NUTRITION SOCIETY OF NIGERIA

15th – 21st September, 2024

54TH SCIENTIFIC CONFERENCE & Annual General Meeting

Theme:

Navigating the Nutrition Frontiers:

Innovative and Alternative Strategies for Sustainable Development

CONFERENCE PROCEEDINGS:

Book of Extended Abstracts

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Book of Extended Abstracts

Profile of the Nutrition Society of Nigeria

The Nutrition Society of Nigeria is a professional, non-governmental association founded in 1963 at the University of Ibadan. Her membership cuts across various disciplines. These include, Nutrition, Agriculture, Biochemistry, Physiology, Medicine, Food Science and Technology, Social Sciences, Home Economics and Education.

Membership categories are as follows: Ordinary, Associate, Student, Fellow, Honorary and Corporate.

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a. To promote and foster the study of Nutrition in its widest sense
b. To provide a common forum for physiologists, biochemists, clinicians, agriculturists, food technologists, economists, public health workers, dietitians and any other group professionally qualified in disciplines related to nutrition to exchange information and ideas
c. To purse these objectives by meetings and publications and by cooperation with other organizations having similar aims
d. To serve as a professional body in Nutrition and food science that can offer authoritative advice when called upon to do so

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The Nutrition Society of Nigeria is an affiliate of the International Union of Nutritional Sciences (IUNS). She is in contact with other Nutritional Societies in the African Region through Federation of African Nutrition Society (FANUS). The Society also recognizes the importance of exchange of ideas with colleagues outside the region and therefore utilizes every opportunity for contact and networking with other Nutrition Societies outside the African region.

The society has linkage with:

A. Government Agencies
   - National Committee on Food and Nutrition (NCFN)
   - Relevant Ministries/ Agencies
B. Institutions of Higher Learning (Universities, Polytechnics, Colleges of Education/ Agriculture etc. especially Nutrition Training Institutions)
C. Societies e.g. NIFST, Home Economics Association, Nigerian, Nigerian Dietetics Association etc
D. Research Institutions
E. Food and Beverages Industries
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SUB-THEME A: NOVEL APPROACHES IN MONITORING AND EVALUATION OF NUTRITION PROJECTS

OA1

Prevalence of Marasmus and Kwashiorkor in Kano State: A Decade-Long Analysis and Management Strategies

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KEYWORDS: *Marasmus, Protein-Energy Undernutrition, Meal Frequency and Macronutrient Deficiency*

HIGHLIGHTS:
75% of reported cases of malnourished children were marasmus, 23% were kwashiorkor, and 2% were marasmic-kwashiorkor.

BACKGROUND AND OBJECTIVE
Child malnutrition has severely impacted public health, undermining the modest gains in child health and survival achieved over the past decades. Marasmus and Kwashiorkor are the two primary forms of protein-energy undernutrition affecting children in developing countries, contributing to nearly half of all deaths in children under the age of five. Kano State, one of the most populous states in Nigeria, has a high under-five population (20% of the total population) [1] and poor nutritional status [2]. Nutritional status of children in the state remain poor despite many efforts aimed at improvement such as the Dietary Diversity programme promoting healthy balanced diet - using locally available foods. This study investigates the predominant type of protein-energy undernutrition affecting under-five children in Kano State, aiming to develop effective management strategies.

MATERIAL AND METHODS
Purposive sampling was used to select two key healthcare facilities renowned for managing child malnutrition in the State: Murtala Muhammad Specialist Hospital and Hasiya Bayero Paediatric Hospital, which handle severe referral cases of child malnutrition. Child malnutrition records from these hospitals over a ten-year period (2009-2018) were analysed with Microsoft Excel 2010 software using frequency analysis statistical tool.

RESULTS AND DISCUSSION
Findings revealed that 75% of cases were marasmus, 23% were kwashiorkor, and 2% were marasmic-kwashiorkor. The majority of children suffer from overall macronutrient deficiency, primarily due to inadequate meal frequency linked to poverty, parental ignorance, and illness. Meal frequency, a major determinant of child under-nutrition, was found to be below WHO standards before and after weaning in the study area. Children are often under-fed before and after weaning, similar to adults and in some cases, are fed based on food availability rather than need [3].

CONCLUSION AND RECOMMENDATIONS
Inadequate meal frequency is a major cause of child malnutrition in Kano State and to address this issue, it is recommended that awareness campaigns target parents of under-five children, emphasizing the importance of adequate meal frequency based on the child's age and breastfeeding status. Parents must take responsibility for ensuring their children are adequately fed to meet their nutritional needs.

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OA2

Addressing Child Malnutrition in Kano State: The Critical Role of Spatial Scale in Effective Nutrition Management

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KEYWORDS: *Child malnutrition, Spatial scale, Nutrition management, Kano State, Community Management of Acute Malnutrition (CMAM)*

HIGHLIGHTS:
Localities with high reported cases of child malnutrition were masked to moderate or low at higher scales.

BACKGROUND AND OBJECTIVE
The Sustainable Development Goal (SDG) two (2) aims to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture by 2030. Good nutrition is essential for the well-being of people, especially children under five, as malnutrition significantly contributes to child morbidity and mortality. Developing countries, particularly in sub-Saharan Africa, bear a disproportionate burden of malnutrition. The ultimate goal is to eliminate all forms of malnutrition among children [1]. Kano State, one of the most populous states in Nigeria [2], faces significant challenges in child nutrition. According to the National Nutrition and Health Survey [3], the prevalence of underweight children in Kano is 26.9%, higher than the national estimate of 22.4%. This aligns with findings from the NNHS and NDHS of 2014 and 2015. Several programs, such as the Community Management of Acute Malnutrition (CMAM) and dietary diversity initiatives, have been implemented in Kano State to combat under-five malnutrition. The CMAM, the oldest and most extensive program, began in 2010 with two Local Government Areas (LGAs) which were expanded to six and later to 13 LGAs by June 2018. CMAMs are funded by UNICEF and the State Government. Despite these efforts, recent findings indicate that 46% of children in Kano State are stunted [3]. Child malnutrition threatens the lives of millions of children under five, who make up 20% of the state's population [4]. To save these children's lives and efficiently utilize scarce resources, effective management strategies for child malnutrition are imperative. The importance of spatial scale has been overlooked in CMAM, which focuses on political divisions using LGA and senatorial districts as the lowest levels of administration. This emphasis neglects detailed locality-level information, hindering interventions from reaching the populations in greatest need. [5] highlighted the substantial spatial heterogeneity of child malnutrition determinants in Nigeria, indicating that overlooking small-area spatial variations could exclude sub-populations and diminish intervention effectiveness.

MATERIALS AND METHOD:
Kano State malnutrition statistics was extracted from National Nutrition and Health Survey Report 2018 and result of analysis of health records (address and number of malnourished children) from 30 CMAMs across the

State from 2010-2018 was used.

RESULTS AND DISCUSSION:

An analysis of CMAM records revealed a clustered distribution pattern and a high number of malnourished children with variations in hotspots at different spatial scales. Localities with high reported cases were masked to moderate or low at higher scales. Thus, using LGA as the lowest scale fails to capture disparities at ward and locality levels.

CONCLUSION AND RECOMMENDATİON(S):

To address these issues, the government should consider the role of spatial scale in nutrition management to account for the spatial heterogeneity of child malnutrition in Kano State; ensuring interventions effectively target populations with the greatest need.

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SUB-THEME B: HARNESSING CULTURE AND TRADITIONS FOR NUTRITIONAL INNOVATION

OB1

Phytochemicals and Sensory Evaluation of Underutilised Vegetable Soups prepared with different cooking oil in South-western Nigeria

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KEYWORDS: *Vegetables, Phytochemicals, Soups, Taste*

HIGHLIGHTS:

Localities with high reported cases of child malnutrition were masked to moderate or low at higher scales.

BACKGROUND AND OBJECTIVE

Green leafy vegetables are generally rich in phytochemicals and antioxidants, consuming them in the diet has been demonstrated to reduce the risk of developing age-related, degenerative, and chronic illnesses [1]. The consumption of exotic vegetable consumption in urban African populations persists, despite the nutritional and food security benefits of underutilized indigenous leafy vegetables. This disparity may be attributed to low scientific knowledge and consumer understanding regarding the culinary and nutritional properties of underutilized vegetable species [2]. The study hereby assessed the phytochemical content and sensory attributes

of underutilized soups in south-western Nigeria.

MATERIALS AND METHOD

Ingredients used were purchased from Iwo local market, Osun State, Nigeria. The five selected vegetables (Iyanapaja, water leaf, gbagba, wild lettuce, and olowonjeja) were prepared with palm oil and shea butter in the kitchen facility of the department of Nutrition and Dietetics, Bowen University, Iwo. The ten dishes was prepared in duplicates and analysis was carried on fresh weight basis. Each soup was cooled to room temperature and homogenized before analysis. The samples were analyzed in the lab to determine the phytochemical contents (tannin, saponin, total alkaloid and flavonoid) [3]. Sensory evaluation was carried out by 20 panelists using 9-point hedonic scale. Data were presented using descriptive statistics, mean, and standard deviation.

RESULTS AND DISCUSSIONS

The appearance of food is known to affect consumers' interest in eating [4]. Wild lettuce (Launaea taraxacifolia) with shea butter, received the highest score for appearance (6±1.298), indicating it was the most visually appealing among the samples.

Table 1: Phytochemical contents of underutilized vegetables cooked with palm oil and shea butter

Samples	Tannin (mg/L)	Saponin (mg/L)	Total Alkaloid (g)	Flavonoid (g)
A	0.58□0.30	1.87□0.00	1.80□0.01	061□0.00
B	0.60□0.03	1.43□0.08	1.36□0.01	0.57□0.00
C	0.48□0.00	1.32□0.01	1.57□0.00	0.44□0.00
D	0.71□0.04	1.91□0.00	1.79□0.02	0.66□0.00
E	1.36□0.02	2.57□0.04	1.73□0.00	0.59□0.00
F	0.84□0.00	3.10□0.00	1.84□0.03	0.47□0.00
G	0.88□0.03	2.01□0.13	1.49□0.01	0.54□0.07
H	0.79□0.00	0.60□0.00	1.75□0.01	1.43□0.00
I	0.64□0.03	1.33□0.00	1.60□0.01	0.34□0.00
J	0.59□0.00	1.67□0.03	1.71□0.01	0.67□0.00

Sample A: Iyanapaja (Cnidoscolus aconitifolius) with palm oil, Sample B: Water leaf (Talinum triangulare) with palm oil, Sample C: Gbagba (Solanum macrocarpon) with palm oil, Sample D: Iyanapaja (Cnidoscolus aconitifolius) with sheabutter, Sample E: Water leaf (Talinum triangulare) with sheabutter, Sample F: Gbagba (Solanum macrocarpon) with Shea butter, Sample G: Wild lettuce (Launaea taraxacifolia) with palm oil, Sample H: Olowonjeja with palm oil, Sample I: Olowonjeja with sheabutter and Sample J: Wild lettuce (Launaea taraxacifolia) with sheabutter.

Phytochemicals in Africa leafy vegetables are known to provide the consumer with desirable health benefits beyond basic nutrition [5].

CONCLUSION AND RECOMMENDATIONS

The study showed that both palm oil and shea butter have distinct advantages in preserving various phytochemicals however, sheabutter appear to be a better cooking medium for iyanapaja (Cnidoscolus aconitifolius), water leaf (Talinum triangulare), gbagba (Solanum macrocarpon) and olowonjeja (Boerhavia diffusa) in order to maintain its phytochemical content. Further study should be conducted to ascertain the safety of shea butter for cooking and how it may affect other components of foods.

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PB2

The Acceptability of Lesser-known indigenous leafy Vegetables (*Colocasaiea esculenta* and *Ipomoea batatas L* leaves) in soups of households in South-East, Nigeria

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KEYWORDS: *Acceptability, Indigenous, Lesser-known, Leafy vegetable.*

BACKGROUND AND OBJECTIVE

The use of lesser-known vegetables is less sweet and more savory. Vegetables include other parts of the plant such as stem, roots, flower bud and leaves (1,2). Olugbenga et al., (3) opined that indigenous leafy vegetables are highly recommended because their consumption gives diversity to daily food intake by adding flavor and zest to the diet. Some indigenous vegetables are lesser-known (unpopular or not well known) while some are well known. The lesser-known vegetables also include cocoyam (colocasaiea esculenta) and sweet potato (ipomoea batatas L) leaves. The main objective of this study was to explore the acceptability of these lesser-known indigenous leafy vegetables in the soups of households in South East which contribute to a more diverse and sustainable food system. Also, identifying opportunities for fortifying meals with essential nutrients and ensuring that food safety practices are being followed.

MATERIALS AND METHODS:

Exactly 14 soup samples were made for the acceptability assessment. The total materials used for the 14 soups include: 6 cups of ground melon seeds, 2 cups of ground ogbono seeds, 6 cooked whole chicken, 30 medium sized dried fishes, 10 medium sized boiled stock fish, 2 kg boiled goat meat, 6 kg of boiled offal, 6 kg of beef, 3 kg of kanda, palm oil, 2 kg of palm fruits, ground crayfish, 14 medium sized onions, fermented locust bean for seasoning, 2 kg of cocoyam leaves, 2 kg of sweet potato leaves, 250 g of fluted pumpkin leaves, 250 g of waterleaf, 6 tablespoons of Achi, 6 tablespoons of offor, 2 kg of okro, fresh pepper and salt to taste. These soup ingredients were used to make 14 different soups and were coded as follows: chicken melon soup made with cocoyam leaf (MECLS); chicken melon soup with sweet potato leaf (MEPLS); Goat meat ogbono soup made with cocoyam leaf (OGCLS); Goat meat ogbono soup with sweet potato leaf (OGPLS); chicken banga soup (palm fruits) with cocoyam leaf (BGCLS); chicken banga soup with sweet potato leaf (BGPLS); chicken vegetable soup with cocoyam leaf (VECLS); chicken vegetable soup with sweet potato leaf (VEPLS); beef okro soup with cocoyam leaf (CLOKS); beef okro soup with sweet potato leaf (PLOKS); beef achi soup with cocoyam leaf (ACCLS); beef achi soup with sweet potato leaf (ACPLS); beef offor soup with cocoyam leaf (OFCLS) and beef offor soup with sweet potato leaf (OFPLS). The soup samples were presented for evaluation at room temperature. The soup samples were properly coded for 20 judges in clean containers. Each judge was given a bottle of water to rinse his or her mouth after tasting a soup sample to avoid interference with the taste of the preceding soup samples. The evaluation was conducted in the Home Economics departmental Foods and Nutrition laboratory of the faculty of Vocational and Technical Education, University of Nigeria, Nsukka.

RESULT:

The 14 soup samples were all rated very high in all the attributes such as taste, flavor, colour, appearance, texture and general acceptability. General acceptability means ($\bar{x}$) are as follows: MECLS (7.70), MEPLS (7.80), OGCLS (7.59), OGPLS (7.60), BGCLS (7.90), BGPLS (7.60), VECLS (7.90), VEPLS (7.95), CLOKS (7.60), PLOKS (7.70),

ACCLS (7.70), ACPLS (7.70), OFCLS (7.50) and OFPLS (7.80).

CONCLUSION AND RECOMMENDATION:
The study concluded that, cocoyam and sweet potato leaves could be of immense benefit if included in household meals. It was recommended among others that the consumption of cocoyam and sweet potato leaves should be encouraged by all families in the country because of their essential nutrients; Cocoyam and Sweet potato leaves should be sold in the open markets same way as the popular vegetables are sold.

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SUB-THEME C: ARTIFICIAL INTELLIGENCE FOR INNOVATIVE NUTRITION SOLUTIONS

OC1

Leveraging Artificial Intelligence and Machine Learning for Research in Nutrition

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KEYWORDS: *Artificial intelligence, machine learning, personalised nutrition, nutrition research.*

BACKGROUND AND OBJECTIVE
Artificial intelligence (AI) mimics human cognitive functions and decision-making processes using computers and machines (1). Its applications in nutrition and dietetics are emerging. Machine learning (ML) enables machines to learn from data and improve performance without explicit programming (2). AI and machine learning (ML) are used in nutrition to diagnose diseases, assess clinical outcomes, and develop innovative treatments (3). However, in Nigeria and Sub-Saharan Africa, the adoption of AI in medical practices, including nutrition, is hindered by insufficient training and socio-economic challenges such as unstable electricity and poor technological infrastructure (1). To overcome these barriers and align with global technological advancements, there is a need for concerted efforts to integrate AI into healthcare. This review aims to examine the applications of AI and ML in nutrition research, their impact on understanding dietary patterns and health outcomes, and to suggest future research directions and practical applications.

MATERIALS AND METHODS:
This review makes use of relevant articles published between 2010 and 2024, including peer-reviewed papers and conference proceedings, retrieved from Google, Google Scholar, PubMed, ResearchGate, Science Direct and Medline databases. A total of 280 articles were retrieved from the databases, with 50 from Google, 75 from Google Scholar, 40 from PubMed, 30 from ResearchGate, 60 from Science Direct, and 25 from Medline. After

screening for relevance, 120 articles pertinent to the research focus were identified. Ultimately, 28 articles were selected for inclusion in the review based on their quality and direct relevance to the research topic.

RESULTS AND DISCUSSION

Results from numerous studies show that AI and ML have significantly advanced in various aspects of nutrition and dietetics research:

Application area	Description
Dietary assessment	AI algorithms make use of image recognition and natural language processing to improve the accuracy and efficiency of dietary assessments, thereby, reducing reliance on biased self-reported data (4).
Nutrient analysis	ML models aid in predicting the nutrient composition in foods. This lead to more detailed and accurate dietary recommendations and the development of nutrient-rich food products.
Personalised nutrition	Through analysing individual genetic, microbiome, and lifestyle data, AI-driven platforms have made it easier to create personalised nutrition plans, which have resulted in more successful dietary interventions (5).
Public health nutrition	ML approaches have enhanced the monitoring and prediction of nutritional deficiencies and diet-related diseases at the population level, leading to better public health policies and programs (5).

The many studies explore challenges like data quality, ethical difficulties, and the need for interdisciplinary collaboration. Additionally, emphasis was laid on how AI and ML could revolutionise nutritional epidemiology, policy-making, and dietary therapy.

CONCLUSION AND RECOMMENDATİON:

The use of AI-based techniques improves the assessment of nutritional status and facilitates the collection, processing, and comprehension of complicated nutrition-related data. AI will have a significant influence on future healthcare solutions. Food has a greater influence on health outcomes according to an AI prediction model. But a number of difficulties and problems with using AI to nutrition and health research emphasise the need for more study to develop and determine the most effective algorithms that will be useful in the future. Collaborations between researchers in several areas, including computer science, food science, nutrition, and data science, are necessary for the successful and innovative research in this field. Also, there is need to collaborate with regional and international partners to share best practices, resources, and innovations in AI for nutrition and dietetics in Nigeria.

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PD1

A Study on the Consumers Behaviour on Food Labeling, Brand Name and Food Choices of Food Products in Yenagoa Local Government Area of Bayelsa State

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KEYWORDS: Food Labeling, Brand Name, Food Products, Consumers

BACKGROUND AND OBJECTIVE
Food labels are information written on food products, it is one of the most important and direct means of communicating the food product information to consumers. According to Codex Alimentarius Commission, Nutrition label is defined as "a description intended to inform the consumer of the nutritional properties of the food as written on the food label or package in the form of a table and includes Nutrient Declaration, Serving Size and percentage Daily Value", [4].
Brand Name of food Products: The brand name of a product is the name given to the product by the manufacturer and under which the product is sold, it is the name by which a certain brand or make of commodity is known, which is used to identify the family of that product. The following are the Objectives of this study:

- To assess the influence of food labels and brand names of products on consumers' food choices
- To assess the consumers' knowledge and perception on food labels and brand name of products

MATERIALS AND METHODS:
A total of 200 respondents were selected for the study using the convenience sampling technique to collect data from commercial supermarkets in Yenagoa LGA of Bayelsa State; this technique supported in finding relevant respondents who willingly participated in the study and a structured questionnaire was used to solicit information on the Socio-demographic/economic characteristics, Consumers perception on Nutrition information on food labels and Consumers perception on the purchase of Branded food products. A total of 200 questionnaires were distributed, filled and collected and 62 commercial supermarkets in nine major wards of the LGA were selected which includes both urban and semi urban communities. Also consumers who use packaged foods were considered and interviewed in 62 supermarkets.
Table 2 in the study shows that 66(33.0%) of the respondents believe that rich people generally buy branded food products while 134(67.0%) do not believe that. Only 47(23.5%) find it difficult to know the best food products through the brand names.
The brand name is tied to the general information about the product and can convey valuable health messages similar to food health labels. A report by, [3] on the effect of physical surroundings in usage situations on consumer, states that brand names on food packaging have effects on consumer preferences and also inspire healthy food marketing.

CONCLUSION:
From the study it is observed that the details given on food labels guide most of the respondents at the time of shopping. Most of the respondents purchase familiar brand names as preferred choices than new brand names.

Table 2. Consumers perception on purchase of Brand names of food products

Factors	Yes (%)	No (%)
Rich people generally buy branded food products	66 (33.0)	134 (67.0)
Buying well branded food products is a symbol of prestige	164 (82)	36 (18)
I buy branded food products because I am concerned about the health and wellness of my family	188 (94)	12 (6)
I have convinced my family and friends to buy branded food products	66 (33)	134 (67)
I am always interested in brand names of food products before I purchase	167 (83.5)	33 (165)
I don't mind food brand names before purchasing my food products	29 (14.5)	171 (85.5)
I don't have the knowledge of any good food brand names so I purchase anyone that is available	60 (30)	140 (70)
It is good to follow the food brand names with the highest advertisement	38 (19.0)	162 (81.0)
I find it difficult to know the best food products through the brand names	47 (23.5)	153 (76.5)
A familiar brand name is better than new brands	183 (91.5)	17 (8.5)

RECOMMENDATIONS

- There should be public awareness creation on Food labels and brand name of food products
- More research work should be carried out on Food labels and brand name of food products

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PD2

Assessment of Consumer Behavior and Perceptions on Sustainable Nutrition Practices among Students in Selected Tertiary Institutions in Abeokuta, Ogun State, Nigeria.

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KEYWORDS: *Sustainable nutrition, Food system, dietary pattern.*

BACKGROUND AND OBJECTIVE

Sustainable nutrition involves diets with low environmental impacts which contribute to food and nutrition security and healthy life for present and future generations [1]. It involves dietary patterns that promote all dimensions of individual health and well-being, meeting the needs of the present without compromising the ability of future generations [2]. This study, therefore, aimed to assess consumer behavior and perceptions of sustainable nutrition practices among students in selected tertiary institutions in Abeokuta, Ogun State, Nigeria.

MATERIALS AND METHOD:

This descriptive cross-sectional design was conducted among 435 randomly selected respondents from three (2) tertiary institutions in Abeokuta, Ogun State, Nigeria. The sample size was determined using Slovin's formula (Slovin, 1960):

$n = N/(1 + Ne^2)$

where,
n= number of samples
The population of students in FUNAAB = 19,357 (Exams and Records, FUNAAB)
The population of students in MAUSTECH = 18,878 (mapoly.edu.ng)
N= total population size (19,357+18,878) = 38,235
e= error of margin (0.05)

therefore,
n= 38,235/ (1+ 38,235(0.05 ^ 2))
n = 395.9
395.9 + 10% attrition = 435.

A semi-structured questionnaire was used to collect data on the socio-demographic and economic characteristics, the awareness and understanding of sustainable nutritional practices, the attitude and perception of the respondents towards sustainable nutrition, the consumption patterns of the respondents and the barriers and facilitators to the adoption of sustainable nutritional practices. The obtained data were analyzed using descriptive and inferential statistics using SPSS version 22.0.

RESULTS AND DISCUSSION:

Majority of the respondents (76.8%) are young adults, between 18 and 25 years old with more female respondents (55.3%) than male (44.8%). As regards monthly income, the largest group of respondents (34.3%) earns between 20,000 and 40,000 Naira per month. Nearly half (44.8%) of the respondents had heard the term "sustainable diet" or "sustainable nutrition" before, while the remaining (55.3%) had not. School (18.3%) and online sources (17.3%) were the most frequent places where respondents learned about the concept. A remarkable portion of the participants (25.3% "always" and 26.3% "often") consider the sustainability of their food choices when making decisions. About a third of respondents (31.3%) always pay attention to the environmental impact statement on the food label/package while purchasing food, with another quarter (28%) often doing so. Over half of the respondents reported to frequently include locally sourced or seasonal foods in their meals. Furthermore, over half (54.8%) indicated a willingness to pay more for products with a lower environmental impact.

CONCLUSION AND RECOMMENDATİON(S):

Attitudes towards sustainable nutrition were generally positive, with many students considering sustainability in their food choices. There was strong agreement on practices like consuming fresh fruits, traditional food varieties and purchasing locally sourced food with many respondents willing to adopt sustainable nutrition practices. More efforts should be geared towards sustainable nutrition education to increase awareness and practices.

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PD3

Consumption Pattern of Cereals Legumes and Starchy Roots and Tubers by the Elderly in North-East Senatorial Zone of Benue State Nigeria.

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KEYWORDS: Consumption, cereals, legumes, elderly

BACKGROUND AND OBJECTIVE

The nutritional well-being of a person is impacted by both their dietary choices and how effectively their body utilizes the nutrients from the food they consume [1]. Numerous studies have shown that older people have poor nutritional status [2]. Promoting healthy ageing and maintaining good health are strongly linked to the importance of adopting a nutritious diet. Nutrition plays a pivotal role in preventing and treating various health conditions across different age groups. Few studies have investigated the food consumption pattern of the elderly in Benue State. The study aimed at assessing the consumption pattern among elderly in Benue State.
Materials and Results: A cross-sectional study was carried out. A multi-stage sampling technique was used to select 516 elderly respondents for the study. Ethical approval reference number MOH/STA/204/VOL.1/251 was obtained from the Benue State Ministry of Health from the research ethical committee. A structured questionnaire was used to collect data on the socio-economic and demographic characteristics and food consumption patterns of elderly individuals.

Inclusion Criteria- Only people aged 60 years and above were selected for the study.

STATISTICAL ANALYSIS

Data was analyzed using descriptive statistics; significance was accepted at the level of $p \leq 0.05$.

RESULTS AND DISCUSSION

The weekly consumption pattern of food groups among the elderly in rural and urban communities shows that, cereals were consumed by the age 76-79, 1-3 times /week by 40.5% by urban and age 66-75 by 26.1% by rural. The majority in the age 66-75 both in urban and rural consume legumes 1-3times/week (81.1% and 63.0%). The root and tubers crops were consumed at least 4-6 times a week by all age groups in both areas (51.1% and 24.1%) respectively. The consumption was statistically significant with age and residence ($p<0.05$). According to the group of cereals, legumes, and roots and tubers, root and tubers was the most popular food in the category both in the urban and rural settlers and in all ages follows by cereals, than legumes. The high consumption may be as a result of their affordability and accessibility. Root and tuber crops play a crucial role in the human diet as well as nutritional and food security by replenishing the food shortage. Cereals also remain the predominant food source worldwide, providing approximately 50% of the total global caloric intake, and even up to 54% in developing nations [3].

CONCLUSION:

The elderly had average consumption pattern for cereals, legumes and root and tuber. Nutrition education and awareness is crucial.

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OD4

Postpartum depression in lactating mothers, diet quality and body mass index-for-age of infants 6–11 months: A community-based cross-sectional survey in rural Umuahia, Nigeria.

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KEYWORDS: Postpartum depression, lactating mothers, infants 6–11 moths, diet quality.

BACKGROUND AND OBJECTIVE
Postpartum depression is a depression that occurs after child delivery, and can lead to negative health outcomes for mother and child, as well as disruption of appropriate infant and young child feeding practices and increasing the risk of malnutrition. Poor households living in resource-poor areas are at high risk of inadequate micronutrient intake when their diet lacks diversity. Data on postpartum depression, diet quality and infants' anthropometric status is lacking. The study determined the postpartum depression in lactating mothers, diet quality and body mass index-for-age of infants 6–11months in rural Umuahia.

METHODOLOGY:
The study was a community-based cross sectional survey to assess postpartum depression in lactating mothers, diet quality and body mass index-for-age of infants 6-11 months in rural Umuahia. The sample size for the study was estimated using Cochran's formula elucidated by Araoye (2008).

$$n = \frac{Z^2 P\,(100-P)}{e^2}$$

The margin of tolerable sampling error applied is 5% and 95% confidence level of the standard normal distribution curve which is Z = 1.96, will be used.
P = Prevalence of postpartum depression among women in Enugu State which is 10.7% according to Abasiubong, Bassey & Ekott (2008).

To make up for dropout during data collection, 10% of the sample size was computed and added to the sample size = 0.1 x 147 = 14.7 + 147 = 161.7 = 162. Therefore, the sample size was one hundred and sixty-two lactating mothers with infants 6-11months of age. Twenty-five compounds in each of the 6 communities were purposively selected, and a total of 150 households overall were sampled. A simple random sampling by balloting without replacement was used to recruit the index lactating mothers for the study.

RESULT AND DISCUSSION:
Some of the infants were wasted (36%) and severely wasted (16%). There was a statistical significant difference ($p < 0.05$) between postpartum depressive symptoms and body mass index-for-age of the infant. The result highlights the connection between a mother's mental health and the anthropometric status of her infant. This suggests that stable mental health is crucial for ensuring proper infant and young child feeding practices.

Table 1: The body mass index-for-age status of the infants (6–11months)

Variables	Frequency (n = 150)	Percentage
Normal BMI-for-age	72	48.0
Wasting	54	36.0
Severe wasting	24	16.0

Table 2: Association between postpartum depression, minimum dietary diversity and body mass index-for-age status of the infants (6–11 months)

(n = 150)	PPD	BMI-for-age	MDD
PPD			
r	1	-0.196*	0.111
p-value		0.016	0.178

BMI = body mass index: MDD = minimum dietary diversity: r = correlation: PPD = postpartum depression.

CONCLUSION AND RECOMMENDATION:
Postpartum depression poses a significant mental health challenge for lactating mothers, which subsequently affects the body mass index of their infants. Therefore, there is need to formulate a social behavioural change framework that would ensure adequate care for lactating mothers within the postpartum period and beyond.

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OD5

Impact of an 8-Week Personalized Intervention on Diet Quality of Black and White Young Adults with Overweight and Obesity

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KEYWORDS: dietary indices, personalized nutrition, overweight, obesity.

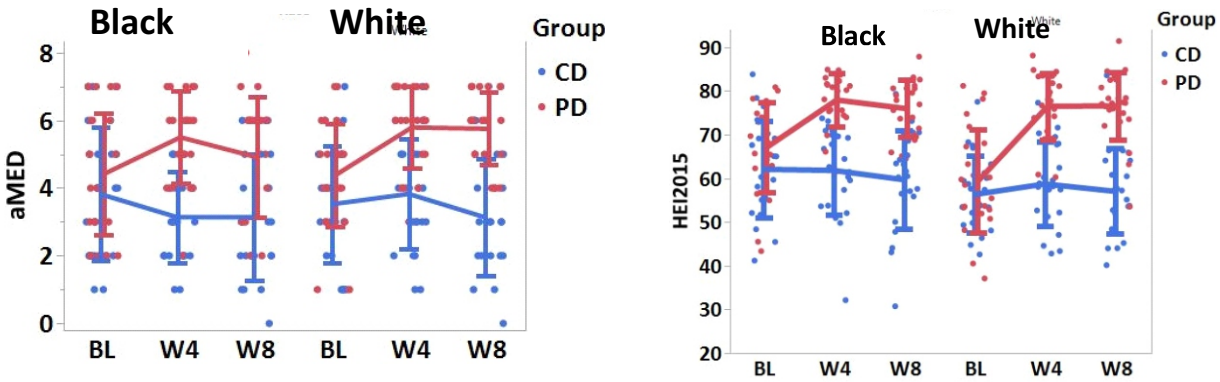
BACKGROUND AND OBJECTIVE
Epidemiological evidence indicates that ethnic and racial minority groups face higher risks of cardiometabolic diseases, including hypertension and diabetes [1]. Improving diet quality is known to mitigate these health risks [2]. Our study aims to investigate whether the effectiveness of dietary interventions is influenced by race. Specifically, we will assess the impact of an 8-week personalized functional food dietary intervention on diet quality among Black and White adults with overweight and obesity.

