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Knowledge, attitude and preference of consumers for cooking oils among female university administrative staffs in South-western Nigeria using Health Belief Model

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Abstract
*Background and Rationale***:** Individual's health behaviour can be explained by theories and models anchored on their perceived susceptibility to a health problem, perceived severity, perceived benefits of actions, and cues to action.
*Aims and Objectives***:** This study assessed the knowledge and attitudes as well as preference consideration of women in choosing cooking oil using the health belief model.
Methods: This cross-sectional study involved 200 sampled consenting female administrative staff in the University in Nigeria. A self-administered questionnaire was used to collect information on socio-demography, Knowledge of healthy oil, preference factors considered in choosing cooking oil. Attitude to healthy oil consumption was as well assessed through health belief model using Likert scale. Categorical variables of knowledge, attitude and preference scores were analysed using chi-squared test. The level of significance was set at $p < 0.05$.
Results: The mean age of the of the respondents was 38.6(±9)years. Less than half (45.6%) of the respondents had good knowledge of healthy oil, six out of ten had positive attitude towards the consumption of healthy oil consumption. Respondents' preference for choice of cooking oils were based on perceived health benefits (45.1%), nutritional labelling (42.1%) and brand (37.9%). There is statistically significant association between respondents' knowledge and age($p=0.021$) as well as respondents' knowledge and attitude ($p= 0.000$). Positive attitude was found to be a predictor of having good knowledge (OR=2.78, $p=0.003$).
Conclusions: Proper knowledge on what makes cooking oil healthy is inadequate but positive attitude towards healthy oil was exhibited by female university administrative staff. The positive attitude should be leverage upon in intervening for improved knowledge and better informed choices in selecting cooking oils.

Keywords: *Consumer preference, Health Belief Model, Healthy oil, Women's Health*

Résumé
Contexte et justification **:** Le comportement de santé d'un individu peut être expliqué par des théories et des modèles ancrés sur sa susceptibilité perçue à un problème de santé, sa gravité perçue, les avantages perçus des actions et les signaux d'action.
Buts et objectifs **:** Cette étude a évalué les connaissances et les attitudes ainsi que la prise en compte des préférences des femmes dans le choix de l'huile de cuisson à l'aide du modèle de croyance en matière de santé.
Méthodes **:** Cette étude transversale a impliqué 200 membres consentant du personnel administratif féminin de l'Université du Nigeria. Un questionnaire auto-administré a été utilisé pour collecter des informations sur la socio-démographie, la connaissance de l'huile saine, les facteurs de préférence pris en compte dans le choix de l'huile de cuisson. L'attitude à l'égard d'une consommation saine d'huile a également été évaluée à l'aide d'un modèle de croyances en matière de santé en utilisant l'échelle Likert. Les variables catégorielles des scores de connaissance, d'attitude et de préférence ont été analysées à l'aide du test du chi carré. Le niveau de signification a été fixé à $p < 0,05$.
Résultats : L'âge moyen des répondantes était de 38,6(±9) ans. Moins de la moitié (45,6%) des répondantes avaient une bonne connaissance de l'huile saine, six sur dix avaient une attitude positive envers la consommation d'huile saine. La préférence des répondantes pour le choix des huiles de cuisson était basée sur les bienfaits perçus pour la santé (45,1 %), l'étiquetage nutritionnel (42,1 %) et la marque (37,9 %). Il existe une association statistiquement significative entre les connaissances et l'âge des répondantes ($p = 0,021$) ainsi que les connaissances et l'attitude des répondantes ($p = 0,000$). L'attitude positive s'est avérée d'être un prédicteur d'avoir de bonnes connaissances (OR = 2,78 ; $p = 0,003$).

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Conclusions **:** Une bonne connaissance de ce qui rend l'huile de cuisson saine est insuffisante, mais une attitude positive envers l'huile saine a été manifestée par le personnel administratif féminin de l'université. L'attitude positive devrait servir de levier pour intervenir afin d'améliorer les connaissances et de faire des choix plus éclairés dans la sélection des huiles de cuisson.

Mots clés (4/6) : *Préférence de la Consommatrice, Modèle de croyance en matière de santé, huile saine, santé des femmes*

Introduction

Human health behavioural change can be explained by theoretical frameworks of which the Health Belief Model has emerged as an important concept. It is a recognized cognitive behavioural model which explains why individual failed to follow preventive health measures [1,2]. The Health Belief Model (HBM) originally, crafted on the disease avoidance orientation comprised of four domains: 1) the risk posed by illness which include a) "perceived susceptibility" and its capacity for causing physical damage and affecting social functioning, and b) "perceived severity"; 2) belief in the value or efficacy of a behaviour in reducing the risk i.e. c) "perceived benefits"; 3) estimates of physical, psychological, financial, or other costs involved in the proposed action i.e. d) "perceived barriers" [3,4]. The HBM asserts that change in behaviour is determined after consideration of severity, benefit, and barriers [5]. Recently, the domains of the HBM was modified from four to six to and the new additions are: e) cues to action, f) self-efficacy, and modifying variables such as motivating factors as additional constructs affecting health behaviour [1].

