tilapia (Oreochromis niloticus)	43.3	Dried, Fresh	Boiled & Mashed	<2×/week
Shine nose (Galeoides decadactylus)	35	Fresh, Dried	Fillet, Boiled & Mashed	<2×/week
Others (croaker, coverpot, etc.)	20	Fresh, Dried	Fillet, Boiled & Mashed	<2×/week

1. *Species ranking for IYC was similar to WRA but with slightly lower percentages.*
2. *IYC forms are based on mothers' reports of preparation and serving methods.*
3. *Stockfish includes head, body, and Panla (Atlantic cod).*



Number of food groups appears higher as fish was separated from other animal-source foods

FIG. 1: Twenty-four-hour dietary recall of different food groups consumed by WRA and IYC

The findings indicate most widely consumed species—such as crayfish, stockfish, catfish, prawn/shrimp, Atlantic & horse mackerel, and bonga—are mainly locally captured or imported, showing dependence on market supply rather than aquaculture. While this ensures access to nutrient-rich fish, it raises sustainability and food security concerns. Less consumed but nutrient-dense species like clupeids, tilapia, tongue sole, and shine nose present opportunities for dietary improvement. High fish consumption among WRA and IYC highlights its importance in household diets and its contribution to improving dietary diversity in starch-based diets.

CONCLUSION AND RECOMMENDATION: Fish remains central to dietary diversity but some nutrient-dense species are less consumed. Nutrition education and market incentives could encourage the uptake of nutrient-rich, less common species, improving dietary diversity for both WRA and IYC. Aquaculture should be promoted to diversify supply and reduce dependence on wild-caught and imported fish.

OEM37 Nutrient and Phytochemical Compositions of Pterocarpus mildbreadii and Basella alba Leaf Extracts and their Therapeutic Potentials on Liver Function and Hematological Indices of Anaemia Induced Rats.

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Keywords: Anaemia, Pterocarpus mildbraedii, Basella alba, Leaf extract, therapeutic potentials.

Highlights:

- The aqueous extracts of the pterocarpus mildbraedii and Basella alba leaf are good sources of protein, carbohydrate, iron, vitamins and bioactive compounds.
- The leaves extract increases the red blood cell and haemoglobin level of the anaemic rats; it is considered a blood booster and treatment for anaemia.
- The leaves extract improves liver function of the rats.

Background and Objective: Both Pterocarpus mildbraedii and Basella alba are widely consumed as leafy vegetables in soups in various parts of Nigeria and are used in traditional medicine for the treatment of various ailments. Both leafy vegetables are good sources of both macro and micronutrients as well as bioactive compounds. The pterocarpus mildbraedii and Basella alba therapeutic potentials are considered an underutilized resource. Hence, this study determined the nutrient and phytochemical compositions of Pterocarpus mildbreadii and Basella alba leaf extracts and their therapeutic potentials on liver function and hematological indices of anaemia induced rats.

Methods: The study employed an experimental design. Both Pterocarpus mildbraedii and Basella alba leaves were procured from a local market in Nsukka, identified in the department of plant science and botany in the University of Nigeria Nsukka, the leaves were sorted, cleaned and processed into aqueous extracts of the leaves separately using standard method. The leaf extracts of both samples were analyzed separately for each sample on proximate composition, selected micronutrients, phytochemicals and anti-nutrients using standard methods. Animal study: The acute toxicity of the leaves and lethal dose were done on mice using standard methods. Thirty adult male rats weighing 126g-152g, procured from the department of Veterinary medicine and randomized into 6 groups (A-F) of 5 rats each with similar body weight in each group. Two control groups (anaemic untreated and anaemic treated with standard drugs) and four experimental groups (Anaemic treated with 100mg and 300mg of the two extracts P. mildbreadii and B..alba leaf extracts each respectively) Anaemia was induced by bleeding of 5ml of blood from each of the animal at an interval of three times for (2) two days, and treatment started immediately anaemia was established with the administration of aqueous P. mildbreadii and B. alba leaf extracts was given at a dose of 100 mg/kg and 300 mg/kg respectively for the four experimental group and standard drug referon 12 (SD-R12) used on one of the control group with the. Treatments were done

orally with an intra-gastric tube for 15 days. The activities of alanine aminotransferase (ALT), aspartate aminotransferase (AST), and alkaline phosphatase (ALP), as well as the levels of packed cell volume (PCV), haemoglobin (Hb), red blood cell (RBC) and white blood cell (WBC) were collected at baseline and endline using standard methods. Data obtained were subjected to statistical analysis using Statistical Product and Service Solution (SPSS) version 23.0. They were analyzed using analysis of variance (ANOVA) for separation of mean and T-test used to test the effect of treatment at 5% probability level ($p \leq 0.05$).

Results and Discussion: The protein content of the leaves extract was 14.7% and 16.3%; carbohydrate 55.3% and 51.0% and Ash 3.2% and 3.2% for Pterocarpus mildbreadii and Basella alba, respectively. The iron content of the leaves extract was 5.24 mg/100g (P. mildbreadii) and 4.70 mg/100g (B. alba). The vitamin C content of P. mildbreadii extract was 3.38 mg/100g, while that of B. alba was 3.54 mg/100g. Vitamins B2, B6, and B12 contents were 0.09, 0.56, and 1.84 mg/100g, respectively in P. mildbreadii extract; and 0.18, 0.78 and 2.43 mg/100g, respectively, in B. alba extract. The contents of folate and vitamin K were 0.26 and 0.06 mg/100g, respectively in P. mildbreadii extract; and 1.07 and 0.87 mg/100g, respectively, in B. alba extract. Pterocarpus mildbraedii being particularly rich in minerals and Basella alba known for its high vitamin content [1]. Flavonoids, terpenoids and alkaloids contents were 6.40, 1.15 and 4.52 mg/100g, respectively, in P. mildbreadii extract; and 2.65, 1.26 and 3.86 mg/100g, respectively, in B. alba extract. All the rat groups treated with the leaf extracts in the dose of 300 mg/kg showed a comparable increase in Hb value between baseline and endline study to the group treated with standard drug. However, there was significant difference ($p < 0.01$) between baseline (10.04 g/dL) and end-line (14.24 g/dL) Hb levels after treatment with aqueous extract of P. mildbreadii leaves at 300 mg/kg body weight, with 41.83% increase. In this study the aqueous extract of P. mildbraedii used for treatment of anaemic rats was seen in the study carried out by Harrison et al [2] in that study extract of P. mildbraedii, significantly increased white blood cell count when administered on rats. The ability of the leaves extract of P. mildbraedii to boost white blood cells is as result of the presence of iron, and white blood boosting minerals it contains. This helps protect the body against infections [1]. The liver function test showed that there was significant difference ($p<0.05$) between the baseline and endline on AST and ALT levels of rats treated with aqueous extracts of P. mildbreadii leaves at 100 and 300 mg/kg body weight and B. alba leaf extract at 300mg/kg and standard drug-R12. Studies indicate that P. mildbraedii extracts can improve liver function by reducing liver enzyme levels

