ORIGINAL ARTICLE

A Study on Impact of Education on Diabetic Control and Complications

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ABSTRACT

Objective: To study the impact of educational level on the control of type 2 diabetes mellitus and subsequent development of its complications.

Methods: Epidemiological Cross-sectional study conducted with 200 patients with Type 2 diabetes *mellitus*. The data were obtained from patients attending a Tertiary care hospital in Eastern India.

Results: Glycemic control is better in more educated persons and level of education has an inverse relationship to the complication score. Percentage of patients with complication score more than 10 gradually decreases as the literacy level increases from 5th standard class onwards.

Conclusion: Our study thus showed a positive impact of education on diabetes control and an inverse relationship with development of complications i.e. the more the education, the less the Diabetic complications.

Key words: Type 2 diabetes mellitus, education level, diabetes control, complications

INTRODUCTION

Diabetes mellitus (DM) is a group of common metabolic disorders that share the phenotype of hyperglycemia. With an increasing incidence worldwide, DM will be a leading cause of morbidity and mortality for the foreseeable future. Socioeconomic status is a major determinant for the risk of diabetes.[1,2] Various research works from the developed and developing countries have suggested that low education level, low income are all risk factors for DM.[1,3,4,5] Similar things have been reported for incidence and prevalence.[3,6] In our community, distribution of DM follows a social gradient, with the highest prevalence in the lowest socio economic status (SES)group, and then decline as SES increases.[7] Socio-economic status mainly comprises of Per capita income, Educational qualification and Occupation of the patient. Other socio-economic factors are Residential status (urban/ semi urban/rural or kachabari/pakkabari), Religion Hindu/Muslim/ Christian/ other), Marrital status, Food habits and Addiction.

There is lack of enough data in establishing any conclusion regarding correlation between socio-economic status and glycemic control in T2DM patient or the correlation between socio-economic status and complication out of T2DM. Some data are conflicting. And the most important factor preventing in any conclusion from a respective data collected from a specific area (country/state/city) is that there is wide variability in social status, economic position, educational qualification, ethnicity, food habits, addiction, Government resource and health care facility, follow up in developed and developing country and within the same country, particularly relevant in a country like India where there is different cultural belief, different language, wide gap between the educational strata, wide disparity in economic capability from a very poor person taking 1 meal/day (instead of 4) to some of the world richest person, unequal availability of medical facility in urban and rural area preventing optimal health care facility in diabetic patients. So data should be area specific and strategy should be taken on the basis of that data. There are few works on this field in different part of the globe which give us some idea regarding the trend in association between socio-economic status and glycemic control and preventing complication of diabetes.

Functional health literacy says that, "it is the ability to read and comprehend prescription bottles, appointment slips, and the other essential health-related materials required to treat a patient successfully " may mediate the relation between low SEP and health.(8) Lower educational status is strongly associated with worse health literacy, and inadequate health literacy has been linked to poorer health status and more hospital admissions.[8]

Persons with diabetes who have inadequate or very marginal literacy are less likely to know the symptoms of hypoglycemia, and they have shown to have higher hemoglobin A1c levels and higher rates of retinopathy even when exposed to traditional diabetes education.[8]

Even when individuals adhere to a prescribed diabetes regimen, many report that they do not know why they are performing the self-management strategies, nor do they understand the benefits of performing such actions. Thus, misunderstandings about diabetes and its treatment were both common and enormous, despite their regular check-ups and adequate access to care.[9]

In this study, out of the various socioeconomic factors, we have tried to analyse the relationship between eudcation level with diabetes control and development of its complications.

MATERIALS AND METHODS:-

We have conducted our study in Medical College & Hospital in Kolkata, West Bengal, India. This was an institution based cross sectional study.

We have taken 200 patients suffering from T2DM. All patients were aged more than 20 years, diagnosed for at least more than one year, irrespective of treatment received. Type 1 DM patients were excluded from the study.Study was conducted in the period of January 2018 to December 2019.We decided to take HbA1c level of less than 7 as a measure of diabetes control. (ADA guideline)

The following cut off value of respective parameter was taken to determine whether complication was present or not, in respect of that parameter. A scoring system was made where each parameter was scored 1. Final scoring was done according to how many complications were present.

