

Effect of Nutrition Education on Blood Glucose and Lipid Profile of Non Insulin Dependent Female Diabetics

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ABSTRACT Sixty non insulin dependent female diabetics in the age group of 40-60 years were selected from PAU, Hospital, Ludhiana to study the impact of nutrition education on their blood and lipid profile. Nutrition education was imparted to all the subjects for a period of 3 months at 15 days interval. The mean fasting and post prandial blood glucose levels reduced significantly ($P \leq 0.05$) from 181.5 to 156.7 mg/dl and 251.5 to 226.7 mg/dl. Before nutrition education only 61 and 23% of the subjects were not showing fasting and post prandial urinary glucose while after nutrition education the value increased to 73 and 48% respectively. The decrease in blood and urinary glucose levels showed a significant ($P \leq 0.01$) reduction in oral hypoglycemic drug intake. The total cholesterol and total triglycerides reduced significantly ($P \leq 0.01$) from 198.9 to 173.4 mg/dl and 206.8 to 198.9 mg/dl respectively. On the whole 13.68% reduction in fasting blood glucose and 9.85% in post prandial glucose was observed which can be attributed to nutrition education. Hence it can be said that nutrition education can go a long way in improving the blood glucose and lipid profile of the diabetics and thus can prevent the secondary complications.

INTRODUCTION

Diabetes is one of the most common non communicable diseases and increasing in epidemic proportions throughout the world. Diabetes affects 150 million people globally and will rise to 300 million in 2025. Of this, 70 million will be in India (Bedi, 2005). Diabetes mellitus is a silent chronic disorder characterized by elevated blood glucose level resulting from defects in insulin secretion, insulin action or both (ADA, 1998). Moreover, diabetes have 2-3 fold increased risk for cardiovascular disease as compared to non diabetics (Shah and Joshi, 2001). High blood glucose values are positively associated with elevated serum triglyceride and cholesterol level (Leiden et al., 2002). Studies by various workers clearly indicates that nutrition education is very important to educate the people about disease, its complications and how to reduce the secondary complications. So the present study has been planned to see the effect of nutrition education on blood glucose and lipid profile of the female diabetics.

MATERIAL AND METHODS

Selection of the Subjects: Sixty non insulin dependent female diabetics in the age group of 40-60 years were selected from Punjab Agricultural University Hospital, Ludhiana.

Nutrition Education: Education regarding

diabetes, types of diabetes, the causes, symptoms, complications, dietary management was imparted to the patients by delivering lectures, by showing transparencies and by giving demonstrations. Nutrition education was given to all the subjects for a period of 3 months at a interval of 15 days. The lectures were repeated at least twice for better retention. Personal contact with respondents was maintained throughout the study period so as their personal Queries may be solved.

Collection and Analysis of Blood Samples: Blood samples of the subjects were collected before and after the nutrition education. Blood glucose was analysed by BIOTRON BTR 820 Auto blood analyser (Trinder, 1969). Serum triglycerides was analysed by using enzymatic DHBC colorimetric method (Fossati and Principle, 1982). Serum total cholesterol was analysed by BIOTRON BTR 820 Auto blood analyzer using enzymatic method. (Richmond, 1973) and high density lipoprotein cholesterol was measured by using BIOTRON BTR 820 Auto blood analyzer using Phosphotunstate method by Lopes Virella et al. (1997). The value of serum low density lipoprotein cholesterol (LDL-C) was calculated based on Friedwald's equation (Friedwald's et al., 1972). The value of serum Very Low Density Lipoprotein Cholesterol (VLDL-C) was calculated as VLDL-C = Triglycerides/5. Urine glucose was analysed by Benedict's method (1911).

Statistical Analysis: The data obtained was analysed by using the appropriate statistical tools.

RESULTS AND DISCUSSION

Blood Glucose: Table 1 depicts Fasting and post prandial blood glucose level of the subjects before and after nutrition education. The mean fasting blood glucose level of the subjects before nutrition education was 181.57 ± 10.04 mg/dl which reduced to 156.72 ± 9.75 mg/dl after nutrition education. The mean post prandial blood glucose level was 251.53 ± 11.61 mg/dl before nutrition education while after nutrition education it reduced to 226.75 ± 11.84 mg/dl. The results are in agreement with the findings of Anuradha and Vidhya (2001) and Sookmee et al. (2001) who also reported the decrease in blood glucose level among non insulin dependent females after dietary counselling.

Urinary Glucose: The percentage of subjects showing fasting and post prandial (PP) glucose ranging from 0.5% to more than 2 gram % in urine reduced after nutrition education from 38.33 to 25.01 and 76.67 to 45% respectively. On the other hand percentage of subjects

showing negative fasting and post prandial glucose in urine increased significantly ($P \leq 0.01$) from 61.67 to 73.33 per cent and 23.33 to 48.33 per cent. Reduction in urinary glucose can be attributed to the reduction in blood glucose level. The results of the present study are inline with the results of Kapoor (2001) who also reported reduction in urinary glucose level after dietary counseling (Table 2).

