

COMPLIANCE TO DIABETIC MANAGEMENT AMONGST PATIENTS WITH DIABETES MELLITUS ATTENDING A GOVERNMENT HOSPITAL IN KANO, NORTHWESTERN NIGERIA

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ABSTRACT

Background: The physical, social, and economic burden of diabetes mellitus result mostly from the complications of the disease, which occur because of poor compliance to treatment. However, Physicians commonly ignore this important aspect of diabetic management. This study assessed patients' compliance to diabetic control measures using a combination of direct and indirect approaches.

Objectives: The study aimed to assess diabetic patients' compliance to management, as well as the Sociodemographic factors influencing their compliance.

Methods: A cross sectional design was used to study 240 systematically selected diabetic patients from the diabetic clinic of a General Hospital. Subjects were interviewed using a semi-structured interviewer administered questionnaires, and data generated were analyzed using "Mini tab" 12.21 computer statistical software. Patients' compliance was assessed using regularity of appointment visits, dietary control, regularity on drugs, modification of life style, and scored using a Likert scale.

Results: More than one-third (37.1%) of the diabetic patients had good compliance to diabetic management, whereas 41.3% and 21.6% of them had moderate and poor compliance respectively. Compliance however varied for the different methods used to control the disease, with compliance to drug use being highest. The sex of the patients, their educational status, occupation, and their average monthly incomes were found to significantly influence the patients' compliance to diabetic management.

Conclusion: This study demonstrates that diabetic patients are being selective on the use of the disease control measures prescribed to them by their physicians.

Key words: *Compliance, Diabetic management, Antidiabetic measures*

INTRODUCTION

Diabetes Mellitus (DM) is an endocrine disease that results from relative or absolute lack of insulin, and is characterized by hyperglycaemia and disturbance of water and electrolytes balance.^{1,2} Diabetes mellitus was ranked as the fourth leading cause of death globally, with an estimated 61,714 death annually.³ The physical, social and economic burden of diabetes mellitus result mostly from the complications of the disease, which occur as a result of poor compliance to treatment measures; and the economic expenses for the management of diabetes complications are far beyond that of an average individual.⁴

Stedman's medical dictionary defines compliance as the consistency and accuracy with which a patient follows the regimen prescribed by a physician or other health professionals.⁵ Failure to adopt compliance however results in default, and the persons involved are called defaulters.⁶ Compliance is the most important single step in the management of chronic illnesses like diabetes mellitus, when achievement of clinical improvement is required. In addition, non-compliance to treatment is the single most important factor resulting to the development of serious complications ranging from complicated morbidities, disabilities to high mortality rates in chronic diseases.⁷

Direct and indirect methods are employed for the assessment of compliance in the management of diabetes mellitus.⁸ Direct methods involves measurement of the level of antidiabetic drugs in the blood or their metabolites in urine. On the other hand, the indirect approach uses six (6) methods of evaluation: self reported compliance; attendance to scheduled visit; degree of disease control; medical judgment; level of knowledge of the disease and Morisky - Green test.^{9,10}

A number of studies shows the importance of compliance in the management of chronic diseases including diabetes mellitus.¹¹⁻¹⁶ Other studies similarly investigated factors that influenced patients' compliance to diabetic management.¹⁷⁻²⁷ However, despite the increasing prevalence of diabetes mellitus, compliance to antidiabetic measures (which is crucial for the treatment and control of the disease) is not so often evaluated, especially in northwestern Nigeria. Using a combination of the indirect methods for evaluating compliance, this study assessed diabetic patients' compliance to diabetes management, as well as the factors that influenced their compliance to the treatment. Information from this study will be useful to the physicians for better patients' management; to other researchers, programmers and to policy makers for the

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purpose of designing and or strengthening non-communicable diseases control programmes.

MATERIALS AND METHOD

The study was conducted in a 250-bedded Murtala Mohammed Specialist Hospital (MMSH) in Kano State. On the average, 100 diabetic patients attend the weekly ran diabetic clinic of this hospital.

A cross sectional design was used to select a sample of 240 diabetic patients (estimated using an appropriate statistical formula for estimating sample size for descriptive studies: $n = Z^2pq/d^2$). Using the weekly clinic attendance list as the sampling frame and by extrapolating the monthly attendance at 400 patients per month, the monthly attendance was divided by the sample size (400/240) to arrive at a sampling interval of 2. Thus 1 in every 2 diabetic patients attending the clinic was interviewed using a semi-structured interviewer administered questionnaire until the required 240 diabetic patients were interviewed. Permission for the study was sought and obtained from the ethical committee of Aminu Kano Teaching Hospital, Kano and the management of MMSH. Informed consent was also obtained from each patient before the interview.

