



THE UNIVERSITY OF THE WEST INDIES
AT ST. AUGUSTINE, TRINIDAD AND TOBAGO

A Research Paper
Submitted in partial requirements
for HUEC 3012
of
The University of the West Indies

Title: The Impact of Nutrition Counseling on the Knowledge, Attitudes and Practices of the Diabetic Clients Attending the San Rafael Health Centre

Student Name: Josanne Aguilal

Project Supervisor: Dr. Marquitta Webb

Year Submitted: 2012

Department of Agricultural Economics & Extension
Faculty of Food and Agricultural

**THE IMPACT OF NUTRITION
COUNSELING ON THE KNOWLEDGE,
ATTITUDES AND PRACTICES
OF THE DIABETIC CLIENTS ATTENDING
THE SAN RAFAEL HEALTH CENTRE**

A Research Paper

Submitted in Partial Requirements for HUEC 3012

Of

The University of the West Indies

Josanne Aguilal

I.D. #: 810000133

PROGRAM: HUMAN NUTRITION AND DIETETICS

SUPERVISOR: DR. MARQUITTA WEBB

ACKNOWLEDGEMENTS

Thanks to Our Father and Creator Almighty God who carried me when I was too burdened with problems at school and at home and had to meet deadlines. Lord, you gave me the inspiration and strength to pursue and endure to the end.

My deepest gratitude goes to my supervisor, Dr. Marquitta Webb, who provided guidance throughout this study. Thank you to Dr. George Legall for all your statistical support and who was always willing to answer queries.

Thank you to Mr. Lendell Narine, for all the SPSS classes.

Thank you to the Chief Executive Officer of Medical Research for permission to carry out the study in selected Health Center.

Thank you to all the members of Staff at the San Rafael Health Center, with a special mention to the Head Nurse – Roseann Aguilal, who provided me with support and encouragement above and beyond the call of duty.

Finally, to my family, thank you for all your support and belief in me.

TABLE OF CONTENTS

	Page
Acknowledgements.....	ii
Abstract.....	vii
CHAPTER I - Introduction.....	1-5
• Problem Statement.....	1-3
• Purpose of the Study.....	3
• Objectives of the Study.....	3
• Research Hypotheses.....	3
• Rationale.....	4
• Scope.....	4
• Key Terms.....	4-5
CHAPTER II - Literature Review.....	6-13
• Diabetes and Nutritional Knowledge.....	7-8
• Diabetes and Nutritional Attitudes.....	8-9
• Diabetes and Nutritional Practices.....	9-10
• Medical Nutrition Therapy.....	10-12
• Theoretical Framework.....	12-13
CHAPTER III - Methodology.....	14-16
• Research Design.....	14
• The Setting and the Population.....	14-15
• Intervention.....	15
• Instrument.....	15
• Ethical Issues.....	16
• Statistical Analysis.....	16
CHAPTER IV - Results.....	17-30

CHAPTER V - Discussion.....	31-33
CHAPTER VI – Conclusions, Limitation and Recommendations.....	34-35
• Conclusions.....	34
• Limitations	34
• Recommendations.....	35
REFERENCES	36-38
APPENDICES	39-49
Appendix A: Caribbean 6 Good Groups	
Appendix B: Blank Diet Plan	
Appendix C: Copy of Participant’s Consent Form	
Appendix D: Nutrition Counseling Questionnaire	
Appendix E: Copy of Approval Letter	

LIST OF TABLES

	<u>Page</u>
Table 1 : Frequency and Percentage for Demographic Variables within the Sample Group	18
Table 2 : Frequency and Percentage concerning counseling within the Sample Group	19
Table 3 : Relationship between Receiving counseling and Knowledge, Attitudes and Practice scores	25
Table 4 : Correlation of Dependent Variables	26
Table 5 : Correlation of Dependent Variables	27
Table 6 : Anova of the Independent Variables; Gender, Ethnicity and Education with the Dependent Variable; Knowledge score %	28
Table 7 : Anova of the Independent Variables; Gender, Ethnicity and Education with the Dependent Variable; Attitude score %	29
Table 8 : Anova of the Independent Variables; Gender, Ethnicity and Education with the Dependent Variable; Practice Pre-Post Counseling score %	30

LIST OF FIGURES

	<u>Page</u>
Figure 1 : Percent of Diabetics (n= 122) answering Knowledge questions correctly	21
Figure 2 : Percent of Diabetics (n=122) answering Attitude questions correctly	22
Figure 3 : Percent of Diabetics (n=122) answering Practice questions correctly before Counseling	23
Figure 4 : Percent of Diabetics (n=122) answering Practice questions correctly after Counseling	24

ABSTRACT

Background: The rate of prevalence of the diabetes chronic disease in Trinidad and Tobago is 12-13% higher than the worldwide prevalence. The Diabetes Association of Trinidad and Tobago has stated that one thousand new cases of diabetes are discovered in adults every year and about 150,000 persons are living with diabetes in Trinidad and Tobago.

Purpose: To examine the impact of nutrition counseling in relation to the knowledge, attitudes and practices of diabetic clients attending the San Rafael Health Center Chronic Disease Clinic.

Methodology: A total of 122 (46 males, 76 females) diabetics were selected using purposive sampling. The data collection was carried out using a nutrition counseling questionnaire. The questionnaire had a total of twenty-seven (27) questions (8 knowledge, 5 attitude, 4 practice, 7 demographics and 3 counseling). Data was analyzed using SPSS and the statistical tests performed were chi square, ANOVA and correlation.

Results: Response scores were higher in some cases where counseling was more frequent. There was a positive correlation between receiving nutrition counseling and the knowledge score percent. There was a negative correlation between the attitude score percent and receiving nutrition counseling. There was no significant difference in knowledge scores, with respect to gender (p value 0.128), ethnicity (p value 0.867) and education level (p value 0.491)

Conclusion: The improvement of the knowledge, of beneficial dietary practices is associated with frequency of nutrition counseling.

CHAPTER I

INTRODUCTION

Problem Statement

With the increase in the prevalence of diabetes worldwide, Trinidad and Tobago is no exception. In Trinidad and Tobago, Diabetes Mellitus was increasing in prevalence with self-reported diabetes in the adult population, 35 years and older being 11%, with mortality rates increasing (Pan American Health Organization, 2001). Diabetes Mellitus was ranked second as the leading cause of death in Trinidad and Tobago in 2003, with a total of 1,427 persons, accounting for 14% of the total deaths (Republic of Trinidad and Tobago, Ministry of Health, Annual Statistical Report, 2004-2005).

According to the Diabetes Association of Trinidad and Tobago (DATT), 1000 new cases of diabetes are discovered in adults every year and about 150,000 persons are living with diabetes in Trinidad and Tobago (reference). Additionally, DATT stated that the reason for the increase in persons living with diabetes may be the overall composition of the country, with the most common ethnic groups being African, East Indian and Asian being at a greater risk for diabetes. Further, the high increase of urbanization, more non active lifestyle, and people's poor eating habits may be the reason for the new cases (Trinidad and Tobago Health Services Initiative, 2012).

