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Assessing the Nutritional Status and Nutrition Education Knowledge of Patients with Type 2 Diabetes in Bamenda Regional Hospital, North -West Region -Cameroon

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Abstract

Type 2 diabetes (formerly termed non-insulin dependent or adult-onset diabetes) occurs when the body does not produce enough insulin (relative insulin deficiency) or cannot use the insulin it produces effectively (insulin resistance) and it could be due to β-cell dysfunction and dysregulated hepatic glucose production.Effective management of diabetes mellitus requires comprehensive nutrition education. However, the relationship between patients' nutritional knowledge and their nutritional status remains underexplored in Cameroon, particularly in the Bamenda Regional Hospital. The aim of this study was to evaluate the nutrition education knowledge and nutritional status of diabetic patients at Bamenda Regional Hospital. A cross-sectional study was conducted involving 152 diabetic patients receiving care at the Bamenda Regional Hospital. Data collection was done through the administration of a structured questionnaire to obtain information on sociodemographic characteristics and nutrition education knowledge. Anthropometric measurements(weight and height) was carried out and used to calculate BMI (weight/height^2). This was used to assess nutritional status following the standard procedures and compared with the World Health Organisation(WHO) classification standards. Dietary intake was assessed using 24 -hour recall and food frequency questionnaire methods.The data was analysed using SPSS (version 21).The level of significance was set at p-value< 0.05.

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The study revealed that 62.2% of the diabetic patients were female, 53.9% were≥45years,62.5% had low income .Moreover, 23.3% were overweight(BMI;24.9 - 29.9kg/㎡) and 58.6% were obese (BMI;≥ 30kg/㎡). A significant difference was observed between low income, nutritional status and nutrition education knowledge($p<0.05$).: The study revealed that diabetes patients in Bamenda Regional Hospital could be having inadequate knowledge which led to poor food choices and financial limitations could have restricted access to healthy foods. Lifestyle modification is the best approach and this can be achieved through enhancing nutrition education programs tailored to local dietary practices which may improve patients' nutritional status and diabetes management outcomes.

Keywords: Diabetes; Nutrition Education knowledge; Nutritional Status; Bamenda; Cameroon.

1. Introduction

Diabetes mellitus is the collective term for heterogeneous metabolic disorders whose main finding is chronic hyperglycaemia. The cause is either a disturbed insulin secretion or a disturbed insulin function or usually both. Diabetes is one of the major public health burdens throughout the world and belongs to the fourth priority non-communicable diseases [1].

IDF Diabetes Atlas[2],reports that 10.5% of the adult population(20-79 years) have diabetes, with almost half unaware that they are living with the condition.It was also revealed, that there was a continued global increase in diabetes prevalence,confirming diabetes as a significant global challenge to the health and well being of individuals, families and countries. It is estimated that 537 million people have diabetes(10% of the world population) and 24 million in Africa Region. This number is expected to reach 643 million(11.3%) by 2030.If the trend continues, the number will skip to 783 million (12.2%) by 2045.In addition,541 million people were estimated to have impaired glucose tolerance in 2021. WHO fact sheet on diabetes[3], predicted a worldwide rise in the prevalence of diabetes that is expected to affect 300million people by 2025. Diabetes was the direct cause of 1.6 million deaths and 47% of all deaths occurred before the age of 70 years. Of these deaths, 530 000 had kidney disease, and around 11% had cardiovascular diseases. IDF atlas[4], highlighted that about 70% of people with diabetes live in low and middle income countries and where the greatest increase in burden are occurring.Over 90% of people with diabetes have type 2 diabetes, which is driven by socio-economic, demographic, environmental, and genetic factors and key contributors to the rise in type 2 diabetes include: Urbanisation, An ageing population,Decreasing levels of physical activity,Increasing overweight and obesity prevalence. In Cameroon,5.5% of the population ages 20 to 79 years was reported to be living with diabetes[2].

1.1. Problem statement

Considering the increasing trend of type 2 diabetes globally, Africa Region and in Cameroon in particular[2], it is important to carryout studies to identify the root causes of this increase.Hence, this study was designed to make data available, by assessing the Nutritional status and level of nutrition education knowledge of patients with type 2 diabetes attending diabetes clinic in Bamenda Regional Hospital , North west region - Cameroon.

1.2. Significance of the study

The findings from the study can help in designing and implementing nutrition services, targeted for patients with type 2 diabetes within the hospital set up.

