

Efficacy of Education through Counselling in Managing Diabetes Mellitus: A Study in Eastern India

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Abstract: *The objective of the study to examine the efficacy of education through counselling among diabetes mellitus (DM) patients of eastern India, which prevents the biochemical profiles, and obesity parameter. A total 50 participants were randomly selected, who visited the endocrinology outpatient department of the hospital in Kolkata. All the data have been collected from clinical records for baseline data of biochemical profiles such as fasting plasma glucose (FPG), post - prandial plasma glucose (PPPG) and glycated haemoglobin (HbA1c), and obesity parameter viz. body mass index (BMI) among DM subjects. The education was delivered through counselling and compared between baseline versus 3 months and 6 months followed up. The biochemical profiles viz. FPG, PPPG and HbA1c, as well as BMI values were found significantly ($P < 0.001$ and $P < 0.01$) decreasing trend during 3 months and 6 months follow up after education to DM subjects. In the present study, for 6 months follow up, the principal component analysis (PCA) indicated the PC - 1 (94.822%) relatively higher value of positive loading for FBG. The present study concludes that education through counselling was observed efficacious for the prevention of DM among patients of eastern India. The present findings in its first time in which the association of parameters found to be related with the PCI regarding the biochemical and obesity parameters.*

Keywords: Diabetes mellitus, Biochemical parameters, Obesity parameter, Education through counselling, Diabetic management

1. Introduction

Many studies reported that lifestyle risk factors such as inadequate physical activity, abnormal dietary habits, adiposity/obesity, consumption of alcohol, smoking habits, etc. in combinations or individually increased the DM prevalence. ^[1 - 8]

The management of lifestyle risk factors reduced the prevalence of DM when patients are educating through counseling for the usage of complimentary medicines, ^[9] performing physical activity/exercise, ^[10, 11] proper diet, ^[3, 8] moderate alcohol consumption, ^[12] non - smoking activity, ^[11] etc. Moreover, an earlier study established that healthy lifestyle control reduced the prevalence of DM. ^[13] An earlier study by Dasgupta and Ray, ^[14] health awareness is necessary among DM patients, and it was observed a close relationship between demographic and socioeconomic profiles along with biochemical and obesity parameters. In other parts of the India and globe, few studies have reported the efficacy of education through counselling in DM patients ^[15 - 19] but it is lacking in our study area.

The objective of the present study was to determine the efficacy of education through counselling among diabetes mellitus patients of eastern India, which prevents the biochemical profiles, and obesity parameter.

2. Materials and Methods

The study was based on a total number of 50 DM patients, who visited the endocrinology outpatient department of hospital, Kolkata, eastern part of India. All the data were collected from clinical records to know baseline data of biochemical profiles such as fasting plasma glucose (FPG), post - prandial plasma glucose (PPPG) and glycated haemoglobin (HbA1c), and obesity parameter viz. body mass index (BMI) among DM patients. Finally, educated through counselling and compared between followed up 3 months and 6 months, respectively for the prevention of DM.

The data were statistically analysed and compared above - mentioned four parameters between baseline versus 3 months and 6 months follow up data by using PAST (Paleontological Statistics (PAST, version 3.26) tool. ^[20] Continuous variables were expressed as mean (M) \pm standard deviation (SD) for comparative analysis with a student 't' test. The principal component analysis (PCA) was also performed by using PAST tool to reduce the variables into a smaller number of uncorrelated predictor variables. ^[20] Individual participant principal component (PC) scores were comprised from their factors loadings for four parameters and used to create PCA of the 4 factors in each case. The statistically significant level at $P < 0.05$ was considered.

3. Results

Table 1 evaluates mean comparison of biochemical and obesity parameters after long - term education among diabetic patients. After education, 3month follow up

observed a decreasing trend for all parameters without significant change FPG (P= 0.192), PPPG (P=0.187), HbA1c (P=0.072) and BMI (P=0.114) while all biochemical parameters as well as obesity parameter were significantly (P<0.001 and P<0.01) reduced after 6months follow up.

