Risk Factors, Knowledge, Attitudes and Practices of Type 2 Diabetics Attending Industry, Campbellville Health Centers and West Demerara Hospital, Guyana

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Abstract The objective of this study was to examine the risk factors, knowledge, attitudes, and practices of type 2 diabetic patients attending three health care facilities (Industry and Campbellville Health Centers and the West Demerara Regional Hospital) in Guyana, May and June 2019. This study utilized a quantitative, descriptive and cross-sectional approach. The sampling technique used was non-probability and purposive sampling. The participants included 114 diabetic patients attending three selected health centers in Guyana. The study used a pretested questionnaire to collect survey data. Data were analyzed using SPSS version 20.0. Statistical analysis methods were mean, median, standard deviation, percentages, cross-tabulation, p-value, chi-square, ANOVA and Friedman test. Study results indicated that risk factors such as age, ethnicity, family history, BMI had no significant relationship with the onset of diabetes among the study population. Findings revealed that the mean average of participants' RBS, BP, fasting blood sugar, HbA1C and lipid profile were high. Participants demonstrated an inadequate level of knowledge and practices. Some of the participants had challenges accessing specific laboratory tests and Insulin. Findings concluded that there is a critical need for improving diabetic knowledge and healthy practices among diabetic patients. Establishing culturally oriented and multi-sectoral diabetic self-care management programs is imperative to manage diabetes effectively.

Keywords Diabetes Mellitus, KAP, Risk Factors, Self-care Management

1. Introduction

Diabetes mellitus poses a significant public health challenge in the Caribbean region due to epidemiological and nutritional transition [1]. Lifestyle changes such as unhealthy dietary practices, physical inactivity, obesity and substance abuse significantly contribute to a higher incidence of diabetes and heart diseases in the Caribbean region [2]. More than 1 in 10 of the adult population of the Region of the Americas are affected with type 2 diabetes [3].

The overall prevalence of type 2 diabetes in the Caribbean region is estimated to be approximately 9%. Diabetic related deaths are responsible for 13.8% of all deaths among adults in the region [4]. Trinidad and Tobago have the fifth-highest per capita rate of diabetes in the world and the highest in the western hemisphere [5]. In Guyana, approximately 24,000-36,000 people (8-12% prevalence) are living with diabetes, 40,000-50,000 people (16-20% prevalence) are living with hypertension, and 54,000-68,000 people are living with the two chronic diseases [6]. Studies indicate that Guyana has the second-highest prevalence (15.9%) of diabetes in the

Caribbean region [9, 24]. Notably, non-communicable diseases contribute to 70% of all deaths occurring in Guyana. These represent the leading cause of premature deaths before the age of 70 years [6]. However, research support that diabetes and diabetic complications are preventable with simple lifestyle modifications [3]. A holistic and culturally oriented diabetic education is a critical component of diabetic care [7]. Regular assessment of the risk factors such as BMI, laboratory tests, physical inactivity and unhealthy dietary practices provide an opportunity to assess diabetic patients' understanding of the disease and their ability to control it [8]. Attaining glycemic control, early detection of diabetic complications, assessing and managing comorbidities are critical components in diabetic management. Ongoing diabetic education of patients is imperative in managing diabetes and preventing diabetic complications [9]. Little research is available on the risk factors, knowledge, attitudes, and practices of type 2 diabetic patients attending Guyana's community health centers. Hence, the researcher designed this study to assess the risk factors, knowledge, attitudes and practices of type 2 diabetic patients attending three health centers in Region 3 and Region 4 communities. The data generated in this study will help to develop and establish holistic and multi-sectoral diabetic self-care management programs.

