CHAPTER 3

BLACK FEMALE PATIENTS WITH TYPE 2 DM MELLITUS: KNOWLEDGE, ATTITUDES AND PHYSICAL ACTIVITY

INTRODUCTION

Type 2 DM Mellitus is a chronic disease that involves continuous self-care activities. These self-care activities must be followed on a daily basis, usually without direct supervision of a health care professional. [219] Attitudes and beliefs are a major component of health behaviour and adherence to the self-care regimen. Glasgow et al [191] found in a sample of 2000 participants that beliefs about treatment effectiveness to be a better predictor of self-management than perceived barriers to adherence.

According to the Social Cognitive Theory [179] adherence to the treatment regimen is influenced by knowledge, beliefs about one's ability to perform certain behaviours and the value of doing so, the skills to so and incentives for engaging in a particular behaviour.

The Theory of Reasoned Action [220] states that an individual's intention to adhere to the self-care regimen is determined by his/her attitude. Attitudes are determined by the individual's beliefs about the outcome of performing certain behaviour. Knowledge about patients' attitudes toward the disease and diabetes care is therefore necessary to understand their behaviour and to educate them. [221]

AIM OF PHASE ONE OF THE STUDY

The aim of this phase of the study was therefore to obtain baseline data from female Type 2 DM patients on their general health status, demographics, their knowledge of and attitudes towards diabetes and exercise, as well as their current physical activity levels.

METHOD

Ethical clearance for the study was obtained from the Ethics Committee of the Pretoria Academic Hospital (Number 116/99). The superintendent and matron of the Mamelodi Hospital also consented.

STUDY DESIGN

Demographic and quantitative data were captured by means of questionnaires.

SUBJECTS

The convenience sample comprised 93 female Type 2 diabetics between the ages of 36 and 70 years, attending the Diabetic Out-patient Clinic at the Mamelodi Community Hospital, east of Pretoria, in the Gauteng Province of South Africa, on a regular basis. The subjects were invited to participate from the waiting room of the Diabetes clinic (twice a week). The only exclusion criterion was mental incompetence. This research project was conducted simultaneously to a research project on the diabetic foot. Professor P Rheeder and team members conducted the last-mentioned project. Due to the relatively small number of men seen at the clinic, the study was restricted to women with Type 2 DM (diagnosed after the age of 30 years and insulin not used within the first year of diagnosis). Females were also chosen because it was thought that they would be more likely to keep research-related appointment visits than the men. This may have biased the sample.

Patients came for two visits, during which the interviews were conducted and the clinical data obtained. Patients were compensated for their transportation costs.

Data capturing started on the 27th of March 2000 and was completed on the 31st of July 2000. Four to six patients reported daily to the research venue at 08h00 on the morning of their appointments.

Each patient was welcomed, introduced to the research team members and asked the language of their preference. Informed consent was obtained from each patient after the aims, procedures and benefits of the study were explained to them. Subjects had an opportunity to ask questions before the consent form was signed, witnessed and each subject received a signed copy of her own consent form.

INSTRUMENTATION

Demographic, clinical, diabetes knowledge, diabetes attitude and physical activity data were captured.

The Diabetes Knowledge Form C (DKNC) scale was developed by Dunn and associates [29] and has been used in the elderly from a variety of ethnic backgrounds. The scale comprises of fifteen questions sampling knowledge in five broad categories. DKNC scores are expressed as raw scores out of 15, or as percentage of correct answers, with higher scores indicating better diabetes knowledge. The internal reliability (0.76) of the DKNC is moderate and acceptable for use with Type 2 DM –samples. [222] The scale was therefore regarded as valid.

The Modified Baecke questionnaire [30] on physical activity for older adults was developed to enable discrimination between physical active and inactive, elderly people living independently. It consists of scores for household and sporting activities and other physically active leisure time activities, for example gardening.

These scores, classified by an intensity code, together with data on the number of hours spent on the activity and the season of the year in which the activity was performed, resulted in a total activity score. In a study by Voorrips et al [30] the subjects at the upper end of the scale with an activity score higher than 17 were labelled the physically active group. Subjects at the lower end of the scale, with an activity score under 9, were labelled the "sedentary group". (Reliability = 0.89; Relative Validity = 0.72-0.78).

