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Original Article

PREVENTIVE STRATEGIES AND THEIR ROLE IN GLYCAEMIC CONTROL AMONG TYPE II DIABETIC PATIENTS

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ABSTRACT

Objective: To inquire about preventive measures adopted by type II diabetic patients to control blood glucose level visiting diabetic clinics of tertiary care hospitals of Karachi. **Study design:** Cross sectional study **Place and Duration of study:** It was conducted at diabetic clinics of Civil Hospital Karachi and National Institute of Diabetes and Endocrinology (NIDE) from January to June 2015. **Material and Methods:** About 400 type II diabetic patients who were diagnosed >1year before interview aged more than 18 years of either gender were selected through consecutive sampling technique. All terminally ill patients were excluded. After getting written consent participants were interviewed through pretested questionnaire regarding socio-demographics, preventive measures using by the patients and recent laboratory reports of Fasting Blood Glucose, Random Blood Glucose and Glycosylated Hemoglobin (HbA1c) were obtained. BMI and Blood pressure was measured. Data was entered and analyzed by SPSS v 21. Frequencies and percentages were calculated for categorical data. **Results:** Mean age of study participants was 51.5±14.1 S.D. About 90% had HbA1c levels >7.5% and 37% had fasting blood glucose >160mg/dl. Overall 59.5% had poor glycaemic control. Nearly 27% had dietary indiscretion and 52% were not exercising. **Conclusion:** The proportion of uncontrolled diabetes was high. The preventive measures like physical activity and dietary modification were less preferred by the type II diabetic patients.

Keywords: Poor glycaemic control, Diabetes Mellitus, Complementary and Alternative Medicines, Lifestyle Modification

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INTRODUCTION

Diabetes Mellitus (DM) is a chronic disease of public health concern across the globe. World Health Organization predicted that if remains uninterrupted, the global prevalence of Diabetes Mellitus will almost double in year 2030[1]. Type 2 diabetes has been linked with genetic

predisposition and behavioral and environmental risk factors[2]. There is strong evidence that obesity and physical inactivity are the main modifiable determinants of the disease[3].

Diabetes Mellitus DM is a complex metabolic disorder with range of micro-vascular and macro-vascular complications including retinopathy, neuropathy, cardiovascular diseases, nephropathy, hypertension, superimposed infections etc [4]. Fortunately several preventive strategies to prevent and control hyperglycemic and its related complications have been emerged in past decade [5]. Literature suggests that most of the Diabetes related health care expenses are In-hospital costs for the management of long term complications of Diabetes Mellitus DM [6]. Blood glucose control remains a major focus in the management of patients with Type II Diabetes which can be achieved through several behavioral and lifestyle modifications including nutritional remodeling, increased physical activity and several pharmacological interventions [7]. A cohort study reported that behavioral modification in initial years of diabetes diagnosis reduces the risk of morbidity and mortality associated with diabetes complications[8]. Combination of Pharmacological agents along with lifestyle modifications have better prognosis in contrast to drugs alone[9].

Pakistan has the seventh largest population of Diabetes in the world with 10% of the adult population is diagnosed patients of type II Diabetes Mellitus [10]. In Pakistan health care is diversified and people utilize different forms of complementary and alternative medicines for management of Diabetes as a first line of treatment [11]. Furthermore, major bulk of the diabetic patients visit public sector hospitals where approach is mainly clinical and least effort has been put in to motivate patients towards preventive strategies for better management and control of Diabetes Mellitus DM and its fatal consequences. There is need to determine the frequency of different preventive measures adopted by the Diabetic patients to control their blood glucose levels as it will help in formulating certain strategies to better management of hyperglycemia and its associated complications which ultimately be helpful in improving the quality of life of diabetic patients.

METHODOLOGY

This cross sectional study was conducted at out-patient diabetic clinics of two tertiary care hospitals of Karachi i.e. Civil Hospital and National Institute of Diabetes and Endocrinology for the period of six months from January 2015 to June 2015. About 400 type II diabetic patients who were diagnosed more than one year at the time of interview and aged more than 18 years of either gender were selected through consecutive sampling technique. All those diabetic patients who were terminally ill were excluded from the study. After obtaining written consent participants were interviewed through semi- structured questionnaire by principal investigator. The questionnaire was based on literature review. It had been piloted on ten diabetic patients and modified as necessary for clarity. Questionnaire included socio-demographic data such as sex, age, marital status, level of education, occupation, and health-related parameters such as smoking status, family history of diabetes, current management, eating practices and sources of nutritional information, physical activity, any other alternative medicine usage etc. Weight and height were measured using a portable digital weighing scale and portable stadiometer and Body Mass Index was calculated. BMI of 23.86kg/m^2 has been used as cut off i.e. BMI of >23.86 has been labeled as obese by using South Asian values. Blood pressure (BP) recordings were made after the subjects had rested in the sitting position for 10 minutes using a validated electronic sphygmomanometer. Three separate readings were taken and their mean recorded. Systolic and diastolic blood pressure has been categorized according to Seventh Joint National Committee for prevention, evaluation and treatment of Diabetes. The results of the most recent investigations including Fasting Blood Glucose (FBS), Random blood glucose (RBS) and glycosylated Hemoglobin (HbA1c) were obtained from patients' medical records. FBS e"160mg/dl, RBS e"200mg/dl and HBA1c e"7.5% were considered as poor glycaemic control. Data was entered and analyzed by using SPSS version 21.00.Mean and standard deviation calculated for continuous data. Frequency and percentages were calculated for categorical data.

