Understanding diabetic care in Southern Nigeria

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Abstract

Background: Diabetic complications significantly impact health and quality of life. Understanding patients' knowledge, attitudes, and practices (KAP) regarding these complications is crucial for promoting self-management and preventing or delaying their onset. Objectives: This study aimed to assess the KAP of diabetic patients toward diabetic complications and explore potential associations with socio-demographic factors and healthcare access. Methods: A cross-sectional study was conducted in the outpatient department of the University of Benin Teaching Hospital. Data was collected through validated questionnaires and interviews, covering knowledge about common complications, attitudes toward self-care and prevention, and self-reported practices related to diet, exercise, and medication adherence. Statistical analysis: Data was entered into the SPSS spreadsheet after checking for correctness and completeness. The analyzed data was presented in tables and charts. Tests of significance were carried out using Chi-square tests. Results: 100 diabetic adult patients, comprising 39 males, and 61 females, attending the University of Benin Teaching Hospital, Benin City consultant outpatient department were studied. The ages of the respondents ranged between 35-79 years with a mean age of 59.04 (SD 10.7). Thirty-two (32%) of the subjects had a tertiary level of education, while eighteen (18%) had secondary education, thirty-seven attained primary education and thirteen respondents had no formal education. Of all the respondents, 62% had a good overall understanding of diabetes mellitus. 72% of the respondents had good knowledge related to diabetic complications. Of the total respondents, 94% used prescribed anti-diabetic medications while 54% possessed a personal blood sugar monitoring device. While 48% of the participants were obese, 37% were overweight. There was a significant association between level of educational attainment and self-care of the respondents (p = 0.004). However, graded diabetic care was not significantly associated with marital status (p =0.543)

Keywords: *Diabetic Care, Southern Nigeria*

Introduction

Diabetes mellitus (DM) describes a metabolic disorder of multiple aetiologies characterized by chronic hyperglycemia with disturbance of carbohydrate, fat, and protein metabolism resulting from defects in insulin secretion, action, or both[1]. The term diabetes was derived from the Greek verb "diabainein" which means "siphon" implying a disease involving the discharge of excessive amount of urine[2]. Diabetes was first recorded in English in the form of "diabete" in a medical text written around 1425. In 1675 Thomas Wills added the word "mellitus" from Latin meaning "honey" a reference to the sweet taste of the urine of diabetics. In 1776 Mathew Dobson[2] confirmed that the sweet taste was because of an excess of a kind of sugar in the urine and blood of people with diabetes.It is estimated that prevalence of diabetes will rise to 5.5% in 2025 as compared to 4% in year 1995[3].

The burden of diabetes has been steadily increasing worldwide in recent years, particularly in low- and middle-income countries. According to the World Health Organization (WHO), the number of people with diabetes globally has increased from 108 million in 1980 to an estimated 529 million in 2021[4].

The burden of diabetes has increased rapidly in many parts of the world. In England in 2006[4], 5.1% of men

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aged 16 years and over, and 3.7% of women, had Type 2 diabetes and a further 0.5% of men and women had Type 1 diabetes. In the 65 to 74 year age group, the prevalence of known diabetes increased from 5.8% in 1994 to 15.7% in 2006 in men and from 4.8% to 10.4% in women[4]. This increase in the frequency of Type 2 diabetes mellitus has been described in many countries and has been referred to as a global epidemic[5].

Diabetes complications can be classified broadly as microvascular or macrovascular disease. Microvascular complications include neuropathy, nephropathy and vision disorders (retinopathy, glaucoma, cataract, and corneal disease). Macrovascular complications include heart disease, stroke and peripheral vascular disease[6]. Diabetes mellitus is known to be associated with a high risk of developing vascular complications which can lead to premature death and/or disability mainly by increasing the risk of myocardial infarction, stroke and peripheral vascular disease[7].

Self care education is an essential element in the treatment of a person with diabetes and its importance is acknowledged in several studies carried out in communities with different socioeconomic and cultural profiles[6,7]. Effective education of people with diabetes mellitus about self-care requires health professionals toknow psychosocial, epidemiological, and patho-physiological aspects of the disease in addition to pedagogical abilities,and capacity to communicate, listen, understand, and also negotiate with the multi-professional health team[8].

