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Original Research Article

Glycemic control with four way model approach in rural area patients

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ABSTRACT

Background: It is very important to keep the Glucose levels under control continuously and without any holidays. Type 2 diabetes is increasingly common in the industrialized world. Tight glycemic control attempts to rigidly glucose control levels (A1c: 6.5% -7.0% or lower). Maintaining tight glycemic control is lifesaving. Proper counselling, proper nutrition and if regular exercise is done it can result is good glycemic control.
Methods: In the present study a total of 350 diabetic patients were selected out of which only 208 participants were eligible for study. Inclusion criteria in the study were 1) Age: men and women between age group 30 years to 70 years and 2) Type 2 Diabetes mellitus with HbA1c between 8 to 10%. Exclusion criteria in the study were 1) Type 1diabetes mellitus, Pre-existing renal, hepatic or cardiac disease, Hba1c >10%. A quadriad was established between patients, personal health worker, dietician and doctor.
Results: Participants had regularly followed up and were divided randomly into cases (n = 112) and controls (n = 96). Patient were followed up as per study design it was observed that at the end of 3 months period mean FBS (case group 168.2±26.4 control group 200.8±38.3 p value <0.001) , Mean PPBS (case group 204.8±53.0 control group 271.0±45.5 p value <0.001) and Mean Hba1c (case group 8.7±0.5 control group 8.9±0.6 p value .003) in cases was significantly lower than control group.at the end 6 months it was observed that the mean cholesterol, mean triglyceride, mean LDL and mean VLDL was significantly lower in the cases compared to controls.
Conclusions: A systematic approach and close monitoring that increased the adherence to medication, diet, and counselling would help in better glycemic control and prevent long term complication.

Keywords: Body mass index, Fasting blood glucose, Four way model approach, Glycemic level, Health worker, Lipid levels, Post prandial blood glucose, Type 2 diabetes mellitus

INTRODUCTION

Glycemic control remains a delicate balancing act. It is very important to keep the Glucose levels under control continuously and without holidays. Failure to maintain euglycemia results from biological factors and psychosocial factors including overmedication and/or under-dosage of medication or skipping of drugs, inappropriate choices regarding food, drink, and, in certain cases, exercise. Type 2 diabetes is increasingly common in the industrialized world. Tight glycemic control attempts to rigidly glucose control levels (typically an A1C between 6.5% - 7.0% or lower). Maintaining tight glycemic control is lifesaving. Proper counselling, proper nutrition and if regular exercise is done it can result is good glycemic control.[1]

The aim of the present study was to achieve glycemic and lipemic control in rural patients using a cost effective quadrangular model.

METHODS

In the present study a total of 350 diabetic patients were selected out of which only 208 participants were eligible for study. These study group patients were divided randomly into two group such as

- Cases (n = 112) and
- Controls (n = 96).

Inclusion criteria

- Age: men and women between age group 30 years to 70 years.
- Type 2 diabetes mellitus with HbA1c between 8 to 10%.

Exclusion criteria

- Type 1 diabetes mellitus
- Pre-existing renal disease
- Hba1c >10%
- Pre-existing cardiac disease
- Pre-existing hepatic disease
- Any history of alcohol intake
- Preexisting neurological disorders

Tie up was made with the multipurpose health worker to visit the patients' home and educate the patients on importance of regular treatment and diet in addition to distribution and observation of medicine intake. A quadriad was established between patients, personal health worker, dietician and doctor and this study was followed upto 6 months. Author have used SPSS v20 software for analysis of patient dat.

RESULTS

Total 208 participants had regularly followed up and were divided randomly into cases (n = 112) and controls (n = 96). All patients grouped under cases were followed up for a period of 6 months using a quadrangular model that includes patients, personal health worker, dietician and doctor. The personal health workers were assigned the task of daily and regular visit to patients home and to counsel them on regular use of medication whereas the dietician visited once a week to ensure proper adherence to diabetic diet and doctor visited once every fortnightly to monitor the role of proper medication and diet counseling in patients. Whereas the control group visited once every three months.

Table 1: Pre-study demographics.