Table 1: Mean comparison of biochemical and obesity parameters after long - term education among diabetic patients

Parameters	Baseline (Mean ± SD, n = 50)	3months follow up (Mean ± SD, n = 50)	6months follow up (Mean ± SD, n = 50)
FPG (mg/dl)	291.6 ± 71.6	270.1 ± 65.0	244.9 ± 63.6*
PPPG (mg/dl)	330.9 ± 68.5	313.0 ± 66.1	284.2 ± 62.4*
HbA1c (%)	10.5 ± 1.7	9.9 ± 1.6	9.3 ± 1.4*
BMI (Kg/m ²)	26.7 ± 3.5	25.6 ± 3.4	24.6 ± 3.2**

FBG = Fasting plasma glucose; PPPG = Post – prandial plasma glucose HbA1c = Glycated haemoglobin; BMI = Body mass index; *P<0.001; **P<0.01

The principal component analysis (PCA) was performed based on biochemical and obesity parameters after long - term education among diabetic patients (Table 2).

In the baseline patients, the PC - 1 (91.199% of the original variation elucidated) observed relatively higher value of positive loading for FPG followed by PPPG, while lower value of positive loading for HbA1c and BMI (Figure1 and 2).

In the 3months follow up patients, the PC - 1 (92.778% of the original variation elucidated) observed relatively higher value of positive loading for FPG followed by PPPG, while lower value of positive loading for HbA1c and BMI (Figure3 and 4).

In the 3months follow up patients, the PC - 1 (94.822% of the original variation elucidated) observed relatively higher value of positive loading for FPG followed by PPPG, while lower value of positive loading for HbA1c and BMI (Figure5 and 6).

Table 2: PCA for biochemical and obesity parameters after long - term education among diabetic patients

	Eigen value	% variance
Baseline PC		
1	8968.62	91.199
2	852.315	8.667
3	11.6145	0.1181
4	1.52244	0.015481
3months follow up PC		
1	7987.68	92.778
2	609.284	7.0769
3	11.0385	0.12821
4	1.46835	0.017055
6months follow up PC		
1	7533.34	94.822
2	400.4	5.0399
3	9.54189	0.1201
4	1.39356	0.017541

