*Original Research Article*

Consumption of Vitamin-A Biofortified Orange Fleshed Sweet Potato (OFSP) Among Agricultural Educators in Tertiary Institutions of Ondo State, Nigeria

.

ABSTRACT

|  |
| --- |
| **Aim:** The present study assess the consumption behavior of vitamin A biofortified orange-fleshed sweet potato (OFSP) among agricultural educators in tertiary institutions in Ondo State, Nigeria, and to explore the relationship between their knowledge, perceptions, and actual consumption  **Study design:** Cross-sectional study.  **Place and Duration of Study:** Agricultural faculties of selected tertiary institutions in Ondo State, Nigeria, conducted between October 2023 and February 2024.  **Methodology:** A structured questionnaire was administered to 75 academic staff across three randomly selected institutions (Federal University of Technology, Akure; Rufus Giwa Polytechnic, Owo; Federal College of Agriculture, Akure). The questionnaire assessed consumption patterns, knowledge of health benefits, and perceptions regarding vitamin A biofortified crops. Data were analyzed using descriptive statistics and Spearman’s rank-order correlation.  **Results:** Out of 75 respondents, 65% reported awareness of OFSP, but only 43% had consumed it. Consumption frequency was low, with 57% never having tried OFSP. Knowledge of health benefits was high, with 100% awareness of immune system benefits and 98.4% for vision health. However, the correlation between knowledge and consumption was not significant (r = -0.06, p = 0.59), indicating that awareness did not translate into dietary behavior. Perceptions of safety and nutritional value were positive, yet accessibility issues hindered regular consumption  **Conclusion:** Despite high awareness and favorable perceptions of OFSP, actual consumption remains low among agricultural educators. This highlights the need for targeted interventions that address practical barriers to increase the adoption of biofortified crops in Nigeria. |

*Keywords: Vitamin A, Biofortification, Orange-fleshed sweet potato, Agricultural educators, consumption behavior*

1. INTRODUCTION

Vitamin A deficiency (VAD) remains a critical global public health challenge, especially in low- and middle-income countries where micronutrient-rich food access is often limited (World Health Organization [WHO], 2024). Vitamin A plays an essential role in vision, immune function, epithelial integrity, and cellular growth. Inadequate intake can result in night blindness, increased susceptibility to infections, and in severe cases, xerophthalmia and irreversible blindness (National Institutes of Health [NIH], 2023). Globally, VAD affects approximately one-third of children under five years, contributing to an estimated 500,000 cases of preventable blindness and approximately 670,000 child deaths annually (WHO, 2025; Nuredin, et al., 2024).

In Nigeria, VAD is similarly widespread. A national nutrition survey revealed that 29.5% of Nigerian children under five have serum retinol levels below the critical threshold of 0.70 µmol/L, indicating a serious public health problem across all agroecological zones (Iseghohi, et al. 2024; Maziya-Dixon et al., 2006). Beyond these visible clinical manifestations lies the broader issue of hidden hunger—a chronic lack of essential micronutrients despite sufficient caloric intake. Hidden hunger is estimated to contribute to about 25% of infant, child, and maternal mortality in Nigeria, with VAD and iron deficiency anemia particularly prevalent in rural populations where dietary diversity remains limited (Ekholuenetale et al., 2024).

While supplementation and industrial food fortification remain common interventions, there is increasing recognition that food-based strategies rooted in agricultural systems may offer more sustainable, culturally appropriate, and accessible solutions to micronutrient deficiencies (HarvestPlus, 2023). One such approach is the promotion of orange-fleshed sweet potato (OFSP), a biofortified crop rich in β-carotene, the provitamin A compound. OFSP, originally domesticated in South America, was introduced to Nigeria by the International Potato Center (CIP) and handed over to the National Root Crops Research Institute (NRCRI), Umudike, in 2005 for national trials and adaptation (Premium Times Nigeria, 2023). A 125 g serving of OFSP can provide a child’s full daily requirement of vitamin A (Phorbee et al., 2023). In addition to its high nutritional value, OFSP is drought-tolerant, high-yielding, and easily integrated into existing sweet potato production systems (CIP, 2018).

Despite its proven benefits and suitability for low-resource settings, the adoption and regular consumption of OFSP remain inconsistent across many parts of Nigeria (Ahoudou et al., 2025; Wongnaa, et al., 2024; Chah et al., 2020; Nwachukwu & Nwaobiala, 2020). Among the critical actors in the agricultural innovation system are agricultural educators, particularly those based in tertiary institutions. These individuals shape agricultural knowledge through curriculum development, student mentorship, and extension outreach. As such, their own behaviors and attitudes toward biofortified crops can serve as a multiplier effect on community-level uptake (Arowosegbe, Alomaja, & Tiamiyu, 2024).