2. Materials and Methods

This study utilized a quantitative, descriptive and cross-sectional approach. The sampling method used was non-probability and purposive sampling. The participants included a total of 114 diabetic patients attending three health centers, including the Industry health center (n=30), Campbellville health center (n=40) and the West Demerara Regional Hospital (n=44). The Institutional Review Board, Ministry of Public Health, provided ethical permission to conduct this study. In addition, the Medical Director of the Georgetown Public Hospital Corporation and the Regional Health Officer, Region 3, provided permission to conduct this study. Prior permission was taken from the participants using consent forms. The researcher used the information provided in the literature reviews for developing a survey tool. Before administering the questionnaire, the researcher pretested the tool for validity and reliability purposes—the survey questionnaire comprised items regarding risk factors, knowledge, attitudes and practices related to diabetic care. The researcher administered the survey tool to the diabetic patients attending the selected health centers during May and June 2019. Inclusion criteria included patients with type 2 diabetes, and exclusion criteria included patients with type 1 diabetes and gestational diabetes. Data were analyzed using SPSS version 20.0. The study used

statistical methods such as mean, median, standard deviation, percentages, cross-tabulation, p-value, chi-square, ANOVA and Friedman test to analyze the data.

3. Results

A total of 114 diabetic patients participated in this study. The mean age of the participants was 60 ± 11 years. Table 1 shows the participants' baseline characteristics and risk factors, such as ethnicity, BMI, comorbidity, and family history.

The duration of diabetic disease of the participants ranged from 1 year to 16 years. Results revealed that thirty-three percent (33%) of the participants had diabetes for less than five years, and twenty-five percent (25%) of the participants had the disease between 6-10 years.

Among the participants, 71% were female, and 29% of the participants were male. Chi-square test concluded that there was a significant relationship between participants' gender and diagnosed with diabetes since the p-value of 0.002 was less than the level of significance 0.05.

The researcher used cross-tabulations to analyze the relationship between the participants' demographic characteristics, such as gender, ethnicity, BMI, family history, and disease duration.

Data showed that almost 31% of the Afro-Guyanese were diagnosed with diabetes for more than 15 years. 34% of the Indo-Guyanese were diagnosed with diabetes for less than five years. 50% of the Amerindians were diagnosed with diabetes for less than five years. Chi-square test concluded that there was no significant relationship between ethnicity and diagnosis with diabetes since the p-value of 0.275 was greater than the level of significance 0.05.

Approximately 62% of participants with a BMI between 25.0 to 29.9 were diagnosed with diabetes for less than or equal to 5 years. In the study group, 37% of the patients with a BMI between 18.5 to 24.9 were diagnosed with diabetes for 6 to 10 years. The chi-square test supported the hypothesis that there was no significant relationship between a patient's body mass index and that he/she was diagnosed with diabetes since the p-value of 0.322 was greater than the level of significance 0.05.

Participants with a diabetic family history, about 30%, were diagnosed with diabetes for less than or equal to five years. Whereas participants without a diabetic family history, approximately 44% were diagnosed with diabetes for less than or equal to five years. The Chi-square test supports the hypothesis that there is no relationship between family history and somebody diagnosed with diabetes. The p-value of 0.343 is greater than the level of significance 0.05.

Table 1. Descriptive Statistics of Demographic data

Demographic Data	Participants (N = 114)	Frequency %
Gender		
Male	33	29
Female	81	71
Ethnicity		
Afro-Guyanese	35	31
Indo-Guyanese	62	54
Amerindian	6	5
Portuguese	3	3
Other (specify)	8	7
Marital Status		
Single	24	21
Married	76	67
Common-Law Union	8	7
Other	6	5
Education		
Primary	64	56
Secondary	42	37
Tertiary	5	4
Other	3	3
Employment		
Working(full-time)	21	18
Working(part-time)	8	7
Unemployed	3	3
Homemaker	35	31
Retired	28	25
Disabled	12	10
Self-employment	7	6
Duration of Diabetes		
≤ 5years	38	33
6-10 years	28	25
11-15 years	21	18
>15 years	27	24
Body Mass Index		
< 18.5 (Underweight)	6	6
18.5-24.9 (Normal)	30	26
25.0-29.9 (Overweight)	62	54
30.0-39.9 (Obese)	16	14
Comorbidity		
Heart disease	6	5
Stroke	7	6
Arthritis	19	17
Hypertension	52	46
Any other disease	30	26
Family History		
High BP	64	56
Diabetes	78	68
Heart Problems	13	12
High Cholesterol	8	7
Asthma/ Allergies	5	4
Cancer	4	3
None	5	4
Others	11	9

Table 2. Family history & Diabetes: When was your diabetes diagnosed? Cross tabulation.