The Revised Diabetes Attitude Scale-III (DAS-III) [31] was used to assess the impact of diabetes education programmes on the attitudes of patients and to explore the relationship between attitudes and behaviour. It consists of five constructs, containing 35 Likert scale items (1, strongly agree; 2, agree; 3, neither agree nor disagree; 4, disagree; 5, strongly disagree). The scale was revised in order to simplify the wording of the original items and to eliminate technical terms and the reading level was lowered from 12th to the 10th grade. It was tested on a sample of 1202 patients, consisting of 65% female patients with a mean age of 50.7 years. The reliabilities for the five sub-scales ranged from 0.61 for the seriousness of Type 2 DM (3 items) to 0.71 for the need for special training (7 items). These reliabilities of the DAS-3 sub-scales are adequate for group comparisons.[31] All the scales were originally developed and validated in English.

RESEARCH PROCESS

ADMINISTRATION OF THE QUESTIONNAIRES

A trained multilingual interviewer was asked to freely translate the questionnaires into the idiom of the community. A second trained interviewer was asked to translate the questionnaires back into English. A pilot study was conducted during which the first interviewer asked the questions, while the second interviewer also completed the questionnaires. The completed questionnaires were then compared to see if the first interviewer interpreted the patients' answers correctly.

The same interviewer was used for the first 45 interviews, after which she was unavailable to continue with the work. A second trained multilingual interviewer was then used to complete the remaining 48 interviews. A trained observer, partaking in the diabetic foot project for the clinical data generally examined the patients and took the following measurements:

CLINICAL MEASUREMENTS

Height was determined to the nearest 0.1 cm using a measuring stick attached to the wall. Weight was determined to the nearest 0.1 kg standing barefoot in light clothing on a calibrated electronic scale (Tanita ®). These measurements were used to calculate the body mass index (BMI) for each subject.

The obtained BMI values were interpreted according to predicted BMI values as published by Manson et al [223] The predicted BMI values are demonstrated in Table 3.1.

TABLE 3.1

PREDICTED BODY MASS INDEX VALUES [223]

CLASSIFICATION	VALUE Kg/m^2
Normal	20-25
Pre-obese	25-29.9
Class I obese	30-34.9
Class II obese	35-39.9
Class III obese	≥40

Blood pressure measurements were taken in a sitting position using the right arm. A period of at least five minutes rest was allowed. A calibrated mercury Baumanometer was used to do the measurements.

Two measurements were taken at least one minute apart. If there was a discrepancy of more than 5 mmHg between readings, a third measurement was taken. The mean of the two closest measurements was used to determine mean blood pressure. (Reference values: Systolic blood pressure: optimal ≤ 130, acceptable 131-150, poor >150. Diastolic blood pressure: optimal ≤ 85, acceptable 86-90, poor >90).[224]

The HbA1c-value, (Beckman LX20®), which give an indication of the average blood glucose concentration over a six to eight week period and is a good monitoring test, was used. In the 88 patients who returned for their second visit 85 sets of blood samples were obtained. In two cases obesity precluded the investigators from obtaining sufficient blood samples. One sample was insufficient for analysis (Reference values: 4.5%-6.5%; acceptable < 2% points above normal; compromised > 2% points above normal).[225,226]

STATISTICAL ANALYSIS

Data were entered into a file on the Statistix -program on the computer, screened for missing values and range checked. Data were analysed using Statistix ®, StatSoft's Statistica® and Stata® software. Data were summarised with descriptive statistics, i.e. mean, SD, median, range, frequency and percentage. Pearson product-moment correlations were employed to assess relationships. Cronbach's alpha measured the reliability of the Revised Diabetes Attitude Scale-3 in this population. Alpha coefficients of > 0.70 was regarded as satisfactory, based on a recommendation by Nunnally.[227] A mean score was calculated for each sub-scale for each individual. Then the sample mean was calculated of the construct averages for the 93 subjects. The sub-scale scores were inter-correlated, using Pearson product-moment correlation.

RESULTS

The results are be presented in the following order:

Demographic, clinical, Diabetes knowledge scale, DAS-3 scale, Modified Baecke Scale and integrated results.

The demographics of this sample by age group, educational level, employment status and housing are provided in Table 3.2.

TABLE 3.2

DEMOGRAPHIC DATA

Demographics variables		N	%
Age	36-39	2	2
	40-49	13	14
	50-59	28	30
	60-69	48	52
	70	2	2
Educational level	None	16	17
	St 1-4	28	30
	St 5-7	34	37
	St 8-10	13	14
	Post St 10	2	2
Employment status	None	23	25
	Part-time	12	13
	Full-time	15	16
	Pensioner	43	46
Housing	Lives with partner	7	8
	Lives with family	81	87
	Lives alone	5	5

Eighty four percent of the sample group had schooling only up to Standard 7 (Grade 9). The sample consisted of 46% pensioners. The majority (87%) of the patients lived with their families at the time of the interviews. All the subjects in the sample were black females.