Moreover, in Trinidad and Tobago, patients with diabetes have high incidences of high blood pressure (73% of cases), mild to severe nervous system damage (60%-70% of cases), and periodontal disease (75% of cases). Additionally, one (1) in four (4) amputations is as a result of diabetes while two (2) out of five (5) persons who died from heart failure are reported to be

diabetic. Erectile dysfunction, another complication of the disease, is found in 74% of men affected with the disease for more than 15 years. Further, type 2 diabetes is the leading cause of kidney failure (45% of new cases in 2010) and blindness (DATF Facts, 2010).

Therefore, by working together, individuals with diabetes and their health care providers can reduce the occurrence of these and other diabetes complications by controlling the levels of blood glucose, blood pressure and blood lipids, and by receiving other preventative care. In order to prevent these complications, diabetes management is imperative. Diabetes management includes pharmacologic therapy and dietary therapy including nutrition counseling. However, this research focused on dietary therapy.

Healthy eating is a cornerstone of any diabetes management plan but it is not just what you eat that affects your blood sugar level. How much you eat and when you eat also matters. Nutrition counseling therapy is an essential part in the treatment of diabetes and it is well recognized as a key part of the disease management in patients who have diabetes (Ziemer, 2003). Dietary adjustments are a crucial part in the management of diabetes. Persons living with diabetes very often need personal guidance, in order to increase their knowledge and thus, influence their choices of suitable foods and eating well balanced meals (Ronquillo, 2003).

Satpute et al. (2009) performed a study to determine whether patient counseling for diabetes patients regarding diet and nutrition can improve glycemic control and concluded that patient adherence to medication and lifestyle modifications plays an important role in diabetes management. Additionally, these researchers concluded that the data provided evidence that a community based patient counseling program can be effective. In this context, this study

investigated how diabetic clients uses the nutrition knowledge they receive to adopt positive attitudes and practices in order to positively manage their diabetes.

Purpose of the Study

The purpose of this study was to examine the impact of nutrition counseling in relation to the knowledge, attitudes and practices of diabetic clients attending the San Rafael Health Center Chronic Disease Clinic.

Objectives of the Study

The objectives of this study were as follows:

1. To relate the impact of the nutrition counseling with respect to the KAP questionnaire, using general statistical tests.
2. To determine the effectiveness of receiving counseling as opposed to not receiving nutrition counseling, using chi square and correlation tests.
3. To assess, using ANOVA tests, if there is significant relationship between selected independent variables and the dependent variables.
4. To make recommendations based on the data collected, to give to the Regional Health Authority.

Research Hypotheses

It was hypothesized that:

1. There will be no association between the nutrition knowledge, attitude and practices of the diabetic clients, with respect to gender, ethnicity and education.
2. Diabetic clients who receive counseling have a greater knowledge base to benefit them, than those clients who do not receive nutrition counseling.

Rationale

Knowing someone who works as a District Health Visitor, in a Health Center in the non urban area of Trinidad, has given an understanding that some diabetic clients, on follow up visits to the chronic disease clinic, are repeatedly out of control, even after having been given dietary counseling and various health education sessions. Upon investigation, it was deduced that some diabetics do not adhere to their dietary regime. This study can be considered relevant, in that the results and findings can contribute to the related literatures surrounding the very broad topic of diabetes. This research, even though small, can provide evidence to the policy makers to take steps in assisting diabetic clients, wherever and whenever the situation arises. Further, This study is timely and necessary given the rise of Diabetes Mellitus, both in Trinidad and Tobago and worldwide.

Scope

The setting for this qualitative study is the San Rafael Health Center in the St. George East County of Trinidad. No patient names are used in order to ensure confidentiality. The goal of the diabetic clinic sessions is towards empowerment and healthy lifestyles. Most diabetics receive counseling from a dietitian and follow up sessions are scheduled to ensure compliance and reinforcement. Sampling was done for six weeks.

Key Terms

- Nutrition counseling - a combination of nutrition expertise and psychological skill delivered by a trained nutrition counselor, who understands how to work within the current setting. It focuses both on foods and the nutrients contained within them, emphasizing dietary change to individual situations and emotions (Snetselaar, 2009).

- Dietary adherence - following the stipulated dietary plan as given by the dietitian. The dietary plan consists of foods from the six food groups (Payne & Hahn, 2002).

CHAPTER II

LITERATURE REVIEW

Diabetes Mellitus is considered a chronic disease which is manifested by an elevated blood glucose level. Diabetes Mellitus is defined by the World Health Organization as a metabolic disorder characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both (Caribbean Health Research Council and Pan American Health Organization, 2006).

According to the International Diabetes Federation, of the entire global adult population, more than 5% have diabetes and in many countries in Asia, the Middle East, Oceania and the Caribbean, diabetes affects up to 20% of the adult population (International Diabetes Foundation, 2009). Further, more than 250 million people worldwide are living with diabetes and the projections show that by 2025, this grand total is expected to rise to over 380 million people (International Diabetes Foundation, 2009).

The Independent Republic of Trinidad and Tobago has not escaped the pandemic of diabetes and is arguably one of the countries which carry the highest rate of disease with complications including heart disease, stroke, blindness, amputations and end stage renal disease, leading to dialysis, and all of these factors can lead to a high rate of mortality and morbidity (reference). The rate of prevalence of the diabetes chronic disease in Trinidad and Tobago is 12-13% higher than the worldwide prevalence (Trinidad and Tobago Health Services Initiative, 2012).

The prevalence of diabetes increases with age and is higher in non white racial and ethnic populations (reference). The publications of results from the Diabetes Control and Complications Trial have pointed to the importance of intensive therapy, including dietary eating pattern

control. Providing appropriate and tailored eating patterns for clients with diabetes can be a challenge. All dietary factors both amount and content must be carefully controlled, yet the diabetic client must be allowed a reasonable selection of foods (Snetselaar, 2009).

Diabetic management is a holistic team effort. Diabetes professionals, physicians, dietitians, nurses and other health care professionals and providers contribute their views and experience to develop therapeutic nutrition plans that allow individuals with diabetes to achieve the best quality of life. The aim of medical nutrition therapy is to provide the diabetic clients with the proper knowledge, skills and motivations to incorporate diabetes nutrition and lifestyle management into their everyday life (Ross, Boucher and O'Connell, 2005).

Diabetes and Nutrition Knowledge

Siddiqui et al. (2010) found that compliance rate was high enough to bring positive changes in the diets of persons living with diabetes, which established a convincing case that patients can improve their diets and therefore counseling can contribute in controlling the diabetic complications rate. Moreover, the research, suggested that better understanding of dietary counseling, could broaden the spectrum of food choices for persons with diabetes and thus promote compliance.

Palaian et al, (2006) conducted a study on hospitalized diabetic patients, in which their goal was to evaluate the results of counseling received by selected hospitalized diabetic patients about their medication, disease and lifestyle modifications, with respect to knowledge, attitudes and practice outcomes. Additionally, in this study, it was reported that the patients were counseled throughout their hospital stay and in order to provide better counseling, Palaian and team, provided them with leaflets and handouts on diabetic lifestyle management. Of the 59 patients

who enrolled in the study, 46 completed (27 controls and 19 tests patients) and it was these 46 that were given the pharmacist follow up visit session, about a month after, in which they evaluated the KAP outcomes (Palaian et al., 2006).

Furthermore, Palaian and team made a point to state in terms of their limitations, that their sample size was very small and that they did not take into account, counseling the diabetics may have received from other sources. The research group concluded that patient counseling by a clinical pharmacist, improved the knowledge outcomes, however this did not help itself to the attitudes and practice responses of the diabetic clients (Palaian et al., 2006).