Previously, the HBM framework has been used to explain compliance with treatment programs in established diseases like hypertension to predict medication adherence [4], explain improvement in adherence levels in tuberculosis treatment [6]. It has also been found useful in predicting adherence to home quarantine in the course of the corona virus disease (COVID-19) pandemic [2]. In nutrition landscape, the HBM has been relevant and impactful in explaining individuals' knowledge and attitude towards healthy living. The HBM framework has been used to disseminate messages on complementary feeding [5] and in the promotion of the use of the adequacy of complementary food in children [7]. It has also been reported to be appropriate in improving the knowledge, attitude, and practice relating to calcium intake among adolescent students [8].

According to the dietary recommendations, consumption of saturated fat should be limited to less than 10 percent for the general population and less than seven percent in individuals with heart disease, while intake of trans-fat is advised to beat zero percent [9]. However, little is known on the extent to which Nigerians know about healthy cooking oil. A study in Ghana reported poor consumers' knowledge on edible cooking [10]. Consumers lack the necessary knowledge on saturated fats and unsaturated fats content of edible oils. A study among undergraduates in a south-western Nigerian tertiary institution reported about 20 percent with good knowledge of what makes cooking oil healthy [11]. The students were found to had frequently consumed cooking oils with saturated fat contents between 45g-50g/100g, polyunsaturated fatty acids (PUFA) content 8g-29g/100g, and monounsaturated fatty acids (MUFA) content 3g-42g/100g [11].

Preference for choice of cooking oils have been shown from previous studies to be determined by price, quality and packaging [12, 13]. Other attributes considered in choice of edible oil by consumers as recently reported includes; nutrition information, perceived quality, price, brand, availability, perceived health benefits, aroma, fat content, packaging, and income [10].

Attention has been brought to the cholesterol content of cooking oils on sale in most Nigerian market [14]. The documented estimated cholesterol level in different brands of vegetable oils in Nigerian markets ranged from 0.12mg/ml to 3.99mg/ml±0.0404 [14]. This could infer that there are no cholesterol-free oils in the markets and manufacturers 'should desist from misleading the public by labelling product as 'cholesterol free' or 'no cholesterol' oils. The saturated fat component of most cooking oils are way off the recommended standard and most of them are refined palm oil, which has 50% saturated fatty acid content [11].

This study, therefore, was designed to assess knowledge of female University administrative staff on healthy cooking oil, attitude to consumption of healthy oil as well as preferences considered when choosing cooking oils through the health belief model.

Methods

Study design

This was a cross-sectional study.

Study setting and population

The study was conducted at the main campus of the University of Ibadan, and the University College Hospital, Ibadan. The respondents were female administrative staff at both campuses

Sampling technique

A total of 200 consenting female administrative staff (100 from the administrative unit of the main University of Ibadan campus and another 100 from the College of Medicine and University College Hospital campus) participated in the study. The study report baseline findings from a formative assessment of what needed to change for effective behaviour change for the design of intervention to improve knowledge of women on healthy oil.

Implication for policy

There is the need to empower Nigerian women especially those in educational settings with adequate information for informed choices on healthy cooking oils. This will contribute immensely to reduction in the risks of cardiovascular diseases in the country.

Study instrument:

A semi-structured self-administered questionnaire developed to collect data in Sections A: socio-demography/socio-economic profile of respondents. Section B: 15 questions relating to nutrition knowledge on healthy oil coiled from previous studies, standard nutrition textbooks and recommended dietary guidelines [9]. The options were Yes, No and Not sure. The section shows Cronbach alpha of 0.74. Section C: Preference factors considered in choice of foods [10]. There were 10 preference factors with Yes or No options and these included; nutritional label, price, brand, perceived health benefits, aroma, income, fat content, packaging, for perceived quality, type of meal to be prepared. Section D: 5-point Likert scale rated assessment of attitude, knowledge and consumption of healthy oil using principles of HBM [6.8].