The data generated were entered into a spreadsheet in Microsoft Excel for windows and then transferred into MINITAB USA release 12.21 software for data validation, cleaning and analysis. Qualitative data were presented as frequencies, percentages or proportions, while quantitative data were described using measures of central tendencies and those of dispersion as appropriate. Chi-square (χ^2) test was used to test for significance of association between qualitative variables.

Patients' compliance was assessed using regularity of appointment visits; dietary control; regularity on drugs; and modification of life style, and scored using a Likert scale (Nil=0; occasional=1; moderate=2; and regular=3), and graded into poor, moderate and excellent compliance. Out of a total of 15 points, respondents who scored 11-15 point were adjudged as having an excellent compliance, while those who scored between 6-10 points were adjudged as having a moderate compliance. A score of between 0-5 points, represented poor compliance.

RESULTS

Sociodemographic profile

The Sociodemographic profile of the diabetic patients is as highlighted in Table 1. Their mean age was 50.9 ± 7.1 years. Majority were married, males, had formal education, and self employed.

Compliance to diabetic management

Table 2 shows details of the parameters used for assessing the compliance of the diabetic patients to diabetic management. More than half (59.6%) of the patients had optimum blood glucose control at the time of the survey (Fasting blood sugar ≤ 7 mmol/L). Majority (64.6%) of the patients were moderately regular on their clinic appointment, whereas only 20.4% of them were very

regular. Up to 39.6% of the patients said they were not regular on their appointments because either they had no transport fee to the hospital or they reside very far from the clinic. Other reasons given by the respondents for not being regular on clinic attendance were too sick at home (13.3%); had concurrent illness and had to visit another clinic (8.3%); long waiting time in the clinic (9.2%); not informed about next appointment (2.1%) and poor attitude of health workers (5.4%). The remaining 22.1% of the patients did not give any reason for not being regular on clinic appointment as shown in Table 3.

More than one third (36.7%) of the diabetic patients studied had regular dietary control whereas only 6.2% of the subjects had no dietary control. Majority (40.0%) of the patients could not maintain good dietary control because they believed it was expensive; 12.7% said they were busy and could not afford the time required to prepare diabetic diet, while 24.1% of the patients complained that the food for diabetics was monotonous and tasteless. In addition, almost a quarter (23.2%) of the patients claimed they could not maintain dietary control because they did not have good knowledge of the foods required.

Most of the patients (81.7%) were regular on drugs. Only 7.9% of them were erratic on drugs. Long duration of treatment (34.3%); multiplicity of drugs (19.2%); lack of resources to buy drugs (33.1%); fear of side effects and toxicity of drugs (8.8%) and forgetfulness (4.6%) were cited by the non-compliant respondents for not adhering to their drugs.

Up to 74.6% of the patients never smoked cigarette. However, 7.5% of the subjects ceased smoking because they were advised against it. Up to 27.4% of those patients that smoke could not give up smoking because of addiction, while 13.7% of them claimed that they were never advised to give up smoking as part of diabetic treatment. The majority of the current smokers (58.9%) however gave no reason as to why they could not cease smoking.

Most of the respondents (87.9%) do not engage in physical exercise despite the health advice by health personnel.

The proportion of the diabetic patients that still consumed alcohol despite health advice was 13.3%. Interestingly, 2.9% of the patients ceased drinking alcohol following medical advice by health workers. Addiction (29.2%) and claims for never been advised against alcohol (15.3%) were the reasons given by those patients that insisted on consuming alcohol, while 55.5% of them could not give any reason for their conduct.

Overall, only 37.1% of the diabetic patients had good compliance to diabetic management, whereas 41.3% and 21.6% of them had moderate and poor compliance respectively (Table 4).

Sociodemographic factors influencing compliance to diabetic management

The sex of the patients, educational status, occupation, and their average monthly incomes were found to significantly influence the patients' compliance to diabetic management.

Respondents' ages and the distance of their residencies to the clinic however were not statistically significant in this regard as shown in Table 5.

Table 1: Sociodemographic profile of respondents

Characteristic	Frequency (n = 240)	Percentage (%)
Age (years)		
20-29	10	4.2
30-39	29	12.1
40-49	49	20.4
50-59	101	42.1
60+	51	21.2
Sex		
Male	126	52.5
Female	114	47.5
Ethnicity		
Hausa/ Fulani	155	64.6
Yoruba	38	15.8
Igbo	30	12.5
Others	17	7.1
Marital status		
Currently married	151	62.9
Widowed	6	2.5
Separated	11	4.6
Divorced	17	7.1
Single	55	22.9
Educational status		
Formal	159	66.2
No formal	81	33.8
Occupation		
Formally employed	43	17.9
Self employed	118	49.1
Unemployed	79	33.0
Average monthly income		
< N5,000	78	32.5
≥ N5,000	162	67.5
Distance of residence to health facility		
Within 5 Kilometers	75	31.2
More than 5 Kilometers	165	68.8