Health professionals' knowledge, abilities, and strategies can positively influence behavioral change in individuals with diabetes to adhere to diet, and physical activities, monitor blood glucose, and take oral medication and insulin, which enable adequate metabolic control[9,10]. Adherence to these measures reduces chronic complications and the need for frequent hospitatization[11].

Rationale for the study: The global increasing prevalence of diabetes mellitus and its attendant complications is not in doubt. Evidence from earlier studies showed that the burden of diabetes as well as its complications is enormous and rising[12]. Subsequently, the total cost of diabetes management has doubled since 1998[12]. Therefore prevention of diabetes and its complications is of paramount importance to reducing its global economic burden. There is an increasing amount of evidence that patient education is the most effective way to lessen the complications of diabetes and its management,hence this study sought to determine the knowledge, attitude, and practice of diabetics to its complications.

Materials and Methods

Study Area: The study was carried out at the University of Benin Teaching Hospital, (UBTH) Benin City. Benin City is a metropolitan city in Edo state, in the south/south geopolitical region of Nigeria. It is made up of 4 Local Government Areas (Egor, Ovia North, Ikpoba-Okha and Oredo) with an estimated population of about 1,905,000 as of 2023.It is located at 6^0 19^1N $5^0$$36^1$E of the Equator. The city has a land mass of 19,281.93 km2. The inhabitants are mainly Bini-speaking people. This ancient town is noted for bronze casting.

UBTH is a 910-bed federal government tertiary healthcare facility and accepts referrals from Edo State and the contiguous states of Anambra, Delta, Ekiti, Ondo, and Kogi. It also has out-patient consultant services with a capacity for 450 outpatients on average daily.

The Study Population: Diabetic patients being followed up at the consultant outpatient clinic of UBTH.

Sample Size: The sample size was determined using the Fischer's formula[55,56] ($N= Z^2/ d^2$). Where N is minimum sample size, P is Prevalence of DM in adult Nigerians, q is 1-P, and d is precision set at 0.05. P is 2.2 % gives 33.06. The minimum sample size for this study was 33 subjects. With an attrition rate of 10% (3.3 persons), a sample size of 36 was used. However, this was increased to 100 respondents

Inclusion Criteria: These include **1.** Diabetic patients whose diagnosis was made at least six months before this study**,** and **2.** Diabetic patients more than 18 years of age who willingly consented to study.

Exclusion Criteria:
1. Diabetic patients diagnosed less than six months at the time of recruitment.
2. Diabetic patients less than 18 years

3. Diabetic patients with evidence of dementing illness.
4. Patients with known psychiatric illness.

Sampling Technique: Serial recruitment of diabetic patients who met the inclusion criteria was done until the sample size was achieved in ten consultant outpatient clinic days.

Data Collection: Patient's knowledge and attitude toward diabetes mellitus were assessed using a structured self-administered questionnaire. The lifestyle practices that affect the outcome of diabetes, such as dietary discipline, regular physical activity, cigarette smoking, and alcoholic intake were assessed. Anthropometric measurements of weight and height were also determined for each patient. The weight was measured with subjects in light clothing, without shoes using a weighing scale and recorded in kilograms (kg) measured to the nearest 0.1kg[57] Height (Ht) was measured without shoes and the subject standing upright and looking straight ahead (coronal plane) with the aid of a stadiometer and recorded to within 0.1cm[57]. The body mass index (BMI) was then calculated with the formula[57].

BMI = Weight(kg)/ Height (m^2).Blood pressure was measured to the nearest 2mmHg with the patient in the sitting position and having rested for at least 5 minutes, using a standard mercury sphygmomanometer, with the stethoscope applied to the antecubital fossa.

Data Analysis: Data was entered into the SPSS version 16 spreadsheet after checking for correctness and completeness. Data was analyzed using SPSS version 16 and presented in tables and charts. Summary statistics and measures of dispersion were calculated for quantitative variables. Tests of significance were carried out using Chi-square tests.

Classification of knowledge and practice was based on a scoring system designed by the researcher where each correct response was scored a point and each wrong or 'don't know' answer scored zero points.

Grading score: A score < 50% was graded poor, between 51- 69% was graded fair and ≥70% was graded good.

Ethical issues: Ethical approval was sought from the ethics and research committee of the University of Benin Teaching Hospital. Informed consent was also obtained from the participants in this study after counselling (see Appendix II). Other ethical issues include counselling the patients on the prevention of diabetic complications.

Results

A total of 100 diabetic adult patients attending the consultant outpatient department of UBTH were interviewed.