MATERIALS AND METHOD:
Young adults (n=91, age: 18-35 years, White=47, Black=44) with overweight and obesity (BMI: 25-45 kg/m2) were randomized to either the personalized diet (PD) or conventional dietary advice (CD) group. Participants in the PD group received personalized dietary counseling aimed at increasing fiber intake and improving the ratio of unsaturated to saturated fats. Additionally, each participant in the PD group was assigned one personalized dietary goal, determined based on their baseline anthropometrics, blood glucose, lipid profiles, HbA1c, and dietary habits. To help participants adhere to the dietary recommendations, they were provided with specific foods such as fruits, vegetables, and nuts for eight weeks. In contrast, participants in the CD group received conventional dietary advice based on the MyPlate guidelines [3] at the beginning of the study. Participants completed the Diet History Questionnaire III (DHQ3) at the Baseline (BL), Week 4 (W4), and Week 8 (W8). The Healthy Eating Index 2015 (HEI2015), Alternative Healthy Eating Index (AHEI), Alternate Mediterranean Diet (aMED), and Dietary Approaches to Stop Hypertension (DASH) scores were calculated from the DHQ3 using the

Dietary index Package in R [4]. A 2-factor ANOVA was conducted in JMP Pro to examine the interaction effects of race and group on changes in diet quality indices over time. This study was approved by the University of Missouri Institutional Review Board (IRB No: 2022561), and all ethical approvals were carefully overseen to ensure compliance with the required standards.

RESULTS AND DISCUSSION:

There were significant improvements in HEI2015, AHEI, aMED, and DASH scores in the PD group compared to the CD group over the 8-week period, and this was consistent across Black and White adults (group effect,



P<0.05). Specifically, White participants in the PD group had higher AHEI total fruit scores than Black participants in the PD group (group x race effect, P<0.05). Importantly, these diet quality improvements were achieved without any changes in body weight. The findings suggest that the PD group adopted healthier dietary patterns, which could potentially lead to better health outcomes [5].

CONCLUSION AND RECOMMENDATİON(S):

This study demonstrated the overall effectiveness of a personalized dietary intervention in improving diet quality for both Black and White adults with some race-specific differences in fruit intake. Future analyses should investigate the long-term sustainability of these dietary improvements and their impact on cardiometabolic health and microbiome outcomes, areas that our ongoing research aims to explore. Additionally, exploring the influence of psychological and socio-economic factors on dietary changes could offer further insights into optimizing personalized nutrition strategies.

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OD6

Comparative Iron Bioavailability in Ferropenic Anaemic Rats on Dietary Goat and Cow Milk

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KEYWORDS: Goat milk, Cow milk, Iron bioavailability, Ferropenic anaemic rats

BACKGROUND AND OBJECTIVE

Iron deficiency is the most common nutrient deficiency in the world and is a public health problem, it is the major cause of anemia and estimated to affect about 20% of the world's population (1). Infants and women are the most vulnerable because of the high demand for iron during these life cycle stages (2). In this study, we determine the effects of Goat milk (GM) and Cow Milk (CM) on the digestive and metabolic use of Fe on haematological parameters to assess the bioavailability of iron in comparison with the corresponding effects produced by a diet.

MATERIALS AND METHODS:

Male Wistar albino breed rats recently weaned (n=40), aged about 3 weeks, purchased from Faculty of Pharmaceutical Sciences, Ahmadu Bello University were used for this study. Animal care procedures and experimental protocols were approved by the Animal Ethics Committee of the of Ahmadu Bello University, Zaria. The rats were randomized into three groups and standardized for 14 days after which dietary iron deficiency was induced using method previously described by Pallares *et al.* (3) and blood drawn from caudal vein to establish anaemia and to determine PCV, Hb and serum iron using standard methods. The three groups were then respectively placed on Standard (SD) diet, Cow milk (CM) diet and Goat milk (GM) diet for another 21 days. Diets, and mineral free water were given to the rats *ad libitum* to all rats

RESULTS AND DISCUSSIONS:

Anaemia decreased in the CM rats as assessed by significantly higher haemoglobin regeneration efficiency, serum iron, red blood cell and packed cell volume (Table 1). The percentage HRE (Hb-Fe gain/ Fe intake) was affected by diet and by anaemia, for the three diets assayed, HRE in anaemic rats consuming GM is significantly higher than those on CM and standard diet. The greater utilization of Fe with GM diet could be due to various nutritional factors: the protein of this milk was more soluble and contain a higher proportion of other soluble protein[3]. Moreover, the fat quality of GM is also different, GM fat is richer in medium chain triglycerides than the CM, the triglycerides could be rapidly absorbed and metabolized to obtain energy[4] and could increase the synthesis of carrier proteins and thus absorption of Fe.

Table 1: Haemoglobin Regeneration Efficiency and Some Heamatological Parameters in Iron Deficient Rats Feed with Cow milk and Goat milk Diets

Parameters	Standard Diet	Cow milk diet	Goat Milk Diet
Changes in Body Weight (g)	28.7 ± 8.1^{a}	22.9 ± 5.3^{b}	19.2 ± 6.7^{b}
Changes in Hb Conc (g/l)	7.0 ± 2.0^{a}	$28. \pm 5.2^{b}$	31.7 ± 1.5^{c}
HRE (%)	26.9 ± 1.1^{a}	29.0 ± 1.2^{b}	35.8 ± 1.6^{c}
Changes in serum iron (μg/l)	388 ± 103^{a}	640 ± 14^{b}	64 ± 45^{c}
Changes in RBC (10^{12}/l)	2.52 ± 0.13^{a}	1.46 ± 0.08^{b}	$2.51 \pm 0.19a$
Changes in PCV (%)	16.0 ± 1.0^{a}	15.9 ± 1.0^{a}	18.0 ± 0.9^{ab}

Mean value $\pm$ SD for ten rats per group.
Mean values between groups with different superscript letters differ significantly ($p<0.05$)

CONCLUSION AND RECOMMENDATION (S):
We conclude that dietary GM improves iron bioavailability in anaemic rats and improving the recovery of haematological parameters after ferropenic nutritional anaemia. We recommend increase use of GM for complementary food of children 24 – 59 months to improve iron bioavailability.

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PD7

Determination of glycemic index of different rice meals (Ofada rice, Tuwon shinkafa, Fried rice, Braised rice and Coconut rice)

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BACKGROUND AND OBJECTIVE
In Nigeria, rice consumption has risen tremendously to about 10% per annum due to changing consumer preferences (1). The glycemic index is used to classify dietary carbohydrate based on their effect on postprandial carbohydrate blood glucose level (3). Low glycemic index food has been shown to reduce the risk of chronic diseases, particularly type 2 diabetes mellitus (2).

OBJECTIVES
1. To determine the blood glucose response of rice meals.
2. To determine the level of glycemic index of rice.

METHODOLOGY
Test food: The rice meals tested were Fried rice, Ofada rice, Braised rice, Coconut rice and Tuwon shinkafa. The reference food is glucose.

Subject selection: Healthy subjects aged 18 to 30 years were screened for the study, 15 Subjects were divided into five randomized groups of 3 people each and were fed with the test and standard food. Ethical approval was obtained from the Department of Nutrition and Dietetics, Kaduna Polytechnic, Kaduna. Also, informed consent was obtained from the volunteers, the study was properly explained to the respondents and were permitted to leave the study anything they felt like.
Experimental procedure: The volunteers arrived fasting, blood samples were taken in the fasting state as a baseline, 50g edible carbohydrate of the samples (either test or reference food) were taken within five minutes

then the blood glucose was measured in capillary (finger prick) at 15, 30, 60, 90 and 120 minutes. This method was used throughout the study. glycemic index was determined using the international organization standard methodology (26642:2010)(4)

DETERMINATION OF GLYCEMIC INDEX

$$GI = \frac{\text{Incremental area under the curve of food test}}{\text{Incremental area under the curve reference food}} \times 100$$

RESULTS AND DISCUSSION

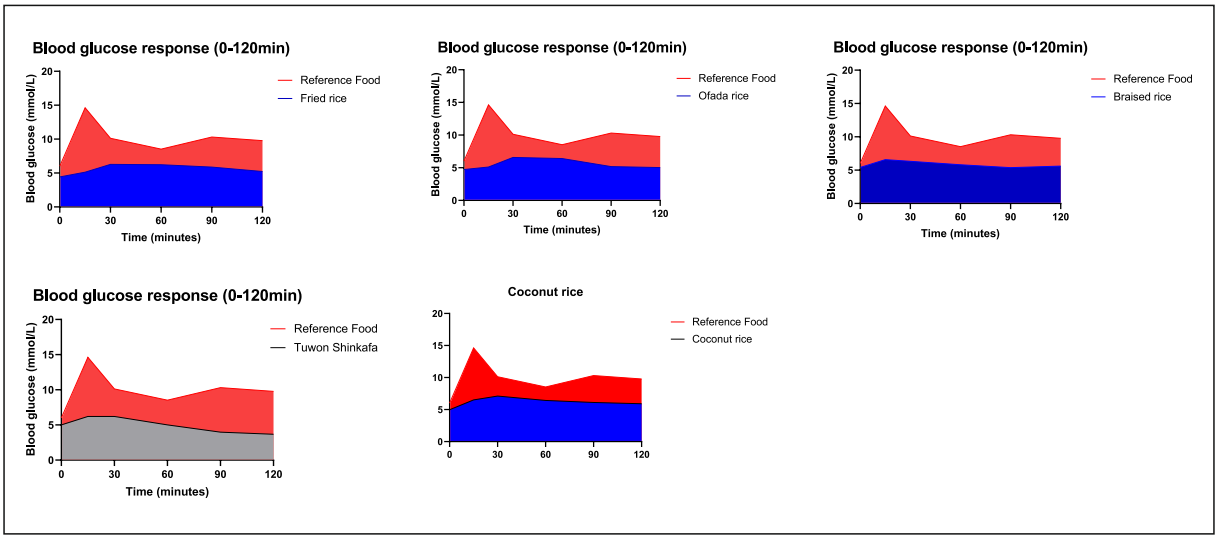
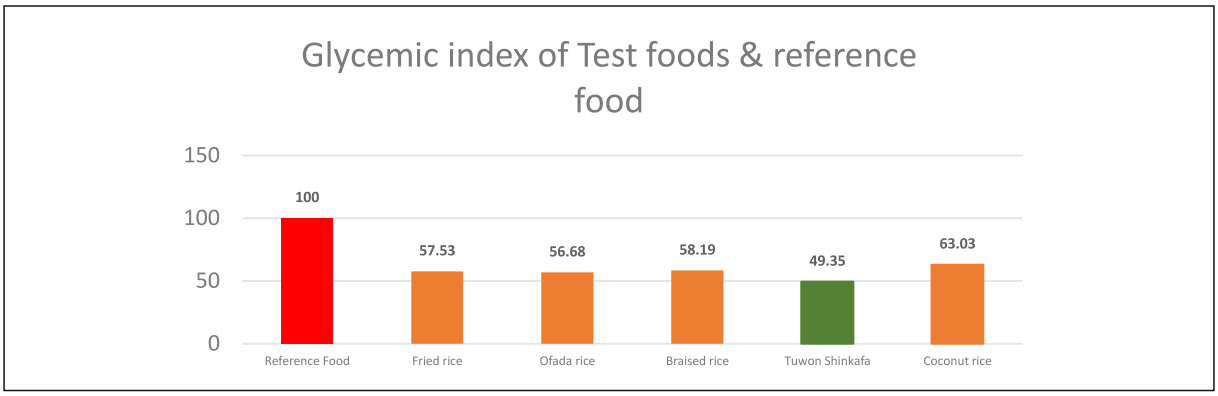


Figure 1: Blood glucose response of the test foods against the reference food



Range low <50 medium 50-69 high > 70

Figure 2: Glycemic index of the selected food samples.

The glycemic index for the reference food is presented in Figure 2 above, it indicates that the reference food has a glycemic index of 100, fried rice had 57.53, ofada rice is 56.68, braised rice is 58.19, tuwon shinkafa is 49.35 and coconut rice is 63.03. The study reveals that glycemic indices differ from one type of food to another. Previous studies have suggested that the glycemic index of single foods may not apply to mixed meals containing representative amounts of fat and protein (3). Different rice meals were produced (fried rice, braised rice, coconut rice, ofada rice and "tuwon shinkafa"). The variations in nutritional composition and glycemic impact among the rice meals suggest that factors such as rice variety, processing methods, and cooking techniques influence their nutritional quality and metabolic response.

CONCLUSION:

Based on the GI and GL values obtained in the study, tuwon shinkafa is recommended for individuals with health

complications such as diabetes, insulin resistance, or metabolic syndrome. Incorporating recommended amounts of tuwon shinkafa as part of the diet may help stabilize blood sugar levels and reduce the risk of associated complications.

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- ISO 26642:2010 specifies a method for the determination of the glycaemic index (GI) of carbohydrates in foods.

OD8

Knowledge and practice of Child Survival Strategies by Caregivers and Nutritional Status of Children 6 to 59 months in Letmauck Barrack, Mokola, Ibadan, Oyo State

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KEYWORDS: *Child Survival Strategies, Childhood Mortality, Nutritional Status.*

BACKGROUND AND OBJECTIVE

In developing countries, Nigeria inclusive, childhood mortality is a public health concern with increase in the rate of malnutrition (1). In addition, child survival is significantly affected by nutrient adequacy, knowledge and practice of child survival strategies by mothers of under-five children (2). This study, therefore, aimed to assess the knowledge and practice of child survival strategies, and the nutritional status of children aged 6 to 59 months and their caregivers in Letmauck Barrack, Mokola, Ibadan, Oyo State.

METHODS:

Using a multi-stage sampling, this cross-sectional study, surveyed 411 mother-child pairs. Data were collected using a semi-structured questionnaire. The information gathered included socio-demographics, anthropometric data and dietary intake of mother-child pair,as well as knowledge and practice of various component of child survival strategies including growth monitoring, oral rehydration solution, immunization, food fortification, family planning and female education. Data was analysed using SPSS version 21.

RESULTS:

The average household size was 3-5 members (68%), with an average monthly income of 10,000 to 50,000 naira for 46.8% of respondents. Majority (81.8%) of the children were of normal weight for their age, 88.1% were not wasted and 77.3% of them were not stunted. However, less than half (49.3%) of the mothers were of normal BMI according to the World Health Organization (WHO) standard BMI classification: underweight (BMI < 18.5), normal weight (BMI 18.5–24.9), overweight (BMI 25.0–29.9), and obesity (BMI ≥ 30.0).

Regarding dietary assessment, more than half (60.8%) of the children met the minimum meal frequency, about half of them (55.9%) met the minimum dietary diversity and few (28.4%) met the minimum acceptable diet for their age. Conversely, majority of the mothers had inadequate intake of all of the nutrients examined.

Awareness of child survival strategies varied among mothers. More than half (55.6%) of the mothers did not know

about growth monitoring and promotion, this result is comparable to 61.3% reported among caregivers in Bayelsa state (3). Almost all respondents (99%) reported knowledge of immunization from the clinic, but only 31.6% of the mothers were aware of food fortification.
In terms of practices, 94.4% of the children were weighed after delivery, 84.7% were weighed subsequently, and 91.4% of mothers reported weighing their children only during hospital visits. About half (48.5%) of the children had received full immunization, similar with the finding of the 2021 Multiple Indicators Cluster Survey/National Immunization Survey Coverage (MICS/NICS) (5), which revealed that 51.9% had received full immunization for the basic antigens in urban areas. Almost all respondents (98.8%) affirmed that female children should be encouraged to attend school. Only 18% of mothers practiced all child survival strategies, 42.2% practiced some, and 39.8% practiced most of them.

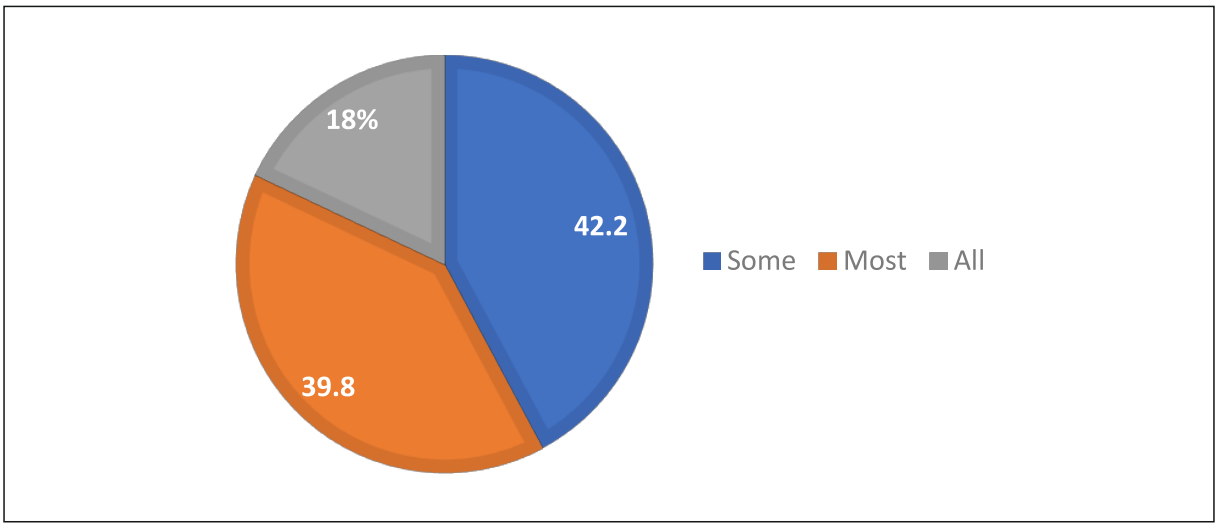

Figure 1: Level of Practice of Child survival strategies

CONCLUSION:

The study highlighted significant gaps in the awareness and practice of child survival strategies among mothers in Letmauck Barrack, Mokola, Ibadan. Despite high knowledge of immunization, there was insufficient awareness about growth monitoring, promotion, and food fortification. The practice of child survival strategies was not comprehensive, with only a small percentage adhering to all recommended practices.

RECOMMENDATION:

This study recommends the implementation of co-created contextualised nutrition intervention to improve mothers' knowledge and practice of child survival strategies in Letmauck Barrack, Mokola, Ibadan

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OD9

Phytochemical Composition of Smoothie Made from Jackfruit (Artocarpus Heterophyllus), Pineapple (Ananus Comosus) and Watermelon (Citrus Lanatus Thumb)

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KEYWORDS: *Phytochemical, smoothie, Jackfruit, watermelon*

BACKGROUND AND OBJECTIVE
There is a need to exploit the phytochemical potential of underutilised fruits in order to solve the problem of over-reliance on the staple fruits used in smoothie production (1; 2).

OBJECTIVE: This study determined the phytochemical composition of smoothie made from jackfruit (*Artocarpusheterophyllus*) pineapple (*Ananuscomosus*), and watermelon (*Citrus lanatus thumb*).

MATERIALS AND METHOD:
Materials: Fresh five (5) jackfruits were plucked from the tree in a residence in Ijebu-ode, Ogun state, Nigeria. Fresh watermelon and pineapple fruits were purchased from Ota market in Ogun state.

METHODS: Five (5) samples of smoothies were produced using the blend ratio and adjusted procedure of Victor-Adulojo*et al*., (3). The blend ratios were: JWP1 (50% Jackfruit, 25% Watermelon, 25% Pineapple); WPJ1 (50% Watermelon, 25% Pineapple, 25% Jackfruit); PJW1 (50% Pineapple, 25% Jackfruit and 25% Watermelon); JJJ1 (100% Jackfruit) and Control 1 (33.3% Jackfruit, 33.33% Watermelon and 33.33% Pineapple). The samples were taken to the laboratory for the phytochemical composition analysis using AOAC standard procedures. The data was analyzed using Statistical Package for Social Sciences (SPSS) version 20.0.

RESULTS AND DISCUSSION: The study found significant variations in phytochemical contents of the samples at $p<0.05$. Sample WPJ1 had the highest significant value of phytochemical content in mg/100g (tannin: 24.01±0.00; flavonoid: 2.68±0.02; Oxalate: 25.45±0.10; Vit. C: 17.28 ± 0.03 and β-carotene: 0.33±0.01) which is not in agreement with the finding of Obianom, *et al.,* (4). The blend ratio of WPJ1 is richest in photochemical and thus possesses highest antioxidant properties.

Table 1: Phytochemical Composition of the Smoothie Samples in (mg/100g)

Parameters	JWP1	WPJ1	PJW1	JJJ1	CONTROL1
Tannin	27.02±0.03^{a}	24.01±0.00^{b}	24.00±0.01^{b}	22.70±0.08^{c}	19.93±0.24^{d}
Flavonoids	2.66±0.01^{c}	2.68±0.02^{c}	5.43±0.14^{b}	2.69±0.02^{c}	5.68±0.02^{a}
Oxalates	24.75±0.16^{d}	25.45±0.10^{c}	28.53±0.11^{b}	36.41±0.16^{a}	28.62±0.20^{b}
Vitamin C	16.64±0.01^{a}	17.28±0.03^{a}	14.87±0.87^{b}	15.29±0.06^{b}	16.80±0.24^{a}
B-carotene	0.11±0.00^{d}	0.33±0.01^{a}	0.21±0.00^{c}	0.02±0.00^{e}	0.23±0.00^{b}
Vitamin E	3.30±0.01^{b}	4.03±0.04^{a}	3.10±0.10^{b}	3.13±0.01^{b}	3.38±0.01^{b}

Values with same superscripts are not significantly different and vice versa by row at $p<0.05$

CONCLUSION AND RECOMMENDATION:
The blend ratio "WPJ!" is richest in photochemical and thus prevents oxidative stress. So, its consumption promotes healthy living most especially among people having chronic diseases.

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OD10

Hemoglobin regeneration potential and iron bioavailability of some edible insects.

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KEYWORDS: *Hemoglobin, iron, bioavailability and insects*

BACKGROUND AND OBJECTIVE
Edible insects refer to a wide variety of insects that are safe for human consumption and are a traditional or contemporary source of food in different regions [1]. They are a potential solution to global food security and nutrition challenges. Objectives of the study is to determine hemoglobin regeneration potential and iron bioavailability of some edible insects (Grasshopper=*Kraussaria angulifera,* winged termite=*Macrotermes nigeriensis* and Cricket= (*Branchytropes memberanacoeus)*

MATERIALS AND METHOD
Animals and Diet: Male weanling rats 21 days of age with an average initial body of ~50 g were used and then randomized into the normal (n = 5) and malnourished (n = 20) group. Subsequently, the healthy group consist of five rats. The malnourished group was further divided into four groups of five rats each. Rats in the normal group consumed protein from 200g soybean flour,10g $FeSO_4$, 100g sucrose, 70g groundnut oil, 37.5g mineral/vita mix, 480g corn starch, 100g fiber and 2.5g choline chloride this diet is herein referred to as Fe sufficient (FeS). Rats in the malnourished group consumed same diet with the removal of $FeSO_4$ with the 20g tannic acid; this diet is herein referred to as iron deficient diet (FeD).

Haemoglobin-iron (Hb-Fe): This was be calculated by adopting the method of [2].

Hemoglobin regeneration efficiency: Hemoglobin regeneration efficiency (HRE) values were calculated according [4]. Relative biological value (RBV) for each iron source compared to ferrous sulfate was calculated as the HRE of test Fe source for each rat divided by the mean HRE of ferrous sulfate (FeS group).

RESULTS AND DISCUSSION

Table I: Effect of ferrous sulphate and edible insects supplementation on haemoglobin-iron on rats.

	FeD	FeS	Termite	Grasshopper	Cricket	FedFes
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Depletion	74.47 ± 5.33^{b}	$79.52 \pm 1.81^{b,c}$	90.23 ± 7.49^{c}	84.03 ± 7.81^{bc}	58.75 ± 6.90^{a}	89.98 ± 0.60^{c}
Repletion	113.28 ± 5.30^{b}	117.38 ± 2.59^{b}	106.60 ± 13.76^{a}	157.23 ± 28.54^{c}	145.65 ± 53.04^{c}	107.83 ± 23.62^{a}
Changes	38.81 ± 0.03^{b}	37.85 ± 4.40^{b}	16.37 ± 6.27^{a}	73.19 ± 20.73^{c}	86.90 ± 59.94^{c}	17.84 ± 24.22^{a}

Values with different superscript down the column differ significantly ($p<0.05$). Effect of tannic acid induction, treatment with edible insects and iron sulphate on Hb-Fe (ng/dl) of albino rats.
The Hb-Fe content is presented in table 1, there was significant differences among the various groups with cricket during the depletion and repletion phase.

Table II: Hemoglobin regeneration efficiency and relative biological value

	FeD	FeS	Termite	Grasshopper	Cricket	FEDFES
	Mean± SD	Mean± SD	Mean± SD	Mean± SD	Mean± SD	Mean± SD
HRE	0.01 ± 0.9^{-3a}	0.02 ± 0.01^{a}	0.01 ± 0.3^{-2a}	0.04 ± 0.01^{a}	0.03 ± 0.02^{a}	$0.01 \pm 0.4\text{-}2^{a}$
RBV	0.65 ± 0.50^{a}	1.00 ± 00^{ab}	0.69 ± 0.35^{a}	2.04 ± 0.76^{b}	1.24 ± 0.14^{ab}	0.91 ± 0.81^{ab}

The hemoglobin regeneration efficiency and the relative biological value are presented in table II, there was no significant difference among the different group with the iron deficient group for HRE and RBV shows there is a significant difference only in the grasshopper and cricket groups.
From our study, it is unclear whether the improvements in RBV with grasshopper and other insects might be due to enhancing factors in their fat content. Consistent with previous studies [4], we speculate that the high saturated fatty acid content of these may have resulted in higher hemoglobin regeneration.

CONCLUSION AND RECOMMENDATION

Our study have shown that these insects are excellent source of iron which can be used to supplement our high carbohydrate diets in Nigeria and we recommend a randomized control trial involving humans to document the bioavailability of these insects in humans

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OD11

A Comparative study on the Knowledge of Fruit and Vegetable Related Practices and Anthropometric status of teachers in Umuahia North LGA, Abia State

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KEYWORDS: *Fruit, Vegetable, Anthropometry, Teachers.*

BACKGROUND AND OBJECTIVE
According to the World Health Organization, fruits and vegetables are important for good health, and at least 400g or 5 servings should be consumed daily [1] to avoid obesity [2], yet its low consumption has been observed among adults. Hence, this study compared the knowledge of fruits and vegetables related practices and anthropometric status of Teachers in Umuahia North LGA, Abia State.

MATERIALS AND METHODS:
A cross-sectional survey of 892 teachers used a validated questionnaire to collect data on demographic and socioeconomic characteristics, knowledge of fruits and vegetables related practices, consumption pattern and common consumed fruits and vegetables. Body mass index (BMI) was calculated from weight and height measurements. Data were analyzed with descriptive statistics (frequencies and percentages).

RESULTS AND DISCUSSION:
Findings revealed that less than half (28.3% primary, 35.9% secondary) of public school teachers and more than half (55.2% primary, 75.2% secondary) of private school teachers exhibited good knowledge of fruit and vegetable practices, yet their intake fell below the recommendation. Prevalent fruits and vegetables were Pear (Ube), Watermelon, Ugu and Garden eggs. BMI analysis indicated that in: Public Primary Schools: 37.9% overweight, 40.7% obese, Private Primary Schools: 31.7% overweight, 27.6% obese, Public Secondary Schools: 18.8% overweight, 1.8% obese and in Private Secondary Schools: 30.3% overweight, 5.5% obese.
Conclusion: This study underscores a gap in fruit and vegetable knowledge and practice among teachers. It advocates for interventions promoting adequate fruit and vegetable consumption and nutrition education on the implications of overweight and obesity among teachers.

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PD15

Prevalence of Metabolic Syndrome among Adolescents in a Government School in Ota, Ogun State

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KEYWORDS: *Metabolic syndrome, Adolescent.*

BACKGROUND AND OBJECTIVE

Metabolic syndrome refers to an energy disorder characterized by the presence of at least any three of the following risk factors: increased plasma glucose, obesity (specifically central adiposity), hypertension, increased serum triglycerides level, and low high-density lipoprotein-cholesterol (HDL-C) levels [1, 2].

OBJECTIVE: This study determined the prevalence of metabolic syndrome among adolescents in a government school in Ota, Ogun State, Nigeria.

METHODOLOGY: Multistage sampling technique was used to select 362 adolescents attending Iganmode Grammar School, Ota, Ogun State. Their weight, height and blood pressure were measured using weighing scale, stadiometer and sphygmomanometer respectively. BMI-for-Age was calculated using the weight and height values. The data was analyzed using Statistical Package for Social Sciences (SPSS) version 20.0.

RESULT AND DISCUSSION: The results of the prevalence of metabolic syndrome among the adolescents showed that exactly 75% (50% female and 20% male) and 70% (40% female and 30% male) were at the risk of metabolic syndrome using BMI- for -age and blood pressure indicator s which is in line with the claim by WHO that by 2030, 57.8% of adults globally are predicted to be overweight.

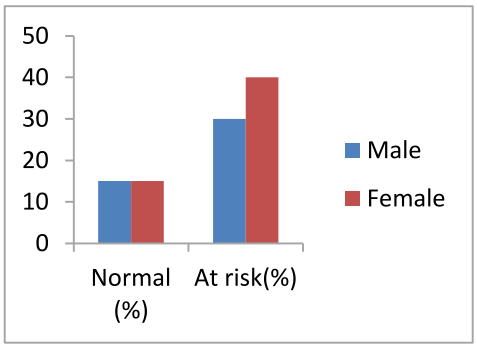

Figure 1: Blood pressure

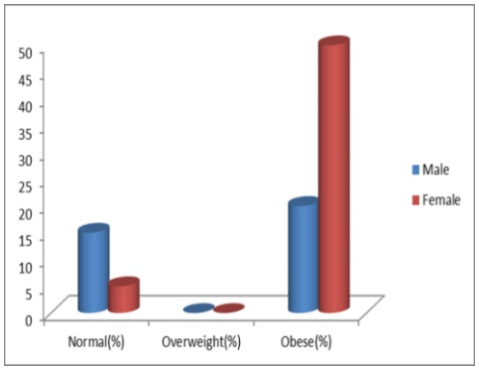

Figure 2: BMI for Age of the Adolescent

CONCLUSION AND RECOMMENDATION: The prevalence of metabolic syndrome among the respondents is of public health significance and needs nutrition education to curb the situation.

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PD16

Staple Food Processing Establishment, Community Livelihood and Household Food Security in Ondo Central Senatorial District, Ondo State, Nigeria

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KEYWORDS: *Staple Food, Food processing, Food security, Nutrition*

BACKGROUND AND OBJECTIVE

Food insecurity often stems from a complex interplay of factors, including insufficient food processing capacity, and associated post-harvest losses and waste in developing countries like Nigeria [1]. In Nigeria, this interplay remains poorly understood, and these gaps need to be addressed to strengthen efforts to promote food security. This study was designed to assess the capacity of staple food processing establishments, host community livelihood and household food security in Ondo Central Senatorial District, Nigeria.

