## Original Article

# Knowledge, Attitudes and Practices of Dietary Modification among Diabetic Patients: A Descriptive Cross-sectional Study at Ejisu-Juaben Municipality, Ghana

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## Abstract

Adequate knowledge, attitude, and practices are effective in providing baseline preventive measures in diabetes. This study determined the knowledge, attitude and practices of diabetic patients towards dietary modification. This descriptive cross-sectional study was conducted at Ejisu-Juaben municipality, Ghana. A structured questionnaire was used to obtain information such as socio-demographic and knowledge, attitude and practices of diabetic patients towards dietary modification. In all, 200 diabetic participants were recruited. The majority of the participants (84.0%) were between the ages 40-60 years. Ninety-two (46.0%) of the participants correctly identified dietary modification as a way of adjusting to healthy eating practices. Forty percent (40.0%) of the participants knew that adjusting to dietary modification help maintain blood sugar to a near normal. Most of the participants (43.0%) knew that non-compliance to dietary modifications can increase blood sugar level. Eighty six (86.0%) of the patients knew that dietary modification could help control their diabetic complications. Most (89.0%) of the participants sometimes adhere to dietary modifications, 11.0% regularly adhere while 10.0% do not adhere to dietary modifications. Diabetic patients had adequate knowledge about their disease conditions but had poor attitude and practice towards dietary modifications. Frequent public health and hospital-based education on adjusting to dietary modifications is required.

### Keywords:
**Attitude; Diabetic Mellitus; Dietary Modification; Knowledge; Practices**

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## Introduction

Diabetes Mellitus (DM) is a chronic disease associated with high rate of morbidity and mortality in both high and low and middle-income countries (American Diabetic Association, 2014). It affects people worldwide and poses a major public health and socioeconomic challenges (Iinternational Diabets Fedearation, [IDF], 2012). This disorder was previously thought to be rare or undocumented in Africa but over the past few decades it has emerged as an important non-communicable disease in Sub-Saharan Africa (Motala, Omar, & Pirie, 2003). Increasing age, sedentary lifestyle, rapid growing of urban culture and modified diets are predicted to triple the global prevalence of Diabetes Mellitus by the next 25 years (Mbanya & Sobngwi, 2003). Studies have shown that increasing patient knowledge regarding Diabetes Mellitus and its complications have significant benefits related to patient compliance to treatment and reduction of complications (Sorganvi, Devarmani, Angadi, & Udgiri, 2013).

Several interventions are available to manage and control diabetes and prevent the development of complications. Some of the interventions include insulin therapy, drug, dietary modification and physical exercise which is intended to slow down the progress of diabetes (Bello, Owusu-Boakye, Adegoke, & Adjei, 2011; Sobngwi et al., 2012). Since dietary modification plays an integral part of the management of diabetes, persons living with diabetes often need personal guidance in order to enrich their knowledge and aid suitable selection of foods and intake of healthy diet (Hernández-Ronquillo, Téllez-Zenteno, Garduño-Espinosa, & González-Acevez, 2003). In Ghana, there has been a rise from 0.2% to 6.0% in the prevalence of DM (Aikins, Owusu-Dabo, & Agyemang, 2013). Various factors such as inappropriate dietary habits, urbanization, and lifestyle changes such as smoking and alcoholism, have been implicated in this condition (Aikins, 2005). Cultural influences are known to affect people's ability to comply with healthy lifestyle modifications and pharmacological interventions when affected with diabetes. Despite the use of pharmacological interventions in the treatment of patients with diabetes in Ejisu and Juaben hospitals, available data indicate that there are no significant improvements in patients' fasting blood glucose (FBG) levels. This poses a great challenge to healthcare providers. Despite the effort made by health providers in educating patients on dietary modification, prevalence and adverse complications of diabetes are still increasing at faster rates in Ghana (Danquah et al., 2012).

