

NUTRITIONAL KNOWLEDGE, FRUITS AND VEGETABLES CONSUMPTION PATTERNS, AMONG UNDERGRADUATES STUDENTS OF ALEX EKWUEME FEDERAL UNIVERSITY NDUFU-ALIKE, IKWO (AEFUNAI)

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ABSTRACT

Background: Eating the recommended amount of fruits and vegetables each day is associated with the reduction in the risk of chronic diseases. There is paucity of data on the patterns of fruits and vegetables consumption among students in Alex Ekwueme Federal University Ndufu-Alike, Ikwo (AEFUNAI).

Objective of the study: The study aimed at assessing nutrition knowledge, fruits and vegetables consumption patterns among students of AEFUNAI.

Method: This was a descriptive cross-sectional study. A total of 470 students aged (17-27 years) (234 males and 236 females) participated in this study. A semi-structured pre-tested interviewer-administered questionnaire was used to collect data on height, weight, socio-demographic profile, nutritional knowledge, fruits and vegetables consumption pattern. Data were analysed using descriptive statistics and Chi-square. Statistical significance was determined at 5% level ($P < 0.05$).

Results: About 88.7% of the respondents were in the age range of 17 – 24 years. Mean age and BMI of males were 21.72 ± 2.80 years and 22.15 ± 2.42 kg/m² while those of females were 20.64 ± 2.12 years and 23.2 ± 3.5 kg/m² respectively. About 92 % of the respondents had a good knowledge about the nutritional benefits of fruits and vegetables. More females than males consumed fruits always or sometimes but the differences were not significant ($p > 0.05$). About 70.9% and 76.0% of the respondents did not have any idea about the minimum daily recommendation of fruits and vegetables respectively. Commonly consumed fruits were watermelon, apples, banana and orange while fruited pumpkin, carrot, bitter leaf and cucumber were the commonly consumed vegetables. Variables such as availability and price significantly ($p < 0.05$) hindered the students' fruit and vegetable intake.

Conclusions: Results of this study suggest inadequate Fruits and Vegetables consumption among students of AEFUNAI. Cost and availability appears to be the major hindrance to adequate consumption of Fruits and Vegetables among students of AEFUNAI.

Key Words: *Fruits, Vegetables, Consumption, Knowledge, Male and Female Undergraduates.*

INTRODUCTION

University students (Undergraduates) who are usually within the age range of 17-20 years make up 1% of the total population in Nigeria (1). Many students lack adequate fund or divert their feeding allowance to other things and so skip meals (2). They also lack information of their nutritional requirement as well as the nutritional values of the food they eat (3). Glor (4) reported that students often have difficulties following healthy dietary habits and are particularly prone to poor dietary habits (5). These unhealthy habits often lead to malnutrition with the resultant effect of being susceptible to avoidable diseases. Therefore emphasis is placed on improving dietary habits at a young age because dietary habits established during adolescence may persist into adulthood (6).

Fruits and vegetables are important component of healthy human diet. They are low energy-dense foods that are relatively abundant sources of Micronutrients

(vitamins and minerals), bioactive and dietary fibres which help to prevent constipation (7) and as their being low in energy density may help to maintain body weight (8, 9, and 10). Consumption of fruits and vegetables on regular basis as well as adequate food consumption pattern have been associated with several health benefits such as promotion of healthy lifestyle, and prevention of chronic non-communicable diseases (e.g. ischemic heart diseases, diabetes mellitus, hypertension, stroke), overweight and obesity, ageing, certain types of cancer (e.g. lung cancer, colon and oesophageal cancers) which pose great threat to public health (11, 12). Poor fruits and vegetable consumption contribute to increase in incidence of micronutrient deficiency and other forms of malnutrition in developing countries (13). The presence of micronutrients in fruits and vegetable facilitates metabolic processes which help the body to utilize energy from macronutrients such as fats and carbohydrates that are needed for optimal function of