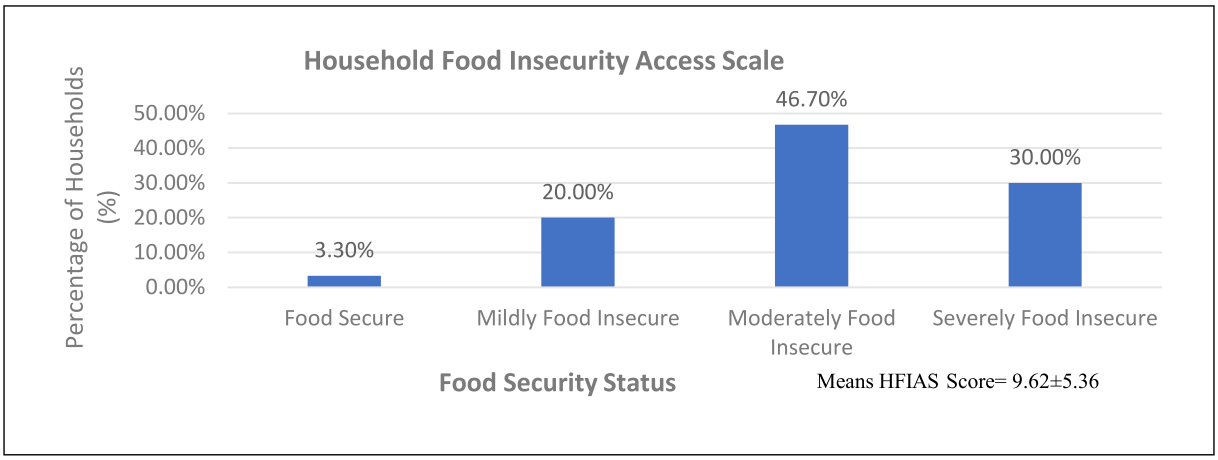
MATERIALS AND METHOD:

This mixed-method [2] study was conducted across six local government areas (Akure North, Akure South, Idanre, Ifedore, Ondo East, and Ondo West) in Ondo Central Senatorial District. Rice, Cassava, and Palm oil processing establishments and four categories of stakeholders were mapped and sampled using snowball and purposive sampling approach, respectively. A structured guide was used to interview five key state government officials to explore intervention around post-harvest losses, food waste, and food security measures. Semi-structured questionnaires were used to explore the perception on the importance of staple foods, processing, and storage method/technology among 131 food processors; knowledge of post-harvest losses, prevention measures, and perceptions of food insecurity among 160 farmers; and assess food security using the Household Food Insecurity Access Scale and food sources among 60 community members. Quantitative data were analyzed using descriptive statistics. Qualitative data were transcribed verbatim and analyzed thematically to identify and interpret recurring themes and patterns.

RESULTS:

The results of this study indicate that staple food processing communities face significant challenges such as inefficient processing technologies, limited production capacity, and inadequate infrastructure resulting in high post-harvest losses, low-quality products, reduced income, and profitability which collectively contribute to heightened food insecurity among households in the region [3]. Only 3.3% of community members were food secure despite the high presence of staple food processing establishments. Key government interventions should include establishing more food processing facilities, capacity building, and research.

Figure 1. Household Food Insecurity among Host Communities



CONCLUSION AND RECOMMENDATİON(S):
Staple food processing in Ondo central senatorial districts rarely runs at optimal levels to promote food and nutrition security within most communities as typified by a high burden of food insecurity. Supporting food processing establishments is hereby recommended to enhance profitability and improve the impact on food and nutrition security in the host communities.

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PD19

Breakfast Habit, Anthropometric Indices and Academic Performance of Children Attending Dorayi Karama Special Primary School Kano State

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KEYWORDS: *Breakfast, Academic, Performance, Nutrition*

BACKGROUND AND OBJECTIVE
Breakfast consumption is considered as the most imperative meal of the day [1]. To achieve adequate daily nutrients supply and maintain good physical and mental health, breakfast is very important [2]. The main aim of this study is to investigate the breakfast habit, anthropometric indices and academic performance among children (4-12) years of age in Dorayi Karama Special Primary School, Gwale Local Government Area of Kano State.

MATERIALS AND METHOD
The study was conducted at Dorayi Karama Special Primary School, Gwale Local Government Area, Kano State. Ethical approval was obtained from State Universal Basic Education Board, Kano, the study was cross-sectional study which involves simple random sample techniques in which 100 children were selected for the study. Structured questionnaire was used to get actual information on socio-demographic, socio-economic, knowledge, attitudes and nutrition-related practices among children attending the school. The anthropometric indices on the children were determined by measuring the Height, Weight, BMI and MUAC while the proximate analysis of the food was done using the method described by AOAC [3].

RESULTS AND DISCUSSION

Table 1:

Variable	Frequency (N=100)	Percentage (%)
Age (Year)		
4-6	30	30
7-10	47	47
11-12	23	23
Grade Level		
1-3	50	50
4-6	50	50
Gender		
Male	50	50
Female	50	50
Days attend school regularly per week		
1-2	5	5
3-4	15	15
5 and above	80	80

The socio-demographic data of the children involved in the study revealed that out of the 100 children surveyed, 58 were male (58.0%), while 42 were female (42.0%). The results showed that 30 children (30.0%) were in the age group of 4-6 years, 47 children (47.0%) were between 7-10 years old, 23 children (23.0%) were in the range of 11-12 years. 50 children (50.0%) were in grade 1-3 and 50% were in grade 4-6. Breakfast Habits:
The majority of children (55%) reported consuming breakfast every day before going to school, primarily between 7:30 am and 8:00 am. Cereals were the most common breakfast choice (80%), followed by bread or toast (10%).

Table 2: Proximate Composition of Breakfast Samples

Food	Moisture (g)	Carbohydrate (g)	Protein (g)	Fat (g)	Crude Fibre (g)	Ash (g)
1. Rice and Beans	65.45±0.38	15.10±0.38	11.19±0.18	7.15±0.21	2.38±0.04	1.11±0.08
2. Masa	38.44±0.12	48.68±0.06	8.28±0.02	2.73±0.03	0.08±0.03	1.08±0.02
3. Taushe soup	71.95±0.15	1.75±0.24	11.20±0.18	14.28±0.21	0.58±0.00	0.82±0.01
4. Stew	73.04±0.06	1.95±0.11	8.10±0.44	7.56±0.28	0.92±0.11	0.89±0.02

Proximate analysis of breakfast samples revealed variations in moisture, carbohydrate, protein, fat, crude fiber, and ash content among different breakfast types commonly consumed by the children.More than half of children (55%) were rated as having excellent academic performance, while 25% were rated as good. Only a small percentage (5%) fell below average in academic performance. The association between breakfast habits and nutritional status was significant (p-value = 0.030 indicating that breakfast habits may influence the nutritional status.

CONCLUSION AND RECOMMENDATION (S)

This study has provided valuable insights into the breakfast habits, nutritional status, and academic performance of primary school children attending Dorayi Karama Special Primary School in Kano.

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PD20

Nutritional status and functional ability of the elderly (≥ 65 Years) in Enugu North Senatorial District of Enugu State

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KEYWORDS: Functional Ability; Nutritional Vulnerability; Elderly

BACKGROUND AND OBJECTIVE:
The increase in elderly population comes with severe consequences for the elderly who may be vulnerable to malnutrition due to changes that occur with ageing. Among the elderly, morbidity and frailty seem to be rising. This community-based study assessed the nutritional status and functional ability of free-living elderly (≥ 65 years) in Enugu north senatorial district of Enugu state.

MATERIALS AND METHODS:
The study adopted a cross-sectional survey design. Multi-stage sampling technique was used to select 1608 respondents from four communities in four selected LGAs in Enugu north senatorial district. An ethical clearance application was made to the Health Research Ethics Committee, University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla Enugu State. The study commenced immediately after approval was granted. Data on socio-demographic characteristics, lifestyle and dietary habits of the respondents were obtained using a structured and validated questionnaire. Mini Nutritional Assessment (MNA) and WHO Disability Assessment Schedule 2.0 questionnaires were used to assess respondent's nutritional vulnerability and functional ability (level of independence when performing activities of daily living), respectively. Anthropometric (weight, height, waist and hip circumferences, calf circumference and mid-arm circumference) and blood pressure measurements of the respondents were obtained and compared with reference standards. Data obtained were analysed using IBM SPSS for windows version 23.0. Data were presented as means, frequencies and percentages. Pearson Chi-square was used to determine the association between variables at $p < 0.05$.

RESULTS AND DISCUSSION:
Most of the respondents were aged 65-74 years (68.3%), married (72.5%), earned <₦20, 000 monthly (66.7%). These socio-demographic characteristics have positive and negative effects on man's state of health [1] Some had secondary school education (43.8%), were retirees (18.2%) and 28.9% lived alone. Meals were skipped by 61.5% of the respondents. About half of the respondents (53.1%) were at risk of malnutrition while more males (20.9%) than females (18.5%) were malnourished. When performing activities of daily living, more females (26.3%) than males (23.5%) reported having severe difficulty whereas more males (20.9%) than females (18.5%) had extreme difficulty. Blood pressure of the males and females differed significantly ($p < 0.05$) with females having higher blood pressure than their male counterparts. The high prevalence of malnutrition and at-risk group seen among the respondents may expose them to cardiovascular disease (CVDs), including stroke and ischemic heart disease, potentially affecting their quality of life (QoL) [2].

Table 1: Socio-demographic characteristics of the respondents

Variables	N (%)	Variables	N (%)
Age (years)		Monthly income	
65-74	1099 (68.3)	<₦20, 000	1072 (66.7)
75-84	394 (24.5)	₦20,000 - ₦50, 000	383 (23.8)
≥85	115 (7.2)	₦51,000 - ₦100,000	137 (8.5)
Total	1608 (100.0)	>₦100,000	16 (1.0)
Marital status		Total	1608 (100.0)
Single	168 (10.4)	Highest educational level	
Married	1166 (72.5)	No formal education	238 (14.8)
Widowed	100 (6.2)	Primary education	549 (34.1)
Divorced	118 (7.3)	Secondary education	705 (43.8)
Separated	56 (3.5)	Tertiary education	75 (4.7)
Total	1608 (100.0)	Vocational education	41 (2.5)
Occupation		Total	1608 (100.0)
None	67 (4.2)		
Farmer	490 (30.5)		
Trader	758 (47.1)		
Retiree	293 (18.2)		
Total	1608 (100.0)		

Table 2: Nutritional vulnerability and functional ability of the elderly

Variables	Males n (%)	Females n(%)	Total n (%)	χ^2; p-value
Nutritional vulnerability				1.878; 0.391
Normal nutritional status	161 (26.1)	281 (28.4)	442 (27.5)	
At risk of malnutrition	327 (53.0)	527 (53.2)	854 (53.1)	
Malnourished	129 (20.9)	183 (18.5)	312(19.4)	
Total	**617 (100.0)**	**991 (100.0)**	**1608 (100.0)**	
Functional ability				50.381;0.000*
No difficulty	72 (11.7)	76 (7.7)	148 (9.2)	
Mild difficulty	145 (23.5)	140 (14.1)	285 (17.7)	
Moderate difficulty	126 (20.4)	331 (33.4)	457 (28.4)	
Severe difficulty	145 (23.5)	261 (26.3)	406 (25.2)	
Extreme difficulty	129 (20.9)	183 (18.5)	312 (19.4)	
Total	**617 (100.0)**	**991 (100.0)**	**1608 (100.0)**	

*P < 0.05

CONCLUSION AND RECOMMENDATİON(S):
The study reports that the elderly were at risk of malnutrition with majority having difficulty in performing activities of daily living. There is need for periodic assessment of free-living elderly in communities with measures put in place for prevention and management of malnutrition among this group.

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PD21

Comparison of the Micronutrients and Phytochemical Contents of Polyethylene-packed Sliced and Freshly Sliced Watermelon Fruit

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KEYWORDS: *Watermelon, Micronutrients, Phytochemicals, Vitamins and Minerals*

BACKGROUND AND OBJECTIVE:
Fruits and vegetables, rich in micronutrients and phytochemicals, are crucial for a healthy diet. Watermelon, a popular fruit in Nigeria can lose these beneficial compounds due to environmental factors like heat, light, and oxygen [1]. Polyethylene, known for its low cost, chemical resistance, and ability to withstand high temperatures [2], is often used for packaging. This study compared the micronutrient and phytochemical contents of watermelon slices packed in polyethylene with those of freshly sliced watermelon.

MATERIALS AND METHOD:
Polyethylene-packed and freshly sliced watermelon were homogenized and analyzed by taking 0.5g samples from each. Vitamins C, D, and pro-vitamin A were measured using calorimetry and spectrophotometry, while Vitamin B2 was assessed by absorbance reading [3]. Calcium, iron, lycopene, beta-carotene, and total phenolic contents were determined using atomic absorption spectrophotometry [4] and a JENWAY 6405 UV-Visible spectrophotometer at 610 nm. Micronutrient concentrations were then estimated using appropriate formulas.

RESULTS AND DISCUSSION:
The study results, summarized in Table 1, reveal that freshly cut watermelon slices contained higher levels of pro-vitamin A, calcium, iron, and polyphenols compared to polyethylene-packed slices. In contrast, the polyethylene-packed watermelon had higher levels of vitamins C and B2, with no difference in Vitamin D content between the two types. The increased Vitamin C in polyethylene-packed slices may be attributed to the protective effect of the polyethylene bags against light and moderate temperatures, which can affect vitamin C levels in

Table 1: Nutritional and Phytochemical Components of Freshly cut and Polyethylene-Packed Watermelon slices

Component (%)	Freshly cut watermelon slice (Mean (%)±SD)	Polyethylene-packed watermelon slice (Mean (%)±SD)
Pro-vitamin A (mg/100g)	*20.35*±0.17	12.93±0.00
Vitamin C (mg/100g)	12.42±0.21	14.42±0.39
Vitamin B_2 (mg/100g)	0.31± 0.02	0.46±0.02
Vitamin D (mg/100g)	0.02±0.00	0.02±0.00
Calcium (mg/100g)	54.71±0.76	49.01±0.86
Iron (mg/100g)	1.81 ±0.03	1.62±0.03
Lycopene (mg/100g)	29.65±1.87	19.78±0.00
β-carotenoid (mg/100g)	63.05±0.32	37.29±0.95
Polyphenol (mg/g)	23.28±0.32	20.86±0.37

fruits [5].

CONCLUSION AND RECOMMENDATION:

This study showed that vitamins C and B_2 are more abundant in polyethylene-packed sliced watermelon fruit while vitamin A, calcium, iron, β-carotenoid, lycopene, and polyphenols are higher in freshly sliced watermelon fruit. It is therefore recommended that sellers of street-vended fruits be sensitized on the need to ensure fruits packed in polyethylene bags are well stored in order to preserve their micronutrient content.

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OD22

Assessment of Food Security and Diet Quality among Undergraduates at Afe Babalola University.

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KEYWORDS: *Food security, Dietary quality, Undergraduate, Nutritional status*

BACKGROUND AND OBJECTIVE:
Food insecurity (FI) continues to be a significant challenge, particularly in light of recent economic shocks in Nigeria. It can negatively impact university students' academic performance, health, and mental status. Food insecurity among university students has not received adequate attention (1). Studies have shown that food insecurity exists among university students and is a barrier to students' well-being and success (2). The ability of students to excel in their academics relies strongly on sound nutrition, which may be compromised if periods of food insecurity persist. This study evaluated the food security and diet quality of undergraduate students

MATERIALS AND METHODS
A cross-sectional study design was employed. A total of 442 undergraduate students were interviewed employing a semi-structured questionnaire. The questionnaire includes socio-demographic, food security, diet quality and anthropometric sections. Food security was assessed using the Household Food Insecurity Access Scale (HFIAS), and diet quality (DQ) was evaluated using Minimum Dietary Diversity for Women (MDD-W) as a proxy indicator of diet quality. The anthropometric assessment was done following WHO guidelines. The study sought ethical review and approval from the Institutional Health Research Ethical Committee (HREC) with protocol number ABUADHREC/05/11/2023/14

RESULTS AND DISCUSSION
The mean age of respondents was 23 ± 5 years. About 68% were food-secured, while 32% were food insecure. Nearly 47% had poor dietary diversity scores. Anthropometric assessment showed 15% were underweight, 57% were normal, and 28% were overweight or obese. A significant association existed between the fathers' occupation, students' monthly allowance, and food security status ($P<0.05$). Daily meal frequency significantly affected dietary quality. Despite access to various foods, students' food choices often lacked nutritional value, compromising dietary quality. Studies from other universities support these findings, emphasizing the need for access to diverse foods and education on healthy eating.

Table 1: Association between food security and socio-demographic characteristics.

Variables	Categories	(n= 437) Food security, n=295 (67.5%)	Food insecurity n=142 (32.5%)	x^2	P-value
Age	15-19	75	42	2.850	0.415
	20-24	85	36		
	25-29	75	42		
	30 and above	60	22		
Level of education	200l	68	25	3.382	0.496
	300l	58	33		
	400l	52	28		
	500l	71	29		
	600l	46	27		
Gender	Male	141	60	1.186	0.276
	Female	154	82		
Religion	Christian	158	78	0.337	0.953
	Muslim	80	36		
	Traditional	21	9		
	Others	36	19		
Ethnicity	Yoruba	92	51	1.315	0.726
	Hausa	73	36		
	Igbo	99	42		
	Others	31	13		
Father's occupation	Civil Servant	121	61	7.404	**0.034***
	Businessman	83	67		
	Merchant	55	24		
	Farmers	8	7		
	Others	8	3		
Mother's Occupation	Housewife	54	33	5.321	0.256
	Businesswom an	63	37		
	Civil Servant	57	29		
	Merchant	65	25		
	Others	56	18		

χ^2: Chi square test; *: *p* value < 0.05

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OD23

Foodimetric WebApp: A Nutri-tech tool to improve access to accurate nutrition information and calculations

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KEYWORDS: *Nutrition Assessment, Technology, Food Composition, Innovation*

BACKGROUND AND OBJECTIVE:

Nigeria faces a double burden of malnutrition, with high rates of both undernutrition and overnutrition [1]. Accurate nutrition assessment and calculation are crucial for effective nutrition care. However, existing resources are limited, and calculations are often time-consuming and prone to errors. The Nigeria Food Composition Database provides valuable data, but its utilization is hindered by accessibility and usability issues. The rise of digital technology offers opportunities to address these challenges [2]. Foodimetric webApp is bridging this gap by providing easy access to nutrition calculations, education, promoting evidence-based practice and personalized nutrition care.

MATERIALS AND METHOD:

We developed a user-friendly webApp (www.foodimetric.com) with the following features: Nutrition calculation tools (local food composition, BMI calculator), educational resources (articles, social media page), and feedback mechanisms. Nigerian Food Composition Database was used as the reference tool for nutrient composition of the foods. We combined the skills of database management, User Interface (UI)/User Experience (UX),, front end and backend website development to develop Foodimetric WebApp.

RESULTS AND DISCUSSIONS:

Foodimetric currently has about 300 users. Our users are registered dietitians, nutritionists, nutrition students and nutrition enthusiasts across different institutions and organizations in Nigeria. One of the users of Foodimetric stated that, "*I really appreciate this innovation, I can now leave the hardcopy at home and still be fine because Foodimetric has placed it in my pocket 24/7.*" The user further explained that he can now easily manage his patients by calculating the nutrient content of the foods they eat and in the quantity of foods he wants to recommend within a very short period of time compared to the traditional method of using the hardcopy. A nutrition student, expressed her excitement after using Foodimetric majoring on the fact that it makes calculation easy and fast, in her words, she said "*calculations are swift, faster than the speed of light*". A clinical nutritionist regards Foodimetric as an innovative platform that allows users to easy access nutritional content of local Nigerian foods. However, some users were disappointed that some foods are not in the database and request for update. The current Nigerian Food Composition is still a work in progress and the 2017 version that was used for this webApp has less than 300 foods [3]. The next version that will be released soon will feature the West Africa Food Composition Database so as to cover more indigenous foods and encourage the use of Foodimetric in other countries across West Africa. More nutrition calculators will also be added.

CONCLUSION AND RECOMMENDATIONS:

Foodimetric is a helpful tool in the field of Nutrition and Dietetics. We recommend increased adoption of digital technology in nutrition care and education, and collaboration between stakeholders to promote evidence-based practice and better health outcomes.

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OD24

Knowledge and Perception Study Around Salt Use in Nigeria

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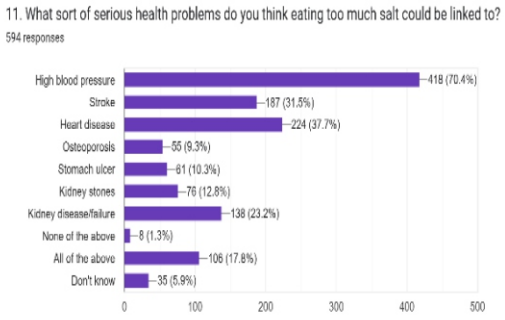
KEYWORDS: *Sodium, Salt, Nutrition, Non-communicable diseases*

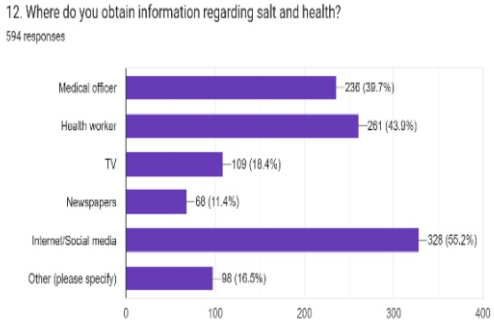
BACKGROUND AND OBJECTIVE:
Nigeria records a daily salt consumption reaching up to 10g per day. Sodium, the primary ingredient in salt, is an essential mineral for the human body; however, consuming too much salt can lead to high blood pressure, increasing the risk of heart disease, stroke, and kidney disease [1,2]. Like other low and middle income countries (LMICs), Nigeria has experienced a nutrition transition, with traditional diets rich in vegetables, fruits, and pulses increasingly replaced by highly processed and packaged foods that are typically high in salt [3]. Salt reduction is a cost-effective public health intervention which delivers great health and economic benefits, it is recognized as a WHO 'Best Buy', with an estimated USD 12.82 return on every single USD invested [4]. To achieve a significant reduction in population salt intake, it is important to understand the knowledge and practices of the populace around salt use and its associated health consequences. The objective of this study is to evaluate the knowledge of the respondents on the health consequences of excessive salt use and to determine the most effective medium(s) for disseminating advocacy and communication key messages related to salt use.

MATERIALS AND METHODS:
As part of the process of developing advocacy and communication key messages for a national salt reduction strategy, we conducted a perception study to understand the prevailing knowledge around salt use and the most effective medium to drive key messages about health and salt use. A questionnaire was adapted from the World Health Organization Standalone Knowledge, Attitude and Perception (KAP) survey questionnaire for salt reduction which had been pre-tested and used successfully to evaluate knowledge, attitudes and practices (KAP) around salt use across different countries. The sample size was 600, questionnaires were administered online through CAPPA's media handles; 594 responses were collected from at least one state in each of the six geo-political regions across rural and urban areas in Nigeria. The knowledge component of the item was asked on health problems related to high salt intake with responses stating different health conditions. The attitude component was asked on the amount of salt consumed, and the practice component was asked on the medium for receiving health information. Calculations were done on all objectives as listed. Descriptive statistics were used to determine the KAP related to salt use.

STUDY POPULATION:
Nigerian population aged 18 years and above.

RESULTS AND DISCUSSIONS
From the results, over 90% of the respondents had the requisite knowledge of the dangers of excessive salt intake and use, however, knowledge is insufficient to influence health behaviours. Furthermore, the reports confirmed that the internet especially social media is a powerful tool for advocacy, communication and dissemination of health-related information.





CONCLUSION AND RECOMMENDATIONS

Access to the right health information and knowledge is not sufficient to achieve behaviour change that will lead to improved food safety and public health outcomes. To stem the ugly tide of a rising burden of cardiovascular disease and NCDs in the country, an enabling environment must be created through the implementation of healthy food policies and enforcement of mandatory salt target regulations especially for processed and packaged foods manufactured in Nigeria. Furthermore, the report showed that the internet especially social media is a very powerful tool for disseminating health information, driving public awareness and advocacy for salt reduction in Nigeria.

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OD25

Association between Dietary Habits and Cardiovascular Disease Risk Factors among Commercial Drivers in North-east Nigeria

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KEYWORDS: *Dietary habits, commercial drivers, cvd risk factors.*

HIGHLIGHTS:

- *Over half of the commercial drivers did not meet the recommended daily servings of fruit and vegetable*
- *Eating on trips was negatively associated with blood pressure*

BACKGROUND AND OBJECTIVE:
Unhealthy lifestyles such as consumption of poor diet are very common among commercial drivers and it is certain that an unhealthy diet predisposes individuals to cardiovascular diseases (CVD) [1, 2]. There is a paucity of information on the association between dietary habits and cardiovascular disease risk factors among commercial drivers in North-East Nigeria. The aim of this study was to assess the association between the dietary habits and cardiovascular disease risk factors among commercial drivers in northeast Nigeria.

MATERIALS AND METHOD:
The study adopted descriptive cross-sectional design and multistage sampling technique was used to select 924 commercial drivers. A pretested structured Food Frequency Questionnaire (FFQ) adapted from the WHO STEPS survey was used in assessing the dietary habits. Statistical analysis was performed using SPSS software version 21.

RESULTS AND DISCUSSION:
Only 16.3% and 8.1% consumed fruits and vegetables daily with over half of them not meeting the recommended daily servings. This low consumption can contribute to negative health outcomes because adequate intake of fruits and vegetables has been associated with lower risk of CVD [3]. Additionally, most of them (82.1%) ate on their trips and more than half (56.4%) ate breakfast outside the home which is not a healthy habit. On the other hand, only few (15.2%) consumed carbonated drinks and snacks daily which is an advantage as high consumption of sugar-sweetened beverages may contribute to weight gain and obesity by increasing overall energy intake [4]. A negative significant correlation ($P<0.01$) existed between eating on trips ($r=-0.134$) and blood pressure which was not anticipated because majority of the drivers ate on their trips and these foods are usually high in salt, which is a significant risk factor for hypertension. There was a significant correlation ($P<0.05$) between servings of vegetables consumed ($r=0.149$) and triglyceride and this might be as a result of low consumption of vegetables among them. The intake of vegetables produces protective effect against triglyceridemia [5].

Table 1: Correlation between Dietary Habits and Cardiovascular Disease Risk Factors

Dietary Habits	Blood pressure r (p-value)	Triglyceride r (p-value)
Eating on trips	-0.134 (0.01)	
Servings of vegetables consumed		0.149 (0.05)

CONCLUSION AND RECOMMENDATÝON:
The low consumption of fruits and vegetables, and high consumption of food outside the home among the commercial drivers can predispose them to cardiovascular diseases. Nutrition education is needed to help implement a change in dietary habits among them.

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OD26

Dietary pattern, physical activities and anthropometric status of adolescents in private and public secondary schools in Abia State.

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KEYWORDS: *Anthropometric status, dietary pattern, physical activities, overweight/obesity.*

BACKGROUND AND OBJECTIVE:

Adolescence is the second most rapid growth stage after childhood characterized by a rapid transition to adulthood, and marked by physical and biological growth and development (1). Obesity in adolescents stems from the interaction between susceptibility genes and unhealthy lifestyle habits such as poor nutrition, high sedentary behavior, and insufficient physical activity (2). Thus, the assessment of lifestyle habit will expose how adolescents' eating habits, exercise routines, and physical measurements (such as BMI) differ between public and private schools. This study assessed the anthropometric status, dietary pattern and physical activities of adolescents in Aba North, Aba South, Ikwuano, Umuahia North, and Umuahia South Local Government Areas in Abia State.

MATERIALS AND METHOD:

This cross-sectional study was conducted in four (4) Local Governments Areas in Abia State. Data was collected by administering a validated questionnaire to the respondents, the data was presented in frequencies and percentages. WHO Anthro-plus software was used to compute the HAZ score and BMIAZ score of the respondents. A multi-stage sampling technique was used to select the study subjects and ethical approval was obtained from Federal Medical Centre Umuahia, Abia state (FMC/QEH/G.596/Vol.10/680). In the first stage, the various local governments; Aba North, Aba South, Ikwuano, Umuahia North, and Umuahia South were purposively selected as the study area. In the second stage, a list of both private and public secondary schools available were obtained from the State Ministry of Education and a simple random sampling technique was used in selection of 4 schools from each selected LGA used for this study by way of balloting without replacement. The next stage involved random selection of students to achieve 50 adolescent respondents from each school. Araoye model (3) for determination of population was used to determine the sample size of 200 respondents for the study from each of the LGA. A total of 1000 respondents was used for this study.

Table 1SSS: Anthropometric measurements of the respondents

Variables	Frequency (N)	Percentage (%)
HAZ STATUS		
Normal (< -1 z score)	813	81.3
Stunted (< -2 z score)	125	12.5
Severely Stunted (< -3 z score)	45	4.5
No response	2	0.2
Missing	15	1.5
Total	**1000**	**100**
BMIAZ STATUS		
Normal (< -1 z score)	338	33.8
Severely thin (< -3 z score)	214	21.4
Overweight (> 1 z score)	391	39.1
Obese (> 2 z score)	25	2.5
Severely obese (>3 z score)	14	1.4
No response	2	0.2
Missing	16	1.6
Total	**1000**	**100**
WHR CATEGORY		
Low Risk	338	33.8
Moderate Risk	334	33.4
High Risk	328	32.8
Total	**1000**	**100**

RESULTS AND DISCUSSION:

The study showed that 39.2% skipped meals and (15.7% and 13.1%) were reported to skip lunch and breakfast, respectively. This is consistent with the report of Worku et al., (4) where breakfast was the most meal skipped by the respondents 64.5%. Several observational studies revealed that skipping breakfast was associated with increased BMI and increased mortality (5). The study also revealed that there were moderate consumption of fruits and vegetables, moderate consumption of animal protein and legumes, nuts and cereals while there was a high consumption of snacks, roots and tubers and fats and oil.

CONCLUSION AND RECOMMENDATIONS:

The importance of implementing school-based programs that promote healthy lifestyles, including nutrition education and physical activity cannot be over-emphasized. Hence, there's a need to plan intervention programs targeted at improving adolescent nutrition.

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OD27

Glycemic index and organoleptic properties of selected food products (Tuwo and pap) from Finger millet seed

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KEYWORDS: *Glycemic index , tuwo and pap*

BACKGROUND AND OBJECTIVE:
The glycemic index provides a measure for classifying foods according to their potential to raise blood glucose levels[1]. The effect that different foods have on blood sugar levels varies considerably. The glycemic index estimates how much each gram of available carbohydrates in food raises an individual blood glucose level following consumption of the food, relative to consumption of pure glucose with a glycemic index of 100%. Glycemic index is one of the determining factors to put into consideration in the consumption of foods by diabetes mellitus patient. Diabetes Mellitus is a metabolic disorder and has been defined as a condition in which the pancreas no longer produces sufficient insulin or cells stop responding to the insulin produced, therefore, the glucose in the blood cannot be taken up by the cells of the body.The objective of this research was to determine glycemic index and organoleptic properties of finger millet (Eleusine coracana) food products (Pap and Tuwo) in context of management of type II diabetes.

MATERIALS AND METHODS: The cereal grain was purchased from a local market in Kaduna metropolis. Forty human subjects were involved in the glycemic response study (20 healthy subjects and 20 diabetics subjects). The glycemic responses were determined using standard methods. The acceptability of the products were carried out by 50 undergraduate students and staff members of department of Nutrition and Dietetics, Kaduna Polytechnic. A 9 – point hedonic scale was used for sensory evaluation, Results were presented as mean ± standard deviation. Student t-test was used for the glycaemic index, differences between means were separated by Duncan's new multiple range test (DMRT), Result with $P<0.05$ was considered significant. SPSS version 23 was used .

RESULTS AND DISCUSSION: Processing significantly ($P < 0.05$) affect the glycemic index of the food products as pap and tuwo respectively (28.51±10.11% and 28.59± 14.21%) from unprocessed seeds administered to non diabetic subjects showed lower glycemic index compared to processed samples (Roasted (32.44±14.05 and 32.74± 8.10 %), germinated (40.56±12.10 and 51.04 ± 11.2 %), and fermented (35.71±14.10 and 40.24 ± 13.12 %)). Lower values were also observed in the diabetic subjects feed with unprocessed samples, the lower (less than 55%) glycemic index values observed in selected foods prepared using flour made from unprocessed finger millet seeds could be based on the nature of the millet starch and its molecular organization including the influence of its polyphenols, phytate, and dietary fiber contents [2] Lowest blood glucose response to pap and tuwo (9.31± 1.53 and 8.21± 2.04mmol/L) respectively from unprocessed seeds in the diabetic subjects was observed compared to product from germinated seeds having the highest value (13.28± 1.21 and 14.31± 1.22mmol/L). The same trend was observed in the normal subject as lowest blood glucose response to pap and tuwo (4.22± 0.3 and 4.22± 1.1mmol/L) from unprocessed seeds was also shown compared to products from germinated seeds (7.02± 0.9 and 6.53± 1.5mmol/L) showing higher values. Sensory analysis revealed that Pap and Tuwo from roasted and germinated seeds were the most prefered compared to food products from the unprocessed.

CONCLUSION: Tuwo and Pap from unprocessed finger millet could be consumed by diabetic and non diabetic individuals since the glycemic index of unprocessed Finger millet food products were below 55% .