RESULTS

Overall 400 diabetic patients were enrolled in the study and response rate was 100%. Mean age of study participants was 51.56 ±14.3 S.D. There were 30.5% males and 69.5% females. Nearly 80% of the diabetic patients were between 30-60 years and 3.5% were below 30 years of age. More than 80% of the study participants were found to be obese with BMI >23.86 and 90% had monthly income less than 50,000 Rupees.

TABLE 1:
Socio demographic characteristics of Study participants N=400

Age in years	**Frequency**	**Percentage**
< 30 years	14	3.51
31 to 40 years	63	5.8
41 to 50 years 5	133	33.3
1 to 60 years	120	30.0
>60 years	70	17.5
Gender		
Male	122	30.5
Female	278	69.5
Marital status		
Single	10	
Married	338	
Widow/Divorced	52	2.584.513
Body Mass Index (Kg/m^2)		
<25.89 Kg/m^2	78	19.5
>25.89 Kg/m^2	322	80.5
Educational Attainment		
Illiterate	147	36.8
Primary	90	23
Secondary	57	14.3
Intermediate	25	6.3
Graduation	52	13
Post graduation	29	29
Total monthly income in rupees		
<10,000 Rs	92	23
10,000 to 20,000 Rs	145	36.3
21,000 to 30,000 Rs	64	16
31,000 to 40,000 Rs	38	9.5
41,000 to 50,000 Rs	24	6
>50,000 Rs	37	9.2
Family History of Type II diabetes Mellitus		
Yes	291	72.8
No	109	27.2

About 72% reported positive family history of Type II Diabetes Mellitus. See table No. 1.

The Clinical characteristics of study participants based on laboratory investigation and Blood pressure measurements. About 36.8% had Fasting Blood Glucose >160mg/d, 89.5% had Random blood glucose >200 mg/dl, 89.5% had HbA1c >7.5%. About 9.8% participants had Systolic blood pressure > 160mmHg

TABLE 2:
Clinical characteristics of study participants N=400

Variables	Frequency	Percentage
Fasting blood glucose level in mg/dl		
Optimal (<126mg/dl)	105	26.3
Fair (126- 160mg/dl)	148	37
poor (> 160mg/dl)	147	36.8
Random Blood glucose level		
Optimal (<200mg/dl)	96	11.5
Poor (>200mg/dl)	354	89.5
HbA1c (%)		
Optimal (<6.5%)	9	2.3
Fair (6.5-7.5%)	33	8.2
Poor (>7.5%)	358	89.5
Systolic Blood pressure		
<120 mmHg	110	27.5
120–159 mmHge	251	62.8
>160 mmHg	39	9.8
Diastolic blood pressure		
<80 mmHg	169	42.2
80–99 mmHg	148	37
>100 mmHg	83	20.8

and 21% had Diastolic blood pressure >100 mmHg. See table No. 2.

More than 80% of the patients used oral hypoglycemic drugs as a preventive measure to control their blood glucose levels and only 18% used insulin. Nearly 50% of the study participants were not doing any form of physical exercise and diet control measures. About 53% of the patients were using Complementary and alternative medicines as a preventive measure to control their blood glucose levels.

Figure 1 shows that 40.5% had good glycaemic control based on different parameters and 59.5% had poor glycaemic control. See table No. 3.

DISCUSSION

The main intend of diabetes management is maintaining good glycaemic control and reducing risk of diabetes related complication so they may lead normal healthy life. In this study we found that majority of the Type II Diabetes patients were aged between 20-50 years of age. Most of the participants had poor glycaemic control and were using alternative medicines to control their blood glucose. Furthermore, dietary modifications and physical exercise were the least adopted preventive measures among study participants.

We observed that type II diabetes was also prevalent in patients younger than 30 years of age it is note worthy as diabetes is usually considered a disease of middle and higher age groups. Similar results has been reported by the studies from USA[12] and India[13], which observed change in secular trends of type II DM with increasing incidence of diabetes type II and its related complications in younger age group. This changing trend of Type II DM in young age can be attributed to several genetic and environmental influences along with poor nutrition and sedentary lifestyle patterns.