the body (8). Asthma, mental disorder as well as iron deficiency anaemia can be prevented by regular intake of fruits and vegetables (14). Also, regular consumption of fruits and vegetables in combination with regular exercises have been recommended as important step to maintaining healthy living (15). WHO (16) recommended a minimum of 400g of fruit and vegetables per day (equivalent to five portions) for the prevention of chronic diseases such as heart disease, cancer, diabetes and obesity, as well as for the prevention and alleviation of several micronutrient deficiencies, especially in less developed Countries. The low consumption of fruits and vegetables globally (below the above requirement) is said to be responsible for the increased incidence of cardiovascular diseases as well as some cancers; the two leading causes of death worldwide (16). A study carried out among school adolescents in seven African countries by Global school- based student Health Survey, reported that 77.5% of adolescents did not meet the WHO daily recommended intake of fruits and vegetables (17). Another study carried out among ten European countries showed that the mean intake of fruits and vegetables among adolescents did not reach the WHO recommendation of 400 g/day (18). WHO (19) reported that approximately 1.7 million (2.8%) of deaths worldwide are attributable to low fruits and vegetables consumption, while low intake of fruits and vegetables is among the top ten (10) selected risk factors for global mortality. Worldwide, insufficient intake of fruits and vegetables is estimated to cause around 14% of gastrointestinal cancer deaths, 11% of Ischemia heart disease (IHD) and 9 % stroke deaths.

In spite of the importance of fruits and vegetables in ensuring good health, their consumption remained low (20) especially among young adults who do not consume fruits and vegetables on a daily basis. Studies in Nigeria also have shown that consumption of fruits and vegetables was low compared to the recommended daily intake (21, 22). Most of the past studies done on fruits and vegetables consumption in Nigeria were among the adult population (23, 24, 20, and 25). To improve fruits and vegetables intake in a community, it is necessary to identify and correlate fruits and vegetables consumption pattern with population at risk in order to design proper intervention programme (26). Hence, this study was carried out to assess nutritional knowledge, and fruits and vegetables consumption patterns, among undergraduate students of Alex Ekwueme Federal University Ndufu-Alike, Ikwo (AEFUNAI)

MATERIALS AND METHOD

Study design: This was a descriptive cross-sectional study with random sampling of male and female University students.

Ethical Approval/Informed Consent: Ethical clearance with reference number FUNAI/SEN/EBC/17/VOL1/7 was given by Alex Ekwueme Federal University Ndufu Alike Ethics Committee. The purpose of the study was explained to the students who gave their consent and also dully filled the informed consent forms. Participants (students) were informed of their freedom to withdraw or refuse to take part in the study without prejudice.

Study Location: The study was carried out in Alex Ekwueme Federal University, Ndufu Alike Ikwo (AEFUNAI), Ebonyi State. The institution is located in Ikwo Local Government Area of Ebonyi State which is about 25 kilometers from the State capital, Abakaliki. The university has a population of about four thousand six hundred and fifty six (4,634) students comprising 2239 female students and 2395 male students spread across the seven faculties that made up the University as at the time of study.

Subjects and Sample size: A total of 470 students (234) males and (236) females between 17 to 30 years were randomly selected from the different faculties. The minimum sample size was determined using the simplified formula for proportion (27):

$$n = \frac{N}{1 + N(e)^2}$$

Where n is the sample size, N is the population size and e is the level of precision which is (0.05)². Thus; $n = 4,634 / 1 + 4,634 (0.05)^2 = 368$.

The sample size was increased to 470 participants because of attrition.

Inclusion criteria: All males and female students' age 17-30 years across the seven faculties who were full time undergraduates students were included except those that are pregnant.

Time and duration of the study: Data were collected from May to June 2018.

Data Collection

A semi-structured interviewer-administered questionnaire was designed and pre-tested to collect information used for this study. The questionnaire had seven sections which included

Respondent Profile: This was used to collect personal information which included the respondent's name, age and, monthly allowance

Anthropometric Measurements: The height was measured to the nearest 0.1cm using a wooden

stadiometer. The weights of the participants were measured to the nearest 0.1kg using a portable bathroom scale (Hana bathroom scale Model). Body mass index (BMI) was calculated by dividing the weight in Kilogram with the square of the height in meters.

Dietary Assessment: Trained interviewers conducted 24-hour dietary recall with a pre-tested questionnaire to obtain information on the subjects' food intake. Subjects were asked to recall all foods and beverages taken in the previous twenty-four hours prior to the interview.

Frequency of Fruits and Vegetables Intake: The weekly consumption of fruits and vegetable was obtained using food frequency questionnaire (FFQ). The respondents' frequency of consumption of fruits and vegetables respectively were graded in eight-point scale ranging from (i) none (= 0); (ii) 1-2 per week; (iii) 3-4 times per week; (iv) 5-7 times per week. The reasons that constitutes barrier to their fruits and vegetables consumptions were elicited from the respondents.