			When was your diabetes diagnosed?				Total
			Less than or equal to 5 years	6-10 years	11-15 years	More than 15 years	
Family history-Diabetes	No	Count	16	6	5	9	36
		% Within Family history-Diabetes	44.4%	16.7%	13.9%	25.0%	100.0%
	Yes	Count	23	21	16	18	78
		% Within Family history-Diabetes	29.5%	26.9%	20.5%	23.1%	100.0%
Total	Count		39	27	21	27	114
	% within Family-history-Diabetes		34.2%	23.7%	18.4%	23.7%	100.0%

Results indicated that 75% received diabetic education from a health care professional, and 25% did not receive from any resources, including health care professionals, TV, radio, brochure or family members.

Table 3 outlines a summary of diabetic complications participants are suffering.

Table 3. Complications of Diabetes

Diabetes Complications	Mean Rank	Rank
Diabetes complications – Eyes	5.49	1
Diabetes complications – Kidneys	4.3	5
Diabetes complications - Nerves or feet	4.65	3
Diabetes complications – Heart	4.51	4
Diabetes complications - Slowed digestion	3.91	8
Diabetes complications - Blocked arteries in your legs	4.19	6
Diabetes complications – No	4.89	2
Diabetes complications - Do not know	4.05	7

From the Friedman test, participants suffer from, firstly, eye-related complications; secondly, no complications; thirdly, complications related to nerves or feet; fourthly, heart-related complications and kidneys associated complications.

The study explored the laboratory findings of the participants during the last 12 months. However, only the participants attending two health centers had access to all the laboratory tests and diabetic medications. One of the health centers did not have Insulin and resources to conduct necessary laboratory tests. Results showed that the participants' average laboratory findings such as BP, RBS, Fasting Blood Sugar, HbA1C, Triglycerides, Cholesterol, LDL, VLDL, and BUN Creatinine were high. Table 4 below displayed these findings.

Table 4. Patients' laboratory findings during the last 12 months

Patients' current readings	Mean	Std. Deviation
BP systolic	132.34	21.718
BP diastolic	78.46	9.583
RBS	189.35	101.45
Fasting blood sugar	156.48	73.418
HbA1C	10	6.065
Triglyceride	125.25	89.088
Cholesterol	197.63	68.704
HDL	37.59	13.486
LDL	154.17	95.052
VLDL	26.42	22.359
BUN	13.68	6.039
Creatinine	0.97	0.675

3.1. Knowledge

The average knowledge score for the patients who participated in this study was 8.95 (SD ± 1.876). The ANOVA test showed that the mean knowledge score among patients attending these three health centers was equal since the p-value of 0.313 was more than the level of significance 0.05.

More than half of the participants (68%) responded that eating too much sugar and other sweet foods was a cause of diabetes. Among 114 participants, (50%) responded that medication was more important than diet and exercise to control their diabetes. In the study, 35% of the participants responded that the cause of an insulin reaction was too much food. Among the participants, 33% of the respondents indicated that the diabetic diet consists primarily of special foods.

3.2. Attitudes

Data revealed that the overall attitude of the participants regarding diabetic care was good. The attitude questions included (1) people with diabetes should learn a lot about the disease (2) the patient has more effect on his/her health status than anything that a doctor or nurse, or dietician can do (3) keeping the blood sugar close to normal can help prevent the complications of diabetes.

3.3. Practices

Table 5 displayed findings concerning practice questions related to exercise, diet and medication.

Table 5. Participants' response to practices

Question	Yes %	No %
Do you exercise for at least 30 minutes per day on at least four days of the week?	57	43
Are you following a controlled diet recommended by your nurse or doctor, or dietician most of the time?	65	35
Do you often miss taking the doses of your diabetic medication?	32	68

Among the participants, 43% of the patients do not exercise for at least 30 minutes per day for four days of the week. Participants provided various reasons for not following the diabetic diet recommended by health care

professionals.