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OD34

Knowledge, Attitude and Practice of Exclusive Breastfeeding among Mothers in Nsukka Urban and the Anthropometric Indices of their Infants Aged 0-6 Months

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KEYWORDS: *Exclusive, Breastfeeding, Knowledge, Practice*

BACKGROUND AND OBJECTIVE:
Breastfeeding is a widespread practice in many sub-Saharan African countries, however, the practice of exclusive breastfeeding may be poor as a result of poor knowledge and attitude of breastfeeding mothers (1). Hence, this study was carried out to assess the knowledge, attitude and practice of exclusive breastfeeding among mothers and the anthropometric indices of their infants aged 0-6 months.

MATERIALS AND METHODS:
The study was conducted in Nsukka Urban area of Enugu State. Ethical clearance was obtained from Health Research Ethics Committee of the University of Nigeria Teaching Hospital Ituku-Ozalla, Enugu State. The study adopted a cross-sectional design. Cochran's formula (2) was used to obtain a sample size of 497. Questionnaire was used to obtain information on socio-economic characteristics, mothers' knowledge, attitude and practice of exclusive breast feeding. Weight and length of the infants were measured using standard procedures. These were related to age and classified using WHO child growth reference standard (3). Data were analysed using SPSS, Version 23. Results were presented in frequencies and percentages. Chi square was used to analyse relationships among variables. $P<0.05$ was set as statistical significance.

RESULTS AND DISCUSSION:
Most (92.0%) had high knowledge of exclusive breastfeeding, 69.0% had positive attitude while 65.6% practiced exclusive breastfeeding. The knowledge, attitude and practice of exclusive breastfeeding among the mothers in this study corroborated with the works of (4) that the attitude of mothers in Ghana towards exclusive breastfeeding reflected positively on the weight and length of their babies.

Table 1: Knowledge and Attitude of Exclusive Breastfeeding of Respondents

Variables	Frequency	Percentage
Knowledge Classification		
High	457	92.0
Low	40	8.0
Total	497	100.0
Attitude Classification		
Positive	343	69.0
Negative	154	31.0
Total	497	100.0

Table 2: Anthropometric Indices of the Children

Variables	Percentage
Underweight	7.9
Moderately Stunted	16.5
Severely Stunted	17.5
Wasting	7.8

CONCLUSION AND RECOMMENDATIONS:
Prevalence of stunting was alarming. Poor knowledge, attitude and inability to practice exclusive breastfeeding were associated factors. Nutrition education to improve mothers' knowledge, attitude and practice of exclusive breastfeeding is recommended.

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OD35

Modelling Beta-Carotene Retention in Three Nigerian Palm Oil Soups

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KEYWORDS: *Pro-vitamin A carotenoids, beta-carotene retention, mathematical modelling, Palm oil*

BACKGROUND AND OBJECTIVE:
Pre-heating of crude palm oil during the preparation of soups is a common practice in Nigeria, used to enhance flavour and taste. However, it leads to degradation and loss of pro-vitamin A carotenoids (1-4). The study modelled the effect of pre-heating and cooking on beta-carotene retention in commonly consumed palm oil soups in Ibadan North LGA in Nigeria.

MATERIALS AND METHODS:
The study was registered by the University of Ibadan/University College Hospital Ethics Committee. Seventy-five people were randomly selected to participate in a quantitative dietary recall, and 60 participants were selected based on their frequent consumption of palm oil soups. Three most-frequently consumed palm oil soups – *egusi* (melon soup), *efo-riro* (vegetable soup) and *obe ata* (palm oil stew) were selected from 15 palm oil dishes recalled by participants. To simulate palm oil pre-heating, oils from three different markets (Agbowo, Bodija and Telemu) in south-west Nigeria were homogenized and heated in an aluminium pot for 5 minutes, 15 minutes and 30 minutes at 190C. Samples were later cooled to room temperature, wrapped in opaque foils and stored at -25C before carotenoid analysis at the Department of Human Nutrition, Wageningen University, the Netherlands. Retention of beta-carotene in the composite soups was calculated using an exponential decay model (model I) at 190°C for the pre-heating phase of palm oil and a polynomial model (model II) for the cooking phase of the soups (5-6). Beta-carotene retention in palm oil was calculated experimentally by

simulating the pre-heating process and measuring beta-carotene concentrations at 5 minutes, 15 minutes and 30 minutes. Beta-carotene content of soup ingredients was calculated using nutrient values from the West African Food Composition Database, while considering the yield factors for each soup (7).

RESULTS AND DISCUSSION

Seventy-eight percent (78%), 82%, and 91% of carotenoid loss was estimated for *egusi*, *efo-riro,* and palm oil stew respectively, corresponding to 13,822 μg/100g, 12,297 μg/100g and 5,880 μg/100g of beta-carotene retained in the soups respectively.

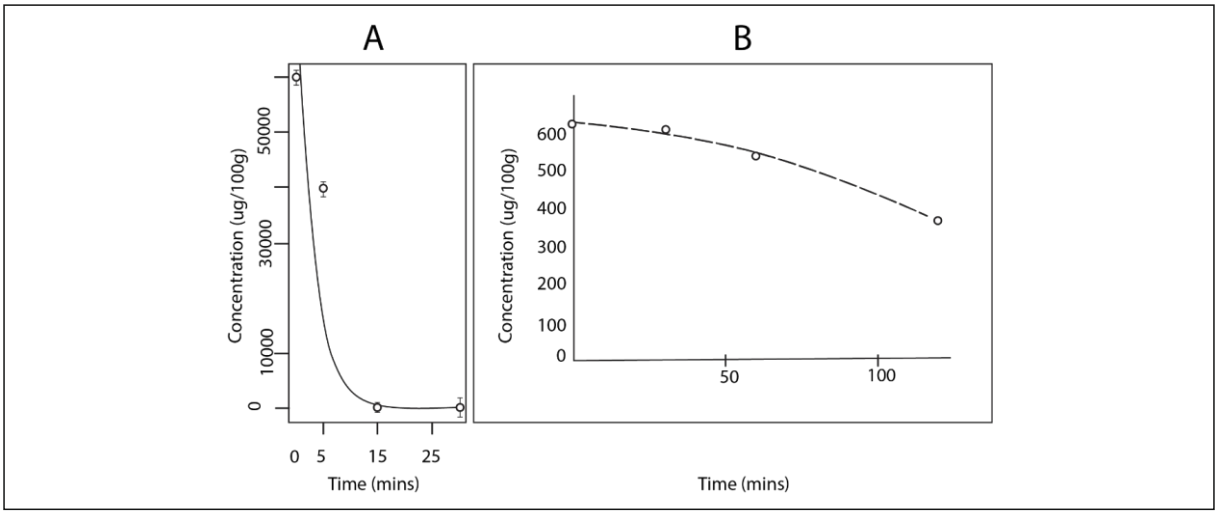

Figure 1.0: Exponential decay (A) and polynomial curves (B) used to model pre-heating and cooking of palm oil soups

Table 1: Estimates for bBeta-carotene lLoss during palm oil pre-heating

Coefficients (β)	Estimate	Standard Error	t-value	P-value
Intercept	11.3576	0.5832	19.474	0.00263
Time	-0.3164	0.0344	-9.197	0.01162

Adjusted R-squared= 0.9654; F-statistic: 84.59 on 1 and 2 DF; p=0.0116

Our results showed that although palm oil was a major contributor to the beta-carotene content of the soups, the pre-heating duration of the palm oil was a major contributor to nutrient loss, leading to a high loss of beta-carotene. Pre-heating of crude palm oil before cooking is a common practice and this was reported by most of the participants who often heated the oil up to 190°C for an average duration of 5 minutes. Following the rate constant estimated in this study, it would take about 3 minutes to lose half of the carotenoid content of palm oil. These findings corroborate previous findings on carotenoid loss during food handling and thermal processing (1-4,).

Interestingly, the estimates for beta-carotene concentrations in the soups were comparable with previous experimental study by Sanusi *et al* (21) who reported that melon soup *(egusi)*, vegetable soup (*efo-riro)* and palm oil stew contained 13,047μg/100kg, 12,976 μg/100kg and 7,872 μg/100kg respectively. In the present study, the modelled estimates were 13,822 μg/100kg, 12,297 μg/100kg and 5,880 μg/100kg (21).

The models from this study can be applied to calculate beta-carotene retention in melon soups (e*gusi)* vegetable soups (*efo-riro)* and palm oil (*obe ata)* soups cooked with similar recipes. It offers a novel approach of accounting for beta-carotene loss during the entire cooking process, most especially during the pre-heating process of palm oil. However, there is need for more work focusing on other carotenoids to account for all pro-vitamin A carotenoids. This would lead to more accurate estimations of retinol active equivalents (RAE) from Nigerian soups.

The multi-ethnic and multi-cultural nature of Nigeria often reflects in the various cooking habits of the Nigerian

people. For example, prolonged heating of palm oil is a more common practice in the south-west compared to the eastern part of the country and this contributes to the variations seen in the (7). Indeed, such variations in cooking habits will have implications for beta-carotene content of soups from these regions and in principle, can lead to wide variations in vitamin A nutrient intake. Therefore, the application of validated models can be useful for capturing individual differences in cooking habits and can lead to a more accurate assessment of vitamin A intake. Moreover, most Nigerian studies on dietary vitamin A intake assessment often assume similar cooking habits/recipes which are potential sources of bias during vitamin intake assessment.

Numerous studies on nutrient composition of Nigerian traditional soups rarely provide standardised recipes for analysed soups, thus leading to increasing difficulty in the estimation of the vitamin A content of these soups (8-9). Therefore, nutrient intake assessment is usually conducted using available values of food composition data from limited sources. In practice, different individuals adopt different food preparation methods which is almost impossible to capture using a static food composition table. Hence, mathematical models which individualise nutrient intake estimation by serving as a predictive tool for measuring nutrient retention from various cooking methods proves useful and sufficient for a quick and economical nutrient intake estimation. Thus, the results of this study will enable a near accurate estimation of beta-carotene intake from the three soups, once the recipe and palm oil pre-heating duration are provided by individuals during quantitative dietary assessment.

Although this study has numerous strengths, it was limited by a reduction in the number of participants. Only 52% of study participants consumed at least one palm oil dish per day, thus reducing the population size planned for this study. Secondly, this study only catered for estimating beta-carotene retention in three soups, which is a very small fraction of palm oil soups consumed in the country. Thirdly, only four data points were used, which can affect the accuracy of the model. Fourthly, the model equation from which beta-carotene retention estimates were computed assumed a first-order reaction with no vertical nor horizontal shifts. This in principle could reduce the accuracy of the estimates, although we think this may not be too significant.

Future studies should focus on other palm oil dishes and should include more experimental data to improve the accuracy of future models.

CONCLUSION

Pre-heating of palm oil contributed mostly to carotenoid loss. Caution should be taken when pre-heating of palm oil to minimize nutrient loss.

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OE1

Production and Sensory Evaluation of Tea Made from Cloves Ginger Lemon Grass Cinnamon Mint and Hibiscus Leaves.

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KEYWORDS:

BACKGROUND AND OBJECTIVE

Tea is one of the most widely consumed beverages globally, appreciated for its diverse flavours and potential health benefits (3). The integration of various natural ingredients such as clove, ginger, lemongrass, mint leaves, hibiscus leaves, cinnamon, and turmeric has led to the creation of a unique and flavoursome category of natural teas (2). This synthesis of different herbs and spices not only enhances the taste but also adds potential health-boosting properties to the brew (1). Tea especially green tea is a rich source of antioxidants such as catechins and bioactive compounds which have been associated with various health benefits. (4). Studies suggest that regular natural tea consumption may be linked to improved cardiovascular health. The objectives of this study include; producing natural tea using clove, ginger, lemongrass, mint leaves, cinnamon and hibiscus leaves and carrying out a sensory evaluation of tea produced from lemon grass, mint leaves, hibiscus leaves, ginger, clove and cinnamon.

MATERIALS AND METHODS

Materials: The materials include Lemon grass, Mint leaves, Hibiscus leaves, Ginger, Cinnamon and Clove (all materials are 100g).

Production of tea from lemongrass, mint leaves, hibiscus leaves, ginger, clove and cinnamon

Dried lemon grass mint leaves, hibiscus leaves, cloves, ginger and cinnamon were blended in varying proportions to obtain four different formulations (Table 1). Clean water was boiled and the packaged tea was dropped into it and allowed to leach into the water, sweetener was added to taste.

Table 1: Sample formulation (Percentage)

Samples	A	B	C	D	Control
Lemon grass	20	25	30	35	Commercially produced tea
Mint leaves	30	30	35	30	
Hibiscus leaves	35	30	20	20	
Cloves	5	5	5	5	
Ginger	5	5	5	5	
Cinnamon	5	5	5	5	

SENSORY EVALUATION: A 9-point hedonic scale was used to determine the organoleptic characteristics of the produced tea. The parameters evaluated include; taste colour, flavour, aftertaste and overall acceptability.

STATISTICAL ANALYSIS: The data collected was analyzed using descriptive statistics, which include mean and standard deviation, except if stated otherwise. Analysis of variance (ANOVA) was used to compare means and DMRT separated the differences between means. The significant difference was set at $p < 0.05$ SPSS version 20 will be used to carry out the statistical analysis.

RESULT

Table 2: Sensory Evaluation of Consumer Acceptability of the Formulated Tea Samples

Samples	Taste	Colour	Flavour	Aftertaste	Overall acceptability
A	7.55 ± 1.39^{b}	6.85 ± 2.41^{b}	7.15 ± 1.84^{b}	6.55 ± 1.57^{b}	7.6 ± 1.60^{b}
B	7.1 ± 1.07^{b}	6.75 ± 2.0^{b}	7.05 ± 1.54^{b}	7.05 ± 1.1^{b}	7.2 ± 1.36^{b}
C	7.6 ± 1.23^{b}	6.5 ± 2.01^{b}	6.7 ± 1.87^{b}	6.9 ± 1.52^{b}	6.85 ± 1.5^{b}
D	7.4 ± 1.57^{b}	7.25 ± 1.37^{b}	7.1 ± 1.92^{b}	6.55 ± 2.21^{b}	7.6 ± 1.27^{b}
E (control)	5.0 ± 1.45^{a}	5.05 ± 1.50^{a}	4.95 ± 1.5^{a}	5.05 ± 1.85^{a}	5.3 ± 1.53^{a}

For taste, there was no significant ($P<0.05$) difference between all the samples, except for sample E. Sample E (5.0 ± 1.45^{a}) had the least taste while sample C (7.6 ± 1.23^{b}) had the highest taste. For colour, there was no significant ($P<0.05$) difference except for different sample E, sample E (5.05 ± 1.5) was the least colour while sample A (6.85 ± 2.41) was the highest colour. For flavour, sample A (4.95 ± 1.5) was significantly ($P>0.05$) different from the rest of the samples and it had the least flavour. For After-taste, sample E (5.05 ± 1.85) was significantly different from the rest of the samples and it had the least after taste while sample B (7.05 ± 1.1) as the highest after-taste, overall acceptability sample E was significantly ($P>0.05$) different from all the samples with a mean score of (5.3 ± 1.53). In terms of colour, taste, flavour and aftertaste, sample A-D were most preferred compared to the control. Samples A, B and D had the highest overall acceptability.

CONCLUSION

The sensory evaluation result reveals that the formulated sample had better organoleptic characteristics compared to the control where sample D was produced from mint leaves 35%, lemon grass 30%, hibiscus leaves 20%, ginger 5%, cloves 5%, cinnamon 5% had highest score for overall acceptability even compared with the control sample (Sample E) which is commercially produced, this implies that the consumer prefers sample D.

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OE2

Effect of processing methods on blood glucose response of pearl millet meal (Dumpling).

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KEYWORDS:

BACKGROUND AND OBJECTIVE:
Pearl millet has more tolerance than sorghum and is the second most tolerant to salinity after barley. Along with these great genetic variations for full plant response have been noticed in pearl millet by Khan *et al.,* (1). Pearl millet is rich in carbohydrates, protein, calcium, dietary fibre, and polyphenols. In addition, it has been reported that millet has many other nutritional and medicinal properties and functions. Pearl millets are nutritionally comparable to major cereals and serve as a good source of protein and phytochemicals (3). The nutrient content and digestibility of millets are significantly influenced by the processing techniques. Consumption of millets helps manage hyperglycemia due to their low carbohydrate and high dietary fibre content, thus making millets a perfect food for the diabetic populace (4). The blood glucose response of food can be predicted by the hydrolysis index (HI) of a carbohydrate-based test food with that of reference foods. These benefits are of great importance in the nutritive treatment of diabetes mellitus, it improves glycemic control (2). The objectives of this study include; To produce meal (swallow) from different methods of processed pearl millet flour and determine the blood glucose response of the food.

MATERIALS AND METHODS
Materials: Pearl millet, glucometer, strip, lancet, cotton wool.

Sources of Raw Material: The raw material was purchased from the central market of Kaduna, Kaduna State.

Test food: four samples were formulated (A-D) according to different processing methods, Sample A: sprouted, Sample B; fermented, Sample C: dehulled, and Sample D: wholegrain

Preparation of Pearl millet meal: About 65g of pearl millet flour was added into 280 mL of boiling water, it was stirred manually with a wooden turning stick over a low flame until a smooth consistency was obtained. The meal was scooped and wrapped until ready to use.

Experimental Procedure: The volunteers arrived fasting, two blood samples were taken in the fasting state and the average result was taken as the baseline blood glucose concentration, expressed in millimoles per litre. The samples were taken within 5 min. This method was used throughout the study. The volunteers consumed test food containing 50g of edible carbohydrate at an even pace within 12-15 minutes. During testing, volunteers were in resting position, blood samples were taken at 15, 30, 45, 60, 90 and 120 mins and analyzed for blood glucose levels. The blood glucose was measured in capillary (finger prick).

Statistical Analysis: Statistical Analysis was performed using Graphpad and SPSS. Analysis of variation (ANOVA) was used to test means. A student test was used to compare the mean of the incremental area under the statistical significance difference was $P < 0.05$.

RESULT

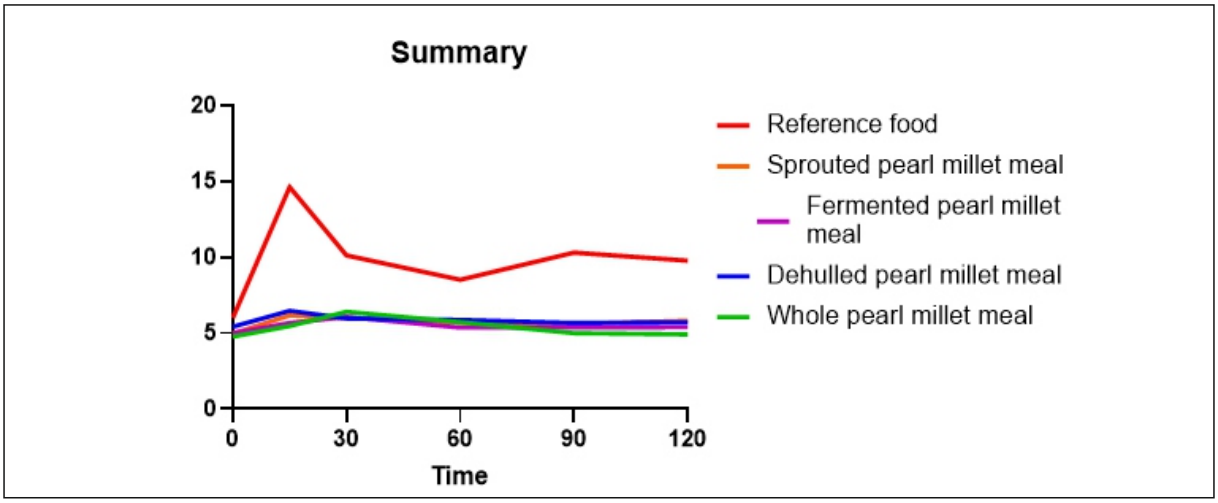
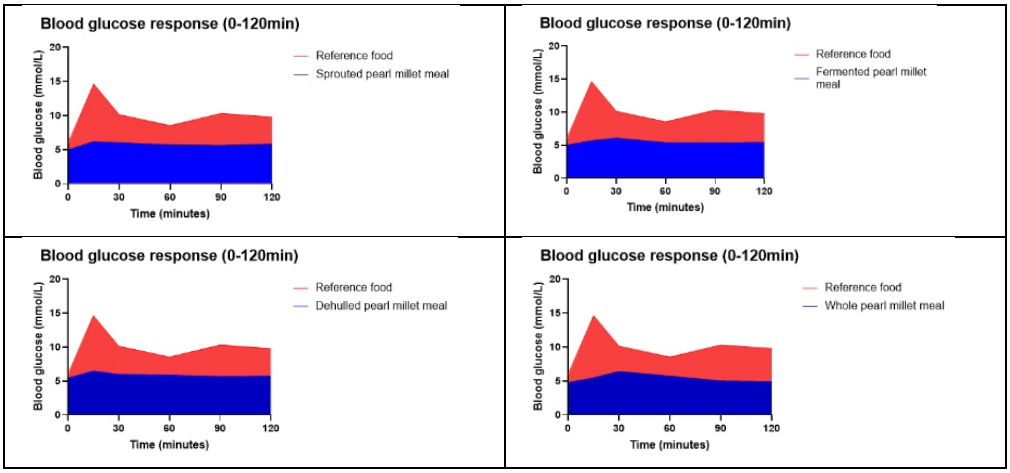


Figure 1: Blood glucose response of the pearl millet meals

Figure 1 above graph gives a graphical summary of the reference food, sprouted pearl millet meal, fermented pearl millet meal, dehulled pearl millet and whole pearl millet meal. The reference food had the highest blood glucose level at all time points, with a peak of 14.63 mmol/L at 15 minutes. The sprouted pearl millet meal had a lower blood glucose response than the reference food, with a peak of 6.17 mmol/L at 15 minutes. The fermented pearl millet meal had a similar blood glucose response to the sprouted pearl millet meal, with a peak of 5.67 mmol/L at 15 minutes. The dehulled pearl millet meal had a slightly lower blood glucose response than the sprouted and fermented pearl millet meals, with a peak of 6.47 mmol/L at 15 minutes.



CONCLUSION

The blood glucose analysis showed that pearl millet meal, regardless of the processing method, had a lower blood glucose response compared to reference foods (glucose).

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OE3

Rheological Parameters and Phytochemical Profiles of Pearl Millet Beverages

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KEYWORDS: *Pearl millet; Fura; tukudi; Freeze-drying*

BACKGROUND AND OBJECTIVE:
The consumption of powdered food products is increasing owing to their practicality, safety, and extended shelf life, which allow for long-term storage. In addition, they are widely produced and traded owing to their desirable properties that make them ideal for transportation and convenience [1]. Dehydrated *Fura* and *tukudi* fortified with dates, coconut flakes, and camel milk cake were prepared to address micronutrient deficiencies and extend the shelf life of the beverages. This study explored the production of enriched pearl millet beverages by freeze-drying dehydration and assessed their physicochemical properties.

MATERIALS AND METHOD:
These beverages (*fura* and *tukudi*) were prepared by mixing millet flour, ginger, cloves, coconut water, date fruit powder, coconut flakes, and camel milk cheesecake powder. Initially, 200 g of millet flour was combined with ginger and cloves, moistened with coconut water, and left to stand for 30 minutes. Date fruit, coconut flakes, and camel milk cheese were added and flash-steamed for 10 minutes. After resting for an hour at ambient temperature, the mixture was freeze-dried for complete dehydration and stored at 24, 4, and -4°C.
Rheological properties were measured using a Par Physical MCR 301 rheometer (Anthon Par, Austria) according to a previously described method [2], and spectroscopic analysis was carried out using a Model Spectrum 65 (PerkinElmer, Waltham, MA, USA) with KBr as the background. Sensory and volatile compounds analysis was performed using GC injection port at 250 °C for 5 minutes in non-split mode using a TR-35MS capillary column (0.25 mm x 30m, 0.25 µm, Thermo Fisher Scientific Ltd., MA, USA).

RESULTS AND DISCUSSION:
The dynamic rheology of the pearl millet beverages showed that G (storage modulus) was greater than G" (loss modulus) for all pearl millet beverages, and both G" and G" increased with increasing frequency ($P < 0.05$). The G′ value was higher than the G″ value ($p < 0.05$), demonstrating the typical elasticity and solid-like property [3] of pearl millet beverages. The G' (222.4 Pa) and G' (15.3 Pa) values of the control lower than those of the G' (4616.5 Pa) and G' (1020.4 Pa) fortified *tukudi* beverage ($p < 0.05$). Increased acidification with time reduces the viscoelasticity of pearl millet beverages, and lower G′ acidity conditions activate proteases [4].
The Fourier transform infrared spectroscopy (FTIR) spectra of the samples showed peaks between 3200 and 3300 cm^{-1} corresponding to O-H bond stretching and C–O peaks at 2399 cm^{-1}. Popping displayed the highest peak, indicating a high fat content, which was likely due to fortification and processing. Protein bands were observed at approximately 1599 cm^{-1} with characteristic infrared spectra at 1200 cm^{-1}. Carbohydrate-related frequencies appeared at 994 cm^{-1}, reflecting the short-range ordering of starch. The 806 cm^{-1} region bands indicate aromatic ring deformations linked to phenolic compounds, as well as C–C, C–H, and O–H planar deformations, suggesting the presence of phenolic acids and flavonoids.
The primary groups volatile organic compounds (VOCs) identified are listed in Table 1. VOCs generated during processing, such as *dodecanoic acid* (mainly from coconut) and *tetradecanoic acid* (from camel milk cheese), act as emulsifiers, facilitating the blending of water- and oil-based ingredients to achieve stable formulations. They also contributed to the creamy texture. Additionally, *ethyl isoallocholate* and *9,12-octadecadienoic acid (Z,Z)-2,3-dihydroxypropyl ester* were identified. Similarly, [5] isolated *ethyl isoallocholate* from rice to serve as a potent inhibitor of dihydropteroate synthase. *l-(+)-ascorbic acid 2,6-dihexadecanoate*, an antioxidant compound containing vitamin C. Catechin, tryptophan, procyanidin B1 were also identified. Volatile flavour compounds were identified by comparing the recorded mass spectra with the main library and the NIST library using retention indices (RI, similarity >80%).

Table 1: volatile organic compounds identified in the pearl millet beverages

VOCs Classifications	Peak area (%) *Fura*	Tukudi	Fortified tukudi
Acids	5.6 ± 0.1^{b}	2.4 ± 0.2^{c}	10.3 ± 0.2^{a}
Alcohols	5.2 ± 1.2^{a}	4.8 ± 0.3^{b}	4.2 ± 1.0^{b}
Alkanes	12.1 ± 1.0^{c}	16.4 ± 1.5^{b}	18.3 ± 1.1^{a}
Aldehydes	6.1 ± 0.3^{c}	8.5 ± 0.4^{b}	17.0 ± 0.2^{a}
Esters	13.4 ± 0.4^{a}	10.0 ± 0.01^{c}	14.0 ± 0.4^{a}
Phenolics	12.1 ± 0.4^{c}	15.4 ± 0.4^{b}	26.2 ± 0.4^{a}
Total	**54.5** ± 3.4	**57.5** ± 2.81	**90.0** ± 3.3

Values are mean ± SD of individual volatile compounds a, b, c: Means in the same row with different superscripts are significantly different ($p < .05$).

CONCLUSION AND RECOMMENDATÝON(S):

Millet grains are nutritious and contain antioxidants, polyphenols, and flavonoids that influence flavour. Volatile profiling characterizes pearl millet beverages and provides insights into the use of millet as a functional food ingredient with health benefits.

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OE4

Sensory Evaluation of Fortified Eba with Vanilla, Strawberry and Chocolate Flavors

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KEYWORDS: *Eba, Vanilla, Strawberry, Chocolate*

BACKGROUND AND OBJECTIVE:
Garri is the most consumed cassava-derived product in West Africa and many other Sub-Saharan African countries. Garri is typically eaten raw (combined with groundnuts, water, and sugar), made into Eba (the most popular variety) or sprinkled over cooked beans. However, despite its nutritional value and sensory qualities, its bland flavour may prevent it from being appealing to a wide variety of young and foreign consumers. The objective of this study is to prepare and assess the sensory attributes of Eba fortified with Chocolate, Strawberry and Vanilla flavours.

MATERIALS AND METHOD:
The strawberry, vanilla, and chocolate flavours alongside the white Garri were obtained at Osiele market, Abeokuta, Ogun State, Nigeria. About 500 ml of water and 1 tablespoon of flavourings were added to a pot and let to boil for 5 minutes. One cup (250g) of Garri was gradually added to the water while it was boiling, and the mixture was constantly swirled to prevent lumps from forming. When well combined, a small amount of water was added and left to cook over low heat for three minutes before turning off the heat. Sample A= Unfortified plain eba; Sample B= Vanilla flavored; Sample C= Chocolate flavored, and Sample D= Strawberry-flavored Eba. Sensory evaluation was assessed using a 9-point hedonic scale for 20 participants, and the data obtained was subjected to SPSS version 26.0 for analysis. ANOVA was used to analyze the mean appearance, aroma, taste, texture and overall acceptability of the food samples. Duncan's multiple range test was used to compare the means at a p-value of < 0.05 level of significance.

RESULTS AND DISCUSSION:
According to the sensory analysis and result, there was a significant difference ($p<0.05$) only in the aroma and overall acceptability of samples A and B. These are the reported appearance for samples A, B, C & D (7.20 ± 1.01^{a}, 7.05 ± 1.23^{a}, 6.85 ± 1.14^{a}, 7.40 ± 1.31^{a}), aroma for samples A, B, C & D (6.30 ± 1.30^{a}, 6.50 ± 1.24^{a}, 6.15 ± 1.31^{a}, 7.60 ± 1.35^{b}), taste for samples A, B, C & D (6.75 ± 1.21^{a}, 6.55 ± 1.23^{a}, 6.60 ± 1.09^{a}, 7.10 ± 1.62^{a}), texture for samples A, B, C & D (7.20 ± 1.01^{a}, 6.80 ± 1.06^{a}, 6.80 ± 1.39^{a}, 7.30 ± 1.22^{a}) and overall acceptability for samples A, B, C & D (7.20 ± 0.83^{ab}, 6.75 ± 1.25^{a}, 6.80 ± 1.01^{a}, 7.65 ± 1.18^{b}). As seen in Figure 1, sample D (strawberry-flavoured Eba) was favoured over all other samples in all attributes. Flavoured Eba offers a novel taste experience, appealing to a broader range of palates and attracting adventurous eaters [1].

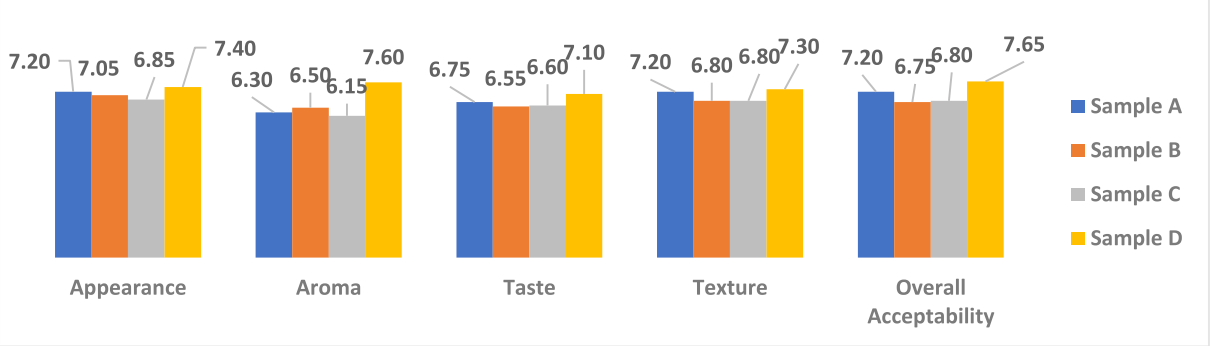

Figure 1: Ranking of the Prepared Food Samples

CONCLUSION AND RECOMMENDATIONS:
Strawberry-flavoured Eba has been found to be the most preferable and accepted flavour for fortifying Eba based on all the sensory attributes assessed in this present study. Therefore, fortifying Eba with strawberry flavour can potentially improve the sensory attributes and the general acceptability of Eba by consumers amongst all age groups, ethnic groups and genders.