However, limited empirical evidence exists on the extent to which these educators are aware of, consume, or advocate for vitamin A biofortified crops such as OFSP. Their knowledge, perception, and consumption behaviour remain underexplored, especially in contexts where they are expected to promote nutrition-sensitive agriculture. Understanding these dynamics is essential for designing targeted interventions, strengthening education-based advocacy, and integrating biofortification more deeply into agricultural education and practice.

To explain consumption behaviour, this study draws on the Health Belief Model (HBM), a psychological framework that posits that health-related actions depend on individuals’ perceptions of susceptibility, severity, benefits, barriers, and cues to action (Rosenstock, Strecher, & Becker, 1988). Applying the HBM in this context provides a theoretical lens for interpreting the disconnect between knowledge and practice. For example, even when educators recognise the health benefits of OFSP, low perceived susceptibility to VAD or practical barriers such as access may limit their motivation to incorporate the crop into their diets. However the study recognizes a limitation, as it focused mainly on the knowledge and perception instead of all the 5 subsets of the model. This is due to the category of respondents being focused on in the study. By examining these psychosocial and contextual factors, the study aims to illuminate the enablers and inhibitors of OFSP consumption among this influential group.

Ultimately, analyzing the consumption behavior of agricultural educators in tertiary institutions across Ondo State offers valuable insights for curriculum reform, nutrition education strategies, and the scaling-up of food-based interventions to combat vitamin A deficiency in Nigeria.

The specific objectives of this study were to determine:

1. The frequency of consumption of OFSP among these educators;

2. Their knowledge of the health benefits of vitamin A biofortified crops; and

3. Their perception of vitamin A biofortified crops in general and OFSP in particular;

Based on these objectives, the study tested the following null hypothesis

1. H01: There is no significant relationship between knowledge of the benefits of vitamin A food crops and the consumption of OFSP among agricultural educators in tertiary institutions in Ondo State, Nigeria.
2. H02: there is no significant relationship between the perception of agricultural educators to Vit A food crops and the consumption of OFSP among agricultural educators in tertiary institutions in Ondo State, Nigeria

2. methodology

This study was conducted in **Ondo State**, located in the South-West geopolitical zone of Nigeria. The state occupies a landmass of approximately **15,500 square kilometers** and is situated around **latitude 7º05'354"N** and **longitude 4º50'070"E.** Ondo State has an estimated population of **five million residents** and shares boundaries with Edo and Delta States to the east, Ogun and Osun States to the west, Ekiti and Kogi States to the north, and the Atlantic Ocean and the Bight of Benin to the south (Ondo State Ministry of Economic Planning and Budget, 2025).

#### **2.1 Study Population**

The target population comprised **academic staff within the agricultural faculties** of tertiary institutions in Ondo State. The state hosts **18 tertiary institutions**, including **seven universities** (one federal, three state-owned, and three private), **five polytechnics** (one federal, one state, and three private), **six accredited colleges of education,** and **one college of agriculture**. This demographic was selected due to their professional expertise in agricultural sciences, which was assumed to enhance their awareness and understanding of the nutritional importance of **vitamin A biofortified crops,** particularly orange-fleshed sweet potato (OFSP).

#### **2.2 Sampling Procedure**

A **stratified random sampling technique** was employed to ensure representation across the various categories of tertiary institutions. From the institutional strata, three institutions were randomly selected to represent the major categories:

* **Federal University of Technology, Akure** (University)
* **Rufus Giwa Polytechnic, Owo** (Polytechnic)
* **Federal College of Agriculture, Akure** (College of Agriculture)

Within each institution, **academic staff from departments within the Faculty of Agriculture** were purposively selected based on their awareness of vitamin A biofortified sweet potato. This purposive inclusion criterion was used to ensure the relevance and depth of responses regarding the study variables. A total of 75 academic staff comprising of **Federal University of Technology, Akure** (47), **Rufus Giwa Polytechnic, Owo (13) and Federal College of Agriculture, Akure (15), which represented 30%, 15% and 15% of total population of academic staff respectively were sampled for the study.**

#### **2.3 Instrument for Data Collection**

Data were collected using a **structured questionnaire,** which was designed to obtain detailed information on:

* **Respondents' consumption patterns** of OFSP
* **Knowledge** of the health benefits of vitamin A biofortified crops
* **Perceptions** regarding the safety, accessibility, affordability, and desirability of such foods

The questionnaire included both **closed-ended questions** and **Likert-type scale items** to facilitate quantitative analysis. Consumption frequency was measured using a **four-point Likert scale**: Most times (4), Once in a while (3), Rarely (2), Never (1)

Eight (8) knowledge items on the health benefits of OFSP were presented to respondents and every one that was assented to was given a score of 1. This was summed up to give a knowledge score.

