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Assessment of knowledge, attitude, practice, and barriers to lifestyle modification among individuals with diabetes mellitus in Kano Nigeria

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ABSTRACT

Objectives: To determine the level of knowledge, attitude and practice with the barriers causing non adherence to lifestyle modification (LSM).

Materials and Methods: This is a cross-sectional study; purposive sampling technique was used to recruit 140 individuals having diabetes mellitus from diabetic clinic of Murtala Muhammad Specialist Hospital, Kano. Data were collected using the Michigan Diabetes Research Training Centre Questionnaire and the 'Barriers to Being Active Quiz' which assessed knowledge, attitude, practice and barriers of lifestyle modification. Descriptive statistics of mean, frequency and percentage were used to summarize participant/study characteristics; Chi square was used to assess the association among knowledge, attitude, practice and barriers to LSM as well as the association between knowledge, attitude, practice, barriers and demographic variables of participants.

Results: Majority were Female 76 (54.3%) within the age range of 40-59 years 83 (59.3%) and mostly obese 98 (70%). Majority have good knowledge, positive attitude and good practice. Lack of will and time were the main important barriers of exercise.

Conclusion: It can be concluded that there was a good knowledge, attitude and practice of LSM among individuals having diabetes mellitus.

Keywords: Diabetes, Exercise adherence, Lifestyle modification, Non-communicable diseases

INTRODUCTION

Diabetes mellitus (DM) is a chronic non-communicable disorder of chronic hyperglycemia as a result of an absolute or relative deficiency or impaired circulating insulin level.[1] Diabetes may either be due to the defect of pancreas or body cells to produce or utilize insulin, respectively.[2] The clinical symptoms includes; polyuria, polydipsia and unexplained weight loss, and fasting plasma glucose level ≥7.0 mmol (126 mg dl-1), or random plasma glucose level ≥11.1 mmol (200 mg dl-1), or a plasma glucose level 2 h after a 75 g oral load of glucose is ≥11.1 mmol (200 mg dl-1).[3] In asymptomatic patients, the test needs to be done severally for proper diagnosis and management (WHO, 2003). Type 1 and 2 DM are the two broad classifications of DM where the latter is largely as a result of hereditary and lifestyle factors.[4]

Management of diabetes includes pharmacological and non-pharmacological management of which lifestyle modification (LSM) falls in the latter.[5] Lifestyle modification is behavioral changes in the management of DM such as consumption of healthy diet, staying away from tobacco smoking, alcohol consumption, and partaking in regular exercise.[5,6] LSM is an essential component in both prevention and management of DM as it can reduce more than half of DM cases[7] and was said to be more effective than the pharmacological management,[8] respectively.

The level of knowledge and attitude one has is an essential predictor of practice of LSM.[9-11] Poor LSM of lifestyle is due to poor knowledge of diabetes complications. Even if one possesses good knowledge and positive attitudes, one may encounter barriers that may hinder proper practice of LSM. Lack of knowledge, family commitments, cost of healthy diet, lack of self-discipline, eating out in a social gatherings, were some of the reported barriers to effective LSM.[12,13] Although Ikombele,[14] Tadesse *et al*.,[11] Ntaate[15] and Kumara and Siriwardena[16] studied knowledge, attitude, and practice of LSM among individuals with DM, they have not incorporated the possible barriers that any hinder proper LSM and thus the present study was designed.

Aim

The aim of the study was to determine knowledge, attitudes, practice, and barriers to LSM among diabetes patients in Kano.

MATERIALS AND METHODS

Study design and population for the study

This was an institutional-based cross-sectional descriptive study among individuals with DM attending the Diabetic Clinic of Murtala Muhammad Specialist Hospital (MMSH), Kano State.

Sample size and sampling techniques

The sample size for this study was calculated using the statistical formula given by Charan and Biswas[17] for cross-sectional study:

$$n = z^2pq/d^2$$

n = minimum sample size
z = statistical significance corresponding to 95% confidence interval, that is, 1.96
p = Assumed proportion of diabetes patients that would response to the survey (50%)
d = Desired level of precision (marginal error), that is, 0.0
$q = 1-p$
$n = (1.96)^2 * 0.5 * (1-0.5)/(0.05)^2$
$= 384$

For population <10,000 the formula, sample size $n_f = n/1+(n/N)$[18] was used, where n_f = desired sample size when population < 10,000; n = desired sample size when the population is more than 10,000 (384 as calculated above), N = estimate of the population size = 200. After substituting the value sample size was calculated as 132. Accordingly, 140 individuals with DM were recruited for this study.

Purposive sampling technique was used in this study.