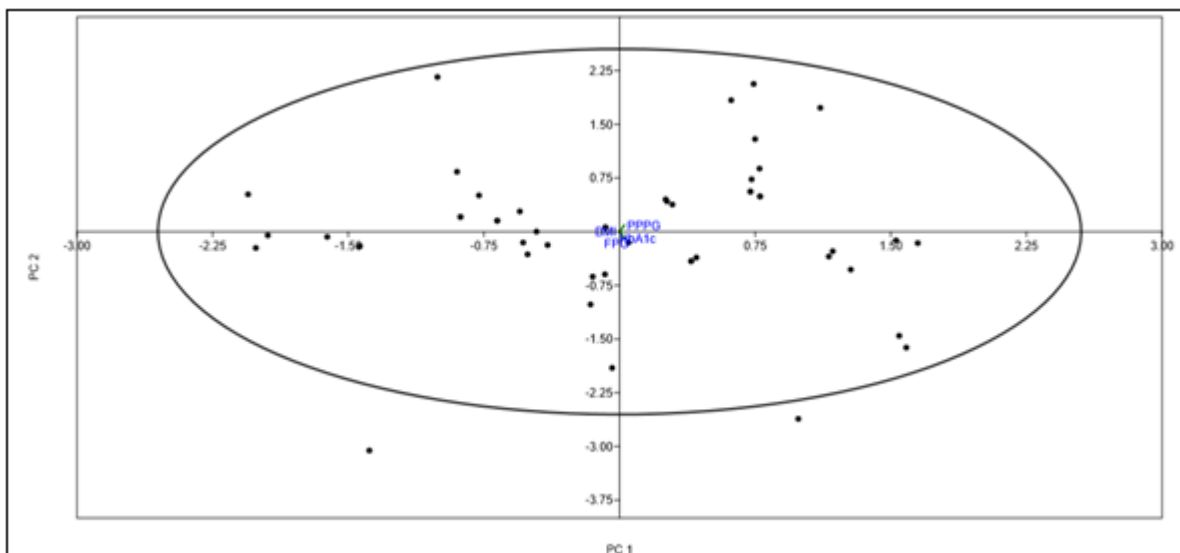


Figure 1: PCA for baseline parameters of diabetic patients

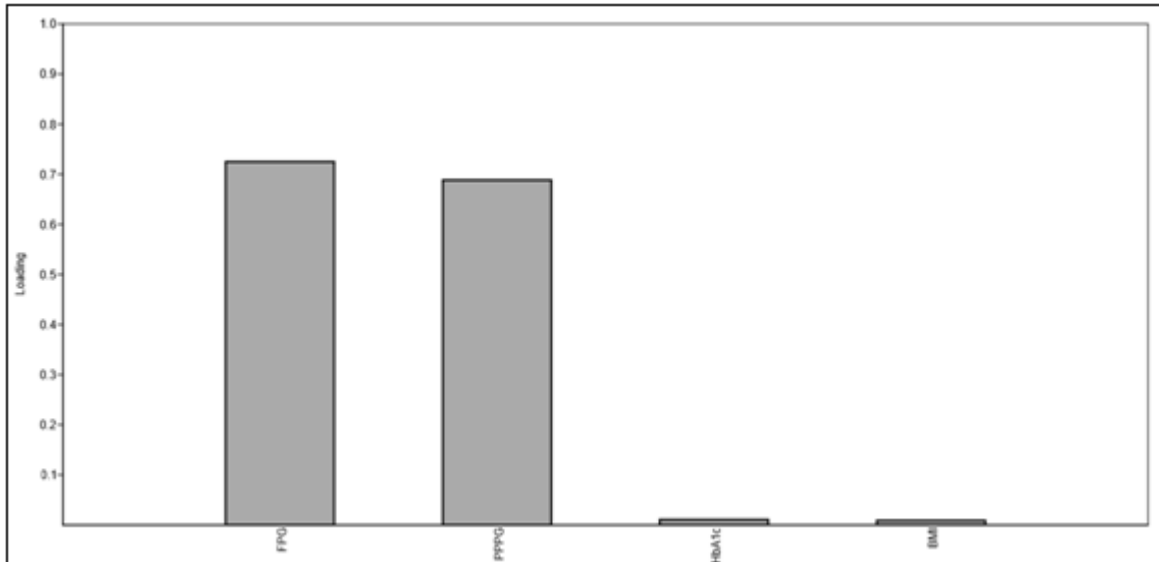


Figure 2: Loading plot for baseline parameters

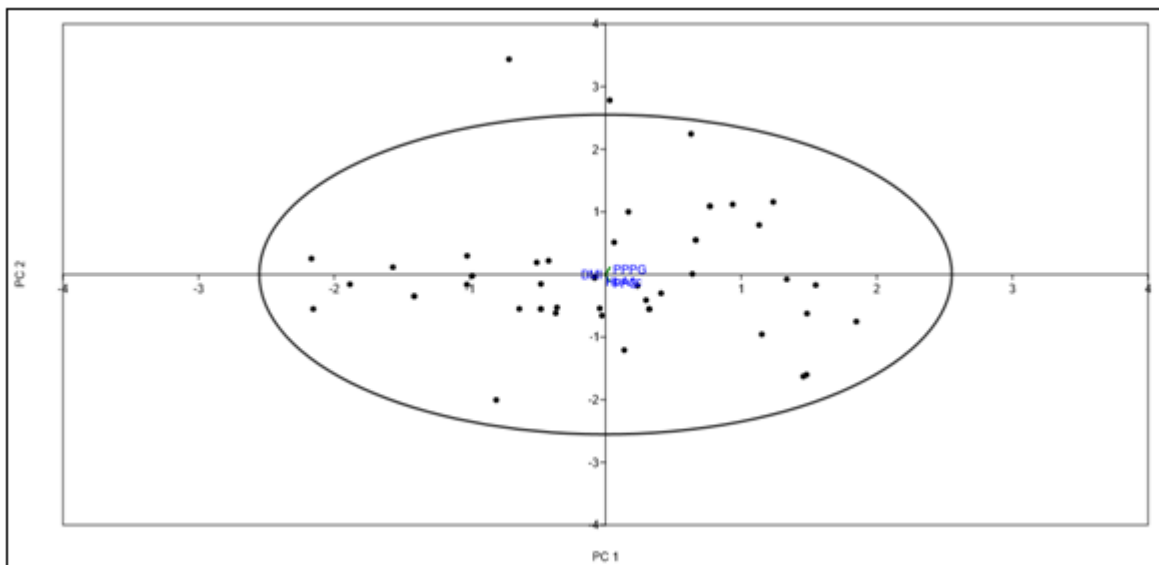


Figure 3: PCA for 3months follow up parameters after education of diabetic patients