The original 35 item attitude scale, with Cronbach alpha of 0.795 was reduced to 16-items attitude scale after the pre-test. The assessment questions were designed based on the HBM using 5-point Likert scale responses, ranging from strongly agree', 'agree', 'neutral', 'disagree' to 'strongly disagree'. The 16 questions include: **(***Perceived susceptibility:* I know all that is to be known on healthy oil choice. high intake of fat increases my blood cholesterol; *(Perceived severity*: high level of fats in the blood could lead to coronary heart disease, heart attack, etc., cardiovascular disease can lead to death, high intake of fat can lead to obesity, obesity can lead to stroke, type II diabetes mellitus, heart attacks, heart diseases; *(perceived benefits:* reducing fat in diet will help prevent heart attacks, reducing fat in my diet will help lower my blood cholesterol, reducing fat in my diet will help reduce my weight, knowing the fat contents of vegetable oils will help reduce my risk of cardiovascular diseases, *(self-efficacy:* I know I should reduce my fat intake but I do not know how to, healthy oils are expensive; *(cues for action:* I have been advised to reduce my fat intake by a doctor, I have watched health shows that advise to reduce saturated fat intake, I can reduce eating fried foods, I can start buying oils low in saturated fats but high in poly-and monounsaturated fats (e.g. canola oil, olive oil, sunflower oil). The resultant 16 item attitude section has Cronbach alpha score of 0.798 [Perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action].

Data analysis

All statistical analysis was performed using the Statistical Package for Social Sciences (SPSS) version 22 [16]. Fifteen questions were used to assess the respondents' knowledge' of healthy oils, (scale; 0-15). Mean nutrition knowledge score was calculated based on the responses of participants. Categorical responses were used (yes/no/not sure), participants scored 1 for every correct answer and zero for every wrong answer. The 'not sure' option was also scored zero, the scores were added, and the mean knowledge score was 8.03 ± 2.44. Those with scores ≥ 8.0 were classified as having good knowledge score while those that scored < 8.0 were classified as having poor knowledge score. Ten preference factor options generated from literature (scores 0 to 10) scored as Yes=1, No=0. Cut-off score was set at 7.0, and respondents with scores ≥ 7 were classified as having good preference while those with scores <7 as having poor preference. Sixteen questions were used to assess the respondent's 'attitude' towards healthy oils. The mean attitude score was calculated based on the responses of the participants. Categorical responses were used (strongly agree/agree/neutral/disagree/strongly disagree). The score of 1 was assigned for every correct answer and zero for every wrong answer. The 'strongly agree' and 'agree' as well as the 'disagree' and 'strongly disagree' options were considered to be the same and had the same score. However, a question 'I know all that is to be known on healthy oil choice' was negatively worded and therefore had a reversed score. Those that chose the 'neutral' option scored zero. All the 'agree' options were scored as 1, 'neutral' and all 'not sure' options were scored as 0. The scores were added and the mean attitude score was 10.64 ± 6.17. Those that scored ≥ 10.0 were classified as having positive attitude and those that scored < 9.0 were classified as having negative attitude. Categorical variables of

knowledge and attitude scores were analysed using chi-squared test. Significantly different variables were recoded into logistic regression; good knowledge=1, poor knowledge=0, positive attitude=1, negative=0, good preference score=1, poor preference score=0, younger (<40years)age=0, older age(>40years) =1. The level of significance was set at $p < 0.05$.

Ethical Consideration

The study was approved by the University of Ibadan/ University College Hospital (UI/UCH) ethical review board. Approval Number.: UI/EC/16/0290.

Results

Socio-demography profile of respondents

Table 1. About 190 out of 200 recruited had complete data for all analysis, response rate is 95%.

Median age of respondents is 38.0 (32.0;45.0) years. Most of the respondents (n=113, 56.5%) are younger than 40 years. Most (n=173, 87%) are married, while14% are single. Most (n=127, 63.5%) had first degree, 23% had postgraduate degrees while 11.0% and 2.5% had secondary and completed primary level of education respectively. Most (n=102, 51.0%) spend above 10,000 naira to about 30,000 naira on food monthly, while 49 (24.5%) spend between 30,000 and 50,000 naira, only 19 (9.5%) spend more than 50,000 naira per month on food purchase. About 30 (15%) spend less than 10,000naira monthly on food purchase monthly.

Distribution of Knowledge and Attitude scores of female University Administrative Staff about healthy cooking oil consumption

Figure 1. Most (n=106, 54.4%) of the respondents had poor knowledge of healthy cooking oil. While, 89 (45.6%) had good knowledge. Most (n=126, 65.6%) of the respondents had positive attitude, while 67 (34.4%) had negative attitude. Having negative attitude is significantly associated with having poor knowledge scores, $X^2=12.29$; p= 0.000*.

