

Knowledge, Attitudes and Practices of Diabetes Amongst Diabetes Patients at A Primary Health Care Centre in Durban, South Africa

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Abstract

Background: Diabetes Mellitus (DM) is considered a major public health problem in South Africa and Globally. The condition is not well-managed globally and in SA. The most important known intervention for prevention and management of DM is lifestyle modification which depends largely on the knowledge, attitude and practices of DM patients and general population. The objective of the study was to investigate the knowledge, attitudes, and practices on diabetes among DM patients.

Method: This was a cross-sectional prospective study conducted on diabetic patients attending a primary health care centre in South Africa between January to June 2018. Students t-test and ANOVA tests were conducted to find the mean difference of the knowledge, attitude, and practice scores among the demographic variables. Pearson's correlation test was conducted to find the relationship between Knowledge, attitudes, and practice towards DM. All statistical tests were performed using two-sided tests at the 0.05 level of significance.

Results: Most of the respondents were over the age of 45 years (87%), female (74%), had no education (58%) and unemployed (52%). Results showed that DM patients had poor level of knowledge, had better positive attitudes towards DM and the respondents were practicing positively towards the management of DM. DM patients in the age group of 46-55 years were practicing better towards DM compared to patients from age group of 25-35 years. It was also found that those had no income practiced significantly better than those earning >R3001 per month ($p < 0.05$). It was found that knowledge was moderately positively correlated with practice towards DM ($p < 0.05$).

Conclusion: The knowledge and practice levels of lifestyle modifications and control of type 2 diabetes mellitus patients attending KwaDabeka Community Health Centre were generally poor. Nevertheless, majority of these patients have positive attitude toward healthy lifestyle habits which could potentially be harnessed and translated into healthy lifestyle practices. Health education intervention through Health Care Workers might improve the knowledge, attitudes and practices of the DM patients regarding DM.

Background

Diabetes Mellitus (DM) is considered a major public health problem worldwide. The World Health Organization (WHO) has estimated that diabetes is considered the seventh cause of death, and DM is increasing rapidly globally as well as in South Africa (SA). The incidence, prevalence and burden of DM are increasing worldwide and SA [1, 2]. Type 2 DM is the most common aetiological type

(>90% of cases) and is predominated by disorders of insulin action (insulin resistance), with insulin deficiency relative to a predominant secretory defect such as disorders of insulin action and secretion. The condition is not well-managed globally and in SA. A major cause of blindness, renal failure, amputation and cardiovascular diseases are found as complications of DM. DM also increases the risk of cancer, dementia and more than doubles

individual's health care costs [3]. It is also found that less than half of DM patients on treatment meet optimal control in developed countries and fewer than 10% are found to achieve glycated haemoglobin (HbA1c) or glycaemic, lipid and blood pressure targets [4, 5]. More than two-thirds of DM patients on treatment in South Africa are found with HbA1c level above the generally recommended target of 7% [6].

The most important known intervention for prevention and management of DM is lifestyle modification which depends largely on the knowledge, attitude and practices of DM patients [6, 7]. Studies showed different level of knowledge, attitude and practices on life style modification. A recent study conducted among Saudi adults found that 53.5% of the participants had good knowledge scores [8]. A South African study conducted among DM patients from a district hospital reported that 92.2% of the patients had poor knowledge on the benefits of exercise, weight loss and a healthy diet. Contrary, 97.7% demonstrated bad practices in relation to lifestyle modifications, although 84.3% had a positive attitude toward healthy lifestyle modifications [9]. A Malaysian study conducted among DM patients found that 87% of the patients were knowledgeable with the disease, most of them had a positive attitude and had lifestyle modification practices [10]. Another study from India which was conducted among DM patients highlighted that majority of the patients had poor knowledge of lifestyle modification as a non-pharmacologic treatment [11]. Furthermore, in a study of 1982 diabetic patients in Kenya, only 28% of the participants had a good attitude toward lifestyle modification; 75% had poor dietary practice; and 72% did not exercise regularly [12]. A study undertaken at primary health care settings of KwaZulu-Natal province of SA among all racial groups of 181 DM patients found that 68% had good knowledge on DM. There was a higher level of knowledge in the female group than in the male with 69.8% and 60% respectively. Furthermore, the Indian patients (76%) showed higher level of knowledge than the Africans (52%) [13]. Studies conducted in Malaysia and Ethiopia to determine the relationship of knowledge, attitude and practice with the control of DM concluded a significantly negative correlation [14, 15].