Knowledge about the Minimum Daily Recommendation of Fruits and Vegetable Consumption: The respondents were asked to provide the minimum daily recommendation of fruits and vegetables without giving options to choose from. WHO (2003) recommended a minimum of 400g of fruit and vegetables per day (equivalent to five portions) for the prevention of chronic diseases such as heart diseases, cancer, diabetes and obesity.

Nutritional knowledge: Respondents general nutrition knowledge of benefits of fruits and vegetables consumption was assessed using five (5) questions on a scale of true or false, by asking some pertinent questions such as Fruits and vegetables are good source of vitamins, minerals and fiber, Most fruits and vegetables are of high nutrient density and low in calories, e.t.c.. Each question was allotted 1 mark for right answer and 0 for wrong answer.

Furthermore, subjects were made to indicate on a scale of like or dislike, how much they liked eating the fibrous chewy-parts of those fruits that have reasonably high fibre content (orange, pine apple, and tangerine). Knowledge was graded as poor, good, and very good based on the number of correct answers respondents gave to the five (5) questions. A score of 0-1 correct answers was graded as poor knowledge, while 2- 3 and 4- 5 correct answers were graded as good and very good knowledge respectively. This score from the Knowledge of benefits of fruits and vegetables was then compared to their weekly consumption and assessed to be either adequate or inadequate for each individual.

Barriers to and Facilitators for Consumption of Fruits and Vegetables: Respondents were asked to specify whether factors such as price, availability, seasonality, quality, price, ill health, lack of money e.t.c pose as barriers to fruit and vegetable consumption

Statistical Analysis: The statistical package for social sciences (SPSS version 17) was used. Data were analysed using descriptive statistics and Chi-square. Statistical significance was determined at $p < 0.05$

RESULTS

Table 1 shows that the Mean age of the males and females were 21.72 ± 2.80 and 20.64 ± 2.12 years respectively, while the mean BMI were 22.15 ± 2.42 kg/m^2 and 23.2 ± 3.5 kg/m^2 respectively. Majority of the males (45.30%) were in the age bracket of 21 to 24 years while majority of the girls (51.7%) were in the age bracket of 17-20 years. About 169(36.0%) students received feeding allowance of ₦1000-₦5000 and were classified as poor students, 170(36.2 %) received ₦6000 to ₦10000 and were classified as average students while 131(27.8 %) received ₦11000 and above and classified as wealthy students.

Table 1: Age distribution and feeding allowance of Respondents

Variables	Males		Females		Total	
	Frequency (N)	%	Frequency (N)	%	Frequency (N)	%
Age (in years)						
17-20	86	36.9	122	51.7	208	44.3
21-24	106	45.3	103	43.6	209	44.4
25-31	42	18.0	11	4.7	53	11.3
Total	234	100	236	100	470	100
Feeding allowance						
₦1,000 - ₦5,000	83	35.5	86	36.4	169	36.0
₦6,000 - ₦ 10,000	85	36.3	85	36.1	170	36.2
₦11,000 & above	66	28.2	65	27.5	131	27.8
Total	234	100	236	100	470	100

N = Number, % = percentage

Information on frequency of fruits and vegetables consumption by the respondents is presented in Table 2. None of the respondents consumed the minimum daily requirement of fruits and vegetables. More females (10.2%) than males (6.4%) consumed fruits 5

to 7 times per week. Also, more females (59.5%) than males (51.7%) consumed vegetables 3 to 4 times per week. Generally, more females (54.6% and 77.2%) consumed fruits and vegetables respectively up to 3 to 7 times per week than males (52.1% and 70.5%).

Table 2: Frequency of fruits and vegetables consumption by the Respondents

Variables	Males	Females	Total	Males	Females	Total
	Fruits %	Fruits %	Fruits %	Vegetables %	Vegetables %	Vegetables %
Never (0)	8.6	5.1	13.7	4.7	3.8	8.5
1-2 time per week	39.3	40.3	79.6	24.8	19.0	43.8
3-4 per week	45.7	44.4	90.1	51.7	59.5	111.2
5-7 per week	6.4	10.2	16.6	18.8	17.7	36.5
Total	100.0	100.0	200.0	100.0	100.0	200

Table 3 shows that the most commonly consumed fruits by the males were Orange (17.9%), Banana (16.2%) and Apple (14.5%). While the most commonly consumed fruits by the females were water melon (20.3%) Apple (15.2%) and Banana (13.0%).