Table 1 shows the sociodemographic data of respondents. A total of a hundred (100) respondents participated in the study out of which sixty-one (61%) were females. The ages of the respondents ranged between 35-79 years with a mean age of 59.04 (SD 10.7). Thirty-two (32%) of the subjects had a tertiary level of education.

The results are shown below.

Table 1: Sociodemographic data of respondents

Age Group (years)	Frequency (n = 100)	(%)
30-39	2	2.0
40-49	20	20.0
50-59	25	25.0
60-69	35	35.0
70-79	18	18.0
TOTAL	**100**	**100**
Sex		
Male	39	39.0
Female	61	61.0
TOTAL	**100**	**100**
Level of Education		
None	13	13.0
Primary	37	37.0
Secondary	18	18.0
Tertiary	32	32.0
TOTAL	**100**	**100**

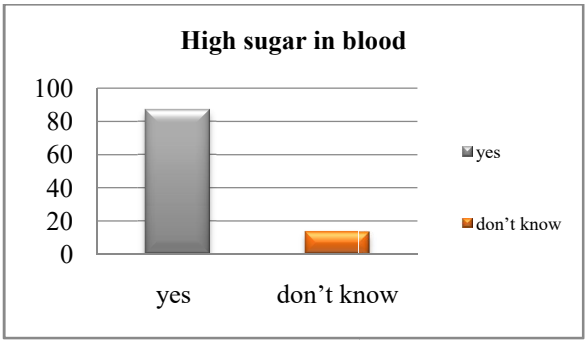

Figure 1: Knowledge of the meaning of diabetes

Of the one hundred respondents eighty-seven (87%) knew that diabetes represents elevated blood sugar.

Table 2: Knowledge of Whether Diabetes Is Curable

Diabetes is curable	Frequency	(%)
Yes	24	24.0
No	55	55.0
Don't know	21	21.0
Total	**100**	**100.0**

TABLE 3: Knowledge of method of diabetic monitoring

Monitoring DM by blood sugar check	Frequency	(%)
Yes	87	87.0
No	4	4.0
Don't know	9	9.0
Total	**100**	**100.0**

Eighty-seven respondents (87%) knew that monitoring diabetes is via regular blood sugar check.

Table 4: Knowledge of the benefit of exercise

Is exercise beneficial?	Frequency	(%)
Yes	72	72.0
No	6	6.0
Don't know	22	22.0
Total	100	100.0

Only seventy-two (72%) knew the benefit of exercise to the diabetic patient.

Table 5: Knowledge of the benefits of cigarette smoking cessation

Cigarette smoking	Frequency	(%)
Yes	67	67.0
No	10	10.0
Don't know	23	23.0
Total	100	100.0

Only sixty-seven (67%) respondents thought that cessation of smoking is beneficial to the diabetic.

Figure 2: Bar chart showing knowledge of the benefits of alcohol cessation

Only sixty-nine (69%) respondents knew that stopping alcohol consumption is of benefit to the diabetic.

Table 6: Knowledge of diabetic complications

Graded complication	Frequency	(%)
Fair knowledge	21	21.0
Good knowledge	72	72.0
Poor knowledge	7	7.0
Total	100	100.0

Of the hundred respondents, seventy-two (72%) had good knowledge of diabetic complications while only seven (7%) were poorly informed of diabetic complications.

Table 7: Adherence to prescribed drug use

Takes drug as prescribed	Frequency	(%)
Yes	94	94.0
No	6	6.0
Total	100	100.0

Ninety-four (94%) of the total respondents adhered to the use of prescribed anti-diabetic medications.

Table 8: Practice of self-monitoring of blood glucose with personal glucometers

Own a Glucometer	Frequency	(%)
Yes	54	54.0
No	46	46.0
Total	100	100.0

Among the participants, only fifty-four (54%) owned a personal blood sugar monitoring device.

Table 9: Showing the distribution of body mass index of respondents

Graded BMI	Frequency	(%)
Normal weight	15	15.0
Overweight	37	37.0
Mild obesity	38	38.0
Moderate obesity	8	8.0
Morbid obesity	2	2.0
Total	100	100.0

Only 15% of respondents had normal weight while 37% of the subjects were overweight.

