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Women's Perception and Readiness regarding Adoption of A Healthy and Sustainable Diet: A Cross-Sectional Study in Enugu City, Nigeria

Daniel Ogbuabor; PhD[*1], Alphonsus Ogbuabor; PhD[2] & Nwanneka Ghasi; PhD[3]

[1] Department of Health Administration and Management, University of Nigeria, Enugu Campus, Enugu State, Nigeria; [2] Department of Medical Laboratory Sciences, College of Medicine, Enugu State University Science and Technology, Enugu, Enugu State, Nigeria; [3] Department of Management, Faculty of Business Administration, University of Nigeria, Enugu Campus, Enugu State, Nigeria.

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Corresponding author
daniel.ogbuabor@unn.edu.ng
Department of Health Administration and Management, University of Nigeria, Enugu Campus, Enugu State, Nigeria Enugu, Enugu State, Nigeria.

Postal code: 400241
Tel: +234 803 877 4436

ABSTRACT

Background: There is little knowledge about healthy and sustainable diets (HSDs) in Africa. This study assesses women's readiness to adopt HSDs and its associated factors in Enugu, Nigeria. **Methods:** This was a cross-sectional household survey in 2021, which assessed women's (n =450) food choice motives, perceived benefit, and readiness to adopt HSDs. The diets were categorised as pre-contemplation and contemplation (PC/C), preparation and relapse (P/R), and action and maintenance (A/M) stages. Odds ratios (OR) were generated using multinomial logistic regression. **Results:** Almost 57% of the women perceived HSD to be of high benefit. About 19%, 21%, and 60% of the women were in the PC/C, P/R and A/M, respectively. Low perceived benefit (OR=4.30, 95%CI: 2.30-8.05, *P*<0.001), low health concern (OR=6.35, 95%CI: 2.53-15.93, *P*<0.001), low education (OR=2.75, 95%CI: 1.39-5.44, *P*=0.004), and age <35 years (OR=2.48, 95%CI: 1.02-6.07, *P*=0.046) predicted being in the PC/C stage. Low perceived benefit (OR=2.75, 95%CI: 1.63-4.63, *P*<0.001), low health concern (OR=5.35, 95% CI: 2.40-11.92, *P*<0.001), low level of education (OR=1.90, 95%CI: 1.05-3.42, *P*=0.033), and being poor (OR=2.90, 95%CI: 1.05-7.97, *P*=0.039) predicted being in the P/R stage. Being <35 (OR=0.50, 95%CI: 0.28-0.87, *P*=0.014) and having low taste consideration (OR=0.29, 95%CI: 0.12-0.72, *P*=0.008) predicted being in the A/M stage. **Conclusions:** Readiness to adopt HSDs needs to be improved in Enugu, Nigeria. For this purpose, respective nutrition education interventions might be implemented regarding progress in HSDs.

Keywords: *Access to healthy foods; Diet; Food and nutrition; Consumer behaviour; Food preferences; Transtheoretical model.*

Introduction

Healthy and sustainable diets (HSDs), defined as dietary patterns that promote all the dimensions of individuals' health, have low environmental pressure and impact. The diets are accessible, affordable, safe, equitable, and culturally acceptable (World Health Organization and Food and Agliculture Organization, 2019), which is important for achieving nutrition and

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health-related targets of Sustainable Development Goals (SDGs) (Martini *et al.*, 2021, Willett *et al.*, 2019). HSDs prevent malnutrition, reduce the risk of non-communicable diseases (NCDs), and improve planetary health (McClements, 2020, Qian *et al.*, 2019, Steenson and Buttriss, 2021, Willett *et al.*, 2019, World Health Organization and Food and Agliculture Organization, 2019). In Nigeria, adherence to food-based guidelines is poor (Obayelu and Osho, 2020), which results in a double burden of malnutrition where undernutrition co-exists with rising cases of overnutrition (Ministry of Budget and National Planning, 2016). Diet-related NCDs are the top risk factors for deaths and disability-adjusted life-years (DALYs) lost (Afshin *et al.*, 2019). HSDs prevent 10.8-11.6 million deaths per year, resulting in 19–24% reduction in deaths among adults (Willett *et al.*, 2019). The mortality rate from non-communicable diseases (NCDs), such as diabetes mellitus, hypertension and dyslipidaemia, increased from 24% in 2014 to 29% in 2018 (World Health Organisation, 2018). Regarding the environmental impact, adopting HSDs reduces land use, greenhouse gas emission, and water use (Lonnie and Johnstone, 2020, Veeramani *et al.*, 2017).