1.3. objectives of the study

1. To evaluate the nutrition education knowledge of patients with type 2 diabetes in Bamenda Regional Hospital.
2. To Assess the nutritional status of patients with type 2 diabetes at the BRH
3. To establish the relationship between nutritional knowledge, nutritional status and

   sociodemographic characteristics of patients with type 2 diabetes at the BRH.

2. Methodology

2.1 .Study design

This was a cross-sectional descriptive study involving patients with type 2 diabetes attending the Bamenda Regional Hospital diabetes clinic.

2.2. Study Population

The population of this study were patients with type 2 diabetes attending the Bamenda Regional Hospital.

2.3. Sample size

The sample size of the population was calculated using Cochran's formula ($N=Z2p(1- p)/e^2$) With 95% confidence level (Z = 1.96), an estimated proportion (p) of 0.5 (which maximizes the sample size), and a margin of error (e) of 5% (0.05). The sample size arrived at was 152 patients.

2.4. Sampling technique

A random sampling technique was used.This method was to allow every diabetic patient in Bamenda Regional Hospital to have an equal chance of being involved in the study.

2.5. Selection criteria

Inclusion criteria: Patients with type 2 diabetes who gave their consent

Exclusion criteria: Patients who had had limb amputation were excluded from the

study.

2.6. Data collection

A questionnaire was administered to obtain information on ;

- Sociodemographic characteristics of the diabetic patients

- Assess nutritional status of type 2 diabetes patients using anthropomethric measurements(weight and height) to be used to calculate BMI((weight/height^2) following the standard procedures and compared with the World Health Organisation[5] classification standards, 24 hour dietary recall and Food frequency questionnaire methods.
- Evaluate the level of nutrition education knowledge of the diabetes patients
- Establish the relationship between nutritional status, nutritional knowledge and sociodemographic characteristics of the diabetes patients

2.7. Data Analysis

Statistical analysis was done using statistical package of social sciences (SPSS) version 21

2.8. Ethical consideration

Ethical clearance was obtained from the Regional Ethics Committee for Human Health

Research (CERSH), Northwest Region. Administrative clearance was obtained from the

Regional Hospital.

3. Results

3.1. Numerical Information

3.1.1. The Sociodemographics characteristics of the study participants

The most represented age group that were most affected was 45 and above (53.9%), followed by 26-44 (32.9%). The female gender (61.2%) were more diabetic than the males. Majority (64.5%) of the diabetic patients are resident in the rural areas and most(62.5%) of the diabetic patients were low income earners (< 50000FCFA per month)(table1a). Some of the patients were diagnosed with other comorbidities; 34.2% were hypertensive, 7.2% had kidney disease and 17.1% had hyperlipidemia and 50% were not physically active (table 1b).

Table 1a: Sociodemographic characteristics

Variable	Frequency	Percentage	P-value
Age (years)			
18-25	0	0%	
26-35	20	13.2%	
36-44	50	32.9%	
45 and above	82	53.9%	
Gender			
Male	59	38.8%	
Female	93	61.2%	
Area of residence			
Rural	98	64.5%	
Urban	54	35.5%	
Level of income (FCFA)			
<50000	95	62.5%	
>50000	57	37.5%	
Level of education			
Primary	20	13.2%	
Secondary	34	22.4%	
Tertiary	98	64.5%	

p-value

Table 1b: Sociodemographic characteristics

How long have you been diagnosed with diabetes?			
Less than 1 year	17	11.2%	
1-3 years	30	19.7%	
4-6 years	80	52.6%	
More than 6 years	25	16.4%	
Comorbidities			
Hypertension	52	34.2%	
Kidney diseases	11	07.2%	
Hyperlipidemia	26	17.1%	
None	63	41.4%	
Physical activities	76	50%	

3.1.2.Anthropometric parameters

BMI CLASSIFICATION

The findings as shown in figure 1 , revealed that majority(58.6%) of the diabetes patients were obese and 24.3% were overweight.