TABLE 3.3

CLINICAL DATA

Table 3.3 reflects the number of patients, mean, standard deviation, median and range for the clinical data of the sample.

Variable	N	Mean	SD	Median	Range
Age (years)	93	58.29	8.18	60.00	36-70
Weight (kg)	92	78.55	13.83	76.90	51.4-119.4
Height (cm)	92	156.71	5.74	156.20	144.5-173.3
BMI (kg/m^2)	92	31.96	5.14	31.51	20.88-45.61
Systolic BP (SBP) (mmHg)	93	149.94	25.59	147.00	96-205
Diastolic Blood Pressure (DBP) (mmHg)	93	89.09	11.09	90.00	60-120
HbA1c (%)	85	9.82	2.23	9.90	5.3-13.9

N = number of patients

SD = standard deviation

The sample can be classified as Class I obese. Mean score = 31.96 (31.51). Mean HbA1c- levels indicated that the sample group was in the acceptable to compromised category.

Mean systolic and diastolic blood pressure results indicated that the patients were in the acceptable category (mean = 149,94 mmHG). However, for the average systolic blood pressure, 43% were classified as poor control and for the average diastolic blood pressure, 38%.

Seventy five percent of the sample was on oral hypoglycaemic agents, with 21% patients using insulin for their diabetes.
Seventy six percent of the subjects were on treatment for hypertension.

TABLE 3.4

DIABETES KNOWLEDGE

The distribution of the scores in the five broad categories of the Diabetes Knowledge scale questionnaire is reported in Table 3.4.

Each item was assigned a score of one (1) for a correct response and zero (0) for an incorrect response. Items one to 12 in the questionnaire had a single correct answer. For items 13 to 15, several answers were correct and a score of one was allocated if all the answers were correct. Only scores of zero or one were used; for a partially correct answer, a score of zero was allocated.

Category of knowledge	N	Percentage of correct answers %
Basic physiology of diabetes including insulin action		
Insulin use during unusually heavy exercise	93	11
Effect of insulin on blood sugar	93	31
High blood or urine sugar level and insulin	93	13
Hypoglycaemia		
Normal range for blood glucose	93	52
Symptoms not associated with hypoglycaemia	93	38
Causes of hypoglycaemia	93	7
Food groups and substitutions		
Food group rice	93	75
Food rich in carbohydrate	93	73
Food group of which can eat limitless amount	93	54
Food approved by the diabetic clinic	93	0
Special diabetic foods	93	7
Sick day management		
Ill and unable to eat prescribed diet	93	18
Vomiting and diarrhoea	93	0
General diabetes care		
Preparation of food	93	23
Weight control	93	72

The mean (SD) total score of the Diabetes Knowledge scale for the sample group was 4.72 (2.05) and the median was 5.00. Scores ranged from zero to 11 out of 15. The percentage of correct answers was 31%.

A very low percentage of correct answers in the category on the basic physiology, including insulin action was seen. The sample scored higher in the category of knowledge about hypoglycaemia, but did not know the causes of hypoglycaemia. The subjects could answer the questions about basic food groups, but not the questions about special diabetic foods and food approved by the diabetes clinic. They were well informed about weight control in diabetes care, but scored low on the question about food preparation. Their knowledge about what to do when they become ill was nearly non existent.

TABLE 3.5

HOUSEHOLD, SPORT AND LEISURE TIME PHYSICAL ACTIVITY

The distribution of the total scores in household, sport and leisure time activities is reflected in Table 3.5.

Variable	N	Percentage %	Mean	SD	Median	Range
Household activities	93	100	2.05	0.56	2.10	0.10-3.40
Sport activities	3	3	0.01	0.10	0.00	0.00-0.94
Leisure-time activities	72	77	0.79	1.85	0.03	0.00-10.70

The total physical activity score resulting form the Modified Baecke Physical Activity Questionnaire ranged from 0.1 to 13.4. (Median = 2.23) The mean score (SD) for the questionnaire was 2.85 (2.09).