Diabetes and Nutritional Attitudes

Daly et al. (2009) conducted a study on the attitudes and behaviors of patients with type 2 diabetes. The study stated that physicians are aware that patient self care behaviors influence diabetes control, but that diabetics may lack training and interest to improve their behaviors. Contributing to poor control are the barriers to appropriate care behaviors or the relationship of specific self care behaviors to glycemic control (Dalewitz, Khan & Hershey, 2000).

Daly et al. (2009) developed a patient questionnaire entitled, “Self care behaviors survey for patients with diabetes,” composed of 141 questions. Self care behaviors were classified in 2 ways; percentage of time the patients adhered to medication, meal plan, exercise and glucose testing during the month and the level of satisfaction with each of the preceding domains. A patient had to have both high adherence and high satisfaction with a given behavior to receive a high adherence- satisfaction score. Barriers to diabetes management were assessed for the self care behaviors of taking medication, following a meal plan and exercising regularly. Greater confidence in the ability to follow a meal plan was significantly correlated with lower blood

glucose, as was greater motivation to exercise regularly. The self care behaviors following a meal plan and monitoring blood glucose had the most significant barriers. The researchers concluded that diabetes management requires knowledge and understanding of what to do and when and how to do it. Because of the belief that type 2 diabetes is a very serious disease, those persons with worse control, may have more difficulty in disease management.

Additionally, Maina et al. (2011) researched knowledge, attitude and practice related to diabetes in Kenya, where of the entire sample of 1982 persons, only 28% of respondents agreed with the statements relating to willingness to engage in physical activity, changing eating habits and maintaining a good body weight. A significant 41% of the respondents did not indicate any willingness to adopt these healthier lifestyles.

Diabetes and Nutritional Practices

A study focusing on lifestyle intervention in persons at risk for type 2 diabetes mellitus stated that the increased incidence of type 2 diabetes is largely due to changes in lifestyle factors such as diet and physical activity (Van Dam, 2003). Lifestyle modification in high risk individuals has been proven effective in reducing type 2 diabetes and is more effective than drug treatment (Knowler et al, 2002).

Nilsen, Bakke and Gallefoss (2011) conducted a study which was focused on individual lifestyle counseling by a physician, with emphasis on diet and exercise, which was provided for the individuals involved in the study, at risk for type 2 diabetes. In this study, all the referred individuals were assessed by the same physician in a clinical examination. A thorough conversation about family history of diabetes and heart disease was carried out as well as

tobacco and alcohol consumption assessments. The Smart Diet Score questionnaire was used in this study for food assessment, resulting in a diet score which ranged between 15 and 45 points.

A diet score between 15-29 points is categorized as unhealthy, 30-37 points as somewhat healthy and greater than or equal to 38 points as a healthy diet. Of the 213 participants, 182 completed the study and 173 participants answered the diet questionnaire at the end of the study. More than two third of those who completed the diet questionnaire, had lower education, that is primary and or secondary only. For the individuals with the lower education, their mean diet score was 2 points lower compared to those participants with a higher education level.

Therefore, low education was associated with a poorer diet. In addition, the study confirmed that changes in lifestyles are possible in individuals at risk or presently have type 2 diabetes and this applies to both male and female persons. Furthermore, Escamilla et al. (2008), researched the impact of peer nutrition education on dietary behaviors and health outcomes among Latinos and declared that peer nutrition education had a positive influence on diabetes self management, as well as on the general knowledge and dietary intake behaviors.

In a study conducted by Maina et al. (2011), 59% of the respondents had bad practices in relation to diabetes prevention. There were 75% of the people interviewed with poor dietary practices, 72% did not participate in regular exercise and over 80% did not monitor their body weight. Also, 51% of the respondents with a good knowledge of diabetes had good practices.

Medical Nutrition Therapy

Findings of researchers also indicated that medical nutrition therapy (MNT) is important in preventing diabetes, managing existing diabetes, and preventing, or at least slowing, the rate of development of diabetes complications. It is, therefore, important at all levels of diabetes

prevention. Achieving nutrition-related goals requires a coordinated team effort that includes the person with diabetes and involves him or her in the decision-making process. It is recommended that a registered dietitian, knowledgeable and skilled in MNT, be the team member who plays the leading role in providing nutrition care. It is important that all team members, including physicians and nurses, be knowledgeable about MNT and supports its implementation (Diabetic Care ADA, 2008).

Individuals who have pre-diabetes or diabetes should receive individualized MNT; such therapy is best provided by a registered dietitian familiar with the components of diabetes MNT. Nutrition counseling should be sensitive to the personal needs, willingness to change, and ability to make changes of the individual with pre-diabetes or diabetes (Diabetic Care ADA, 2008).

In Trinidad and Tobago and the rest of the Caribbean, carbohydrate counting is not widely used as much as the Exchange System. According to the exchange system developed for use in the Caribbean, portions are based on calories, presenting substitutions using the Caribbean Food Groups. Based on information gathered, in Trinidad and Tobago, people with diabetes know but do not use internationally popular diet. Patients do, however, associate diabetes with a diet and often ask for a sheet. Persons should be dissuaded from simply using a diet sheet. Rather they should focus of healthy meal planning based on their own individual situation (White & Holdip, 2012).

An individualized meal plan, integrated with oral diabetes medications or insulin is the basis of all therapy for diabetes (reference). Experts avoid the term diet, which may carry negative connotations and they prefer more generally to promote a healthy meal plan and regular physical activity. The meal plan is developed by the process of medical nutrition therapy. This includes

assessment of eating habits and diabetes knowledge, identification and negotiation of nutrition goals, nutrition education and intervention, ongoing monitoring and evaluation of outcomes (Saudek & Loghmani, 2012). For a diabetic, an individualized nutrition meal plan is based on age, type of diabetes, comorbidities, cardiovascular risk factors, patient preferences and cultural and personal circumstances (Franz et al, 2002).

A proper meal plan helps promote a healthy weight, while avoiding hypoglycemia, improve lipid levels, promote healthy blood pressure and provide a good quality of life. Diabetes management also includes an assessment of eating habits and diabetic nutrition knowledge and the attitudes and practices of the clients (Trinidad and Tobago Health Services Initiative, 2012).

The important issues from the literature, which has relevance to this study, are that persons living with diabetes very often need personal guidance and better understanding of dietary counseling. This support could broaden the spectrum of food choices for persons with diabetes and thus promote compliance towards the nutrition counseling they receive.

Theoretical Framework

The hypotheses of the study are grounded in constructs of the Health Belief Model (HBM). The health belief model is based on the value-expectancy theories of social psychology, which predict that behavior is determined by the subjective value attached to an outcome and the perceived likelihood that certain actions will result in that outcome (Maiman & Becker, 1974). The health belief model contains three key elements. The first is the readiness to take action, where the subject estimates susceptibility to and the severity of their particular health problem. Second is the feasibility and efficacy of health behaviors, weighed against costs and barriers to that behavior. Thirdly, involves the internal and external cues that may be needed to motivate

initiation of health behaviors (Wu, 1973). The HBM is frequently used to effect change in individuals who exhibit high risk health behaviour, in this current study, the constructs of the theory are being applied to the behaviour and attitudes of diabetic patients receiving nutritional counseling.