Perceptions were assessed using a **five-point Likert scale**, ranging from Strongly Agree (5) to Strongly Disagree (1), allowing for evaluation of attitudes and beliefs. This was summed up to give a perception score.

#### **2.4 Data Analysis**

Quantitative data were analyzed using **descriptive and inferential statistical techniques (Pearson Product Moment Correlation).** Descriptive statistics, including **means, percentages, and frequency distributions,** were used to summarize responses related to consumption frequency, knowledge, and perception.

To test the study hypotheses, **Spearman’s rank-order correlation coefficient (ρ)** was applied. This non-parametric test was appropriate given the ordinal nature of the Likert-scale data and was used to evaluate the **strength and direction** of relationships among variables such as knowledge, perception, and frequency of OFSP consumption.

3. results and discussion

**3.1 Disciplinary distribution of Respondents**

Figure 1 presents the disciplinary distribution of agricultural educators who participated in the study. The data indicate that awareness of orange-fleshed sweet potato (OFSP) is generally high across all agricultural disciplines, with the majority of respondents indicating that they “have heard of” the biofortified variety (Adebisi, et al., 2020). Notably, 65% of the respondents belong to four core disciplines within the agricultural sciences: Agricultural Economics (19%), Crop Science (17%), Animal Science (16%), and Food Science (13%). Each of these disciplines offers a distinct yet complementary perspective relevant to the promotion and integration of OFSP in Nigeria’s food systems.

Agricultural Economists are likely to focus on the economic feasibility, market demand, cost-benefit analysis, and adoption barriers of OFSP. Their insights are vital in designing pricing strategies, understanding consumer behavior, and informing policy decisions that can enhance uptake. Crop Scientists, on the other hand, are primarily concerned with agronomic performance, including varietal adaptability, yield potential, and production constraints—factors that directly influence farmer adoption and sustainability of cultivation (Phorbee et al., 2023).

Animal Scientists contribute a unique perspective by exploring OFSP’s potential use in livestock systems, particularly through the utilization of vines and peels as feed resources, thereby promoting resource efficiency and mixed farming models (Ejoh et al., 2021). Meanwhile, Food Scientists approach OFSP from a consumer-oriented angle, investigating aspects such as processing technologies, sensory attributes, nutritional quality, and recipe innovation—all of which are crucial for increasing consumer acceptability and market penetration.

Beyond these core disciplines, Agricultural Extension professionals represent 11% of the respondents. As crucial intermediaries between research institutions and rural communities, they play a pivotal role in translating technical knowledge into accessible practices through farmer education, participatory learning, and community mobilization (Arowosegbe et al., 2024). Their limited representation, however, may suggest a missed opportunity in leveraging extension systems for widespread diffusion of biofortified crops.

The remaining 24% of respondents come from disciplines such as Soil Science, Forestry, Ecotourism, and Fisheries. While not directly involved in root crop production, these professionals contribute to integrated land-use systems, agroecological planning, andsustainable farming practices, all of which are relevant to the broader implementation of nutrition-sensitive agriculture and climate-resilient food systems (WHO, 2024).

This disciplinary breakdown underscores the multidimensional nature of OFSP promotion, highlighting the need for interdisciplinary collaboration. For biofortified crops to achieve meaningful uptake and health impact, efforts must be informed by technical, economic,behavioral, and ecological perspectives—a goal that aligns well with the expertise represented in this educator cohort.

**Figure 1: Awareness of OFSP according to Agricultural discipline**

**3.2 Contact with and Consumption of OFSP**

Approximately **65%** of the surveyed agricultural educators reported having seen or come into some form of contact with orange-fleshed sweet potato (OFSP), indicating that awareness-raising interventions—whether through media, institutional communication, or professional exposure—have been relatively successful in disseminating knowledge about the crop. However, this relatively high level of contact has not translated into equivalent consumption. Only 43% of respondents reported having ever eaten OFSP, while a significant 57% had never consumed it.