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OE5

Sensory Evaluation of Flavoured Amala Fortified with Vanilla, Strawberry and Chocolate Flavour

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KEYWORDS: *Amala, Vanilla, Strawberry, Chocolate*

BACKGROUND AND OBJECTIVE:
This research focuses on the sensory evaluation of amala, a traditional Nigerian staple food fortified with the flavours of strawberry, chocolate, and vanilla, in an effort to diversify its flavours and enhance its nutritional value. Amala is a popular starchy meal that has been a significant part of Southwestern Nigerian cuisine for generations. Thus, this study aimed to assess the sensory evaluation of amala fortified with the stated flavours in order to introduce new and appealing variations to diversify the traditional food landscape, potentially attracting new consumers and appealing to those who enjoy different flavour profiles.

MATERIALS AND METHOD:
The ingredients were purchased at CAMP, towards Alabata Road, Abeokuta, Ogun State. Different variants of amala were prepared, each infused with one of the selected flavourings, and a control group of traditional amala was carried out in the food preparatory laboratory of the Department of Nutrition and Dietetics, FUNAAB. A group of 20 voluntary participants who are also Amala consumers were engaged to assess the organoleptic properties such as taste, aroma, colour, texture, and overall acceptability of the fortified amala. About 500ml of water was boiled to above 100°C in a pot, then 1 teaspoon of strawberry, chocolate, and vanilla for each sample (Sample A= Unflavoured amala; Sample B= amala fortified with strawberry flavour; Sample C= amala fortified with chocolate flavour; Sample D= amala fortified with vanilla flavour), covered the pot and left water to boil, lowered heat then added a cup of yam flour into water at a go then stirred with turning stick till it comes together. Add the reserved cup of hot water, cover it, and let it simmer for 1-2 minutes. Stirred 'amala' till it is smooth and fluffy. A 9-point hedonic scale was used to assess the sensory attributes and data obtained was subjected to analysis using SPSS version 26.0. Analysis of Variance (ANOVA) was used to compare and test the mean values. The significant level was set at < 0.05.

RESULTS AND DISCUSSION:
As seen in Table 1, a statistically significant difference was observed for the textures of the prepared samples. In contrast, no statistically significant difference was observed among the remaining attributes assessed in this present study. Sample A (unflavoured Amala) had the most favoured overall acceptability (6.50) among the samples. Moreover, appearance (7.0), taste (6.17), and texture (6.85) were the most acceptable qualities of the participants. Studies have demonstrated that familiarity with a flavour can significantly impact its acceptability [1], which might be the reason for the panellist's preference for sample A. At the same time, sample C (Amala fortified with chocolate flavour) had the highest acceptable aroma (6.70).

Table 1:Sensory Evaluation of the Prepared *Amala*

Sample (g)	Appearance	Aroma	Taste	Texture	Overall Acceptability
A	7.00±1.21^{a}	6.10±1.17^{a}	6.17±1.42^{a}	6.85±1.03^{b}	6.50±1.53^{a}
B	6.70±1.08^{a}	5.98±1.51^{a}	5.80±1.10^{a}	6.70±1.17^{ab}	6.05±1.27^{a}
C	6.55±1.19^{a}	6.70±1.71^{a}	5.70±1.49^{a}	5.95±1.31^{a}	6.10±1.48^{a}
D	6.85±1.41^{a}	6.45±1.60^{a}	6.15±1.46^{a}	6.50±1.50^{ab}	6.27±1.57^{a}

The mean values of each attribute under each sample along the same column with the same superscripts are not significantly different, and the values with different superscripts are significantly different.

CONCLUSION AND RECOMMENDATIONS:
The infusion of these flavours brings a delightful twist to the Amala, a traditional Nigerian dish, as seen by the selection of sample D, which is the most appealing sample with aroma. Fortified Amala specialty dishes should be offered in restaurants or food establishments, especially those seeking to offer innovative and unique menu items to consumers.

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OE6

Proximate composition of indigenous therapeutic foods made from local cereals and legumes

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KEYWORDS: *Indigenous therapeutic foods, cereals, legumes*

BACKGROUND AND OBJECTIVE:
Therapeutic foods are like specialized tools in the toolbox of nutrition, carefully crafted to serve specific therapeutic purposes (1). A therapeutic diet plays a crucial role in ensuring that individuals undergoing convalescence and rehabilitation receive adequate nutrition to support their recovery process (2). These dietary interventions are essential components of comprehensive care, helping to support recovery, prevent complications, and improve outcomes for children. The study was carried out to evaluate the proximate composition of four indigenous therapeutic foods made from cereals and legumes.

MATERIALS AND METHOD:
The raw materials were purchased from Ota market in Ado-Odo Ota local government area of Ogun State. The materials were sorted and weighed. Yellow maize was washed and soaked for 10hours, drained, oven dried for 60°C, milled and pass through mesh sieve. Soy beans were washed, steeped in water for 10 hours, drained and precooked for 15 minutes at 100 ºC and dehulled. Dehulled soybeans were dried in a cabinet dryer at 100ºC, milled and pass through sieve. Wholesome wheat grains were washed and stepped in water for 10 hours, drained and oven dried for 8 hours at 60°C. The dried wheat grains were milled and sieved to produce fine wheat flour. The rice sample was cleaned and sorted to remove chaff and other foreign materials, milled into flour using a hammer mill and sieved to obtain a flour of uniform particle size and dried groundnuts was crushed and sieved to obtain smooth flour. Recipe of four indigenous therapeutic foods was formulated and prepared in

the Laboratory, the samples were produced from blends of maize, soybean, Guinea Corn, Wheat, Rice and Groundnut at different ratios. The samples were prepared and coded as follows:
Sample1 –AWT - Wheat flour 60g, Soya bean Flour 30g and groundnut flour 10g. Sample2 –AMF- Yellow Maize flour 60g, Soya bean Flour 30g and groundnut flour 10g. Sample 3 –GCG - Guinea corn flour 80g, groundnut flour 20g. Sample 4 –RGT - Rice flour 80g, groundnut flour 20g. The proximate composition of the food blend was determined. Analysis of variance (ANOVA) was employed to analyse the data, Duncan's multiple range test used to separate the means at $P<0.05$.

RESULTS AND DISCUSSION:
The moisture content ranges from 2.40±0.06 in sample AMF to 6.09±0.08 in sample RGT. The result of moisture content obtained is lower compared to the result obtained by Ajilore *et al*. (3). There was no significant difference ($p>0.05$) in carbohydrate content between sample GCG (69.42±0.16) and RGT (69.43±0.16). Sample AWT (52.28±0.23) had the lowest value of carbohydrate content. The result of the carbohydrate is in line with the result obtained by Adeola *et al*. (4) but lower than the result obtained by Anigo *et al*., (5) in their study. There were significant differences ($p<0.05$) between the crude protein content of the samples. Sample RGT (12.27±0.08) had the lowest protein content while sample AWT (24.97±0.18) had the highest content. The crude protein result obtained in sample AMF is similar with the result obtained by Adeola *et al*. (4) but higher than crude protein content in sample RGT and GCG.

Table 1: Proximate composition of indigenous therapeutic foods made from cereals and legumes

PARAMETERS	AMF	GCG	AWT	RGT
Moisture (%)	2.40 ± 0.06^{d}	3.72 ± 0.08^{c}	4.89 ± 0.08^{b}	6.09 ± 0.08^{a}
Carbohydrate (%)	$55.25\ \pm0.29^{b}$	69.43 ± 0.18^{a}	52.28 ± 0.23^{c}	69.42 ± 0.16^{a}
Crude Protein (%)	$23.93\pm\ 0.06^{b}$	13.19 ± 0.06^{c}	24.97 ± 0.18^{a}	12.27 ± 0.08^{d}
Crude Fat (%)	$15.08\pm\ 0.45^{a}$	10.61 ± 0.28^{c}	14.45 ± 0.14^{b}	8.39 ± 0.13^{d}
Crude Fibre (%)	$2.03\pm\ 0.84^{a}$	1.61 ± 0.01^{c}	1.47 ± 0.06^{d}	$1.78\ \pm\ 0.01^{b}$
Total Ash (%)	$1.32\pm\ 0.00^{c}$	1.71 ± 0.05^{b}	$1.94\pm\ 0.12^{a}$	2.05 ± 0.04^{a}
Gross Energy (%)	5105.04	4616.19	4973.33	4374.66

Values are mean ± SD. Values with different superscript in the same row are significantly different at $P<0.05$.

CONCLUSION AND RECOMMENDATÝON
The study revealed that food formulated from indigenous food commodities, can meet the macro and micro nutritional needs of young children. The proximate composition of the foods shows that all samples were rich in macro – nutrients. Based on the results obtained in this study, we could conclude that readily available cereals and legumes as used in this study will improve daily protein, energy, fat, and also the macronutrient and micronutrient requirement of the children. Nutritional interventions should emphasize on the promotion of indigenously produced therapeutic foods, produced from locally available raw materials

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OE7

Effect of different drying methods on the nutritional composition of chili *(Capsicum Annuum L.)*

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KEYWORDS:

BACKGROUND AND OBJECTIVE:
Chili peppers (*Capsicum annuum* L) are globally popular spices, known for their heat and vibrant color. Originating from Central and South America, they have been integral to the region's culinary and medicinal traditions for thousands of years [1] (Dubey *et al.,* 2015). Today, they are used in various global cuisines and valued for their flavor enhancement and nutritional content, being rich in vitamins A, C, E, and minerals like potassium and magnesium, as well as antioxidants such as capsanthin with health benefits. However, fresh chili peppers are highly perishable due to their high moisture content [2] (Tjukup *et al*. 2012), necessitating preservation methods like shade, oven, and sun drying. These methods extend their shelf life and enable diverse culinary uses. Understanding the effects of different drying methods on the nutritional composition of chili peppers is crucial for making informed choices about preservation techniques. This knowledge helps in choosing the most suitable preservation technique based on nutritional retention, cost, and availability of resources.

MATERIALS AND METHODS:
This study evaluated the impact of various drying methods on the nutritional composition of chili peppers. Fresh chili peppers were sourced from a local market and sorted for uniform size and ripeness. Proximate and elemental analyses were conducted using AOAC (2005) methods, while vitamin content was determined using Rutkowski and Grzegorczyk (2007) methods. Data from each drying method were compared to assess their impact on nutritional quality. Statistical analysis was performed to identify significant differences between the drying methods.

RESULTS AND DISCUSSION: The result of the proximate composition, vitamins and minerals analysis of different drying methods on the nutritional composition of Chili (*Capsicum annuum L.*) are presented in Tables 1 and 2, respectively.

Table 1: Proximate Composition of different drying methods

	Moisture	Ash	Protein	Fat	Fiber	Carbohydrate
Oven-dried	9.35±0.59	10.67±0.62^{b}	8.33±1.53^{a}	9.67±1.53^{a}	27.43±0.60^{a}	34.55±2.01^{a}
Sun-dried	11.80±0.6	12.00±0.30^{a}	9.20±0.53^{a}	7.6±0.53^{b}	27.73±0.46^{a}	31.67±1.42^{a}
Shade-dried	12.43±0.59	12.77±0.68^{a}	9.93±0.31^{a}	7.97±0.25^{b}	23.47±5.95^{a}	33.43±7.25^{a}

Table 2: Vitamins and minerals composition of chili samples

	Thiamine (mg/100g)	Riboflavin (mg/100g)	Niacin (mg/100g)	Vitamin C (mg/100g)	Vitamin E (mg/100g)	Calcium (mg/100g)	Iron (mg/100g)	Zinc (mg/100g)
Oven-dried	0.07±0.01^{a}	0.06±0.02^{a}	0.05±0.01^{b}	84.07±1.03^{a}	0.5±0.10^{a}	9.93±0.12^{b}	0.31±0.02^{a}	0.15±0.03^{a}
Sun-dried	0.06±0.01^{a}	0.05±0.01^{a}	0.07±0.01^{a}	84.5±0.56^{a}	0.57±0.06^{a}	11.67±0.50^{a}	0.25±0.04^{b}	0.11±0.02^{a}
Shade-dried	0.07±0.01^{a}	0.06±0.01^{a}	0.07±0.01^{a}	83.57±1.78^{a}	0.6±0.10^{a}	11.47±0.38^{a}	0.32±0.03^{a}	0.17±0.05^{a}

CONCLUSION:
The study demonstrated that the choice of drying method (shade, oven, or sun) has varied effects on the nutritional composition of chili. While the vitamins and minerals content remained relatively stable across different drying methods, there were notable differences in proximate analysis. Oven drying yielded the highest carbohydrate and fat content, while shade drying preserved the most protein. Sun drying resulted in the highest fiber content.

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PE8

Proximate composition of cake and biscuit produced from wheat and sorghum enriched with sunflower seeds

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KEYWORDS:

BACKGROUND AND OBJECTIVE:
The increased rate of snacks (especially cookies) in Nigeria has been reported as a remote cause of growing urbanization, working mothers, and prolonged school period stays (1). Cake and biscuits are one of the most popular foods because they have varied tastes, easy to consume, are relatively low cost and have a long storage life (2). Therefore, intentionally increasing and enriching the nutrients poorly available in wheat flour with inexpensive and nutritious staples, such as seeds, nuts and pulses, will help improve the nutritional quality of the wheat products (3).

OBJECTIVE: The study was to determine the nutrient composition of cake and biscuit produced from wheat and sorghum enriched with sunflower seeds.

MATERIALS AND METHOD:
Wheat, sorghum, and sunflower seeds were cleaned, stones and other foreign materials removed, and the cleaned samples were washed and dried at 60 °C for (six hours for wheat and sorghum; eight hours for sunflower seeds) in an oven and milled using a Hammer mill (F-23ZS England) into flour. Wheat, sorghum, and sunflower seed fine flour were obtained using a sieve (800 micron) and packaged in an airtight nylon bag for further use. Six composite flour samples were formulated from wheat, sorghum and sunflower seeds flours in the ratio of 70:20:10; 60:20:20; 50:20:30; 70:10:20; 60:30:10; 50:30:20; and 100% wheat flour. 250 and 350g blends of wheat, sorghum and sunflower seeds were produced in the production of cake and biscuits respectively. The proximate composition of the produced samples of cake and biscuits were analyzed. All nutrients were determined in triplicates using standard method AOAC. Data from the study were statistically analyzed using analysis of variance. Average means were separated by least significant difference (LSD) and significance was judged at 0.05.

CONCLUSION: The incorporation of sunflower seed flour enriched the fiber and protein content of biscuit and cake samples.

RESULTS AND DISCUSSION:

TABLE 1 Proximate composition of cake samples

Samples	% Moisture	% Ash	% Fiber	% Fat	% Protein	% Carbohydrate
CWSCON	$24.36^{a}\pm0.25$	$2.37^{e}\pm0.08$	$0.08^{e}\pm0.01$	$26.72^{d}\pm0.10$	$6.43^{f}\pm0.19$	$40.06^{c}\pm0.08$
CWSF1	$13.51^{g}\pm0.34$	$3.04^{a}\pm0.03$	$2.02^{b}\pm0.03$	$25.85^{e}\pm0.11$	$10.45^{a}\pm0.00$	$45.14^{a}\pm0.18$
CWSF2	$18.37^{d}\pm0.09$	$2.73^{c}\pm0.04$	$2.74^{a}\pm0.02$	$29.50^{c}\pm0.05$	$7.68^{d}\pm0.20$	$39.00^{d}\pm0.22$
CWSF3	$21.61^{b}\pm0.33$	$2.56^{d}\pm0.04$	$2.04^{b}\pm0.03$	$30.05^{c}\pm0.06$	$7.40^{d}\pm0.38$	$36.34^{e}\pm0.13$
CWSF4	$20.61^{c}\pm0.32$	$2.29^{e}\pm0.02$	$1.38^{c}\pm0.03$	$26.96^{d}\pm0.25$	$9.42^{b}\pm0.37$	$39.36^{d}\pm0.45$
CWSF5	$15.69^{f}\pm0.39$	$2.95^{b}\pm0.06$	$0.76^{d}\pm0.01$	$31.45^{b}\pm0.53$	$6.90^{e}\pm0.19$	$42.26^{b}\pm0.01$
CWSF6	$17.49^{e}\pm0.06$	$2.84^{b}\pm0.17$	$1.44^{c}\pm0.04$	$33.47^{a}\pm0.33$	$8.50^{c}\pm0.20$	$36.27^{e}\pm0.20$

The cake sample showed significant difference in the nutritive values. However, CWSFI recorded the highest Protein (10.45%) and Ash (3.04%).

TABLE 2 Proximate compositions of Biscuit samples

Samples	% Moisture	% Ash	% Fiber	% Fat	% Protein	% Carbohydrate
BWSCON	$0.20^{f}\pm0.04$	$3.91^{a}\pm0.02$	$0.06^{f}\pm0.00$	$26.30^{f}\pm0.08$	$7.96^{a}\pm0.36$	$61.59^{a}\pm0.30$
BWSF1	$0.89^{b}\pm0.05$	$3.60^{b}\pm0.14$	$1.13^{d}\pm0.02$	$26.12^{f}\pm0.16$	$7.31^{b}\pm0.19$	$60.97^{b}\pm0.04$
BWSF2	$0.57^{d}\pm0.04$	$3.02^{d}\pm0.06$	$2.25^{c}\pm0.03$	$26.83^{e}\pm0.08$	$8.25^{a}\pm0.00$	$59.08^{c}\pm0.04$
BWSF3	$0.37^{e}\pm0.03$	$3.27^{c}\pm0.01$	$3.47^{a}\pm0.04$	$29.35^{c}\pm0.12$	$7.79^{ab}\pm0.19$	$55.76^{f}\pm0.13$
BWSF4	$0.75^{c}\pm0.04$	$2.24^{f}\pm0.06$	$2.21^{c}\pm0.01$	$28.13^{d}\pm0.37$	$8.30^{a}\pm0.40$	$58.44^{d}\pm0.05$
BWSF5	$0.54^{d}\pm0.00$	$2.76^{e}\pm0.11$	$0.98^{e}\pm0.01$	$30.44^{b}\pm0.23$	$7.97^{a}\pm0.00$	$57.33^{e}\pm0.13$
BWSF6	$1.30^{a}\pm0.05$	$2.08^{f}\pm0.06$	$2.51^{b}\pm0.01$	$33.05^{a}\pm0.03$	$6.60^{c}\pm0.00$	$54.47^{g}\pm0.00$

The proximate composition of samples varied. But the protein contents of BWSF2, BWSF4 and BWSF5 were similar statistically.

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PE9

Proximate composition, glycemic index and sensory attributes of some edible flours

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KEYWORDS: *Edible flours, nutritional composition, sensory properties, glycaemic index*

BACKGROUND AND OBJECTIVE:
Alternative foods are being recommended as replacements for excessively starchy and sugary foods due to the rise in the prevalence of diet-related diseases, globally [1]. Naturally, cereals contain relatively less starch and are rich sources of essential macro and micro nutrients [2]. This study determined the proximate composition, glycaemic index and sensory attributes of processed cassava flour and some cereal flours (finger millet, black fonio, rye).

METHODOLOGY:
Already processed cassava flour was purchased while the cereals were bought and processed into fine flours. A laboratory experimental approach was used; chemical analyses were carried out to determine the proximate content of the edible flours using AOAC standard methods. Sensory evaluation of the flours (made into swallows) was carried out using a 9-point hedonic scale. Quantitative data were analysed using SPSS and ANOVA was carried to determine significant difference at $p<0.05$.

RESULTS AND DISCUSSION:
The findings show that the protein content of rye flour (10.55±0.03mg/100g) was significantly ($p<0.05$) higher while cassava flour recorded the least protein value (2.86±0.02mg/100g). Rye flour also had the highest concentration of dietary fibre and (4.14±0.02mg/100g) fat compared to other flour samples. Carbohydrate content in cassava flour was significantly higher when compared to other flour samples. The result also revealed that GI of rye flour was significantly ($p<0.05$) higher (52.73+0.07) compared to black fonio flour (48.4±0.01), finger millet flour (46.32±0.59) and cassava flour (42.73±0.05). In managing NCDs, incorporation of low GI foods is beneficial especially for reducing blood glucose levels [3]. The sensory evaluation also showed that the edible flours had good overall acceptability which means consumers would find it easy to eat them when prepared as swallows/meals.

TABLE 1: Proximate composition of the edible flours (in g/100g)

Flours	Moisture	Ash	Protein	Dietary fibre	Fat	Carbo-hydrate	Energy (kilojoules)	Glycaemic index
Cassava	9.83 ±0.01^{b}	1.79 ±0.01^{a}	2.86 ±0.02^{a}	7.91 ±0.01^{a}	1.59 ±0.01^{a}	82.68 ±0.00^{d}	356.40 ±0.02^{b}	42.73 ±0.05^{a}
Finger millet	10.26 ±0.02^{d}	1.86 ±0.02^{b}	8.65 ±0.05^{c}	8.61 ±0.01^{b}	1.79 ±0.01^{b}	75.66 ±0.15^{c}	353.68 ±0.20^{a}	46.32 ±0.59^{b}
Black fonio	10.17 ±0.01^{c}	1.78 ±0.02^{a}	7.37 ±0.03^{b}	9.65 ±0.02^{c}	3.85 ±0.01^{c}	74.63 ±0.02^{b}	363.16 ±0.40^{c}	48.40 ±0.01^{c}
Rye	9.69 ±0.01^{a}	2.17 ±0.01^{c}	10.55 ±0.03^{d}	9.76 ±0.02^{d}	4.14 ±0.02^{d}	71.11 ±0.04^{a}	363.42 ±0.02^{c}	52.73 ±0.07^{d}

Values are expressed as mean ±SEM, n -= 3. Values in the same column with different superscripts are significantly different at $p<0.05$

CONCLUSION AND RECOMMENDATION:
From the findings of this research, the cereal flour samples are good sources of protein, and dietary fibre, which makes them healthy alternatives to starchy staples. This will go a long way to offer diet options to people managing non-communicable diseases such as diabetes and obesity, especially in this part of the world where a lot of swallows are consumed alongside traditional soups.

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PE10

Assessment of feed type effects on consumption patterns and serum biochemistry of Albino rats

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KEYWORDS: *Consumption Patterns,Feed intake, Biochemical Parameters, Growth performance*

HIGHLIGHTS:
- Higher feed consumption with commercial feeds and stable growth with formulated feeds
- Enhanced biochemical markers in commercial feed group and intricate relationship between diet and physiological responses
- Personalized nutritional strategies could enhance growth and health in animal husbandry and experimental settings

BACKGROUND AND OBJECTIVE:
Nutritional management in animal husbandry and biomedical research is crucial for growth performance and health. Albino rats are ideal subjects for studying dietary variations, as they have well-documented physiology [1]. The objective of this study is to assess the impact of formulated and commercial feeds on albino rats' consumption patterns, growth performance, and serum biochemical parameters.

MATERIALS AND METHODS:
The study at Kaduna Polytechnic, Nigeria, involved 20 rats divided into two groups. They were fed a diet of maize, soybean, and groundnut, with weekly measurements (2) of feed consumption and growth. Serum samples were collected to assess liver and kidney function. Data were analyzed using SPSS Version 20 and ANOVA to compare means and determine significant differences.

RESULTS AND DISCUSSION:
The study compared the effects of commercial and formulated feeds on feed intake, body weight, and biochemical profiles of Wistar albino rats over seven weeks. The key findings include:

1. **The Feed Intake of the Formulated and Commercial Feed of Wistar Albino Rats**
   Both commercial and formulated feeds showed varying levels of intake at different weeks, with commercial feed showing slightly higher daily intake. The differences in feed intake were not statistically

significant.

2. **Effect of the Formulated and Commercial Feed on the Body Weight of Wistar Albino Rats**
   Rats fed with formulated feed exhibited a more significant increase in body weight compared to those on commercial feed. The weight gain difference was notable but not statistically significant.
3. **Effect of the Formulated and Commercial Feed on the Biochemical profiles of the Wistar Albino Rats**
   The commercial feed group had higher levels of urea, creatinine, total protein, albumin, ALAT,ASAT, and alkaline phosphatase. These higher levels suggest potential liver stress or higher protein metabolism in the commercial feed group. Formulated feed provided a balanced biochemical profile, indicating healthier outcomes.

Table 1: Effect of the Formulated and Commercial Feed on the Body Weight and Biochemical Profile of Wistar Albino Rats

Week	Commercial Feed (g)	Formulated Feed (g)	Parameters	Commercial	Formulated
Week 0	55.35 ± 0.38 ^{a}	55.35 ± 0.38 ^{a}	Urea (mol/L)	6.46 ± 0.07 ^{a}	4.83 ± 0.49 ^{a}
Week 1	62.69 ± 1.98 ^{a}	69.37 ± 1.52 ^{a}	Creatinine (umol/L)	83.35 ± 5.34 ^{b}	61.10 ± 4.43 ^{a}
Week 2	82.52 ± 0.52 ^{a}	92.13 ± 1.21 ^{ab}	Total protein (g/L)	64.00 ± 2.55 ^{ab}	51.10 ± 1.70 ^{b}
Week 3	92.97 ± 1.78 ^{b}	108.89 ± 1.52 ^{a}	Albumin (g/L)	36.35 ± 1.74 ^{a}	27.10 ± 0.29 ^{b}
Week 4	109.09 ± 1.99^{ab}	126.42 ± 1.04 ^{b}	ALAT (IU/L)	10.75 ± 0.86 ^{b}	5.80 ± 0.41 ^{a}
Week 5	130.11 ± 1.02 ^{a}	141.29 ± 1.11 ^{ab}	ASAT (IU/L)	10.95 ± 0.41 ^{b}	6.75 ± 0.22 ^{ab}
Week 6	141.91 ± 1.62 ^{a}	150.33 ± 1.68 ^{a}	ALK Phosphatase (IU/L)	73.55 ± 2.33 ^{a}	55.20 ± 1.97 ^{b}

KEY: Period of Seven Weeks after Weaning. Values are expressed as mean ± SD: n = 10.
Data in the same row carryin different superscripts differ significantly from each other ($P<0.05$)

CONCLUSION:
Commercial feeds may promote higher daily intake and growth performance, formulated feeds lead to more significant body weight gains and healthier biochemical profiles in Wistar albino rats. Nutritional composition of formulated feeds is better suited for promoting balanced growth and maintaining overall health.

RECOMMENDATION:
Use formulated feeds for Wistar albino rats in experimental diets and animal husbandry practices. These feeds provide stable nutrition, support growth, and balanced biochemical profile, contributing to the overall health and well-being of the animals.

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PE13

Nutrient Evaluation and Acceptability of Garri Fortified with Soybeans

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KEYWORDS: *Garri, fortification, soybeans*

HIGHLIGHTS:

- Fortification of garri with soybeans has enhanced its nutritional value

BACKGROUND AND OBJECTIVE:

The consumption of garri, a popular staple food in Nigeria is widespread among university students. However, concerns about its nutritional content have led to exploration of fortification methods to enhance its nutritional value [4]. This study aims to evaluate the nutrient content and assess the acceptability of garri fortified with soya beans among students at Bayero University Kano (BUK).

MATERIALS AND METHODS:

Grains of soybeans were washed, dried and grounded. Fresh cassava roots were peeled to reveal the inner flesh and grated. The grated cassava was then placed in a clean sack and squeezed to remove excess liquid. This was then allowed to ferment naturally for about two to three days after which it was sun dried. Once dried, the fermented cassava was roasted for about five minutes on medium low heat. The grounded soybeans were combined with the fermented, dried cassava granules and roasted continuously for 5-10 minutes on medium low heat until crispy. Proximate analysis, vitamin and mineral content of the resulting fortified garri were determined using standard methods and a structured questionnaire was administered for sensory evaluation. A stratified random sampling method was employed to select 200 participants from students of BUK only. Independent T-test was carried out to compare traditional and fortified garri. P-values less than 0.05 were considered significant.

RESULTS AND DISCUSSION

Table 1: Proximate, Vitamins and Minerals Contents of Traditional and Fortified Garri

Parameter	Traditional Garri	Fortified Garri
Crude Protein (%)	2.80*	7.76*
Crude fibre (%)	18.29*	8.10 *
Fat content (%)	6.44 *	7.95 *
Moisture content (%)	11.86*	8.64 *
Ash content (%)	1.28 *	2.06 *
Carbohydrate (%)	59.33*	65.49 *
Vitamin A (mcg/g)	18.50±0.41*	22.67±0.01*
Vitamin C(mcg/g)	12.52±0.02*	22.45±0.03*
Vitamin K(mcg/g)	0.05±0.00*	0.06±0.01*
Vitamin B12(mcg/g)	0.41±0.00*	0.53±0.05*
Vitamin D(mcg/g)	0.78±0.09*	1.85±0.11*
Calcium(mg/100g)	43.33±0.47*	57.67±1.25*
Copper(mg/100g)	30.95±1.35*	38.33±1.25*
Phosphorus(mg/100g)	2.12±0.01*	4.36±0.08*

* Independent T-test. All p-value >0.05

Table 2: Sensory Evaluation of Fortified Garri

	Frequency	Percentage (%)
Taste		
Excellent	178	89
Poor	22	11
Aroma and Flavour		
Neutral	185	92.5
Too Strong	15	7.5
Texture		
Excellent	161	80.5
Poor	39	19.5
Overall Satisfaction		
Satisfied	193	96.5
Not Satisfied	7	3.5

The results of sensory evaluation and acceptability mostly had a positive response. Similar results were reported by [4] who found fortified garri with soybeans to be generally well-accepted by consumers in Nigeria. The substantial rise in crude protein in fortified garri was consistent with the findings of [1] and [4] and it addresses a critical nutritional gap, as protein deficiency is a concern in many African countries. The decrease in moisture content in fortified garri aligns with expectations and suggests that fortified garri might have a longer shelf life due to reduced microbial activity. The importance of shelf life extension in fortified foods to ensure wider accessibility and program sustainability were highlighted by [2]. The impact of fortification on vitamins and minerals contents appears to be mixed. A decrease in some of the vitamins and minerals contents highlights the importance of optimizing fortification techniques, as emphasized by [3] who stressed minimizing nutrient losses during food fortification.

CONCLUSION AND RECOMMENADATION(S)

These results provide promising evidence for the potential of fortified garri to improve the nutritional profile of a staple food in Nigeria. Authorities should develop educational campaigns to raise awareness about food fortification practices and the specific benefits of fortified garri.

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OE14

Nutritional analysis of commonly consumed complementary foods produced by women in farming communities of Bauchi State

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KEYWORDS: *Nutritional Analysis, Complementary Foods, Farming Communities, Female Farmers*

HIGHLIGHTS:

- TBC has significantly higher protein (17.91%) than GPC (14.45%).
- Zinc content is higher in TBC (6.22 mg) compared to GPC (4.14 mg)
- A cross-sectional survey used multistage sampling and SPSS for data analysis.

BACKGROUND AND OBJECTIVE:

Child nutrition is crucial for lifelong health, especially during early growth [1]. The WHO emphasizes adequate infant and young child feeding (IYCF), including breastfeeding and timely complementary foods [2]. In 2022, 149 million children under 5 were stunted, 45 million wasted, and 37 million overweight [3]. However, few children receive nutritionally adequate and safe complementary foods; in many countries, less than a fourth of infants aged 6–23 months meet the criteria for dietary diversity and appropriate feeding frequency [4]. Therefore, this study evaluated the nutritional content of commonly consumed cooked complementary foods produced by women in farming communities within selected Local Government Areas of Bauchi State.

METHODOLOGY:

A cross-sectional descriptive survey recorded the most produced and accepted formulations and food types. A total of 300 questionnaires were distributed to female farmers in Bauchi State using a multistage sampling technique, dividing respondents into three senatorial districts and selecting one local government area from each. Nutritional value analysis was performed following standard procedures, with data processed using SPSS version 25.0.

RESULS AND DISCUSSION:

Most respondents are aged 26-35 (50.5%) and predominantly married (90.7%). Trading is the primary occupation (46.2%), while students and apprentices constitute a smaller group (8.6%). A significant portion earn less than ₦10,000 monthly (72.8%), and over half live in block flats (53.2%).

Table 1: Proximate composition of commonly consumed complementary food produced by Female farming communities in Bauchi state

Nutrients (%)	TBC	GPC
Moisture	3.46 ± 0.31^{b}	3.24 ± 0.09^{b}
Crude Fibre	12.15 ± 0.06^{a}	11.44 ± 0.08^{as}
Ash	4.24 ± 0.59^{b}	4.07 ± 0.07^{a}
Protein	17.91 ± 0.09^{b}	14.45 ± 0.45^{a}
Fat	2.42 ± 0.20^{a}	2.31 ± 0.19^{a}
Carbohydrate	22.42 ± 0.24^{a}	20.12 ± 0.40^{b}

Sample TBC (Turn Brown Cooked): Soya beans, Guinea corn and Groundnut
Sample GPC (Groundnut pap Cooked): Groundnut and Maize

Mean ± standard deviation values of duplicate analyses. Values with different superscripts in each column are not statistically significant at ($P < 0.05$).