Studies investigating consumer's perceived benefits and readiness to adopt HSDs are growing. Most consumers have high perception of the benefits of HSDs (Culliford and Bradbury, 2020, Rankin *et al.*, 2018, Reipurth *et al.*, 2019, Tobler *et al.*, 2011, Vanhonacker *et al.*, 2013). Readiness to adopt HSDs increases with its perceived benefit (Culliford and Bradbury, 2020, de Boer *et al.*, 2016, Pacho, 2020, Rankin *et al.*, 2018). Moreover, food choice motives including availability (Fink *et al.*, 2021), taste (Allès *et al.*, 2017, Boesveldt *et al.*, 2018, Liem and Russell, 2019, Rankin *et al.*, 2018, Tan and Tucker, 2019, Wekeza and Sibanda, 2019), price (Fink *et al.*, 2021, Rankin *et al.*, 2018, Wekeza and Sibanda, 2019), health (Allès *et al.*, 2017, Culliford and Bradbury, 2020, Hu *et al.*, 2019, Lê *et al.*, 2013, Rankin *et al.*, 2018, Shrestha and Baral, 2019), weight control (Rankin *et al.*, 2018) and environmental consideration (Allès *et al.*, 2017, Culliford and Bradbury, 2020, Wekeza and Sibanda, 2019) affect readiness. Findings regarding the influence of socio-demographic factors are mixed; in some studies, willingness to adopt HSDs is not associated with socio-demographic characteristics (Tobler *et al.*, 2011). Conversely, females (Culliford and Bradbury, 2020, de Boer *et al.*, 2016, Tobler *et al.*, 2011), young people (Culliford and Bradbury, 2020, Sánchez-Bravo *et al.*, 2020), and high level of education (Azizi Fard *et al.*, 2021, Fink *et al.*, 2021, Lê *et al.*, 2013, Sánchez-Bravo *et al.*, 2020) increase readiness to adopt HSDs. Higher socio-economic status of households decrease the likelihood of adopting a healthy and sustainable diet (Eini-Zinab *et al.*, 2021).While low level of knowledge and self-efficacy influence high-income people, high prices and lack of inspiration and skills influence low-income people's sustainable food choices (Vos *et al.*, 2022).

There are three key gaps in literature regarding HSDs. First, little is known about the factors that influence perception and the actual practices of consumers (Vermeir *et al.*, 2020). Second, environmental impact and socio-cultural aspects of diet are not much considered in national dietary guidelines of developing countries (Martini *et al.*, 2021). Third, most studies on benefits and readiness to adopt HSDs are conducted outside sub-Saharan Africa. In Nigeria, while urbanization has led to a dietary shift from traditional to highly processed diets, there are no empirical evidence to show what factors should be considered to shift Nigerian diet towards a healthier and more sustainable one (Maziya-Dixon *et al.*, 2021). Therefore, there is a need for studies which assess the factors influencing sustainable dietary behaviours in Nigeria. Given that women make the decisions regarding food and meals in Nigerian families (Mapis, 2020), the objective of this study is to assess readiness to adopt HSDs and its association with food choice motives, perceived benefits, and socio-demographic factors among childbearing women in Enugu State, Nigeria.

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Materials and Methods

Study setting: The study as cross-sectional survey was conducted in Enugu metropolis, Enugu State, Nigeria. Enugu metropolis is the capital city of Enugu State and comprises three local government areas (LGAs): Enugu East, Enugu North, and Enugu South LGAs. Whereas Enugu North is composed of an entirely urban population, Enugu East and Enugu North have a mix of urban and rural areas. Enugu East, Enugu North, and Enugu South LGAs consist of 808, 565, and 451 enumeration areas (EAs) (National Bureau of Statistics, 2006). In 2020, the estimated population of Enugu metropolis was 1.2m people from the 2006 population census (National Bureau of Statistics, 2007). Publicly owned health facilities in metropolis include one teaching hospital, three general hospitals, and a network of primary healthcare facilities.