Differences existed in preferences for types of fruits among males and females respondents but the only fruit that showed significant difference ($p < 0.05$) between the respondents was the consumption of Orange.

Table 3: Commonly consumed fruits among FUNAI Students

Types of Fruits	Males (%)	Females (%)	Total (%)
Apple	14.5	15.2	29.7
Banana	16.2	13.0	29.2
Cherry	0.4	0.4	0.8
Cashew	1.3	1.7	3.0
Grape	0.9	5.0	5.9
Mango	6.4	8.1	14.5
Orange	17.9*	5.1*	23.0
Pawpaw	6.0	4.3	10.3
Pear	0.9	5.1	6.0
Pineapple	8.9	12.9	21.8
Plantain	1.7	0.4	2.1
Water Melon	13.2	20.3	33.5

Chi-square tests were used to analyzed the difference in fruits consumption between the males and females

*shows values that were significantly different ($p < 0.05$) between males and females

Table 4 shows that the most commonly consumed vegetables by the males were Ugu leaf (40.0%), bitter leaf (11.5%) and cucumber (11.9%) while the most

commonly consumed vegetables by the females were ugu leaf (32.1%) carrot (18.1%) (0.05), and garden egg (9.7%) but no significant difference ($p > 0.05$).

Table 4: Commonly Consumed Vegetables among AEFUNAI Students

Types of Vegetables	Males (%)	Females (%)	Total (%)
Bitter leaf	11.5	6.8	18.3
Oha	3.4	3.4	6.8
Ugu (fruited pumpkin)	40.0	32.1	72.1
Scent leaf	2.2	3.0	5.2
Spinach	2.3	3.8	6.1
Water leaf	3.8	3.4	7.2
Cabbage	5.5	3.8	9.3
Cucumber	11.9	6.3	18.2
Garden egg	6.4	9.7	16.1
Lettuce	0.4	0.6	1.0
Okro	8.5	5.5	14.0
Onion	3.8	5.9	9.7
Uziza leaf	0.4	0.5	0.9
Carrot	8.5	18.1	26.6

Table 5 shows that the four major factors that hindered the consumption of fruits and vegetables by both male and female students were availability

(41.2%, 41.3%), high price of fruits (23.0 %, 13.2%), seasonality (14.3%, 15.1%) and lack of money (9.5 %, 7.2%) respectively.

Table 5: Barriers of fruits and vegetables consumption

Variable	MALE		FEMALE		TOTAL	
	Frequency	(%)	Frequency	(%)	Frequency	(%)
BARRIERS TO FRUITS CONSUMPTION						
AVAILABILITY	74	31.6	120	51.1	194	41.2
DISLIKE	7	3.0	8	3.3	15	3.1
LACK OF MONEY	27	11.5	19	8.0	46	9.7
PREFERENCE	8	3.4	4	1.7	12	2.5
PRICE	70	29.8	38	16.0	108	23.0
QUALITY	15	6.4	7	3.0	22	4.7
SEASONALITY	31	13.6	35	14.8	67	14.3
ILL HEALTH	2	0.8	2	0.8	4	0.9
LACK OF TIME	0	0.0	3	1.3	3	0.6
TOTAL	234	100.0	236	100.0	470	100.0
BARRIERS TO VEGETABLE CONSUMPTION						
AVAILABILITY	82	35.3	112	47.7	194	41.3
DISLIKE	12	5.1	8	3.4	20	4.3
LACK OF MONEY	19	8.1	15	6.3	34	7.2
PREFERENCE	7	3.0	6	2.5	13	2.7
PRICE	40	17.0	22	9.3	62	13.2
QUALITY	34	14.5	34	14.4	68	14.5
SEASONALITY	36	15.3	35	14.8	71	15.1
ILL HEALTH	1	0.4	2	0.8	3	0.6
LACK OF TIME	3	1.3	2	0.8	5	1.1
TOTAL	234	100.0	236	100.0	470	100.0

% = Percentage

Table 6 shows that about 70.9% and 76.0% of the respondents did not have any idea about the minimum daily recommendation of fruits (2-4 servings) and vegetable (3-5 servings) respectively. More than 70%

of males and 80% of females had no idea of daily minimum recommendation of three to five servings (3 to 5 servings) per day of vegetables, respectively (p>0.05)