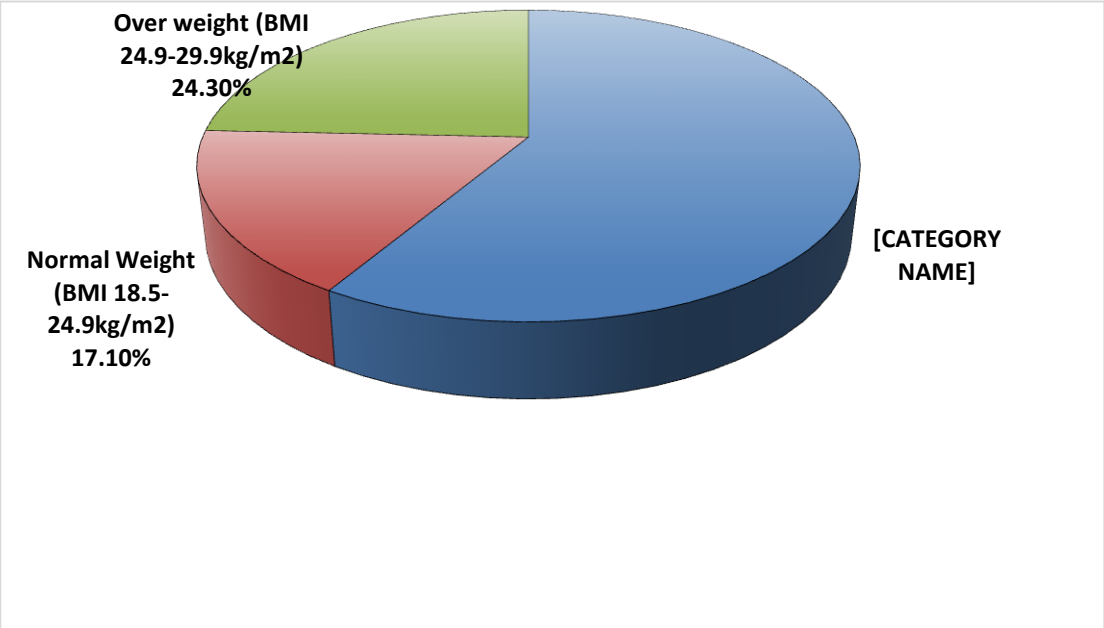

Figure 1: BMI Classification of the respondents

3.1.3 Dietary assessment

Assessing the dietary habits of the patients as shown in tale 2, majority (57.2%) were eating 4 meals per day and 58.5% of them were not noting portion sizes.The findings also revealed that 86.6% of the patients were taking snacks. For food consumption frequency per week (figure 2a), majority(57.2%) were consuming starchy foods, 53.2% were consuming vegetables and 50% were consuming fruits 3- 4 times a week . Figure 2b,showed the food choices and revealed that majority(76.9%) consumed alcohol , 51.3% consumed fried foods, 3-4 times a week.

Table 2: Dietary habits of the respondents

Item	Frequency	Percentage
Number of meals you take a day		
3	21	13.8
4	87	57.2
5	43	28.3
Noting portion size of the meals taken		
Yes	63	44.4
No	89	58.5
Skipping meals		
Yes	89	58.4
No	63	44.4
Taking snacks		
Yes	131	86.1
No	21	13.8
Preferred method of cooking		
Frying	48	31.6
Boiling Grilling or Baking	88	57.9
	17	11.1