Dietary and nutrition habits must change and new behaviours learned, for success of any long term maintenance therapy for diabetes, as is the case for any chronic illness and changes depends largely on the extent to which the diabetic client's behavior coincides with their clinical prescriptions (Briggs et al., 1975). Haynes (1976) stated that while socio-demographic variables have been found to be a foreseeable entry into the health care system, they have not been predictive of compliance levels once treatment has been initiated. Davis (1967) elaborated this further by adding that the degree and duration of behavioral changes a regimen requires and it interferes with past life patterns, all having exhibited inverse relationships to compliance levels.

Cerkoney and Hart (1980) researched the relationship between the health belief model and how it affects persons with diabetes mellitus. The researchers concluded that compliance to behavior change is likely to be influenced by attitudes, which are amenable to change and that those changes might be facilitated by long-term follow-up care.

CHAPTER III

METHODOLOGY

Research Design

This research is a cross sectional descriptive study, which utilized purposive sampling. Men and women with diabetes mellitus, with or without other diseases and who are or are not receiving nutrition/dietary counseling, were eligible for inclusion in the study. Children, pregnant women and mentally incompetent diabetic clients were excluded from the study. A study sample of only one hundred and twenty-two (122) was obtained, using the following formula:

$$n = \frac{1.96^2 p q}{d^2}$$

p = % of patients who may receive 1 on 1 counseling on a visit.

Estimate 40%

$$p = 1 - p$$

$$d = \text{Precision - margin of error} = 0.05$$

$$n = \frac{1.96^2 (.4) (.6)}{0.0025}$$
$$= 188$$

The Setting and the Population

The study, which ran from September 2012 to November 2012, was conducted at the Chronic Disease Clinic at the San Rafael Health Center. The San Rafael Health Center is located in North Central Trinidad in the St. George East County. The diabetic population at the chronic

disease clinic consists of two hundred and fifty (250) clients. These two hundred and fifty (250) clients are formed into twelve (12) groups and each group has a clinic session every twelve (12) weeks. For this study, one hundred and twenty-two (122) clients were administered questionnaires.

Intervention

The diabetic clinic sessions at the San Rafael Health Center, focuses on pursuing healthy lifestyles through the process of client empowerment and health education. The diabetic clients are provided with nutrition counseling by a registered dietitian and a nutritionist every three months. These dietary counseling sessions instruct the clients by giving them each an individualized diet plan, constructed for them, by the dietitian, incorporating choices from the Caribbean six (6) food group choices. *(See Appendix A for a copy of the Caribbean six (6) food groups, Appendix B for a copy of a blank diet plan and Appendix C for a copy of the participants consent form).*

Instrument

The knowledge, attitudes and practices (KAP) questionnaire administered to the diabetic clients was originally created and successfully pretested. For the pretest, a pilot was carried out in a sample group of five diabetic clients in order to assess the appropriateness of the questionnaire. The questionnaire had a total of twenty-seven (27) questions (8 knowledge, 5 attitudes, 4 practices, 7 demographics and 3 counseling). For the knowledge questions, a correct answer was worth one (1) point and an incorrect answer was worth zero (0) points.

Both the attitude and practice sections were scored using a form of the Likert Scale *(See Appendix D for a copy of the nutrition counseling questionnaire).*

Ethical Issues

In order to conduct this research, permission was obtained from the Chief Executive Officer of Medical Research and also from the Head Nurse in charge of the area. The population sample was informed of the purpose of the study and gave their consent to participate. Confidentiality of the sample participants was maintained throughout the research (*See Appendix E for a copy of the approval letter*).

Statistical Analysis

Data was analyzed using the Statistical Package for Social Sciences, version 17. The overall scores for knowledge, attitude and practice questions had maximum marks of 8, 25 and 4, respectively. Chi-square test was used to relate the effectiveness of nutrition counseling to the KAP questionnaire and two sample t-tests were used to determine the impact of receiving counseling. The level of statistical significance was set at $p < 0.05$

CHAPTER IV

RESULTS

General Statistics

Table 1 shows all the demographic data.

Gender- The sample consisted of one hundred and twenty two (122) diabetics with forty six (46) of them being male, accounting for 37.7% of the respondents and seventy six (76) female accounting for 62.3% of the respondents.

Age- The majority of the respondents (34.4%, n=42) were in the 61-70 age group. The second highest was 51-60 (28.7%, n=35). In the 41-50 group was 20 respondents (16.4%), 71-80 group was 12 respondents (9.8%) and the 81+ age group was 4 respondents (3.3%).

Ethnicity- With regards to ethnicity, the two highest majorities were East Indian (42.6%, n=52) and Mixed race (41%, n= 50). Additionally, 14.8% (n=18) were of African descent and 1.6% (n=2) were Chinese.

Source of income- A majority of 39.3% (n=48) of the respondents were collecting government pension, 24.6% (n=30) were employed, 18.9% (n=23) were supported by a family member and 17.2% (n=21) were collecting public assistance.

Level of education- A majority of 63.9% (n=78) only possessed primary school education, 30.3% (n=37) had secondary school education and 4.9% (n=6) had technical training.

TABLE 1: FREQUENCY AND PERCENTAGES FOR DEMOGRAPHIC VARIABLES
WITHIN THE SAMPLE GROUP

Variable	Categories	Frequency (n=122)	Percentage (100%)
Gender	Male	46	37.7
	Female	76	62.3
Age	30-40	9	7.4
	41-50	20	16.4
	51-60	35	28.7
	61-70	42	34.4
	71-80	12	9.8
	81+	4	3.3
Ethnicity	African	18	14.8
	East Indian	52	42.6
	Chinese	2	1.6
	Mixed	50	41.0
Source of income	Public assistance	21	17.2
	Pension	48	39.3
	Employed	30	24.6
	Family member	23	18.9
Level of education	Primary	78	63.9
	Secondary	37	30.3
	Trade	6	4.9
Other health conditions	Yes	89	73
	No	33	27
Who prepares meals	Self	85	69.7
	Family member	35	28.7
	Caterer	1	0.8

Table 2 shows the nutrition counseling patterns of the diabetic clients.

Counseling- The majority of the respondents (68.9%, n=84) received nutrition counseling on a few of their clinic visits, with only one respondent stating that they received counseling at every visit. Most of the respondents have been attending the chronic disease clinic for 5-10 years (36.9%), with 27.9% of the respondents attending the clinic for over 10 years.

TABLE 2: FREQUENCY AND PERCENTAGE CONCERNING COUNSELING WITHIN THE SAMPLE GROUP

Variable	Categories	Frequency (n=122)	Percentage (100%)
Receive nutrition counseling	Never	34	27.9
	Few times	84	68.9
	Most times	3	2.5
	Always	1	0.8
Attending clinic	Under 5 years	42	34.4
	5-10 years	45	36.9
	10+ years	34	27.9
Using nutrition counseling	Never	44	36.1
	Sometimes	50	41
	Always	28	23

Figures 1- 4 show the knowledge, attitude and practice responses of the entire sample group.

Knowledge Questions- The respondents all had adequate nutrition knowledge, with respect to the questions that were given, with the exception of the question on a serving of fruit, with only 23% of the respondents answering correctly and the question on a serving of vegetables, with only 27.9% of the respondents answering correctly.