There are quite high numbers of research studies on the prevalence of diabetes, knowledge of risk factors associated with diabetes, and diabetic complications in the Ghanaian setting. However, studies on the knowledge, attitude and practice of dietary modification among diabetics are rare to find in the existing literature. Therefore, the study aimed at establishing the knowledge, attitude and practice of dietary modification among patients living with diabetes.

## Design and Methods
## Study Design

The quantitative research approach was used to assess diabetic patients' level of knowledge, attitude and practice of dietary modification and adjustment. A cross-sectional descriptive study design was specifically used to study the knowledge, attitude and practice of dietary modification among diabetic patients in two-selected hospitals at the Ejisu-Juaben municipality.

## Study Setting

The Ejisu-Juaben Municipality is one of the 30 administrative and political districts in the Ashanti Region of Ghana. The Municipality stretches over an area of 637.2 km2 constituting about 10% of the entire Ashanti Region, and it has Ejisu as its capital. The hospitals (Ejisu Government Hospital and Juaben Government Hospital) have a total bed capacity of about 70 beds and twenty-four (24) departments. The following services were available on a 24-hour basis during the period of study: out-patients' department, pharmacy, surgery, in-patient services, mortuary, emergency, and laboratory. The following services were also available but not on a 24 hour basis: ultrasound scan, Prevention of Mother to Child Transmission (PMTCT), Voluntary Counselling and Testing (VCT), Anti-Retroviral Treatment Services, Eye, Reproductive and Child Health, Urology/Obstetrics and Gynaecology (outreach clinics once per week). Both hospitals run weekly diabetic clinics and currently manage an estimated number of 250 patients from nearby communities.

## Study Population

In this study, patients who were living with Type I and II Diabetes and accessed follow-up care services at the diabetic clinics in both hospitals during the study period were the target population. Convenience sampling techniques were used to recruit 200 diabetic patients attending the diabetic clinic during the study period. The hospitals have a total of 250 patients attending the clinic and using a confidence interval of 95% and a margin of error of 3.5%, 190 patients were to be selected for the study. However, the researchers recruited 200 patients for the study to make the results obtained more statistically significant.

## Subject Selection

All diabetic patients, attending the diabetic clinic within the period of October, 2014 to March, 2015 were eligible to participate in the study. The eligible respondents were recruited in order of their follow-up appointments. The selection of the hospitals for the study was done based on the services provided and the frequency of diabetes cases per month. Health-care institutions available in Ejisu-Juaben municipality were grouped into public and private. Of these, only the two selected hospitals met the inclusion criteria of running a diabetic clinic and therefore were chosen for the study. Out of the 200 participants, most of them were recruited from Ejisu (53.0%) and Juaben (47.0%).

## Data Collection Tool

Questionnaires were administered to obtain information from all study respondents. These questionnaires were administered personally to the diabetic patients during their visit to the diabetic clinic. The questionnaire was divided into three sections and had open and close-ended questions. Section A involved questions that elicited information on socio-demographic variables such as age, occupation, marital status, economic income, levels of education, ethnicity, family type and religion. Section B included questions on the knowledge diabetic patients have on dietary modification and adjustment. Section C was focused on items that elicited information on the attitude and practices of dietary modification among diabetic patients. All questions were in English language but were interpreted to the understanding of participants in the local language where needed.

## Ethical Consideration

Approval for this study was obtained from the committee on Human Research, Publication and Ethics of the School of Medical Sciences (SMS), Kwame Nkrumah University of Science and Technology (KNUST) (Ref-CHRPE/RC/157/13). Permission was also obtained from the Municipal Health Directorate office at Ejisu. Verbal consent was sought from respondents before collecting the data. Names and addresses of respondents were omitted from the questionnaires to ensure anonymity. The respondents were assured that the information gathered was to be used strictly for research and academic purposes. In addition, the respondents were given the freedom to opt out at any time during the study when they thought they could not continue to participate in the research.