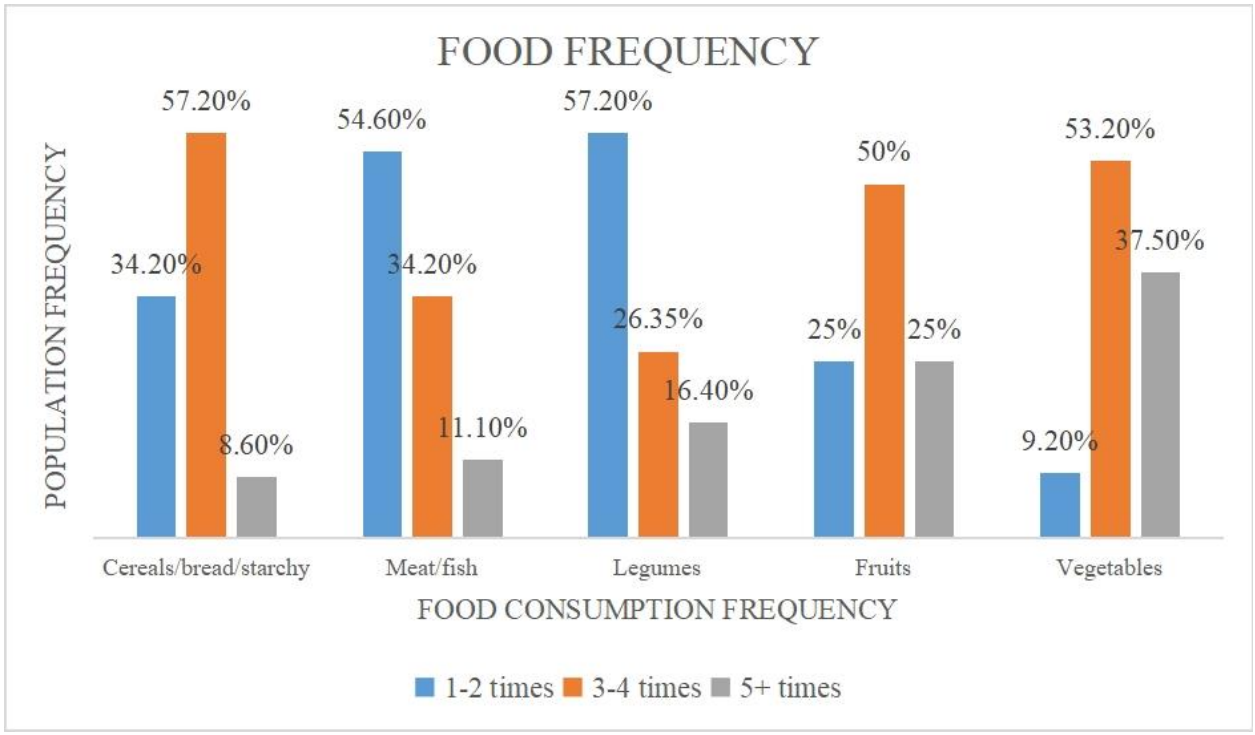

Figure 2a*:* Food frequency of the respondents

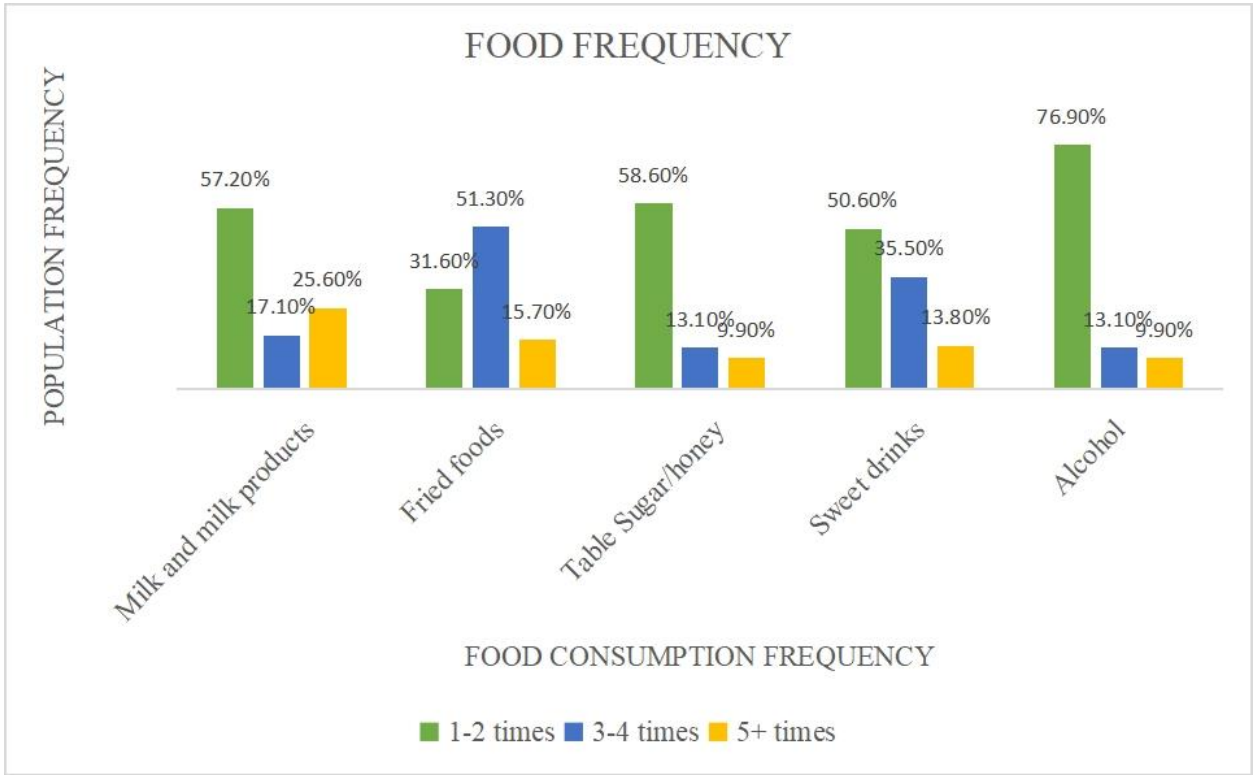

Figure 2b: Food frequency of respondents

3.1.4. Nutrition Education Knowledge

Concerning correct knowledge on nutrition education (figure 3a) , only few(22.4%) had knowledge on recommended number of food servings per day, 38.% had knowledge on food good for diabetics and 30.9% had knowledge of healthy fat foods. Figures 3b and 3c revealed that all of them had