EATING HABITS AND DIETARY PRACTICES AMONG OUTPATIENT TYPE 2 DIABETIC ADULTS IN ENUGU, NIGERIA

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ABSTRACT

Background: Eating habits and dietary practices have a remarkable effect on the health outcome of an individual.
Objective: This study investigated eating habits and dietary practices of out-patients diabetic adults attending a tertiary health facility in Nigeria.
Materials and Methods: The cross-sectional survey was conducted in the Out-patients Diabetic clinic of University of Nigeria Teaching Hospital (UNTH) Ituku-Ozalla, Enugu Nigeria. A total of 370 respondents were purposively selected from the hospital's diabetic attendance. Information on eating habits and dietary practices was obtained with a validated structured interviewer-administered questionnaire. Data collected were analyzed with IBM Statistical Product for Service Solution version 21. Results were presented with descriptive statistics and Chi-Square.
Result: Many (77.3%) of the subjects had 3meals per day, 62.1% did not take snacks, and 63.8% consumed home foods. There were occasional outdoor eating (82.2%) mainly due to ceremonies (45.2%), 67% took supplements, 53.5% had knowledge of nutrition fact, and 44.3% desired weight reduction. Some consumed vegetables (67.3%) and fruits (39.5%) > once/day, 81.4% consumed 94g to 188g meat portion/meal and 76.2% consumed fish >2 times per week. Preference of poultry/fish over red meat/pork/fried meat was sometimes for 45.4% of the respondents. Up to 56.8% consumed appreciable quantities of grains/starches, 67% ate desserts, and 55.1% consumed baked foods < once/week. Some (61.9%) took coffee ≤3 cups/week and 78.4% took salted fast foods ≤ once/week, and 63.8% consumed non-hydrogenated vegetable oils. Relationships exist between socio-demographic/economic characteristics, eating habits and dietary practices.
Conclusion: The study showed that appreciable percent of the diabetics studied can make informed choices although significant proportions need comprehensive nutrition education on eating habits and adherence to dietary guidance.

Keywords: Eating habit; dietary practices; out-patient; type 2 diabetes; nutritional status; adults.

INTRODUCTION

Eating habits and dietary practices are the food choices and observances made by individuals in their life course. They can be consequences of factors like age, sex, nutrition, physical activity, behavior, disease, culture, social, economic, religious, environmental and food safety. These habits especially in adults have been developed for so long that most people are unaware of it. Food intake patterns are directly related to the health status of an individual [1, 2].Good food habits will result to good nutritional status and bad eating practices will amount to poor health and diseases. Recently, both local and international organizations concerned with nutrition and health have implemented interventions to promote healthy eating behavior among the generality of the global population. Of major concern are the eating habits and dietary practices of adults with type 2 diabetes (T2D). This is because the prevalence of diabetes is currently on the increase globally [3] especially in adults [4]. This upsurge has already been attributed to nutrition transition [5, 6]. Although a good number of patients with diabetes had received dietary guidance from nutrition experts [7], the adherence to the guidance and the dietary habits of the diabetics that are yet to access the services of Dietitian-Nutritionist remains to be ascertained. It is therefore imperative to investigate the eating habits and dietary practices of out-patients diabetic adults.

MATERIALS AND METHODS

Survey area

The study was carried out at the University of Nigeria Teaching Hospital's outpatient Diabetic Clinic. The hospital is located on Enugu Port- Harcourt Express Way, some minutes from Enugu, the capital city of Enugu state. The diabetic clinic has an annual average attendance of 2,888 patients for three years (2013 to 2015).

Survey design

A cross-sectional survey design was adopted for the study.

Population of the study
The previous (2013 to 2015) years' annual average (2,888) attendance of diabetics at UNTH made up the population size for the study.