The subjects' physical activities mainly consisted of household physical activities and all the subjects did household physical activities to some extent:

- 62% always did light household work, like dusting, washing dishes, repairing clothes,
- 75% never or sometimes did heavy household work such as washing floors, windows, carrying garbage bags,
- the mean number of persons for whom they kept house was five,
- the mean number of rooms and floors they had to keep clean was one,
- 70% mostly or always prepared warm meals for themselves,
- 62% never used stairs on a daily basis,
- 68% of the sample used transport to move about in their hometown,
- 81% go shopping never or less than once a week and 80% travel by car to go shopping.

Only three subjects indicated that they were participating in a sport (two did bowling and one skipping) at the time of the interviews as can be seen from the low sport activity score.

Fifty-five (55%) of the subjects did physical activities consisting of walking, hand or arm and body movements. Seventy four percent did physical activities for only one to two hours per week and 83% indicated that they did physical activities for a period of less than one month per year.

The patients were asked if they had played any sport at school. Seventy three percent responded that they did take part in sport activities at school.

TABLE 3.6

ATTITUDES TOWARDS DIABETES AND ITS TREATMENT

Table 3.6 presents the descriptive statistics and Cronbach's alpha for each of the defined sub-scales after the items had been excluded.

The mean score for each sub-scale was calculated for the 93 patients. The items, which did not contribute to the reliability of the construct, as measured by Cronbach's alpha were excluded from the final analysis.
Individuals were classified into one of two groups. If an individual's score on a given sub-scale was less than 3.00, she was placed in the positive attitude group (Pos). If an individual's score was more or equal to 3.00, she was placed in the negative attitude group (Neg).

Sub-scale	N	No Of Items	Mean	SD	Range	Cron-bach's alpha	% Pos	% Neg
Special training	93	4	1.87	0.29	1.00-2.50	0.62	98	2
Seriousness of Type 2 DM	93	3	3.04	0.56	1.67-4.0	0.58	24	76
Value of tight control	93	3	2.79	0.49	1.67-3.67	0.55	37	63
Psychosocial impact	93	5	2.20	0.42	1.20-3.20	0.41	67	33
Patient autonomy	93	4	3.95	0.42	3.00-4.75	0.55	12	88

1 = Strongly agree

2 = Agree

3 = Neutral

4 = Disagree

5 = Strongly disagree

Pos = positive

Neg = negative

The mean is equal to the sample mean of construct averages. The reliabilities ranged from 0.41 for the psychosocial impact (5 items) to 0.62 for special training (4 items).

The sample mean reflects that the sample agrees with respect to sub-scale 1: the attitude that the health care professionals who care for patients with diabetes need teaching, counselling and change in behavioural skills. They also agree with respect to sub-scale 4: an attitude that diabetes usually has a substantial psychosocial impact on their lives.

The sample reacted neutrally with respect to sub-scale 2: that Type 2 DM is a serious disease. They also reacted neutrally to sub-scale 3: the relative value of tight glucose control.

The sample disagreed with respect to sub-scale 5, reflecting the attitude that patients should be the primary decision-makers regarding the daily self-care of their diabetes.
Individuals, who scored more or equal to 3.00, were placed in the negative attitude group. A substantial number of the responses for certain sub-scales was a "3", indicating a neutral response. The items with the highest neutral scores were item 21: *" ...Type 2 DM is a very serious disease"* and item 25: *"...Type 2 is as serious as Type I diabetes."*

The Pearson product-moment correlation for the five sub-scales is presented in Table 3.7.

TABLE 3.7

PEARSON PRODUCT-MOMENT CORRELATION BETWEEN SUB-SCALES

No	Sub-scale(SC)	SC1	SC2	SC3	SC4	SC5
1	Special training	-				
2	Seriousness of Type 2 DM	0.29	-			
3	Value of tight control	0.28	-0.01	-		
4	Psychosocial impact	0.41	0.11	0.17	-	
5	Patient autonomy	0.33	0.07	-0.27	0.12	-

No = sub-scale number

SC = sub-scale

The highest correlation between two sub-scales was between the need for special training and the psychosocial impact of the disease (r = 0.41). The remaining correlation was low to moderate, indicating that the sub-scales were measuring relatively independent attitudes; however, it is recognised that the sub-scale reliabilities are attenuating this correlation to some degree. [31]

The following variables were significantly correlated:

- Systolic blood pressure correlated significantly with the sub-scale: seriousness of Type 2 DM on the DAS-3 scale ($r = 0.22$; $p<0.05$).
- Blood glucose correlated significantly with the sub-scale Patient autonomy on the DAS-3 scale ($r = 0.28$; $p<0.01$).
- Systolic blood pressure also correlated significantly with patient autonomy ($r = 0.21$; $p<0.05$).