This divergence between awareness and behavioraluptake underscores a key limitation in many nutrition education and agricultural promotion strategies: exposure does not equate to adoption (Ejoh et al., 2021; Arowosegbe et al., 2024). While over 90% of respondents had encountered OFSP in some capacity, fewer than 60% had incorporated it into their diet, reflecting a critical drop-off between passive awareness and active consumption. This finding is in contrast to Fasina et al. (2025), where contact with biofortified vitamin A cassava influenced the consumption of the crop. This reveals technology peculiar characteristics also has a role to play in their uptake.

The findings suggest that current sensitization efforts may be overly theoretical or passive, failing to provide educators with practical avenues or motivation to incorporate OFSP into their personal food practices. According to the Health Belief Model, knowledge must be paired with perceived benefits, low barriers, and tangible cues to action to result in behavior change (Rosenstock et al., 1988). In this case, even though educators are aware of OFSP and its benefits, the lack of hands-on exposure, dietary integration, and systemicaccess may be inhibiting consistent consumption.

To address this gap, there is a need for experiential interventions that go beyond information dissemination—such as taste-testing programs, institutional meal inclusion, and community-based cooking demonstrations—to help normalize OFSP consumption among educators and position them as authentic advocates of food-based solutions to vitamin A deficiency.

**Figure 2: Contact with and Consumption of OFSP**

**3.3 Level of Consumption of OSFP**

Figure 3 presents data that highlights a significant under-consumption of orange-fleshed sweet potato (OFSP) among agricultural educators in Ondo State. Only 14% of respondents reported consuming OFSP "most of the time," while 29% indicated they had eaten it but only on rare occasions. Most notably**,** a clear majority (57%) had never consumed the crop. This finding is particularly striking when considered alongside earlier results showing that 65.3% of respondents had reported some level of contact or awareness of OFSP. The data reveal a substantial gap between awareness and actual dietary behavior, echoing a pattern frequently observed in nutrition-sensitive interventions that rely on knowledge as a primary driver of behavioral change (Fasina et al., 2025; Ejoh et al., 2021; Rosenstock et al., 1988). This is corroborated by Omoba et al. (2020) that there is a poor acceptability and consumption of sweet potato leaves as accomplices with starchy food. These might be attributed to the erroneous belief that it is inferior in taste and nutritional value compared to other common vegetables.

This discrepancy suggests that while informational campaigns and awareness efforts may have succeeded in introducing OFSP as a concept, they have not translated into meaningful behavioral adoption. According to the Health Belief Model, knowledge alone is insufficient to trigger action unless it is accompanied by a strong sense of perceived benefit, low perceived barriers, and accessible cues to action (Rosenstock et al., 1988). In this case, although respondents may be aware of OFSP’s nutritional value—especially its rich vitamin A content—they may not have internalized its importance or found practical ways to incorporate it into their dietary routines.

Furthermore, the findings align with broader critiques of biofortification programs that emphasize information dissemination without corresponding structural or behavioral enablers, such as availability, affordability, and culturally appropriate culinary integration (Phorbee et al., 2023; Arowosegbe et al., 2024). The low consumption rates among educators—who are themselves agents of innovation and knowledge transfer—highlight a critical bottleneck that may undermine the broader public health goals of combating vitamin A deficiency through food-based strategies.

**Figure 3: Frequency of Consumption of OFSP**

**3.4 Knowledge of benefits**

Figure 4 presents data on respondents’ knowledge of the health benefits associated with vitamin A biofortified crops. The most widely recognized benefits among agricultural educators were the improved immune system (100%), growth and development (100%), and eyes and good sight (98.4%). These functions of vitamin A are prominently emphasized in global and national nutrition messaging, particularly in relation to child survival, vision health, and immunity enhancement (World Health Organization [WHO], 2024; Ejoh et al., 2021). Such consistent promotion in public health campaigns likely explains the high awareness observed in this study.

Moderate levels of awareness were recorded for vitamin A’s roles in reproductive health (82.7%) and healthy pregnancy (65.3%). Although scientific literature affirms the significance of vitamin A in reproductive organ function and fetal development (WHO, 2024), these specific links appear to be underrepresented in mainstream agricultural or nutritional education. This suggests a gap in knowledge transmission, especially among educators who occupy strategic positions in shaping student curricula and influencing community-level nutrition practices. Therefore, strengthening advocacy and instructional messaging on vitamin A’s role in maternal and reproductive health is essential, particularly within agricultural training institutions (Phorbee et al., 2023).

