ORIGINAL ARTICLE

Assessment of Dietary Knowledge, Practices and Control in Type 2 Diabetes in a Nigerian Teaching Hospital

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ABSTRACT

Background: *In spite of the importance of diet in the management of diabetes mellitus (DM), diabetics are often unaware of its place in ensuring good glycaemic control. Consequently, compliance and adherence with dietary advice remain poor among diabetics. The standard of practice of dietary therapy for DM among physicians is also low. The aim of this study therefore was to assess the dietary knowledge, practices and control of type 2 DM in Obafemi Awolowo University Teaching Hospitals' Complex, Ile-Ife, Nigeria.*

Method: *All 33 type 2 diabetes patients that attended the hospital over a three month period were studied to assess knowledge of DM, dietary practice and control. Percentage perceived, correct and accurate knowledge as well as practice were used for comparative analysis.*

Results: *All 33 subjects had truncal obesity and needed to lose weight. This was moderately severe in 60% of subjects. About 52% received dietary advice. The latter had a significantly higher mean dietary knowledge score than those without dietary advice. Significantly higher mean knowledge scores seemed to be associated with better dietary practices and better glycaemic control. Overall, dietary practices improved significantly following diagnosis and counselling. A significant proportion of subjects increased their use of food with low glycaemic index (legumes 48.5%, cereals 90.9%) following diagnosis.*

Conclusion: *The findings further emphasize the importance of structured dietary advice and dietary control in Type 2 diabetes. In settings where dieticians are scarce, physicians managing diabetic patients must be skilled in the dietary management of the condition and show commitment to it.*

KEYWORDS: *Dietary knowledge; Practice; Control; Glycaemic control; Hyperglycaemia; Type 2 Diabetes; NIDDM.*

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INTRODUCTION

Diet is the basis of successful treatment in type 2 diabetes (NIDDM). Coupled with lifestyle modifications, dietary advice is an important aspect of secondary prevention in NIDDM. It forms an essential part of the initial management of the condition prior to pharmacological treatment[1-4]. It involves the avoidance of rapidly absorbed simple carbohydrates, a reduction in fat intake, an increase in high fibre foods and a balanced distribution of complex ("slow release or lente") carbohydrates throughout the wakeful day[1,5-7]. High carbohydrate, high fibre (low glycaemic index) diets have been shown to control hyperglycaemia and its associated hyperlipidaemia[8]. Leguminous seeds and cereals that have high fibre contents are slowly digested and they produce a smaller rise in blood glucose than expected for a given amount of carbohydrate contents[5,6,9]. Modifying meal frequency and size alters nutrient uptake and affords better glycaemic control[6]. In the obese diabetic, diet involves the reduction of total calories to produce weight loss. Dietary strategies have been found to be more effective for weight loss than other non-dietary or combination strategies[10,11].

Despite the well-documented beneficial role of diet in diabetes care, available local evidence shows that diabetics rarely appreciate and follow dietary advice[12]. Standards of medical practice in relation to diet therapy for diabetes are equally generally low[13]. Casual observations of contemporary management of diabetes in the country also show poor application of current dietary knowledge. This study therefore aims at assessing nutritional knowledge and practice of NIDDM patients attending the Obafemi Awolowo University Teaching Hospitals' Complex, Ile-Ife, Nigeria.

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SUBJECTS AND METHODS

All patients with non-insulin dependent diabetes mellitus attending the Obafemi Awolowo University Teaching Hospitals' Complex Ile-Ife, Nigeria from September to November 1998 were studied with the aid of a structured questionnaire. The questionnaire sought information on socio-demographic factors, anthropometric indices, knowledge of diabetes mellitus, dietary control and practices. In all 22 questions were used to assess subject's knowledge of the condition and its dietary control. Percentage perceived, correct and accurate knowledge scores for each respondent was determined and mean knowledge used for inter-group comparisons. Perceived, correct and accurate knowledge were defined as follows:

Perceived knowledge = number of definite responses as a percentage of total number of questions (22)

Correct knowledge = number of correct responses as a percentage of total number of questions (22)

Accurate Knowledge = number of correct responses as a percentage of total number of definite responses.