Attitude Questions- All the respondents had positive attitudes towards diabetes management, with correct responses of 90% and above for all the questions.

Practice Questions- With respect to the practice questions, only those respondents who received counseling, answered the post- counseling section. For the 88 respondents answering the post- counseling session, their behavior improved reasonably.

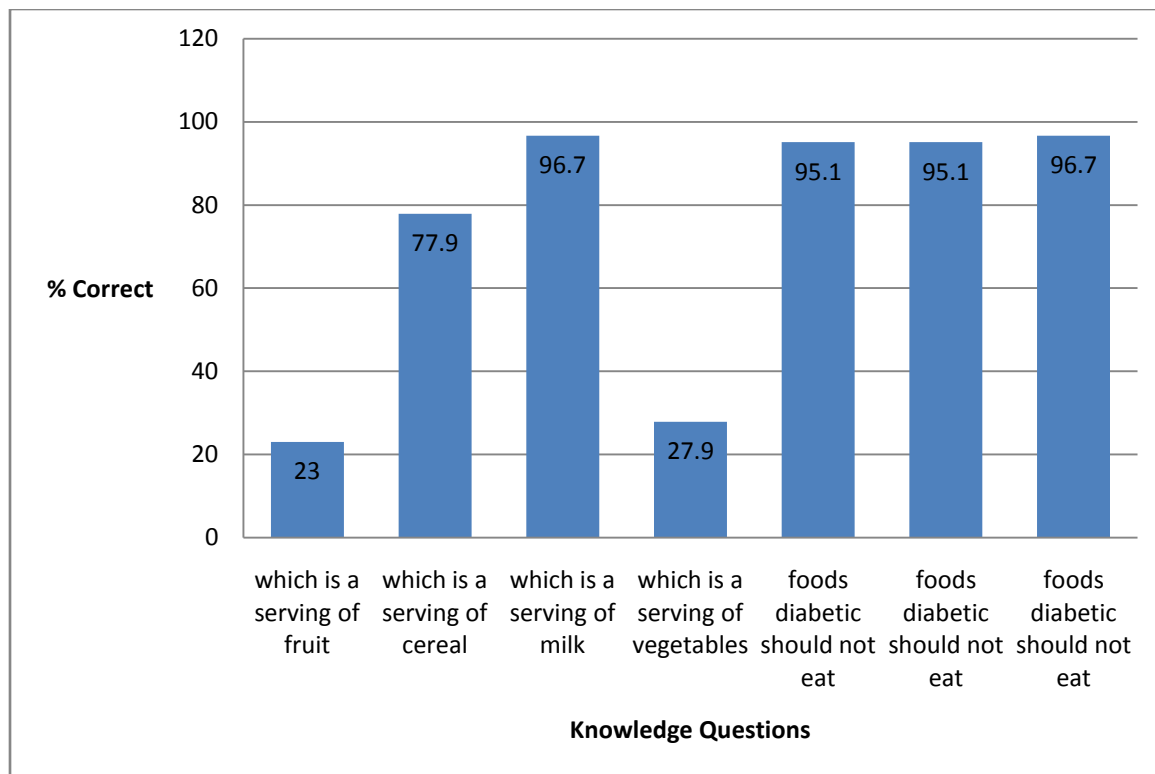


FIGURE 1: PERCENT OF DIABETICS (n=122) ANSWERING KNOWLEDGE QUESTIONS CORRECTLY

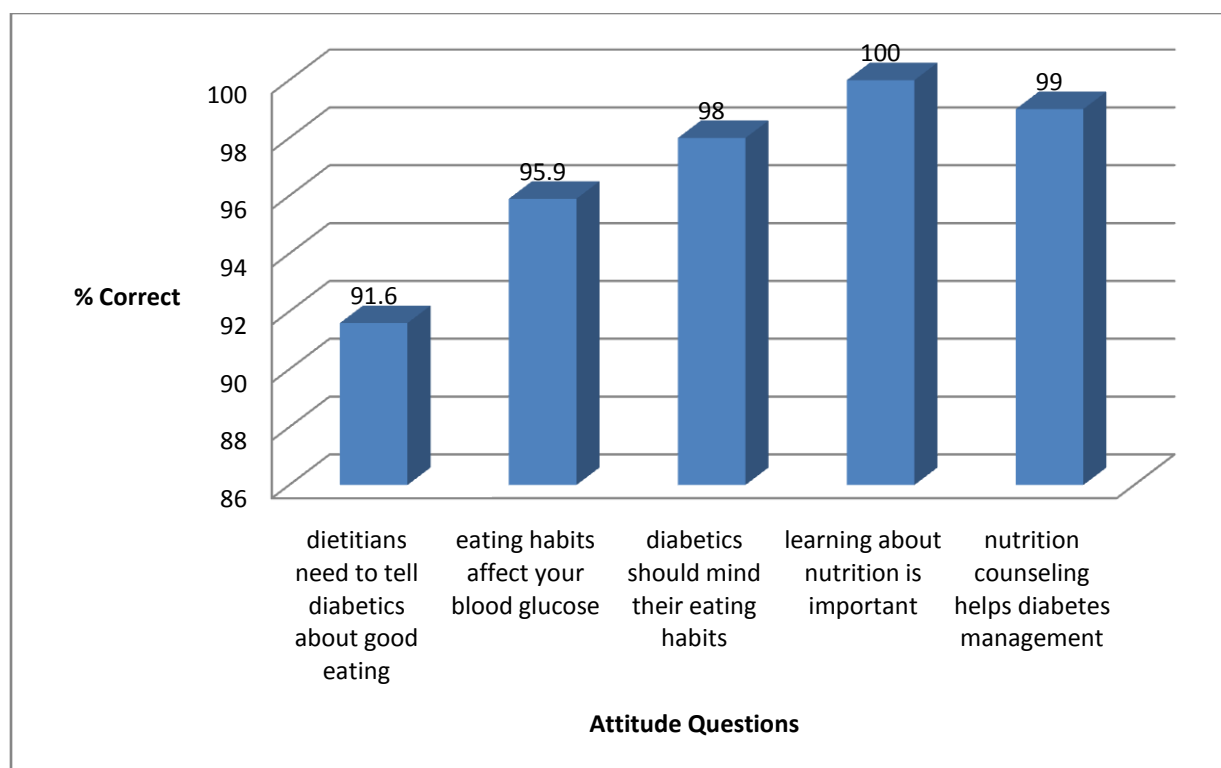


FIGURE 2: PERCENT OF DIABETICS (n=122) ANSWERING ATTITUDE QUESTIONS CORRECTLY

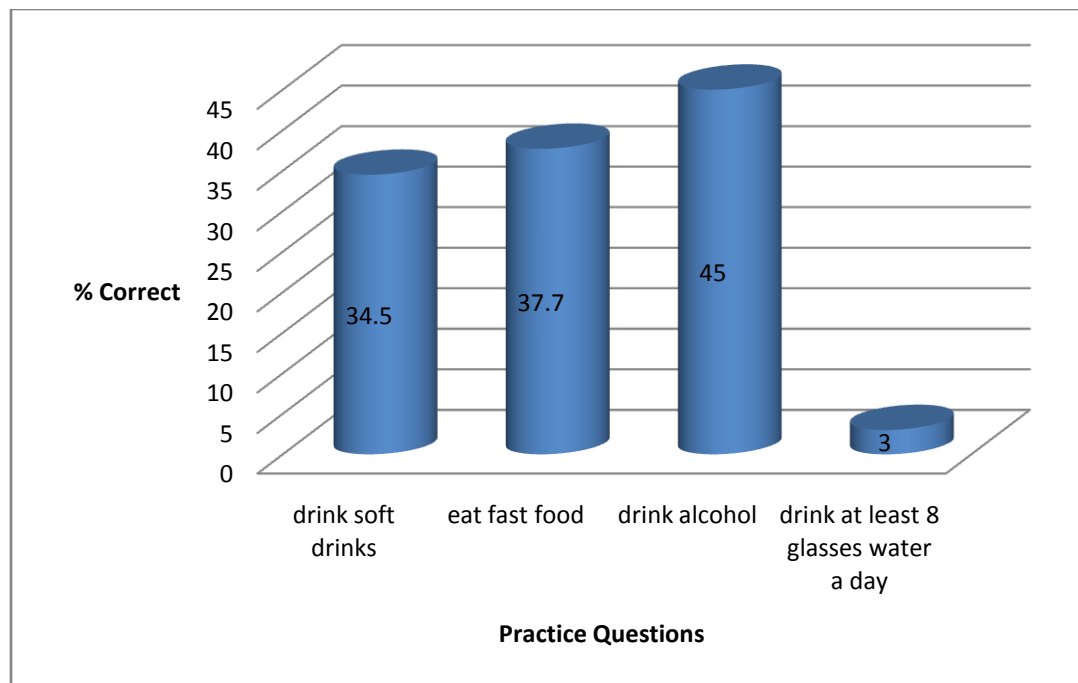


FIGURE 3: PERCENT OF DIABETICS (n=122) ANSWERING PRACTICE QUESTIONS CORRECTLY BEFORE COUNSELING

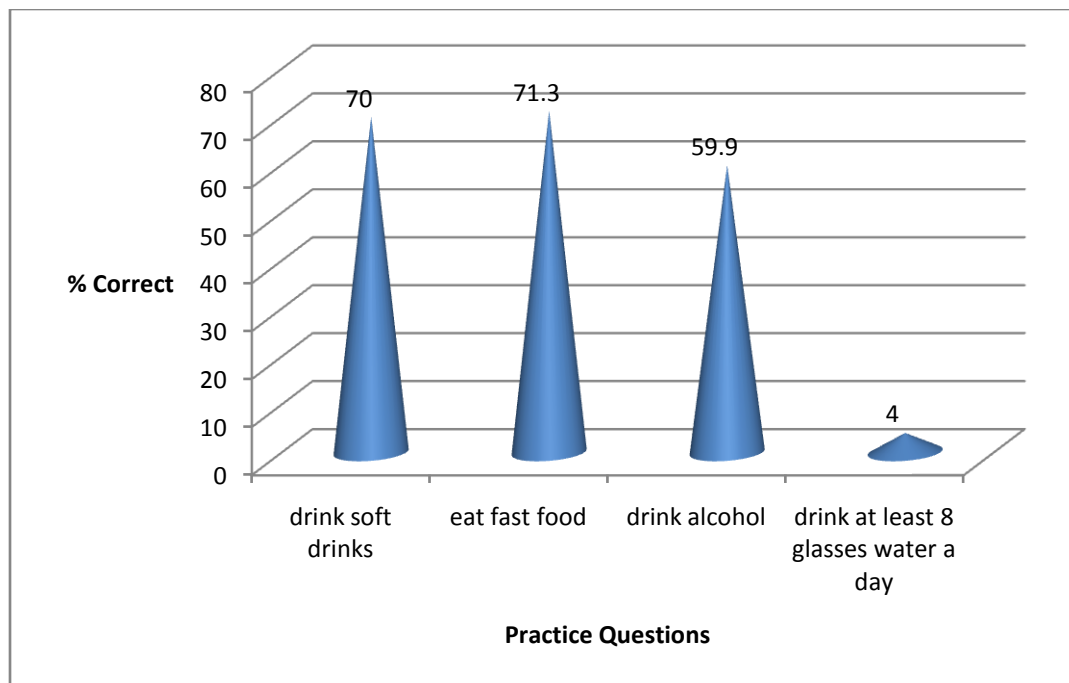


FIGURE 4: PERCENT OF DIABETICS (n=122) ANSWERING PRACTICE QUESTIONS CORRECTLY AFTER COUNSELING

Chi square

Table 3 shows the chi square test findings.

The relationship between the respondents receiving nutrition counseling and their response scores showed that as the frequency of counseling increased, the mean knowledge score increased and there was not much difference in the means for the attitude scores.

TABLE 3: RELATIONSHIP BETWEEN RECEIVING COUNSELING AND KNOWLEDGE, ATTITUDE AND PRACTICE SCORES

Received nutrition counseling		Knowledge score (%)	Attitude score (%)	Practice pre-post counseling difference score (%)
Never	N	34	34	5
	Mean	70.2	24.7	84
Few times	N	84	84	84
	Mean	75.9	21.1	16.1
Most times	N	3	3	2
	Mean	83.3	20.0	7.5
