



CONSUMER'S BEHAVIORAL INTENTIONS, NUTRITION INFORMATION, ACCEPTANCE AND WILLINGNESS TO PAY FOR FORTIFIED FOODS IN ABAKALIKI METROPOLIS, NIGERIA

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Abstract

Despite efforts to improve nutrition, consumer understanding and acceptance of fortified foods in developing regions remains limited. This study investigated the relationship between consumer behavioural intentions, acceptance, and willingness to pay for fortified foods in the Abakaliki metropolis, Nigeria, with a particular focus on the role of nutrition information. A well-structured questionnaire survey was administered using a multi-stage sampling technique. Data was analyzed using descriptive and inferential statistics. Results revealed that fortified product consumers were mostly youths (74%) and predominantly female (56%). While the availability of fortified food items was perceived positively, accessibility and affordability were identified as barriers to frequent consumption. Product availability, knowledge, and price. Safety, advertisement, and taste significantly influence food purchasing decisions. Similarly, price, fear of artificial additives, perception as only for sick people, and fear of side effects discouraged the purchase of fortified products. Consumers expressed willingness to buy organic foods if priced like conventional ones. This study, therefore, recommends the need to explore consumer attitudes, address accessibility and affordability barriers, and develop effective marketing strategies. Further, there is a need to investigate the reasons behind the limited accessibility and affordability of fortified food products in the market. Addressing these barriers could help increase consumer demand and availability of fortified foods.

Keywords: Consumer's behavioral intentions; Nutrition information; Consumer acceptance; Willingness to pay; Fortified foods.

Introduction

It is estimated that 2 billion people globally have micronutrient deficiencies with severe health implications (Bailey *et al.*, 2015; Gombei & Toteja, 2018). In recent years, increased attention to the food-health nexus has affected consumer choices (Beer *et al.*, 2014; Birol *et al.*, 2015). People's growing sensitivity to their personal well-being and health has consequently favored the creation of the agri-food system of items with healthy implications. (Basha &

Lal, 2019). Recent studies reflect this tendency, identifying "healthiness" as one of the most important factors influencing food choices in European Union nations (Scuderi *et al.*, 2018). Functional foods have been found to increase the quality of the human diet, reduce the risk of various chronic illnesses, and successfully promote public health at a low cost, therefore complementing existing health initiatives (Siddiqi, 2019). As a result, the technique of

addressing nutritional imbalances by food fortification is generally acknowledged worldwide (Xiao et al., 2023). In particular, food-based approaches have been implemented to address this issue, particularly in low- and middle-income countries (LMICs), by improving the quantity and quality of nutrients consumed through the diet (Von Grebmer *et al.*, 2014). A food-based approach reduces the risks of nutrient toxicity (particularly in the case of vitamin A, vitamin D, and iron) and diminishes adverse interactions that are introduced by supplementation and food fortification (Jayatissa & Fernando, 2018). While food-based approaches have proven to be a cost-effective strategy in reducing micronutrient deficiencies, publicly funded interventions have faced challenges in achieving scale and long-term viability, especially in low-income populations (von-Grebmer *et al.*, 2014; Gibson, 2014). As a result, there is a growing interest in leveraging food markets and businesses to promote the consumption of nutrient-dense foods by low-income households, complementing public interventions (Humphrey & Robinson, 2015). Some ways in which food markets have been utilized to increase the availability of nutrient-rich foods to low-income households include the biofortification of staple crops, such as orange-fleshed sweet potato (OFSP), and the fortification of foods during processing, such as fortified wheat flour (Kiran *et al.*, 2022). Biofortification provides a feasible means of reaching undernourished populations in relatively remote rural areas, delivering naturally fortified foods to people with limited access to commercially marketed fortified foods that are more readily available in urban areas (Nestel *et al.*, 2006).