Study population and sampling strategy: The study population consisted of childbearing women aged 18 to 49 living in Enugu metropolis. The women in childbearing age were chosen because mothers make good decisions in families (Mapis, 2020). The sample size was calculated with the absolute error of 5% and at type 1 error of 5% using the following formula:

Sample size = $Z_{1-\alpha/2}^2 P(1-P)/d^2$

Where, $Z_{1-\alpha/2}$ is the standard normal variate considered at 5% type 1 error which is 1.96, and P is the expected proportion in population based on previous or pilot studies. As there was no previously published study regarding the actual proportion of HSD in Nigeria, the authors chose 50%. In addition, a 10% non-response rate was included. Therefore, 422 women were calculated as sample size. However, the study sampled 450 eligible women using a multi-stage sampling strategy with proportionate size weights. The first stage was to select 20, 14, and 11 enumeration areas from Enugu East, Enugu North, and Enugu South LGAs respectively using systematic random sampling. In the second stage, 10 households were selected from each enumeration area by systematic sampling. Regarding the 450 respondents, 1 eligible woman was interviewed per household.

Data collection: Data were collected in January and February 2021 using an interviewer-administered questionnaire. The questionnaire had four sections. Section A included 9 items which assessed consumers' perception of HSDs published in a previous study (Culliford and Bradbury, 2020). Women's perceived benefits of HSDs were measured using a 5-point Likert scale ranging from 'a little amount of benefit' to 'a large amount of benefit'. Section B of the questionnaire measured readiness to adopt HSDs using 1 question with 6 response options based on the stages of change construct regarding transtheoretical model of behaviour change (Prochaska and Velicer, 1997). The response options included: 'I am not interested in doing this at the moment' (pre-contemplation), 'I am thinking about this;, but I need more information' (contemplation), 'I would like to do this; but, some things are stopping me' (planning), 'I have started to do this some of the time' (action), 'I am doing this confidently most of the time' (maintenance), and 'I am not currently doing this; but, I have done it in the past' (relapse). Section C focused on food choice motives. Childbearing age women selected their 3 most significant food-choice motivations from a provided list (health, cost, taste, environmental concern, and availability) based on a previous study (Culliford and Bradbury, 2020).

The authors estimated scale content validity index (S-CVI) of the nine-item questionnaire and content validity index of the single-item measure for readiness to adopt HSD and food choice motive. Five experts (in the fields of nutrition, public health, and health systems) evaluated the content of the questionnaire for its relevance to Nigerian context and its socio-cultural appropriateness of the statements. A moderate sample size (5-9 experts) was deemed appropriate for assessing the content validity of data collection tools (Mokkink *et al.*, 2016). The evaluation was done using a 4-point scale (1=not relevant, 2=somewhat relevant, 3=quite relevant, 4=highly relevant). In this study, the S-CVI of the perceived benefit scale was 0.95, while its reliability in the sample was 0.755. The content validity indices of

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the single-item measures for readiness to adopt HSD and the food choice motives were also calculated as 0.95 and 0.95, respectively.

Section D covered socio-economic and demographic information. The socio-economic status was measured using Nigeria's equity tool (Metrics for Management, 2015). Information about age, education level, marital status, and the number of children living at home were also collected. Data were collected using an open data kit (ODK) version 1.29.2. The questionnaire was interviewer-administered, and by the 5 research assistants who were trained to use ODK. The assistants were trained regarding the questionnaire, data collection procedure, and ethical consideration for two days prior to data collection, including one day of field testing for the questionnaire. The interviewers explained each question to the women, evaluated how the women answered the questions, and scored the response.

Ethical consideration: The Ethics Committee of Health Research from Enugu State Ministry of Health, Enugu, Nigeria, approved this study (MH/MSD/REC21/163). Moreover, written and informed consent was obtained from all the respondents.