and improve liver regeneration. Similarly, B. alba extracts have demonstrated hepatoprotective effects, particularly in reducing liver enzyme levels (ALT & AST) in rats.

Conclusion and Recommendations: Both Pterocarpus mildbraedii and Basella alba leaf extracts have shown therapeutic potential in treating liver damage and anemia in animal models and it is dose dependent. Further research, particularly clinical trials, is warranted to explore their full therapeutic potency.

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OEM38 Therapeutic Effects of Soy Yogurt Drink Enriched with Tropical Fruits on Aspirin-Induced Gastric Ulcer in Rats.

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Keywords: Soy-yoghurt, Gastric ulcer, Antioxidant, Probiotics.

Highlights:

- Soy-yoghurt enriched with tropical fruits improved gastric pH, reduced lesion areas, and lowered serum triglycerides.
- The watermelon-enriched group showed the most pronounced improvements, indicating enhanced gastroprotective, renal, and hepatic benefits

Background and Objective:

Soy yoghurt, when enriched with tropical fruits, holds therapeutic potential due to its bioactive compounds, probiotics, and antioxidant properties, which may protect against aspirin-induced gastric ulceration in rats [1]. This study investigated the development of a soy-based yogurt drink enriched with

tropical fruits (banana, watermelon, and soursop) and its therapeutic effects on aspirin-induced gastric ulcers in rats.

Materials and Methods:

Soymilk was extracted, pasteurized, and fermented using *Lactobacillus acidophilus* and *Lactobacillus bulgaricus*. The resulting soy yogurt was blended with fruit juices in different ratios after which the proximate, physicochemical, and microbiological properties were evaluated using standard methods. Twenty male albino rats were randomly assigned into four groups and administered the various yogurt formulations after ulcer induction. Gastric pH, lesion area, and biochemical markers (ALT, AST, triglycerides, and urea) were measured post-intervention.

Result:

Fruit-enriched yogurts had higher moisture and carbohydrate content but reduced fat and protein compared to plain soy yogurt. The watermelon blend exhibited the highest acidity and lactic acid content. In ulcer-induced rats, all treatments improved gastric pH and reduced lesion areas. Biochemical analysis revealed slight reductions in ALT, AST, triglycerides, and urea across all groups, most notably in the watermelon group.

Table 1. Baseline and end-line of gastric pH and lesion area of gastric ulcer induced rats

Variable	100% Soy-yoghurt group	Soy yoghurt-banana group	Soy yoghurt-soursop group	Soy yoghurt-watermelon group
Gastric pH				
Baseline	$3.08^{b} \pm 0.05$	$3.10^{b} \pm 0.05$	$3.10^{b} \pm 0.05$	$3.40^{b} \pm 0.05$
Endline	$4.50^{a} \pm 0.05$	$3.80^{a} \pm 0.06$	$3.50^{a} \pm 0.05$	$4.00^{a} \pm 0.07$
Lesion area (mm^2)				
Baseline	$12.00^{a} \pm 1.5$	$10.00^{a} \pm 1.00$	$11.50^{a} \pm 0.70$	$9.00^{a} \pm 0.35$
Endline	$10.00^{b} \pm 1.5$	$8.00^{b} \pm 1.00$	$9.00^{b} \pm 1.20$	$7.00^{b} \pm 1.00$

Table 2. Baseline and end-line of serum levels triglycerides, AST, urea and ALT of gastric ulcer induced rats

Variable	100% Soy-yoghurt group	Soy yoghurt-banana group	Soy yoghurt-soursop group	Soy yoghurt-watermelon group
Triglyceride (mg/dl)				
Baseline	$115.0^{a} \pm 1.50$	$105.00^{a} \pm 1.00$	$110.00^{a} \pm 1.20$	$100.00^{a} \pm 5.00$
Endline	$110.0^{b} \pm 4.00$	$100.00^{b} \pm 3.00$	$105.00^{b} \pm 3.50$	$95.00^{b} \pm 3.00$
Urea (mg/dl)				
Baseline	$30.00^{a} \pm 0.00$	$28.00^{a} \pm 0.71$	$29.00^{a} \pm 0.71$	$160.00^{a} \pm 0.35$
Endline	$28.00^{b} \pm 1.50$	$26.00^{b} \pm 1.00$	$27.00^{b} \pm 1.20$	$155.00^{b} \pm 5.00$
ALT (U/L)				
Baseline	$40.00^{a} \pm 2.50$	$38.00^{a} \pm 2.00$	$39.00^{a} \pm 2.20$	$37.00^{a} \pm 1.50$
Endline	$38.00^{b} \pm 2.50$	$36.00^{b} \pm 2.00$	$37.00^{b} \pm 1.80$	$35.00^{b} \pm 1.50$
AST (U/L)				
Baseline	$46.00^{a} \pm 2.50$	$44.00^{a} \pm 2.00$	$43.00^{a} \pm 2.20$	$45.00^{a} \pm 1.50$
Endline	$42.00^{b} \pm 2.50$	$40.00^{b} \pm 2.00$	$41.00^{b} \pm 2.20$	$39.00^{b} \pm 1.50$

Conclusion:
Soy Yoghurt enriched with tropical fruits demonstrated protective effects against gastric ulcers in rats. These results support its potential as a functional and therapeutic food for managing gastrointestinal disorders.