Preferences factors considered in choice of cooking oils among female University administrative staff in Ibadan, 2016

Figure 2. The respondents' preference factors considered in choice of cooking oils among women is reported as 42.1% chose yes for nutritional label, 28.7% chose yes for price, 37.9% chose yes for brand, 45.1% chose yes for perceived health benefits, 17.4% chose yes for aroma, 14.4% chose yes for income, 27.7% chose yes for fat content, 17.4% chose yes for packaging, 31.8% chose yes for perceived quality and 9.2% chose yes for type of meal to be prepared. There is low (r=0.152) to moderate (r=0.392) correlation amongst preference factors influencing their choice of cooking oil.

Attitude of Female University Administrative Staff and Relationship with Knowledge about healthy cooking oil

Table 2. Most (n=141, 76.2%) disagree that high intake of fat increases my blood cholesterol, which is significantly different amongst the knowledge

Table 1: Socio-Demography profile of Female University Administrative Staff in Ibadan

Variable	Frequency (%)	Variable	Frequency (%)
Marital Status		*State of Origin*	
Single	27 (13.5)	South-West	167 (83.5)
Married	173 (86.5)	South-EastSouth-South	12(6.0)12(6.0)
		North-Central	9 (4.5)
Age (years)			
=<40years	113(56.5)		
>40years	87(43.5)		
Mean (SD)	38.6(9.0)		
Median (IQR)	38.0(32.0;45.0)		
Level of Education		*Estimate amount spent on food monthly (₦)*	
Up to Primary Education	5(2.5)	≤10,000	30 (15.0)
Secondary Education	22 (11.0)	11,000 – 30,000	102 (51.0)
First Degree	127 (63.5)	31,000 – 50,000	49 (24.5)
Postgraduate	46 (23.0)	>50,000	19 (9.5)

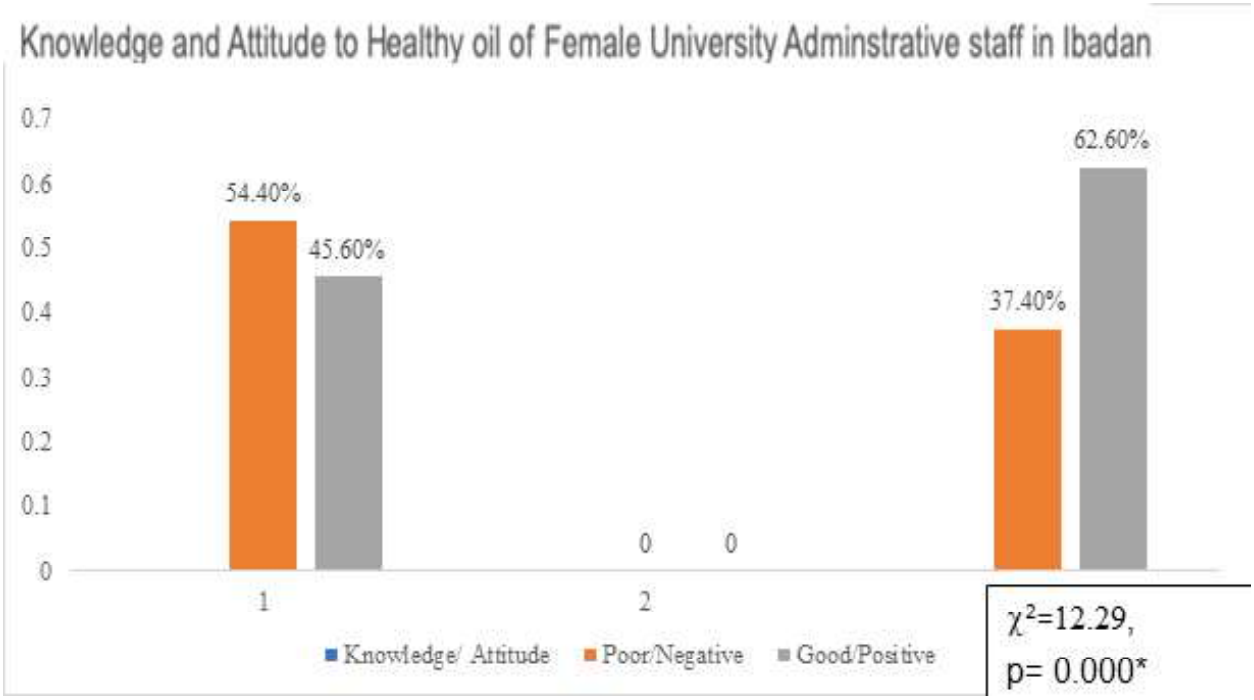

Fig. 1: Distribution of knowledge and attitude of female University Administrative Staff about healthy oil consumption