Data analysis: Data were analysed using SPSS (version 20, IBM, New York, USA). Descriptive statistics were used to summarise the characteristics of respondents, perceived benefit, and food choice motives. The perceived benefit of HSD was dichotomised into 2 categories 'low benefit' (scores 1 to 3) and 'high benefit' (scores 4 and 5). Furthermore, the 6 stages of change were reclassified into 3 categories: pre-contemplation and contemplation (PC/C), preparation and relapse (P/R), action and maintenance (A/M). These stages reflected the groups of individuals who were not interested or needed further information (PC/C), those who experience other barriers (P/R), and the subjects who were already taking action (A/M). Chi-square test of independence was used to test the differences between the proportion of women at different stages of adoption disaggregated by women's perceived benefit, food choice motives, and sociodemographic characteristics. Multinomial regression analysis was used to predict women's stage of change for HSD based on perceived benefit, demographic characteristics, and reported food-choice motives. Odds ratio (OR) represented the likelihood of women being in the PC/C or P/R stages of change, compared to the reference A/M stage of change. Statistical significance was also set at P-value ≤ 0.05.

Results

Basic characteristics of the respondents: All the responses were complete and were included in the analysis. Over 50% of the respondents were within the 25-34 age group (**Table 1**). Almost 68% of respondents were married, about 60% had university education, and 64% were living with their children. Nearly 83% of respondents were in rich quintiles.

Women's food choice motives: Health, cost, availability, and taste were the most reported motives regarding food choice among the women (**Figure 1**).

Perceived benefits of HSDs: Overall, about 57.3% of the women perceived regarded HSD to be highly beneficial (**Table 2**). The perceived benefit of individuals' dietary behaviors ranged from 54% to 84%.

Factors associated with readiness to adopt HSDs: About 19%, 21%, and 60% of the women were in the PC/C, P/R, and A/M stages, respectively. Other than environmental concern, marital status, and living with a child at home, readiness to adopt HSDs significantly differed based on perceived benefit, other food choice motives, age, education, and socio-economic status (**Table 3**).

Predictors of readiness to adopt HSDs: As shown in **Table 4**, low perceived benefit of HSD was predicted to be in the PC/C (OR=4.30, 95%CI: 2.30-8.05) and P/R (OR=2.75, 95%CI: 1.63-4.63) stages of change (**Table 5**). Stating low health concern as a food choice motive predicted women's likelihood of being in the PC/C (OR=6.35, 95%CI: 2.53-15.93) and P/R (OR=5.35, 95%CI: 2.40-11.92) stages of change.

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Low taste consideration, as a food choice motive (OR=0.29, 95%CI: 0.12-0.72) was significantly associated with being in the PC/C stage of change. Low education level predicted being in the (OR=2.75, 95%CI: 1.39-5.44) and PR (OR=1.90, 95%CI: 1.05-3.42) stages. Being over 35 suggested the likelihood of women being in the PC/C (OR=2.48, 95%CI: 1.02-6.07) and A/M stage compared to P/R (OR=0.50, 95%CI: 0.28-0.87) stage of change.

Table 1. Socio-demographic characteristics of women.

Variables	n(%)
Age(y)	
18-24	99(22.0)
25-34	244(54.2)
35-44	95(21.1)
45-49	12(2.7)
Marital Status	
Never married	125(27.8)
Married	304(67.6)
Divorced or widowed Formerly married	21(4.7)
Education	
Primary	25(5.6)
Secondary/vocational	157(34.9)
University degree	268(59.6)
Children	
Yes	287(63.8)
No	163(36.2)
Socio-economic status	
Poorest/poorer	37(8.2)
Middle-income	41(9.1)
Riche	372(82.7)

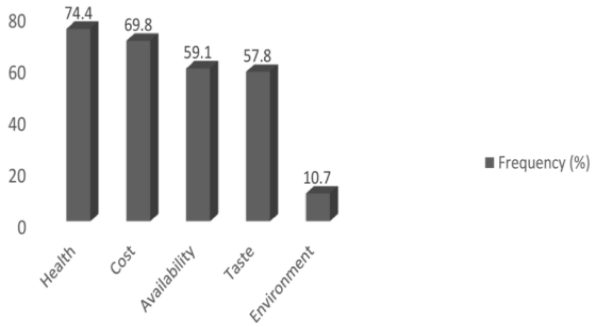


Figure 1. Motives for food choices among women.