Height was measured in centimetres without footwear, with feet together, heels and subject's back against a vertical board to which was affixed a steel tape. Subjects were weighed without footwear, all pockets emptied, on a bathroom Waymaster^{R} scale to the nearest tenth of a kilogram. Hip circumference was measured in the horizontal plane using the largest circumference around the buttocks when the subject was standing with the feet placed together. Waist girth was also measured standing in the horizontal plane but at the level of the umbilicus. All measurements were taken twice and the mean recorded for each parameter. Body mass index, BMI, (Kg/M^2) was calculated for each respondent from weight and height. The waist-hip ratio (WHR) was also determined. Subjects whose BMI were < 25, 26-28, 29-35, and > 35 Kg/M^2 were classified as non-obese, mildly, moderately and severely obese respectively. WHR below 0.84 and 0.73 were taken as normal for males and females respectively, while ratios equal or greater than these values were regarded as indicative of truncal obesity. Truncal obesity was classified as mild, moderate and severe (0.84-0.91, 0.92-0.95, >0.95 for males and 0.73-0.79, 0.80-0.86, > 0.86 for females respectively) using Harvey and Simon's criteria[14]. Blood sugar control was assessed with the fasting and 2-hour post-prandial blood sugar (FBS, 2HrPPS) values determined by standard laboratory methods at the patient's visit. FBS <6, 6-7.8 and > 7.8 were rated as optimal, fair and poor control respectively while 2HrPPS < 8, 9-10 and > 10 were similarly rated optimal, fair and poor control respectively.

The data were coded into a microcomputer and all analyses were done with Epi Info version 6 software (CDC, USA/WHO 1994). Simple descriptive and inferential statistics were carried out. Main effects were considered significant at $p < 0.05$.

RESULTS

A total of 33 type 2 diabetics, 18(54.5%) males and 15(45.1%) females, were registered during the study period. Their ages ranged from 31 to 72 years with a mean of 56.6 $\pm$ 10.9 years. All were married. Twenty-three (69.7%) had primary or no formal education. Altogether, 24 (72.7%) were traders, farmers and artisans. Mean age at diagnosis was 47.5 $\pm$ 11.8 years. Majority, 29(87.9%), had had the illness for at least a year prior to the study. Only 10 (30.3%) subjects, 8 of whom were females, were classified as obese using BMI while the WHR showed that all had central or truncal obesity, with 20 (60.6%) severely obese by this criterion as revealed in Figure 1. Table I shows that there were no sex differences in mean WHR, age, age at diagnosis, duration of illness and mean knowledge scores of subjects, $p>0.05$. While males were significantly taller than females, BMI, waist and hip circumferences were significantly higher in females than males, $p < 0.05$. Only two subjects were on dietary management alone; two others were NIDDM patients who required insulin and the rest were on hypoglycaemic drugs. Of the 33, only three attained optimal glycaemic control while 15 each were fairly or poorly controlled.

Only about 25% of subjects knew what diabetes mellitus was and its cause, though majority (90.9%) knew it is treatable and that diet has an important role in its treatment (97%). Nearly all diabetics knew that their control requires: a change in dietary habits (97%); avoidance of simple sugars (97%); and regulation of consumption of complex

carbohydrates and oils (90.9%) as shown in Table II. Table III shows that nearly all respondents had grossly inaccurate knowledge of foods freely allowed for diabetics. Subjects' level of knowledge (perceived, correct and accurate) did not differ significantly with sex, age, age at diagnosis, duration of illness, religion, occupation and literacy level ($p > 0.05$). The source of dietary information was the physician in 69.7% of respondents. A total of 17 (51.5%) respondents admitted receiving definite dietary advice as part of their management at diagnosis or thereafter. While perceived knowledge scores of subjects who received and did not receive dietary advice did not differ significantly, mean correct and accurate knowledge scores were significantly higher in the former as shown in Table IV. The mean correct and accurate dietary knowledge scores were all below 60%.

