ORIGINAL ARTICLE

An Observational Study on Implication of Educational Level on Control and Long-Term Complications of Diabetes Mellitus In a Tertiary Care Hospital of Eastern India

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ABSTRACT

Introduction: The strongest environmental risk factor for diabetes, obesity, is related to socio-economic status. Due to lack of education in India, several myths and social stigma add to the problems of managing Diabetes Mellitus. The purpose of the project is to establish association of educational of the patient with complications and control of diabetes mellitus.

Materials and Methods: An epidemiological cross sectional study of descriptive observational nature was conducted at the Diabetic OPD in a tertiary care centre in Eastern part of India on 303 patients. Patients of both sexes suffering from diabetes mellitus attending the Diabetic OPD in the tertiary care hospital and selection on random basis. The patients were asked to fill a pretested predesigned questionnaire prepared by Stanford Patient Education Research Centre.

Observations and Results: Though the timing of taking pill regularly is high of lower socioeconomic classes, regular exercise and probability of complications is higher for the lower education level and it gradually decreases as the Education level increases.

Conclusion: Treatment can be improvised by spreading awareness about the disease and its complications along with proper education on exercise, following diet plans and treatment regimens

Keywords: Observational Study, Educational Level, Long-term Complications, Diabetes Mellitus.

INTRODUCTION

Diabetes mellitus is defined as a multimetabolic syndrome, characterized by chronic hyperglycemia associated with disturbance of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both[1]. Complications of Diabetes can be microvascular (neuropathy, retinopathy, nephropathy); macrovascular (coronary artery disease, Peripheral vascular disease, cerebrovascular disease) and infections. A high percentage of this cost is related to the treatment of its complications.[2, 3]

Adverse lifestyle behaviours, such as smoking, unhealthy diets and lack of exercise, social implications associated with income inequalities, and to the adverse effects of stress in the workplace, including job insecurity can worsen the life expectancy[4,5]. The strongest environmental risk factor for diabetes, obesity, is related to socio-economic status. Socioeconomic status may influence access to and quality of care, social support, and community resources, diabetes-related knowledge, communication with providers, treatment compliance, regular follow-up, ex-

ercise, and dietary regimens, treatment choices, monitoring of blood glucose concentrations, adjustment of insulin and oral antidiabetic agents in response to blood glucose readings and intercurrent illness. Due to lack of education in India, several myths and social stigma add to the problems of managing Diabetes Mellitus. Regarding administration of insulin, Patient-centred issues focus on the fear of weight gain, social embarrassment/stigma, hypoglycemia, lifestyle changes/restrictions, and painful injections[6].

In addition, communities may play an instrumental role in the health status of the residents through availability of health care services, neighbourhood characteristics that promote health and prevailing attitudes towards health[7].

The purpose of the project is to establish association of educational level of the patient with complications and control of diabetes mellitus. Correspondingly, the reduction of socioeconomic disparities in health may have a profound impact on the morbidity and mortality associated with diabetes.[8,9]

OBJECTIVES

The objective of this study was to distribute the study population according to educational status, to explore the association between the educational level and the complications and to find out the association between education and control of diabetes mellitus.

MATERIALS AND METHODS

An epidemiological cross sectional study of descriptive observational nature was conducted at the Diabetic OPD in a tertiary care centre in Eastern part of India on 303 patients. Patients of both sexes suffering from diabetes mellitus attending the Diabetic OPD in the tertiary care hospital and selection on random basis (ADA criteria: HbA1c> 6.5% or fasting Plasma glucose > 126mg/dl or 2 hour plasma glucose during OGTT(75g)> 200 mg/dl or random plasma glucose> 200 mg/dl)[10] were included. Patients of Extremes of age, Pregnant and with complications leading to acute morbid state excluded from the study group.