## Data Management and Analysis

Participants were said to have 'adequate' knowledge of dietary modification if they responded to correct answers about definition, importance and consequences of non-compliance to dietary change. The attitude towards dietary modification was assessed based on correct responses to questions pertaining to frequency of adherence to dietary modification, believing dietary modification can affect Diabetes control, daily lifestyle and health status. Data were entered and the analysis was conducted using statistical package for social science (SPSS) version 20. Data were described and presented as frequencies and percentages.

## Results

The study constituted 200 diabetic patients. Table 1 presented below shows the frequency distributions of the socio-demographic characteristics of respondents. Frequency distribution of diabetic-related characteristics, knowledge about dietary modification and knowledge of diabetes control and their sources are presented in Tables 2, 3 and 4 respectively Table 5 depicts the distribution of responses to attitude towards dietary modification.

Out of a total of 200 participants, majority 84 (84.0%) were between the ages 40-60 years. There were more females (78.0%) than male (22.0%) participants. Most of the participants (49.0%) were self-employed while few (16%) were government employed.

Higher proportions (52.0%) were low income earners while 10.0% were high income earners. Most had no formal education (49.0%). Akans (86.0%) were the highest in number in terms of ethnic group followed by Ga-Adangbe (11%). Christians were in the majority (91.0%) followed by Moslems (7%). Information on the socio-demographic data is presented in Table 1.

**Table 1: Socio-demographic characteristics**

| Variables | Frequency (n) | Percentage (%) |
|---|---|---|
| **Age group** | | |
| 20-40 years | 20 | 10% |
| 40-60 years | 168 | 84% |
| 60 and above | 12 | 6% |
| **Gender** | | |
| Male | 44 | 22% |
| Female | 156 | 78% |
| **Occupation** | | |
| None | 70 | 35% |
| Government | 32 | 16% |
| Self employed | 98 | 49% |
| **Marital Status** | | |
| Single | 74 | 37% |
| Married | 120 | 60% |
| Divorced | 60 | 3% |
| **Socio economic income (GHS)** | | |
| <500 | 104 | 52% |

| | | |
|---|---|---|
| 500-1000 (middle) | 76 | 38% |
| >1000 (high) | 20 | 10% |
| **Highest level of education** | | |
| None | 98 | 49% |
| Primary | 40 | 20% |
| Secondary | 22 | 11% |
| Tertiary | 40 | 20% |
| **Ethnicity** | | |
| Akan | 172 | 86% |
| Ga-Adangbe | 22 | 11% |
| Mole- dagbani | 4 | 2% |
| Ewe | 2 | 1% |
| **Religion** | | |
| Christianity | 182 | 91% |
| Islam | 140 | 7% |
| Others | 4 | 2% |

Most of the participants (41.0%) had between 3-4years of living with diabetes followed by 1-2 years (32.0%), 5 years and more (21.0%) and less than 1 year (6.0%). A higher proportion had fasting blood glucose (FBG) level between 7-10.9 mmol/l (52.0%) while 18.0% reported with levels of 11.0 mmol/l and above [Table 2].

**Table 2: Diabetics- related characteristics of participants**

| Variables | Frequency | Percentage |
|---|---|---|
| **Duration of Diabetes (years)** | | |
| < 1 | 12 | 6% |
| 1-2 | 64 | 32% |
| 3-4 | 82 | 41% |
| 5 and above | 42 | 21% |
| **FBS status (mmol/l)** | | |
| 4.0-6.9 | 60 | 30% |
| 7.0-10.9 | 104 | 52% |
| 11.0 and above | 36 | 18% |

Most of the participants (46.0%) knew the meaning of dietary modification as 'a way of adjusting to healthy eating practice". Forty percent (40.0%) knew it as a healthy eating habit while 6% did not know. A high proportion (40.0%) of the participants knew that adjusting to dietary modification helps maintain blood sugar to a near normal as possible. Thirty four percent (34.0%) knew that dietary modifications help to reduce the short term complications of diabetes, 14.0% knew that it provides knowledge on healthy eating, 11.0% knew it has no importance while 1.0% were ignorant of it. Most of the participants (43.0%) knew that non-compliance to dietary modifications can cause a persistent increase in blood sugar, 21.0% knew it can result in sudden death, 20% knew it can result in obesity, 12% knew it can result in hypertension and 4.0% did not know about the effects of non-compliance to dietary modification [Table 3].

