

# Attitudes of patients and their family members towards nutrition and exercise for diabetic care in rural areas of South Africa



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## Abstract

To Individual's attitudes towards diabetes treatment can influence adherence. Nutrition and exercise are critical in diabetes care, and its non-adherence increases chance of patients and family members developing complications and diabetes, respectively. This study determines attitudes of patients and their family members towards nutrition and exercise diabetes care. Quantitative approach and cross-sectional design used and included 400 participants (200 patients and 200 family). Patients were selected using systematic random sampling from clinics in Senwabarwana, whereas family members were obtained through sampled patients. Two close-ended questionnaires for patients and family were used to collect data. Data analysis was through statistical package for social sciences software. Descriptive and inferential statistical analysis was conducted. Most patients (73%) and 25% of family had positive attitude. Patients (56%) and 61% of family are too old to change how they eat. Patients mentioned that they too old (23.5%), too sick (21.5%), too fat (21.5%) and too busy (20%) to exercise. Patients had positive attitude and likely to adhere to dietary and exercise diabetes treatment. Family members had negative attitude. Therefore, family members must be involved in diabetes care, empowered and motivated to lead healthy lifestyle to positively influence patients and minimize chances of developing considering family history.

## Introduction

Diabetes Mellitus (DM) is chronic disease, requiring lifestyle intervention which includes healthy eating and increased physical activity, which could help in putting disease under control and/or minimize chances of developing diabetes [1,2]. Diabetes management enormously depends on the ability of patients to self-care in their daily lives activities [3]. Adherence to diabetes self-care is associated with improved glycemic control, and reduction of chances of developing complications [4].

Similarly, appropriate self-care activities among vulnerable family members of diabetes patients minimize chances of developing diabetes. South Africa like many other countries within the globe, experiences increasing diabetes prevalence with prevalence rate of 12.9% [5]. Worse, over 2 million South Africans are estimated living with undiagnosed diabetes mellitus [5]. Diabetes is amongst the leading cause of death in all districts of South Africa [6]. Attitudes were found to be a significant factor in the management of diabetes. It has direct or dynamic influence on

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**KEYWORDS**

- Attitudes
- diabetes patients
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- exercise
- nutrition

behavior and adherence to treatment; as such change in beliefs or attitudes could lead to taking appropriate action in behavior [7].

Attitude is regarded as positive/negative behaviors an individual's acquires through experience. It is significant to alter false perceptions and attitudes towards diabetes so as to help individuals develop positive attitudes [8]. According to Muchiri, Gericke and Rheeder, attitudes are considered as the most important determinants of behavior change among diabetes patients [9]. It has been found that individuals' perception and attitudes towards the disease influences how they deal with it. A study on the diabetes attitudes involving patients and community members reported very poor attitudes against diabetes [10]. A comparative study reported that diabetes patients with positive attitudes towards their diabetes are more likely to adopt an active lifestyle, than those with negative attitudes. So far, studies have reported poor attitudes towards diabetes and its treatment, despite benefits related to positive diabetes attitudes [11,12]. A South African cross-sectional study which assessed attitudes among Type-2 Diabetes Mellitus (T2DM) patients in the Free State reported negative attitudes towards diabetes among patients, which may contribute to morbidity and mortality [13]. In contrast another South African cross-sectional study which also assessed attitudes among T2DM patients in Gauteng reported positive attitudes towards diabetes treatment and lifestyle modifications, which may contribute to better diabetes outcomes [14].

Positive attitude towards diabetes management together with family support were associated with adequate diabetes management [15]. However, on contrary a mixed method study reported that family behaviors may negatively impact diabetes management, particularly when having negative attitudes [16]. Positive attitudes towards diabetes and its treatment are associated with the improved self-care practices, adherence to dietary plan, exercise, and medication [17]. Hence it becomes essential to understand attitudes towards diabetes and its treatment. It has been established that misguided attitudes towards the diseases and its management is contributing factor to poor diabetes outcomes [18]. Individual patient's attitudes could influence adherence to diabetes treatment, particularly nutrition and exercise modification which are found to be a cornerstone in diabetes management [19,20]. Non-adherence to dietary and exercise care could predispose patients to

complications and family members at added risks of developing diabetes considering family history [21]. On those grounds, this study seeks to determine attitudes of patients and their family members towards nutrition and exercise diabetes care of outpatients.