Sample selection
The sample size was calculated using the formula n = N /1+N (e)². Where n = sample size, N = population size, 1 = constant, e = marginal error (0.05) Source: Yamane, 1967. N = 2888/1 + 2888(0.05)² = 351. Five (5) percent attrition provided an additional 17.55 to the total for possible drop out (351 + 17.55 = 368.55 = 369 approximated to 370).

Ethical approval/Inform consent
Ethical clearance was obtained from the hospital's Health Ethics Committee. Patients that participated in the study were duly informed and their consent obtained.

Data collection
Questionnaire
A validated interviewer-administered structured questionnaire was used to obtain information on Meal frequency and forms; snacking and home food consumption; reasons for outdoor eating, intake of food supplement, knowledge of nutrition fact, food types and quantities consumed by the respondents.

The reliability of the questionnaire was tested on diabetic adults attending Federal Medical Centre Umuahia, using Cronbach Alpha.

Statistical analysis
Statistical Product for service solution (software) version 21 was used to analyze the data collected. Results were presented as frequencies, and percentages, chi-square was used to evaluate the relationship between socio-demographic/economic characteristics, eating habits and dietary practices.

RESULTS
Eating habit is one of the indicators of dietary practices (Table 1). Many (77.3%) of the respondents had 3 meals /day, 11.9% had more than 3meals /day and as many as 10.8% had 1 to 2 meals /day. An appreciable percentage (62.1%) did not consume between meals. Many (63.8%) of the respondents cooked their meals from the scratch, 66.7% ate foods prepared by other people less frequently (< once a week) and 57.3% consumed home meals ≥ 3 times/week. Although a majority (82.2%) of them ate out, 57% ate out less frequently (less than once a week) and 17.8% did not consume fast foods.

Table 1: Eating Habit of the Respondents

Variables	Frequency (%) n=370
No of meals/day	
1 to 2 meals/day	40 (10.8)
3 meals/day	286 (77.3)
>3 meals/day	44 (11.9)
Between meal consumption	
No	230 (62.1)
Yes	140 (37.9)
Meal cooking from scratch	
< Once/week	81 (21,9)
1 to 2 times/week	53 (14.3)
≥ 3 times/week	236 (63.8)
Food prep* by another	
< once/week	247 (66.7)
1 to 2 times/week	66 (17,8)
≥ 3times/week	57 (15.4)
Home meal consumption	
< 1 meal/week	79 (21.4
1 to 2 meals/week	79 (21.4)
≥ 3meals	212 (57.3)
Eating out (fast food)	
No	66 (17.8)
< once/week	211 (57.0)
1-2 times/week	47 (12.7)
≥ 3times/week	46 (12.4)

*prep = prepared; L. = low; H. = high

Table 2 shows the dietary practices of the respondents. The main reason for eating out was ceremonies (45.2%). There were also busy schedule (20%) and far from home (19.5%). Many (67%) of them took food supplements ≤ twice/week. Sixty percent read nutrition fact information and 53.5% had a good understanding of nutrition fact. Many (44.3%) desired weight reduction. Almost half (49.5%) of the respondents claimed they consumed adequate diet.

Table 2: Dietary Practices of the Respondents

Variables	Frequency (%) n=370
Reasons for eating out	
Busy schedule	74 (20.0)
Friends	24 (6.5)
Not at home	72 (19.5)
Ceremonies	167 (45.2)
None	33 (8.9)
Intake of food supplement	
No	80.0 (21.7)
≤ twice/week	248 (67.0)
3 to 4 times/week	37 (10.0)
Reading of nutrition fact	
Yes (good understanding)	198 (53.5)
Yes (poor understanding	24 (6.5)
Rarely	124 (33.5)
No	24 (6.5)
Desirability of weight reduction	
No	160 (43.2)
Yes	164 (44.3)
Undecided	46 (12.4)
Adequate diet consumption	
Maintenance	183 (49.5)
Action	86 (23.3)
Preparation	41 (11.1)
Contemplation	20 (5.4)
Pre-contemplation	40 (10.8)