Table 10: The level of overall knowledge of diabetes among respondents

Knowledge	Frequency	(%)
Fair knowledge	24	24.0
Good knowledge	62	62.0
Poor knowledge	14	14.0
Total	100	100.0

A total of sixty-two (62%) respondents had a good overall knowledge of diabetes mellitus i.e. knowledge of what diabetes means, monitoring, lifestyle modification such as physical exercise, dietary discipline, cessation of smoking, and alcohol use.

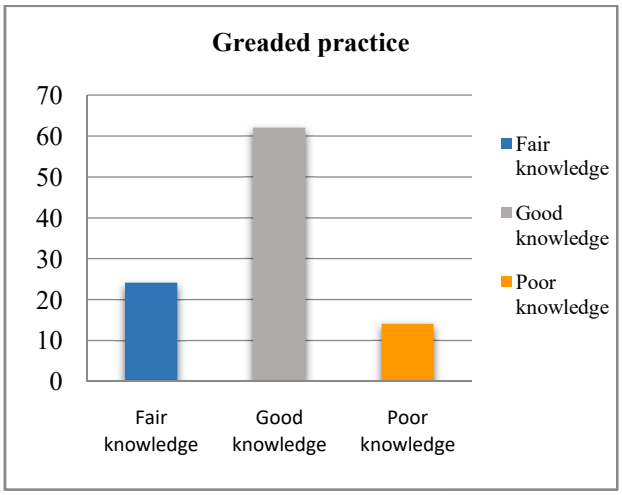

Figure 3: Showing practice of respondents of self-care

The above figure shows that a total of fifty-five (55%) respondents had a fair practice of self-care i.e. eating a prescribed balanced diet, taking the prescribed medications, and avoiding herbal medicines.

Table 11: Marital status and knowledge of diabetes.

Knowledge	Marital Status			TOTAL (%)
	Married (%)	**Separated (%)**	**Widowed (%)**	
Fair knowledge	22 (25.3)	1 (16.7)	1 (14.3)	24 (24)
Good knowledge	59 (67.8)	0 (0)	3 (42)	62 (62)
Poor knowledge	6 (6.9)	5 (83.3)	3 (42.9)	14(14)
Total	87 (100)	6 (100)	7 (100)	100 (100)

Of the total respondents good knowledge was demonstrated by 59 (67.8%) married subjects, 3(42.9%) widows while 22 (25.3%) married subjects, 1 (16.7%) separated and 1 (14.3%) widowed subjects had a fair general knowledge of diabetes. Respondents who demonstrated poor knowledge included 6(6.9%) married, 5(83.3%) separated and 3(42.9%) widowed subjects.

There was a significant association between marital status and general knowledge of diabetes (p = 0.001).

Table 12: Practice of self-care and level of education

Practice	None (%)	Primary (%)	Secondary (%)	Tertiary (%)	Total
Fair practice	7 (53.8)	23 (62.2)	5 (27.8)	20 (62.5)	55 (55.0)
Good practice	3 (23.1)	11 (29.7)	13 (72.2)	12 (37.5)	39 (39.0)
Poor practice	3 (23.1)	3 (8.1)	0 (0)	0 (0)	6 (6.0)
Total	13 (100.0)	37 (100.0)	18 (100.0)	32 (100.0)	100 (100.0)

Chi square = 19.466, df = 6, p = 0.004

Of the total respondents 12 (37.5%) with tertiary level of education, 13(72.2%) with secondary education, and 11 (29.7%) with a primary level of education had good practice of diabetic self-care. 3 (23.1%) subjects with no education also had good practice. Similarly, none of the respondents with tertiary and secondary levels of education had poor practice. 3 (8.1%) subjects with

primary education and 3 (23.1%) subjects with no education had poor practice.

There was a significant association between level of educational attainment and self-care of the respondents (p = 0.004).

Table 13: Practice of self-care and marital status

Graded Practice	Married (%)	Separated (%)	Widowed(%)	Total (%)
Fair practice	50 (57.5)	3(50.0)	2(28.6)	55(55.0)
Good practice	32 (36.8)	3(50.0)	4(57.1)	39(39.0)
Poor practice	5(5.7)	0(0)	1(14.3)	6(6.0)
Total	**87 (100.0)**	**6(100.0)**	**7(100.)**	**100(100.)**

Chi =3.070, df =4, p =0.543

Among the respondents with good practice, thirty-two (36.8%) were married, three (50%) were separated and four (57.1%) were widowed. Similarly, subjects with poor diabetic practice included five (5.7%), none separated, and one (14.3%) widowed subjects.