**Table 3** Respondents' knowledge about dietary modification

| Variable | Frequency (n) | Percentage (%) |
|---|---|---|
| **What do you understand by dietary modification?** | | |
| Adjusting to healthy eating practice | 92 | 46.0% |
| Healthy eating habit | 80 | 40.0% |
| Changing patient's diet | 12 | 6.0% |
| Don't know | 12 | 6.0% |
| Eating separately from other members of the family | 4 | 2.0% |
| **What are the importance of dietary modification to your condition?** | | |
| Don't know | 2 | 1.0% |
| Has no importance | 22 | 11.0% |
| Provides knowledge of healthy eating | 28 | 14.0% |
| Reduces the short term complications of diabetes | 68 | 34.0% |
| Maintains blood sugar to as near normal as possible | 80 | 40.0% |
| **What do you think are some of the consequences of non-compliance to dietary change?** | | |
| Don't know | 8 | 4.0% |
| Hypertension | 24 | 12.0% |
| Obesity | 40 | 20.0% |
| Sudden death | 42 | 21.0% |
| Persistent increase in blood sugar | 86 | 43.0% |

Eighty six percent (86.0%) of the patients knew that dietary modification could help control their diabetes status while 14.0% were not aware of it. Out of 86.0% of the participants who were aware of dietary modification, most (81.0%) of them heard it from the hospital while 19.0% heard it from the media. The common restricted diet known among the participants were sugar intake (19.0%), alcoholic beverage intake (19.0%), soft drinks (19.0%), saturated fat and meat (15.0%), and carbohydrate foods (12.0%). The majority (78.0%) of the participants report to the doctor as a result of non-compliance to dietary modification, 12.0% report to family members while 10.0% do not report to anyone [Table 4].

**Table 4** Response to knowledge on diabetes control and their sources

| Variables | Frequency (n) | Percentages (%) |
|---|---|---|
| **Can dietary modification help control diabetes?** | | |
| Yes | 172 | 86.0% |
| No | 28 | 14.0% |
| **If yes, where did you hear the information?** | | |
| Hospital | 162 | 81.0% |
| Media | 38 | 19.0% |
| Family member | | - |
| Herbalist | | - |
| **What are some of the diet that you have been told to eat** | | |
| **in moderation?** | | |
| Excessive salt intake | 8 | 4.0% |
| Others | 12 | 6.0% |
| Carbohydrate food | 24 | 12.0% |
| Saturated fat and meat | 30 | 15.0% |
| Sugary foods intake | 38 | 19.0% |
| Alcohol | 38 | 19.0% |
| Soft drinks | 38 | 19.0% |
| **What immediate action did you take if you were unable** | | |
| **to comply with dietary changes?** | | |
| Report to doctor | 156 | 78% |
| Report to family members | 24 | 12% |
| Report to anyone | 20 | 10% |

Eighty nine percent (89.0%) of the participants sometimes adhere to dietary modification, 11.0% regularly adhere while 10.0% do not adhere to dietary modification. A higher percentage (88.0%) agreed that adherence to dietary modification could control their diabetic condition while 12.0% disagree. Out of those who agreed, the majority of the participants (52.0%) knew that dietary modification can control diabetes by reducing high blood sugar levels. The majority (62.0%) of the participants agreed that dietary modification had affected their daily life while 38.0% disagreed. The common challenge among the participants was that dietary modification increases their financial demands (73.0%), making them take meals separately from their family members (13.0%), preventing them from eating their favorite foods (8.0%), and avoiding the eating of meals outside home (4.0%) while 38.0% disagreed. Seventy six percent (76.0%) responded that dietary modification had affected their lives positively while 24.0% responded that it had affected them negatively. The majority (62.0%) of the participants felt that modifying their diet was challenging, whilst 26.0% felt that it was good modifying their diet, and 12.0% felt it was bad. Eighty-eight percent (88.0%) agreed that there are instances where they fail to adhere to dietary modifications. The most common reasons stated included festive occasions (57.0%), when favorite foods are cooked (17.0%), when not feeling well (11.0%), during church meetings (9.0%) and periods of fasting (6.0%) [Table 5].