Table 3: Respondents' reasons for not being regular on their clinic appointments

Reason	Frequency	Percentage (%)
Lack of transport fee	34	14.2
Distance	61	25.4
Too sick at home	32	13.3
Busy attending another clinic for other ailment	20	8.3
Do not like long waiting time in clinic	22	9.2
Not informed about next appointment	5	2.1
Poor attitude of health workers	13	5.4
No reason	53	22.1
Total	240	100.0

Table 2: Distribution of respondents by parameters used for assessing their compliance to diabetic management

Parameters	Frequency (n = 240)	Percentage (%)
Fasting blood sugar		
≤ 7 mmol/l.	143	59.6
> 7 mmol/l.	97	40.4
Regularity of appointment visits		
Very regular	49	20.4
Moderately regular	155	64.6
Not regular	36	15.0
Dietary control		
Regular control	88	36.7
Moderate control	72	30.0
Erratic control	65	27.1
No control	15	6.2
Regularity on drugs		
Very regular	196	81.7
Moderately regular	25	10.4
Erratic	19	7.9
Modification of life style		
Never smoked	179	74.6
Stopped smoking	18	7.5
Current smokers	43	17.9
Engage in physical Exercise		
No physical exercise despite health advice	211	87.9
Never drank alcohol		
Never drank alcohol	201	83.8
Ceased alcohol following health Advice		
Still drink alcohol despite health advice	32	13.3
Advise		
Advise	7	2.9

Table 4: Summary of respondents' compliance to diabetic management

Level of compliance	Frequency (n = 240)	Percentage (%)
Good compliance	89	37.1
Moderate compliance	99	41.3
Poor compliance	52	21.6
Total	240	100

Table 5: Sociodemographic factors influencing compliance in diabetic management

Factor	Compliance			Chi-square	p-value
	Good (n=89) 100%	Intermediate (n=99) 100%	Poor (n=52) 100%		
Age					
< 30 years	31	36	7	4.12	0.04100
> 30 years	58	63	45		
Sex					
Male	51	62	27	8.79	0.003
Female	38	37	25		
Educational status					
Primary education	78	97	36	56.77	<0.001
High school education	11	2	16		
Occupation					
Usually employed	32	21	9	48.22	<0.001
Not employed	56	61	31		
Unemployed	10	17	22		
Average monthly income					
< 45000	21	35	22	1.66	0.4310
> 45000	48	54	30		
Distance of residence to health facility					
< 5 km	39	22	12	9.72	0.00700
> 5 km	39	77	36		

DISCUSSION

This study demonstrated that majority of the diabetic patients studied were inadequately controlled with diabetic control measures. Patients compliance increases along with the different parameters used for the assessment. There is no indication that patients are being educated in their classes of interventions prescribed to them by their physicians. This practice does not appear well for the control of the debilitating disease.

Compliance to diabetic management

More than half (59.5%) of the diabetes studied had optimum blood sugar control at the time of the survey (fasting blood sugar < 100mg/dl). This leaves about a third of the subjects with high risk of metabolic complications from poor glucose control. In a similar study from Ghana, Kenya, only 37% of the respondents had optimum control of blood glucose. In the Israeli study, hemoglobin (Hb1c) was used as the measure of disease control, with Hb1c of less than or equal to 8% considered as optimum. Our study utilized fasting blood sugar but the fact that it measures current control of blood sugar and was therefore adjudged suitable for studying a mixture of diabetes who had been attending the clinic for various lengths of time. Whereas Hb1c measures glycaemic control over a period of approximately 3 months, patients just commencing treatment and those with previously poorly controlled blood sugar may have an optimal value

which is even if their current blood sugar is optimally controlled.

More than half (64.6%) of our subjects were moderately regular in their clinic appointments, while only 21.4% of them were very regular. Without regular follow-up, optimal monitoring and compliance are a priority, perhaps because of the increasing possibility of self-medication and complications. It is likely that some of the patients will continue on earlier prescribed drugs even after neglecting clinic appointments. Consequently there are risks of hypoglycaemia or hyperglycaemia as drug doses are not adjusted based on biochemical status of patients.

One of the reasons adduced by respondents for not being regular on following a "no sick at home" (53.3%). This may indicate a communication gap in follow-up procedures because such a situation of being "no sick at home" should warrant even more frequent visit, regardless of earlier scheduled appointment.