Table 1 presented the proximate composition of complementary foods. The analysis showed that Turn Brown Cooked (TBC) had slightly higher moisture content (3.46±0.31%) compared to Groundnut Pap Cooked (GPC) (3.24±0.09%), though this difference was not significant. TBC exhibited higher crude fibre (12.15±0.06%) and ash content (4.24±0.59%) than GPC (11.44±0.08% and 4.07±0.07%, respectively). Notably, TBC had significantly higher protein content (17.91±0.09%) and carbohydrate content (22.42±0.24%) compared to GPC (14.45±0.45% and 20.12±0.40%, respectively). Both samples had similar fat content, with TBC at 2.42±0.20% and GPC at 2.31±0.19%.Sample TBC (Turn Brown Cooked): Soya beans, Guinea corn and Groundnut

Table 2: Mineral contents of commonly consumed complementary food produced by Female farming communities in Bauchi state

MINERALS	TBC	GPC
Sodium	10.17±0.203[a]	10.12±0.201[a]
Calcium	5.24±0.104[a]	5.21±0.101[a]
Potassium	14.18±0.208[b]	14.18±0.084[b]
Magnesium	8.22±0.164[a]	8.09±0.10[b]
Phosphorus	4.17±0.083[a]	4.11±0.17[a]
Zinc	6.22±0.03[b]	4.14±0.05[as]
Iron	9.81±0.14[b]	9.65±1.17[a]

Sample GPC (Groundnut Pap Cooked): Groundnut and Maize

Mean ± standard deviation values of duplicate analyses. Values with different superscripts in each column are not statistically significant at ($P < 0.05$)

Table 2 detailed the mineral content analysis. TBC showed higher magnesium (8.22±0.164) and zinc (6.22±0.03) contents compared to GPC (8.09±0.10 and 4.14±0.05, respectively), with these differences being statistically significant. Iron content was also higher in TBC (9.81±0.14) compared to GPC (9.65±1.17). Sodium, calcium, and phosphorus levels were comparable between the two samples.

CONCLUSION AND RECOMMENDATION:
TBC exhibits higher nutritional and mineral contents compared to GPC, notably in protein, fibre, magnesium, and zinc. It is recommended to prioritize TBC in complementary feeding programs to enhance nutritional intake, especially protein and essential minerals, for female farming communities in Bauchi State.

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OE16

Functional Food Physicochemical and Sensory Evaluation Properties of Black and Green Sugarcane Jaggeries

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KEYWORDS: *Functional food, nutraceuticals, jaggery sugar cane and antioxidant.*

BACKGROUND AND OBJECTIVE:
Jaggery is a natural traditional sweetener made by the concentration of sugar cane juice. It contains variety of essential amino acids, minerals and vitamins of the sugarcane juice. It is also high in calcium which is required for maintenance of bone strength and is rich in iron, magnesium and potassium, which may prevent diseases like anemia[1]. It is also rich in phytochemicals present in sugarcane juice and therefore, it is expected that its nutritional value is higher than that of refined sugar[3&4]. Despite its health benefits, jaggery is not accepted as a natural sweetener in Nigeria especially in southern and some northern parts of the country. It is well known in north western part of the country but also not well accepted. This research is aimed at studying the physicochemical and some functional properties of the jaggery produced from black and green sugar cane, and to study the sensory acceptability of each of the two jaggeries by panelists.

MATERIALS AND METHOD:
Black and green sugar canes were bought fresh from local farmers in two different villages of Kano State. They were used to prepare the two jaggeries in the laboratory of Biochemistry Department, Bayero University Kano. The total phenolics content was determined by Folin-Ciocalteau's method[5], total flavonoid content by the aluminium trichloride method and the antioxidant capacity by the 1, 1'-diphenyl-2,2'-pycryl hydrazine (DPPH) radical scavenging method. The physicochemical properties of the two jaggeries produced were quantified by standard methods, while the sensory analysis was done using the nine point hedonic scale by a 15 man panelist.

RESULTS AND DISCUSSION:
The antioxidant potential of black and green sugar cane jaggeries were assayed and presented in Table 1 below as percent inhibition.

Table 1: Percent inhibition of DPPH radical, TPC and TFC Jaggery samples

Concentration (mg/mL)	Percent Inhibition (%)		
	Ascorbic Acid	Black Sugar Cane	Green Sugar Cane
1.0	95.66 ± 0.29^{a}	47.30 ± 1.10^{c}	58.74 ± 0.04^{b}
0.5	97.02 ± 0.80^{a}	42.23 ± 1.94^{c}	50.95 ± 0.49^{b}
0.25	95.54 ± 0.17^{a}	38.18 ± 0.10^{c}	41.58 ± 0.16^{b}
0.125	94.42 ± 0.36^{a}	37.43 ± 0.21^{b}	38.74 ± 0.68^{b}
0.623	94.21 ± 0.23^{a}	35.82 ± 0.10^{c}	37.93 ± 0.92^{b}
0.3125	90.70 ± 0.52^{a}	34.62 ± 0.10^{b}	36.01 ± 0.31^{b}
0.15625	80.68 ± 0.32^{a}	32.59 ± 0.02^{c}	35.20 ± 0.50^{b}
0.78125	69.50 ± 0.26^{a}	31.67 ± 0.11^{b}	31.90 ± 2.08^{b}
TPC (μg GAE/g)		46.85 ± 0.07^{b}	51.17 ± 0.00^{a}
TFC (μg QE/g)		33.41 ± 3.76^{a}	34.46 ± 0.04^{a}

Values are presented as mean ± standard deviation of three different experimental readings. Values with different superscripts within the rows are significantly different (P<0.050). TPC = total phenolics content, TFC = total flavonoid content.

The result for the antioxidant assay indicated a trend of increase in concentration of any of the jaggeries causes a corresponding increase in percent inhibition. This depicts increase in antioxidant potential with increase in concentration of the tested jaggeries. This trend was also reported by previous research (Harish et al., 2021). This could be as a result of the polyphenols present in the two jaggeries as presented in Table 2. The green sugar cane jaggery presented stronger antioxidant potential than that of the black as indicated by the statistical difference and the percent inhibition values in Table 1. Compared to the antioxidant capacity of ascorbic standard, the antioxidant potential of the green sugarcane jaggery is half that of the standard. The total phenolics content of the green sugarcane jaggery was also statistically greater (P<0.05) than that of the black sugarcane. But, their total flavonoids content was not statistically different (P>0.05). The total phenolics and total flavonoids contents of the two jaggeries were also quantified and presented in Table 1 above.
The physicochemical and sensory evaluation parameters of both the black and green sugar cane jaggery were also quantified and presented in Table 2 below.

Table 2: Physicochemical and sensory evaluation parameters of black and green jaggery

Parameters	Physicochemical Analysis	
	Black	Green
pH	5.20 ± 0.10^{a}	4.50 ± 0.12^{a}
Insoluble solute (g)	0.06 ± 0.01^{a}	0.08 ± 0.02^{a}
Moisture (%)	20.20 ± 0.51^{a}	19.45 ± 0.12^{a}
Total ash (%)	3.60 ± 0.15^{a}	4.15 ± .010^{a}
Titratable acidity (Meq/g)	0.02 ± 0.00^{a}	0.050 ± 0.01^{a}
TRSSC (g/mL)	28.90 ± 6.13^{a}	29.80 ± 4.15^{a}
Colour	Brownish Black	Brownish
Sensory Parameters	**Black**	**Green**
Appearance	7.73 ± 0.96	8.37 ± 0.56
Color	7.73 ± 0.80^{a}	8.23 ± 0.60^{a}
Flavor	7.60 ± 1.30^{a}	8.16 ± 1.10^{a}
Taste	8.07 ± 1.03^{b}	9.38 ± 0.93^{a}
Texture	7.93 ± 0.80^{a}	8.03 ± 0.80^{a}

Values are presented as mean ± standard deviation of three different experimental readings. Values with different superscripts within the rows are significantly different (P<0.050). TRSSC = Total reducing sugar and sucrose content.

The sensory evaluation indicated that the green sugarcane had the best sensory attributes compared to that of black sugar cane, but there were no statistical difference (P<0.05) between the two. Their physicochemical parameters were also not statistically different (P<0.05). The pH of the two jaggeries were slightly more acidic than that reported by a previous study[6].

CONCLUSION AND RECOMMENDATİON(S):
Based on the results of this research, the both the black and green sugar cane jaggeries are relatively rich in polyphenols. They all exhibited good antioxidant potentials based on DPPH radical scavenging assay. These antioxidant property is a good quality of functional foods and nutraceuticals, which makes the studied jaggeries to be potential functional food when consumed regularly in place of the conventional white sugar.

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OE17

Effect of substituting de-oiled cake flour of groundnuts for flour in nutritional values of some confectionaries.

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KEYWORDS: *Groundnuts, De-oiled cake flour, substitution*

BACKGROUND AND OBJECTIVE:
The consequent soaring food price are putting nutritious meal beyond the reach of households in Nigeria which put children's lives at risk. Owing to its richness in high dietary protein and oil groundnuts helped to alleviate malnutrition in many developing countries (Diksha *et al.,* 2018). De oiled cake of groundnuts contains 45-60% protein 22-30% carbohydrate and 4-6% minerals (Abhishek *et al.,* 2018) thus substituting it in food helps to increase nutrient content.
This work aimed at exploring ways of adding nutritional values to some confectionaries by substituting de-oiled cake flour of groundnut for flour.

METHODOLOGY:
Cakes and Biscuits were prepared with substitution of 1/3 de-oiled cake flour of groundnuts for white flour. Proximate analysis of the cake and biscuit was done by the methods of AOAC 2000.

RESULTS AND DISCUSSION:

Table 1: proximate composition (%) of cake and biscuits substituted with de-oiled cake flour of groundnuts for flour

PARAMETER %	MOISTURE	PROTEIN	CARBOHYDRATES	FAT	FIBRE	ASH
BISCUITS	11.12 ± 0.14	18.05± 0.96	56.32 ±0.56	10.85 ±0.03	2.98± 0.99	2.40 ±0.11
CONTROL	8.70±0.04	5.2 ±0.91	76.55±0.55	5.3±0.99	2.33 ± 0.76	0.7 ±0.11
CAKE	16.22±0.52	23.86± 0.08	44.46±0.78	13.86 ±0.3	3.56 ± 0.45	1.76± 0.31
CONTROL	13.18 ± 0.17	15.05± 0.26	58.67±0.34	10.85 ±0.43	2.02 ±0.32	1.4 ±0.19

Table 1 presented proximate composition of cake and biscuits substituted with de-oiled cake flour of groundnuts for flour. There is significant increases $P<0.05$ in the amount of protein, fat and ash owing to the substitution of de-oiled cake flour of groundnut for flour in both cake and biscuits. De oiled cake of groundnuts contains 45-60% protein, 22-30% carbohydrate and 4-6% minerals (Abhishek *et al.,* 2018) thus substituting it in food helps to increase nutrient content.

CONCLUSION:
From the results above it can be concluded that substitution of de-oiled cake of groundnuts had a positive effect on the overall nutritional quality of cake and biscuits.
Recommendation
Substitution and fortification of food with local and less utilized materials should be employed to decrease the menace of malnutrition in our society.

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OE18

Proximate, micronutrient and anti-nutrient contents of soymilk and zobo beverages fortified with bitter kola powder

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KEYWORDS: *Beverages, Bitter kola powder, Fortification.*

BACKGROUND AND OBJECTIVE:
Certain fortified beverages provide nutrients and other beneficial compounds. Bitter kola, an edible medicinal seed, is consumed as a snack for its nutritional value and is now being used to produce functional products like beverages [1]. This study examined the proximate, vitamin, mineral, and anti-nutrient contents of soymilk and zobo beverages fortified with bitter kola powder offering a potential alternative to sugar-sweetened beverages.

MATERIALS AND METHOD:
Bitter kola seeds, soybeans, zobo and dates were obtained from Orie-Orba market in Nsukka, Enugu State. The bitter kola was sorted, weighed, washed, cut, oven-dried at 50°C, peeled, milled into powder and stored. An acute toxicity test was performed on the bitter kola powder before conducting a pilot sensory evaluation to establish a safe level for beverage formulation. Dates were processed into powder. Samples of soymilk (SBK_{500}, SBK_{600}) and zobo drinks (ZBK_{200}, ZBK_{400}) were prepared using conventional procedures and fortified with bitter kola powder at ratios of 200:1, 167:1, 500:1 and 250:1 (v/w). Each sample was sweetened with five grams of date powder. Proximate analysis, vitamin, mineral and anti-nutrient contents of the samples were determined using standard methods. Data was analyzed using mean and standard deviation with Statistical Product and Service Solutions (SPSS) version 23.0.

RESULTS AND DISCUSSION:
Table 1 presents proximate, micronutrient and anti-nutrient compositions of soymilk and zobo beverages fortified with bitter kola powder. The results indicate that the highest contents of crude fiber (2.22%), ash (0.92%), protein (5.72%), β-carotene (13.85 μgRE), vitamin C (46.73 mg), iron (0.94 mg), and zinc (0.13 mg) were observed in soymilk-SBK_{600}, soymilk-SBK_{600}, soymilk-SBK_{600}, zobo-ZBK_{400}, zobo-ZBK_{400}, zobo-ZBK_{400}, and soymilk-SBK_{600}, respectively. The increases in fiber, ash, protein, β-carotene, vitamin C, iron, zinc contents of beverages were dose-dependent. The anti-nutrient content of the beverages was negligible. Chemical compositions of the beverage samples were comparable to the reports of other authors [2, 3], suggesting that soy milk and zobo

fortified with bitter kola powder are nutritious beverages. Variations in nutrient and anti-nutrient contents of the bitter kola-fortified beverages may be attributed to differences in crop variety, geographical conditions, processing and preparation techniques [4].

Table 1: Proximate (%) micronutrient (mg) and anti-nutrient (mg) contents of soymilk and zobo beverages fortified with bitter kola powder

Parameters	SBK_{500}	SBK_{600}	ZBK_{200}	ZBK_{400}
Moisture	87.22±0.06	87.24±0.04	94.36±0.18	94.39±0.24
Fibre	2.19±0.03	2.22±0.03	ND	ND
Ash	0.91±0.03	0.92±0.03	0.62±0.03	0.65±0.03
Fats	2.43±0.06	2.46.±0.03	2.86±0.03	3.01±0.03
Protein	5.69±0.07	5.72±0.38	1.57±0.12	1.62±0.17
Carbohydrate	1.56±0.05	1.66±0.33	0.59±0.09	0.63±0.03
Energy (Kcal)	50.87±0.07	51.66±1.03	34.38±0.84	36.09±1.03
βcarotene(μgRE)	11.20±0.55	11.93±0.49	13.50±0.26	13.85±0.10
Vitamin C	3.76±0.54	5.96±0.66	43.04±0.17	46.73±0.17
Iron	3.76±0.54	5.96±0.66	43.04±0.17	46.73±0.17
Zinc	0.10±0.01	0.13±0.02	0.10±0.02	0.12±0.01
Phytate	0.01±0.23	0.03±2.26	0.02±0.48	0.02±1.03
Oxalate	0.02±0.28	0.02±3.93	0.05±0.30	0.05±1.53

CONCLUSION AND RECOMMENDATION:

Soymilk and zobo beverages fortified with bitter kola powder were sources of protein, ash, fat, fiber, β-carotene, vitamin C, iron, zinc and contained low levels of phytate and oxalate. Fortifying food products with bitter kola powder is recommended to enhance their nutritional quality.

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PE26

Determination of some heavy metals and effect of pesticides in spinach and tomato cultivated at Kafin Gana in Birnin Kudu Local Government Area, Jigawa State.

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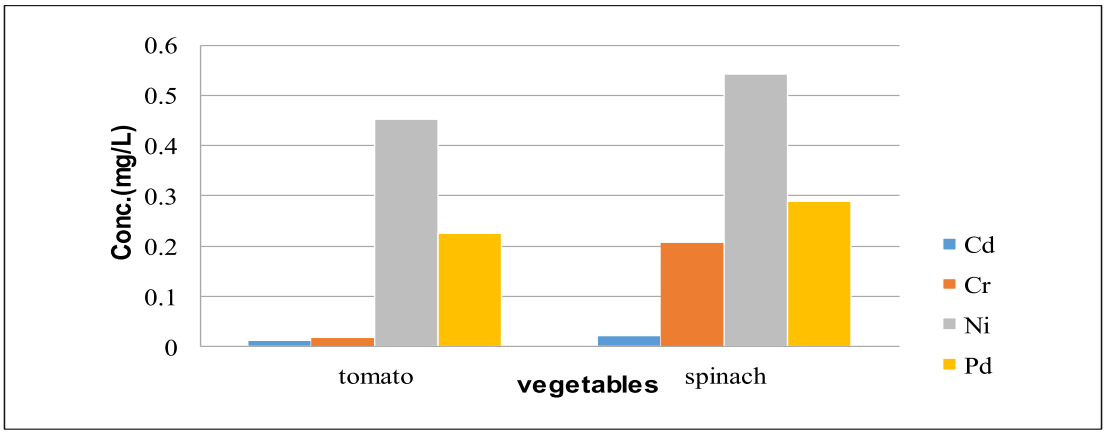
KEYWORDS: *Pesticides, Heavy metals, Organochlorides, food safety.*

BACKGROUND AND OBJECTIVE:
Production of food safe for human consumption has been an important issue worldwide (1). Pesticides most especially organochlorides (2) are often used in preservation and prevention of pest, and their use has serious impact on human health (3). This study determined the concentrations of some heavy metals (Pb, Cd, Cr, and Ni) and pesticides residue in vegetables (Spinach and tomatoes) cultivated in Kafin gana, Birnin kudu local government area, Jigawa state.

MATERIALS AND METHOD:
The heavy metal concentrations were determined using Atomic Absorption Spectrophotometry, and pesticides residues were analyzed using gas chromatography mass spectrometry (GC-MS) using chromatograph-electron capture detector

RESULTS AND DISCUSSION:
The heavy metals (Cd, Ni, Cr, and pd) were detected in all samples and in concentrations higher than WHO acceptable limits. Pesticides residue such as aldrin, azobenzene and dieldrin were detected in the Tomato sample used. While in the spinach sample dieldrin and p,p'-Dichlorodiphenyldichloroethylene (p,p'-DDE) were detected.
These findings showed that the vegetables at Kafin gana are contaminated by pesticides and heavy metals and the contaminations might been due to agricultural practices such as indiscriminate use of pesticides and irrigation with contaminated water This research aligns with the findings of Brown and Davis (4).



Key: Sp: Spinach, TT: tomatoes, N.D: not detected

TABLE 1: The GCMS Analysis Result for Pesticide Residue

Target Compounds	Conc.(mg/kg) in Sp	Conc.(mg/kg) in TT
1,3-Cyclopentadiene, 1,2,3,4-tetrachloro 5 (dichloromethylene)	N.D	N.D
Cyclohexane, 1,2,3,4,5,6 hexachloro	N.D	N.D
Heptachlor	N.D	N.D
Aldrin	N.D	0.3399
Isobenzan	N.D	0.0605
Isodrin	N.D	0.0451
Heptachlor epoxide	N.D	N.D
Dieldrin	11.5848	9.4422
p,p' Dichlorodiphenyldichloroethylene	11.334	N.D
2,2 Bis(p chlorophenyl)ethanol	N.D	N.D
1,3-Cyclopentadiene, 1,2,3,4-tetrachloro 5 (dichloromethylene)	N.D	N.D
Cyclohexane, 1,2,3,4,5,6 hexachloro	N.D	N.D
Heptachlor	N.D	N.D
Aldrin	N.D	0.3399
Isobenzan	N.D	0.0605
Isodrin	N.D	0.0451
Heptachlor epoxide	N.D	N.D
Dieldrin	11.5848	9.4422
p,p'-Dichlorodiphenyldichloroethylene	11.334	N.D
2,2-Bis(p-chlorophenyl)ethanol	N.D	N.D

Figure 1: mean concentration of Cd, Cr, Ni, Pd in tomato and spinach samples

CONCLUSION AND RECOMMENDATİON(S):

The Vegetable samples at Kafin gana are contaminated by heavy metals and pesticides with concentrations above the acceptable limits of WHO, therefore it is recommended that farmers should improve their farming practice and avoid excessive use of pesticides and contaminated water.

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PE27

Production, macronutrient composition, and selected micronutrient of peanut butter fortified with moringa leaf powder

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KEYWORDS: *Fortification, Peanut Butter, Moringa, Nutrients*

HIGHLIGHTS:

- *Fortifying peanut butter with moringa leaf powder showed a marked increase in the micronutrients and macronutrients composition of the peanut butter.*

BACKGROUND AND OBJECTIVE:

There is an increased concern about the concept of medicinal plants for human health and their importance for general well-being, rather than solely for consumption as human foods (1). Starchy foods make up the majority of the diets of people in many developing nations. Sadly, low-income households cannot afford the expensive animal protein sources that are used to supplement starchy diets (2). Food fortification is recognized as a powerful and incredibly economical approach for delivering micronutrients to sizable populations and lowering nutritional issues in children under the age of five (3)

OBJECTIVES:

This study was carried out to develop, to determine macronutrient composition, selected micronutrient of peanut butter fortified with moringa leaf powder and to carry out sensory evaluation of homemade peanut butter fortified with moringa seed powder.

MATERIALS AND METHOD:

Peanut seeds, Peanut Oil, Moringa Powder, Sugar and Salt were gotten from Orita Market, New Garage, Ibadan, Oyo State, Nigeria. 2,400g seeds were sorted, soaked in water, drained, salted and roasted, peeled and ground. A 70:30 ratio was applied for the peanut seeds and moringa powder respectively. The moringa powder was added to the peanut butter and the peanut butter was packaged in an airtight glass container and stored at ambient temperature. AOAC methods were applied for the proximate analysis. A five-point Hedonic scale was used for the acceptability test, ranging from 1 = like extremely, 2=like moderately, 3= neither like nor dislike, 2= dislike moderately, 1=like extremely. Data was analyzed using SPSS and T test was used to find levels of statistical significance.

RESULTS AND DISCUSSION:

There was statistical difference between the macronutrients composition of peanut butter only and peanut butter fortified with moringa ($p < 0.05$). Also, there was more nutrient composition in the fortified peanut butter than the control sample. This finding is consistent with another study on proximate composition and mycological characterization of peanut butter sold in retail markets of Abidjan (Côte d'Ivoire) (4).

Table 1: Proximate Composition of Peanut Butter with Moringa

SAMPLES	MOISTURE (%)	PROTEIN (%)	FAT (%)	FIBRE (%)	ASH (%)	CHO (%)
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
A	2.05±0.01	24.84±0.06	50.68±0.01	4.35±0.01	2.53±0.02	15.56±0.03
B	2.12±0.01	26.23±0.08	52.66±0.01	4.87±0.03	3.26±0.02	10.87±0.04

Table 2: Micronutrient Composition of Peanut Butter with Moringa

SAMPLES	IRON (mg/100g) Mean±SD	POTASSIUM (mg/100g) Mean±SD	ZINC (mg/100g) Mean±SD	VITAMIN B6 (mg/100g) Mean±SD	VITAMIN A (mg/100g) Mean±SD
A	5.25±0.02	389.25±0.21	3.24±0.03	0.44±0.00	378.71±0.02
B	7.14±0.02	405.70±0.14	4.80±0.03	0.45±0.00	395.84±0.03

Table 3: Sensory Evaluation of Peanut Butter with Moringa

Samples	Taste	Colour	Texture	Flavor
	Mean±SD	Mean±SD	Mean±SD	Mean±SD
A	2.90±0.31	1.70±0.48	1.70±0.48	1.00±0.00
B	2.90±0.32	2.90±0.32	1.40±0.52	1.10±0.32

Table 4: Comparison between the samples

NUTRIENT(%)	SAMPLE			
	Peanut butter	Peanut butter with Moringa	t	P value
Iron	5.25	7.14	-89.095	*0.000
Potassium	389.25	405.70	-91.248	*0.000
Zinc	3.24	4.80	-55.154	*0.000
Vitamin B6	0.43	0.45	-6.505	*0.023
Vitamin A	378.71	395.84	-685.400	*0.000

CONCLUSION AND RECOMMENDATION(S):

This study has shown that adding moringa leaves to peanut butter can result in a tasty and nutritious fortified food. The results of this study will help dietitians, the Ministry of Health, and non-governmental organizations inform the public about the advantages of using peanut butter supplemented with powdered moringa leaf powder in their diets.

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PE28

Estimation of the Nutritional Composition of Castor Seeds

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KEYWORDS: *Nutritional composition, mineral properties, partial oil characterization, antioxidant properties*

BACKGROUND AND OBJECTIVE:
Castor seeds which are derived from the *Ricinuscommunis* plant, are cultivated in regions with warm climates. They are well-known for their usage in the manufacture of castor oil, which has several industrial and commercial uses [1]. Castor oil's moisturizing and conditioning characteristics makes it a popular cosmetic ingredient, with lotions, soaps, and shampoos among its applications [1]. The oil from Castor seeds are also utilized as a flavor, ingredient, and preservative in the food business [2]. In the textile business, castor oil is used to manufacture synthetic fibers, varnishes and finishes. Castor oil have anti-inflammatory, analgesic, and antioxidant qualities, making it effective in the treatment of illnesses such as arthritis, skin disorders, and gastrointestinal disorders [3]. This research was carried out to determine the nutritional composition of castor seeds.

MATERIALS AND METHODS:
The sample (castor seeds) was purchased from Eke-Awka market, Awka south local government area in Anambra state. The outer covering (hull) of the castor seeds were de-shelled to give the endosperm. The endosperms which are whitish in color was blended and stored in an airtight sterile plastic container. The proximate analysis, mineral and vitamin content, partial oil characterization, and antioxidant properties of Castor seeds were analyzed using standard laboratory methods.

RESULTS AND DISCUSSION:
The proximate analysis carried out on castor seeds revealed the percentage crude fat to be 51.90 ± 1.273, which was greater than that of crude protein of 30.32 ± 0.014, crude fiber of 9.90 ± 1.273, moisture content of 4.00 ± 0.707, ash content of 2.00 ± 0.707, and carbohydrate of 1.88 ± 0.021. The crude fat and protein are present in castor seeds in high amounts of 51.90% and 30.32% were not too far from the findings of Omotehinse et al.,[4], whose result showed a percentage of 59.43% and 26.64% for fats and protein respectively. The ash and moisture content of this analysis was said to be 2.00% and 4.00%, indicating low amount of inorganic minerals in castor seeds, and its resistance to microorganism's invasion.
The mineral analysis carried out revealed the presence of calcium, magnesium, sodium, potassium, selenium, cobalt, copper, iron, zinc, and manganese in castor seeds to be 8.84 ± 0.03, 4.95 ± 0.04, 7.58 ± 0.01, 7.12 ± 0.08, 0.28 ± 0.00, 0.08 ± 0.00, 0.42 ± 0.22, 3.31 ± 0.01, 0.21 ± 0.01, 0.23 ± 0.01 respectively.
The partial oil characterization showed that castor seeds have an acid value of 6.62 ± 0.91, free fatty acid value of 3.31 ± 0.46, saponification value of 296.40 ± 10.62, peroxide value of 6.53 ± 0.230, iodine value of 33.67 ± 3.59, refractive index of 1.42 ± 0.00, viscosity of 147 ± 2.65, and specific gravity of 0.93 ± 0.00. The partial oil characterization carried out in this research revealed high saponification value in the castor seeds used when compared with the result obtained by Udoh et al.,[5] which showed a lesser saponification value of 182.9. Other important antioxidants as well as vitamins were also present in varying concentrations.
The antioxidant activity of castor seeds were determined by measuring its scavenging activities and ferric reducing power with their garlic acid standards. The percentage scavenging of these antioxidants increases with an increase in concentration. The high antioxidant activity of castor seeds shows that it could be very useful for the treatment of diseases resulting from oxidative stress.

CONCLUSION AND RECOMMENDATIONS:
The results of this study shows that castor seeds are a rich source of various nutrients and antioxidants. These antioxidant properties of castor seeds work together to fight oxidative stress and protect cells from damage

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PE29

Comparative Analysis of Nutrients, Anti-nutrients and Phytochemical Compositions of a Formulated Plant-based Milk Alternative (PBMA) and Conventional Infant Formula (NAN).

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KEYWORDS: *Plant-based, Formulated, Milk alternative, infant formula.*

BACKGROUND AND OBJECTIVE:

The quest for suitable alternatives to conventional infant formula has led to the development of plant-based milk alternatives. However, the nutritional composition of these substitutes, particularly in comparison to conventional infant formula, is a topic of ongoing research [1, 2]. While plant-based milk alternatives may offer certain health benefits, it is important to consider their nutritional adequacy, especially for infants and children [2]. This study was aimed to compare the nutrients, anti-nutrients and phytochemical compositions of a formulated plant-based milk alternative and a conventional infant formula (NAN). It aims to inform consumers, healthcare professionals, and policymakers about the scientific evidence surrounding plant-based milk alternatives and diary milk, enabling informed decisions.

METHODOLOGY: The major raw materials used for this study were soybean, tiger-nut, date fruit, cashew nut, groundnut, dry fish and crayfish. They were purchased from the local market.

Preparation and Formulation of the milk blend: The ingredients (soybean, tiger-nut, groundnut, cashew nut and dates) were roasted and milled together into flour. The total blend was made up of soybean and tiger-nut mixed in the ratio of 100:50, one cup each of groundnut and cashew nut, 200g of dates fruit, dry-milled crayfish and dry fish of 50 g each. The proximate, anti-nutrients and phytochemical compositions were determined using standard biochemical methods.

RESULTS AND DISCUSSIONS: From the result of proximate analysis, crude fiber and moisture were significantly higher ($p<0.05$) in PBMA than in NAN while Ash was significantly higher ($p<0.05$) in NAN than in PBMA. The energy value of NAN was significantly higher than that of PBMA. These results are in line with previous studies, which found that diary milk often contain higher amounts of carbohydrates, minerals as indicated by higher ash content, lipids and tend to be more energy-dense [3]. The higher protein, fiber and moisture content of PBMA are expected as PBMAs are fortified with protein sources. More so, plant-based ingredients tend to be higher in fibre and water content.

Table 1: Proximate Composition of PBMA and NAN

	PBMA	NAN
Ash (%)	1.53 ± 0.04	2.00 ± 0.14*
Carbohydrate (%)	54.99 ± 0.32**	59.94 ± 1.73
Crude Fibre(%)	1.60 ± 0.07*	0.525 ± 0.03
Crude Protein (%)	16.51 ± 0.45**	15.095 ± 0.30
Total Lipids (%)	17.00 ± 1.13**	20.14 ± 1.22
Moisture (%)	8.49 ± 0.38*	2.31 ± 0.099
Energy (Kcal)	438.98 ± 7.10	481.34 ± 5.30*

Values are presented as mean ± standard deviation of duplicate values. *Significantly higher than value on the same row; **Not significantly different from the value on the same row.

From the phytochemical analysis (Table 1), phenol and flavonoids were significantly higher ($p<0.05$) in PBMA than in NAN. Lycopene was found only in PBMA. Tannin, phytate, oxalate and alkaloids were the anti-nutrients found in PBMA while only oxalate was found in NAN. This is expected as anti-nutrients are frequently related to plant-based diets and are naturally synthesized in plants [4]. Phytates and tannins are the major anti-nutrients found in plant-based foods [5].

Table 1: Phytochemicals and Anti-nutrient Composition of PBMA and NAN

Phytochemicals/anti-nutrients	PBMA	NAN
Total Phenol (mgGAE/g)	34.64 ± 2.96	1.315 ± 0.1
Flavonoid (mgCE/g)	21.12 ± 0.0*	ND
Lycopene (mg/g)	0.20 ± 0.03*	ND
Beta carotene (mg/g)	0.89 ± 0.03**	1.43 ± 0.4
Tannin (mgTAE/g)	2.97 ± 1.31*	ND
Phytate (%)	0.50 ± 0.11*	ND
Oxalate (mg/g)	6.01 ± 0.16*	0.16 ± 0.05
Alkaloids (%)	0.63 ± 0.13*	ND
Saponin (%)	0.21 ± 0.04*	ND

Values are presented as mean ± standard deviation of duplicate values. mgGAE: Milligram Gallic Acid equivalent; mgCE: Milligram Catechin equivalent. *Significantly higher than value on the same row. **Not significantly different from the value on the same row.