Food-based approaches have the potential to achieve significant scale by focusing on culturally acceptable foods without requiring major changes in household diets (Nordstorm *et al.*, 2013). However, the success of biofortified and fortified foods in addressing micronutrient deficiencies depends on sustained and sufficient consumption, which in turn relies on consumers' ability and willingness to pay for these foods (Henson & Humphrey, 2015). When it comes to purchasing food goods, young consumers

prioritize price affordability and willingness to pay (WTP) (Kovacs & Keresztes, 2022). Willingness to pay for products with organic and natural ingredients was found in 42% of the population globally and in 47% of millennials in 2016 (Deloitte, 2018). Consumers' willingness to pay fluctuates over time (Kovacs & Keresztes, 2022). Studies have found that low-income consumers are willing to pay a premium for the nutritional benefits of biofortified staple foods and fortified infant foods, provided they are informed about these benefits (Henson & Humphrey, 2015).

In low- and middle-income countries (LMICs), there is a nutrition transition characterized by increased urbanization and the adoption of "Western" eating patterns, including the consumption of processed foods (Pham *et al.*, 2017). Some businesses are responding to this trend by producing and marketing nutritionally enhanced products through fortification, with evidence showing their potential impact when consumed in sufficient quantities (Osendarp *et al.*, 2018).

Food businesses face challenges in producing and distributing processed nutrient-rich foods to low-income populations, including thin profit margins, high distribution and marketing costs, and the need to develop value propositions that resonate with low-income consumers (Karamchandani *et al.*, 2011; Evan *et al.*, 2015). The market for nutrient-dense foods also presents specific challenges, such as consumer recognition and valuation of nutritional attributes and the desirability of more nutritious foods (Koh *et al.*, 2014).

Previous studies have shown that low-income consumers are willing to pay a premium for biofortified staple foods and fortified infant foods Chowdhury *et al.* (2011), but there is a lack of research on the willingness to pay for nutritionally enhanced processed foods. Factors influencing willingness to pay include nutritional awareness, prior exposure, and acceptability of the fortified foods. Socioeconomic and demographic variables have varied effects on willingness to pay. The lack of understanding about prices, demand, and trade-offs with other product characteristics hinders businesses from targeting nutritionally enhanced

processed foods for the poor. This research gap hampers efforts to increase the availability of nutritionally enhanced foods for low-income households.

The research questions aim to investigate the health consciousness, perception of availability and affordability, willingness to pay, buying behavior tendencies, and knowledge level of consumers towards fortified foods in the study area.

The study holds significant value for households, the government, policy makers, students, and researchers by providing insights on the importance of fortified foods for healthy living, aiding in the implementation of policies to combat illegal importation of adulterated fortified foods, guiding policy-making processes, serving as a conceptual guide for students and researchers, and stimulating further research in the field.

METHODOLOGY

The study focuses on Ebonyi State, located in the south-eastern part of Nigeria. The study selected Ebonyi State due to its reputation as a major player in food production and consumption in the region.

Data collection for this study involved both primary and secondary sources using a multistage sampling technique to select participants for the survey and interviews. The procedures involved - **Stage 1:** Selection of Local Government Areas (LGAs) within

Abakaliki Metropolis: LGAs in Abakaliki metropolis were stratified based on geographical location within the Abakaliki metropolis. Three LGAs (Abakaliki, Izzi and Ebonyi) which make up Abakaliki metropolis were randomly selected for inclusion in the study. **Stage 2:** Selection of Communities: Within each selected LGA, communities with a high population density and socioeconomic diversity were purposively chosen for data collection. **Stage 3,** which is the selection of participants involves using a combination of convenience and systematic random sampling. Individuals who have previously purchased or consumed fortified foods or those who have shown an interest in nutrition information, Agribusiness owners, farmers, and stakeholders involved in agricultural activities within the selected communities were approached and invited to participate in the study. A total of fifty (50) participants were used for the study.

Analytically, the collected data were analyzed using both descriptive and inferential statistical techniques.