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PEM26 Mental Well-being and Fruit and Vegetable Intake of Undergraduate Students.

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Keywords: Eating behaviours, Depression, Mental Health.

Highlights:

- One in three students do not consume either a fruit or a vegetable daily.
- One in four students has poor mental well-being.
- A positive and significant association existed between mental well-being scores and daily fruit and vegetable intake.

BACKGROUND AND OBJECTIVE

A lack of daily fruit and vegetable (F&V) intake contributes to micronutrient deficiencies and promotes poor mental health. Mental health issues in students are rising globally, and in Nigeria, it is estimated at 20 to 30%, which calls for urgent action. Studies conducted in other countries are providing evidence that supports a relationship between mental well-being and fruit and vegetable (F&V) intake [1]. In Nigeria, there seems to be no existing study on this relationship. To fill this gap, the present study assessed mental well-being and F&V intake of students attending tertiary institutions in Abia State.

Hypothesis: There is no relationship between mental well-being score and daily F&V intake.

MATERIALS AND METHODS

Data were collected by a cross-sectional survey. Multi-stage random sampling was used to select the undergraduate students from Abia State University, Umuahia Campus and Abia State Polytechnic Aba. A total of 271 students participated in the study. An interviewer-administered structured and validated questionnaire was used to collect data on socio-demographic characteristics. The WHO-Five Well-being Index (WHO-5) was used to determine their mental well-being scores. Scores 0 - 12 indicate poor mental well-being, while scores 13 - 25 indicate good mental well-being. Validated questions on the portions of F&V consumed daily were used to assess the students' daily F&V intake. Ethical approval was obtained from the Federal Medical Centre Umuahia, Abia State. Data was analysed using IBM SPSS version 27. Spearman's correlation was used to test for a relationship.

RESULTS AND DISCUSSION

The mean age of the students was 22 (SD 3); 50.9 % were females; 35.8 % do not consume either F or V daily; 25.1 % had poor mental well-being. A statistically significant positive relationship existed between mental well-being scores and daily F&V intake rho (269) = .24, P .000 (Table 1). The study supports that many students are not meeting the recommendation of at least five portions of F&V a day and are prone to micronutrient deficiencies as F&V are abundant in micronutrients. The study also supports that there is a high prevalence of mental health issues in Nigerian students. Students with poor mental well-being may suffer from poor academic performance, reproductive issues, substance abuse, and violence [1]. If no measures are taken to reduce the rising prevalence, disabilities and poverty may increase in Nigeria.

Table 1: Relationship between Mental Well-being Score and Daily F&V Intake

			Daily F&V Intake
Spearman's rho	Mental well-being score	Correlation Coefficient	.237**
		Sig. (2-tailed)	.000
		N	271

**. Correlation is significant at the 0.01 level (2-tailed).

CONCLUSION/RECOMMENDATIONS

Many undergraduate students are not consuming fruits and vegetables daily, which may predispose them to micronutrient deficiencies and poor mental well-being. Strategies that can enable them to change this behaviour are required. With the high prevalence of poor mental well-being seen in this study, mental well-being support services are recommended in Nigerian institutions.

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PEM27 A System-Based Approach to the control of micronutrient deficiencies among under-five children and women of reproductive age in Akpabuyo Local Government Area, Cross River State Nigeria.

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Key Words: 1. Strengthen nutrition – Sensitive health services and delivery systems.

2. Improve food fortification.

3. Foster multi – sector collaboration with monitoring for micronutrients.

Background: In Nigeria, micronutrient gaps in iron, vitamin, and iodine continue to undermine child and material health, despite existing fortification and supplementation efforts. Rural communities such as Akpabuyo L.G.A remain disproportionately affected, with limited dietary diversity and high anaemia rates among under-five children and women at reproductive age.

Objective: Evaluate the impact of a system-based, multi-sectoral intervention (health services, fortification, education, community engagement) on improving dietary diversify and reducing micronutrient deficiencies.

Methodology: A quasi-experimental pre-post design was used (Jan-Dec, 2024) in Akpabuyo L.G.A. the intervention included multiple micronutrient powders, fortified staples WHO-aligned nutrition education (25 food groups), and primary health outreach. Dietary diversity, aneamia (Hemocue), and anthropometry were assessed at baseline and endline.

Results Discussion and implications

Table 1 – Summary of Key Nutrition indicators

Indicator	Baseline (%)	Post-intervention (%)
Children meeting WHO MDD (≥5 food groups, 6-23 months).	31.5	48.2
Women meeting MDD-W (≥5 of 10 food groups).	22. 0	39.5
Aneamia prevalence (Children 6-59 months)		
Aneamia prevalence (Women 14-49yrs).	54.0	32.0
Stunting (Children ≤5yrs)	24.6	20.1

Discussion/Implications: Baseline data showed low dietary diversity, with fewer than 35% meeting WHO's ≥5 food groups. Post-intervention, compliance rose to over 70% among both children and women, alongside improvements in vitamin A and iron intake. Stunting, underweight, and anaemia prevalence declined significantly. These changes highlight the impact of integrated strategies nutrition education, fortified food distribution, and health service strengthening in addressing multiple micronutrient deficiencies. Scaling up this system-based approach can accelerate progress toward national nutrition targets, reduce child morbidity and mortality, and improve maternal health outcomes in similar low-resource settings.