Fruit and vegetable consumption frequency of the respondents is presented in Table 3. An appreciable percentage (40%) of the respondents consumed vegetables 2 to 3 times /day, 27.3% consumed it > 4 times/day. More than half (52.2%) consumed cruciferous vegetables < 5times/ day while as much as 40.2% had never consumed them at all. Many (60.5%) consumed fruits < 2 times/day, 13% consumed it >3 times/day, 26.5% consumed it 2 times/per day. A good number (62.7%) consumed citrus fruits less than 4times/week. As much as 23.2% did not consume orange-yellow fruits and vegetables.

Table 3: Fruit and Vegetable Consumption by the Respondents

Variables	Frequency (%) n=370
Vegetables consumption	
> 4/day	101 (27.3)
2 to 3/day	148 (40.0)
< 1/day	121 (32.7)
Cruciferous vegetable	
< 5 times/week	193 (52.2)
> 5 times/week	28 (7.6)
Never	149 (40.2)
Fruits	
≥ 3/day	48 (13.0)
2 /day	98 (26.5)
< 2 ≤ 1/day	224 (60.5)
Citrus fruits	
< 4 times/week	232 (62.7)
> 4 times/week	34 (9.2)
Never	104 (28.1)
Orange-yellow fruits & vegetable	
< 5 times/week	236 (63.8)
> 5times/week	48 (13.0)
Never	86 (23.2)

The respondents' consumption frequency of animal products is presented in Table 4. The meat portion per meal of majority (81.4%) of the respondents was between 95 to 190g, 6.5% ate >190g portion of meat per meal, while as much as 12.2% consumed less than 95g. More than half (52.4%) of the respondents consumed fatty meat less than once per week. Frequent consumption of chicken skin and visible fat on meat were by 14.1%. Many (74.9%) consumed whole egg 1to 2 times weekly, 16.2% did not consume egg at all. Many (76.2%) consumed fish more than 2 times per week, while 5.7% did not consume fish. The respondents' preference of poultry/fish over red meat/pork/fried meat was 45.4% (sometimes), 34.6% (always) and 20% (never) respectively. Some (46.5%) consumed smoked meat/fish 2 to 3 times per week, 34.1% consumed it ≤ once/week, 4.1% did not consume smoked fish or meat. More than half (53.2%) ate barbecued foods ≤once/week, 22.7% ate it 2 to 3 times/week while 18.6% had never eaten barbecued foods. Many (68.4%) consumed milk and ice cream 1 to 2 times per week, 13.2% 3 to 4 times while 17.0% did not consume milk and ice cream. A majority (73.8%) consumed < 2 servings of dairy products/day; 16.2% 3 to 4 servings/day while as much as 10% did not consume dairy products at all.

Table 4: Meat, Poultry, Fish and Dairy Foods Consumption by the Respondents

Variables	Frequency (%)
Meat portion/meal	
< 95g	45 (12.2)
95 to 190g	310 (81.4)
> 190g	24 (6.5)
Consumption of fatty meat	
< once/week	194 (52.4)
1 to 2 times/week	89 (24.1)
≥ 3 times	6 (1.6)
Never	81 (21.9)
Chicken skin & visible fat	
Never	147 (39.7)
Sometimes	171 (46.2)
Always	52 (14.1)
Weekly whole egg	
1 to 2 times/week	277 (74.9)
3 to 5 times/week	33 (8.9)
Never	60 (16.2)
Fish	
> twice/week	282 (76.2)
Once/week	38 (10.3)
Rarely	29 (7.8)
Never	21 (5.7)
Poultry/fish or red meat/pork/fried foods	
Never	74 (20.0)
Sometimes	168 (45.4)
Always	128 (34.6)
Smoked meat /fish	
≤ once/week	126 (34.1)
2 to 3 times/week	172 (46.5)
> 3 times/week	57 (15.4)
Never	15 (4.1)
Barbecued foods	
≤ once/week	197 (53.2)
2 to 3 times/week	84 (22.7)
≥ 4 times/week	20 (5.4)
Never	69 (18.6)
Milk/ice cream	
Never	63 (17.0)
1 to 2times/week	253 (68.4)
3 to 4times/week	49 (13.2)
≥ 5times/week	5 (1.4)
Amount of dairy product	
< 2 servings/day	273 (73.8)
3 to 4 servings/day	60 (16.2)
None	37 (10.0)