**Methodology****■ Research method and design**

A quantitative method and cross-sectional study design were adopted to describe attitudes of participants.

**■ Study setting**

Our study was conducted in selected clinics of Senwabarwana, which has total number of 22 clinics, and 2 health centers. The clinics at the area refer patients needing further attention to the only existing hospital. Senwabarwana is rural based and situated in blouberg municipality of capricorn district, limpopo province in South Africa.

**■ Study population and sampling**

Target population in this study was diabetes patients and their non-diabetic family members. A total of 400 participants (200 DM patients and 200 non-diabetic family members) were incorporated in this study. Diabetes patients were sampled using a systematic random sampling technique where every second patient was recruited verbally at the clinics for the study. The sample size of patients was determined from a population of 406 patients, using Yamane formula [22]. This is as follows;

$$n = \frac{N}{1 + N(e)^2}$$

Where n=Sample size, N=Population size (N=406), and e=error margin (5%).

The sample size calculation yielded 203 which were rounded-off to 200. An extra 10% of the sample which amounted 20 were included to cater for spoilt or incompletely filled questionnaires. Eligibility criteria for diabetes patients to participate in the study were diagnoses with type 1 and 2 diabetes and on treatment, with or without comorbidities, and had lived with diabetes for six months. The selected diabetes patients were requested to bring their non-diabetic family members who are not on treatment and above the age of 18 years. The family members included spouses, children and siblings who are primarily involved in the care of patients.

■ Data collection and instruments

Data were gathered utilizing two self-administered close-ended questionnaires for both patients and their family members. All questionnaires had two sections i.e., demographic-profile, and attitudes related to nutrition and exercise diabetes care. The questionnaires differed mainly on socio-demographic data. The sociodemographic data section for patients' questionnaire had additional questions such as number of years living with diabetes, comorbid conditions and how they control diabetes. The attitude section of questionnaires differed only on how the questions were phrased. Seven and twelve questions were utilized to establish attitudes towards nutrition and exercise diabetes care, respectively. The questionnaires were pre-validated and derived from the study by Keakile and Skaal, and included the 3-point likert scale were used for knowledge ("Agree, Neutral; Disagree") [23]. Moreover, the questionnaires were piloted in non-participating clinics to test for reliability and yielded no changes. Content validity of the questionnaire was ensured using dietitians and supervisors, as well as literature review.

■ Data analysis

Quantitative data analysis was done through coding data and entered it into the Statistical Package for Social Sciences for analysis. Attitude was scored on an overall scale of 100% and classified into 2 categories, i.e., negative, and positive. Negative attitude refers to achievement of a total score of between 0%-50%, while positive attitudes refer to achievement of a total score of between 51%-100%. Descriptive statistics was used where frequency distributions, means, and standard deviations were calculated. Chi-squared test was used to calculate associations @ 95% confidence interval, where p-value of <0.05 was considered statistically significant.

■ Ethical consideration

Our study was approved by Turfloop Research Ethical Committee (TREC) and allocated clearance certificate number TREC/35/2019: PG. The Limpopo Department of Health (DOH) gave permission to conduct the study with Ref: LP 201903-007. All participants gave written informed consent. Participation was voluntary and participants were informed about their rights to withdraw from the study at any stage without penalty. Privacy and confidentiality of the participant's data were also maintained.