Conclusion/Recommendation

A systems-based approach combining supplementation, food fortification, dietary diversification, and nutrition education effectively improved micronutrient status among vulnerable populations in Akpabuyo, underscoring the importance of sustained, multi-sectoral collaboration to eliminate deficiencies.

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PEM28 Micronutrient and amino acid profile of *Poga oleosa* Pierre (African Brazil nut) in Abo-Ogbagante, Boki Local Government Area, Cross River State, Nigeria.

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Keywords: *Poga oleosa* Pierre, Micronutrient, amino acid, deficiency.

Highlights:

- *Poga oleosa* Pierre constitute key concentrated bioavailable sources of micronutrients.
- The nut contains essential amino acids which help in the absorption and utilization of micronutrients.

BACKGROUND AND OBJECTIVES: The nutritional components in *Poga oleosa* Pierre serves to address some public health issues related to micronutrient deficiency in developing regions like Nigeria. Therefore, the study evaluates the micronutrient and amino acid profile of *Poga oleosa* Pierre.

MATERIALS AND METHOD: *Poga oleosa* nuts were collected from the rain forest zones of Abo-Ogbagante in Boki LGA of Cross River State, Nigeria. They were sundried, cracked and the seeds cleaned, ground and packaged for analysis. All analysis were conducted using standard methods. Data obtained from the analysis were expressed as standard error of mean (SEM) with statistical package for social science (SPSS) Version 21 software.

RESULTS AND DISCUSSION:

Table1: Fat soluble vitamins and vitamin C content of *Poga oleosa* Pierre (mg/100g) edible portion

Parameters	Mean ± SEM
Vitamin A	18.05±0.02
D	5.92±0.02
E	22.0±0.07
B-carotene	18.09±0.08
Vitamin C	4.09±0.07

Values are expressed as Mean ±SEM

The result in table 1. showed that *Poga oleosa* Pierre have the highest amount of vitamin E and appreciable amounts of other fat-soluble vitamins and vitamin C.

In a research conducted by Vankatachalam (2006), it was revealed that the amount of tocopherol in hazel nut and walnuts (15.03±0.39mg/100g and 1.08 mg/100g) were low compared to ***Poga*** nuts (22.0±0.07mg/100g) edible portion.

Poga oleosa Pierre is a good source of vitamin C when compared with Macadamia nuts which constitute far lower levels (1.2mg/100g) (USDA, 2018).

CONCLUSION AND RECOMMENDATION(S):

Given the growing burden of micronutrient deficiencies- termed " hidden hunger". Inclusion of *Poga* nut into regular dietary practices will serve to offer a natural, sustainable, and culturally acceptable approach to improving nutritional status due to its nutrient-dense profile including significant levels of minerals, vitamins and such as (Mg, Ca, Fe, Zn and Ni; Vit A, D, E, C and β-carotene) along with essential amino acids (Lysine, leucine, valine, methionine, phenylalanine, threonine, histidine, isoleucine and tryptophan).

Policymakers and health practitioners should consider incorporating *Poga* nut into national nutrition programs such as nutrient composition table and maternal health initiatives to enhance micronutrient intake at the population level.

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PEM29

Proximate, Vitamins and Sensory Properties of Cakes Produced from Composite Flours of Orange Fleshed Sweet Potato, Wheat And Soy Bean.

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Keywords: **OFSP, Soybean flour, Nutritional composition; Sensory quality**

Highlights

- OFSP and soybean blends enhanced the proximate contents of the cakes.
- OFSP and soybean blends increased the vitamin composition of cakes.
- Composite cakes maintained sensory acceptability at moderate substitution levels.

BACKGROUND AND OBJECTİVES

Cake, a delectable sweet dessert typically baked, represents a convenient, ready-to-eat treat enjoyed across all socioeconomic classes and cultures, cherished by both adults and children alike [1]. Most people rely on staple foods like wheat flour. This can lead to diets that are high in calories but low in essential nutrients, contributing to widespread vitamin A deficiency and Protein Energy Malnutrition. This study assessed the nutrient, vitamin and sensory attributes of cake produced with wheat, orange flesh sweet potato and soybean flour.

MATERIALS AND METHODS

An Experimental design was used to determine the proximate, vitamin composition and sensory attributes. Five formulations (SWC1–SWC5) were prepared with varying proportions of OFSPP, Soybean, and Wheat flour with the following formulation Sample C1 : (Wheat Flour 20% Soybean 20% OFSP 60%), Sample C2: (Wheat Flour 20% Soybean 60% OFSP 20%), Sample C3: (Wheat Flour 20% Soybean 40% OFSP 40%), Sample C4: (Wheat Flour 0% Soybean 50% OFSP 50%), Sample C5: (Wheat Flour 100% Soybean 0% OFSP 0%) served as control. Analysis was conducted using IBM SPSS version 30.0. and Duncan Multiple Range Test (DMRT) method was used to compare the means of experimental data.

RESULTS AND DISCUSSION

TABLE 1: PROXIMATE ATTRIBUTES OF CAKE MADE FROM WHEAT, OFSP FLOUR AND SOY BEAN

Sample	Moisture content (%)	Crude Protein (%)	Fat (%)	Crude fiber (%)	Ash (%)	Carbohydrate (%)	Energy Value (kcal)
C1	$16.73^{c} \pm 0.02$	$13.33^{d} \pm 0.02$	$17.55^{c} \pm 0.03$	$2.57^{d} \pm 0.02$	$2.36^{c} \pm 0.02$	$47.47^{a} \pm 0.03$	$401.12^{bc} \pm 0.18$
C2	$12.87^{e} \pm 0.02$	$25.65^{a} \pm 0.02$	$13.83^{e} \pm 0.03$	$4.05^{b} \pm 0.02$	$3.63^{a} \pm 0.03$	$39.97^{c} \pm 0.02$	$386.98^{bc} \pm 0.23$
C3	$14.82^{d} \pm 0.02$	$19.47^{c} \pm 0.02$	$15.71^{d} \pm 0.02$	$3.33^{c} \pm 0.03$	$2.97^{b} \pm 0.01$	$43.69^{b} \pm 0.02$	$406.94^{b} \pm 22.18$
C4	$17.52^{b} \pm 0.03$	$23.72^{b} \pm 0.02$	$18.37^{b} \pm 0.02$	$4.11^{a} \pm 0.02$	$3.65^{a} \pm 0.02$	$32.62^{e} \pm 0.02$	$380.72^{bc} \pm 17.43$
C5	$20.33^{a} \pm 0.02$	$13.25^{e} \pm 0.03$	$25.11^{a} \pm 0.59$	$1.22^{e} \pm 0.02$	$1.08^{d} \pm 0.03$	$39.35^{d} \pm 0.02$	$433.36^{a} \pm 0.13$

Values are mean ± standard deviation of samples.