Inclusion criteria

Only individuals with DM that were being regularly followed-up (those that adhere to their scheduled outpatient follow-up) at the diabetic clinic of MMSH and were willing to participate in the study were recruited.

Exclusion criteria

The following were excluded from the study:
1. Individuals with gestational diabetes.
2. Diabetes insipidus patients.
3. Diabetic patients with impaired memory or cognitive function.
4. Diabetic hypertensive.

Data collection instruments

The following instruments [Appendix 1 and 2] were used:
1. A KAP Questionnaire: The questionnaire was adapted from Ntaate.[15] This was used to determine the level of knowledge, attitude, and practice of LSM among the participants. It has four sections-Section A captures demographic variables such as age, sex, marital status, educational level, and employment status. Section B comprising ten questions assess knowledge about the cause and complications of diabetes, as well as appropriate food choices. Each correct answer carried 5 points and incorrect answer carried 0 point. A score of 5 or more correct questions out of 10 was assigned Good knowledge and anyone with <5 correct answers were marked as having Poor knowledge. Section C comprising seven questions assess the attitude of the participants towards LSM focusing on dietary and exercise importance as part of self-care management in the treatment of DM. The response was either Yes, No or I do not know. The next six statements focused on the patient's ability to manage their condition, assessed by using a Likert scale ranging from strongly agrees to strongly disagree. A score of 4 or more correct statements out of the 7 was assigned a positive attitude and anyone with <4 correct answers was deemed to have a negative attitude. Section D assess the practice of LSM and comprised 6 statements having responses on the Likert scale ranging from (0 = not at all to 6 = very

frequently/regularly/well/able). A score of 4 or more out of the 6 questions was assigned as good practice and one with <4 as one with poor practice. The questionnaire had content validity.[15]

2. Barriers to being active quiz (BBAQ):[19] This was used to assess the barriers to exercise among the participants. The BBAQ is a 21-item instrument (each item measured on a 4-point Likert scale ranging from 0 = "very unlikely" to 3 = "very likely") that measures barriers to physical activity in seven self-reported constructs-Lack of time, social influences, lack of energy, lack of willpower, fear of injury, lack of skill, and lack of resources. A score of 5 or more scores in any category was recorded as an important barrier to overcome and <5 in any category was recorded as less important barrier to overcome. The questionnaire has a Cronbach's alpha value of 0.87.[20]

Ethical consideration

Ethical approval was sought and obtained from Kano State Ministry of Health. Informed consent was sought from the respondents in the Diabetes Clinics before administering the questionnaire. Confidentiality of respondents was assured. Respondents were informed that the participation is voluntary and were allowed to withdraw at any stage of the study.

Data collection procedure

Respondents were recruited on clinic days (Tuesdays and Thursdays) for 2 consecutive weeks until the required sample size was attained. The Nurse in-charge of the clinic was approached and was informed about the research with the obtained ethical approval after which she advised the researcher to make an announcement about the study to individuals sitting in the waiting area of the clinic. Each individual sitting in the waiting area of the diabetic clinic was approached and the researcher confirmed if they have diabetes and then explain the study to the individuals. Screening was done based on the inclusion and exclusion criteria, those that met the inclusion criteria were issued the information sheet and questionnaire.

Data analysis

Data were analyzed using Statistical Package for the Social Sciences (version 20). Significance was determined at $P < 0.05$. Descriptive statistics of percentages and frequencies was used to summarize data. Chi-square was computed to determine the associations between knowledge, attitude, practice, and barriers to LSM. It was also used to determine the associations between demographic variables and knowledge, attitude, practice, and barriers to LSM.

RESULTS

A total of 140 individuals with diabetes attending MMSH participated in the study giving a response rate of 100%.

Respondents' Socio-demographic variables

Table 1 shows the summary of respondents' socio-demographic variables. Majority (n=83, 59.3%) of the participants were within the age range of 40–59 years while 41 (29.3%) were ≥60 years and 16 (11.4%) within the age range of 20–39. Female 76 (54.3%) predominate in the study. In addition, majority 93 (66.4%) were overweight married 98 (70%), with secondary school education 58 (41.4%) and self-employed 48 (34.3%).

Knowledge, attitude, practice, and barriers to LSM

Figure 1 shows the level of knowledge, attitude, and practice of LSM. Majority 91 (65%) of the respondents have good knowledge, positive attitude 131 (93.6%), and good practice 79 (56.4%).

Table 2 shows the barriers to LSM. Majority of the participants reported lack of willpower 107 (76%), lack of time 84 (60%),

Table 1: Respondents' socio-demographic variable.