Table 6: Knowledge about the minimum daily recommendation (MDR) for fruits and vegetables consumption by the Respondents

Servings	Male	Female	Total N (%)	Male	Female	Total
	N (%)	N (%)		N (%)	N (%)	N (%)
	Fruits			Vegetables		
No idea	156 (66.7)	177 (75.0)	333(70.9)	167 (71.4)	190 (80.5)	357 (76.0)
1	31 (13.2)	17 (7.2)	48 (10.2)	34 (14.5)	19 (8.1)	53 (11.3)
2-4	19 (8.1)	13 (5.5)	32 (6.8)	21 (9.0)	16 (6.8)	37 (7.8)
3-5	28 (12.0)	29 (12.3)	57 (12.1)	12 (5.1)	11 (4.6)	23 (4.9)
Total	234 (100.0)	236 (100.0)	470(100.0)	234 (100.0)	236 (100.0)	470 (100.0)

Table 7: shows that More than 89 % of the male and female students knew the nutritional benefits of fruits and vegetables and the difference is significant

($p < 0.05$) when compared to the percentage that had no knowledge of the nutritional benefits. Also, about 85% like to eat the fibrous part of the fruits ($p < 0.05$).

Table 7: Nutritional knowledge of benefits of fruits and vegetables

VARIABLES	True			False		
	Male (%)	Females (%)	Total (%)	Male (%)	Female (%)	Total (%)
Fruits and vegetables are good source of vitamins, minerals and fiber	98.7	95.3	97.0	1.28	4.66	3.0
Most fruits and vegetable have high nutrient density and low in calories	92.3	89.0	90.6	7.7	11.0	9.4
Consumption of fruits and vegetables help prevent cancer, heart disease and obesity	92.3	91.1	91.7	7.69	7.69	8.3
Nutrients contained in vegetables are denatured by over cooking	91.5	93.6	92.6	8.55	6.4	7.4
	Likes			Dislike		
Do you like eating the fibrous part of fruits such as orange, pineapple, tangerine etc.?	87.2	85.1	86.2	12.82	14.8	13.8

Table 8: shows the scoring of the nutritional knowledge of fruits and vegetables into three groups namely, Poor, good and very good. Most of the male and female respondents (92.6%) had good nutritional

knowledge of fruits and vegetables, 6.8% had poor knowledge while only 3 (0.6%) of the respondents had very good knowledge about fruits and vegetables respectively

Table 8: Scoring of nutritional knowledge of the respondents on fruits and vegetables

Nutritional Knowledge	Male		Female		Total
	N	(%)	N	(%)	N (%)
Poor	16	(6.8)	16	(6.8)	32 (6.8)
Good	217	(92.7)	218	(92.3)	435 (92.6)
Very good	1	(0.4)	2	(0.9)	3 (0.6)
Total	234	100.0)	236	(100.0)	470 (100.0)

Table 9 shows that above 40% of those with good knowledge about the benefits of fruit and vegetables consumed both the fruit and vegetable 3-4 times a

week while those with very good knowledge did not consumed any fruits and vegetables during the week and the is significantly difference ($p < 0.05$).

Table 9: Relationship between nutritional knowledge and consumption of fruits and vegetables

Variable	Nutritional Knowledge							
	Poor (%)	Male Good (%)	Very good (%)	Total (%)	Poor (%)	Female Good (%)	Very Good (%)	Total (%)
Consumption of fruits per week								
0	1.3	7.7	0.0	9.0	0.4	4.2	0.0	4.7
1-2	1.3	37.2	0.0	38.5	3.4	38.1	0.0	41.5
3-4	4.3	41.5	0.4	46.2	2.1	40.7	0.9	43.6
5-7	0.0	6.3	0.0	6.3	0.9	9.3	0.0	10.2
Total	6.9	92.7	0.4	100.0	6.8	92.4	0.9	100.0
Consumption of Vegetable per week								
0 (None)	0.0	5.1	0.0	5.1	0.0	3.4	0.0	3.4
1-2	1.3	23.5	0.0	24.8	1.3	18.2	0.0	19.5
3-4	4.3	45.7	0.4	50.4	3.4	55.1	0.9	59.3
5-7	1.3	18.4	0.0	19.7	2.1	15.7	0.0	17.8
Total	6.9	92.7	0.4	100.0	6.8	92.4	0.9	100.0