Knowledge levels were notably lower in less-highlighted but scientifically validated areas such as good teeth (64.0%), strong bones (62.7%), and good skin (54.7%). These benefits are well-documented in medical literature—vitamin A plays a vital role in bone remodeling, enamel formation, and skin cell regeneration (National Institutes of Health, 2023). However, these aspects are often neglected in agricultural education, pointing to a narrow framing of vitamin A’s value within existing learning frameworks. As a result, educators may inadvertently under-communicate these lesser-known benefits in their professional outreach and instruction (Arowosegbe et al., 2024).

The data therefore indicate an uneven understanding of the multifaceted health functions of vitamin A-rich foods. Despite being key intermediaries in nutrition and agricultural knowledge dissemination, agricultural educators in this context may not fully internalize or communicate the holistic health importance of biofortified crops such as orange-fleshed sweet potato (OFSP). This partial knowledge could be a latent barrier to behavior change, potentially contributing to the gap between awareness and actual consumption of OFSP observed elsewhere in the study. When educators lack a comprehensive grasp of the benefits of vitamin A, they may be less likely to model regular consumption or effectively motivate others—particularly students, rural women, and farming households—to integrate these crops into their diets (Rosenstock et al., 1988; Ajzen, 1991).

If educators do not grasp the multifaceted health value of vitamin A-rich foods, they are less likely to internalize the urgency of regular consumption or pass on strong motivation to farmers, women, and children.

**Figure 4: Knowledge of the health benefits of vitamin A biofortified food crops**

**Figure 5: Level of Knowledge of health Benefits of Vitamin A biofortified food crops**

**3.5 Perception of vitamin A biofortified food crops**

Most notably, respondents strongly agreed that vitamin A biofortified foods are safe for consumption (mean = 4.47; SD = 0.58), healthier than conventional foods (mean = 4.43; SD = 0.60), and possess numerous potential benefits (mean = 4.61; SD = 0.52). These perceptions indicate a well-informed understanding of the nutritional efficacy of biofortified crops, such as orange-fleshed sweet potato (OFSP), particularly in addressing micronutrient deficiencies. This is consistent with earlier observations in the study showing high levels of awareness and knowledge of key health benefits, especially the role of vitamin A in immunity, growth, and ocular health.

Furthermore, there was strong agreement among respondents that vitamin A biofortified crops should be consumed more frequently than regular foods (mean = 4.36; SD = 0.71), and that consuming these crops is cost effective and preferable to relying on vitamin supplements (mean = 4.27; SD = 0.74). These findings support existing literature advocating for sustainable, food-based approaches to addressing hidden hunger, as opposed to pharmaceutical supplementation, which may be less culturally integrated and more economically exclusionary (Ejoh et al., 2021; WHO, 2024).

However, despite these positive perceptions, a significant constraint was identified in the perceived accessibility of vitamin A biofortified foods. The mean score for ease of accessibility in Ondo State was notably low (mean = 2.39; SD = 1.35), suggesting that logistical and market-related factors may limit the actual availability of OFSP and similar crops. This finding corroborates earlier consumption data, which showed that although over 90% of educators had come into contact with OFSP, fewer than 60% had ever consumed it. The perception of inaccessibility thus represents a structural barrier, inhibiting the translation of positive attitudes into regular dietary behavior.

In addition, cultural acceptance and affordability were moderately rated (mean = 3.81 and 3.51, respectively), indicating that while biofortified foods are not culturally alien, they may still require further social normalization. The moderate perception of taste and flavor (means = 3.41 and 3.44, respectively) also suggests that while sensory qualities are not major deterrents, they are influential in shaping consumption preferences. This aligns with studies that emphasize the importance of culinary adaptation and taste familiarization in promoting the adoption of novel food crops (Phorbee et al., 2023; Arowosegbe et al., 2024).

Overall, the data underscore a disjunction between perception and practice. While educators acknowledge the superior health value and benefits of vitamin A biofortified foods, consumption remains low—largely due to systemic issues of accessibility and supply chain inefficiencies. This indicates that perception alone is insufficient to drive adoption; practical enablers such as availability, affordability, and culinary promotion must be addressed concurrently.