KwaDabeka Community Health Centre (KCHC) is a Primary Health Care (PHC) facility that offers first level care for black African DM clients involving preventing, promotive and curative care. Those include diabetic education, screening and treatment of all cases of DM. Within this context, there was no previous study on this topic in this black-populated setting of Kwadabeka Township in South Africa. Therefore, the objective of this study was to investigate the knowledge, attitudes, and practices (KAP) of diabetes among DM patients attended at KCHC.

Method and Materials

Setting and Population: KCHC provides preventative, promotive and curative services including chronic and acute conditions, trauma, infectious diseases including HIV and TB, maternity and gynaecological services with free of cost for the people living in the communities of KwaDabeka and Clermont, the residence of over 150,000 black people. These communities are located within the municipal boundaries of Durban. Most of the dwellers are poor, unemployed, living in formal and informal (mainly) type of dwellings and having well-built cultural bond with rural people

of KwaZulu-Natal and Eastern Cape Provinces. DM and all other chronic diseases are managed at KCHC on 24 hours a day basis and is run by trained and skilled Clinical Nurse Practitioners (CNP) and Medical Officers (MO). There are about 4000 diagnosed DM patients registered for receiving chronic medications. There are about 80 DM patients attending KDCHC out-patients department (OPD) daily on a booking basis.

DM management Practices at KCHC

Screening, diagnosis and management of DM at KCHC is undertaken according to National Guidelines at the OPD. The Society for Endocrinology, Metabolism and Diabetes of South Africa (SEMDSA) develops and updates the National guidelines and provides supports for optimal management of DM in the country both for private and public sector [16, 17]. Once DM is confirmed, the following acts are considered; education of patients on healthy lifestyle including nutrition, physical activity and weight control, education of families about diabetes, drug treatment and complication of DM and management of it at home. It takes 2-3 months to adjust the drug therapy. During these periods, patients are given two weekly drug therapy and review. Once patients are stable with the therapy, they are monitored monthly for 6 months.

Study Design, Sample Selection, and Data Collection

This was a prospective descriptive study conducted as part of routine audit of diagnosed cases of DM attending KCHC between January to June 2018. A medium length, three-part patient questionnaire was developed and used to collect necessary variables for the study (demographic, and KAP) by two trained social workers. Four patients were selected using systematic random sampling method from the daily booking lists of patients on daily basis. If a selected patient refused to participate, the next chronologic patient was requested to participate until the next participant was found. A total of 240 patients were selected from those attended during the study period. Any DM type 2 patients who were diagnosed DM over 12 months and were coming for review of his/her treatment included in the study. The KAP questions were obtained from other study questionnaires [10, 17-20]. Section A of the questionnaire dealt with patients' socio- demographic information, while section B dealt with knowledge, attitude and practice on DM.

Exclusion: Pregnant women with DM and patients attending emergency room with complications of DM (hypoglycaemia or hyperglycaemia with coma/stupor) and type 1 DM.

Scoring on the questionnaires

The lifestyle modification knowledge, attitude and practice questionnaire had eight questions on knowledge of DM and benefits of exercise and weight loss, four questions on attitudes toward lifestyle modifications and eight questions on lifestyle modification and DM control Practices, respectively. Each correct answer by the participant for a question earned a score of '1' and each incorrect answer earned a score of '0'.

Data Analysis

Data were entered into a Microsoft Excel 2010 spreadsheet and imported to SPSS 22.0.1 for window version for analysis. The demographic and baseline outcome variables were summarized using descriptive summary measures: expressed as mean (SD) for continuous variables and percent for categorical variables.