The patients were given informed consent forms in 3 languages (Bengali, Hindi and English) and their informed consent was duly obtained. The patients were asked to fill a pretested predesigned questionnaire prepared by Stanford Patient Education Research Centre. The questionnaire had been modified according to the requirements of the project. Selection was done on a random basis. Those patients who had been included in the study were excluded when they attended to the OPD for further visits. It took approximately 15 minutes per patient to fill the provided questionnaire. The questionnaire included the following: Sociodemography(name, age, sex, religion, income, residence, occupation), background(education, marital status, family type, number of family members, addiction, presence of chronic diseases, family history of diabetes), mental health, daily activities, physical activities, diet, regular glucose testing, medical care along with measurements of height, weight, waist circumference, blood pressure). Along with the questionnaire, clinical examinations and laboratory investigations were done.

For clinical examinations, the following parameters were examined--- Height, Weight, BMI, Waist circumference ,Hip circumference, Waist hip ratio, Blood pressure in standing and lying position(to check postural hypotension), Anemia, Oedema, Clubbing, Pulse on both sides, Neuropathy testing by monofilament or tuning fork.

The laboratory investigations that were done are--- Fasting blood glucose, Oral glucose tolerance test, Post prandial blood glucose, HbA1c, Lipid profile(total cholesterol, LDL, HDL, Lp(a)), Test for ketone bodies and Proteins in urine, Serum urea and Creatinine, Ophthalmoscopy.

The laboratory investigations were done at a NABL accredited laboratory. Ophthalmoscopy was conducted at the Institute.

The confidentiality of the study was maintained throughout the study duration. A separate subject enrolment code with details of the subjects' identification and contact information like address and telephone number was maintained. In the questionnaire, reports and all other documentation and communication relevant to the study were inducted. The subject was identified only by code number.

The data obtained was incorporated in Microsoft Excel version 2010 and was analysed by descriptive and inferential statistical methods. Categorical data were represented in the form of percentages and diagrams like pie charts, bar diagrams were prepared by Microsoft Excel. Regression equations were formed and the analyses were done using Minitab Version 18 to establish relationships between variables by link function logit.

Ethical considerations: The study protocol was approved by the Independent Ethics Committee of the institution for necessary approval. The informed consent form was prepared in Hindi, English, and Bengali for the patients. The information was maintained confidential and was solely utilized for academic and research purpose.

OBSERVATIONS

To determine the educational level, the study populations are divided into seven groups as follows:-

Group- I No formal education
Group- II Primary school not completed
Group- III Primary school completed
Group- IV Secondary school completed
Group- V High school completed
Group- VI Graduate and
Group-VII Post – Graduate

From the Figure 1, it can be seen that majority of the population (32.34%) have completed primary school (Group- III). Majority of the study population (40.59%) has an annual family income of Rs 20000-100000. It has been found that majority of the patients (70.3%) live in a nuclear family. Majority of the patients (89.11%) do not own a glucometer. Of the 33 people who use glucometer, 16 had completed graduation and 17 had completed post graduation.

The study population divided into three groups depending into time spent for exercise. It was found that Majority of the study population (54.13%) does not exercise regularly. Regarding food habit it was observed that majority of the study population (51.16%) consumes fruits and vegetables for more than 5 days a week, in relation to meat (07.92%) and

sweetener (16.17%). The habit and timing of pill consumption was observed as it is very important for diabetic population. It was found that majority of the study population (89.11%) consume their pills regularly.

Table 1: Distribution of Study Population according to Education (n=303)

Educational Level	Cases in Percentage
No Formal Education	18.82
Primary School Not Completed	21.78
Primary School Completed	32.34
Secondary School Completed	2.64
High School Completed	2.64
Graduate	10.89
Post Graduate	10.89

Table 2: showing the number of patients using Glucometer (n=303)

Using Glucometer	Number of Patients
Yes	33
No	270

Table 3: showing the time spent by the study population on Exercise (n=303)

Time Spent on Exercise	Cases in Percentage
No Regular Exercise	54.13
<= 30 minutes	27.06
> 30 minutes	18.81

Table 4: Distribution of Study Population according to Complications of Diabetes Mellitus (n=303)*

Type of Complications	Cases in Percentage
Eye	45.95
Kidney	10.81
Feet	40.54

*Multiple complications possible

Majority of the patients have completed primary school (32.34%) (Table 1). Majority of the patients (270) do not use a glucometer (Table 2). Majority of the study population does not exercise regularly (54.13%) (Table 3).