The Friedman test results in Table 6 demonstrated the ranking of various reasons for not following the participants' recommended diet.

Table 6. Reasons for not following the recommended diet

Reasons for not following Controlled Diet	Mean Rank	Rank
Practice- Financial	3.28	3
Practice - Family - related problems	3.2	5
Practice - Lack of time	3.2	5
Practice - Too much trouble	3.23	4
Practice - I do not like the food	3.33	2
Practice - I follow the recommended diet	4.75	1

This study assessed other practices of diabetic patients, including regularly checking their blood pressure, blood sugar and feet examination. Among the participants, 58% responded that they checked their blood pressure only during clinic visits.

3.3.1. Checking Feet for Cuts and Abrasions

Data revealed that 45% of the patients never checked their feet for cuts and abrasions. Figure 1 demonstrates the multiple comparisons on checking feet for cuts and abrasions.

Figure 1. Check feet for cuts and abrasions – Multiple comparisons

Figure 2. Monitor blood glucose at home—multiple comparisons

3.3.2. Monitoring Blood Glucose

Data revealed that 67% of the patients never monitored their blood glucose at home. The multiple bar chart in Figure 2 shows a comparison between the health care centers and patients monitoring their blood glucose level at home.

4. Discussion

Type 2 diabetes is a significant cause of morbidity and mortality in many countries. The estimation of the global prevalence of type 2 diabetes for all age groups was 2.8% in 2000 and 4.4% in 2030 [13]. In Guyana, type 2 diabetes is the fourth leading cause of death, affecting 15.5% of the adult population [19]. Effective diabetic management includes training healthcare professionals, extending critical health care services and establishing self-care management programs. However, because of lack of access to health care services and awareness about diabetes, most diabetic patients suffer from complications [20]. This study has proven that patients' knowledge levels and practices attending these three health care centers were inadequate and similar.

Among the participants, 71% were female, and 29% were male. This finding was consistent with the other studies that diabetes has a high prevalence among women [7, 24]. The chi-square test concluded that there was a significant relationship between gender and diagnosis with diabetes.

The data revealed that fifty-four percent (54%) of participants were Indo-Guyanese, and thirty-one percent

(31%) of the participants were Afro-Guyanese, seven percent (7%) of the patients from other ethnic group and five percent (5%) of the patients from the Amerindian community. This study's findings are similar to a survey held in Schenectady, New York, which confirmed the high prevalence of diabetes were among Indo-Guyanese adults [8]. On the other hand, this study's results support that most diabetes is increasing among other ethnic populations in Guyana [9, 20, 24].

During the last decade, similar to many Caribbean territories, the prevalence of diabetes has significantly increased in Guyana due to epidemiological transition [9, 20, 24]. This study observed that thirty-three (33%) of the participants had diabetes for less than the last five years, and twenty-five (25%) percent of the participants had the disease between 6-10 years. This trend indicates the growing prevalence of the disease among the Guyanese population.

Additionally, the data have proven that 24% of the newly diagnosed patients fall under the age group of less than 55 years. The results of this study support other studies that the prevalence of diabetes has been significantly escalating among the working-age population from all ethnic backgrounds in the Caribbean [9, 18].

Obesity is a significant risk factor for cardiovascular diseases among diabetic patients. The findings of this study revealed that more than half of the participants (54%) in this study were overweight. The prevalence of obesity and sedentary lifestyle in Caribbean societies contributes to non-communicable diseases such as diabetes and heart diseases [12, 22].

Moreover, results indicate that the risk factors such as ethnicity, family history, and BMI had no significant relationship with the duration of diabetes since the p-value was greater than 0.05. These findings support other research studies that diabetes prevalence is trending among all ethnic backgrounds due to epidemiological transition [5, 11, 18].

Additionally, most participants in this study also suffered from comorbidities such as heart diseases, hypercholesterolemia and stroke. Most of the burden in the Caribbean region comes from medical conditions such as diabetes, cardiovascular disease, hypercholesterolemia, and cancers [12].