Oral Hypoglycemic Drug (OHD) Intake: The most commonly prescribed OHD to the subjects during the study period was Daonil and Betanase. There was a significant ($P \leq 0.01$) increase from (8.33 to 26.67%) and (11.67 to 40%) among the subjects taking 0.5 and 1.0 tablet/day. On the other hand, a significant ($P \leq 0.01$) decrease 60 to 23.33% was observed in subjects taking 2 tablets/day which may be associated to decrease in blood glucose levels. Similar results among NIDDM patients was reported by Gulati (2000) and Kapoor (2001) (Table 3).

Lipid Profile: The mean triglycerides values before and after nutrition education were 198.90 ± 9.77 mg/dl and 173.45 ± 7.65 mg/dl respectively. Triglyceride level of the subjects after nutrition education decreased significantly

Table 1: Fasting and post prandial blood glucose levels of the subject before and after nutrition education

Blood glucose (mg/dl)	Before N.E.	After N.E.	t-value	Normal range*
Fasting	181.57 ± 10.04	156.72 ± 9.75	3.88***	80-115
Post prandial	251.53 ± 11.61	226.75 ± 11.84	2.51**	120-160

N.E. - Nutrition education

*** - Significant at 1%

** - Significant at 5%

* - Raghuram et al. (1993)

Table 2: Fasting and post prandial urinary glucose levels of the subject before and after nutrition education

Urinary glucose (g%)	Fasting urinary glucose		Post prandial urinary glucose	
	Before N.E.	After N.E.	Before N.E.	After N.E.
Nil	37(61.67)	44(73.33) ^{NS}	14(23.33)	29(48.33)***
0.5	12(20.00)	9(15.00) ^{NS}	14(23.33)	7(11.67)*
1.0	5(8.33)	0(0.00)**	10(16.67)	8(13.33) ^{NS}
1.5	2(3.33)	1(1.67) ^{NS}	8(13.33)	4(6.67) ^{NS}
2.0	0(0.00)	1(1.67) ^{NS}	1(1.67)	0(0.00) ^{NS}
>2.0	4(6.67)	4(6.67) ^{NS}	13(21.67)	8(13.33) ^{NS}

N.E. - Nutrition education

Figures in parenthesis indicate percentages

NS - Non-significant

*** - Significant at 1%

** - Significant at 5%

* - Significant at 10%

Table 3: Effect of nutrition education on oral hypoglycemia drug intake by the subjects

Tablet/day	Before N.E. number percentage	After N.E. number percentage
0.5	5 (8.33)	16 (26.67)***
1.0	7 (11.67)	24 (40.00)***
1.5	12 (20.00)	6 (10.00) ^{ns}
2.0	36 (60.00)	14 (23.33)**

N.E. - Nutrition education

*** - Significant at 1%

($P \leq 0.01$) by 12.79 per cent. The mean cholesterol level of the subjects before nutrition education was 206.85 ± 5.70 mg/dl which was reduced significantly ($P \leq 0.05$) to 198.93 ± 4.37 mg/dl after nutrition education. The decrease in total cholesterol among diabetics after nutrition education was also reported by Pati et al. (1996) and Zargar et al. (1997). The very low density lipoprotein level of the subjects after nutrition education reduced significantly ($P \leq 0.01$) from 39.5 to 34.6 mg/dl while the reduction in low density lipoprotein cholesterol (LDL-C) level of the subjects was non significant Pati et al. (1996) also reported decrease in VLDL-C after counseling among diabetics. On the other hand, after nutrition education non significant increase was found in high density lipoprotein cholesterol (HDL-C) level of the subjects. Decrease in triglycerides level, VLDL-C level, total cholesterol and LDL-C may be due to decrease in fasting and post prandial blood glucose levels of the subjects as blood glucose was found to be positively correlated with triglycerides ($r=0.257$) total cholesterol ($r=0.301$), LDL-C ($r=0.321$), VLDL-C ($r=0.308$) while HDL was negatively correlated ($r= - 0.310$) with fasting and post prandial blood glucose level (Table 4).

Table 4: Serum lipid profile of the subjects before and after nutrition education

Serum lipid profile (mg/dl)	Before N.E.	After N.E.	t-value	Normal* range (mg/dl)
Total triglycerides	198.90 ± 9.77	173.45 ± 7.65	3.58***	<150
Total cholesterol	206.85 ± 5.70	198.93 ± 4.37	2.31**	<200
HDL-C	43.30 ± 0.84	44.33 ± 1.09	1.03 ^{NS}	30-70
LDL-C	120.53 ± 5.11	119.73 ± 3.90	1.32 ^{NS}	80-160
VLDL-C	39.58 ± 1.95	34.62 ± 1.49	2.98***	20-40

N.E. - Nutrition education

* - Raghuram et al. (1993)

** - Significant at 5%

*** - Significant at 1%

NS - Non significant

CONCLUSION

The data obtained from the present study shows that before nutrition education fasting blood glucose, post prandial blood glucose, total triglycerides and total cholesterol levels were higher while LDL-C, HDL-C and VLDL-C levels were within the normal range. After nutrition education the blood glucose, total cholesterol and triglycerides reduced significantly but were still in the higher range when compared with normal values. Hence it can be concluded that nutrition education if continued may go a long way in improving the blood glucose and lipid profile of the diabetics and thus can prevent secondary complications.

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