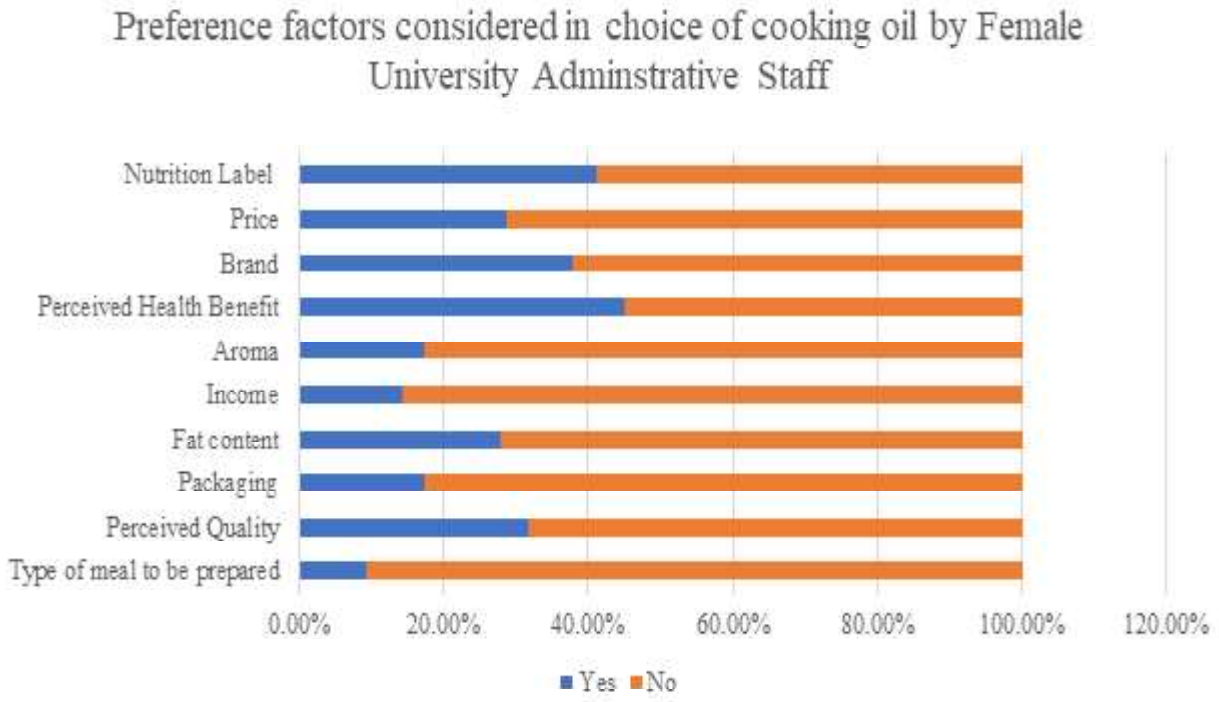

Fig. 2: Preference factors considered in choice of cooking oil by Female University Administrative Staff

categories, p=0.033. Most (n=147, 80.3%) disagree that high level of fats in the blood could lead to heart disease, heart attack, significantly different amongst the knowledge categories, p=0.018. Most (n=160, 84.2%) disagree that high intake of fat can lead to obesity, significantly different amongst the knowledge categories, p=0.022. Most (n=161, 83.9%) disagree that reducing fat in my diet will help lower my blood cholesterol, significantly different amongst the knowledge categories, p=0.035. Majority (n=161,

Table 2: Attitude of respondents and Relationship with knowledge of healthy oil of female University administrative staff in Ibadan