Majority of the patients suffer from eye complications (45.95%), followed by complications in kidney (40.54%), followed by complications in feet (10.81%). On applying regression analysis, it was found that people who have lower educational level have a greater chance of developing complications than people with higher educational level.(p=0.971, which is significant). The probability of complications in patients with no formal education was the highest (0.70792) and the lowest for patients who were post graduate (0.694058).

DISCUSSION

In the study, it was seen that the educational status is up to primary school (32.34%) in most of the patients. The annual family income lies between Rs 20000-100000 in most of the patients (40.59%). The patients mostly live in a nuclear family (70.3%). In a nuclear family, a person is subjected to greater financial and emotional burdens which might increase the prevalence of diabetes mellitus.

Most of the patients (89.11%) do not own a glucometer; hence they do not check their plasma glucose levels regularly. Many of the patients (54.13%) do not exercise regularly. The commonest diet pattern in the study group is- fruits and vegetables for > 5 days per week, they do not add extra salt in food. 89.11% of the patients take their pills regularly. On regression analyses, it was found that the probability of complications increases with low levels of education, low levels of exercise, family history of diabetes mellitus, irregular intake of pills, intake of sweeteners.

In a study conducted by Yusuf Kayar[15] in Turkey in 2016, it was found that patients with lower educational level(not completing high school) have poorer glycemic control (HbA1c>=7) than those who have higher educational level. It is in compliance with the current study which shows that lower educational level increases the probability of complications. It is because glycemic control depends on multiple factors like proper diet, regular exercise, drug compliance, regular checkups, regular monitoring of plasma glucose by glucometer: and all these factors are related to the educational level of the patients.

Another study conducted by Dr. Ahmad Ali S. Al-Rasheedi[16] conducted in Saudi Arabia in 2014, revealed that the educational level had no impact on glycemic control, but the patients of high educational level had better awareness of the complications and a high rate of adherence to diet. Thus, it can be deduced from the current study that better awareness reduces the chances of complications.

It was found that knowledge about diabetes was significantly associated with the compliance to the pharmacological and non-pharmacological management in a study conducted by VivekB Waghachavare[17] in 2015 at a rural district of Sangli in Maharashtra, India. As a result knowledge which is related to educational level plays an important factor in good glycemic control and reducing complications.

SUMMARY

Lack of education, inadequate family income, number of children, central or visceral obesity, addiction, association with other diseases, mental stress, irregular checking of plasma glucose, lack of exercise, unhealthy diet, increased salt intake, non-compliance, incorrect insulin administration techniques, irregular checkups, lack of awareness about complications.

The management of Diabetes Mellitus stands on 3 pillars- diet, exercise, medications[11]. Other than these factors, diabetic care givers must not overlook the socio-economic issues, and must properly counsel the patients, which can greatly reduce the cost burden of the family, improve the quality of life, reduce premature deaths. This approach can cause a monumental change in the pattern of diabetic care in India.

CONCLUSION

Patients suffering from Diabetes mellitus must be educated about the complications, importance of regular checkups, giving up addiction, regular checking of blood glucose, proper insulin administration techniques, and importance of compliance, healthy diet and exercise, relief of mental stress in leading a better quality of life[12]. Education is a crucial factor in the management and control of Diabetes Mellitus[13,14]. The purpose of the study is to establish a model for management of diabetes, based on the socioeconomic conditions of the patient, so that treatment can be individualized and quality of life can be improved. Treatment can be improvised by spreading awareness about the disease and its complications along with proper education (exercise, following diet plans and treatment regimens).

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