**Table 1: Perception of vitamin A biofortified food crops**

|  |  |  |
| --- | --- | --- |
| Statements | Mean | SD |
| Vitamin\_A\_biofortified\_foods are easy accessible\_in\_Ondo\_state | 2.39 | 1.35 |
| Vitamin\_A\_biofortified food is\_safe\_for\_consumption | 4.47 | 0.58 |
| Vitamin\_A\_biofortified foods are culturally\_accepted\_in\_Ondo\_state | 3.81 | 0.67 |
| Vitamin\_A\_biofortified foods is\_affordable\_in\_Ondo\_state | 3.51 | 0.72 |
| The\_taste\_of\_Vitamin\_A\_ foods\_influence\_my\_consumption | 3.41 | 0.90 |
| The\_flavour\_of\_Vitamin\_A Foods\_influence\_my\_consumption | 3.44 | 0.92 |
| Vitamin\_A\_biofortified\_foods\_should be consumed more\_than\_regular\_foods | 4.36 | 0.71 |
| Vitamin\_A\_biofortified\_Foods\_are\_worth\_the\_price | 3.73 | 0.79 |
| Consuming\_biofortfied\_vitamin\_A\_foods\_are Better\_than\_ vitamin\_supplements | 4.27 | 0.74 |
| Vitamin\_A\_biofortified\_foods\_are\_healthier\_than\_conventional\_foods | 4.43 | 0.60 |
| There\_are\_many\_potential\_benefits\_of \_consuming\_biofortified\_foods | 4.61 | 0.52 |

**3.6 Hypotheses Testing**

**3.6.1 Knowledge vs. Consumption**

The correlation between knowledge of vitamin A food crop benefits and OFSP consumption produced an r-value of -0.06 and a p-value of 0.59. This indicates a very weak, non-significant negative correlation between knowledge and consumption. Based on this, the null hypothesis is accepted, that, there is no significant relationship between knowledge of the benefits of vitamin A food crops and the consumption of OFSP among agricultural educators in tertiary institutions in Ondo State, Nigeria. This result is particularly revealing. Despite the assumption that increased awareness and understanding of vitamin A’s health benefits—such as improved immunity, growth, and eye health—would translate into increased consumption of OFSP, the data do not support this linkage. In fact, the negative correlation, although not statistically significant, suggests that knowledge alone does not predict dietary behavior among this population.

This finding supports broader evidence in nutrition and health behavior research which suggests that knowledge is a necessary (O’Leary, 2025; Sun et al., 2025) but insufficient condition for behavioral change (Worsley, 2002). This is supported by Koch et al. (2021),that discovered significant but low associations between nutrition knowledge and food consumption.

According to the Health Belief Model, perceived benefits must be coupled with cues to action and perceived barriers being addressed for behavior change to occur (Rosenstock et al., 1988). In this study, barriers such as accessibility constraints and limited exposure to taste and preparation options may have prevented knowledge from translating into action (Ejoh et al., 2021; Arowosegbe et al., 2024). This further supports the propositions of the HBM.

**3.6.2 Perception vs. Consumption**

The correlation between perception and consumption yielded an r-value of 0.16 with a p-value of 0.18, indicating a weak but positive correlation, which again was not statistically significant. Based on this result, the study accepts the null hypothesis postulated in the study, that there is no significant relationship between the perception of agricultural educators to Vit A food crops and the consumption of OFSP among agricultural educators in tertiary institutions in Ondo State, Nigeria.

This result implies that even though respondents generally held favourable perceptions—including high ratings for safety, health benefits, and value—these attitudes did not significantly influence their consumption behaviour. This finding is consistent with the Theory of Planned Behaviour (Ajzen, 1991), which posits that behaviour is influenced by a combination of attitude, perceived behavioural control, and subjective norms. A positive attitude alone may not be enough if individuals perceive external constraints (e.g., cost, availability, social norms) as barriers to action. In this context, even though educators believe that OFSP is healthy and beneficial, the low accessibility score (mean = 2.39) discussed earlier may act as a critical barrier, preventing translation of positive perceptions into actual consumption patterns (Phorbee et al., 2023; WHO, 2024).

Both findings demonstrate that neither knowledge nor perception, on their own, significantly predict OFSP consumption among this key professional group. This has crucial implications for intervention design: merely increasing awareness or running perception-based campaigns is unlikely to change behavior unless they are paired with structural and environmental enablers such as increased product availability, affordability, and integration into institutional food systems.