low knowledge of reading and interpreting food labels and risk factors associated with food consumption.

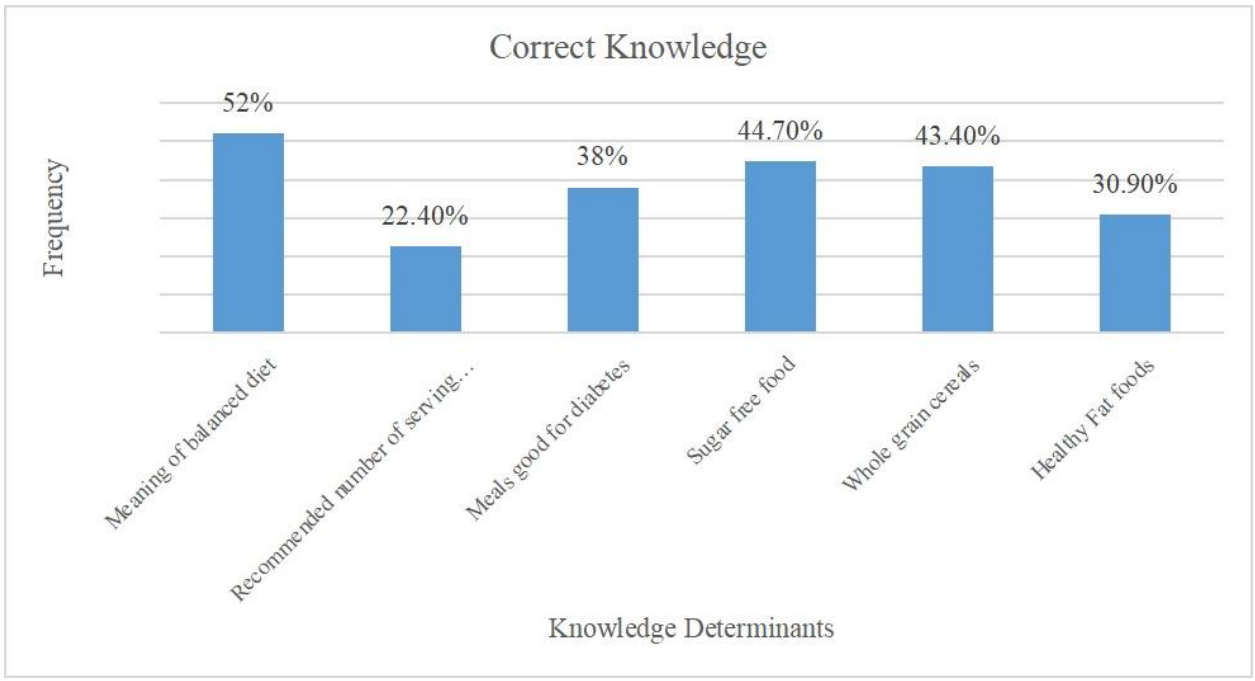

Figure 3a: Nutrition education knowledge

Figure 3b: Nutrition education knowledge

Figure 3c: Nutrition education knowledge

Findings from inferential statistics (table 3) revealed that, there was a correlation between some sociodemographic characteristics (Age, gender, low income) and nutritional status which were significant at $p < 0.05$.