Table 5 presents the staple, desserts and sweet consumption frequency of the respondents. Some (38.4) of respondents had their plates ¼ and ½ filled with grains/starches respectively; while 18.4% ate more than ½ a plate of grains/starches daily only 4.9% did not consume grains at all. An appreciable proportion (38.6%) always consumed whole grains while 7.8% rarely and did not consume whole grains respectively. Many (67%) ate desserts while 33% did not. More than half (55.1%) consumed baked foods less than once per week; 19.5% 2 to 3x/week, 1.1% more than 4times/week and 24.3% did not consume baked foods. A good number (65.2%) took sweet 1 to 3 times a week, 5.7% ≥ 4 times/week while 29.2% did not.

Table 5: Staple, Desserts and Sweet Consumption by Respondents

Variables	Frequency (%)
% of grains/starches per plate	
¼ of plate	142 (38.4)
½ of plate	142 (38.4)
> 1/2 of plate	68 (18.4)
None	18 (4.9)
Whole Grain	
Always	143 (38.6)
Sometimes	169 (45.7)
Rarely	29 (7.8)
No	29 (7.8)
Desserts	
≤ twice/week	248 (67.0)
Baked foods	
≤ once/week	204 (55.1)
2 to 3 times/week	72 (19.5)
> 4 times/week	4 (1.1)
Never	90 (24.3)
Sweets	
Never	108 (29.2)
1 to 3 times/week	241 (65.2)
≥ 4 times/week	21 (5.7)

Table 6 presents the consumption frequency of miscellaneous food items by the respondents. Many (63%) of the respondents consumed soups, broths and sauce ≤ once/week and 26.5% had them >3 times/week. Many (78.4%) ate salted snacks ≤ once/week and 63% hardly used table salt. Many (63.8%) consumed non-hydrogenated vegetable oils and 21.6% consumed red oil. More than half (58.4%) consumed sweet drinks 1 to 2 times/week. Many (61.9%) took coffee ≤ 3 cups/week while 32.2% did not take coffee at all.

Table 6 Consumption of miscellaneous foods by the respondents

Variables	Frequency (%)
Soups, broth/sauce	
≤ once/week	233 (63.0)
1 to 2 times/week	39 (10.5)
> 3 times/week	98 (26.5)
Salted snacks	
≤ once/week	290 (78.4)
2 to 3 times/week	43 (11.6)
> 4 times/week	37 (10.0)
Table salt	
Never	55 (14.9)
Rarely	233 (63.0)
Often	42 (11.4)
Usually	40 (10.8)
Fats/oil	
Vegetable oil (NH*)	236 (63.8)
Red oil	80 (21.6)
Butter/cream/lard/margarine	36 (9.7)
None	18 (4.9)
Sweet drink	
< once /week	26 (7.0)
2 to 3 times/week	32 (8.6)
1 to 2/day	216 (58.4)
Never	96 (26.0)
Coffee	
≤ 3 cups/week	229 (61,9)
4 to 5 cups/week	22 (5.9)
None	119 (32.2)
Alcohol (1 drink = 5 oz of wine, 1 beer, 1½ oz of spirits)	
None	123 (33.2)
Occasionally	222 (60.0)
2 drinks/day	11 (3.0)
> 2 drinks/day	14 (3.8)

*NH= Non-hydrogenated

Table 7 shows that relationships exists between socio-demographic and economic characteristics, eating habits and dietary practices of the respondents at p = 0.01.