Research postulates that one of diabetic care's critical components is the early detection and treatment of diabetic complications [9, 20]. This study recommends that a holistic, multi-sectoral and collaborative approach in addressing NCDs is imperative.

Results showed that the participants' average laboratory findings such as BP, RBS, Fasting Blood Sugar, HbA1C, Triglycerides, Cholesterol, LDL, VLDL, and BUN Creatinine were high. Some study participants lacked access to laboratory tests such as HbA1C and lipid tests. Some participants could not have access to Insulin [13]. This limitation, if not corrected, will continue to hamper the effective management of the disease. The finding supports research highlighting that patients living in rural areas were at a greater disadvantage in accessing health care services and managing chronic diseases [15, 26].

Likewise, data indicated that the knowledge of participants regarding dietary practices was inadequate. Many patients (35%) responded that they were not following a controlled diet recommended by a nurse or doctor, or dietician.

Some participants were not following the recommended diet due to uncontrolled food habits or financial challenges. Some participants responded that they do not eat fresh fish, vegetables, peas and beans regularly. Therefore, providing diabetic patients with ongoing, holistic, cost-effective, and culturally tailored dietary education is critical [5, 7, 23].

Almost half of the patients (43%) did not exercise for at least 30 minutes per day on at least four days of the week. Thirty-two (32%) of the participants missed taking the dose of diabetic medication. Freidman test revealed that most participants checked their BP, RBS and feet for cuts only when visiting the clinics. These results were similar to another study done in Trinidad [5]. Also, results revealed that 27% of the participants never had their eye examination done. Besides, participants in this study lacked knowledge of diabetic diet, exercise and assessment of early symptoms of diabetic complications. These findings support another study conducted in Guyana, which projected that the KAP level of the diabetic population regarding complications attending the Diabetic Clinic of the Peter's Hall Jamat in Guyana was inadequate [24].

Although the doctors and nurses gave diabetic education at the clinic, the study participants demonstrated poor knowledge and inadequate self-care practices. Among the participants, 22% of the patients responded that they did not receive any diabetic education.

Results indicated that effective and ongoing self-care management programmes for diabetic patients lacked among the study population. This study concludes that there is a paucity of ongoing culturally tailored diabetic self-care management programmes for diabetic patients in Guyana [5, 23]. A research study conducted on diabetic foot challenges in Guyana highlighted that patient education was the most effective tool that could assist with early detection, lessen complications, and assist with the management of diabetes [20]. Similarly, few global KAP studies on chronic diseases identified poor patient knowledge and inadequate practices for secondary prevention. Therefore, providing correct information and support for adopting good behaviours in the target population suffering from these diseases is critical [25, 26].

Clearly, in response to this need, a self-care management program should be a high priority intervention. Local studies showed that low health literacy was associated with higher HbA1C and random blood glucose [11, 19]. Several global studies proved that diabetes self-management education is an effective intervention strategy that enhances diabetic knowledge and provides the best treatment outcomes [11, 17, 23]. Likewise, studies established that the long-term complications of type 2 diabetes are preventable [11, 21]. A participatory action research study conducted in the UK among the Guyanese population successfully connected, engaged and socially empowered the participants by group therapy and participatory community approaches. [23]. Hence, establishing culturally tailored self-care management programs are critical interventions.

Research supports that inadequate training of health care workers and lack of ongoing diabetic education programs are critical challenges in managing diabetes care in Guyana [20]. For this reason, policymakers from the government and non-government agencies should collaborate and maximize human and material resources. Training programs for health care professionals in educating diabetic patients effectively at the primary healthcare level is imperative.

In summary, there is an urgent need for establishing comprehensive, multi-sectoral, collaborative, and innovative measures in combating diabetes effectively in Guyana. Hence, addressing these shortages on an emergency basis should be a priority.

5. Conclusions

In conclusion, this study showed that the knowledge and self-care practices of study participants are inadequate.

Therefore, ongoing, holistic, culturally oriented self-care management programmes are critical in assisting diabetic patients in navigating complex decisions and activities to improve health outcomes.

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