Always	N	1	1	1
	Mean	87.5	20.0	20.0
Total	N	122	122	92
	Mean	74.6	22.1	16.0

Correlation

Tables 4 – 5 show the correlation test findings

- correlation is significant at the 0.05 level (2 tailed)
- correlation is significant at the 0.01 level (2 tailed)

TABLE 4: CORRELATION OF DEPENDENT VARIABLES

		Knowledge score (%)	Practice pre-post counseling difference score (%)
Knowledge score (%)	Correlation coefficient	1.000	0.059
	Sig. (2 tailed)		0.577
	N	122	92
Practice pre-post counseling difference score (%)	Correlation coefficient	0.059	1.000
	Sig. (2 tailed)	0.577	
	N	92	92
Attitude score (%)	Correlation coefficient	-0.180*	0.116
	Sig. (2 tailed)	0.047	0.271
	N	122	92
Received nutrition counseling	Correlation coefficient	0.264**	-0.042
	Sig. (2 tailed)	0.003	0.691
	N	122	92

TABLE 5: CORRELATION OF DEPENDENT VARIABLES

		Attitude score (%)	Received nutrition counseling
Knowledge score (%)	Correlation coefficient	-0.180*	0.264**
	Sig. (2 tailed)	0.047	0.003
	N	122	122
Practice pre-post counseling difference score (%)	Correlation coefficient	0.116	-0.042
	Sig. (2 tailed)	0.271	0.691
	N	92	92
Attitude score (%)	Correlation coefficient	1.000	-0.273**
	Sig. (2 tailed)		0.002
	N	122	122
Received nutrition counseling	Correlation coefficient	-0.273**	1.000
	Sig. (2 tailed)	0.002	
	N	122	122

ANOVA

Tables 6 – 8 show the ANOVA test findings.

There showed no difference in score and no significant relationship with respect to the knowledge, attitude and practice responses, analyzed against the gender, ethnicity and education level of the respondents.