Parameters	Cases		Control		t value	p value
	Mean	SD	Mean	SD		
Age	42.4	10.8	40.7	11.4	1.105	0.270
TCHOL	226.6	35.3	229.1	31.3	0.539	0.590
TGL	232.3	27.7	247.2	63.5	2.052	0.056
HDL	41.1	3.0	41.4	7.5	0.355	0.723
LDL	146.4	36.7	138.3	31.9	1.688	0.093
FBS	177.2	23.3	180.6	40.2	0.760	0.448
PPBS	225.2	43.8	234.0	41.8	1.463	0.145
Hba1c	9.2	0.5	9.0	0.6	2.150	0.050

Table 2: 3 months glycemic parameters.

Parameters	Cases		Control		t value	p value
	Mean	SD	Mean	SD		
FBS 3 month	168.2	26.4	200.8	38.3	7.210	<0.001
PPBS 3month	204.8	53.0	271.0	45.5	9.580	<0.001
Hba1c 3 month	8.7	0.5	8.9	0.6	2.997	0.003

Table 3: Glycemic parameter after 6 months.

Parameters	Cases		Control		t value	p value
	Mean	SD	Mean	SD		
FBS 6 month	138.9	19.5	208.0	44.8	14.790	<0.001
PPBS 6month	168.4	26.3	258.3	48.9	16.810	<0.001
Hba1c 6 month	7.3	0.3	9.0	0.6	26.060	<0.001

Table 4: Lipid parameter after 6 months.

Post 6 months	Cases		Control		t value	p value
	Mean	SD	Mean	SD		
Total cholesterol	194.2	19.8	229.0	33.6	9.262	<0.001
Triglycerides	186.3	17.9	252.4	54.7	12.072	<0.001
HDL Cholesterol	43.4	7.1	42.9	2.6	0.715	0.475
LDL Cholesterol	114.0	20.0	135.1	41.0	4.811	<0.001

In the present study (Table 1) it was observed that there was no statistically significant difference in the Mean age (case group 42.4±10.8, control group 40.7±11.4 and p value 0.270) lipid parameters, Mean BMI, Mean FBS, mean, PPBS Mean HbA1c and gender wise distribution in the patients (p >0.05). Patient were followed up as per study design it was observed that at the end of 3 months period mean FBS (case group 168.2±26.4 control group 200.8±38.3 and p value <0.001), Mean PPBS (case group 204.8±53.0 control group 271.0±45.5 and p value <0.001)and Mean Hba1c (case group 8.7±0.5 control group 8.9±0.6 and p value 0.003) in cases was significantly lower than control group (Table 2).

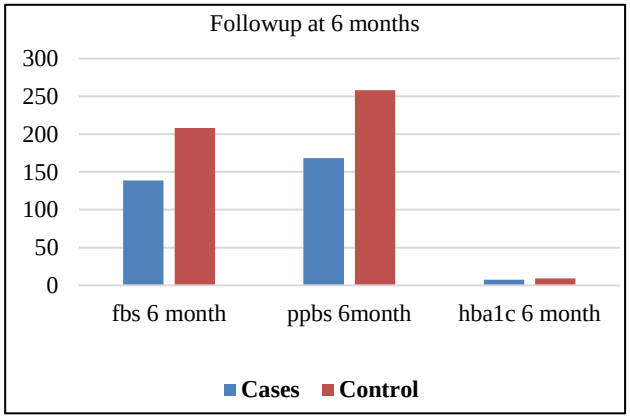

Figure 1: Graphical representation of case and control study group.

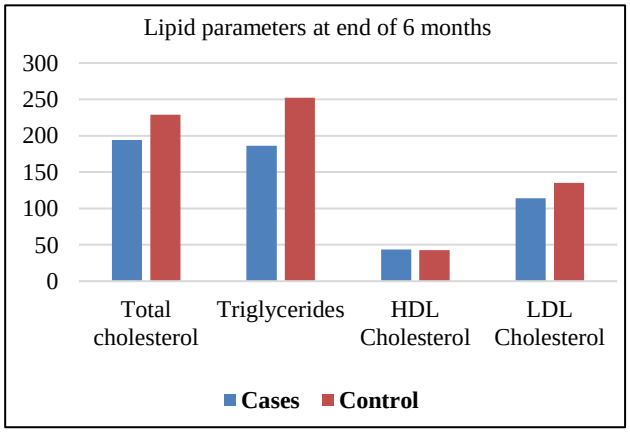

Figure 2: Lipid parameters in both group post study.