Variable		Knowledge n (%)			Chi square	P value
		Total	Poor	Good		
Perceived susceptibility						
I know all that is to be known on healthy oil choice (n=187)	Agree	50(26.7)	32(64.0%)	18(36.0)		
	Disagree	137(73.3)	69(50.4%)	68(49.6%)	2.742	0.098
High intake of fat increases my blood cholesterol (n=185)	Agree	44(23.8)	29(65.9)	15(34.1)		
	Disagree	141(76.2)	67(47.5)	74(52.5)	4.544	0.033*
Perceived severity						
High level of fats in the blood could lead to heart disease, heart attack, etc. (n=183)	Agree	36(19.7)	6(72.2)	10(27.8)		
	Disagree	147(80.3)	274(50.3)	73(49.7)	5.587	0.018*
Cardiovascular disease can lead to death (n=188)	Agree	34(18.1)	20(58.8)	14(41.2)		
	Disagree	154(81.9)	79(51.3)	74(48.7)	0.633	0.426
High intake of fat can lead to obesity (n=190)	Agree	30(15.8)	22(73.3)	8(26.7)		
	Disagree	160(84.2)	81(50.6)	79(49.4)	5.248	0.022*
Obesity can lead to other serious health conditions like stroke, type II diabetes and heart attack and heart diseases (n=192)	Agree	35(18.2)	24(68.6)	11(31.4)		
	Disagree	157(81.8)	79(50.3)	78(49.7)	3.834	0.050
Perceived benefits						
Reducing fat in diet will help prevent heart attacks (n=190)	Agree	29(15.3)	18(62.1)	11(37.9)		
	Disagree	161(84.7)	83(51.6)	78(48.4)	1.091	0.296
Reducing fat in my diet will help lower my blood cholesterol (n=192)	Agree	31(16.1)	22(71.0)	9(29.0)		
	Disagree	161(83.9)	81(50.3)	80(49.7)	4.461	0.035*
Reducing fat in my diet will help my weight (n=189)	Agree	37(19.6)	28(75.7)	9(24.3)		
	Disagree	152(80.4)	74(48.7)	78(51.3)	8.727	0.003*
Knowing the fat contents of vegetable oils will help reduce my risk of cardio vascular diseases (n=190)	Agree	48(25.3)	16(33.3)	32(66.7)		
	Disagree	142(74.7)	72(50.7)	70(49.3)	4.354	0.037*
Self-efficacy						
I know I should reduce my fat intake but I do not know how to (n=191)	Agree	138(72.3)	71(51.4)	67(48.6)		
	Disagree	53(27.7)	32(60.4)	21(39.6)	1.229	0.268
Healthy oils are expensive (n=190)	Agree	62(32.6)	38(61.3)	24(38.7)		
	Disagree	128(67.4)	66(51.6)	62(48.4)	1.595	0.207
Cues for action						
I have been advised to reduce my fat intake by a doctor (n=189)	Agree	130(68.8)	62(47.7)	68(52.3)		
	Disagree	59(31.2)	38(64.4)	21(35.6)	4.550	0.033*
I have watched health shows that advise to reduce saturated fat intake (n=193)	Agree	73(37.8)	27(37.0)	46(63.0)		
	Disagree	120(62.2)	62(51.7)	58(48.3)	3.937	0.047*
I can reduce eating	Agree	36(18.7)	22(61.1)	14(38.9)		

fried foods (n=193)	Disagree	157(81.3)	82(52.2)	75(47.8)	0.930	0.335
I can start buying oils low in saturated fats but high in poly-and monounsaturated fats (e.g., canola oil, olive oil, sunflower oil, rapeseed oil, avocado oil) (n=191)	Agree	45(23.6)	32(71.1)	13(28.9)		
	Disagree	146(76.4)	71(48.6)	75(51.4)	6.997	0.008*

Table 3: Relationship between knowledge, socio-demography, preference factor scores and attitude scores of female University administrative staff in Ibadan

Variable		Knowledge n (%)				
		Total	Poor	Good	Chi square	pvalue
Age group (years)	<=40	98(56.6)	62(63.3)	36(36.7)		
	>40	75(43.4)	33(44.0)	42(56.0)	6.369	0.012*
Marital Status	Single	26(13.5)	17(65.4)	9(34.6)		
	Married	167(86.5)	87(52.1)	80(47.9)	1.599	0.206
Education	Up to Primary	5(2.6)	4(80.0)	1(20.0)		
	Completed Secondary	22(11.3)	14(63.6)	8(36.4)	2.353	0.308
	Tertiary &>	168(86.2)	88(52.4)	80(47.6)		
Income(naira)/month	<50,000	92(68.7)	46(50.0)	46(50;0)		
	>50,000	42(31.3)	26(61.9)	16(38.1)	1.644	0.200
Preference factor score	Poor	81(41.5)	52 (64.2)	29(35.8)		
	Good	114(58.5)	54(47.4)	60(52.6)	5.406	0.020*
Attitude score	Negative	73(37.4)	54(74.0)	19(21.3)		
	Positive	122(62.6)	52(42.6)	70(57.4)	18.092	0.000*

Table 4: The likelihood of women having good knowledge of healthy oil

Variable	B	SE	Wald	P value	Exp. (B)	95% C.I. Lower	Upper
Age group	0.773	0.334	5.351	0.021*	2.165	1.125	4.166
Attitude	1.023	0.348	8.656	0.003*	2.781	1.407	5.498
Preference factor score	0.654	0.341	3.683	0.055	1.923	0.986	3.748
Constant	-1.591	0.376	17.861	0.000	0.204		

80.4%) disagree that reducing fat in my diet will help my weight, significantly different amongst the knowledge categories, p=0.003. Most (n=120, 62.2%) disagree that they have watched health shows that advise to reduce saturated fat intake, significantly different amongst the knowledge categories, p=0.047. Most (n=146, 76.4%) disagree that I can start buying oils low in saturated fats but high in poly-and monounsaturated fats, significantly different amongst the knowledge categories, p=0.008.