CONCLUSION AND RECOMMENDATION:

The study suggests that the formulated plant-based milk alternative can be a nutritious alternative to conventional infant formula. However, the presence of anti-nutrients in PBMA is not desirable as they could hinder the bioavailability of essential nutrients. There should be further evaluation of the commercial viability of the formulated milk alternative.

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PE30

Assessment of effect of the formulated feeds on serum biochemistry of albino rats

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KEYWORDS: *Consumption Patterns, Feed intake, Biochemical Parameters, Growth performance*

BACKGROUND AND OBJECTIVE:
Nutritional management is crucial for growth performance and health of animals in husbandry and biomedical research. Albino rats are ideal subjects for studying dietary variations, as they have well-documented physiology that can be extrapolated to Human subject[1]. The objective of this study is to assess the impact of formulated and commercial feeds on albino rats' consumption patterns, growth performance, and serum biochemical parameters.

MATERIALS AND METHODS:
In this study, a controlled experimental design was employed to assess the effects of commercial and formulated feeds on 20 albino rats. The rats were randomly divided into two groups of 10 animals each. One group was fed with commercial feed, while the other group received a formulated feed, both over a period of seven weeks. The formulated feed was specifically designed to match the nutritional content of the commercial feed but with variations in ingredient composition, using maize 49%, soybean 16%, groundnut 15% and others 20% to assess the impact on growth and biochemical profiles. The study used SPSS Version 20 to analyze data, using ANOVA to compare means and determine significant differences.

RESULTS AND DISCUSSION:
The study compared the effects of commercial and formulated feeds on feed intake, body weight, and biochemical profiles of Wistar albino rats over seven weeks. The key findings include:

- The Feed Intake of the Formulated and Commercial Feed of Wistar Albino Rats
- Both commercial and formulated feeds showed varying levels of intake at different weeks, with commercial feed showing slightly higher daily intake. The differences in feed intake were not statistically significant.
- Effect of the Formulated and Commercial Feed on the Body Weight of Wistar Albino Rats
- Rats fed with formulated feed exhibited a more significant increase in body weight compared to those on commercial feed. The weight gain difference was notable but not statistically significant.
- Effect of the Formulated and Commercial Feed on the Biochemical profiles of the Wistar Albino Rats

The commercial feed group had higher levels of urea, creatinine, total protein, albumin, ALAT,ASAT, and alkaline phosphatase. These higher levels suggest potential liver stress or higher protein metabolism in the commercial feed group. Formulated feed provided a balanced biochemical profile, indicating healthier outcomes.

Table 1: Effect of the Formulated and Commercial Feed on the Body Weight and Biochemical Profile of Wistar Albino Rats

Week	Commercial Feed (g)	Formulated Feed (g)	Parameters	Commercial	Formulated
Week 0	55.35 ± 0.38^{a}	55.35 ± 0.38^{a}	**Urea (mol/L)**	**6.46 ± 0.07**^{a}	4.83 ± 0.49 a
Week 1	62.69 ± 1.98^{a}	69.37 ± 1.52^{a}	Creatinine (umol/L)	83.35 ± 5.34^{b}	61.10 ± 4.43 a
Week 2	82.52 ± 0.52^{a}	92.13 ± 1.21^{ab}	Total protein (g/L)	64.00 ± 2.55^{ab}	51.10 ± 1.70 b
Week 3	92.97 ± 1.78^{b}	108.89 ± 1.52^{a}	Albumin (g/L)	36.35 ± 1.74^{a}	27.10 ± 0.29 b
Week 4	109.09 ±1.99^{ab}	126.42 ± 1.04^{b}	ALAT (IU/L)	10.75 ± 0.86^{b}	5.80 ± 0.41 a
Week 5	130.11 ± 1.02^{a}	141.29 ± 1.11^{ab}	ASAT (IU/L)	10.95 ± 0.41^{b}	6.75 ± 0.22 ab
Week 6	141.91 ± 1.62^{a}	150.33 ± 1.68^{a}	ALK Phosphatase (IU/L)	73.55 ± 2.33^{a}	55.20 ± 1.97 b

KEY: Period of Seven Weeks after Weaning. Values are expressed as mean ± SD: n = 10. Data in the same row carrying different superscripts differ significantly from each other (P<0.05).

CONCLUSION:
The study's findings in albino rats emphasize that nutritional composition of formulated feeds is better suited and also the importance of diet quality for promoting balanced growth and maintaining overall health. When applied to humans, it suggests that while convenient and palatable commercial foods may drive higher intake, a carefully planned, nutrient-dense diet is essential for achieving and maintaining optimal health outcomes. This highlights the value of educating individuals on making healthier food choices that prioritize long-term well-being over short-term satisfaction.

RECOMMENDATION:
Use formulated feeds with the respective ratio in experimental diets and animal husbandry practices. These feeds provide stable nutrition, support growth, and balanced biochemical profile, contributing to the overall health and well-being of the animals.

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SUB-THEME F: STRENGTHENING CAPACITIES FOR IMPROVED NUTRITION SERVICE DELIVERY

OF1

Preparedness towards Exclusive Breastfeeding among Post-Cesarean Mothers in The St Raphael Divine Mercy Specialist Hospital, Ikorodu Local Government Area, Lagos State

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KEYWORDS: *Preparedness, Exclusive Breastfeeding, Post-Cesarean, Mothers*

HIGHLIGHTS

- The knowledge and awareness of exclusive breastfeeding among primiparous post-caesarean mothers was limited
- The negative harmful practices and beliefs among the post caesarean mothers influenced the uptake of

exclusive breastfeeding

- The number of factors that determined the preparedness for exclusive breastfeeding among mothers include the post-cesarean medical condition, comfortable breastfeeding condition, previous breastfeeding experience, and post-cesarean support from the healthcare provider

BACKGROUND AND OBJECTIVE

Exclusive breastfeeding is essential for infant health, but post-cesarean mothers often face specific challenges that affect their preparedness for breastfeeding (1). This qualitative research study aims to explore the preparedness of post-cesarean mothers towards exclusive breastfeeding, examining their experiences, perceptions, and the factors influencing their breastfeeding practices.

METHOD:

A qualitative research approach was adopted by enrolling 20 study participants through the purposive sample of post-cesarean mothers. The sample size was determined based on data saturation, ensuring a comprehensive understanding of the participants' experiences. Ethical clearance was issued by the hospital. Two focus group interviews each comprised 10 women per group. The interview session was audio recorded, transcribed in English, and transferred to a qualitative research data analysis software Nvivo 12 for coding. Thematic analysis was applied to identify patterns, themes, and sub-themes within the interview data.

RESULTS:

PART 1

Table 1- Socio-demographic characteristics of participants

Number of focus groups (2 FGDS, 10 per session, Total = 20 women).	N	%
Age		
29-34	8	40
35 44	7	35
45 54	5	25
Marital status		
Married	20	100
Formal education	19	99
Informal education	1	1
N of Participants		
Group 1 (Female surgery ward 1)	10	50
Group 2 (Female surgery ward 2)	10	50

PART 2

From the qualitative data analysis, three (3) themes emerged: First, exclusive breastfeeding knowledge and awareness are limited among primiparous post-caesarean mothers (2). Second; exclusive breastfeeding uptake is influenced by negative harmful practices and beliefs. Nevertheless, the perceived benefits of EBF are seen as the motivation for its uptake (3). Third, preparedness for exclusive breastfeeding is significantly determined by factors that include; the post-cesarean medical condition of the mother (medically fit or unfit to breastfeed), comfortable breastfeeding condition, previous breastfeeding experience, and post-cesarean support from the healthcare provider (4).

CONCLUSION AND RECOMMENDATION:

Addressing knowledge gaps, providing accurate and timely information offering support networks, and addressing the physical and emotional well-being of post-cesarean mothers are vital for improving their preparedness and promoting successful breastfeeding practices. An intervention study to include partners, healthcare providers, families, and friends of post-cesarean mothers to support them in uptake of exclusive breastfeeding is needed.

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OF2

Incidence of Severe Acute Malnutrition and Performance of Community-Based Management of Acute Malnutrition in Three States (Gombe, Enugu and Ebonyi) Between 2015 and 2023

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KEYWORDS: *Community-Based Management, Acute Malnutrition, Performance Indicator, Incidence and Children aged 6-59 months.*

BACKGROUND AND OBJECTIVE:
Severe acute malnutrition (SAM) or Severe wasting is an acute form of under nutrition that manifest more frequently and rapidly in a severe food deprivation in terms of quality and quantity of adequate food or reoccurring or prolonged illnesses. SAM children are associated with high rate of mortality and are 12 times more likely to die than a well-nourished child. The community-based management of acute malnutrition (CMAM) approach comprises of four components namely: community outreach and mobilization; outpatient management of SAM without medical complications; inpatient management of SAM with medical complications; and services or programs to manage moderate acute malnutrition (MAM), such as supplementary feeding. CMAM is a comprehensive and cost-effective approach of timely treatment of acute malnutrition and reduction of morbidity and mortality risk in under five children (1). In Nigeria, CMAM programmes faced a lot of challenges ranging from lack of monitoring, lack of trained health workers, stock out of Ready-to-use-therapeutic food (RUTF) and scarcity of data to inform decision on tracking progress and strengthening the performance of the programme. Hence, the study was carried out to assess the incidence of severe acute malnutrition and performance of community-based management of acute malnutrition in three states (Gombe, Enugu and Ebonyi) between 2015 and 2023.

MATERIALS AND METHODS:
The study was carried out in three states (Gombe, Enugu and Ebonyi) and employed a retrospective cross sectional study design. Ethical approval and permission to conduct the study was obtained following a standard procedure. A multi-stage sampling technique was used to select a total of 15 CMAM Facilities and 1004 OTP Cards of malnourished children enrolled in the CMAM programmes in the three states (Gombe, Enugu and Ebonyi) between 2015 and 2023. Data was collected using key informant interview, CAPI (kobo collect) and Ena SMART data tools from the Nutrition Focal Person and OTP cards and summary record of severe acute

malnourished (SAM) children aged 6-59 months enrolled into CMAM programmes, respectively. Data was analyzed using Statistical Products for Service Solution (SPSS) version 23, statistical analysis was carried out using descriptive and inferential analysis and significant level was accepted at probability ($p \leq 0.05$).

RESULTS AND DISCUSSION:

The study observed highest old case load (93.46%) of SAM children in Ebonyi, highest incidence (new) cases (34.14%) in Gombe State and 0.44% transferred cases in Enugu State, indicating the presence and severity severe acute malnutrition among children in the states. More than half (51.05% of Gombe, 52.22% Enugu and 56.33% Ebonyi) of female new cases enrolled in the CMAM programmes. Majority (97.70% Gombe, 98.10% Enugu and 92.40% Ebonyi) of the SAM children aged 6-24 months old benefited from the CMAM programmes. More than three quarter (86.82% Gombe and 90.97% Ebonyi) cured rate in the CMAM programmes in the two states, while Enugu state CMAM programme had 67.86% cured rate, Gombe state CMAM programmes had 0.97% deaths rate and 2.05% non-recovery rate and Enugu state had 30.36% defaulters.

Table 1: The enrolment categories (old, new and transferred cases) and sex of the children benefiting from CMAM programmes in the three states (Gombe, Enugu and Ebonyi).

Variables	Gombe State	Enugu State	Ebonyi State
Malnourished children enrolled			
Old case	60,728 (65.78%)	7,759 (90.85%)	85,443 (93.46%)
New Case	31,519 (34.14%)	743 (8.70%)	5,926 (6.48%)
Transfer-In	67 (0.07%)	38 (0.44%)	56 (0.06%)
Total Children enrolled	92,314 (100.00%)	8,540 (100.00%)	91,425 (100.00%)
Sex of the new cases enrolled			
Male	15428 (48.95%)	355 (47.78%)	2588 (43.67%)
Female	16091 (51.05%)	388 (52.22%)	3338 (56.33%)
Total	31519 (100.00%)	743 (100.00%)	5926 (100.00%)

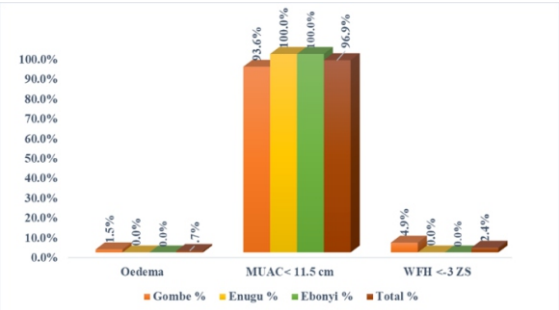

Figure 1: Enrolment criteria into CMAM programmes across the three states.

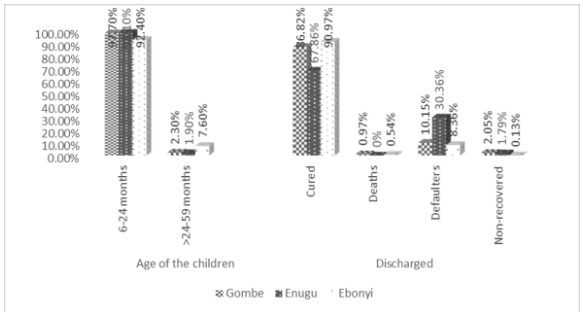

Figure 2: CMAM beneficiaries age distribution and discharge categories across the three states.

CONCLUSION AND RECOMMENDATION:

The study observed high incidence of SAM children in CMAM programme in Gombe State, poor performance of CMAM programme in Enugu State, and high prevalence of SAM in younger and female children than the other counter parts. Hence, there is an urgent need to scale up CMAM programmes in the States with effective monitoring and supervisory strategy.

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OF3

Medical nutrition therapy as a treatment option in the management of diabetic patients in the University of Nigeria Teaching Hospital Ituku-Ozalla, Enugu (2017-2023)

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KEYWORDS: *Medical nutrition therapy, Diabetes mellitus, Management, In-patient.*

BACKGROUND AND OBJECTIVE:

Diabetes Mellitus is one of the fastest growing global health concerns with over 463 million people within the age 20-79 years affected with the disease and 4 million that have died from Diabetes mellitus in the year 2019 [1]. The study was carried out to evaluate the medical nutrition therapy as a treatment option in the management of diabetic patients in the University of Nigeria Teaching Hospital Ituku-Ozalla Enugu state from (2017-2023).

MATERIALS AND METHODS:

The study was carried out in the Department of Health and Information Management University of Nigeria Teaching Hospital Ituku-ozalla, Data was obtained from diabetic in-patient folders admitted in the hospital from (2017-2023), a total of 202 folders were reviewed. Information about the Socio-demographic characteristic of the patients, complications and medical nutrition therapy and outcomes were extracted and analysed using statistical product for service solution (SPSS) version 23.0.

RESULTS AND DISCUSSION:

The result observed that more male patients were admitted on account of diabetes mellitus in the hospital, with higher cases among patients aged 59 to 78 years (Table 1). More than 2 out of every 5 patients with diabetes mellitus were hypertensive, nephropathic, neuropathic and had diabetic foot ulcers (Figure 1); Table 2 shows that majority of the patients were on medications with only few that adhered to drug or medication, more than one third of the patients received dietary intervention, dietary monitoring and evaluation of which one third of the patients had improved health outcome upon discharge.

Table 1: Demographical Characteristics of the Patients

Variable	n	%
Sex		
Male	108	53.5
Female	94	46.5
Age group (years)		
19-38	22	11.0
39-58	78	38.7
59-78	87	42.9
79-108	15	7.3

Table 2: Treatment Options and Outcome of Diabetic Patients Admitted to UNTH Enugu (2017-2023)

Variable	Multiple response (N=202)	Percent (%)
Medication (drugs and insulin	192	95.0
Drug adherence	27	13.4
Dietary intervention	75	37.1
High fiber diet	40	19.8
High protein	7	3.5
Low fat	24	11.9
Monitoring and evaluation	73	36.1
Discharge	166	82.2
Improved health	68	36.6
Death	16	7.9

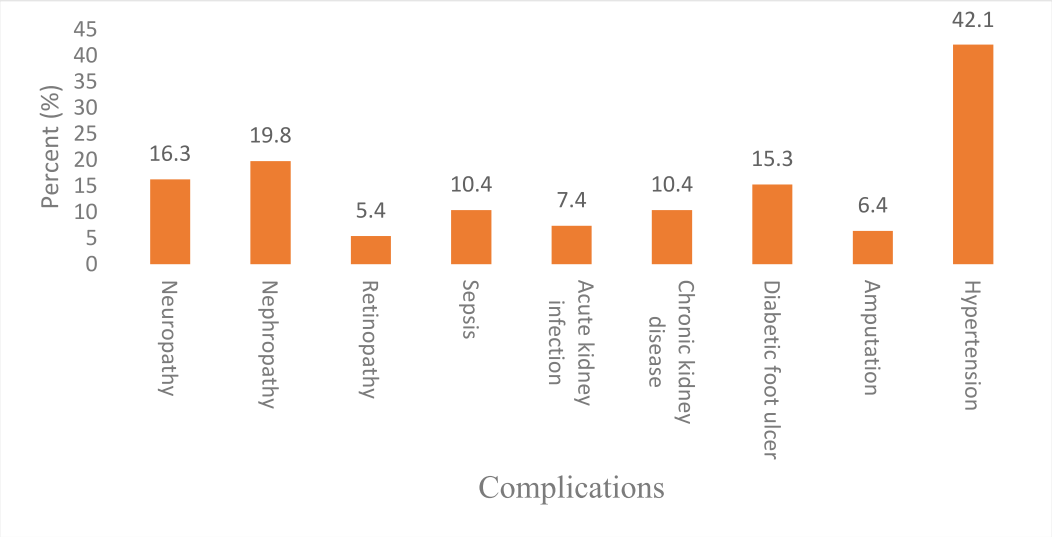

Figure 1: The Associated Complications of Diabetic Patients in UNTH Enugu

CONCLUSION AND RECOMMENDATION:

Only 1 out of every 3 diabetic patients received medical nutrition therapy, hypertension was the common complication seen amongst the diabetic patients. Hence, there is an urgent need to scale up medical nutrition therapy in hospitals as to effectively improve the health outcome of diabetic in- patients.

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OF4

Anthropometric and dietary assessment of postpartum mothers in Imo State.

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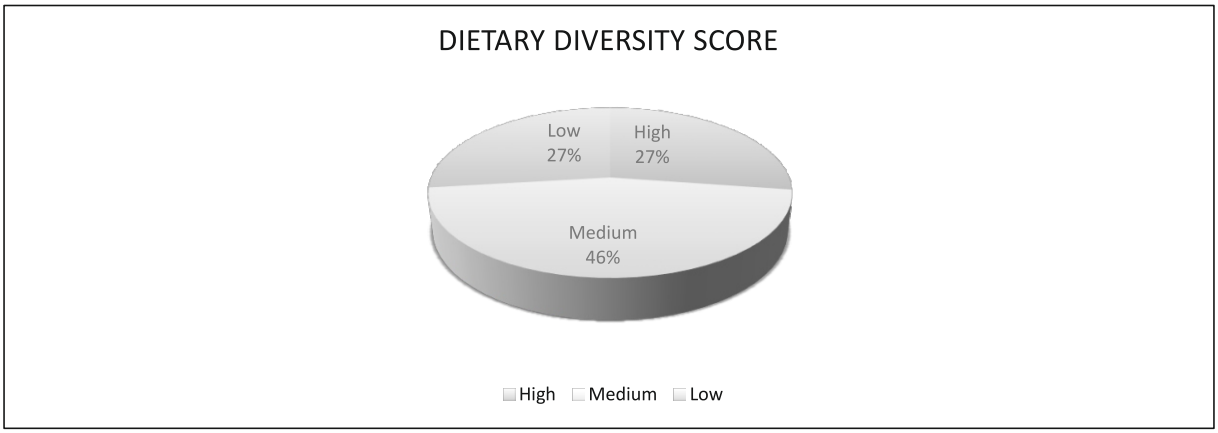
KEYWORDS:

BACKGROUND AND OBJECTIVE:
The World Health Organization defined postpartum as the first six weeks (42 days) after birth. It is also referred to as postnatal period, puerperium or the "fourth trimester. The physiological changes during pregnancy and childbirth may take longer than six weeks to go back to the pre pregnancy state. Also, caring for an infant, changes in body image and in family composition most often become major challenges during this period. Despite these challenges most maternal and newborn deaths occur during postnatal period it is the most neglected phase in the lives of mothers and babies.

OBJECTIVES:
This study aimed to assess the dietary diversity, the Body Mass Index (BMI), Waist Circumference (WC) and the Waist-Hip-Ratio (WHR) of the postpartum mothers
METHODOLOGY: The study was a Cross sectional study of 350 Post-Partum Mothers (PPM) that visited the Primary Health Care Centres for six weeks post-natal clinic and or first dose of pentavalent vaccine immunization of their new born. Simple random sampling technique was used to select the mothers. The height, weight, hip and waist circumference of the postpartum mothers were measured, while strictly observing the standard procedure. Also the post-partum mothers were subjected to 24 hour dietary recall.

RESULTS:
The result showed that 26% respondents had normal BMI while 39%, and 35% were overweight and obese respectively. The Waist Circumference (WC) measurement showed that 10% of the respondents had normal WC of < 88 cm while 84% are >88 cm. The prevalence of central obesity among the postpartum mothers, as defined by Waist Circumference (WC) and WHR were 84%, and 92% respectively. The 24 hour dietary recall indicated 27.3%, 45.8% and 26.9% consumed foods from ≥ 6 food groups (high), 4-5 groups (medium) and <3 food groups (low) respectively. There was positive correlation between WC, WHR and consumption of tubers, cereals and plantains at $p \leq 0.05$ significant difference. Please include at least (1) table or chart or graph to show your results.



Dietary Diversity Score for the mothers

Anthropometric status of the postpartum mothers

Variable	Frequency	Percentage
Body Mass Index (BMI)/Health risk		
Undernutrition- <18.5	0	0
Normal 18.5-24.9	92	26
Overweight 25-29.9	137	39
Obese 30 39.9	121	35
Waist Circumference (cm)		
Health risk ranking		
Low <80	21	6
High 80 88	35	10
Very High >88	294	84
Waist Hip Ratio (WHR)		
Health risk ranking		
Low ≤0.8	21	6
Moderate 0.81-0.85	6	2
High ≥0.86	323	92

CONCLUSION:

The low dietary diversity of the study participants may have contributed to 39% and 35% overweight and obesity respectively. Therefore, there should be regular postpartum care to check Post-Partum Weight Retention (PPWR) during child bearing years that has been shown to be associated with the development of adverse maternal health outcomes, such as cardiovascular diseases, metabolic syndromes, and long-term obesity in later life.

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OF5

Association between nutritional status and risk of developing Cardiovascular Diseases among Pregnant Women attending some selected Primary Healthcare in Kano Municipal LGA.

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KEYWORDS: *Nutritional Status, Cadiovascular Disease, Pregnant Women*

BACKGROUND AND OBJECTIVE:
The importance of maternal nutrition during pregnancy is clear and has a significant impact on pregnancy outcomes and the long-term health of the child[1]. This study investigated the relationship between nutritional status and risk of cardiovascular disease among pregnant women attending primary health care facilities in Kano Municipal.

MATERIALS AND METHOD:
Dietary diversity was assessed by food frequency questionnaires and 24-hour dietary recalls. Carefully recorded anthropometric data including height, weight, waist circumference, and mid-upper arm circumference. Blood samples were analyzed comprehensively for cholesterol, triglycerides, HDL and LDL cholesterol, glucose and cystatin C levels. The QRISK3 tool was used to calculate cardiovascular risk.

RESULTS AND DISCUSSION:
Dietary patterns showed high consumption of starchy staples (97.9%) and vegetables (75.2%), along with low dietary diversity scores (30%), indicating a potential risk of inadequate nutritional intake. Younger and single pregnant women were more likely to meet dietary diversity criteria ($p=0.01$). These findings are consistent with similar studies by Amfo-Antiri *et al.*,[2] highlighting the impact of age and marital status on dietary patterns. Although the majority of pregnant women had normal waist and mid-upper arm circumference (MUAC) scores (98.7%), a significant proportion had an increased waist-to-hip ratio (W:H) (38%). Cholesterol, triglycerides, and HDL levels are all within normal limits. study by Ahmed *et al.*,[3] also found that higher dietary diversity scores were positively correlated with better maternal anthropometric measurements, including lower waist circumference and body mass index (BMI) in pregnant women

Table 1: Association between dietary diversity and Biochemical Parameters of the pregnant women attending some selected primary health care (PHC) in Kano Municipal L.G.A

Variables		Dietary Diversity		
		Met	Not met	Chi-square
		%	%	p-value
Cholesterol (mg/dl)	Normal (≤200 mg/dL)	30.6	69.4	0.047*
	At risk (>200mg/dl)	29.3	70.7	
Triglycerides (mg/dl)	Normal (≤150mg/dl)	29.5	70.5	0.123
	At risk(>150mg/dl)	37.5	62.5	
HDL Cholesterol (mg/dl)	Normal (≥50mg/dl)	36.8	63.2	0.004*
	At risk (<50mg/dl)	24.1	75.9	
LDL cholesterol (mg/dl)	Normal (≤130mg/dl)	28.8	71.2	0.081
	At risk (>130mg/dl)	33.8	66.2	
Hypertension	Normal (120/80)	74.1	25.9	0.021*
	Prehypertension (> 120/80)	38.2	61.8	
	Mild hypertension (> 140/90)	66.7	33.3	
	Severe hypertension (> 160/100)	0.0	0.0	
Glucose	Hyperglacaemic (≥200mg/dl)	28.4	71.6	0.028*
	Normal (<200mg/dL)	31.7	68.3	
Cystatin C	Normal (≤1.2 mg/dl	54.1	45.9	0.046*
	At risk(>1.2mg/dl)	35	65	

CONCLUSION AND RECOMMENDATIONS

The study highlighted the importance of promoting dietary diversity and adequate nutrition among pregnant women to mitigate potential health risks, particularly with regard to cardiovascular disease. Targeted interventions and nutrition education during antenatal care emerge as key strategies to improve maternal health.

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OF6

Impact of an 8-Week Personalized Intervention on Diet Quality of Black and White Young Adults with Overweight and Obesity

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KEYWORDS:*Dietary indices, personalized nutrition, overweight, obesity*

HIGHLIGHTS

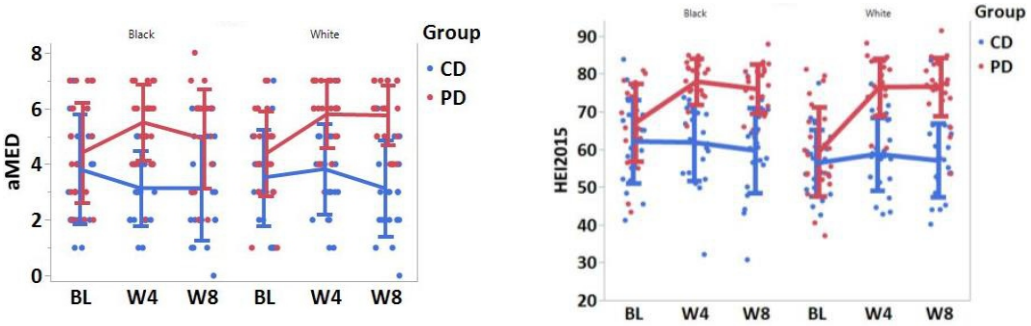
- Dietary indices suitably capture the complexity of dietary patterns
- Personalized diet was effective in improving diet quality for both races
- Whites had higher diet-induced AHEI total fruit scores than Blacks

BACKGROUND AND OBJECTIVE:

Epidemiological evidence indicates that ethnic and racial minority groups face higher risks of cardiometabolic diseases, including hypertension and diabetes [1]. Improving diet quality is known to mitigate these health risks [2]. Our study aims to investigate whether the effectiveness of dietary interventions is influenced by race. Specifically, we will assess the impact of an 8-week personalized functional food dietary intervention on diet quality among Black and White adults with overweight and obesity.

MATERIALS AND METHOD:

Young adults (n=91, age: 18-35 years, White=47, Black=44) with overweight and obesity (BMI: 25-45 kg/m^2) were randomized to either the personalized diet (PD) or conventional dietary advice (CD) group. Participants in the PD group received personalized dietary counseling aimed at increasing fiber intake and improving the ratio of unsaturated to saturated fats. Additionally, each participant in the PD group was assigned one personalized dietary goal, determined based on their baseline anthropometrics, blood glucose, lipid profiles, HbA1c, and dietary habits. To help participants adhere to the dietary recommendations, they were provided with specific foods such as fruits, vegetables, and nuts for eight weeks. In contrast, participants in the CD group received conventional dietary advice based on the MyPlate guidelines [3] at the beginning of the study. Participants completed the Diet History Questionnaire III (DHQ3) at the Baseline (BL), Week 4 (W4), and Week 8 (W8). The Healthy Eating Index 2015 (HEI2015), Alternative Healthy Eating Index (AHEI), Alternate Mediterranean Diet (aMED), and Dietary Approaches to Stop Hypertension (DASH) scores were calculated from the DHQ3 using the Dietary index Package in R [4]. A 2-factor ANOVA was conducted in JMP Pro to examine the interaction effects of race and group on changes in diet quality indices over time. This study was approved by the University of Missouri Institutional Review Board (IRB No: 2022561), and all ethical approvals were carefully overseen to ensure compliance with the required standards.



RESULTS AND DISCUSSION:
There were significant improvements in HEI2015, AHEI, aMED, and DASH scores in the PD group compared to the CD group over the 8-week period, and this was consistent across Black and White adults (group effect, $P<0.05$). Specifically, White participants in the PD group had higher AHEI total fruit scores than Black participants in the PD group (group x race effect, $P<0.05$). Importantly, these diet quality improvements were achieved without any changes in body weight. The findings suggest that the PD group adopted healthier dietary patterns, which could potentially lead to better health outcomes [5].

CONCLUSION AND RECOMMENDATİON(S):
This study demonstrated the overall effectiveness of a personalized dietary intervention in improving diet quality for both Black and White adults with some race-specific differences in fruit intake. Future analyses should investigate the long-term sustainability of these dietary improvements and their impact on cardiometabolic health and microbiome outcomes, areas that our ongoing research aims to explore. Additionally, exploring the influence of psychological and socio-economic factors on dietary changes could offer further insights into optimizing personalized nutrition strategies.

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SUB-THEME G: STRATEGIES FOR SUSTAINABLE COMMUNITY ENGAGEMENT IN NUTRITION

PG1

Nutritional status and functional capacity of Physically challenged adolescents attending school of students with special needs in Ilaro, Ogun State, Nigeria

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KEYWORDS: *Adolescent, Functional Capacity, Nutritional Status, Physical Disability.*

BACKGROUND AND OBJECTIVE
Physical disability is a multifaceted and progressing issue, which occurs as a result of interaction between the individual with the physical impairment as well as attitudinal, institutional and environmental obstacles which

obstruct their capability to be fully engage in various activities in the society compare to their mate (1). Physical disability places a limitation on functional capacity, physical activities, mobility, fitness, stamina, self-reliance (2). Study (3) have shown that overall health and nutritional status of adolescents with one or more physical disabilities is usually poorer compared to their contemporaries without any disabilities. Also, due to disability related limitations, some individual with disabilities may not have enough time, strength and capability to cook healthy meal, thus leads to quantitative and qualitative dietary intake inadequacy (3). Based on these, continuous evaluation of the issues pertaining to the health and lively hood of adolescents living with disabilities like; nutritional status and functional capacity will help in providing an intervention that will favour their wellbeing before becoming an adult. Thus, this study assessed the nutritional status, functional capacity of the physically challenged adolescent attending school of students with special needs in Ilaro, Ogun sate, Nigeria.