Results

■ Demographic profile of participants

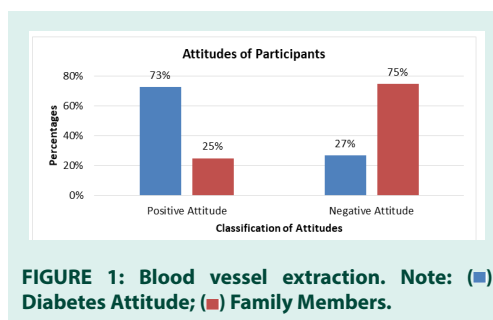
Most of the patients (65%) and less than a third of family members (27%) were respectively 61 years old and above. Majority of patients (81%) and over a third of family members (36%) had primary education. Majority of patients (74.5%) and less than half of family members (46%) were married. Also, 75.5% of diabetes patients had comorbidity is shown in TABLE 1.

**TABLE 1: Demographic profile of participants.**

Demographic data		Diabetes patients (n=200)	Family members (n=200)
Age groups	≤ 60 yrs	70 (35%)	146 (73%)
	61 yrs	130 (65%)	54 (27%)
Gender	Male	37 (18.5%)	48 (24%)
	Female	163 (81.5%)	152 (76%)
Education	Primary or never been to school	162 (81%)	72 (36%)
	Secondary or higher	38 (19%)	128 (64%)
Marital status	Single	51 (25.5%)	108 (54%)
	Married	149 (74.5%)	92 (46%)
Comorbidity	Yes	151 (75.5%)	
	No	49 (24.5%)	

■ Overall attitudes of participants regarding nutrition and exercise diabetes

Most of diabetes patients had positive attitude (73%), compared to only 25% of family members is shown in FIGURE 1.



**FIGURE 1: Blood vessel extraction. Note: (■) Diabetes Attitude; (■) Family Members.**

Significant association between levels of attitudes and education of patients (p-value=0.031), and no significant association with education of family members (p-value=0.095). Moreover, there is no significant association between levels of attitudes and gender of patients (p-value=0.737) and significant association with gender of family members (p-value=0.000) is shown in TABLE 2.

Most diabetes patients are willing to follow recommended diet plan (95.5%), and avoid certain food when advised (94.5%). and at time

intervals as recommended (93%). Over half of the participants indicated that they are too old to change how they eat (56%), and too late to start checking what to eat and not to eat (56%) is shown in TABLE 3.

Most of diabetes patients are willing to do regular exercises (91%). Less than a third of participants indicated that they are too old (23.5%), too sick (21.5%), too fat (21.5%) and too busy (20%) to exercise. Also, less than a third of participants highlighted that diabetes (18.5%) and culture (25%) prevent them from exercising, while only 19% of participants indicated that it is too late for them to exercise is shown in TABLE 4.

Most family members are willing to follow diet plan recommended for diabetes patients

(93.5%), and avoid food patients was advised to avoid (94.5%). Close to two-third of family members believe patients are too old to change how he/she eat (61%), while half of family members said it is too late for their patients to start checking what to eat and not to eat (50.5%) is shown in TABLE 5.

Most family member is willing to join patients in doing regular exercises (89%). Over half family members indicated that patients are too old to exercise (57%), while close to half believe patients are too sick to exercise (45.5%). Most family members disagreed that patients are too fat (84.5%), too busy (80%) and that it is too late (77.5%) to exercise is shown in TABLE 6.

**TABLE 2: Overall attitudes of participants by socio-demographic profile.**

Attitude of participants vs socio-demographic profile		Overall attitude				P-values	
		Negative attitude		Positive attitude			
		DM	Family	Patients	Family	Patients	Family
Age	≤ 60 yrs	16 (8%)	92 (46%)	54 (27%)	29 (14%)	X2=3.592 P=0.309	X2=0.334 P=0.563
	>60 yrs	39 (20%)	58 (29%)	91 (45%)	21 (11%)		
Gender	Male	11 (5%)	45 (22%)	26 (13%)	2 (1%)	X2=0.113 P=0.737	X2=14.101* P=0.000
	Female	44 (22%)	105 (53%)	119 (60%)	48 (24%)		
Education	Primary or less	50 (25%)	49 (25%)	112 (56%)	24 (12%)	X2=6.921* P=0.031	X2=2.788 P=0.095
	Secondary or less	5 (2%)	100 (50%)	33 (17%)	27 (13%)		
Marriage	Single	15 (7%)	81 (41%)	36 (18%)	26 (13%)	X2=0.125 P=0.723	X2=0.060 P=0.806
	Married	40 (20%)	69 (34%)	109 (55%)	24 (12%)		