Variables	*n*	%
Age Category		
30–39 years	16	11.4
40–59 years	83	59.3
≥60 years	41	29.3
Gender		
Male	64	45.7
Female	76	54.3
Marital Status		
Single	2	1.4
Married	98	70.0
Divorced	15	10.7
Widow(er)	25	17.9
BMI (kg/m^2)		
Underweight	0	0
Normal	43	30.7
Overweight	93	66.4
Obese	4	2.9
Educational level		
Primary school	57	.7
Secondary school	58	41.4
Tertiary institution	25	17.9
Employment status		
Government employee	28	20.0
Private employee	18	12.9
Self-employed	48	34.3
Unemployed	46	32.9

n: Frequency %: Percentage

lack of skill 57 (41%), and social influence 52 (37%) as more important barriers of exercise to overcome. Majority considered lack of energy 106 (76%), fear of injury 128 (91.4%) as little important barriers of exercise to overcome.

Association between knowledge, attitude, and practice of LSM and demographic variables

Table 3 shows statistically significant association ($P < 0.05$) between level of education and knowledge about LSM. However, there was no significant association between other demographic variables of respondents (age, gender, marital status, and employment status) and knowledge about LSM ($P > 0.05$).

Table 4 shows no statistically significant association between demographic variables of respondents and attitude towards LSM ($P > 0.05$).

Table 5 shows no statistically significant association ($P > 0.05$) between demographics and practice of lifestyle modification.

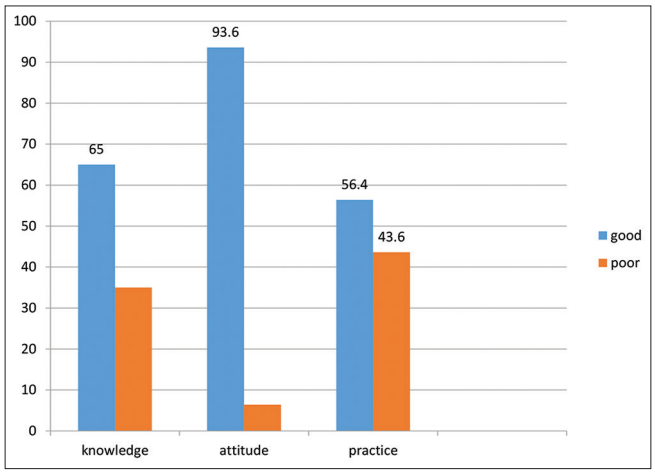

Figure 1: Knowledge, attitude, and practice of lifestyle modification among diabetes mellitus patients.

Table 2: Barriers to exercise.

Barriers to LSM	Response	
	MIBTO *n* (%)	LIBTO *n* (%)
Lack of time	84 (60)	56 (40)
Social influence	52 (37)	88 (63)
Lack of energy	34 (24)	106 (76)
Lack of willpower	107 (76)	33 (24)
Fear of injury	12 (8.6)	128 (91.4)
Lack of skill	57 (41)	83 (59)
Lack of resources	35 (25)	105 (75)

MIBTO: More important barrier to overcome, LIBTO: Less important barrier to overcome, LSM: Lifestyle modification

DISCUSSION

The aim of this study was to assess the knowledge, attitude, practice, and barriers to LSM among individuals with DM attending outpatient clinic of MMSH Kano.

Majority of the respondent have good knowledge of LSM. This might be due to the fact that the study recruited participants that are regular with clinics appointments which may lead to their exposure to different knowledge of DM from other patients and the health-care providers. This is in tandem with the findings of Tadesse *et al.*,[11] but contrary to studies by Ikombele[14] and Kumara and Siriwardena.[16] The reason for the disparity could be due to the differences in geographical location between Nigeria and the other countries. In addition, Nigeria has the highest burden of DM relative to these countries and as such there might be more awareness programs toward DM and hence the better knowledge. Formal education was said to influence knowledge of diabetes,[11] and this could also account for the good knowledge in this study as majority of the participants had formal education.

Similar to the findings of Tadesse *et al.*,[11] Ikombele,[14] and Upadhyay *et al.*[21] and of Mukhopadhyay *et al.*,[22] this study showed that majority of the participants possess positive attitudes toward LSMs. This is not surprising due to the high percentage of people with good knowledge of DM.

Table 3: Association between knowledge of LSM and demographic variables.