Table 2. Women's perceived benefit of healthy and sustainable diets (HSDs).

Variables	Perceived benefit	
	Low	High
	n(%)	n(%)
Avoiding overpackaged food	164(36.4)	286(64.6)
Buying locally grown products	73(16.2)	377(83.8)
Consuming fruits and vegetables	58(12.9)	392(87.1)
Limiting red and processed meat	195(43.3)	255(56.7)
Prioritising plant-based diets	158(35.1)	292(64.9)
Reducing consumption of air freighted foods	199(44.2)	251(55.8)
Choosing sustainable fish	100(22.2	300(77.8)
Reducing food waste	81(18.0)	369(82.0)
Choosing organic produce	114(25.3)	336(74.7)
Overall HSD	192(42.7)	258(57.3)

Discussion

The study examined women's perception and readiness with respect to adopting HSD and the factors affecting the diet. Overall, the perceived benefit of HSD was moderately high. Low perceived HSD benefit, low health concern, low taste consideration, being under 35, low level of education, and being poor significantly influenced women's readiness to adopt HSDs.

The proportion of women with high perceived benefit of HSD was moderately high in this study. The finding was consistent with previous studies (Culliford and Bradbury, 2020, Rankin *et al.*, 2018, Reipurth *et al.*, 2019, Tobler *et al.*, 2011, Vanhonacker *et al.*, 2013), and might reflect an increasing awareness of diet-related NCDs, health consciousness, high nutritional value of HSDs, and renewed interest in traditional foods among Nigerians (Maziya-Dixon *et al.*, 2021). Nevertheless, women's perceived benefit of individual dietary behaviors in this study varied from the findings of prior studies (Culliford and Bradbury, 2020, Tobler *et al.*, 2011). These diversities in individual dietary behaviors could be due to contextual differences in women's understanding of dietary behaviors and sustainability perspectives in

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various settings (Sánchez-Bravo *et al.*, 2020). Hence, strategies intended to improve readiness regarding HSDs among women in this study should be tailored to variations in individual dietary behaviors.

Table 3. Factors associated with readiness to adopt healthy and sustainable diet among women.

Variables	Readiness to adopt HSD						χ^2	P-value
	PC/C		P/R		A/M			
	n	%	n	%	n	%		
Perceived HSD benefit							53.21	<0.001
Low	60	31.3	54	28.1	78	40.6		
High	26	10.1	42	16.3	190	73.6		
Health consciousness							98.58	<0.001
No	53	46.1	35	30.4	27	23.5		
Yes	33	9.9	61	18.2	241	71.9		
Cost consideration							14.83	0.001
No	15	11.0	22	16.2	99	72.8		
Yes	71	22.6	74	23.6	169	53.8		
Taste consideration								
No	16	8.4	42	22.1	132	69.5	25.19	<0.001
Yes	70	26.9	54	20.8	136	52.3		
Environmental concern								
No	82	20.4	86	21.4	234	58.2	4.42	0.110
Yes	4	8.3	10	20.8	34	70.8		
Availability consideration								
No	20	10.9	36	19.6	128	69.6	16.76	<0.001
Yes	66	24.8	60	22.6	140	52.6		
Age (years)								
<35	78	22.7	61	17.8	204	59.5	18.46	<0.001
35≤	8	7.5	35	32.7	64	59.8		
Education								
Low	56	30.8	50	27.5	76	41.8	43.39	<0.001
High	30	11.2	46	17.2	192	71.6		
Socio-economic status								
Poor	14	37.8	13	35.1	10	27.0	20.58	<0.001
Moderate	9	22.0	11	26.8	21	51.2		
Rich	63	16.9	72	19.4	237	63.7		
Marital status								
Never married	26	20.8	23	18.4	76	60.8	1.61	0.806
Formerly married	3	14.3	6	28.6	12	57.1		
Married	57	18.8	67	22.0	180	59.2		
Living with a child							1.31	0.519
Yes	54	18.8	66	23.0	167	58.2		
No	32	19.6	30	18.4	101	62.0		

HSD: Healthy and sustainable diet; PC/C: Pre-contemplation and contemplation; P/R: Preparation and relapse; A/M: Action and maintenance.