Table 3: Correlation between sociodemographic characters and nutritional status

Variable		Age	Gender	LE	NS
Age	Pearson Correlation	1			0.818
	Sig.(2-tailed)				0.00
	N				152
Gender	Pearson Correlation		1		0.810
	Sig.(2-tailed)				0.00
	N				152
LE	Pearson Correlation			1	0.703
	Sig.(2-tailed)				0.000
	N				152

LE: Level of education

NS: Nutritional status

Table 4 showed a correlation between Nutritional Status(BMI,24HDH,FF) and Nutrition Education Knowledge which was significant at $p<0.05$

Table 4: Correlations between Nutritional status and Nutrition Education knowledge

Variable		BMI	24HDC	FF	NEK
BMI	Pearson Correlation	1			0.470
	Sig.(2-tailed)				0.001
	N				152
24HDC	Pearson Correlation		1		0.434
	Sig.(2-tailed)				0.002
	N				152
FF	Pearson Correlation			1	0.886
	Sig.(2-tailed)				0.001
	N				152

NEK: Nutritional education knowledge

BMI: Body mass index

24HDC: 24 hour dietary recall

FF: Food freauency

4. Discussions

4.1 Sociodemographic characteristics

Majority (61.2%) of the diabetic patients were females and Majority(64.5%) of the diabetes patients had low income. Similar findings were obtained from a study carried out by Almousa and his colleagues 2023 in Saudi Arabia and Olatona and his colleagues 2019 - Nigeria. Most of the diabetic patients(53.9%) were aged 45 years and above. The similar result was obtained by.Kaptso and his colleagues [7] and Mbanya and his colleagues [8] which showed that there was a strong association between increasing prevalence of diabetes with increasing age groups.This might have been due to the fact that their organs were getting worn out as age increases and so the

pancreas could not be producing enough insulin to keep the blood sugar at normal level.

4.2 Nutritional Status

Majority of the diabetes patients were obese (58.6%) and 24.3% were overweight. .There was high snack consumptions (86.2%), High consumption of alcohol (77%),High consumption of saturated fats(56.6%), Low consumption of fruits and vegetables (37.5%), Physical inactivity (50%). All these could have contributed to high obesity rates.Similar findings were obtained in studies carried out by Khan and his colleagues [8] and Bigna., [9] which showed that the diabetic patients were at risk of developing cardiovascular complications as well as other chronic diseases.The Bivariate analysis showed associations between some sociodemographic characteristics (gender,age ,income) with nutritional status(table 3), which were significant at $p<0.05$. this may likely be due to lifestyle and consumption of unhealthy foods.

4.3 Nutrition education Knowledge

Nutritional status defined by Body Mass Index,24 Hour Dietary Recall, Food Frequency, correlated with Nutrition education knowledge (table 4) and showed significance at $p>0.05$.

This revealed that nutrition education knowledge was inadequate in majority of the type 2 diabetes patients and this deficit in nutritional knowledge could have contributed to the burden of the disease. Similar findings were obtained by Kaptso and his colleagues [7] and Kagaruki and his colleagues [10]. These findings implied that low level of knowledge observed among the diabetic patients signified that they were less likely to practice recommended control strategies, and they were more likely to be diagnosed late, a situation which led to poor treatment outcomes.

5. Conclusion

Diabetes patients attending diabetic clinic in the Bamenda Regional Hospital had poor nutritional status as most of them were overweight and obese. Their knowledge in nutrition education was inadequate indicating that they were lacking in food literacy and food numeracy. Hence, diabetes patients can adapt a healthy lifestyle by avoiding alcohol,sticking to healthy diets and engaging in physical activities. It is therefore recommended that community - based nutrition education programs should be implemented to create awareness and interventions that can influence behavioural changes and these measures which could help to avoid or delay complications in patients in Bamenda and in the country at large.

6. Contraints and limitations

- The duration of the research was too short to observe significant changes in eating habits and food choices.

- The study did not assess the long-term sustainability of changes in eating habits and food choices beyond the duration of the intervention.

-The time of year of the study might have affected food availability and eating habits, leading to seasonal variations in data.

-Findings were specific to the Bamenda Regional Hospital and not generalize to other regions with different socioeconomic and cultural contexts.

7. Consent

Following the international and university standards, written consent was collected and kept by the authors.

8. Competing interests

The authors declared that, there was no competing interest.

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9. Corrections done on

- More discussions on similar previous studies and clarifications on the results.

- Constraints and limitations added.