Variables	Knowledge of LSM		Chi-square	*P*-value
	Good	Poor		
Age				
30–39	12	4	0.737	0.733
40–59	53	30		
≥60	26	15		
Gender				
Male	39	25	0.558	0.455
Female	52	24		
Marital status				
Single	1		1.650	0.675
Married	65	33		
Divorced	8	7		
Widow(er)	17	8		
Educational Level				
Primary school	29	28	22.88	0.000*
Secondary school	37	21		
Tertiary institutions	25	0		
Employment status			0.332	0.339
Government employee	22	6		
Private employee	10	6		
Self-employed	29	19		
Unemployed	30	16		

LSM: Lifestyle modification

Table 4: Association between attitude toward LSM and demographic variables.

Variables	Attitude towards LSM		Chi-square	*P*-value
	Good	Poor		
Age				
30–39	16	0	2.580	0.246
40–59	75	8		
≥60	40	1		
Gender				
Male	61	3	0.181	0.671
Female	70	6		
Marital status				
Single	2	0	3.468	0.278
Married	91	7		
Divorced	13	2		
Widow(er)	25	0		
Educational level				
Primary school	56	1	3.860	0.165
Secondary school	52	6		
Tertiary institutions	23	2		
Employment status				
Government employee	26	2	4.307	0.181
Private employee	15	3		
Self-employed	45	3		
Unemployed	45	1		

LSM: Lifestyle modification

Table 5: Association between practice of LSM and demographic variables.

Variables	Practice of LSM		Chi-square	*P*-value
	Good	Poor		
Age				
30–39	8	8	3.273	0.195
40–59	52	31		
≥60	19	22		
Gender				
Male	36	28	0.000	1.000
Female	43	33		
Marital status				
Single	1	1	2.702	0.453
Married	55	43		
Divorced	11	4		
Widow(er)	12	13		
Educational level				
Primary school	34	23	0.892	0.640
Secondary school	30	28		
Tertiary institutions	15	10		
Employment status				
Government employee	16	12	1.250	0.755
Private employee	117			
Self-employed	29	19		
Unemployed	23	23		

LSM: Lifestyle modification

Knowledge was shown to influence the way we perceived things. However, it is contrary to the findings of Ganiyu *et al.*[13]

Majority of the participants of this study have good practice of LSM which implies that most of the student participants adhere to the LSM such as healthy eating habit, quitting smoking, and exercising regularly among others. This is similar to the findings of Tadesse *et al.*,[11] Maina *et al.*,[22] Kumara and Siriwardena,[16] Ganiyu *et al.*,[13] This is expected taking into consideration that the majority of the participants have good knowledge and positive attitude toward LSM due to the fact that knowledge and attitude were said to be important predictors to a practice.[10] Contrary to this report is a study by Ikombele.[14]

Lack of willpower, lack of time, lack of skill, and social influence were the main perceived barriers to exercise participation. This means that the high prevalence of the practice of LSM by this participant would have been more without these barriers. This is supported by the findings of Ganiyu *et al.*,[13] who reported an adherence to diet modification to be better than exercise participation among the participants which could be due the high number of barriers to exercise than the barriers to diet modification. The findings is in concordant with the findings of Donahue *et al.*,[10] Ikombele,[14] Satariano *et al.*,[24] as they reported lack of interest, lack of time, and lack of social support as barriers to exercise participation.

Only level of education was significantly associated with knowledge of LSM which implies that more the educated one is, the better the knowledge he has. This is similar to the findings of Tadesse *et al.*[11] and Busienei *et al.*[25] also stated that the higher the knowledge the more chance of being aware of a risk and hence its avoidance. This could be true because someone with higher education level is exposed to different method of knowledge acquisition in media, internet, and conferences among others.

CONCLUSION AND RECOMMENDATION

The participants possess good knowledge, positive attitude, and good practice of LSM. The main barriers to regular exercise among the participants are lack of power will, lack of time and skill. Health education programs should be increased using different media to diabetes and non-diabetes patient on the benefit of LSM to increase their motivation. Hospital-based exercise should be organizes regularly to the participant so that they can acquire adequate skill.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

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APPENDIX 1: QUESTIONNAIRE.

Section A: Demographics

Age……

Sex: Female, Male

Marital status: Single, Married, Divorced, Widow(er)

Education level: Primary school, Secondary school, Tertiary institution

Employment status: Government employee, private employee, self-employed, Unemployed.