[a-e] Means with similar superscripts within the same column are not significantly different (p>0.05)

Protein content varied significantly ($p < 0.05$), with C2 showing the highest value (25.65%) and C5 the lowest (13.25%) which is consistent with [2] where protein content of all the composite cake samples was significantly higher than the control. Moisture and fat was lower in the formulated samples showing that the product would have a longer shelf life and reduce risk of rancidity but crude fiber, ash and energy was higher in all the formulated samples than the control making the cakes more nutrient dense.

TABLE 2: VITAMIN COMPOSITION OF CAKE MADE FROM WHEAT, OFSP FLOUR AND SOY BEAN

Sample	Vitamin B1 (mg/100g)	VitaminB2 (mg/100g)	VitaminB3 (mg/100g)	VitaminE (mg/100g)	Carotenoid (µg/100g)
C1	$0.84^{d} \pm 0.01$	$0.12^{d} \pm 0.01$	$0.87^{a} \pm 0.02$	$1.87^{d} \pm 0.02$	$5378.07^{a} \pm 0.02$
C2	$1.23^{b} \pm 0.01$	$0.22^{a} \pm 0.02$	$0.86^{a} \pm 0.58$	$4.27^{a} \pm 0.02$	$1854.03^{d} \pm 0.01$
C3	$1.01^{c} \pm 0.01$	$0.15^{c} \pm 0.02$	$1.04^{a} \pm 0.02$	$3.12^{c} \pm 0.02$	$3616.07^{c} \pm 0.02$
C4	$1.28^{a} \pm 0.02$	$0.18^{b} \pm 0.01$	$1.22^{a} \pm 0.02$	$3.84^{b} \pm 0.02$	$4515.07^{b} \pm 0.02$
C5	$0.17^{e} \pm 0.01$	$0.13^{cd} \pm 0.02$	$1.09^{a} \pm 0.00$	$1.17^{e} \pm 0.01$	$100.25^{e} \pm 0.01$

Values are mean ± standard deviation of samples.

[a-e] Means with similar superscripts within the same column are not significantly different (p>0.05)

The carotenoid content was higher in the formulated samples, with C1 recording the highest concentration (5378.07 µg/100g), and the control (C5), devoid of OFSP, contained the lowest carotenoid level (100.25 µg/100g) showing these results are directly linked to the proportion of OFSP, a rich source of β-carotene which was consistent with [3], where the vitamin A (µg RAE) content of OFSP flour was 1989.8µg RAE/100 g. B1. B2, B3, E content was higher in the formulated sample than in the control

CONCLUSION

This study explored the proximate, vitamin and sensory attributes of Cakes produced from the composite flour of wheat, soya bean, and OFSP. The addition of soya bean flour decreased the moisture and the fat content but increased the crude protein, crude fiber, Ash, Carbohydrate, energy values as well as the vitamins content of the samples, making the products a more valuable source of nutrients, for populations at risk of protein-energy deficiency. The incorporation of OFSP flour significantly enriched the cake with beta-carotene, a precursor of vitamin A, which is crucial for vision, immune function, overall health and combating vitamin A deficiency.

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PEM30 Formulation, Production and Proximate Composition of Maize-Based Breakfast Cereals, using Lesser-known Legumes

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Background

A healthy and adequate diet in the current economic climate has become increasingly difficult (FAO et al., 2022). Consumers in rural areas rely mainly on a cereal-based diet to fulfil their energy needs, resulting in an inadequate intake of macro- and micronutrients. The consumption of nutrient-poor cereal-based diets has further contributed to malnutrition (PEM) in Nigeria (Makumba et al., 2016). Pigeon pea is one of the most important legumes produced in the tropics after common beans, chickpeas, field peas, cowpeas, and lentils. Currently, pigeon pea flour is used in various food products because of its protein, gluten-free status, low glycemic index and high antioxidant levels (Makumba et al., 2016). Pigeon pea products combined with cereals can be used as a potential source of protein to alleviate malnutrition (Tan et al., 2020).

Materials and methods

Maize, Soybeans, Pigeon Pea and Bambara groundnut were obtained from the seed unit, NCRI Badeggi, Niger State. Five (5kg) each were cleaned manually of all foreign materials and divided into two parts. The legume was soaked in cold water for 24 hours to germinate, after which the water was drained off and the seeds was dried until a constant weight was obtained. After that, it was milled and packaged until needed for use (Aliyu et al., 2021). Seven samples were formulated: EB1, EB2, EB3, EB4, EB5, EB6, & EB7. Moisture, Ash, Protein, Fat, Fibre, Carbohydrate and Energy value were determined using AOAC (2021). Data were analyzed using ANOVA at $p < 0.05$.