Figure 2 show that 31 (93.9%) subjects avoided sweet fatty foods and alcohol at the time of the study compared with 16 (48.5%) before the diagnosis was made ($p<0.05$). Although, not statistically significant, more subjects also used vegetables in their diets following the diagnosis ($p>0.05$). Sixteen (48.5%) respondents increased the proportion of legumes in their diet while about 91% changed to more cereal-based foods than before diagnosis. Although only 8 (24.2%) subjects constantly measured food to determine the quantity to eat, 66.7% were definite that they had reduced the size of their meals. Five subjects used the eyeball test while 20 made no attempts to quantify their meals. Figure 3 shows an increased proportion of small and moderately sized- meals post-diagnosis relative to pre-diagnosis estimates. Only 11 (33.3%) of the subjects observed regular meal times. Table V shows significantly higher mean accurate knowledge scores among subjects who quantified their meals and observed regular meal times. It also shows that mean accurate knowledge score was highest in subjects who achieved optimal blood sugar control and lowest in poorly controlled subjects.

Table I. Numerical summary of selected variables by sex of respondents

	MALE (n=18)		FEMALE (n=15)			
Variable	Mean	S.D	Mean	S.D.	t	P value
Weight(Kg)	66.79	9.65	68.13	11.84	0.358027	0.72296
Height(cm)	170.43	5.82	161.40	5.58	4.520509	0.00022*
Waist+ (cm)	85.50	11.79	93.93	10.44	2.153031	0.03702*
Hip+ (cm)	89.94	10.25	98.80	8.20	2.700546	0.01076
WHR	0.935	0.062	0.947	0.057	0.557730	0.58748
BMI (Kg/M2)	23.08	3.58	26.14	3.98	2.324635	0.02530
Perceived K	90.0	6.7	86.9	7.5	1.268424	0.21000
Correct K	51.3	10.6	45.1	8.1	1.858171	0.07000
Accurate K	57.2	12.4	51.9	8.8	1.368455	0.18000
Age(yrs)	56.44	10.22	56.80	11.93	0.092262	0.92430
Age Diagnosed (yrs)	51.67	8.28	51.27	11.97	0.113093	0.90678
Duration++	4.65	3.74	5.39	5.29	0.471539	0.64535

* Significant difference, + Circumference, ++ Duration of illness, WHR = waist-hip ratio, BMI = body mass index, K = Knowledge

Table II. Knowledge of respondents about Diabetes Mellitus

Item	Correct Responses	
	N	%
What is Diabetes mellitus?	8	24.2
Cause of Diabetes mellitus	8	24.2
Is Diabetes mellitus treatable?	30	90.9
Does diet have a role in treatment?	32	97.0
Control requires change of dietary habits	32	97.0
Control requires avoidance of simple sugars (sweet foods)	32	97.0
Control requires regulation of complex carbohydrates + oils	30	90.9

Table III. Proportion of respondents with correct knowledge of foods freely allowed for diabetics

Item	N	%
Vegetables	31	93.9
Fruits	16	48.5
Black Eye Beans	33	100.0
Unripe Plantain	31	93.9
Animal Proteins	31	93.9

Table IV. Influence of dietary advice on knowledge scores of respondents

		Knowledge					
		Perceived		Correct		Accurate	
Dietary Advice	n	Mean Score (%)	S.D	Mean Score (%)	S.D	Mean Score (%)	S.D
Received	17	87.2	7.1	51.9	10.7	59.7	12.4
Not received	16	90.3	7.2	44.9	7.4	49.6	6.3
T		1.278378		2.171860		2.932777	
P value		0.208		0.036*		0.0063*	