**Table 5: Attitude of Diabetic Patients towards Dietary Modification**

| Attitude | Frequency | Percentage |
|---|---|---|
| **How often do you adhere to the dietary modification?** | | |
| Regularly | 22 | 11% |
| Sometimes | 178 | 89% |
| Do not adhere | 10 | 10% |
| **Do you believe that dietary modification can control your diabetes?** | | |
| Yes | 176 | 88% |
| No | 24 | 12% |
| **If yes, how?** | | |
| Reduces body weight | 72 | 36% |
| Reduces blood sugar level | 104 | 52% |
| Reduces frequent urination | 4 | 2% |
| Reduces acute complication e.g. diabetes foot | 10 | 5% |
| Others | 36 | 18% |
| **Has dietary modification affected your daily lifestyle?** | | |
| Yes | 124 | 62% |

| | | |
|---|---|---|
| No | 76 | 38% |
| **If yes, how?** | | |
| Affected my financial demands | 146 | 73% |
| Made me avoid eating outside home | 14 | 7% |
| Made me eat separately from my family | 26 | 13% |
| Made me not eat my favorite food | 16 | 8% |
| **How has dietary modification affected your health status?** | | |
| Positive | 152 | 76% |
| Negative | 48 | 24% |
| **How do you feel modifying your diet?** | | |
| Good | 52 | 26% |
| Challenging | 124 | 62% |
| Bad | 24 | 12% |
| **Are there instances when you cannot adhere to dietary modification?** | | |
| Yes | 176 | 88% |
| No | 24 | 12% |
| **If Yes, when?** | | |
| During festive occasions | 114 | 57% |
| During fasting periods | 12 | 6% |

*Values are presented as proportion of positive response to each option*
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## Discussions

Despite numerous medicinal interventions, diabetes continues to increase across the globe accompanying serious health issues (McMichael, 2000). Lifestyle modifications have shown to improve diabetic status of patients when they strictly adhere or comply with the specific interventions (Tuomilehto et al., 2001). Previous studies have mostly considered other aspects of lifestyle modification such as regular exercise, avoiding smoking and intake of alcoholic beverages as a way of managing diabetes (Wing et al., 2001). However, dietary modification is a major component of diabetes care which has not been given much attention. This study for the first time assessed the knowledge of diabetic patients towards dietary modifications in the Ejisu-Juaben Municipality, Ghana.

The first aspect of the assessment was to understand their general concept and meaning of dietary modifications. It was observed that ninety-two) (46%) correctly knew the meaning of dietary modification. Again, the participants gave several opinions on the importance of dietary modification. A considerable proportion (40.0%) of them knew that adjusting to dietary modifications help maintain blood sugar to a near normal as possible. Others knew that it helps reduce the short term complications of diabetes (34.0%), provide knowledge on healthy eating (14.0%) while very few (1.0%) did not know. This presupposes that participants knew that strict adherence to dietary modifications could reduce their high blood glucose levels. This study also showed a higher proportion of the participants as being knowledgeable of the consequences of non-compliance to dietary modifications. The most common reason was that it could lead to persistent increase in blood pressure (43.0%).