In this study majority of the diabetic patients were found obese. Similar results have been reported by

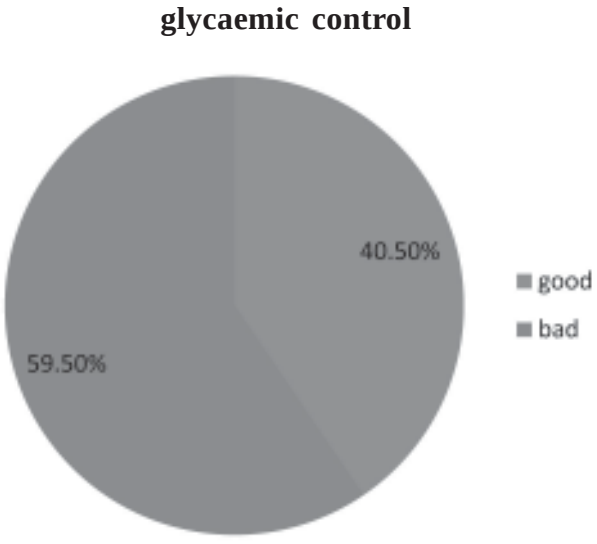
TABLE 3
Preventive Methods adopted by study participants to control their blood glucose level

Preventive Methods	Frequency	Percentage
Diet control		
Yes	252	63
No	148	27
Regular exercise or strenuous physical activity		
Yes	189	47.2
No	211	52.8
Use oral hypoglycemic drugs		
Yes	325	81.2
No	75	18.8
Use insulin		
Yes	78	19.5
No	322	80.5
Use complementary and alternate medicines		
Yes	214	53.5
No	186	46.5
Use Home remedies		
Yes	52	13
No	348	87

the studies from Yemen[14] and Nepal[15] which reported high prevalence of obesity among diabetic patients. Furthermore they suggested worsening of glycaemic control and increase burden of diabetes related complications among obese patients in contrast to diabetic patients of normal weight. This finding supports the fact that obesity is a strong predictor of type 2 diabetes, this high proportion of obesity can be linked with several factors like geographical variations, life style, occupational status, genetic factors and health care services.

Good glycaemic control is crucial to prevent diabetes related complications among diabetic patients. In this study proportion of poor glycaemic control with debilitating fasting blood glucose and HbA1c was high. This finding is consistent with the results of several local and international studies[16,17&18]. A study from Jordan reported that nearly 70% of the diabetic patients had poor glycaemic control[19]. Moreover they revealed that non-adherence to diet plan and medication

FIGURE 1
Glycaemic control among study participants



were significantly associated with poor glycaemic control. The findings of Panorama study suggested that physician's lifestyle and diet recommendations were essential to maintain glycaemic level[20]. Poor glycaemic control in this study can be attributed to lack of physician-patient bonding, proper counseling and guidance regarding prevention of diabetic complications and maintaining desirable glycaemic levels.

We found that majority of the patients' preferred oral hypoglycemic drugs to control their blood glucose. Furthermore, diet modification and physical exercise were less preferred preventive measures adopted by study population. However literature revealed that lifestyle modification is proved to be most efficient and cost-effective preventive strategy to decrease the risk the long-term consequences of persistent hyperglycemia. A systemic review and reported that diabetic patients were more reluctant to adopt dietary modification and physical activity which are consistent with the findings of our study[21]. Another study from United Kingdom suggested that lack of motivation and realization of seriousness towards disease were the main predictors of unchanged lifestyle patterns among diabetic patients[22]. This finding highlight the fact that there is lack of health educational programmes along with detailed follow up sessions ultimately leads to poor practices among patients.

In this study high proportion of diabetic patients were using Complementary and Alternative Medicines to control their blood glucose levels. These findings are consistent with the findings of other studies from Pakistan[23&24] and Taif[25]. Another study from Uganda reported high use of herbal medicines among diabetic patients[26]. Moreover results from European study also suggested increasing popularity of Herbal medicines in the Western world[27]. This high consumption of CAM is probably due to patient's misperception and wrong publicity through media regarding their high safety and cultural assumption of good efficacy.

There were several limitations of our study. Firstly, it was a cross sectional study so causal association cannot be established. Secondly, this study was hospital based study so results cannot be generalized over entire population.

CONCLUSION

The proportion of uncontrolled diabetes was high. The preventive measures like physical activity and dietary modification were less preferred by the type II diabetic patients. Health promotional program that emphasizes lifestyle modification with importance of adherence to treatment regimen would be of great benefit for glycaemic control.

RECOMMENDATIONS

There is need of multidisciplinary approach engaging physician, dietician, fitness trainer and social counselor who can play active role in the management of diabetes. Patients should be motivated through role models for adopting preventive lifestyle and good adherence to medication and by sensitizing them for the worst outcome of uncontrolled diabetes. Dietary and physical activity advices for diabetes should be tailored to individual patients

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* Research work, data collection ** Data collection and compilation *** Supervision and review the manuscript

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