We found that about a third (34.7%) of our subjects had regular dietary control and had 41.4% could not maintain good dietary control because they believed it was expensive and cumbersome. In the study from Hungary, a much higher figure (74.8%) was reported for non-compliance with dietary guideline. African diet is richer in fibers, unrefined carbohydrates and less in fats compared to that of Hungary. As a result, African patients may find it easier to comply with "diabetic diet" because it has more similarities with African diet. This assertion is consistent with that of Sedor and other workers from Kuwait where 79% of the respondents said they were not adherent to dietary regulations because they can not trust along the traditional Kuwaiti food. Other reasons for respondents gave for not adhering to dietary advice "busy, no time to prepare the diet" (7%), "food tasteless and boring" (24%) and "inaware of the dietary guidelines" (23%). Similar reasons were adduced by patients non-compliant to dietary advice reported in other studies.¹⁰

Most of the diabetes studied (87.7%) were regular on Group A study by Walker and his colleagues² paradoxically reported lower level of compliance in drugs (77%) among their subjects. One infinitely expects more adherences to drugs among the USA study subjects because of socioeconomic differences. However, this paradox may be attributed by the fact that the USA study was conducted on patients with migrated disease associated with and who are so medication is present occurrence of most clinical and biochemical diabetes. On the other hand, many of our subjects were in either insulin or other hypoglycaemic group that medication free, the difference in compliance

rate of about 10% may not be unconnected with the high gastrointestinal side-effects of metformin,¹¹ and the disease state of the respondents (Participants in their study only had impaired glucose tolerance and may be less willing to comply with treatment, as symptoms may be less in them). The reasons adduced for non-compliance with drugs were also identified in the Walker study.¹² These comprised of long duration of treatment, multiplicity of drugs; fear of side effects and toxicity of drugs and forgetfulness. Our study in addition identified lack of resources to buy drugs as a reason for non-compliance in 33.1% of non-compliant patients. This was not identified as a factor in the Walker study, and is perhaps reflective of the difference in economy of the two countries and the difference in health care financing systems.

The finding of 17.9% of the respondents been current smokers in this study is near that of Hanko and colleagues¹³ where 14.8% current smokers was reported. This has strong implication, in that smoking in a diabetic patient compound the risk for cardiovascular and cerebrovascular disease.

Sociodemographic factors influencing compliance to diabetic management

The findings of this study suggest that male patients were more compliant with diabetes management. Perhaps because the northern culture requires that female respondents need to first seek and obtain consent and funding from the husbands before attending the hospitals (new or otherwise). In addition, patients with some form of formal education were significantly more compliant to antidiabetic measures compared to those without. Patients with formal education have more access to health education, as those without formal education cannot benefit from health education pamphlets, articles in newspapers and probably materials in English language. Further more, those with formal education are more likely to appreciate appointment dates and the rationale behind the appointments than those without.

This study also found that patients who are formally employed or self employed are significantly more compliant than those who are unemployed. Patients who earned five thousand naira or more in a month were found to be significantly more compliant to diabetic management than those who earned less. Lack of means to procure drugs has earlier been cited by 33.1% of our respondents as one reason for non-compliance with drugs.

CONCLUSION AND RECOMMENDATIONS

More than one third (37.1%) of the diabetic patients studied had good compliance to the holistic diabetic management comprising of diet, exercise and drugs. The levels of compliance however varied for the different methods of assessment, with compliance to drug use been highest. This is an indication that patients are being selective in their choice of interventions prescribed to them by their physicians. This practice does not augur well for the control of this debilitating disease.

In view of the findings of this study, we recommend as follows:

1. Health care providers should inculcate the practice of assessing individual patient's compliance to diabetes control measures routinely in the clinics. This could help track down areas of weaknesses in diabetes control that requires specific intervention.
2. Detailed socio-demographic and health assessment at the time of enrollment into the clinic has the potential to identify enrollees with higher risk for non-adherent behaviors, and should therefore be routinely done.
3. Health care administrators should ensure that facility and health care givers related factors (long-waiting time, poor attitude of health care givers, insufficient patient information e.t.c) identified as contributors to non-compliance are further locally explored and addressed.
4. In view of the finding that multiplicity of drugs hinder compliance, physicians should endeavor to use fixed combination drugs for treatment of diabetic patients, where possible.
5. Pharmacological approach (example "antabuse" and nicotine replacement therapy) could help in curtailing alcohol and smoking amongst addicted diabetic patients. The Federal Ministry of Health (FMOH), National Agency for Foods, Drugs Administration and Control (NAFDAC) and Pharmaceutical Society of Nigeria (PSN) should ensure that such agents are widely available locally to support addiction control.
6. Treatment support groups for diabetic patients should be constituted in clinics/hospitals. Their role should be to develop, introduce, and maintain adherence clues and strategies to patients and clinic staff alike.

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