Students t-test and ANOVA tests were conducted to find the mean difference of the knowledge, attitude, and practice scores among the demographic variables. Pearson's correlation test was conducted to find the relationship between Knowledge, attitudes, and practice towards DM. All statistical tests were performed using two-sided tests at the 0.05 level of significance.

Ethical consideration

The institutional review board approved the study prior conducting the study. Participation in the study was voluntary. Participants who agreed to participate in the study signed informed consent. Anonymity and confidentiality were maintained at all times as no

name of any patient was used in presenting data.

Results

The demographic and socio-economic information is presented in table 1. Most of the DM clients are over the age of 45 years (87%), and female (74%). The household incomes for most of these patients (55%) were between R1000 to R2000 per month. Most of the respondents had no formal education (58%) and unemployed (52%). About half of them were receiving old age pension (47%), disability grant (24%) and child support grant (47%). Some respondents are found with receiving more than one type of social grants in the households.

Table 1: Distribution of demographic information of 240 diabetic patients

Variables	Frequency	Percentage
Age (n=238)		
< 25 years	4	1.7
25-35 years	12	5
36-45 years	14	5.8
46-55 years	78	31.7
>55 years	132	55
Gender (n=234)		
Male	60	26
Female	174	74
Marital status (n=236)		
Married	110	47
Single	70	30
Other	56	23
Individual monthly Income in Rand (n=240)		
No Income	92	38
< R 1000	10	4
R 1000- R 2000	132	55
R 2001-R 3000	6	3
Education (n=234)		
No Schooling	136	58.1
Between 3 to 7 years schooling	92	39.3
Between 8 to 12 years	6	2.6
Employment (n=236)		
Full- time	122	51.7
Part- time	82	34.7
Unemployed	32	13.5
Households receiving Social services grant (n=240) (Multiple answers were possible)		
Old age Pension	112	47
Disability Grant	38	24
Child support grant	112	47
Foster care grant	6	3

Knowledge, attitude and practice towards DM are presented in table 2 below. There were eight questions that were asked to determine the level of knowledge. For each questions one point was given for correct answer and a zero for incorrect answer, the average score for the knowledge was found to be 2.26 (SD=1.97) which indicating that the patients had poor knowledge regarding DM. For example, only 30% knew about the definition of DM, 14.5% knew about normal blood sugar level, and a third knew about any complications of DM. Most of the patients (94%) knew that regular physical exercise can help to control DM.

To determine the attitudes towards DM, four (04) statements were asked to the patients. The average score was found to be 3.04 with

standard deviation of 0.49. This indicates that more patients had positive attitudes towards DM. For example, more than 94% of the patients responded positively to the following statements: it is good to include green leafy vegetables in daily diet, good to have whole fruit rather than to have deserts or sweets, regular physical exercise is essential to control and diet control act as central pillar in management of DM. Results showed that patients were practicing positively towards the management of DM as the average score was 4.77 (SD=1.30). It was found that almost all the patients were regularly taking prescribed medicine (99%), 81% followed a healthy diet, and 78% attended for regular follow up last year.

Table 2: Knowledge, attitude and practice of 240 DM patients

Variables	Frequency	Percentage
Knowledge (n= 240)		
Correct knowledge on definition of DM	68	30.5
Correctly knowledge on normal blood sugar level	33	14.5
Risk factor for DM – known any factor	101	42.1
Knowledge on regular physical exercise to control DM	226	94.2
Knowledge on diet control in management of DM	45	18.8
Knowledge on any complications of DM	78	32.5
Known to target fasting blood sugar for DM control	146	60.8
Knowledge of consuming alcohol on DM	38	17.7
Average score knowledge (SD)	2.26 (1.97)	28
Attitude (n= 240)		
It is good to include green leafy vegetables in daily diet	230	96.6
It good to have whole fruit rather than to have deserts or sweets	228	95
Regular physical exercise is essential to control DM	226	94.2
Diet control act as central pillar in management of DM	45	18.8
Average score for attitude (SD)	3.04 (0.49)	76
Practice (n=240)		
Measure blood sugar at home	62	25.8
Don't take any herbal medicine	184	77
Take regular prescribed medicine	238	99.2
Attend for regular follow up (last one year)	188	78.3
Follow a healthy diet	194	80.8
Undertaking any form of exercise to control DM or maintain weight	104	45
Avoiding sugar product in diet	164	68
Took medication yesterday	174	74
Avoid red meat in diet	38	17.7
Average score for knowledge (SD)	4.77 (1.30)	53