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Table 4. Predictors of readiness to adopt a healthy and sustainable diet among women.

Variables	PC/C		P/R	
	OR (95%CI)	P-value	OR (95%CI)	P-value
HSD benefit intercept				
Low	4.30(2.30-8.05)	<0.001	2.75(1.63-4.63)	<0.001
High	1.00			
Health consciousness				
Low	6.35(2.53-15.93)	<0.001	5.35(2.40-11.92)	<0.001
High	1.00			
Cost consciousness				
Low	0.63(0.27-1.49)	0.293	0.91(0.46-1.83)	0.799
High	1.00			
Taste consideration				
Low	0.29(0.12-0.72)	0.008	1.03(0.52-2.04)	0.938
High	1.00			
Environmental concern				
Low	1.40(0.36-5.40)	0.624	1.05(0.41-2.73)	0.917
High	1.00			
Availability consideration				
Low	0.51(0.21-1.23)	0.135	1.26(0.63-2.51)	0.514
High	1.00			
Age (years)				
<35	2.48(1.02-6.07)	0.046	0.50(0.28-0.87)	0.014
35≤	1.00			
Education				
Low	2.75(1.39-5.44)	0.004	1.90(1.05-3.42)	0.033
High	1.00			
Socio-economic status				
Poor	2.54(0.83-7.76)	0.103	2.90(1.05-7.97)	0.039
Middle-income	0.66(0.23-1.86)	0.431	0.95(0.38-2.38)	0.917
Rich	1.00			

HSD: Healthy and sustainable diet; PC/C: Pre-contemplation and contemplation; P/R: Preparation and relapse; A/M: Action and maintenance; The reference category is A/M.

Consistent with the transtheoretical model of behavior change (Prochaska and Velicer, 1997), the authors found that readiness to adopt HSDs increased with its perceived benefit. This finding aligned with the results of previous studies (Culliford and Bradbury, 2020, de Boer *et al.*, 2016, Pacho, 2020, Rankin *et al.*, 2018). In the current study, women with low perceived benefits were 4 and 3 times more likely to be in the PC/C and P/R stage of change. This finding implied that women with perceived low benefits were either not intending to adopt HSD in the foreseeable future or were preparing for the diet, while those who had started were more likely to relapse. Hence, women's awareness of the benefits of HSDs must be prioritized in interventions to enhance readiness to adopt HSDs.

That low health consciousness increased the likelihood of being in the PC/C and P/R stages of change was supported by several studies which found that high health concerns increased consumer's readiness to adopt healthy and sustainable diets (Allès *et al.*, 2017, Culliford and Bradbury, 2020, Lê *et al.*, 2013, Rankin *et al.*, 2018, Shrestha and Baral, 2019, Wang *et al.*, 2019). In this sample, health was the foremost food choice motive, implying that health and nutrition benefits of food take precedence over all the other motivations for choosing food. In the current study, health consciousness among women could also be the result of increasing awareness regarding the relationship between NCD and unhealthy diets

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(Maziya-Dixon *et al.*, 2021, Pacho, 2020). Given that transition towards HSD results in substantial health benefits (Fadnes *et al.*, 2022), there is a need for policies and to encourage people to adopt HSD.

According to this research, the participants with a low level of concern for taste were more inclined to adopt HSD compared with those who prioritized taste as a motive. This finding was consistent with the results of the previous studies, where high concern for taste was associated with less healthy dietary habits (Allès *et al.*, 2017, Boesveldt *et al.*, 2018, Liem and Russell, 2019, Rankin *et al.*, 2018, Tan and Tucker, 2019). Two reasons might explain this finding. First, the taste profile of unhealthy foods makes them attractive to consumers especially the refined and total sugars (Liem and Russell, 2019, Tan and Tucker, 2019). Second, the innate liking for sweet and salty food does not prevent consumers from having unhealthy foods (Boesveldt *et al.*, 2018, Liem and Russell, 2019, Tan and Tucker, 2019). Consequently, interventions regarding nutrition education with a focus on HSD should encourage women to try healthy foods (Liem and Russell, 2019).