No statistically significant correlation between the indices of physical activity and age, BMI and blood glucose was found.

DISCUSSION

The principal findings of this study are that the participants know little about their disease and that they lead a sedentary lifestyle. The participants furthermore agree that diabetes has a negative impact on their lives and feel that health professionals taking care of them should be specially trained. Of importance is the fact that they disagreed with the attitude that they should be involved with decision-making about their health care, indicating a dependence of the health professionals.

The participants come from a cultural tradition where the patient is a passive participant in the consultation process. [202] They may therefore prefer a traditional, hierarchical, authoritarian approach to diabetes care. This factor may constitutes as a barrier to accept self-responsibility by these patients since they must belief that their actions will have an influence on their disease to commit to a change in life style. [220]

The total score of the Diabetes Knowledge scale (4.7), while very low, compares favourably to the score reported by Campbell. [228] He reported total scores of 4.8 to 5.8 out of a possible total score of 15 in a sample of 229 Type 2 DM patients, whose mean age was 59 years and of whom 52% were female. However Beeney and co-workers, [222] reported a mean score of 7.6, in a sample of 460 mostly older Type 2 DM population, which is 50% correct answers compared to the 33% of the current study.

The subjects' higher scores in the categories of knowledge about hypoglycaemia, basic food groups and weight control indicate that they had received some education, most probably at the Mamelodi Diabetes Clinic. The lack of knowledge about the basic physiology of diabetes, insulin action and causes of hypoglycaemia is an important finding, since 97% of the patients were on oral hypoglycaemic agents, insulin or a combination. The lack of knowledge of the subjects is further emphasised by the finding that only 52% of the sample knew what the acceptable HbA_{1c} value was.

On this issue, Beeney and co-workers [222] stated: " Patients with previous formal diabetes education who are not treated with exogenous insulin should still understand the physiological action of endogenous insulin secretion and its role in diabetes."

The low education level and the high mean age of the subjects can be considered as contributing factors to the lack of knowledge, since the ability of the elderly to learn and practise self-care, may be compromised by demographic and environmental factors. [2] Nilsson et al [229] report that the relative mortality risk is increased in women who are less well educated, single living and lacking socio-economic resources. Beckles et al[230] performed a population-based study among 48 315 adults with diabetes in 21 states in America. They found that insulin use, socio-economic status (as judged by level of education), access to care and extent of continuing education (as judged by awareness of HbA1c) were important factors related to diabetes management.

The measurement of knowledge remains important to diabetes management and is essential before an effective educational programme can be implemented. [231] Every patient should be provided with full and accurate information about the underlying patho-physiology of diabetes as a rationale for its treatment. Logically it would seem that more knowledge would enable the patient to put into practice those self-care behaviours, which will contribute to improvement in metabolic control. However, Tu and co-workers [219] performed a study on diabetes self-care knowledge, behaviours and metabolic control of older adults in a sample of 27 Type 2-diabetes patients. Their sample included 18 females and 13 black subjects with a mean age of 65 years. They reported that the focus of education for older adults with diabetes should be placed on effecting changes in self-care behaviours and that adherence should not be measured based solely on metabolic values.

This viewpoint is shared by Lockington et al [232] who did a study on knowledge profile and control on 72 Type 2 DM patients, mean age 58 years. They recommended that for good blood glucose control, a minimum level of knowledge is necessary above which other factors, including attitudes, health beliefs and motivation, are likely to be of much greater importance.

Another important finding of the study was that he subjects scored very low on the Modified Baecke Questionnaire on Physical Activity and clearly leading a sedentary lifestyle. [233] The more active subjects were doing household and leisure time activities, but not on a regular basis. In a study on 255 white postmenopausal women, aged 50-65 years, Cauley and co-workers [234] reported work, leisure and sport indices of respectively 2.7, 3.1 and 2.2. The household score of this study compares favourably with the one reported by Cauley and associates but the leisure and sport indices are much lower than the scores reported by them. Ligtenberg et al [235] showed a mean (SD) physical activity score of 8.7(5.2) in their study on the effects of physical training on metabolic control in 58 Dutch Type 2 DM patients with a mean age of 64 including 38 females. While only the total questionnaire score was reported, it was well above the total score obtained by the subjects in this study.