Relationship between knowledge, socio-demography, preference factor scores and attitude scores of female University administrative staff in Ibadan, 2016

Table 3. Most (n=98, 56.6%) were younger than 40 years old and had poor knowledge of healthy oil which is significantly associated with poor knowledge, p=0.012. Most (n=114, 58.5%) had good preference factor scores. Having good preference was significantly associated with having good knowledge, p=0.020. Most (n=122, 62.6%) had positive attitudes and is significantly associated with good knowledge, p=0.000.

Logistic regression

Table 4. The major factors influencing whether the women have good knowledge are: positive attitude, older age ([age (>40years)]. Preference factor considered did not contribute significantly. The

Table 5: Assessment of the knowledge of healthy oils amongst female University administrative staff in Ibadan

S/No	Knowledge of healthy oil by respondents	Correct Response F (%)	Incorrect Response F (%)
1	Vegetable oils are considered healthy when the level of saturation is low (n=191)	138(72.3)	53(27.8)
2	Vegetable oils with more than 5-6% saturated fats are healthy (n=188.)	99 (52.7)	89(48.4)
3	Vegetable oils with "no cholesterol" label is considered healthy (n=192)	28(14.6)	164(85.4)
4	The beneficial health effect of vegetable oils can largely be explained by their fatty acid composition (n=183)	115(62.8)	68(37.2)
5	Fried foods are considered healthy (n=190)	164(86.3)	26(13.7)
6	Partially refined oils are healthier than liquid plant oils (n=187)	78(41.7)	109(58.3)
7	Canola oil, sunflower oil, corn oil, soybean, and other plant-based oils are rich in heart-healthy unsaturated fats (n= 191)	152(79.6)	39(20.4)
8	Healthy oils have higher percentages of saturated fats and trans fats in contrast to monounsaturated and polyunsaturated fats (n=.182)	46(25.3)	136(74.8)
9	Fried foods are considered healthier than nuts and seed (walnut, almond) (n=188)	151(80.3)	37(19.7)
10	Consumption of partially hydrogenated oils and fried foods and trans fats is healthy in contrast to monounsaturated and polyunsaturated fats (n=189)	78(41.3)	111(58.7)
11	The likelihood of developing cardiovascular diseases (heart attack, stroke, heart disease, etc.) increases with the intake of trans fat (n=190)	108(56.8)	82 (43.2)
12	The quality of oils used for frying will remain the same regardless of how many times the oil is reheated (n=192)	131(68.2)	61(31.8)
13	I can use the oil for many times and discard it only when it turns dark (n=186)	119(64.0)	67(36.0)
14	The type of cooking oil does not influence the type of by-products produced from repeatedly heated oils (n=188)	102(54.3)	86(45.7)
15	Repeat heated oil used for frying has bad effect on our health (n=192)	122(63.5)	70(36.5)

F: frequency, (%): percentage

likelihood of a respondent having good knowledge is 2.78 times higher for women with a positive attitude all other factors being equal. The likelihood of a respondent having good knowledge is 2.17 times higher in older women, all other factors being equal.

Discussion

This cross-sectional study was undertaken to investigate the knowledge and attitude about healthy oil as well as preference factors considered by female University administrative staffs when choosing cooking oil. This is very important as women are usually responsible for meals cooked at home. Adequate knowledge of women in the family could serve as a positive leverage to prevent and control cardiovascular diseases among members of a household. The study revealed poor knowledge about healthy oil, positive attitude towards healthy oil consumption and good preference factor scores when choosing cooking oil. Overall, the best predictor among the female administrative staffs of the University of Ibadan of having good knowledge is positive attitude as well as being older. Of note is that there is dearth of literature to discuss this study.