**Note:** \*signifies statistical significance @ 95% CI.

**TABLE 3: Attitude of patients towards diabetes management through nutrition, % in rows; n=200.**

Attitude of patients towards diabetes management through nutrition	Agree	Neutral	Disagree
I can see a dietitian for diabetes nutritional counseling at least once every 6 months.	188 (94%)	2 (1%)	10 (5%)
I can control my diabetes with food so that it does not interfere with the things I want to do.	188 (94%)	2 (1%)	10 (5%)
I can follow my recommended diet even when I have to share food with other people who do not have diabetes.	191 (95.5%)	5 (2.5%)	4 (2%)
I am willing to avoid food that a dietitian or healthcare worker advises me to avoid.	189 (94.5%)	6 (3%)	5 (2.5%)
I can eat all my meals as per the time intervals recommended by dietitian or healthcare worker.	186 (93%)	10 (5%)	4 (2%)
I'm too old to change how I eat.	112 (56%)	3 (1.5%)	85 (42.5%)
It is too late for me to start checking what to eat and not to eat.	112 (56%)	4 (2%)	84 (42%)

**TABLE 4: Attitude of patients towards diabetes management through exercise, % in rows; n=200.**

Attitude of patients towards diabetes management through exercise	Agree	Neutral	Disagree
I can lead a normal life through regular exercise.	189 (94.5%)	6 (3%)	5 (2.5%)
I am willing to do regular exercise to prevent further complication due to diabetes.	182 (91%)	13 (6.5%)	5 (2.5%)
I am willing to do specially prescribed exercises as given by physiotherapist or healthcare worker.	187 (93.5%)	7 (3.5%)	6 (3%)
I will/wear footwear as recommended by physiotherapist when I go to exercise.	184 (92%)	7 (3.5%)	9 (4.5%)
I can see a physiotherapist for diabetes exercise counseling at least once every 6 months.	181 (90.5%)	3 (1.5%)	16 (8%)
I'm too old to exercise.	47 (23.5%)	13 (6.5%)	140 (70%)
I'm too sick to exercise.	43 (21.5%)	10 (5%)	147 (73.5%)
I'm too fat to exercise.	43 (21.5%)	8 (4%)	149 (74.5%)
My diabetes prevents me from exercising.	39 (19.5%)	8 (4%)	153 (76.5%)
I'm too busy to exercise.	38 (20%)	9 (4.5%)	153 (76.5%)
It is too late for me to exercise.	37 (18.5%)	7 (3.5%)	156 (78%)
My culture does not allow me to exercise.	50 (25%)	4 (2%)	146 (73%)

**TABLE 5: Attitude of family members regarding diabetes management through nutrition, % in rows; n=200.**

Attitude of family regarding diabetes care through nutrition	Agree	Neutral	Disagree
I can go with a family member living with diabetes to consult a dietitian for diabetes nutrition counseling at least once every 6 months.	148 (74%)	8 (4%)	44 (22%)
I can help family member with diabetes control his/her diabetes with food so that it does not interfere with the things he/she want to do.	178 (89%)	4 (2%)	18 (9%)
I can follow diet plan recommended for a family member living with diabetes.	187 (93.5%)	6 (3%)	7 (3.5%)
I am willing to avoid food that a dietitian or healthcare worker advises a patient to avoid in support of family member with diabetes.	189 (94.5%)	3 (1.5%)	8 (4%)
I can eat all my meals as per the time intervals a family member living with diabetes does as recommended by dietitian or healthcare worker.	191 (95.5%)	1 (0.5%)	8 (4%)
My family member living with diabetes is too old to change how he/she eat.	122 (61%)	2 (1%)	76 (38%)
It is too late for my family member living with diabetes to start checking what to eat and not to eat.	101 (50.5%)	5 (2.5%)	94 (47%)