Result and discussion

As shown in Table 1 below, the proximate composition of formulated (pigeon pea) breakfast cereals showed considerable differences in most variables. The highest moisture content ($p<0.05$) was between samples. For crude fat ($p<0.05$), EB2 (6.30^{a}) was highest and much over than EB1 (4.58^{b}), EB3 (4.57^{b}), EB5 (5.36^{ab}), EB7 (4.33^{bc}), EB6 (3.29^{cd}), and EB4 (2.30^{d}). EB2 (23.45^{a}) for crude protein ($p<0.05$) was much greater than all other samples. Crude fibre ($p<0.05$) was highest in EB1 (2.73^{a}), significantly

greater than EB2 (1.62^{b}) and EB4 (1.62^{b}). Carbohydrate levels ($p<0.05$) were highest in EB4 (70.9^{a}), considerably greater than EB2 (63.8^{c}). Energy values ($p<0.05$) showed EB2 (405.7^{a}) with the highest caloric content, significantly greater than other samples except EB1 (395.3^{ab}). These results reveal that different techniques of preparation substantially changed the nutritional profile, with toasted soya (EB2) giving superior protein and energy levels ($p<0.05$), while raw pigeon pea (EB4) offered greater carbohydrates ($p<0.05$).

Table 4.1: Proximate composition of formulated maize-based breakfast cereals

Samples	Moisture (%)	Ash (%)	Crude fat (%)	Crude protein (%)	Crude fibre (%)	Carbohydrate (%)	Energy value (kcal/kg)
EB1	4.52b	1.47	4.58b	20.36b	2.73a	67.7b	395.3ab
EB2	4.40b	0.44	6.30a	23.45a	1.62b	63.8c	405.7a
EB3	4.44b	0.71	4.57b	20.22b	2.33a	67.7b	392.9b
EB4	2.60c	0.99	2.30d	21.03b	1.62b	70.9a	388.3bc
EB5	5.62a	0.84	5.36ab	16.25d	2.37a	69.6ab	391.5b
EB6	6.34a	0.80	3.29cd	17.47c	2.15ab	69.9ab	379.3c
EB7	5.62a	0.77	4.33bc	18.36c	2.23ab	68.7ab	387.1bc
P - value	0.000	0.097	0.000	0.000	0.003	0.001	0.001
SEM	0.058	0.071	0.075	0.068	0.047	0.210	0.790

EB1- extruded breakfast cereal using raw soya, EB2- extruded breakfast cereal using toasted soya, EB3- extruded breakfast cereal using germinated soya, EB4- extruded breakfast cereal using raw pigeon pea, EB5- extruded breakfast cereal using toasted pigeon pea, EB6- extruded breakfast cereal using germinated pigeon pea, EB7- extruded breakfast cereal using germinated and toasted pigeon pea, SEM- standard error of mean

Conclusion and Recommendation(s): The study produced maize-based breakfast cereal; toasted samples (EB2, EB5) were richer in protein and energy, while raw and germinated samples (EB4, EB6) provided higher fibre and carbohydrates. Hence, either pigeon peas can be used in place of soybean.

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PEM33 Consumer Knowledge, Attitude and Pork Consumption Pattern of Adults in Umuahia, Abia State.

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Keywords: **Pork, Consumption patterns, Proliferation, pork joints,**

Highlights

- Umuahia has witnessed a notable rise in the number of pork joints, reflecting a dynamic shift in the local food landscape.
- Despite the growing availability of pork joints, adult consumption rates remain moderate, suggesting that accessibility does not directly translate to increased intake.

BACKGROUND AND OBJECTİVES

Pork is recognized as a rich source of high-quality protein, essential for muscle development and tissue repair and also provides vital micronutrients which play key roles in metabolic processes and immune system support. In recent years, Umuahia, the capital of Abia State, has experienced a noticeable increase in pork consumption, contributing to the rapid proliferation of pork-selling joints across the city. However, despite the visible expansion of pork joints, there remains a lack of empirical data on the consumption patterns of pork among adult residents. This study aims to investigate the frequency of pork consumption in Umuahia and the underlying factors driving the emergence and growth of the business.

MATERIALS AND METHODS

A cross-sectional descriptive study design was employed and simple random sampling techniques was used to select 440 respondents. A validated, structured questionnaire was used to gather information. Data were analyzed using IBM SPSS Statistics version 30. Descriptive statistical tools used for interpretation included frequency distributions, percentages, and mean.

RESULTS AND DISCUSSION

TABLE 1: PORK CONSUMPTION PATTERN OF ADULTS

Variable	Frequency (F)	Percentage (%)
Frequency of pork consumption		
Rarely	241	54.8
Daily	63	14.4
2x weekly	63	14.4
Weekly	42	9.6
Never	30	6.8
Place Pork is Purchased		
Pork joints	205	46.6
Pork hawkers	93	21.2
Local market	81	18.5
Commercial pig farm	60	13.7
Total	**440**	**100.0**

Over half (54.8%) reported consuming pork only on rare occasions, while smaller (14.4%) proportions indicated daily or twice in a week consumption. This low regular intake aligns with previous study [1], which highlighted a prevailing household preference for beef over pork in Umuahia, influenced by health considerations and religious beliefs.

In terms of purchase preferences, pork joints (46.6%) were the most commonly patronized source. These findings are consistent with observations by [2] in Abakaliki, where urban consumers patronized structured retail outlets, and by [3] in Zaria, which reported similar consumer behaviour patterns.

TABLE 2: REASONS BEHIND THE PROLIFERATION OF PORK JOINTS

Number of pork joints in your locality last year		
1-3	362	82.2
4-6	72	16.4
More than 10	6	1.4
Total	**440**	**100.0**
1-3	12	2.7
More than 10	190	43.2
Total	**440**	**100.0**
Reasons behind the proliferation.		
Pork meat consumption is trending	370	84.2
Consumer demand and preference	27	6.2
Market demand	21	4.8
Highly profitable	18	4.1
Urbanization	3	0.7
Total	**440**	**100.0**

While 82.2% of the respondents reported having only 1–3 pork joints in their locality the previous year, current figures show a dramatic shift as 43.2% now report more than 10 pork joints, and 41.1% indicate between 7–10 pork joints. This significant growth underscores a rapid proliferation of pork outlets, likely fueled by increasing urbanization, shifting dietary preferences, and rising consumer demand.