* Significant difference

Table V. Mean accurate knowledge scores and indices of compliance among type 2 diabetics

		Accurate Knowledge Score				
		N	Mean	S.D	F/t	P-value
Quantification of meals	Yes	13	61.0	11.2	t=2.90517	0.0067*
	No	20	50.7	9.0		
Fixed meal times	Yes	11	64.3	12.2	t=4.39406	0.0003*
	No	22	50.0	6.6		
Blood sugar control	Optimal	3	70.3	8.7	F=7.56	0.0019*
	Fair	15	57.4	9.7		
	Poor	15	49.1	9.1		

*Significant difference

Fig 1. Pattern of Obesity among Subjects using Body Mass Index and Waist-hip Ration

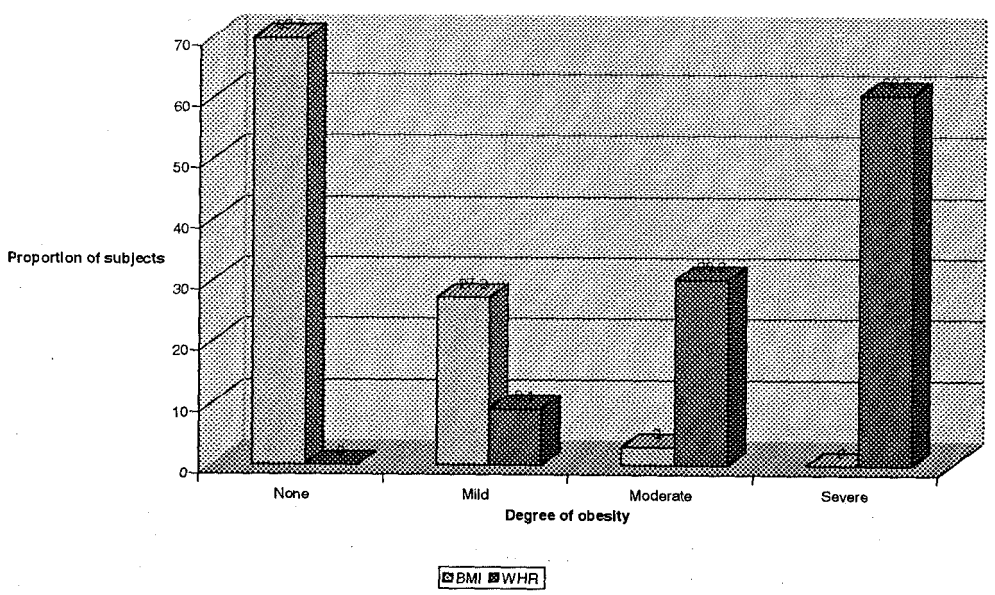


Fig 2. Dietary Practices of Respondents

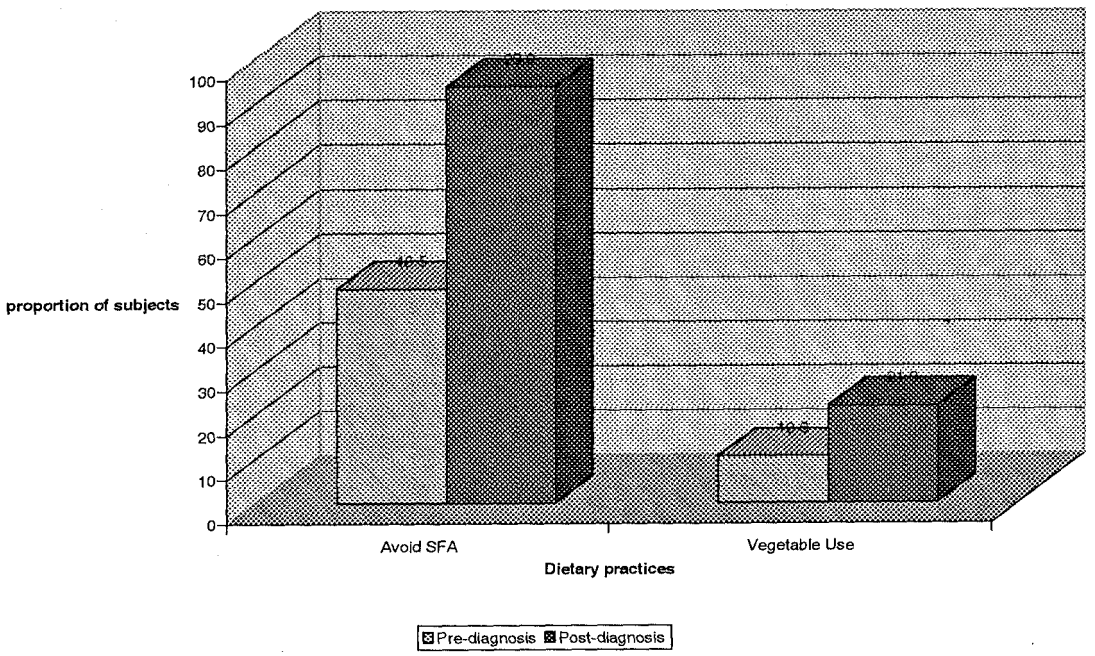