DISCUSSION

Several studies have associated low intake of fruits and vegetables with chronic diseases such as cardiovascular diseases, hypercholesterolemia, osteoporosis, many cancers, chronic obstructive pulmonary diseases, respiratory problems as well as mental health (28, 29). This study showed that all the students consumed fruits and vegetables at different times but majority of the respondents consumed fruits and vegetables 3 to 4 times per weeks which was lower than (16) recommendation of a minimum of 400g of fruit and vegetables per day (equivalent to five portions). This result is similar to the study (30) who reported inadequate fruit consumption among students in Ghana. In general, more female students consumed fruits and vegetables than the male respondents. The result is similar to the previous studies by (31, 20) among undergraduate students in two universities in South Western Nigeria and among adults in an Urban Community in North Central Nigeria who reported that females consumed more quantities of fruits and vegetables than their male counterpart. And also (32) in their study in Tabriz, Iran reported that boys were at risk of low levels of daily fruits and vegetables consumption than girls. Slight gender differences existed in preferences for types of fruits among the students but only the consumption of Orange showed a significant difference ($p < 0.05$) (Table 3). This result is similar to study by (33) in Ghana where male students had higher preference for orange, banana and pineapple and by (34) in Oyo State Nigeria where the most preferred fruits and vegetables were Banana and

pumpkin leaves respectively. Above 70% of the respondents did not have any idea about the minimum daily recommendation of 400g of fruit and vegetables per day (equivalent to five portions). Fruits and vegetables are rich in micronutrients and low in energy density which help to maintain body weight (4) and irregular consumption of fruits and vegetables should be avoided. Availability, seasonality, lack of money as well as high prices of fruits and vegetables were identified as factors that pose as determinants to consumption of fruits and vegetables, this is similar to the result obtained by previous studies (35, 34, 36). Availability and seasonality to most of fruits and vegetables depends on their seasons and this determines the quantity and variety of fruit and vegetables available to students. Many of these fruits and vegetables are not available all the year round. Increase in students pocket money and reduction in prices of fruits and vegetables will probably increase the students fruits and vegetable consumption since their knowledge of benefits of fruits and vegetables was high. Adenegan and Adeoye, (37) reported that increase in students' allowances increases the amount the students spend on fruits and vegetables.

There is significant difference ($P < 0.05$) between the nutritional knowledge of benefits of fruits and vegetables and the consumption pattern. Majority of the respondents (89.0%) had a good knowledge of the nutritional benefits of fruits and vegetables but unfortunately their knowledge did not translate to high consumption since only about 40% of those with good

knowledge of benefits of fruit and vegetables consumed fruit and vegetable 3-4 times a week. This result is similar to the study conducted by (8, 20) in Surulere, Lagos State and North Central Nigeria who reported 84.99% and 92.4% respectively of good knowledge of the nutritional value of fruits and vegetables with low consumption among the respondents. This is in contrast to study by (38) in Sokoto who reported that only 29% of the respondents had good knowledge of the nutritional value of fruits and vegetables. The display of high knowledge of benefits of fruits and vegetables by the respondents in this study can be attributed to the level of their education and the low consumption could be attributed to barriers like lack of money, high prices availability, seasonality and maybe absence from home. Consumption of fruits and vegetables is very important because it helps to prevent cancer, heart disease and obesity and should be encouraged among students.

CONCLUSIONS

Results of this study indicate inadequate fruits and vegetables consumption among students of AEFUNAI. Also, although majority of the students had good nutritional knowledge of Fruits and Vegetable, most were deficient in the knowledge of Minimum Daily Recommendation for Fruits and Vegetables. Cost and availability of fruits and vegetables appear to be the major hindrance to adequate consumption of fruits and vegetables among students of AEFUNAI.

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Authors' contributions

GN carried out the data collection, data analysis and interpretation and drafted the Manuscript; C E.C.C corrected the manuscript.

All authors have read and approved the manuscript and made their contributions to improve the manuscript.

Competing interest

The authors declare that there are no competing interests.

Consent for publication

Consent for publication is not necessary because this manuscript does not have personal data like individual details, images or videos.

Data and material availability

Authors declare that the data and materials for this manuscript are available.

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