Table 7 Relationship between Socio-demographic and economic characteristics, eating habits and dietary practices of respondents

Socio-demographic/economic characteristics	Eating habits						Dietary practices			
	Frequency of meal	Snack intake	Own meal Cooking	Meals cooked by another	Home meal intake	Eating out	food supplement Intake	Nutrition facts Reading	Weight reduction regime	Adequate diet intake
Location	*297.2	*131.2	*105.6	*12.0	*114.4	*188.4	*205.6	*41.6	*79.2	*91.0
Age	*38.6	*315.0	*206.2	*312.2	*152.6	*99.6	*19.6	*388.2	*105.2	*269.4
Sex	*95.6	*54.2	*366.8	*192.4	*305.6	*128.0	*46.6	*338.8	*63.4	*182.8
Marital status	*29.4	*316.2	*403.8	*399.6	*334.2	*95.8	*77.2	*485.2	*193.2	*338.2
Family type	*478.6	*86.4	*397.4	*81.8	*390.8	*405.0	*352.0	*498.6	*196.2	*170.2
Family size	*54.2	*313.8	*154.2	*287.0	*108.4	*86.4	*95.8	*284.6	*149.8	*1099.0
Religion	*562.6	*170.4	*442.8	*128.8	*447.6	*443.6	*432.6	*168.4	*268.0	*602.2
Ethnicity	*539.6	*144.4	*423.0	*104.2	*426.4	*461.2	*409.6	*160.8	*209.4	*203.4
Education	*721.6	*693.4	*435.4	*554.4	*383.0	*454.2	*585.8	*412.6	*572.2	*391.6
Occupation	*570.6	*617.6	*502.6	*525.0	*504.6	*411.8	*558.0	*420.2	*538.0	*368.6
Income	*515.6	*513.0	*477.6	*459.2	*470.0	*418.0	278.4	*426.6	*458.2	*345.2

*Relationship exists when Chi-cal > Chi-tab at p value = 0.01

DISCUSSION

Many respondents ate ≥3 meals /day. This result was similar to Naja et al.[8] and could mean that the respondents were food secured. Frequent eating can be an upshot to eating little and nibbling which can compensate for nutrient deficiencies/excesses, shift food consumption earlier in the day and increase the amount of carbohydrate relative to fat as reported by Kirk and Cursiter, [9]. Increased meal frequency had beneficial reduction in various blood markers of health (LDL, TCHO and insulin), and nutritional status even when confounding factors like BMI, cigarette smoking, physical activity and dietary intake were taken into account [10, 11]. The respondents that had 1-2 meals per day may be at risk of overweight as reported by Garg, Rajesh and Kuma [12] found more meal skippers to be overweight. Many of the respondents did not consume between meals may be because of fear of weight gain. Bellisle[11]reported that eating between meals helps people with little appetite to eat enough, provides regular food for the muscles of physically active people, prevents the discomfort experienced after consuming large meals, spread nutrients absorption evenly throughout the day, as well as help people control their caloric intake effectively. Many respondents cooked their meal from scratch, ate food prepared by other people less frequently and consumed home meals > 3 times/week, so can easily conform to nutrition recommendation. This was inconstant with the report of Alkerwi, Crichton, Herbert & James [13]. When age, sex, socioeconomic status and lifestyle factors were controlled, daily consumption of ready-made foods was associated with higher energy intake and poor compliance with nutritional recommendations [13]. Increased consumption of ready-made foods will also imply consumption of large amounts of sodium added

to foods by the food industry and restaurants. The number that consumed fast foods was higher than that reported by Naja et al. [8] but lower than those in Awosan et al. [14]. Too many meals away from home is associated with risk of overweight/obesity [13]. People who ate fast foods more often consumed more calories, fat, soft drinks, less milk, fewer fruits and vegetables and have high body weight and fat [15].