Table 2: Results of Spearman Rho Correlation Analysis between Consumption frequency of Vitamin A Biofortified Foods and Selected variables

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | r-value | p-value | Decision |
| Score of Knowledge of Benefits of Vitamin A Biofortified Foods | -0.06 | 0.59 | Not a significant factor |
| Perception of Vitamin A Biofortified Foods | 0.16 | 0.18 | Not a significant factor |

4. Conclusion

The study concluded that consumption of OFSP is very low, despite a high awareness of the crop, good knowledge of benefits and favourable perception of OFSP. This means that to effectively promote the consumption of biofortified crops like OFSP, strategies must extend beyond cognitive factors (knowledge and attitude) and address practical, social, and environmental dimensions of behaviour change. This underscores the importance of integrated, multisectoral interventions—involving education, market development, and community engagement—to drive meaningful uptake of biofortified foods in Nigeria and other regions grappling with hidden hunger.

There is therefore an urgent need for targeted interventions aimed at strengthening the distribution and accessibility of biofortified crops within and beyond academic institutions. Policy makers and development actors should prioritize market development strategies, institutional procurement for school feeding and staff canteens, and community sensitization that extends beyond informational campaigns to include taste trials and recipe demonstrations. Integrating these crops into institutional diets, extension services, and teaching curricula would not only improve the personal consumption behavior of educators but also enhance their capacity to influence broader community adoption through education and outreach.

Combining improved demonstration access with structured tasting events and hands-on recipe training, you can move more educators from “seeing” to “eating”—and from “eating” to “teaching,” thereby catalyzing wider adoption of OFSP across Ondo State.

Consent

All respondents gave their written consent and agreed to fill the forms. There was no cohesion or manipulation of respondents to partake in the study.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that generative AI technologies (ChatGPT and Grammarly), have been used during the writing and editing of manuscripts. Details of the AI usage are given below:

1. It was used during the writing to rephrase and paraphrase the write up
2. Input prompts include: rephrase this write up and outline implications of this data

References

Adebisi, O.A., Adebisi, L.O., Olatunji, I.B., Daodu, T.O., Omofaiye, A.M. & Akilapa, O.A. (2020). Sensory Evaluation and Willingness to Pay for Orange Flesh Sweet Potato. Cercetări Agronomice în Moldova, Vol. LIII, No. 1 (181) / 2020: 73-83. Available online: www.uaiasi.ro/cercet\_agromold/. DOI: 10.46909/cerce-2020-006

Ahoudou I., Sogbohossou D.E.O., Fassinou, Hotegni V.N., Fanou-Fogny N., Moumouni-Moussa I. & Achigan-Dako E.G. (2025) A systematic review on the factors influencing adoption and consumption of orange-fleshed sweetpotato in sub-Saharan Africa. *Front. Sustain. Food Syst.* 9:1545827. doi: 10.3389/fsufs.2025.1545827

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Arowosegbe, O. B., Alomaja, O. A., & Tiamiyu, B. B. (2024). The role of agricultural extension workers in transforming agricultural supply chains: Enhancing innovation, technology adoption, and ethical practices in Nigeria. *World Journal of Advanced Research and Reviews, 23*(3), 2585–2602.

Wongnaa, C.A., Tuﬀour, T., Asante, B.O., Adabah, R. & Agoalikum, P. (2024) Unlocking the potential of biofortiﬁed crops: economic determinants of orange ﬂesh sweet potato adoption among smallholder farmers in Ghana. *Cogent Food & Agriculture*, 10:1, 2415390, DOI: 10.1080/23311932.2024.2415390

Chah, J., Anugwa, I., & Nwafor, I. (2020). Factors driving adoption and constraining the non-adoption of biofortified orange fleshed sweet potatoes (OFSP) among farmers in Abia State, Nigeria. *Journal of Agriculture and Rural Development in the Tropics and Subtropics* (JARTS), 121(2), 173-183. doi:https://doi.org/10.17170/kobra-202007291509

CIP – International Potato Center. (2018). *Newly launched orange-fleshed sweetpotato (OFSP) platform to fight hidden hunger in Nigeria*. <https://www.cipotato.org>

Ejoh, S. I., Wireko-Manu, F. D., Page, D., & Renard, C. M. G. C. (2021). Traditional green leafy vegetables as underutilised sources of micronutrients in a rural farming community in South West Nigeria II: Consumption pattern and potential contribution to micronutrient requirements. *South African Journal of Clinical Nutrition, 34*(3), 145–152.