Dietary modification was essential in controlling diabetes, and 86.0% agreed that dietary modification could control their diabetic conditions. Based on the above knowledge of patients living with diabetes, we assessed their attitude and practice towards dietary modifications. A large proportion (89.0%) of the participants sometime adhere to dietary modifications, 11.0% regularly adhere while 10.0% did not adhere to dietary modification. It can be deduced from the study evidence that higher proportions of the participants adhered poorly to dietary modifications despite their adequate knowledge on the dietary modifications. Several studies have also reported poor adherence of diabetic patients towards dietary practice. In a recent study by Worku, Abebe, and Mesele (2015), the overall occurrence of poor dietary practice among Type II diabetic patients at Yekatit 12 Medical College Hospital was found to be 51.4%. A study conducted on the assessment of dietary practice among diabetic patients in the United Arab Emirates and Riyadh, Saudi Arabia also indicated inadequate dietary practice (Mohamed, Almajwal, Saeed, & Bani, 2013). Another study conducted on compliance and control of diabetes in a family practice setting in Saudi Arabia has indicated that there was a 60% poor diet compliance which is higher than the finding of the present study. These low proportions compared with 89.0% in this study show that poor compliance is high. However, the proportion of participants in this study

(11.0%) who had regular adherence practice is small compared to evidence from a study by Addisu, Eshete, and Hailu (2014) who indicated that 49.7% had regular dietary adjustment intake. These disparities could be explained by the differences in socioeconomic status, study settings, and the types of foods available in the different countries of study (Khattab, Aboifotouh, Khan, Humaidi., & Al-Kaldi, 1999). Other reasons include, but not limited to, culture, personal food choices, the unavailability of food guide prepared for diabetic patients in the country and lack of detailed understanding of the food-disease association (Worku et al., 2015).

It was observed that more than fifty percent (50%) of the participants had challenges regarding adherence to dietary modifications. The most common challenges were related to financial demands. Seventy three percent (73%) agreed that dietary modification had affected their daily lives by increasing financial demands. This result is in agreement with the finding that most of the study subjects had low economic income and that could have attributed to the low dietary practice among the participants in this study. Reports by Addisu et al. (2014) observed that patients with middle income status had better diabetes self-practice compared with those with low incomes. Participants may have thought of the high cost of food associated with compliance to dietary changes hence the high proportion of poor dietary practice. Other reasons were that dietary changes make them take meals separately from their family members (13.0%), prevent them from eating their favorite foods (8.0%), make them avoid eating meals outside of home (4.0%) while 38.0% disagreed with the need for dietary changes. Again, the challenge associated with socioeconomic status could have explained these differences. In another study, patients living with Type II diabetes who never received diabetic nutritional education, had less access to fruits and vegetables and thought of cost of foods had poor dietary practice (Worku et al., 2015). This evidence suggests that patients need nutritional education for optimal management of their condition regardless of other factors. Another significant finding of this study was that almost 90.0% of the participants found it difficult to adhere to dietary changes due to festive occasions and preference for certain kinds of foods.

## Study Limitation

Although this study's findings are comparable to evidence from previous studies, it had some limitations. This study may not show conclusive findings on the knowledge of diabetic patients towards dietary modification due to the small sample size. Moreover, the use of a self-reported instrument on dietary practice may have introduced social desirability bias. There is therefore the need to use a validated dietary practice scale to better understand the dietary behaviour of patients.

## Implications

This study has implications on nursing practice and research. The study evidence shows that though the majority of the participants knew that adjusting to dietary modification helps maintain blood sugar to a near normal level as possible and control their diabetic complications, quite a significant number did not adhere to the dietary modifications at all, with most of them adhering and just a few regularly adhering to dietary modifications. Nurses are in the best position to educate clients on their health issues and encourage them to adhere to their treatment modalities and dietary modifications at the facility and community level. Nurses also need to update their knowledge and skill-base in diabetes through continuous profes-sional development programmes in order to assist their clients appropriately. Researchers are encouraged to engage in qualitative, interventional and longitudinal studies into why clients living with diabetes are not regularly adhering to their dietary modifications. This study's evidence serves as baseline for directing future studies in Ghana.

## Conclusion

Based on the study's findings, we conclude that, although the knowledge of people living with diabetes on dietary modification was good, the practice of dietary modification was lower than desirable. Therefore, there is the need for structured programmes to improve the practice of dietary modifications among patients.

## Conflict of Interest

The authors declare that there is no conflict of interest.

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