In this study, most had poor knowledge about healthy oil, though much lower than 79.3% reported in a similar previous survey among undergraduate students of the same institution in Nigeria [11]. According to Folasire *et al*. (2018), only about 20% were knowledgeable about what constitutes healthy oil [11]. However, this study also was in agreement with a Ghanaian study where a significant number of respondents' knowledge was poor as consumers lack the requisite knowledge on saturated fats, and unsaturated fats content of edible oils [10]. Also, in the same study, about 46.6% do not read the labels on the cooking oils before purchasing [10]. However, looking at the individual component assessed about healthy oil, it is obvious why the knowledge reported is poor. Though reading of food labels before purchasing was not assessed in the current study as in [10], however, the responses to specific knowledge

Table 6: Attitude to healthy oil choices by female University administrative staff in Ibadan, based on Health Belief Model

Variable	Agree n (%)	Not agree n (%)
Perceived susceptibility		
I know all that is to be known on healthy oil choice (n=187)	50 (25.6)	137(70.3)
High intake of fat increases my blood cholesterol	44 (22.6)	141 (72.3)
Perceived severity		
High level of fats in the blood could lead to heart disease, heart attack, etc. (n=183)	36 (18.5)	147 (75.4)
Cardiovascular disease can lead to death (n=188)	34 (17.4)	154 (79.0)
High intake of fat can lead to obesity (n=190)	30 (15.4)	160 (82.1)
Obesity can lead to other serious health conditions like stroke, type II diabetes and heart attack and heart diseases (n=192)	35 (17.9)	157 (98.5)
Perceived benefits		
Reducing fat in diet will help prevent heart attacks (n=190)	29 (14.9)	161(82.6)
Reducing fat in my diet will help lower my blood cholesterol (n=192)	31 (15.9)	161(82.9)
Reducing fat in my diet will help my weight (n=189)	37 (19.0)	152(96.9)
Knowing the fat contents of vegetable oils will help reduce my risk of cardiovascular diseases (n=190)	48 (24.6)	142 (72.8)
Self-efficacy		
I know I should reduce my fat intake but I do not know how to (n=191)	138 (70.8)	53 (27.2)
Healthy oils are expensive (n=190)	62 (31.8)	128 (65.6)
Cues for action		
I have been advised to reduce my fat intake by a doctor (n=189)	130 (66.7)	59 (30.3)
I have watched health shows that advise to reduce saturated fat intake (n=193)	73 (37.4)	120 (61.5)
I can reduce eating fried foods (n=193)	36 (18.5)	157 (80.5)
I can start buying oils low in saturated fats but high in poly-and monounsaturated fats (e.g., canola oil, olive oil, sunflower oil, rapeseed oil, avocado oil) (n=191)	45 (23.1)	146 (74.9)

questions reflected the poor knowledge. The poor knowledge base and lack of awareness as regards the cardiovascular risk and other Non-communicable diseases (NCDs) posed by consumption of unhealthy oil, create avenue to plan educational intervention as previously documented [17]. Planning interventions at workplace will be a creative avenue to improve and impact worker's knowledge. Thus contributing to the major source of information being commercial advertising [17]. In this environment, standard food labelling guidelines are not adhered to by manufacturers and influence of advertising industry cannot be underplayed in overall knowledge of consumers.

Also, most of the women had positive attitudes towards use of healthy oil, unfortunately, there are dearth of data to compare our findings. However, having poor attitude responses had significantly poor knowledge responses as this is portrayed in specific questions of Health Belief Model domains especially perceived susceptibility, severity, benefits and cues for action. Further strengthening this finding is the logistic regression, where having positive attitude was associated with increased likelihood of having good knowledge. Remarkably, in previous studies, the HBM has been shown to be effective in nutrition education [2,18,19]. This is important finding that can be leveraged upon in designing intervention in these respondents.

In the study, preference factors considered in choice of cooking oil by the respondents generated good scores which is in contrast to previous works [11]. Perceived quality (88% responded yes) and price (88% responded yes) of the cooking oil topped the respondents' considerations [11]. This might be because it was a student population studied. In another previous work, perceived quality, benefit and nutritional value topped [10]. Unlike in this current study, where barely less than half of the respondents, perceived health benefit and nutrition label as top priority in choosing cooking oil.

Conclusion

Respondents showed poor knowledge on what makes cooking oil healthy, and improvement in the knowledge is predicted by demonstrated positive attitude. The positive attitude may be leveraged on in designing educative intervention to promote informed choices in future.

Limitation and Strength

This study is the first in this environment that assessed the knowledge and attitude of women about cooking oils, considered what influences their choice of cooking oil. It will be assumed that being an academic environment adequate knowledge would have been impacted. A limitation of the study is that most staffs interviewed are in the middle/lower cadre and not many had tertiary education exposure.

Recommendation

In designing educative intervention in these group of women, the positive attitude already demonstrated should be leverage upon while improving their overall knowledge about healthy cooking oil and use of nutrition information labels.

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