There was no significant association between marital status and graded diabetic care (p =0.543)

Table 14: Showing practice of self-care and level of education

Graded Practice	None	Primary	Secondary	Tertiary	Total
Fair Practice	7 (53.8)	23 (62.2)	5 (27.8)	20 (62.5)	55 (55.0%)
Good Practice	3 (23.1)	11 (29.7)	13 (72.2)	12 (37.5)	39 (39.0%)
Poor Practice	3 (23.1)	3 (8.1)	0 (.0)	0 (.0)	6 6.0%
Total	**13 (100.0)**	**37 (100.0)**	**18 (100.0)**	**32 (100.0)**	**100 (100.0)**

Chi = 19.466, df =6, p = 0.004

Among the survey participants with good diabetic self-care twelve (37.5%) had tertiary education, while thirteen (72.2%) and eleven (29.7%) had secondary and primary level of education respectively. Subjects with poor practice included three (23.1%) subjects with primary education and three (23.1%) subjects with no education. Respondents with tertiary and secondary levels of education had no poor practice.

There was a significant association between graded practice and level of education (p = 0.004)

Discussion

Diabetes is an important cause of morbidity and mortality all over the world. Because of a lack of awareness about diabetes, most patients with diabetes suffer from its complications[58].

Most studies on the knowledge, attitude, and practices of diabetes carried out in Africa and elsewhere target patients with diabetes. The study was carried out amongst diabetic subjects attending the consultant outpatient clinic of the University of Benin Teaching Hospital for follow-up to assess their attitude, knowledge, and practice towards diabetic complications.

A total of 100 subjects (39 males and 61 females) were consecutively enrolled and all completed the study. The female preponderance of respondents could be attributed to their higher health-seeking behaviors compared to their male counterparts. The overall mean age of the respondents was 59.04 ± 10.7 years. About one-third of the respondents had a tertiary level of education closely followed by subjects that attained secondary education. Only about one-eight of the respondents had no formal education. The level of education of the respondents may not be unconnected to the fact that the University of Benin Teaching Hospital is closely sited to tertiary and secondary institutions of learning.

Close to two-third of respondents had good overall knowledge of diabetes. This does not come as a surprise as a large chunk of the respondents had good educational background. This finding is higher than that of Puepet and colleagues[59] who reported a 30% level of knowledge among diabetic respondents in Jos. Dinesh et al., in a similar study in western Nepal, noted a lack of awareness of diabetes even in patients who had had the disease for a long time[60]. Even in a developed country setup, Baradaran and Jones also found that knowledge about diabetes amongst ethnic groups in Glasgow was very low[61].

The difference in the level of knowledge may be attributable to differences in the characteristics of the respondents. At the moment, there are no comprehensive primary care programs for diabetes in the country, and diabetes health education is done within health facilities through microteaching and only targets subjects with diabetes. This therefore leaves the rest of the public ignorant of the disease. Most of the diabetes health promotion efforts by different stakeholders are uncoordinated and the messages are not standardized due to lack of clear guidelines regarding diabetes education[61]. Also very importantly, there is even low knowledge of diabetes among healthcare workers who are expected to deliver health education to the community[62,63]. Diabetes prevention interventions need to target health education directed to the community and the health care providers. Good knowledge of diabetes among caregivers is directly related to the quality of care given by such providers. Education of patients, likewise, improves compliance with treatments and leads to favorable treatment outcomes. This is due to the direct influence of knowledge on the attitude and practices of both the caregiver and the patients [64].

A little above half of the respondents (55%) had good practice of diabetic self-care. This may stem from the fact that regular health talks are given on each clinic visit and also majority of the respondents are members of the Diabetic Association of Nigeria, a patient-doctor mix that seeks to improve patients' knowledge and coping skills with the ailment. However, knowledge about a subject does not always translate to good practice of the subject matter, as Altamimi and Peterson demonstrated that women continued to consume sweetened foods, even though they knew about the deleterious impact of sugar on oral and dental tissues[65]. Knowledge does not always result in behavior change and needs to be reinforced [66].

It is therefore important to identify interventions that reinforce peoples' attitudes despite their levels of knowledge of a particular subject[67]. Proper education and awareness programs have previously been shown to change the attitude of the public regarding diabetes. Improving the knowledge of people can improve their attitude toward diabetes and in the long run change their practices to embrace healthier lifestyles such as eating healthy foods, and engaging in physical activity [68]. Such practices will minimize the risks for diabetes in the general public and delay the onset of complications in those already diabetic.