**TABLE 6: Attitude of family members towards diabetes management through exercise, % in rows; n=200.**

Attitude of family regarding diabetes care through exercise	Agree	Neutral	Disagree
A diabetes patient can lead a normal life if he/she regularly exercises.	197 (98.5%)	2 (1%)	1 (0.5%)
I am willing to join family member with diabetes in doing regular exercise to prevent further complication due to diabetes.	178 (89%)	5 (2.5%)	17 (8.5%)
I am willing to join family member with diabetes in doing specially prescribed exercises as given by my physiotherapist or healthcare worker.	175 (87.5%)	7 (3.5%)	18 (9%)
I will/wear footwear as recommended by physiotherapist when I go to exercise.	167 (83.5%)	7 (3.5%)	26 (13%)
I can go with a family member with diabetes to consult a physiotherapist for exercise diabetes education at least once every 6 months.	161 (80.5%)	11 (5.5%)	28 (14%)
My family member with diabetes is too old to exercise.	114 (57%)	9 (4.5%)	77 (38.5%)
My family member with diabetes is too sick to exercise.	91 (45.5%)	10 (5%)	99 (49.5%)
My family member with diabetes is too fat to exercise.	36 (18%)	5 (2.5%)	159 (79.5%)
Diabetes is the type of disease which can prevent a person living with it from exercising.	23 (11.5%)	8 (4%)	169 (84.5%)
My family member with diabetes is too busy to exercise.	36 (18%)	4 (2%)	160 (80%)
It is too late for my family member with diabetes to exercise.	40 (20%)	5 (2.5%)	155 (77.5%)
Our family culture does not allow us to exercise.	45 (22.5%)	8 (4%)	147 (73.5%)

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**Discussion**

This study was aimed at determining attitudes of participants towards nutrition and exercise diabetes care. This study was carried on the basis that misguided attitudes towards nutrition and exercise diabetes treatment could be reason for poor diabetes control. Similarly, individual's attitudes toward diabetes treatment or lifestyle modification influences adherence to treatment or lifestyle modification, which helps in achieving good glycemic control or minimizing chances of developing diabetes. Diet and exercise are fundamental in the management of diabetes [24]. Therefore, it becomes essential to understand attitudes of patients and their family members regarding nutrition and exercise diabetes care, since most of care occurs at home.

Most diabetes patients (73%) and only 25% of family members had positive attitude regarding overall nutrition and exercise in diabetes management. Findings related to diabetes patients participants in this study are consistent with South African cross-sectional study which reported positive attitude among diabetes patients towards healthy lifestyle modifications.<sup>14</sup> Contrariwise, findings of diabetes patients' participants in this study are in contrast with an Indian cross-sectional study which reported negative attitude among patients about diabetes [25]. Previous studies showed a linkage between positive attitudes with appropriate behavior and subsequently diabetes outcomes [26]. Most of diabetes self-care happens at home, and that most of the self-care activities are carried by patients themselves or their family members [27]. Most family members who participated in this study had negative attitudes, which is associated with negative behaviors [28]. Therefore this study contends that negative attitudes towards nutrition and exercise diabetes care could impact negatively patient's treatment and outcomes. Again, this study argues that family member's negative attitudes among family members could be due to lack of knowledge regarding nutrition and exercise diabetes care. Adequate diabetes knowledge is associated with positive attitudes, 9 and helps in the alteration of misleading information which could have contributed to negative attitudes. However, this study acknowledges a limitation of not assessing knowledge of family members regarding nutrition and exercise diabetes care. Therefore, there is a need to assess knowledge of family members for appropriate intervention and subsequently improvement of attitudes.