A decline in physical activity is generally observed with ageing and reduced energy expenditure. If energy intake is not adjusted, it may lead to overweight. The class I obesity status and sedentary lifestyle of this sample are risk factors for cardiovascular disease [225] and they may also lead to complications such as osteo-arthritis of the weight-bearing joints. [236] Overweight and obese people are less likely to engage in physical activity, because excess body weight may increase the difficulty of physical activity and this may lead to functional limitations. [237]

Hays and Clark [238] performed a study to assess physical activity behaviour and its correlates (i.e. physical activity knowledge, barriers and outcome expectations) in 260 older adults with Type 2 DM. They reported that individuals, who were older, had ≤ 12 years of education and perceived their health as fair or poor, were less likely to be physically active. They also showed that socio-demographic variables have an important influence on the odds of being physically active.

All the above mentioned factors are present in this study, such as the mean age of the subjects, the low level of education and clinical data. Therefore the encouragement of physical activity among these patients has become an important goal of preventative medical practice.

However, initiating and maintaining a physically active lifestyle is complex health behaviour. [237] Personal barriers to physical activity participation of these subjects are unknown and should be investigated.

Understanding the self-care behaviour of patients with diabetes and responding to their needs with appropriate patient education requires some knowledge of their attitudes toward the disease and diabetes care. Patients who report high levels of adherence for diet and exercise and monitoring reported higher levels of understanding diabetes, had more positive attitudes toward diabetes and better overall health. [31]

Ninety eight percent of subjects in this study agreed that there is a need for special training of health care professionals taking care of diabetes patients. (Cronbach's alpha = 0.62; Positive answers (Pos) = 98%). This finding shows that patients expect special expertise from their health care professionals. The results of this study correlate with a large study by Anderson et al, [31] consisting of 65% female subjects with a mean age of 51 years. They reported a Cronbach alpha = 0.71 and a percentage of positive answers of 99.7%.

The sample also agreed with the attitude that diabetes had a substantial psychosocial impact on their lives, which suggests that diabetes and its complications detract from the quality of life for most patients. (Cronbach's alpha = 0.41, % Pos = 67%). Anderson et al [31] reported a Cronbach's alpha of 0.68 and 94% positive answers for this attitude. They postulated that patients, who reported high adherence to exercise recommendations, expressed lower agreement on the sub-scale for negative impact of diabetes. The attitude of the participants that diabetes has a negative impact on their lives may therefore be a reason why they do not comply with instructions by the clinic staff to become more physically active. Westaway et al [224] reported that health status and quality of life were poorer for diabetic patients than for well persons staying in Mamelodi.

Pearson product-moment correlation between sub-scales in this study showed that the need for special training for health care workers correlated strongly with the psychosocial impact of the disease ($r = 0.41$). Anderson et al [31] found this correlation to be 0.35 in their study.

However, the neutral and negative responses to sub-scales 2, 3 and 5 are in contrast to results by Anderson and co-workers, [31] who reported positive responses to all three of the mentioned sub-scales. This finding suggests that the patients did not understand all the questions.

The revised Diabetes Attitude Scale was rewritten to eliminate technical terms and the reading level was lowered from the 12th to the 10th grade. However, it is clear that some of the concepts were unknown to the patients in the present study, for instance "*tight control*". One possible explanation may be the average low educational level of the sample. Despite the fact that the second interviewer received similar training to the first interviewer, the use of two interviewers may have influenced the results.

The process of translation of the measuring instruments into the idiom of the community was a limitation of this study. Although the process described by Anderson and associates [31] was followed, the free translation of the questionnaires may have resulted in altering the meaning of certain items. It is suggested that in addition to the translation process that was followed in the present study, diabetes educators, speaking the native language to clarify ambiguous words or terms should review the translated instruments. The instrument should then be pilot-tested with a sample of diabetic patients, and the understanding of each item of the instrument should be discussed with those patients. This may ensure that the patient's understanding of the terms used matches the investigator's definition.

CONCLUSION

In this study, baseline data were captured about the general health status, demographically profile, knowledge of and attitudes towards diabetes and exercise, as well as their current physical activity levels. The sample size was too small for the use of the instruments. Nunnely [227] stated that the sample size should have ten respondents per item in a questionnaire in order to test the reliability and validity of the instrument. However, the results can be used as baseline data. No attempt was made to control for extraneous factors such as stress, physical illness and the use of drugs, which can affect blood glucose levels.

The design of the study was sufficient to obtain baseline data, because all the data were collected at the same time and patients were contacted only once. The study was relatively cheap and easy to carry out, but contributed important new knowledge to our understanding of the female diabetics in Mamelodi.