Descriptive statistics, including frequencies, percentages, means, and standard deviations, were computed to summarize the demographic characteristics of the participants and their responses to survey questions related to health consciousness, perception of availability and affordability, willingness to pay, buying behavior tendencies, and knowledge level of consumers and prospects for fortified foods.

RESULTS AND DISCUSSIONS

Socio-Economic Characteristics of Respondents

Table 1: Socio-Economic Characteristics of Respondents

Age	Frequency	%
< 30	27	54.0
30-40	10	20.0
41-50	8	16.0
>50	5	10.0
Total	50	100.0
Sex		
Male	22	44.0
Female	28	56.0
Total	50	100.0
Marital status		
Single	22	44.0
Married	19	38.0

Divorced	3	6.0
Separated	3	6.0
Widowed	3	6.0
Total	50	100.0
Level of Education		
Tertiary	31	62.0
Secondary	16	32.0
Primary	3	6.0
Total	50	100.0
Primary Occupation		
Farming	28	56.0
Others	22	44.0
Total	50	100.0
Secondary occupation		
Farming	7	14.0
Government salaried job	19	38.0
Private salaried job	9	18.0
Self-employed	14	28.0
Others	1	2.0
Total	50	100.0
Farm size		
1-3	19	38.0
4-7	26	52.0
>7	5	10.0
Total	50	100.0
Listen to news		
Very often	17	34.0
Often	15	30.0
Not often	13	26.0
Not at all	5	10.0
Total	50	100.0

Source: Field survey, 2024

The study reveals that a majority of the participants in the study are youth, with 54% below the age of 30 and an additional 20% falling within the 30-40 age range. Furthermore, 56% of the respondents are female. The educational profile shows that 62% of the participants have tertiary education, indicating a

high level of literacy within the population. In terms of primary occupation, a majority of respondents (56%) are farmers, followed by civil servants (38%) and self-employed individuals (28%).

Health consciousness perception of consumers**Table 2: Health consciousness perception of consumers**

<i>Statements</i>	<i>Extremely Important (4)</i>	<i>Important (3)</i>	<i>Not Important (2)</i>	<i>Not at all important (1)</i>	<i>Total</i>	<i>Mean</i>
I am reflective and concerned about my health a lot	144	33	6	0	183	3.66
I am very health conscious	148	24	10	0	182	3.64
I usually give attention to my inner feelings about my health	104	60	8	0	172	3.44
I regularly examine my health status	112	51	10	0	173	3.46
I notice changes in my health immediately	112	57	6	0	175	3.50
Usually, I am aware of my health	120	39	14	0	173	3.46
I am conscious of my state of health on a daily basis	84	63	12	2	161	3.22
I notice my feelings of physical state during daily hours	96	39	22	2	159	3.18
I am very involved about my health issues	108	54	10	0	172	3.44

Source: Field survey, 2024

The study reveals several health consciousness perceptions of consumers towards fortified food in Abakaliki metropolis. The findings were based on a survey where respondents rated their level of agreement with each perception using a scale of 1 (Not at all important) to 4 (Extremely important). The results indicated that consumers were highly concerned about their health, with the highest mean score obtained for the statement reflecting their health concerns. This suggests

that specific health benefits offered by fortified food products are likely to influence consumers' acceptance (Shamal & Mohan, 2017). However, it is important to note that consumer acceptance of foods with health benefits is influenced by various other factors, including limited knowledge about such foods and concerns about taste and product authenticity (Baker *et al.*, 2022; Plasek *et al.*, 2020; Temesi *et al.*, 2019).