Average scores for knowledge, attitude and practice were compared among the demographic variables using t-test and ANOVA test where appropriate. Descriptive analysis shows that age between 36-45 years had the lowest average score for knowledge whereas age <25 years had the highest average knowledge score. But the difference of the scores were not statistically significant between the age groups ($p>0.05$). Similar results were also found for attitudes towards DM between the age groups. For practice

towards DM, the descriptive analysis showed that age 46-55 years had the lowest average score and age 25-35 years had the highest average score. The ANOVA test showed that difference of the average scores were statistically significant ($p<0.05$) between this two groups (Table 4) meaning patients in the age group of 46-55 years were practicing better towards DM compared to patients from age group of 25-35 years (Table 5).

Table 3: Descriptive analysis for knowledge, attitudes, and practices with regards to age of the patientsa

Variables		N	Mean	Std. Deviation
Total score for knowledge	<25 years	4	4.50	1.291
	25-35 years	12	3.00	2.523
	36-45 years	15	1.87	1.685
	46-55 years	76	2.11	2.024
	Over 55 years	132	2.28	1.891
Total score for attitude	<25 years	4	3.00	.000
	25-35 years	12	3.33	.492
	36-45 years	15	3.27	.458
	46-55 years	76	3.01	.503
	Over 55 years	132	2.99	.470
Total score for practice	<25 years	4	4.50	.577
	25-35 years	12	5.75	1.215
	36-45 years	15	4.40	1.298
	46-55 years	76	4.45	1.269
	Over 55 years	132	4.93	1.285

Table 4: ANOVA test output for comparison of means with regards to age of the patients

Variables		Sum of Squares	df	Mean Square	F	p-value
Total score for knowledge	Between Groups	30.802	4	7.701	2.023	.092
	Within Groups	890.520	234	3.806		
	Total	921.322	238			
Total score for attitude	Between Groups	2.153	4	.538	2.351	.055
	Within Groups	53.579	234	.229		
	Total	55.732	238			
Total score for practice	Between Groups	25.221	4	6.305	3.903	.004
	Within Groups	378.026	234	1.615		
	Total	403.247	238			

Table 5: Post-hoc Tukey multiple comparison test output for practice score with regards to age of the patients

Dependent Variable	(I) Age	(J) Age	Mean Difference (I-J)	Std. Error	p-value
Total score for practice	<25 years	25-35 years	-1.250	.734	.434
		36-45 years	.100	.715	1.000
		46-55 years	.053	.652	1.000
		Over 55 years	-.432	.645	.963
	25-35 years	<25 years	1.250	.734	.434
		36-45 years	1.350	.492	.051
		46-55 years	1.303*	.395	.010
		Over 55 years	.818	.383	.209
	36-45 years	<25 years	-.100	.715	1.000
		25-35 years	-1.350	.492	.051
		46-55 years	-.047	.359	1.000
		Over 55 years	-.532	.346	.540
	46-55 years	<25 years	-.053	.652	1.000
		25-35 years	-1.303*	.395	.010
		36-45 years	.047	.359	1.000
		Over 55 years	-.484	.183	.065
Over 55 years	<25 years	.432	.645	.963	
	25-35 years	-.818	.383	.209	
	36-45 years	.532	.346	.540	
		.484	.183	.065	

The present study found that patients practice towards DM was associated with participant's household income. The descriptive analysis showed that income group between R 1000-R 2000 per month had the lowest average score for practice and income group >R3000 per month had the highest practice score (Table 6). The ANOVA test shows that the average scores for practice

were significantly different between the different income groups of the patients (Table 7). The Tukey multiple comparison test found that the difference mean practice scores between income group <R1000 per month and income group >R3000 per month was significantly different ($p < 0.05$) (Table 8).