MATERIALS AND METHOD:

The study adopted a cross-sectional and descriptive research design and it involved a total number of one hundred and eleven (111) physically challenged students exhaustively selected from the school of students with special needs Ilaro and its annex in Yewa College Ilaro, Ogun State Nigeria. Socio-demographic and economic characteristics of the respondents were obtained using a semi-structured interview guide. Anthropometry measurement (Height and weight) was taken using standard procedure and twenty four hour dietary recall questionnaire was used to obtained data on food intake of the respondent. Functional capacity was assessed using Bristol Activities of Daily Living Scale and Lawton and Brody instrumental activities of daily living scale. Data obtained subjected to both descriptive and inferential statistics using SPSS version 20.0 while food intake data was analysed using TDA soft-ware.

RESULTS AND DISCUSSION

Larger percentages (56.8%) of the respondents were male, 35.1% were between 13-15years old and more than half of the study population (53.2%) were deaf and dumb and about half (45%) of the respondents had normal body mass index (BMI) for their age, 30% of the respondents had normal height for their Age, 29% were mildly stunted, 12.0% and 18.0% were moderately and severely stunted respectively. Nearly all (72%) the respondent were functionally independent in basic activities of daily living (BADL) while 61% were either moderate or severely independent in instrumental activities of daily living (IADL). Significant association ($p<0.05$) was observed between the respondent's nature of disabilities and their functional capacity in BADL (eating, drinking, dressing, meal preparation and housekeeping) and some IADL like; telephone usage, talking, understanding. No significant ($p>0.05$) association was observed between the functional impairment in both ADL/IADL and the nutritional status of the respondents.

CONCLUSION

Adequate intake of energy and macro-nutrients was observed among the respondents while intake of some micronutrients are sub optimal, high prevalence of functional independent which is significantly associated with the nature of physical disability was observed. No significant association was observed between the nutritional status of the respondents and the level of functional impairment.

RECOMMENDATIONS

Adequate support should be given to the study population in performing both basic and instrumental activities of daily living.

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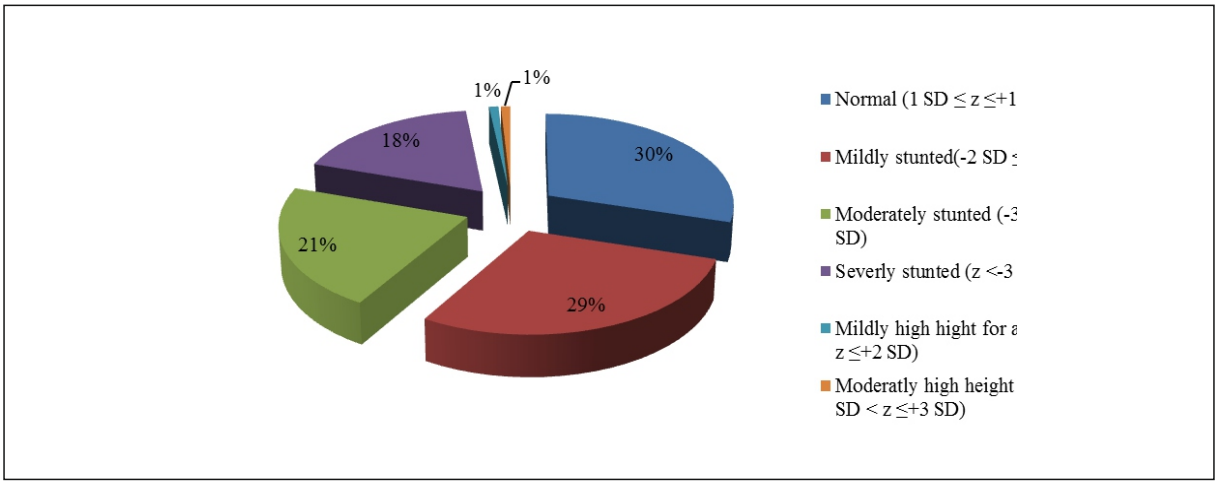

Figure 1: Percentage distribution of Heightfor age z score of the respondents.

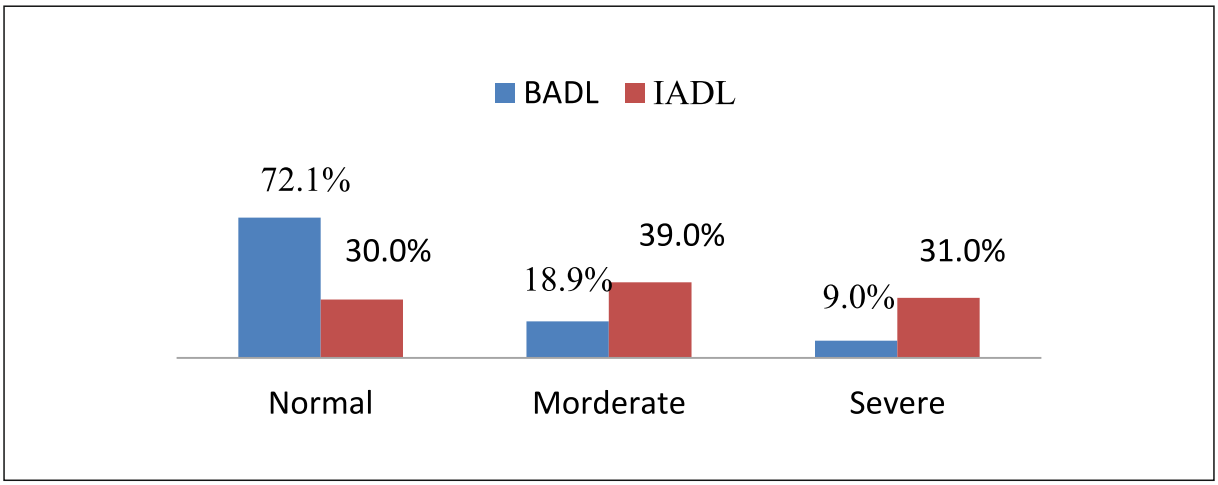

Figure 2: Level of Functional impairment in basic and instrumental activities of daily living

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PG2

Prevalence of prediabetes among undergraduate students in the University of Nigeria Nsukka Campus

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KEYWORDS: *Obesity, Prediabetes, Undergraduate Students.*

BACKGROUND AND OBJECTIVE:
Prediabetes, with blood glucose concentrations higher than normal, but lower than the threshold of diabetes mellitus (DM), is a high-risk state of DM development (1). Most of the time, unhealthy eating habits such as, skipping meals, relying on processed foods, and excessive consumption of sugary drinks are common among undergraduates due to busy schedules and limited budgets. This study, therefore, assessed the prevalence of prediabetes among undergraduate students in University of Nigeria, Nsukka campus.

MATERIALS AND METHODS:
This research adopted a cross-sectional survey design. Multi stage sampling technique was used to select 416 respondents used in this study. Data was collected using questionnaires, anthropometric measurements and fasting blood sugar. Questionnaire was used to obtain information on socio-demographic status, family history of non-communicable diseases, dietary patterns and lifestyle characteristics. Anthropometric measurements and Fasting Blood Glucose were obtained using standard procedures. Data obtained through questionnaires were analyzed using Statistical Product and Service Solutions (SPSS) version 23. Descriptive statistics was used to present results, and inferential statistics such as Pearson Correlation and Chi-square that were used to establish association between variables at $p<0.05$.

RESULTS AND DISCUSSION:
The result of the study showed that about half (50.5%) of the respondents were males while 49.5% were females. Almost all (97.8%) of the respondents were Christians and 51.4% were between the ages of 18-20 years. The feeding habits of the respondents showed that many (78.0%) of the respondents skipped their meals, most especially breakfast, while 22.0% did not. More than half (60.3%) of the respondents had moderate dietary diversity scores. There was a significant positive relationship between obesity and prediabetes. About 10% of the respondents had prediabetes while (1.0%) few of the respondents were diagnosed with diabetes.

Table 1: Cross tabulation of respondents' fasting blood sugar with BMI

Variables	Blood Glucose Level			Total
	Normal	Prediabetes	Diabetes	
BMI				
Underweight	70(95.9%)	2(2.7%)	1(1.4%)	73(100.0%)
Normal	250(96.5%)	8(3.1%)	1(0.4%)	259(100.0%)
Overweight	37(84.1%)	7(15.9%)	0(0.0%)	44(100.0%)
Obese	14(35.0%)	24(60.0%)	2(5.0%)	40(100.0%)
Total	**371(89.2%)**	**41(9.9%)**	**4(0.9%)**	**416(100.0%)**
	$\chi^2 = 28.88$, df = 6, P-value = 0.000*			

χ^2 = Chi-square, df = degree of freedom, P = probability, * = statistically significant ($p < 0.05$),
F = frequency, % = percentage.

A significant relationship observed between obesity and prediabetes in this study is similar to the findings of Al-Zahrani et al. (2) in their study among young females in Alkharj, Saudi Arabia. Obesity has been shown to be associated with an increased insulin demand and increased likelihood of insulin resistance leading to prediabetes or hyperinsulinaemia and ultimately type 2 diabetes mellitus (3). The presence of obesity and prediabetes among this age bracket is a worrisome trend as it is capable of leading to diabetes mellitus and cardiovascular diseases if vigorous intervention is not given.

CONCLUSION AND RECOMMENDATIONS:
There was a high prevalence of prediabetes among the respondents which is positively correlated with obesity. Undergraduate students should be educated on healthy eating habits, the importance of physical activity, and other lifestyle changes that can help prevent and manage prediabetes. Self-monitoring of blood sugar levels should be promoted and those at risk should be encouraged to seek medical advice if their blood sugar levels are outside the normal range.

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OG4

Assessing the lifestyle behaviours and metabolic health status of Adults in Abeokuta South Local Government Area of Ogun State.

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KEYWORDS: *Metabolic syndrome, lifestyle behaviours, body mass index*

HIGHLIGHTS
- There is high prevalence of metabolic syndrome among the respondents.
- Metabolically unhealthy overweight was more prevalent among male than female
- Smoking, alcohol and fruit intake quantity were associated with metabolic syndrome

BACKGROUND AND OBJECTIVE:
Overweight and obesity are associated with high mortality rates driven by comorbidities such as type 2 diabetes, hypertension, dyslipidemia, and certain cancers. However, comorbid individuals with normal body mass index have been shown to be at risk of metabolic dysregulation similar to obese individuals, and have 3-fold higher risk of all-cause mortality and/or cardiovascular events [1]. In this region, there is low level of awareness of metabolic health status and even body mass index. This finding will provide information that can be used to reduce mortality, and cardiovascular events among adults. This study therefore assessed the metabolic health status of adults in Abeokuta South Local Government Area in Ogun State.

METHODOLOGY:
The study adopted a descriptive cross-sectional research design. Using a multi-stage sampling, 450 apparently healthy adults were randomly selected from 20 communities proportionately in five wards, out of the fifteen wards in Abeokuta South LGA. Respondents' socio-demographic data, and lifestyle behaviours were assessed using

WHO step instrument. Anthropometry was assessed using standard procedures, and body mass index was calculated. Triglycerides, LDL-cholesterol, HDL-cholesterol, total cholesterol, blood pressure, fasting blood glucose (FBS) were assessed using standard procedures. Metabolic syndrome was assessed using the NCEP-ATP III and IDF classification. Data were analyzed and presented using descriptive statistics. Chi-square was used to assess association among variables.

RESULTS AND DISCUSSION:

Socio-demographic characteristics of the respondents

More-than half (59.8%) were male and 40.2% were female, 2.9% fall within the age of 18-19 years, 51.7% were 20 – 39 years, 29.5% were 40 – 59 years and 3.8 % were 60 years and above. More than half (65.2%) had tertiary academic qualification, and 4% had no formal education.

Lifestyle behaviours of the respondents

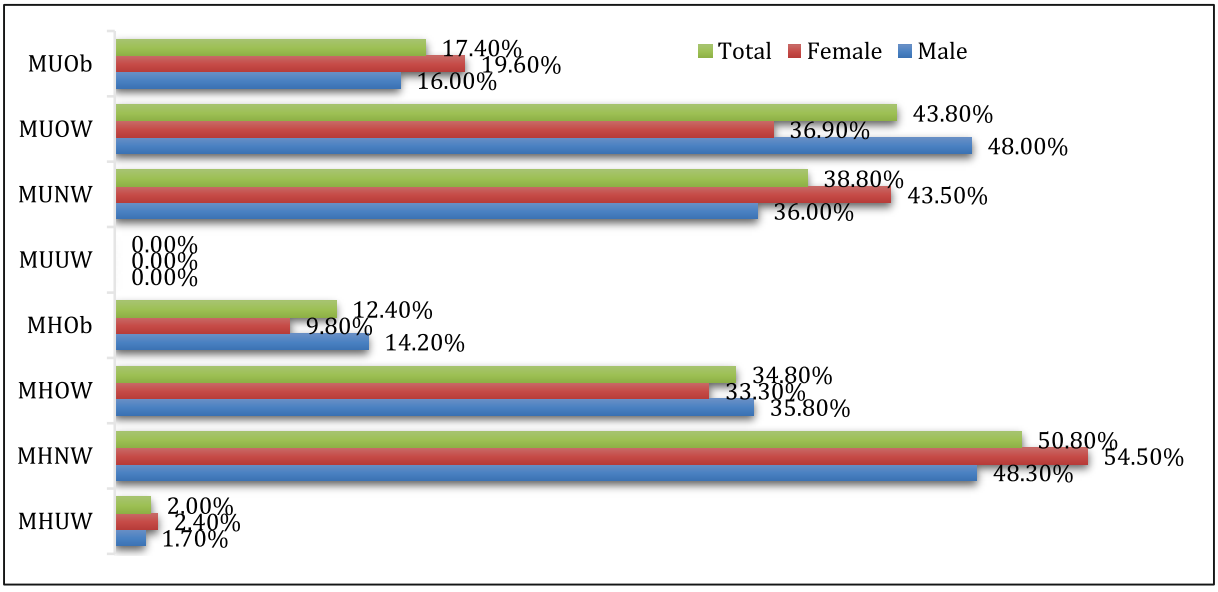
About one-third (34.3%) of the respondents were current smokers, one-quarter of them were daily smokers with 12.4% started smoking within age 15-20 years. Also, more than half (59.5%) consumed alcohol, and 26.2% consumed alcohol for at least 4 times/week. The mean quantity of alcohol consumed was 29.5g. About 28.4% of them were bring drinkers. Only 5% and 3.6% of the respondent consumed at least 400g of fruits and vegetables /day, respectively while 20.7% and 20.5% had no fruit and vegetable intake daily, respectively. Also, about 14.0% were sedentary, 19.3% were minimally active, and 55.0% had health enhancing physical activities.

Anthropometric, biochemical and metabolic health status of the respondents

About 69% of the respondents had MetS. The prevalence of overweight, and obesity were 37.4 and 13.8%, respectively. 14.8% had abdominal obesity, 25.3% were hypertensive, 32.9% had high fasting blood glucose, 17.9 and 32.1% had high glycated Hb, and raised triglyceride, 56.9 and 23.6% had low LDL, and HDL cholesterol level, 26.7% had high cholesterol level. About 38.8, 43.8 and 17.4% had metabolically unhealthy normal weight, overweight, and obesity, respectively (Figure 1)

Associated factors with metabolic health of the respondents

Age (p=0.00), educational level (p=0.03), current smoking (p=0.02), alcohol drinking (p=0.02), fruit intake quantity (p=0.04) were associated with metabolic syndrome.



MUOB- metabolically unhealthy obesity, MUOW- metabolically unhealthy overnight, MUNW- metabolically unhealthy normal weight, MUUW- metabolically unhealthy underweight, MHOb- metabolically healthy obesity, MHOW- metabolically healthy overweight, MHNW- metabolically healthy normal weight, MHUW- metabolically healthy underweight.

Figure 1: Metabolic health status of respondents by body mass index

CONCLUSION AND RECOMMENDATION:
High prevalence of metabolic unhealthy normal weight, overweight and obesity among respondents may put them at risk of high mortality. There is need for weight reduction and regular check up to reduce morbidity.

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OG5

Pathways to strengthen food demonstration in selected primary healthcare centres in akinyele local government area of ibadan

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KEYWORDS: *Food Demonstration, Primary Healthcare Centre, Pregnant women, Lactating Mothers*

HIGHLIGHTS
- Identified barriers include funding and infrastructural challenges
- Strategies include community awareness and partnership development
- Opportunities lies in existing community willingness and potential funding sources.

BACKGROUND AND OBJECTIVE:
Food demonstration provides essential knowledge and skills necessary to promote optimal dietary practices for maternal and child well-being. The Paucity of resources has impacted on the frequency and quality of food demonstration sessions in Nigeria's primary health facilities. Understanding the strategies to strengthen these sessions could promote healthy diet and reduce malnutrition. This study explores pathways to strengthen food demonstrations in Primary health Centres (PHCs) in Akinyele Local Government Area, Ibadan, Nigeria.

METHODS:
This qualitative study employed purposive sampling to select four health facilities, 11 health workers/stakeholders, four community leaders and 60 pregnant/lactating women. Data were collected through Focus Group Discussions (FGDs)for pregnant/lactating women, and key informant interviews (KIIs) for health workers and community leaders and in-depth-interview (IDIs) for other stakeholders as perspectives, barriers and opportunities to strengthen food demonstration in PHCs were explored using structured guide. Interviews were recorded, translated, transcribed verbatim and analysed thematically to identify pattern and insights.

RESULTS AND DISCUSSION:
Seventy-five participants contributed through three IDIs, six FGDs, and 12 KIIs. Identified barriers to effective food demonstration sessions in sampled PHCs include inadequate funding/financial limitations, insufficient infrastructure, high cost of food items, lack of collaboration and partnership with multiple sponsors, lack of awareness and involvement of local stakeholders among others. Strategies to strengthen food demonstration in accordance with the results of the present research, [1] asserted in their investigation that "Community participation necessitates a heightened community awareness and the full utilization of all community capabilities, within the framework of cultural considerations. High cost of food items was mentioned by majority of the participants made many succumb for whatever is available and affordable; lack of adequate space for food demonstration activities was also mentioned as a challenge by the health workers. A study by [2] revealed that in low- and middle-income countries (LMICs), such challenges are prevalent, impacting the implementation of nutrition-related actions in school settings. Existing opportunities includes inclusion of food demonstration

funding in basic health care provision fund, availabilities of some partners and availability of manuals/recipe books in the state. Please include at least (1) table or chart or graph to illustrate your results and reduce the narrative.

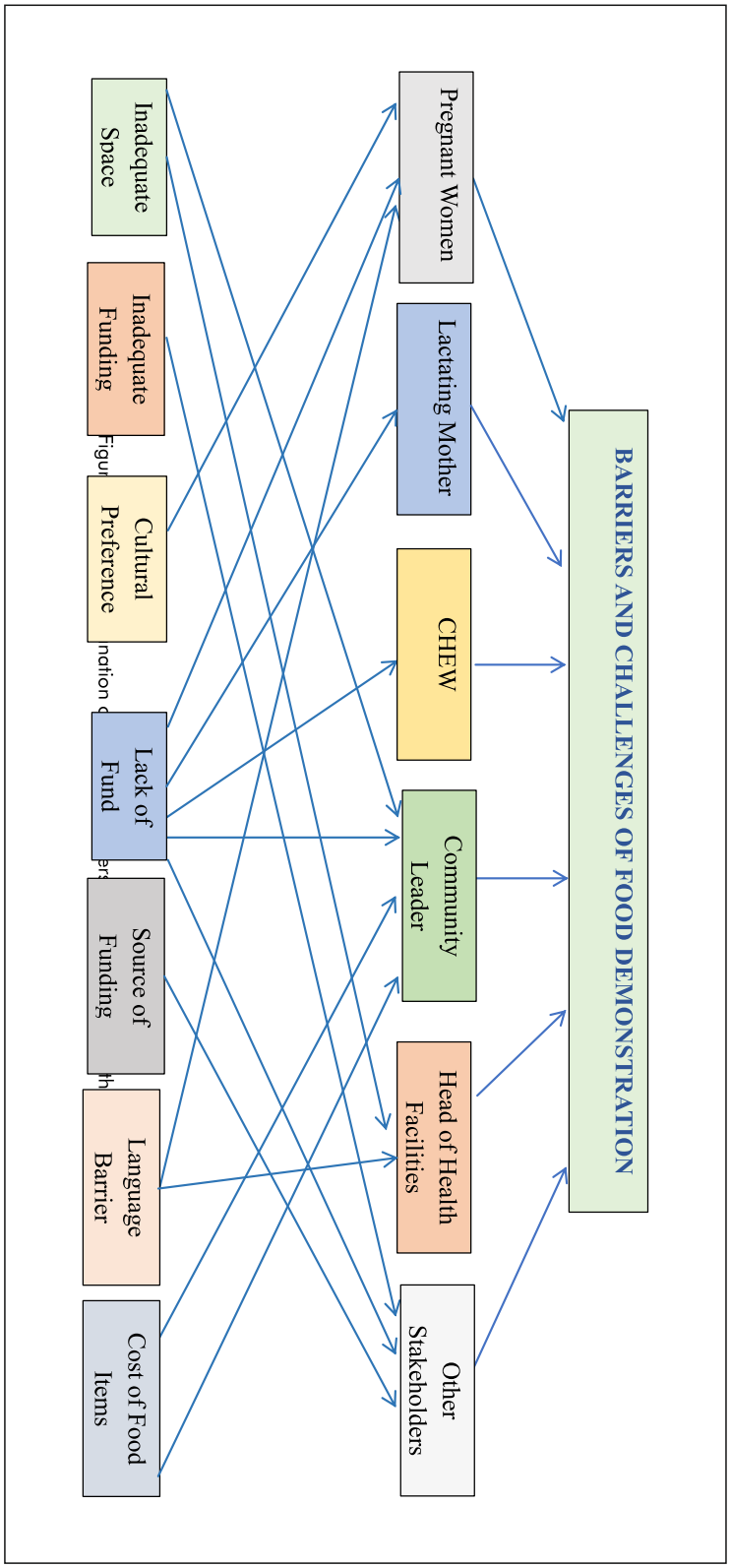

Figure 1: A Model Explanation of Identified Barriers and Challenges and the Identifiers.

CONCLUSION AND RECOMMENDATION:
To bolster food demonstration in the LGA, there should be an improvement in awareness creation, initiation of advocacy efforts, execution of capacity development programs for intended beneficiaries, promotion of community involvement, and encouragement of participation and financial support which ultimately contribute to the enhancement of maternal and child health, thereby fostering a healthier community.

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OG6

Socio-economic and Food security status of adolescent girls in Ikwuano lga of Abia State, Nigeria: A Pilot Study.

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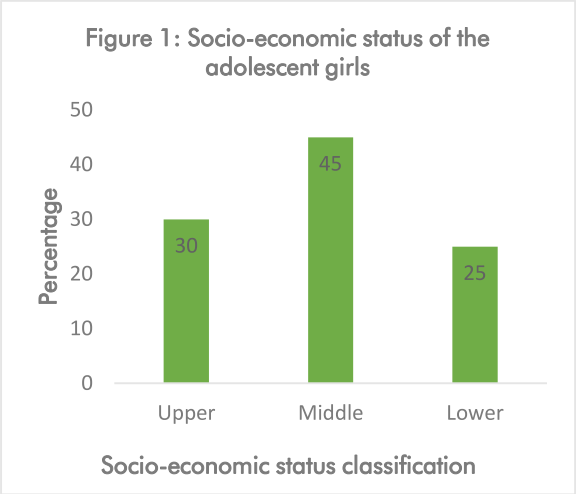
KEYWORDS: *Adolescent girls, Nigeria, food security.*

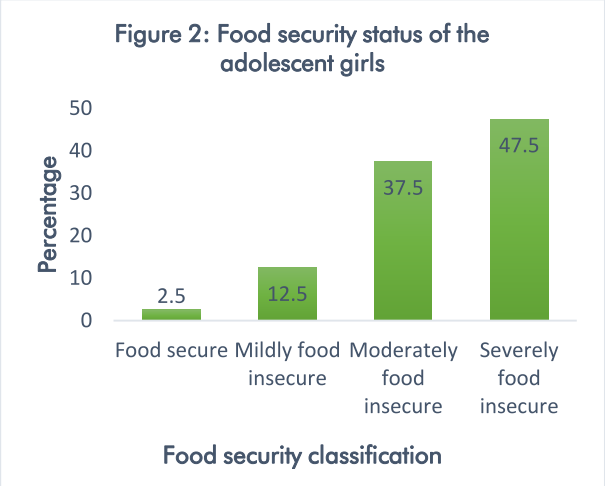
BACKGROUND AND OBJECTIVE:
Adolescents make up 21% of Nigeria's population, with about 25 million being females (1). This stage offers a key opportunity to break the cycle of malnutrition, yet food insecurity remains a major barrier to adequate nutrition for adolescent girls (2). Limited data exists on food security status among this group, particularly in developing countries. This pilot study assessed the socio-economic and food security status of adolescent girls in Ikwuano LGA, Abia State, Nigeria.

MATERIALS AND METHODS:
A school-based pilot study was conducted using purposive sampling to collect data from 40 adolescent girls aged 10-19 years. Socio-economic status was assessed using a modified version of Mendez-Castellano and Mendez (3) socio-economic questionnaire based on ownership of household assets, and scores were classified as: upper (4-9), middle (10-12) and lower class (13-20) (3). Food insecurity was measured using the Household Food Insecurity Access Scale (HFIAS). Scores of 0–1 indicated food secured, 2-7 mild food insecurity, 8-14 moderate food insecurity, and 15-27 severe food insecurity. Data were coded and analyzed with IBM SPSS Statistics version 25. Chi-squared tests determined the association between socio-economic and food security status at $p<0.05$.

RESULTS AND DISCUSSION:
More than half (52.5%) of the adolescent girls were in the late adolescent period (15-19 years) and 70% had ≥7

people in their homes. Socio-economic status based on household assets revealed 45% were middle and 25% lower class. Half (50%) were mildly and moderately food insecure, 47.5% were severely food insecure, while 2.5% were food secure, aligning with a study in northern Nigeria which reported very low food security (4). No significant association was found between socio-economic status and food security ($p>0.05$).





CONCLUSION AND RECOMMENDATION:

A significant proportion of the adolescent girls still faced food insecurity, with nearly half severely affected. Interventions must address high food insecurity rates among adolescents, regardless of socio-economic status.

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OG7

Impact of maternal nutrition knowledge and child care practices: A community engagement approach

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KEYWORDS: *Maternal Nutrition Knowledge, Child feeding practices, Community Engagement*

HIGHLIGHTS:

- Better nutrition knowledge among mothers improved their children's feeding practices.
- Community engagement bridged gaps in maternal nutrition understanding and childcare.
- Mixed methods revealed maternal knowledge, practices, and key association indicators.

BACKGROUND AND OBJECTIVE:
Maternal nutrition knowledge serves as a foundational element in shaping child feeding practices and overall child health [1]. Numerous studies have shown a strong correlation between a mother's understanding of nutritional principles and the quality of care she provides to her children [2]. However, the specific level of nutrition knowledge among mothers in Ogbomoso North Local Government remains largely unexplored. This study investigates the impact of maternal nutrition knowledge and child care practices through a community engagement approach.

METHODOLOGY:
A cross-sectional survey was conducted using a validated maternal nutrition knowledge questionnaire (MNKQ) adapted from previous studies [2]. A sample size of 385 mothers with children under five was selected using stratified random sampling across the wards in Ogbomoso North Local Government. A mixed methods approach, capturing a more comprehensive picture of maternal knowledge, practices, and other influencing factors, was adopted [3]. Data on socio-economic factors and other relevant variables were collected and analyzed using descriptive statistics and Spearman's correlation to determine the association between maternal nutrition knowledge scores and child feeding practice indicators.

RESULTS AND DISCUSSION:
The findings reveal that 82.3% of mothers had good nutrition knowledge. Maternal nutrition knowledge was significantly associated with child feeding practices ($r = 0.424$, $p = 0.024$) and the child's nutritional status ($r = 0.279$, $p = 0.041$). While 75.0% identified exclusive breastfeeding as optimal, gaps were found in knowledge about micronutrient-rich foods and complementary feeding. Cultural beliefs, economic constraints, and traditional practices significantly influence child feeding practices.

CONCLUSION AND RECOMMENDATION:
The study underscores the need for targeted interventions to improve maternal nutrition knowledge and child care practices, addressing both educational and socio-economic barriers, with the hope of contributing significant improvements in child health outcomes.

Table 1: Spearman's Correlation Coefficients Showing Statistically Significant Associations Between Variables and Nutritional Status

Variables	r- value	p-value
Working hours of mothers and childcare	0.182	0.049
Mother's nutritional knowledge and childcare	0.424	0.024
Mother's occupation and childcare	0.367	0.427
Maternal education and child's nutritional status	0.136	0.022
Maternal monthly income and childcare nutrition	0.173	0.034
Mother's nutritional knowledge and child's nutritional status	0.279	0.041

P < 0.05 indicates statistical significance.

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SUB-THEME I: STRATEGIES FOR SUSTAINABLE COMMUNITY ENGAGEMENT IN NUTRITION

PI1

Problems of Volunteering in the Context of Moderate Acute Malnutrition treatment -Case study of Masaki nutrition program in Jahun LGA Jigawa state.

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KEYWORDS: *Moderate acute malnutrition, Community volunteer, Outpatient therapeutic program, Active case finding*

BACKGROUND AND OBJECTIVE

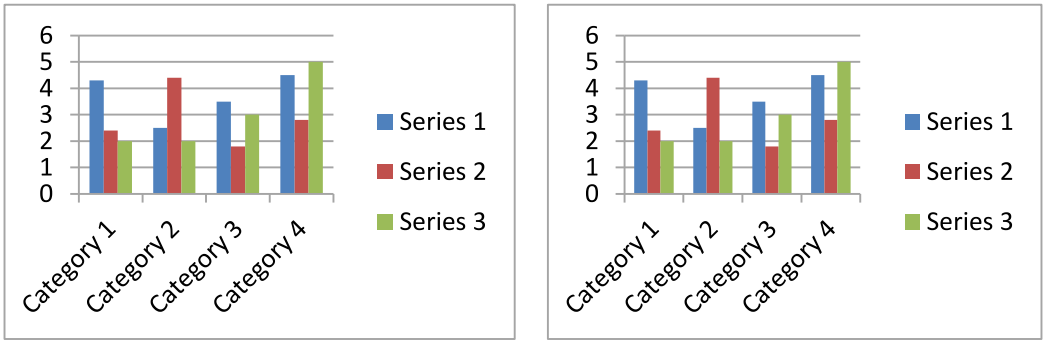
Jigawa State of the northern Nigeria has unacceptable high stunting rate of 64% (NDHS2018) But the current trend of tackling malnutrition is expensive which call for re-strategizing; it is evident that many mothers do not have required knowledge and skills in terms of child feeding such as early initiation, exclusive breast feeding complementary feeding etc. To address this ,Jigawa state Primary health care development agency (PHCDA) introduced Masaki nutrition program in the year 2019 in 300 centers engaging 3,300 CVs to assist in curving

the menace of moderate acute malnutrition. The rural women engaged are taught how to identify, classify and treat Moderate acute malnutrition (MAM) with aim of having sustainable community engagement and ownership but there are confronted with many problems which call for a research of this type. The objectives of the study were to highlight the nutritional status of under 5 children in Jigawa state and the current trend of treatment of MAM. To outline various challenges facing the community volunteers working in the Masaki sites.

MATERIALS AND METHODS:

Eight (8) respondents were randomly selected in each Masaki site of the LGA of the study and 20 Community volunteers (CVS) from, outpatient therapeutic program (OTP) making a total of 60 out of 75 volunteers the figure represent 80 percent of the CVS in the area of study.

RESULT AND DISCUSSIONS



The entire respondent were engaged by the LGAs through influence of either political or traditional leaders which affect the choice of the best CV from the community, they were trained but inadequately. And no incentives were given while resource mobilization teams do not get the required donations for food stuff for the food demonstration.

CONCLUSION AND RECOMMENDATIONS

MNP which started in the year 2019 has recorded tremendous successes including: Screening of 346,215 U/5 children, admission of 34,127 children, Conversion of 28,599, from MAM to normal, Empowering of 3,300 rural women with knowledge of identification and treatment of MAM using simplified approach, Engagement of 900 community gate keepers who sourced food items for demonstration, Clustering of 1,500 communities for easy access of nutrition services. But there are many problems that need to be address as highlighted above.

RECOMMENDATIONS

There should be good engagement of stakeholders; selection should be based on merit and interest, rigorous training, community sensitization and resource mobilization with any type of incentive for proper community ownership of MNP.

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