In this research, younger women were more likely to be in the PC/C stage, which was consistent with the results of the studies by Culliford and Bradbury in 2020 and Sánchez-Bravo *et al.*in 2020 (Culliford and Bradbury, 2020, Sánchez-Bravo *et al.*, 2020). Young Nigerian women tended to eat few traditional foods and preferred imported and western goods, as they were considered appealing and healthy (Mapis, 2020). The young women also tended to be greatly influenced by mass media which promote air-freighted foods (Mapis, 2020). Moreover, the consumption of sugary foods decreased with aging among Nigerian women (National Population Commission and ICF International, 2019). Younger women were more likely to be in A/M compared to older women in PR stage. This study found that older women faced more barriers for remaining in the action and maintenance stage. It might be food choosiness as is the case in high-income countries where food choosiness is a barrier to the acceptance of healthy and sustainable diets among older adults (Grasso *et al.*, 2019). A double-barrel intervention addressing the needs of women in different age groups is recommended to motivate them to adopt HSD.

The association of high level of education with readiness to adopt HSDs was in line with the other studies (Fink *et al.*, 2021, Lê *et al.*, 2013, Sánchez-Bravo *et al.*, 2020). On the other hand, low education was associated with higher consumption of carbohydrates, sweets, red meats, and low dietary diversity (Azizi Fard *et al.*, 2021). Higher education and the resulting innovations might provide consumers the tools to access and comprehend dietary information and its impact on health (Azizi Fard *et al.*, 2021). Moreover, education increased the opportunities for employment, improving financial status to access diverse healthy and sustainable diets (Mapis, 2020, Obayelu and Osho, 2020). Targeting information campaigns regarding food sustainability of women with a lower level of education might improve their readiness to adopt HSDs.

Furthermore, poor women were more likely to be in the PR stage of change, which was supported by the fact that higher socio-economic status improved dietary quality. In contrast, an Iranian study revealed that higher socio-economic status of households decreased the likelihood of HSD (Eini-Zinab *et al.*, 2021). This study suggested that poor women might face barriers which limited their choices regarding sustainable dietary behaviours. For instance, financial problem is a barrier to daily consumption of fruit and vegetable among the women in Nigeria (De Filippo *et al.*, 2021).High prices and lack of inspiration and skills were also reported as barriers to HSD among the low-income households (Vos *et al.*, 2022).

This was the first study regarding the factors influencing the adoption of HSD by Nigerian women. This study contributes to the growing volume of research on appropriate policies and strategies to facilitate a shift towards alternative sustainable dietary guidelines. Nevertheless, women in this study may have projected a socially desirable perception of food choice motives and dietary behaviors, which could limit the scope of findings.

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Furthermore, as a cross-sectional study, a cause-and-effect relationship could not be established. Third, the perceived benefit of HSD may not have adequately captured environmental benefits given that the impact of food on the environment is poorly understood, and consumers have not yet internalised environmental sustainability (Sánchez-Bravo *et al.*, 2020). Therefore, the interpretation of the environmental effects of food in Nigeria can be addressed in future studies.

Conclusions

Adopting HSD needs to be improved in Enugu Metropolis, Nigeria. Nutritional education interventions to improve transition towards action and maintenance stage of change must focus on raising awareness regarding the benefits of the diet. Moreover, such policies and programs must prioritize health benefits, the taste of healthy foods, younger women inclinations, women with low level of education, and.

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Authors' contributions

Ogbuabor D, Ogbuabor A, and Ghasi N designed the research; Ogbuabor D, and Ghasi N conducted the study; Ogbuabor D, and Ogbuabor A analyzed the data; Ogbuabor D, Ogbuabor A, and Ghasi N wrote the paper; Ogbuabor D had the primary responsibility for final content. All the authors approved the final manuscript.

Conflict of interests

The authors report no conflict of interest.

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