Table 6: Descriptive analysis for knowledge, attitudes, and practices with regards to income of the patients

		N	Mean	Std. Deviation
Total score for knowledge	No income	92	2.46	2.145
	Less than R1000	10	.90	.876
	R1001 to R3000	132	2.23	1.868
	> R3001	6	2.33	2.066
Total score for attitude	No income	92	3.09	.527
	Less than R1000	10	3.20	.422
	R1001 to R3000	132	2.98	.462
	>R3001	6	3.17	.408
Total score for practice	No income	92	4.52	1.338
	Less than R1000	10	4.20	1.229
	R1001 to R3000	132	5.03	1.248
	?R3000	6	3.83	.75c3

Table 7: ANOVA test output for comparison of means with regards to income of the patients

ANOVA						
		Sum of Squares	df	Mean Square	F	p-value
Total score for knowledge	Between Groups	22.221	3	7.407	1.933	.125
	Within Groups	904.241	236	3.832		
	Total	926.462	239			
Total score for attitude	Between Groups	.955	3	.318	1.349	.259
	Within Groups	55.707	236	.236		
	Total	56.663	239			
Total score for practice	Between Groups	23.127	3	7.709	4.747	.003
	Within Groups	383.269	236	1.624		
	Total	406.396	239			

Table 8: Post-hoc Tukey HSD multiple comparison test output for practice score with regards to income of the patients

Dependent Variable	(I) Income	(J) Income	Mean Difference (I-J)	Std. Error	p-value.
Total	No income	Less than R1000	.322	.424	.873
		R1001 to R3000	-.509*	.173	.019
		>R3001	.688	.537	.575

Pearson correlation test was conducted to determine the relationship between knowledge, attitude, and practice (Table 9). It was found that knowledge was moderately positively correlated with practice

towards DM ($p < 0.05$). This means that patients having better knowledge would practice positively towards DM.

Table 9: Correlation test output for KAP of DM

Correlations				
		Total score for knowledge	Total score for attitude	Total score for practice
Total score doe knowledge	Pearson Correlation	1	-.015	.328**
	Sig. (2-tailed)		.821	.000
Total score for attitude	Pearson Correlation	-.015	1	-.072
	Sig. (2-tailed)	.821		.266
Total score for practice	Pearson Correlation	.328**	-.072	1
	Sig. (2-tailed)	.000	.266	

Discussion

This is a facility based study thus does not represent all DM cases of KwaDabeka population. However, it is estimated from other community based studies similar to this set up showed a higher rate (75%) of populations attend public health facilities [18-21]. The majority of participants (DM clients) in this study are over the age of 45 years. This reflects the fact that type 2 diabetes mellitus usually has its onset after the age of 40 years [22]. The preponderance of this age group is also consistent with the findings of the 2003 and 2016 South African demographic and health surveys and recent hospital-based DM client study [23, 24].

Respondents with no formal education (59%) and with primary school education (39%) together constitute an overwhelming 98% of the participants in this study. Indicating that most participants have little or no education, a finding which is similar to two other South African studies among black South Africans with DM [24, 25]. Majority of the DM patients were found with poverty-stricken conditions, with 38% have no personal income and majority (55%) with monthly earning (ZA) between R1000 – R1999 per month. This finding is similar to the results of other studies of DM clients and the South African income distribution and poverty study where higher percentages of black South Africans were shown to have a low income [24, 25]. Since most of these DM clients belong

to older age group, about half (47%) receives old age pension.