This study showed that majority of diabetes patients indicated that they could consult dietitian (94%) and physiotherapist (90%) every 6 months for nutrition and exercise diabetes counseling. Moreover, majority of family members pointed out that they are willing to accompany family members with diabetes to consult both dietitian (74%) and physiotherapist (80.5%). These could attribute to the African philosophy of botho and further lays foundation for the introduction of family-centered care [29]. This approach enables partnership with family members in the care of patients [30]. Accordingly, it will assist in improvement of attitudes of family members towards nutrition and exercise diabetes care. Various studies have found association of socio-demographic profiles such as gender, age, income and education with positive attitudes and between positive attitudes and adherence to diabetes self-care. [31,32].

Sami et al., defines dietary attitude as beliefs, thoughts, and feelings about, behaviors toward, and relationships with food, and that influences influence people's food choices [33]. Over half of diabetes patients (56%) in this study indicated that they are too old to change how they eat and that it is too late for them to start checking what to eat and not to eat. Whist 61% and 50.5% of family members respectively indicated that their family members with diabetes are too old to change how they eat, and that it is too late for them to start checking what to eat and not to eat. These are regarded as negative attitudes towards dietary treatment since diabetes patients are never too old or too late for dietary modifications. Diabetes has been found to be most prevalent among the elderly and that patients should modify their dietary intake for better diabetes outcomes [34,35]. Therefore there is a serious need to for educational approaches to improve knowledge to alter misinformation and misguided attitudes. This study differs with Ugandan study which reported positive attitudes towards diet and willingness of patients to follow dietary prescription [36]. Conversely, this study affirms the Saudi Arabian cross-sectional study which reported existence of inappropriate dietary attitudes among diabetes patients which was accounted to cultural reasons.

Majority of patients (94.5%) and family members (98.5%) in this study showed positive attitudes towards exercise and its importance by indicating that diabetes patient can lead a normal life through regular exercises. This findings are similar to study which reported

that majority of patients had positive attitudes towards exercise [37]. In contrast, Al-Adsani, et al., found that diabetes patients had negative attitudes towards exercise and its importance in diabetes management [38]. Exercise plays a major role in the prevention and control of diabetes complications, improve insulin action, and assist with the management of blood glucose, pressure, lipids, cardiovascular risk, mortality, and quality of life. 5 Less than a third of patients indicated that they are too old (23.5%), too sick (21.5%), too fat (21.5%) and too busy (20%) to exercise. While, family members indicated that their family member with diabetes is too fat (84.5%), too busy (80%) and that it is too late (77.5%) to exercise. It is encouraging that most diabetes patients in our study pointed out that they are not too old, sick, fat, busy, late to start exercising, and that their diabetes and culture doesn't prevent them from exercising. However, it is worrisome that majority of family members who provides diabetes self-care support at home indicated that patients are too old to exercise, while close to half of the participants believe patients are too sick to exercise. Negative attitude towards nutrition and exercise can lead to obesity, which is central in developing diabetes or its complications [39]. Exercise should be encouraged from diagnosis, and throughout living with diabetes [40]. Therefore, there is a need to improve attitudes of family members through education and subsequently altering misinformation regarding exercising when sick.

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### Conclusion

Diabetes patients had positive attitudes towards nutrition and exercise diabetes care, whereas family members had negative attitudes. Patient indicated that they too old to change how they eat and too late to watch what to eat or not.

Similarly family members indicated that diabetes patients too old to change how they eat and those patients are too late to watch what they eat or not. An intervention for both diabetes patients and their family members to improve attitudes towards nutrition diabetes care is required. Patients indicated that they are willing to do regular exercises to put their condition under control, and that family members are willing to join them. Therefore, this study lays good foundation for home-based care centered on patient-family partnership. Further studies to assess factors affecting these attitudes are recommended.

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### Conflict of Interest

The authors report no conflicts of interest.

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### Authors' Contributions

Mphasha Pitso led this research project, including conducting data collection and interpretation and contributed 50% in writing this article. Skaal Linda analysed data and supervised data collection and interpretation and contributed 30% in writing this article. While Mothiba Tebogo co-supervised data collection and interpretation; and contributed 20% in writing this article. The final manuscript was approved by all the authors.

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