CONCLUSION

Although the frequency of pork consumption remains moderate, the rapid rise in pork joints reflects a growing demand and changing urban dietary preferences. Given the findings and conclusion of these study, there is need to strengthen government oversight to regulate the proliferation of the pork joints. Targeted awareness campaign should be implemented to educate consumers on safe pork consumption practices and the risk of overconsumption.

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PEM35 Factors Associated with Preconceptual Micronutrient Supplementation Behaviour of Women of Reproductive Age in Selected Areas in Abia State.

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Keywords: Preconceptual, Micronutrient, Supplementation, Deficiencies

Highlights:

- High level of awareness about micronutrient supplementation exists among WRA in the study location
- Poor knowledge of micronutrient supplementation was negatively associated with intake of micronutrient supplements.
- Positive attitude towards supplementation was positively associated with micronutrient supplementation behaviour.

BACKGROUND AND OBJECTIVES

Women of Reproductive Age (WRA) are most vulnerable to micronutrient deficiencies [1] and when present, are known to impair health, pregnancy outcomes as well as the growth and development of the growing offspring [2]. The aim of this study was to determine the factors associated with preconceptual micronutrient supplementation (MNS) behaviour of WRA in selected areas of Abia State.

MATERIALS AND METHOD

This study was a cross sectional descriptive study of 567 WRA between ages (15-49) in Ikwuano and Aba North Local Government Areas of Abia State. The women were selected through a multistage probability sampling procedure. Data on their socio demographic characteristics, knowledge, attitude and intake of micronutrient supplements were obtained from only WRA that gave their consent, using an interviewer administered questionnaire. Data obtained were subjected to descriptive statistics and Pearson's and Point Biserial correlation analyses with significant association judged at $P<0.05$.

RESULT AND DISCUSSION

A total of 566 WRA were studied with many being single (63.3%), aged below 25 years (68.9%) and students (79.2%). Some (33.7%) of the respondents reported having at least one health condition in the past 6 months.

Knowledge and Attitude towards Micronutrient Supplements: This study revealed that although majority (83.4%) of the WRA were aware of MNS and had positive attitude (87.5%) towards it (mean±SD = 0.7±0.5), but their basic knowledge of micronutrients was generally low (mean±SD = 38.3%±19.6) with 57.1% having poor knowledge. This reflects a limited understanding of the health implications of micronutrient deficiencies and the general benefits of micronutrient supplementation, especially among younger age groups.

Intake of Micronutrient Supplements: Majority (80.7%) of the WRA reported that they take micronutrient supplements with 58.8% and 44.2% reportedly taking it in the past 6 months and within the study period respectively. MNS was found to be done mostly when lacking appetite (35.5%) and recovering from sickness (33.0%). Only 29.2% took micronutrient supplements after menstruation.

Factors associated with intake of micronutrient supplements

	Intake of micronutrient supplements		
Factors	General	In the past 6 months	Within the study period
Age (years)	.072	-.101*	-.065
Low education status (<Secondary)	.139**	-.010	-.127**
Being unemployed	-.017	.141**	-.058
Low income (<N30,000)	.228**	-.060	-.153**
Hospital /clinic as source of awareness	.420**	.051	.078
Number of health conditions in the past 6 months	.270**	.101	-.011
Knowledge of micronutrients and MNS	.368**	.100*	.030
Attitude towards MNS	.320**	.248**	.087

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

CONCLUSION AND RECOMMENDATION

Knowledge and attitude towards MNS were positively associated with intake of MNS among WRA in the study area. Targeted nutrition education and behaviour change interventions can therefore be an effective tool in increasing preconceptual intake of micronutrient supplements among WRA.

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PEM39

Evaluating the Impact of Pretreatment on the Micronutrient Profile of Bottled and Sterilized Tigernut Milk: Investigating its Potential to Alleviate Micronutrient Deficiencies.

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Background: The prevalence of veganism, awareness of animal welfare, the idea of lower environmental impact and improved health has created an opportunity for plant-based beverages to thrive. Given the global interest in food security, it is important to explore the nutritional potentials of some underutilized crops. Tigernut milk is one of the appreciated plant-based beverages, and a healthy source of nutrients with no alle rgy-causing components, yet they are highly underutilized. The potential of tigernut as a milk alternative that can mitigate micronutrient deficiencies in a growing population, particularly in vulnerable children and pregnant women could be a valuable resource in public health strategies aimed at reducing micronutrient deficiency. This study investigated the role of different pretreatment methods in enhancing the micronutrient composition of bottled and sterilized tigernut milk.

Materials and Methods: Two varieties of tigernut tuber (yellow and brown) were used, three pretreatment methods (boiling, soaking, and malting) were also used. The 26mm crown corks used from Pellconi Company Italy were used and sterilized was done. Vitamins and minerals were quantified with HPLC and AAS respectively.