The present study found poor level of knowledge amongst the patients regarding DM. This is related to poor knowledge on normal blood sugar level (3%), risk factors for DM (37%), symptoms and complications of DM (27% and 35% respectively) and taking herbal medication (24%) to control DM. However, majority (73%) could define DM, this finding is similar to another study conducted among DM patients in South Africa which reported that majority of the patients had poor knowledge on the benefits of exercise, weight loss and a healthy diet [9]. A KAP study conducted in India demonstrated that patients' knowledge scores positively correlated with their glycemic control [26]. Another qualitative study from Iraq found that patients who highly adhered to their antidiabetic medications may still have insufficient knowledge about their daily self-management practices [27].

In the present study it was found that income level was associated with knowledge score. This finding is similar with other studies conducted elsewhere. For example, a study conducted among adult non-diabetic community members of Gondar city in Ethiopia reported that the odds of good knowledge regarding diabetes mellitus among study participants who had an income of 3000–5000 ETB were two times greater than the odds of good knowledge for study subjects who had an income of \leq 1999 ETB [15]. Similar finding was also reported from study conducted in Bangladesh, India, and Pakistan [28-30]. This means that socioeconomic status may increase the exposure of individuals to information about diabetes mellitus. That is why a high level of income has a positive association with knowledge towards diabetes mellitus.

In this study it was found that more patients had positive attitudes towards DM. Similar finding was reported from a study conducted in Ethiopia. The Ethiopian study reported that nearly two-thirds (65.2%) of the study participants had a good attitude level [31]. A study from Bangladesh reported 66.4% of participants had a good attitude [32]. In this study 94% of the participants responded positively regarding regular physical exercise is essential to control DM. This rate is higher than study conducted in Ethiopia (80%), and Bangladesh (70%) but lower than Jamaica (97%) [31-33]. This differences could be because of a lack of counselling by health professionals about the effect of poor glycaemic control, as it is the major cause of DM complications, because of their work overload.

Results showed that more patients were practicing positively towards the management of DM. It was found 81% of the participants followed a healthy diet in this study. This rate is higher than studies conducted in Ethiopia (69.5%) [31]. This higher rate in South Africa as compared to other African countries could be because of the content of the diet recommended by health professionals which is almost similar to what they are practicing regularly.

About half of the patients (45%) were undertaking any form of exercise to control DM or maintain weight. This finding is higher than studies conducted in Ethiopia (5%), and Pakistan (8.6%), but lower than study from Bangladesh (57%) [28-31]. This low activity in the current study might be because of a lack of habit of exercise or a lack of commitment to exercise by the study participants. It might also be because of the inappropriateness of the living environment to exercise.

It was found that knowledge was moderately positively correlated with practice towards DM. This means that patients having better knowledge would practice positively towards DM. This was expected, as good knowledge translates to good practice. But other studies from Malaysia and Ethiopia found negative relationships [14, 15]. Therefore, further studies are required to validate our findings.

Limitations

Since the data about knowledge, attitude and practice of DM were self-reported, there may be a recall bias and they may respond only to socially acceptable responses that might cause an overestimation of some results. The study was conducted on all type 2 diabetic patients without considering their diabetic complication history status during the data collection period which affects their attitude and practice level positively or negatively. Though patients who were severely ill were excluded, some patients having mild complications (e.g. Nephropathy) have been included in the study and such complications could have also affected their attitude and practice. Some questions used to assess attitude (diabetes spoils my social life; diabetes is the worst thing that happened to me) have some limitations on assessing attitude towards diabetes complications because it can be affected by patients opinions.

Conclusion

The knowledge and practice levels of lifestyle modifications and control of type 2 diabetes mellitus patients attending KDCHC were generally poor. Nevertheless, majority of these patients have positive attitude toward healthy lifestyle habits which could potentially be harnessed and translated into healthy lifestyle practices. Poor level of knowledge, attitude and practices of DM patients at this health facility may resulted in poor control of the disease. A clinic/community-based. lifestyle intervention programme should be implemented in order to improve the knowledge and practice of patients regarding healthy lifestyle. Health education intervention is urgently needed to improve DM management at PHC facilities in KZN. Health care workers KAP is also necessary to be investigated.

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Competing interests

The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.

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