Section B: Knowledge about lifestyle modification

1. What effect does unsweetened fruit juice have on your blood sugar?
   - Lowers it
   - Raises it
   - Has no effect
2. Which of these should not be used if you sense that your blood sugar is low?
   - 3 pieces of chocolate
   - Half a cup of orange juice
   - 1 cup of soft drink (soda)
   - 1 cup of full cream cow's milk
3. Which of the following is highest in fat?
   - Low fat milk
   - Orange juice
   - Corn
   - Honey
4. Which of the following is highest in carbohydrates?
   - Roasted chicken
   - Chocolate
   - Baked potato
   - Peanut butter (ground nut paste)
5. Eating food low in fat reduces the diabetic patients' risk for
   - Nerve disease
   - Kidney disease
   - Heart disease
   - Eye disease
6. Medication is more important than diet and exercise to control my Diabetes
   - Yes
   - No
   - I don't know
7. Maintaining a healthy weight isn't important in the management of diabetes.
   - Yes
   - No
   - I don't know
8. Exercising regularly can help reduce blood sugar level and high blood pressure.
   - Yes
   - No
   - I don't know
9. Wearing shoes size bigger than usual helps prevent foot ulcers
   - Yes
   - No
   - I don't know
10. Infection is likely to cause an increase in blood sugar level
    - Yes
    - No
    - I don't know

Section C: Attitude

11. Diet and exercise are not as important as medication in control of Diabetes
    - Yes
    - No
    - I don't know

Select one of the following options as a response to each of the questions below

Responses: Strongly agree, Agree, Neutral, Disagree, Strongly disagree

I think it is important for me to:

12. Keep my weight under control.
13. Do the things I need to do for my diabetes (diet, medicine, exercise, etc.).
14. Handle my feelings (fear, worry, anger) about my diabetes.

In general, I believe that:

15. I can motivate myself to manage my diet
16. I know enough about myself as a person to make dietary choices that are right for me
17. I know the barriers to managing my diet as part of my management of diabetes

Section C: Practice

For the questions below, answer using the scale of 0 to 7, where 0 means not at all, and 7 means frequently

18. In the past 1 week how often have you missed or skipped meals?
    0 1 2 3 4 5 6 7
    Not at all Very frequently
19. In the past 1 week how often have you overeaten (eaten more than you know you should)?
    0 1 2 3 4 5 6 7
    Not at all Very frequently

20. In the past 1 week how often have you eaten high fat foods like fried animal protein?
    0 1 2 3 4 5 6 7
    Not at all Very frequently
21. In the past 1 week how regular have you been exercising?
    0 1 2 3 4 5 6 7
    Not at all Very regularly
22. How empowered are you to control/avoid sweets or limit fatty foods?
    0 1 2 3 4 5 6 7
    Not at all Very well
23. Please circle the number that indicates how able you are to fit dietary management into your life in a positive manner
    0 1 2 3 4 5 6 7
    Not at all Very able

Appendix 2: Barriers to being active quiz.

Directions: Listed below are reasons that people give to describe why they do not get as much physical activity as they think they should. Please read each statement and indicate how likely you are to say each of the following statements: How likely are you to say?	**Very likely**	**Somewhat likely**	**Somewhat unlikely**	**Very unlikely**
1. My day is so busy now, I just don't think I can make the time to include physical activity in my regular schedule.	3	2	1	0
2. None of my family members or friends like to do anything active, so I don't have a chance to exercise.	3	2	1	0
3. I'm just too tired after work to get any exercise.	3	2	1	0
4. I've been thinking about getting more exercise, but I just can't seem to get started	3	2	1	0
5. I'm getting older so exercise can be risky.	3	2	1	0
6. I don't get enough exercise because I have never learned the skills for any sport.	3	2	1	0
7. I don't have access to jogging trails, swimming pools, bike paths, etc.	3	2	1	0
8. Physical activity takes too much time away from other commitments — time, work, family, etc.	3	2	1	0
9. I'm embarrassed about how I will look when I exercise with others.	3	2	1	0
10. I don't get enough sleep as it is. I just couldn't get up early or stay up late to get some exercise.	3	2	1	0
11. It's easier for me to find excuses not to exercise than to go out to do something.	3	2	1	0
12. I know of too many people who have hurt themselves by overdoing it with exercise.	3	2	1	0
13. I really can't see learning a new sport at my age.	3	2	1	0
14. It's just too expensive. You have to take a class or join a club or buy the right equipment.	3	2	1	0
15. My free times during the day are too short to include exercise.	3	2	1	0
16. My usual social activities with family or friends to not include in physical activity.	3	2	1	0
17. I'm too tired during the week and I need the weekend to catch up on my rest.	3	2	1	0
18. I want to get more exercise, but I just can't seem to make myself stick to anything.	3	2	1	0
19. I'm afraid I might injure myself or have a heart attack.	3	2	1	0
20. I'm not good enough at any physical activity to make it fun.	3	2	1	0
21. If we had exercise facilities and showers at work, then I would be more likely to exercise.	3	2	1	0