Results: Table 1: Vitamin composition of fresh and sterilized tigernut milk

Pre-processing method	Variety	Post-packaging	Vitamin B_1 (mg/100 g)	Vitamin B_2 (mg/100 g)	Vitamin B_6 (mg/100 g)	Vitamin C (mg/100 g)
Malted	Yellow	Fresh	$1.54^{a}\pm0.02$	$13.19^{a}\pm0.30$	$25.95^{a}\pm0.28$	$34.16^{a}\pm1.10$
Malted	Yellow	Sterilized	$1.52^{a}\pm0.02$	$10.14^{c}\pm0.23$	$6.30^{e}\pm0.10$	$31.86^{a}\pm0.01$
Malted	Brown	Fresh	$1.54^{a}\pm0.02$	$13.18^{a}\pm0.22$	$23.19^{b}\pm0.025$	$34.92^{a}\pm1.10$
Malted	Brown	Sterilized	$1.52^{a}\pm0.02$	$12.39^{b}\pm0.28$	$6.34^{e}\pm0.00$	$27.52^{b}\pm0.00$
Soaked	Yellow	Fresh	$1.52^{a}\pm0.02$	$10.93^{c}\pm0.25$	$20.27^{c}\pm0.025$	$17.08^{d}\pm0.01$
Soaked	Yellow	Sterilized	$1.50^{a}\pm0.02$	$9.98^{d}\pm0.22$	$5.50^{f}\pm0.12$	$15.84^{e}\pm0.00$
Soaked	Brown	Fresh	$1.53^{a}\pm0.02$	$9.93^{d}\pm0.22$	$17.68^{d}\pm0.04$	$20.96^{c}\pm1.10$
Soaked	Brown	Sterilized	$1.50^{a}\pm0.02$	$9.91^{d}\pm0.27$	$6.11^{e}\pm0.00$	$15.04^{e}\pm0.00$
Boiled	Yellow	Fresh	$1.50^{a}\pm0.02$	$9.66^{d}\pm0.17$	$18.41^{d}\pm0.30$	$13.98^{f}\pm0.01$
Boiled	Yellow	Sterilized	$1.48^{b}\pm0.02$	$9.06^{e}\pm0.24$	$5.05^{f}\pm0.00$	$11.65^{g}\pm1.10$
Boiled	Brown	Fresh	$1.51^{a}\pm0.02$	$9.12^{e}\pm0.20$	$17.71^{d}\pm0.29$	$13.85^{f}\pm0.02$
Boiled	Brown	Sterilized	$1.48^{b}\pm0.02$	$9.12^{e}\pm0.21$	$4.85^{g}\pm0.02$	$12.21^{g}\pm1.10$

Malting enhanced the vitamins compared to soaking and boiling. Boiling and soaking decreased the riboflavin content of the samples. There were no significant differences ($p>0.05$) in the vitamin B_1 contents. Sterilization had more effect on the vitamin B_6 content; this could be attributed to auto-oxidation, which could lead to leaching of heat-liable nutrients.

Table 4.2: Mineral composition of fresh and sterilized tigernut milk

Pre-processing method	Variety	Post-packaging	Calcium (mg/100 g)	Magnesium (mg/100 g)	Iron (mg/100 g)	Sodium (mg/100 g)	Potassium (mg/100 g)	Copper (mg/100 g)
Malted	Yellow	Fresh	$78.90^{d}\pm0.08$	$71.86^{b}\pm0.04$	$0.76^{f}\pm0.00$	$212.50^{c}\pm7.07$	$136.25^{c}\pm1.77$	$14.43^{bcd}\pm0.81$
	Yellow	Sterilized	$79.07^{d}\pm0.07$	$47.82^{e}\pm0.25$	$0.70^{f}\pm0.09$	$136.25^{g}\pm5.30$	$103.75^{h}\pm1.77$	$17.28^{a}\pm1.61$
	Brown	Fresh	$78.61^{e}\pm0.12$	$71.59^{b}\pm0.00$	$1.26^{cd}\pm0.00$	$192.50^{e}\pm3.54$	$83.75^{i}\pm1.77$	$12.73^{d}\pm1.61$
	Brown	Sterilized	$39.84^{f}\pm0.11$	$48.50^{c}\pm0.56$	$1.21^{d}\pm0.08$	$190.00^{e}\pm3.54$	$118.75^{de}\pm1.77$	$13.29^{cd}\pm0.81$
Soaked	Yellow	Fresh	$38.70^{g}\pm0.06$	$46.87^{f}\pm0.03$	$0.94^{e}\pm0.07$	$215.00^{c}\pm3.53$	$111.25^{fg}\pm1.77$	$15.57^{abc}\pm0.81$
	Yellow	Sterilized	$39.76^{f}\pm0.00$	$48.23^{cde}\pm0.00$	$0.83^{ef}\pm0.09$	$107.50^{h}\pm3.53$	$116.25^{ef}\pm1.77$	$16.14^{ab}\pm1.60$
	Brown	Fresh	$39.66^{f}\pm0.17$	$72.32^{a}\pm0.09$	$1.27^{cd}\pm0.00$	$201.25^{d}\pm5.30$	$110.00^{g}\pm0.00$	$14.43^{bcd}\pm0.81$
	Brown	Sterilized	$39.77^{f}\pm0.00$	$48.27^{cd}\pm0.04$	$1.27^{cd}\pm0.00$	$133.75^{g}\pm1.77$	$77.50^{j}\pm3.53$	$15.57^{abc}\pm0.81$
Boiled	Yellow	Fresh	$80.04^{a}\pm0.01$	$48.56^{c}\pm0.02$	$1.61^{a}\pm0.09$	$257.50^{b}\pm3.54$	$131.25^{c}\pm1.77$	$17.84^{a}\pm0.80$
	Yellow	Sterilized	$79.45^{c}\pm0.04$	$48.17^{cde}\pm0.00$	$1.52^{b}\pm0.00$	$208.75^{cd}\pm1.77$	$123.75^{d}\pm1.77$	$16.14^{ab}\pm1.60$
	Brown	Fresh	$78.98^{d}\pm0.00$	$47.94^{de}\pm0.05$	$1.39^{bc}\pm0.00$	$160.00^{f}\pm3.53$	$220.00^{a}\pm3.54$	$6.48^{e}\pm0.80$
	Brown	Sterilized	$79.64^{b}\pm0.06$	$24.19^{g}\pm0.07$	$1.21^{d}\pm0.09$	$268.75^{a}\pm1.77$	$191.25^{b}\pm5.30$	$8.75^{e}\pm0.81$

The boiled brown variety had the least value for copper. Calcium, sodium and potassium are still the major constituents of tigernuts, the result recorded showed all samples were significantly different $p<0.05$.

Conclusion: The result showed that tigernut milk is rich in micronutrients which means that they are a good source of natural refreshment. sterilization had little effect on the mineral content of tigernut milk, although there was a decline on the calcium content of the malted brown. However, there was a significant increase on the potassium content. While malting enhanced the vitamin content, it was observed that sterilization had an obvious effect on the vitamin B_6 content of the milk.