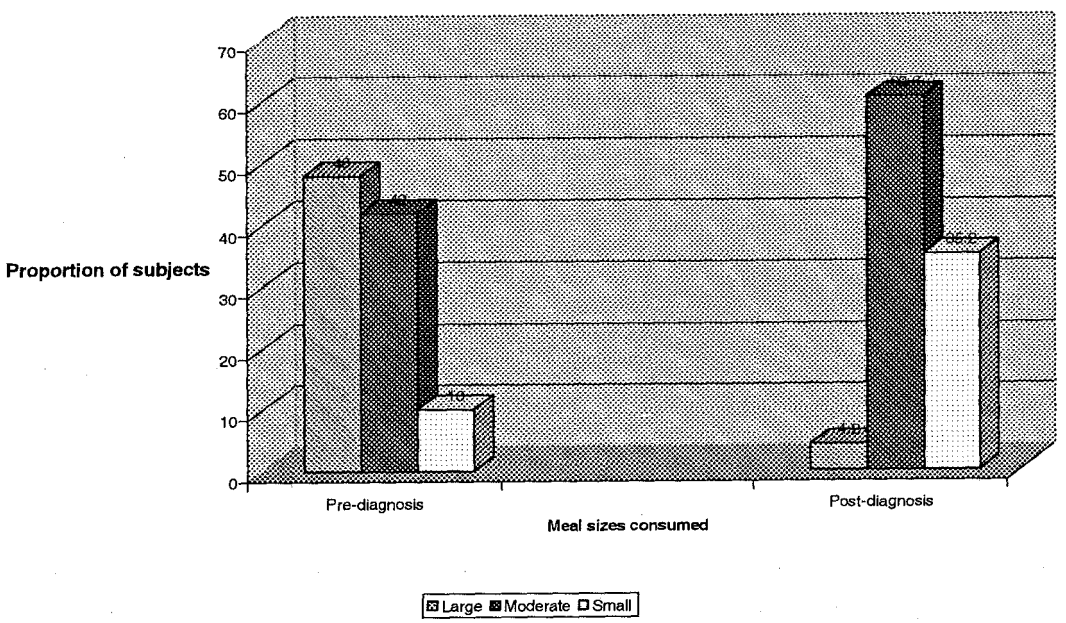


Fig 3. Pattern of Meal sizes used by Respondents



DISCUSSION

NIDDM is a disease of later ages. Its incidence increases with advancing age. This explains the age range of 31 to 72 years, the mean age of 56.6 ±10.9 years and a mean age at diagnosis of 47.5±11.8 years found in this study. The low mean age of 47.5 years at diagnosis in this study could be interpreted as early onset of the disease due to adoption of western diets[15,16]. About 70% of the respondents had little or no formal education. This is similar to the findings of Famuyiwa *et al.* in Ibadan, Nigeria[17].