Perception of Availability, Accessibility and Affordability of Fortified Food**Table 3: Perception of Availability, Accessibility and affordability of fortified food**

<i>Statements</i>	<i>Extremely Good (4)</i>	<i>Good (3)</i>	<i>Bad (2)</i>	<i>Extremely Bad (1)</i>	<i>Total</i>	<i>Mean</i>
Availability of fortified food	104	72	0	0	176	3.52
Accessibility of Fortified food	64	93	6	0	163	3.26
Affordability of fortified food	80	81	6	0	167	3.34

Source: Field survey, 2024

The findings were based on a survey where respondents rated their level of agreement with the perceptions using a scale of 1 (Extremely bad) to 4 (Extremely good). The study revealed that a majority of the respondents in Abakaliki metropolis perceived good availability (mean

score of 3.52) of fortified food items in the market. However, accessibility (mean score of 3.26) and affordability (mean score of 3.34) were identified as significant factors hindering frequent consumption.

Factors important for buying decision of consumers for fortified foods

Table 4: Factors important for buying decision of consumers for fortified foods

<i>Statements</i>	<i>SA (4)</i>	<i>A (3)</i>	<i>D (2)</i>	<i>SD (1)</i>	<i>Total</i>	<i>Mean</i>
Lower price of fortified food	128	42	8	0	178	3.56
More knowledge about fortified food	124	51	4	0	179	3.58
Greater availability of fortified food	100	88	4	1	193	3.86
More advertisement for fortified food	108	57	6	1	172	3.44
Wider production of biofortified crops	68	57	12	8	145	2.90
Wider product selection of fortified foods	72	60	20	2	154	3.08
Strong influences from friends/family	92	66	10	0	168	3.36
Safety	112	60	4	0	176	3.52
Accepted taste	104	57	10	0	171	3.42
Nutritive value	96	54	16	0	166	3.32
Freshness	112	42	16	0	170	3.40
Packaging	108	42	18	0	168	3.36
Brand name	92	54	14	2	162	3.24
Simple to cook	80	78	8	0	166	3.32
Can be tried/experimented	56	81	14	2	153	3.06
Compatibility with food habits	48	66	20	6	140	2.80

SA = Strongly, A = Agree, D = Disagree, SD = Strongly Disagree

Source: Field survey, 2024

The study reveals several factors important for the buying decision of consumers for fortified food in Abakaliki metropolis. The findings were based on a survey where respondents rated their level of agreement with each factor using a scale of 1 (Strongly disagree) to 4 (Strongly agree). The results showed that greater availability of the product, more knowledge about the product, and low price were important factors considered by consumers when making a purchase (mean

scores of 3.86, 3.58, and 3.56 respectively). Additionally, the safety of the product, advertisement, and acceptable taste of fortified products were also found to be influential factors (mean scores of 3.52, 3.44, and 3.42 respectively). These findings are consistent with previous research highlighting the significance of price, nutritional information, and taste as motivating factors for food consumption (Kovács et al., 2022).

Willingness to Pay (WTP) estimate for fortified products

Table 5: WTP estimated for fortified product

<i>Statements</i>	<i>SA (4)</i>	<i>A (3)</i>	<i>D (2)</i>	<i>SD (1)</i>	<i>Total</i>	<i>Mean</i>
I will ONLY buy or consider buying fortified foods if they are cheaper than conventional foods	96	72	2	1	171	3.42
I will ONLY buy or consider buying fortified foods if they are more or less the same price as conventional foods	152	30	2	1	185	3.70
I will buy or consider buying fortified foods EVEN if they are slightly more expensive than conventional foods	108	42	16	1	167	3.34
I will buy or consider buying fortified foods EVEN if they are significantly more expensive than conventional foods	72	66	20	0	158	3.16

SA = Strongly, A = Agree, D = Disagree, SD = Strongly Disagree

Source: Field survey, 2024

The findings were based on a survey where respondents rated their level of agreement with each statement using a scale of 1 (Strongly disagree) to 4 (Strongly agree). The study indicated that a majority of the respondents (mean value of 3.70) stated that they would only consider buying organic foods if they were priced similarly to conventional food.

Conversely, an average of 3.42 respondents mentioned that they tend to buy fortified products only when they are cheaper than conventional foods. However, it is worth noting that willingness to pay is influenced by the price of the product, and certain specifications can help consumers justify purchasing fortified products at a slightly higher price.