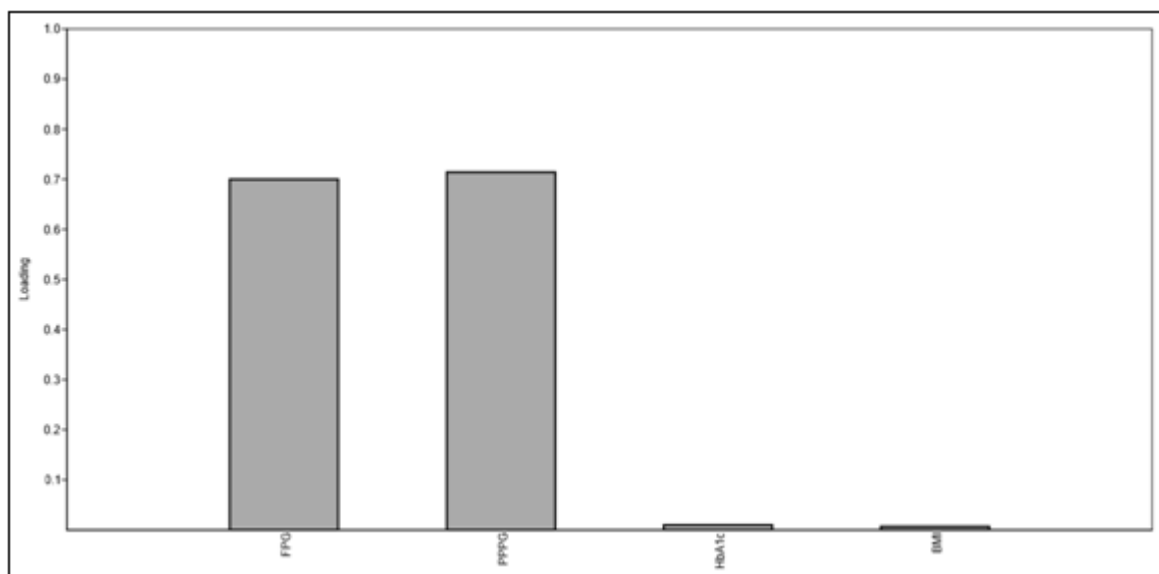


Figure 4: Loading plot for 3months follow up parameters

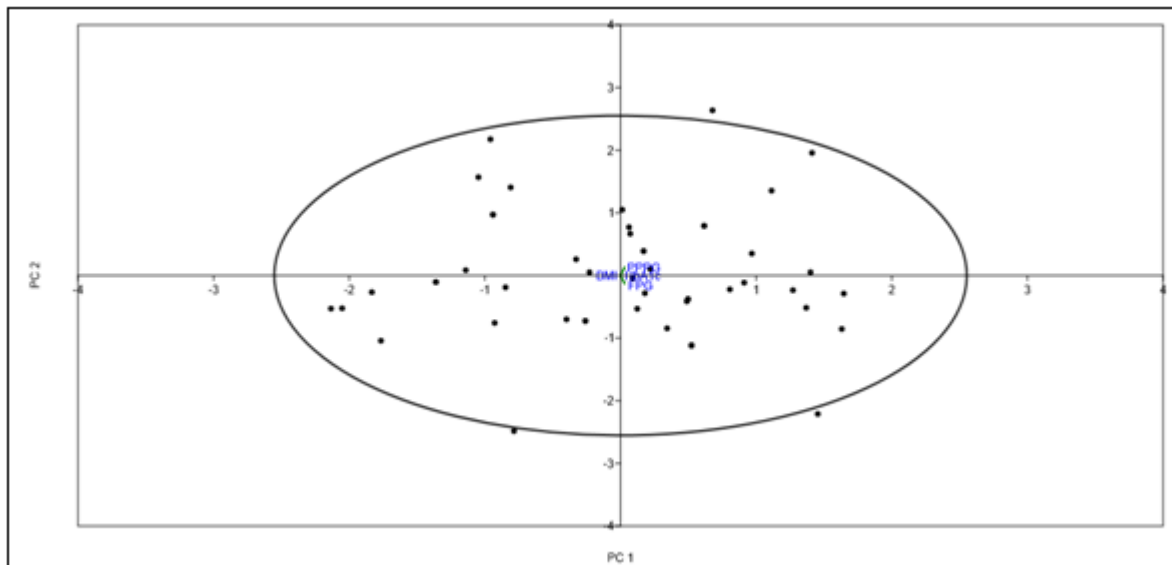


Figure 5: PCA for 6months follow up parameters after education of diabetic patients