And at the end of 6 months period mean FBS, Mean PPBS and Mean Hba1c in cases was significantly lower than control group which is depicted (Table 3 and Figure 1).

Patient were also followed up for lipid parameters and BMI at the end 6 months (Figure 2) it was observed that the mean cholesterol (case group 194.2±19.8, control group 229±33.6 and p value <0.001), mean triglyceride (case group 186.3±17.9, control group 252.4±54.7 and p value <0.001, mean LDL (case group 114±20, control group 135.1±41, p value <0.001) and mean VLDL was significantly lower in the cases compared to controls.

Mean HDL was observed to be higher in cases group 43.4±7.1compared to controls group (42.9±2.6) but the increase was not statistically significant p >0.05 (Table 4). Mean BMI was observed to be lower in cases at the end of 6 months compared to controls p <0.05 (Table 5).

Table 5: BMI pre and post study.

Parameters	Cases		Control		t value	p value
	Mean	SD	Mean	SD		
BMI	24.7	1.8	24.8	2.5	0.541	0.589
BMI 6	23.7	2.5	24.7	2.6	2.798	0.006

DISCUSSION

It is well known fact that poor medication adherence results in increased costs of T2D outpatient care, ER visits, hospitalization, and managing T2D complications. Multiple studies have proven this fact, present study has also shown that good adherence to treatment and proper intake of medication will have better glycemic and lipemic control and prevent further complications.

Patient were followed up as per study design it was observed that at the end of 3 months period mean FBS, Mean PPBS, and Mean Hba1c in cases was significantly lower than control group.

At the end 6 months it was observed that the mean cholesterol, mean triglyceride, mean LDL and mean VLDL was significantly lower in the cases compared to controls.

Satpute DA et al, has shown that counselling, proper nutrition and if regular exercise is done it can result is good glycemic control. In the study group who received Counselling, Nutrition and Exercise have shown significant reductions in HbA1c FPG, total cholesterol, serum triglyceride and LDL cholesterol. This was also seen in our study with proper counselling it had shown-beter results in glycemic control.[1]

Singh K et al, study has shown that Pharmacists giving counseling to the intervention group during each visit and their health-related quality of life was assessed with the help of Ferrans and Powers questionnaire. It has shown that frequent explanation of medication and its importance have helped the patient in achieving glycemic control.[2]

Adepu R et al, study results show that, pharmacist provided patient counseling has a significant impact and it has also helped in improving the perception about disease, diet and life style changes which eventually had reflected in better glycemic control.[3,4]

Luis-Emilio et al, have shown the significance of adherence to diabetic drugs had better glycemic levels when compared to non-adherent group of people.[5]

Osterberg L et al, had shown, the importance and significant adherence to therapy have a good impact on glycemic levels.[6]

Guillausseau PJ, has also shown effect of low compliance to medication have resulted in poor metabolic control which had finally resulted in elevation of 1.4% in glycosylated hemoglobin in poor complaint patient versus compliant group.[7]

Ho PM et al, study has shown that the frequency of non-adherence was more seen in younger group than compared to other arm group and eventually over a period of time the risk of all cause hospitalization was increased in this non adherent group arm.[8]

Lau DT et al, and Egede LE et al, both the studies have shown those patients who were taking oral hypoglycemic drugs properly had better glycemic control than compared to the non-adherent group. The risk of hospitalization was doubled in non-adherent group.[9,10]

At the end of 6 months period of the study, it was noted that the mean FBS, Mean PPBS and Mean Hba1c in cases was significantly lower than control group which is statistically significant. The lipid parameters and BMI at the end 6 months was also noted.

The mean cholesterol, mean triglyceride, mean LDL and mean VLDL was significantly lower in the cases compared to controls and it was statistically significant (p value <0.001). Mean HDL was observed to be higher in cases group than compared to controls group but the increase was not statistically significant.

CONCLUSION

Adherence to therapies is a primary factor that determines the success of therapy and decreases the negative consequences not only for the patient but also for the health care provider. A single contact with physician could not achieve good glycemic control.

A systematic approach and close monitoring that increased the adherence to medication, diet, and counselling would help in better glycemic control and prevent long term complication. Author have proven by the present study that a systematic approach helps in achieving good glycemic and lipemic control.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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