The main reasons for eating-out by the study respondents in descending order were ceremonies, busy schedule, and far from home (Table 3.2). This is in consonance with [11] which elaborated that reasons for eating out are complex and involve a combination of cultural, social, religious, practical and personal influence. More than half of the respondents took food supplements ≥ twice a week. Bender, Levy, Schacker and Yettey[16] reported a slight decrease of supplement use among adults but more intense among individuals with health problems and those who perceived their health as very good, implying that supplement usage is behavior linked and can be changed. Although Stratton, Green and Elu[17] underscored the benefits of supplement use on patients with low BMI, some dietary supplements may have side effects, interact with diabetes treatment or increase the risk of kidney problems [18]. Many respondents read and understand nutrition fact. This was consistent with Levy and Fein [19]. This knowledge will allow for more effective use of dietary guidance and informed choices. Lando and Lo [20] reported significant influence of nutrition labeling on consumer purchasing behavior and informed choices. The number that was undecided on weight loss was lower than that reported by Unyime et al. [21]. Those that desired weight reduction may be those that were overweight or obese and knew that excess weight is

detrimental in T2D. Loss of weight in overweight diabetics decreases the risk of diabetes complications [22], and has a beneficial effect on insulin resistance, blood pressure, TG, LDL and HDL levels [23].Weight loss (>3% body weight) yields greater reduction in risk factors for diabetes [24], readmission [25], and overweight people were more likely to be diabetic [26]. Rolfes et al. [27] reported a relationship between excessive weight and some form of cancers. Bouchard et al. [28] recommended that diabetic patients with normal weight should choose foods from starches, vegetables, fruits, and protein, while limiting the number of fats daily. Almost half of the respondents claimed that they consume adequate diet, this could mean better health outcome. The beneficial effect of adequate diet is well documented [26].

The respondents' that consumed vegetables was higher than those reported by Awosan et al. [14]. Vegetables contained large amounts of micronutrients, phytochemicals, antioxidants and dietary fiber and have been associated with reduced risk of many diseases [27]. Increasing dietary fiber in the diet of T2DM patients is beneficial as a management strategy [29]. The frequency of consumption of cruciferous vegetables by the respondents was minimal. Cruciferous vegetables have been linked to many health benefits and are called cancer killers [30]. Many respondents consumed fruits more frequently than those in Awosan et al. [14]. Higher intakes of fruits and vegetables were associated with improved blood glucose control and lower risk of developing T2D [31]. Turker et al. [32] had highlighted the benefits of fruits and vegetables. Mohammad [26] have associated orange-yellow fruits and vegetables with optimum health, lower blood pressure, lower LDL, decreased risk of T2D, reduced weight gain, prevention of malnutrition and various chronic diseases. Recently they have been shown to make people happy [33].

Most respondents consumed meat higher than those in Naja et al. [8]. Quintana et al. [34] linked the increased risk of cardiovascular diseases, DM, obesity, cognitive decline, cancer and mortality on daily consumption of red meat (1-2 servings/day). Hu et al. [35] reported that substituting whole grains, nuts, low- fat, dairy, fish and poultry (listed in order of effectiveness) for meat substantially lowered diabetes risk. More respondents consumed fatty meat, chicken skin or visible fat on meat less than once per week. Poultry without skin has less saturated fat and cholesterol and can, therefore, reduce the risk for heart disease [36]. High-fat diets hinders insulin action while low-fat diets, reduce meats, high-fat dairy products, and oils and increase grains, legumes, fruits, and vegetables