Above two-thirds of respondents with good knowledge were married and was significantly associated ($p = 0.001$). It's possible that this may not come as a surprise. As partners of the respondents may play a significant role in care giving which includes ensuring regular clinic visits where health-talks are given. This lends further credence to the adage that states that what affects one directly impacts everyone other indirectly. Undoubtedly, an individual's illness could have a profound impact on their family, finances, work, and community. It is important to recognize that societal challenges affect everyone.

The overall knowledge of respondents was significantly influenced by their level of education as majority of respondents with good diabetic knowledge were those with good level of educational attainment. This compares to similar findings in a study conducted in India, which concluded that low scores were common with poor formal education, thus confirming the relationship between education and knowledge.[69] The role of formal/school education is further confirmed by a related study from Italy where the presence of foot complications was correlated with insulin treatment, cigarette smoking, and low levels of school education.[70]
Likewise, there was a positive correlation between good practices and school education.

This further confirms the allusion that the enlightened mind is better able to appreciate and understand the health awareness talks/lectures given at each clinic visit. In the same vein, the educated subject is likely to research into his/her ailment and the options available to him/her. In this study about three-quarters and one-third of respondents with secondary and tertiary education respectively had good practice. Thus, education has a strong relationship with knowledge and practices about diabetic care. This finding, however, contrasts a European study that suggested that uneducated people are more knowledgeable about diabetes and its damage[71].

More than one-third of married respondents had good diabetic practice. This is in contrast to the married respondents with good knowledge of diabetes (67.8%).

The likely explanation for this disparity may not be unconnected to the prevailing economic situation in the country and the need for the married respondents to work harder to make ends meet. Evidence indicates that diabetes self-management education using empowerment models improves patient outcomes.
Barely above half of the subjects had a personal blood sugar monitoring machine. This is not unexpected as the present economic crunch bites hard on the finances of respondents, thereby making them spend the available lean resources on drugs and medicaments.

Obesity, an independent risk factor for diabetic complications including cardiovascular events, was demonstrated in close to half of the patient respondents while more than one-third of subjects were overweight. The harsh living standards of the present times do not afford most people the luxury of the time to engage in physical exercise despite its perceived immense health benefits.

This finding is comparable to that of a study in Asia where a concurrent increase in the prevalence of overweight and obesity was observed in many Asian countries[72]. In rural areas of China, the percentage of overweight individuals has increased significantly over the years. In men, the rate has gone up from 5.3% to 13.6%, and in women, it has increased from 9.8% to 14.4% between 1992[73] and 2002[74]. More recent statistics from the 2015 China Health and Nutrition Survey (CHNS) showed that prevalence rates of 48.2% for women and 50.7% for men in rural China indicate that over half of the adult population is now affected by overweight and obesity.[75,76,77]. This rise in overweight cases has also been linked to a higher incidence or prevalence of diabetes in several studies conducted in Asia.[78]

Conclusion

These findings imply that while diabetic individuals have strong general knowledge, they do not practice self-care well. The respondents' self-care and degree of educational achievement were significantly correlated. This study also shows a substantial correlation between graded practice and educational attainment.

Recommendation

From the findings of the foregoing study, the following recommendations are being suggested;

It is unquestionably essential for well-coordinated medical teams across the nation to continuously work on health education and promotion initiatives aimed at improving self-care participation and early detection and treatment.

Increased public awareness of the global diabetes epidemic through media, including television commercials and radio jingles, emphasizing the importance of leading a healthy lifestyle to slow down this trend.

To maintain adherence to prescriptions and lower the incidence of diabetic complications, health practitioners should better and consistently raise awareness of the improved personal engagement of all diabetics in their care and treatment.

It is recommended that managing primary care physicians urge all diabetics to maintain acceptable and healthy body habitus through regular, concentrated, and well-coordinated physical exercise.

Limitations of study

The accuracy of responses in a questionnaire is dependent on the memory and honesty of the respondents, which is typically considered reliable. However, the entry of responses is subject to interpretation by interviewers, which can lead to misrepresentation of the data. This risk is reduced by training interviewers and selecting individuals with medical backgrounds. In the study, the researchers did not inquire about the sources of health information used by the subjects. This information would have been useful in determining the most effective media for promoting health interventions.

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