In this study, respondents generally had poor knowledge of diabetes mellitus. Seventy five percent of subjects were totally ignorant of

causal factors. The latter is of significance in view of its implications for lifestyle modification, healthful living and compliance with advice. Although only 51.5% of subjects had definite dietary advice, mainly from their physicians, they demonstrated fairly good knowledge of the basic principles of dietary treatment of diabetes but possessed grossly inaccurate knowledge of the foods freely allowed for diabetics. While low glycaemic index foods should be encouraged for diabetics, patients need to be aware of the importance of achieving caloric balance and regulate body weight as well. Similarly, diabetics need to be aware of the hidden fat in animal proteins and maintain necessary discretion. These findings are similar to those reported by Smith[18]. The findings can be explained by the fact that majority of respondents had had their illness for at least a year before the study and would have picked up information (including erroneous ones) about the condition over time. Passive patient education often does not offer explanations for the practical issues raised and often lacks the correct emphasis on the important issues. It merely equips patients with knowledge without motivation for application. As information provided by medical personnel may not incorporate relevant skills and may not be detailed, routine and regular consultation with the dietician should be established if adequate attention should be given to this vitally important initial and subsequently complimentary management of NIDDM. These observations emphasize the role of the dietician in the management of NIDDM and the multidisciplinary nature of its care.

The finding that knowledge scores were not influenced by literacy levels may be explained by the technical nature of diabetic dietary information. Significantly more respondents avoided simple sugars, increased consumption of legumes and cereals but decreased meal sizes compared to pre-diagnosis levels. These dietary practices have all been found to improve glycaemic control and dyslipidaemia in NIDDM[5-7]. The adoption by a majority of subjects of low glycaemic index or lente diet in the local staple, particularly black eye beans and cereals should thus be encouraged and reinforced among diabetics. Moreover, mean knowledge scores were significantly higher among those who received definite dietary advice, those who quantified their meals and those who observed regular meal times. These findings emphasize the importance of accurate dietary information in compliance with dietary control, and how diabetics can be assisted to achieve better glycaemic control through making healthy food choices. This inference, however, needs to be supported with findings from a larger population of Nigerian diabetics. Patients with NIDDM must understand the disease and the rational basis for management decisions to ensure compliance.

Studies have shown that diet instruction and behaviour modification have a significant beneficial effect on metabolic control[19]. The fact that the mean knowledge score was positively related to glycaemic control further emphasizes the importance of dietary advice in the management of NIDDM. It is believed that in a proportion of NIDDM patients, glycaemic control can be achieved with diet alone.

The direct comparison of WHR of males and females showed no significant difference but the fact that the normal value for females is lower than for males implies a higher severity of truncal obesity in females in this study. Whereas BMI classified only a third of subjects as obese, WHR showed that all had truncal obesity. Thus, it can be inferred that WHR is more sensitive than BMI. This becomes important in that central or truncal obesity has been found to be a strong risk factor for NIDDM. Interestingly, dietary strategies have been shown to be the most effective in producing weight loss, which in turn improves glycaernic control and reduces hyperlipidaemia[10,20].

As effective planning and supervision of dietary intervention is an important NIDDM management strategy, the role of dieticians in targeting sustained optimal glycaemic control cannot be over emphasized. Where dieticians are not available, doctors must both appreciate the vital importance of dietary control and accord it prominence in the management of their patients with NIDDM[3,4]. The doctor needs to guide and continually encourage the patient to make informed, healthy, affordable and acceptable food choices. This is most relevant both in primary and secondary prevention of the condition.

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