TABLE 6: ANOVA OF THE INDEPENDENT VARIABLES: GENDER, ETHNICITY AND EDUCATION WITH THE DEPENDENT VARIABLE: KNOWLEDGE SCORE %

Independent Variable	F value	P value
Gender	2.348	0.128
Ethnicity	0.242	0.867
Level of education	0.809	0.491

TABLE 7: ANOVA OF THE INDEPENDENT VARIABLES; GENDER, ETHNICITY AND EDUCATION WITH THE DEPENDENT VARIABLE; ATTITUDE SCORE %

Independent Variable	F value	P value
Gender	2.798	0.097
Ethnicity	1.079	0.361
Level of education	1.344	0.264

**TABLE 8: ANOVA OF THE INDEPENDENT VARIABLES; GENDER,
ETHNICITY AND EDUCATION WITH THE DEPENDENT VARIABLE;
PRACTICE PRE-POST COUNSELING SCORE %**

Independent Variable	F value	P value
Gender	3.260	0.075
Ethnicity	1.379	0.257
Level of education	0.824	0.442

CHAPTER V

DISCUSSION

This study evaluated the impact of nutrition counseling on the knowledge, attitudes and practices of diabetics. Management of chronic disease is strongly linked to lifestyle modifications. For effective disease prevention and treatment, behavioral changes are required. For patients with chronic diseases, the home is usually the central site of managing the illness. This is true for diabetic patients who also need knowledge about their illness in order to manage it effectively (Lewis et al., 1997).

Based on the results, 69.7% prepare their meals themselves, 28.7% of the diabetics, have their meals prepared by a family member and only one (1) diabetic stated that his meals were prepared by a private caterer. The results from this study suggest that only approximately 4% of the diabetics in the sample received counseling frequently. This finding does not support Zimer (2003) who stated that nutrition counseling is an important part of diabetes management.

Inspection of the data reveals that of the entire sample, 92.6% of the diabetics were over the age of 40 years, furthermore, that a majority of them (63.9%) only had primary school education, while the others (30.3% and 4.9%) possessed secondary education and technical training. Having considered this, it can be also seen in the chi square analysis, the differences in the mean knowledge score %, in relation to the frequency at which nutrition counseling is received. For the thirty-four (34) diabetics who never received counseling, they answered 70.2% of the knowledge questions correctly; the eighty-four (84) diabetics receiving counseling only a few times since they started attending clinic, answered 75.9% of the knowledge questions correctly

and of the three (3) diabetics who stated they receive nutrition counseling most times and the since (1) diabetic who stated they always received nutrition counseling, their knowledge questions answered correctly were 83.3% and 87.5% respectively. Therefore for the chi square analysis, it can be deduced that the more the diabetic clients receive nutrition counseling, the more knowledgeable they become. These results show comparison to Palaian et al (2006), where it was concluded that diabetic patient counseling improved the knowledge responses given by the diabetics who participated in that study.

Additionally from the chi square test findings, it is seen that as nutrition counseling is increased, the attitudes of the diabetics slightly increases and it was Dalewitz, Khan and Hershey (2000), who all stated that the diabetics sometimes lack training to improve their behaviours. This means that, where it can be seen in this study, counseling the diabetics about their disease, can better equip them with the knowledge needed to adopt positive attitudes in disease management.

Meanwhile, from the correlation findings, there is a positive correlation between the knowledge score % and the frequency at which the diabetics receive counseling (correlation coefficient 0.264, p value 0.003), meaning that an increase in nutrition counseling resulted in an increase in the correct answers of knowledge questions given. Apart from this shown, were negative correlations between the attitude score % and the knowledge score% (correlation coefficient – 0.180, p value 0.047) and attitude score % and receiving nutrition counseling (correlation coefficient – 0.273 P value 0.002). This means that though there is a relationship in both groups, as seen by their respective p values, an increase in a positive attitude towards disease management did not result in an increase in nutrition knowledge, same as increasing nutrition counseling, did not lead to a more positive attitude towards diabetes management.

Subsequently, with respect to the ANOVA test findings, it was highlighted that the gender, ethnicity and level of education, of the diabetics, did not affect knowledge, attitude and practice scores in any significant form, with all results showing P values greater than 0.05. This is in contrast with results found by Nisen, Bakke and Gallefoss (2011 where diabetic who had lower education their mean diet score was 2.2 point lower (p value <0.001) than diabetics with higher education.

CHAPTER VI

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

Conclusions

There was no association between the nutrition knowledge, attitudes and practices of diabetic clients, with respect to gender ethnicity and level of education. Receiving nutrition counseling increases the diabetic's knowledge of nutritional eating. However, to note, increasing nutrition counseling, does not necessarily produce a more positive attitude towards nutritional eating neither does it significantly cause the diabetics to increase practicing the information that is given to them.

Limitations

Some of the limitations encountered that may have inadvertently affected the research findings are as follows:-

1. Restricted time constraints met by the researcher, resulted in a reduced period of data collection.
2. Due to the age of some of the participants, the questionnaire had to be read to them, so researcher bias may have occurred.
3. Owing to the fact that the researcher had other commitments, on occasion, the questionnaires were administered to the participants by the health professionals at the health center.
4. The nutrition counseling questionnaire did not include options of all foods choices that the diabetics' diet may compose.

Recommendations

Being knowledgeable about nutrition, having a positive attitude and following best practice as regards diabetes is indeed helpful for diabetic clients to function at their optimum level.

Several recommendations came about as a result of this study. These include:

1. It is recommended that this research be replicated, using a larger sample size.
2. Diabetics should be counseled on a more frequent basis or possible on every visit to the chronic disease clinic.
3. Home visits should be made by the dietitian as a means of follow-up, to ensure the clients are adhering to the advice given to them.
4. Food demonstrations should be added to the clients counseling regime, as a way of integrating the theoretical advice they receive into practice.

REFERENCES

- Briggs, WA., Lowenthal, DT., Cirksena, WJ., Et al. (1975). Propranolol in hypertensive dialysis patients: efficacy and compliance. Clin. Pharmacol Ther, 18, 606 – 612.
- Caribbean Health Research Council and Pan American Health Organisation (2006). Managing Diabetes in Primary Health Care in the Caribbean.
- Cerkoney, K., Hart, LK. (1980). The Relationship Between the Health Belief Model and Compliance of Persons with Diabetes Mellitus. Diabetes Care 3, (5), 594 – 598.
- Dalewitz, J., Khan, N., Hershey, CO. (2000) Barriers to control of blood glucose in diabetes mellitus. Am J Med Qual, 15, 16 – 25.
- Daly, JM., Hartz, AJ., Yinghui, XU., et al. (2009). An Assessment of Attitudes, Behaviours and Outcomes of Patients with Type 2 Diabetes. JABFEM, 22, 280 – 290.
- Diabetic Care ADA. (2008). Nutrition Recommendations and Interventions for Diabetes. Diabetes Care, 31, 61 – 78.
- Davis, MS. (1967). Predicting non-compliant behavior. J. Health Soc Behav, 8, 265 – 271.
- Franz, MJ., Bantle, JP., Beebe, CA., Brunzell, JD., et al. (2002). Evidence – based nutrition principles and recommendations for the treatment and prevention of diabetes and related complications, 25, 148 – 198.
- Haynes, RB. (1976). A critical review of the determinants of patient compliance with therapeutic regimens. Johns Hopkins University Press, 26 – 39.
- International Diabetes Federation (2007 – 2009) Diabetes Education and Prevention, from: <http://www.worlddiabetesday.org/en/the-campaign/diabetes-education>.