Reasons for not consuming fortified food

Table 6: Reasons for not consuming fortified food

<i>Statements</i>	<i>Extremely Important (4)</i>	<i>Important (3)</i>	<i>Not Important (2)</i>	<i>Not at all important (1)</i>	<i>Total</i>	<i>Mean</i>
Concern about novel food	72	54	18	5	149	2.98
Bad taste	76	69	12	2	159	3.18
I prefer non-fortified food	60	60	26	2	148	2.96
I focus more on present than the future	64	81	14	0	159	3.18
I am not sick	88	57	18	0	163	3.26
Fear of side effects	84	66	12	1	163	3.26
Fear of artificial additives	76	84	6	0	166	3.32
Not effective	60	51	30	3	144	2.88
Too expensive	104	42	20	0	166	3.32
Not available	72	66	10	5	153	3.06
Not easy to buy	96	27	16	9	148	2.96

Source: Field survey, 2024

The study reveals several significant reasons hindering the consumption of fortified food in Abakaliki metropolis. The findings are based on a survey where respondents rated their level of agreement with each reason using a scale of 1 (Not at all important) to 4 (Extremely important). Table 6 illustrated that among the

respondents, price value (mean score of 3.32), fear of artificial additives (mean score of 3.32), the perception that such products are only meant for sick people (mean score of 3.26), and concerns about potential side effects (mean score of 3.26) were the primary factors influencing their decision not to purchase these products.

Exploratory buying behavior tendencies (EBBT) of the consumers

Table 7: Exploratory buying behavior tendencies (EBBT) of the consumers

<i>Statements</i>	<i>SA (4)</i>	<i>A (3)</i>	<i>D (2)</i>	<i>SD (1)</i>	<i>Total</i>	<i>Mean</i>
Even though certain food products are available in a number of different flavors. I tend to buy the same flavor	64	72	18	1	155	3.10
I would rather stick with a brand I usually buy than try something I am not very sure of	80	66	8	4	158	3.16
I think of myself as a brand-loyal consumer	92	69	6	1	168	3.36
When I see a new brand on the shelf, I'm not afraid of giving it a try	80	72	10	1	163	3.26
When I go to a restaurant, I feel it is safer to order dishes I am familiar with	112	48	10	1	171	3.42
If I like a brand, I rarely switch from it just to try something different	92	72	6	0	170	3.40
I am very cautious in trying new or different products	80	54	22	1	157	3.14

I enjoy taking chances in buying unfamiliar brands just get some variety in my purchases	108	51	8	2	169	3.38
I rarely buy brands about which I am uncertain how they will perform	76	60	10	6	152	3.04
I usually eat the same kinds of foods on a regular basis	72	54	24	2	152	3.04
Reading mail advertising to find out what's new is a waste of time	64	63	20	3	150	3.00
I like to go window shopping and find out about the latest styles	100	33	14	7	154	3.08
I get very bored listening to others about their purchases	84	51	18	3	156	3.12
I generally read even my junk mail just to know what it is about	56	84	8	4	152	3.04
I don't like to shop around just out of curiosity	56	72	16	4	148	2.96
I like to browse through mail order catalogues even when I don't plan to buy anything	84	60	8	5	157	3.14
I usually throw away mail advertisements without reading them	76	57	6	9	148	2.96
I don't like to talk to my friends about my purchases	72	57	24	1	154	3.08
I often read advertisements just out of curiosity	60	84	12	1	157	3.14

SA = Strongly, A = Agree, D = Disagree, SD = Strongly Disagree

Source: Field survey, 2024

The exploratory buying behavior tendencies of consumers were measured using a 4-continuum scale where respondents rated their level of agreement with each statement provided using a scale of 1 (strongly disagree) to 4 (strongly agree). It was observed that consumers tend to prefer the safety of consuming existing products or dishes rather than trying something new with new flavors. Additionally, consumers showed a lower inclination to take risks, as indicated by

their disagreement with the statement, "If I like a brand, I rarely switch from it just to try something different." This could be attributed to factors such as the cost of fortified food or the lack of acceptance of new flavors. The findings align with the theory of optimum stimulation level and exploratory behavior in consumer psychology, which distinguishes between sensory and cognitive forms of stimulation seeking (Mor & Sapra, 2015).