Ekholuenetale, M., Tudeme, G., Onikan, A., & Ekholuenetale, C. E. (2020). Socioeconomic inequalities in hidden hunger, undernutrition, and overweight among under-five children in 35 sub-Saharan Africa countries. *The Journal of the Egyptian Public Health Association*, *95*(1), 9. https://doi.org/10.1186/s42506-019-0034-5

Fasina, O.O., Ighoro, A., and Akinola, S. (2025). Socioeconomic Drivers of Vitamin a Biofortified Cassava Consumption Among Agricultural Professionals in Ondo State, Nigeria. *Asian Research Journal of Agriculture* 18 (2):150-61. https://doi.org/10.9734/arja/2025/v18i2690.

Iseghohi, I., Abe, A., Meseka, S., Mengesha, W., Gedil, M., Job, A., Menkir, A. (2024) Reactions of provitamin-A-enriched maize to foliar diseases under field conditions in Nigeria. CEREAL RESEARCH COMMUNICATIONS 52, 747–758 (2024). https://doi.org/10.1007/s42976-023-00395-1

Koch, F., Hoffmann, I., & Claupein, E. (2021). Types of Nutrition Knowledge, Their Socio-Demographic Determinants and Their Association With Food Consumption: Results of the NEMONIT Study. *Frontiers in nutrition*, *8*, 630014. https://doi.org/10.3389/fnut.2021.630014

Phorbee, O., Olatunde, G., Aderonmu, D., Ikerionwu, D., Ojo, A., Oguzor, G, Sanni, L., & Onabolu, A. (2023). Appropriate Post-Harvest Technologies for Biofortified Crops Pro Enhanced Utilization, Value Addition, and Micronutrient Retention. IntechOpen. doi: 10.5772/intechopen.110473

Maziya-Dixon, B. B., Akinyele, I. O., Sanusi, R. A., Oguntona, T. E., Nokoe, S. K., & Harris, E. W. (2006). Vitamin A deficiency is prevalent in children less than 5 y of age in Nigeria. *The Journal of nutrition*, *136*(8), 2255–2261. https://doi.org/10.1093/jn/136.8.2255

National Institutes of Health. (2023). *Vitamin A – Fact sheet for health professionals*. <https://ods.od.nih.gov/factsheets/VitaminA-HealthProfessional/>

Nwachukwu, C. C. & Nwaobiala, C. U. (2020) Analysis of Technology Transfer of the Orange Fleshed Sweet Potato Varieties to Farmers in Abia State, Nigeria. *Nigerian Agricultural Journal*, 51 (3), 72-80. Available online at: <http://www.ajol.info/index.php/naj>

Nuredin, Abdilwahid, Melis, T., Abdu, A. (2024). Clinical vitamin A deficiency among preschool aged children in southwest Ethiopia. Frontiers in Nutrition 11, https://www.frontiersin.org/journals/nutrition/articles/10.3389/fnut.2024.1267979

O’Leary, M., Mooney, E., & McCloat, A. (2025). The Relationship Between Nutrition Knowledge and Dietary Intake of University Students: A Scoping Review. Dietetics, 4(2), 16. https://doi.org/10.3390/dietetics4020016

Omoba, O. S., Oyewole, G. O., & Oloniyo, R. O. (2020). Chemical Compositions and Antioxidant Properties of Orange Fleshed Sweet Potato Leaves and the Consumer Acceptability in Vegetable Soup. *Preventive nutrition and food science*, *25*(3), 293–300. https://doi.org/10.3746/pnf.2020.25.3.293

Premium Times Nigeria. (2023). Why Nigeria should prioritise orange-fleshed sweet potato farming. *Premium Times*. <https://www.premiumtimesng.com>

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the Health Belief Model. *Health Education Quarterly, 15*(2), 175–183. https://doi.org/10.1177/109019818801500203

Sun, Y., Dong, D., & Ding, Y. (2021). The Impact of Dietary Knowledge on Health: Evidence from the China Health and Nutrition Survey. *International journal of environmental research and public health*, *18*(7), 3736. https://doi.org/10.3390/ijerph18073736

World Health Organization. (2024). *Vitamin A deficiency*. Retrieved from <https://www.who.int/news-room/fact-sheets/detail/vitamin-a-deficiency>

WHO (2025) Vitamin A deficiency. Retrievd from https://www.who.int/data/nutrition/nlis/info/vitamin-a-deficiency#:~:text=In%20its%20more%20severe%20forms,months%20of%20losing%20their%20sight.

Worsley A. (2002). Nutrition knowledge and food consumption: can nutrition knowledge change food behaviour?. *Asia Pacific journal of clinical nutrition*, *11 Suppl 3*, S579–S585. https://doi.org/10.1046/j.1440-6047.11.supp3.7.x