- Knowler, WC., Barrett-Connor, E., Fowler, SE., et al. (2002). Reduction in the incidence of Type 2 diabetes with lifestyle intervention or metformin. *N Engl J Med*, 346, 393 – 403.
- Lewis, RK., Lasack, NL., Lambert , BL., et al. (1997). Patient Counseling: A Focus on maintenance therapy. *Am J Health Syst Pharm*, 54, 2084 – 2095.
- Maiman, CA., Becker, MA. (1974). The health belief model: origins and correlates in psychological theory. *Health Educ. Monagr*, 2, 336 – 353.
- Maina, WK., Ndegwa, ZM., Njenga, EW., Muchemi, EW. (2011). Knowledge, Attitude and Practices related to diabetes among community members in four provinces in Kenya: a cross-sectional study. *African Journal of Diabetes Medicine*, 19 (1), 15 – 18.
- Nilsen, V., Bakke, P.S., Gallefoss, F. (2011) Effects of lifestyle intervention in persons at risk for Type 2 diabetes mellitus – results from a randomized, controlled trial. *Public Health*, 11, 1 – 9.
- PAHO (2001) Regional Core Health Data System – Country Profile: Trinidad and Tobago <http://www.paho.org/English/sha/prfltrt.html#morbimortal>.
- Palaian, S., Leelavathy, A., Padma, G., et al. (2006). Knowledge, Attitude and Practice Outcomes: Evaluating the Impact of Counseling in Hospitalized Diabetic Patients in India. *P and T Around the World*, 31 (7), 383 – 396.
- Payne, W.A., Hahn, D.B. (2002). *Understanding your Health* (7th Ed.) New York: Mc Graw Hill.
- Perez – Escamilla, R., Hromi – Fiedler, A., Vega – Lopez, S., et al. (2008) Impact of peer nutrition education on dietary behaviours and health outcomes among Latinos: A systematic literature review. *J Nutr Educ Behav*, 40 (4), 208 – 225.
- Republic of Trinidad and Tobago. Ministry of Health. *Annual Statistical Report 2004 – 2005*.

- Ronquillo, LH., Zenteno, JFT, Espinosa, JG., Acevez, EG (2003). Factors associated with therapy noncompliance in Type 2 diabetes patients. *Salud publica Mex*, 45, 191 – 197.
- Ross, T., Boucher, J., O'Connell, BS. (2005) American Dietetic Association Guide to Diabetes: Medical Nutrition Therapy and Education. American Dietetic Association.
- Satpute, DA., Patil, PH., Kuchake, VG., et al. (2009). Assessment of impact of Patient Counseling, Nutrition and Exercise in patients with Type 2 Diabetes Mellitus. *International Journal of Pharm Tech RTesearch*, 1, 1 – 21.
- Saudek, CD and Loghmani, E. (2012). John Hopkins Diabetes Guide; Treatment and Management of Diabetes. John Hopkins Medicine.
- Siddiqui, A., Gul, A., Ahmedani MY., et al. (2010). Compliance to dietary counseling provided to patients with Type 2 diabetes at a tertiary care hospital. *Journal of Diabetology*, 1 – 5.
- Snetselaar, Linda. (2009). Nutrition Counseling Skills for the Nutrition Care Process. Jones and Bartlett Learning.
- Trinidad and Tobago Health Services Initiative. (2012). Trinidad and Tobago Diabetes Guide. Trinidad and Tobago.
- Van Dam, RM. (2003). The epidemiology of lifestyle and risk for Type 2 diabetes. *Eur J. Epidemiol*, 18, 15 – 25.
- White, A and Holdip, J. (2012). Trinidad and Tobago Diabetes Guide. Trinidad and Tobago
- Wu, R.(1973). Behaviour and Illness. Prentice – Hall, 111 – 135.
- Ziemer, CD., Berkowitz, KJ., Panayiotto, RM., et al. (2003). A simple meal plan emphasizing healthy food choices is as effective as an exchange – based meal plan for urban African Americans with Type 2 Diabetes. *Diabetes care*, 26, 1719 – 1724.

APPENDICES

APPENDIX A - CARIBBEAN SIX FOOD GROUPS



APPENDIX B - COPY OF BLANK DIET PLAN

APPENDIX C - COPY OF PARTICIPANT'S CONSENT FORM

CLIENT CASE STUDY CONSENT FORM

Title : _____

I agree to be interviewed by the researcher

☐ **Yes**

☐ **No**

I understand that my participation is voluntary, that I can choose not to participate

I understand that any data that the student extracts from the questionnaire for use in the research will not, under any circumstances, contain names or identifying characteristics.

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party.

I understand that reports based on the interview(s) will be kept in a secure storage and accessible to the Unit examiners only

Participant's name: _____

Signature: _____

Date: _____

Adapted from Monash University of Medicine, Nursing and Health Sciences.

www.med.monash.edu.au/current/docs/consent-form.doc -

APPENDIX D - NUTRITION COUNSELING QUESTIONNAIRE

- Name of Health Centre:
- Date:
- Sex: ☐ male ☐ female
- Age:
- Ethnicity:
 - ☐ African
 - ☐ East Indian
 - ☐ Chinese
 - ☐ Mixed
- Source of income:
 - ☐ public assistance
 - ☐ pension
 - ☐ employed
 - Other (specify).....
- Level of education:
 - ☐ primary
 - ☐ secondary
 - Other (specify).....
- Do you suffer from any other health conditions?
 - ☐ Yes, please state.....
 - ☐ No
- Who prepares your meals?
 - ☐ self
 - ☐ family member
 - Other (specify).....

COUNSELING

1. Do you receive nutrition counseling from a dietitian at every clinic visit?
 - ☐ always
 - ☐ most times
 - ☐ few times
 - ☐ never

2. How long have you been attending this clinic?

☐ under 5 years

☐ 5-10 years

☐ 10 years +

Other (specify).....

3. Do you use the nutrition counseling given as a guide to prepare meals?

☐ always

☐ sometimes

☐ never

KNOWLEDGE

As a diabetic:

(Circle the correct answer)

4. Which of the 3 apples is a serving of fruit?



5. Which of the 3 bowls is a serving of cereal?



6. Which of the 3 is a serving of milk?



7. Which of the 3 bowls is a serving of pasta?



8. Which of the 3 portions of carrots is a serving of cooked vegetables?



9. Circle the foods a diabetic should not eat\drink?



(SHADE THE BOX OF YOUR CHOICE)

ATTITUDE

- 1 -strongly agree
- 2 -agree
- 3 -neutral
- 4 -disagree
- 5 -strongly disagree

	1	2	3	4	5
10. Dietitians need to tell diabetics about good eating\ health.					
11. Eating habits affect your blood glucose.					
12. Diabetics should pay more attention to the foods they eat now that they have diabetes.					
13. Learning about nutrition is important for diabetics.					
14. Nutrition counseling would better help diabetics to properly manage their diabetes.					

PRACTICE

- 1- Very frequently
- 2- Frequently
- 3- Occasionally
- 4- Rarely
- 5- Never

Behaviour	Before nutrition counseling					After counseling				
	1	2	3	4	5	1	2	3	4	5
15. Drink soft drinks										
16. Eat fast food (chicken and chips, pizza, chinese, doubles).										
17. Drink alcohol										
18. Drink at least 8 glasses of water a day.										

APPENDIX E - COPY OF APPROVAL LETTER