enhances insulin performance [37]. Many respondents consumed whole egg 1-2 times weekly. Weggemans, Zock, and Katan[38] suggested a positive association between higher egg intake and elevated blood glucose, increased risk of T2DM or CVD, egg is a major source of cholesterol but also a very good source of protein and healthy fats. The respondents' consumption of egg will not constitute health hazard since it has been established that moderate egg intake shows no adverse effect on risk of T2DM in middle-aged and older men [39]. Many respondents ate fish more than 2 times per week. Fish oils and fish are very effective in reducing CHD risk [40] and T2DM [36]; the higher the dose, the greater the effect [41]. The respondents preference of poultry/fish over red meat/pork/fried could mean better management of diabetes as fish are high in healthy fats/oils containing Alpha lipoic acid (ALA) that have healing effects on neuropathy and can control insulin resistance [36, 27]. The respondents that consumed smoked meat/fish and barbecued foods were less than those reported in Awosan et al. [14]. Changes in the cooking methods have been demonstrated to reduce the risk of T2D and dry cooking can produce advanced glycation end-products (AGES) whose higher levels have been linked to insulin resistance, stress on the body cells and inflammation [41]. Evidence suggests that cooking meat, poultry, and fish at high temperature causes carcinogens to form on food surfaces [42]. Respondents that consumed dairy products especially skim will have calcium and some vitamins in addition to proteins intakes. Forouhi [43] revealed that dairy products have a protective effect on T2DM whereas alcohol/margarine are associated with greater risk.

The respondents that consumed whole grains were higher than those that consumed refined grains in Naja et al. [8]. This may be because of cultural differences. Consumption of whole grains/legumes was associated with improves glycemic control, reduced glycosylated hemoglobin, blood pressure, heart rate, risk of CHD, better levels of cardio-metabolic risk factors, lower risks of DM [44]. Increased consumption of refined grains increases the risk of DM [35]. The high percentage that consumed desserts was worrisome as desserts contain a lot of sugar. More than half of the study respondents consumed baked foods less than once per week. This will mean reduced intake of salts, saturated fats and trans-fats as baked foods are known to contain surplus amounts of these substances that can increase the risk of chronic diseases. There is evidence that low saturated fat diet will improve glycemic control and reduce cardiovascular risk factors in patients with diabetes T2D [45]. More respondents took sweet 1to 3times/week. This may mean inadequate information on diabetes management or

poor compliance to dietary counseling. Diets rich in candy were associated with bone losses and increased odds of T2D [8].

More respondents consumed sweet drinks than those reported in Awosan et al. [14]. Although sugar-sweetened beverages (SSB) have been associated with weight gain and increased risk of DM [46], diabetics should not avoid sweetened drinks but they should espouse the quantity and frequency with their other dietary intakes and activities. The high percentage that consumed coffee could be because of the proliferation of supplements with herbal coffee and teas as coffee is not an indigenous drink in the study area. Diets containing caffeine have been associated with bone losses [32, 47].

More respondents consumed soups, broths and sauce ≤ once/week. The type of soups consumed matters. Indigenous soups with more vegetables and less fat is beneficial to health than western soups made of more salt, oil, and fats. The seldom use of table salt by an appreciable proportion could be because they were aware of the negative effect of added salt to health. Increasing dietary salts intakes are associated with increased blood pressure [48] and bone losses [48-50]. The consumption of non-hydrogenated vegetable oils by more respondents could be that they were informed on the beneficial effect of non-hydrogenated vegetable oils since hydrogenation changes the liquid vegetable oil to solid cholesterol-raising saturated trans-fats. Increased consumption of saturated fats/trans-fat increases LDL, TG, and TCHOL to HDL ratio, lower HDL levels, and cause endothelial dysfunction [50-51].

The eating habits and dietary practices of the respondents were related to the socio-demographic and economic characteristics selected. Yusuke [52] reported relationship between socioeconomic characteristics and nutritional status of subjects.

CONCLUSION
Although an appreciable proportion of the diabetics could make informed choices and conform to some dietary guidelines for adequate nutrition, the proportion that had poor eating habits and practices were considerably significant and related to their socio-demographic and economic characteristics.

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