Prospects for Fortified Food/Crops

Table 8: Prospects for fortified food/crops

<i>Statements</i>	<i>SA</i> <i>(4)</i>	<i>A</i> <i>(3)</i>	<i>D</i> <i>(2)</i>	<i>SD</i> <i>(1)</i>	<i>Total</i>	<i>Mean</i>
The price of fortified foods will increase	104	66	4	0	174	3.48
Even though prices will rise demand will also increase	96	75	2	0	173	3.46
There will be a shift from conventional to fortified food completely	80	72	10	1	163	3.26
Health hazards will increase due to prevalent food consumption	64	63	20	3	150	3.00
There will be strict rules and regulations to ensure fortified certification label	100	63	6	1	170	3.40
Awareness and adoption of fortified foods will increase among farmers	68	75	14	1	158	3.16
Like USA/other countries more fortification will be mandatory	96	57	14	0	167	3.34
People will buy fortified food as they will be more aware	56	93	10	0	159	3.18
Like in USA and Europe, more people will go for fortified foods	100	66	6	0	172	3.44
Fortified food market is a growing market	64	66	18	3	151	3.02
Fortified food consumption will lead to better health	68	69	18	1	156	3.12
The future generation is going to be more health conscious and hence fortified food demand will grow	64	54	12	10	140	2.80

SA = Strongly, A = Agree, D = Disagree, SD = Strongly Disagree

Source: Field survey, 2024

The findings suggest that there is optimism regarding the future consumption and demand for fortified food products, albeit with an expected increase in their price. The prospects of fortified food/crops by consumers were measured using a 4-continuum scale where respondents rated their level of agreement with each statement provided using a scale of 1 (strongly disagree) to 4 (strongly agree). When asked about the prospects of fortified food/crops, the majority of respondents (mean score of 3.48) believed that the price of fortified foods would increase (Table 8). Additionally, a significant number of respondents (mean score of 3.46) believed that despite the price increase, the demand for fortified foods will also increase. Furthermore, a considerable portion of respondents (mean score of 3.44) believed that similar to the trends in the USA and Europe, more people would opt for fortified foods.

Conclusion and Recommendations

The study revealed that the majority of fortified product consumers were educated youth, with a significant representation of females (table 1). Health concerns were found to be a key factor influencing consumer acceptance, while limited knowledge, taste concerns, and product authenticity were identified as barriers (table 2). Availability of fortified food items was generally perceived positively, but accessibility and affordability hindered frequent consumption (table 3). Factors such as price, nutritional information, taste, and safety influenced purchasing decisions (table 4). Consumers favored familiar products over trying something new, possibly due to cost and flavor acceptance (table 7). Despite expected price increases, respondents remained optimistic about the future consumption and demand for fortified foods (table 8).

Based on the core findings of this study, the following recommendations are forwarded:

Firstly, there is a need to further explore consumer attitudes and beliefs towards fortified foods, including their perceived benefits and risks. This would provide a deeper understanding of consumer behavior and guide strategies for promoting the consumption of fortified foods. Secondly, it is important to investigate the

reasons behind the limited accessibility and affordability of fortified food products in the market. Addressing these barriers could help increase consumer demand and availability of fortified foods. Additionally, exploring effective marketing strategies, such as education campaigns, would be beneficial. Lastly, policymakers and stakeholders in the food industry should be informed about the study's findings to support the development of policies and programs that promote the availability, accessibility, and affordability of fortified foods, ultimately improving public health and nutrition.

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