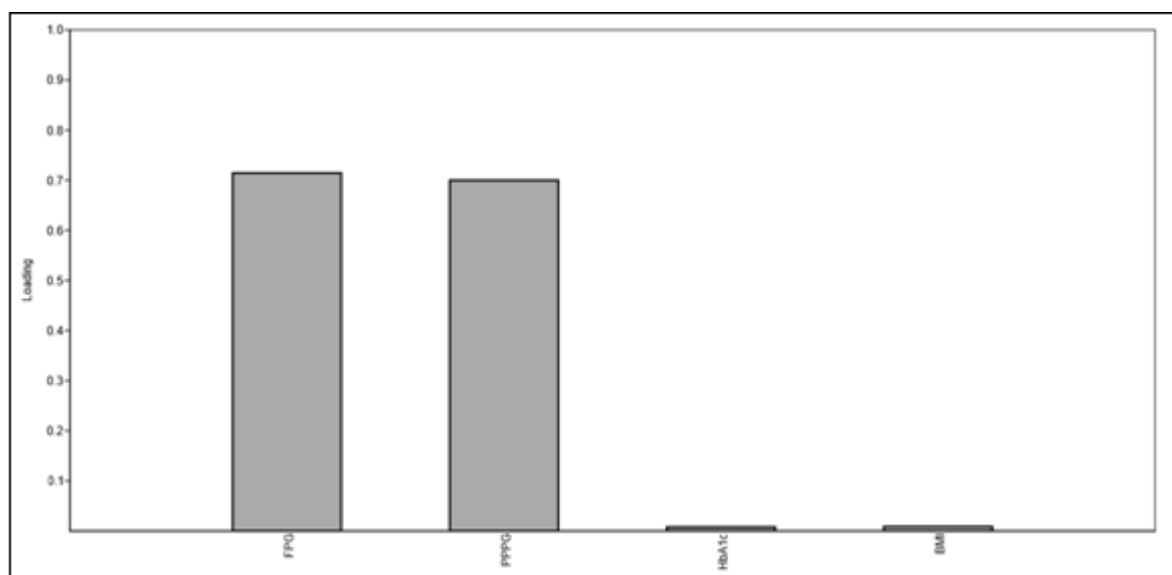


Figure 6: Loading plot for 6months follow up parameters

4. Discussion

Generally, any health education is an important intervention in preventing the general masses from non - communicable diseases. [16, 17, 18] The participant's knowledge improved significantly after face - to - face 30 minutes' session on diabetes. [16] Earlier research suggested that the timely information could be prevented a greater number of DM - related risk factors among the patients. Hence, the present study has highlighted the efficacy of education through counselling among DM patients in eastern India is lacking.

After education, 3month follow up observed a decreasing trend for all biochemical and obesity parameters without significant change FPG ($P= 0.192$), PPPG ($P=0.187$), HbA1c ($P=0.072$) and BMI ($P=0.114$) while all these parameters were significantly ($P<0.001$ and $P<0.01$) reduced after 6months follow up when compared to baseline data. These findings were supported by the interventional studies conducted in similar settings in other parts of the India as well as worldwide. [16 - 19]

Moreover, the present findings in its first - time endeavour to know the association of above - mentioned parameters found to be related with the PC1 regarding 3months and 6months follow up after education among diabetic patients, which are lacking in the health management arena of eastern India. From earlier study, it is well - known fact that the study of components variation though PCA could be an important tool in clinical research to understand easily PCs for four parameters, which may be reduced in a set of intercorrelated variables into a few dimensions and gathered of a large amount of the variability of the original variables. [21] Among several PCs, the PC1 has the largest possible variance to detect among all components that are chosen to characterize the correlated variables. [22] An earlier meta - analysis reported that passive smoking is a risk factor of diabetes even in those who were not themselves active smokers. [23] Wang et al. [24] studied PCA of nutrition factors and physical activities with diabetes, which help for the lifestyle risk management among DM patients.

5. Conclusion

The present study concludes that education through counselling was observed efficacious for the prevention of DM among patients of eastern India. The present findings in its first time in which the association of parameters found to be related with the PCI regarding the biochemical and obesity parameters.

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