- Diabetic Nephropathy : Urine microalbumin :creatinine ratio (ACR) > 30/ serum creatinine >1.5/ renal parenchymal disease -1.
- Diabetic Retinopathy : both proliferative and non proliferative on fundoscopy, macular edema, diabetic cataract -1
- Dyslipidemia: Total Cholesterol >200 mg/dl, /LDL >100 mg/dl, HDL: <40 mg/dl, Triglyseride : >150 mg/dl - 1
- Cardiovascular abnormality : IHD/LVH/Conduction abnormality/Arrythmia/or other abnormality in ECG or presence of wall hypokinesia /scarring/reduced ejection fraction/systolic or diastolic dysfunction in Echocardiography-1
- Respiratory system : presence of pneumonitis/infection/ consolidation/pulmonary TB/Pleural effusion-1
- Gastro-intestinal: presence of NAFLD/NASH in ultrasonography -1 or presence of gastroparesis/dyspepsia /constipation-1
- Central nervous system : history of cerebrovascular accidentdisease-1 (infarction/hemorraghe -1
- Autonomic nervous system: presence of any sign of autonomic neuropathy-1 Diabetic Peripheral neuropathy : by NCV study and clinical examination) -1.
- Genito-urinary: presence of recurrent UTI/bladder dysfunction /decreased libido/erectile dysfunction-1
- Skin : presence of recurrent infection (boil/impetigo) -1
- Foot : presence of ulcer/gangrene-1

Total score was calculated depending on how many systems were involved.

We used predesigned, pretested, semi structured, interview schedule Bed head ticket (BHT) for indoor patients, Out door (OPD) Ticket, Other hospital records, routine bedside clinical examination tools.All patients were divided into four groups depending on their education level A) illiterate B) below class 5th standard B) 5th to 10th standard C) more than 10th standard.

It was an institution based Cross sectional Observational study. Depending on selection criterion / inclusion criteria, 200 patients were selected. Informed consent were taken from the patient. All relevants documents & records were reviewed & documented. It was interviewed with the said interview schedule. Data was entered and analysed using SPSS 17 software.

RESULTS

Among 200 patients 114 were male and 86 patients were female. At a glance table no.2 shows, out of 20 illiterate diabetic, 20% (n=4) are controlled and 80% (n=16) are uncontrolled. Out of 34 below 5th standard class diabetic, 41.18% (n=14) are controlled while 58.82% (n=20) are uncontrolled. Out of 100 5th -10th standard class diabetic, 46% (n=46) are controlled and 54% (n=54) are uncontrolled. Out of 46 >10th standard class diabetic, 78.26% (n=36) are controlled while 21.74% (n=10) are uncontrolled. So glycemic control is better in more educated patient.

Education level and complication score –Now education level was cross tabulated against complication score. The more is the scoring, the more number of complications a person have. A score of more than 10 had significantly more complications than a score of less than 10.

Data shows that patients with education level 5th and above have less complication than person with education level below 5th class.

Table 1: showing literacy level of selected diabetic patients

Education	Patients (%)
Illiterate	20 (10)
Below 5th standard	34 (17)
5th – 10th standard	100 (50)
Above 10th standard	46 (23)

Table 2: Table showing relation of HbA1c level with education

HbA1c%	Education				Total
	Illiterate	<5th class	5th -10th class	>10th class	
Controlled	4	14	46	36	100
Uncontrolled	16	20	54	10	100
Total	20	34	100	46	200

Table 3: Showing complications scores with education level

Education	Score (%)		
	<10 (n=106)	>=10 (n=94)	Total
Illiterate	12 (60)	8(40)	20
<5th standard	10(29.41)	24(70.59)	34
5th-10th std class	56(56)	44(44)	100
>10th std class	28(60.87)	18(39.13)	46

The percentage of patients with complication score less than 10 gradually increases as the education level increases from 5th standard onwards.. On the contrary, percentage of patients with score more than 10 decreases as the education level increases. Chart also shows that among the illiterate 60% have less complication but the sample number is too low to be taken as statistically significant.

DISCUSSION:

Diabetes Mellitus is one of the most common non-communicable disease worldwide. Though T1DM is increasing day by day, but it is T2DM which is the main threat of this Millennium. Till the 1980 diabetes was not considered a health problem in India, when ICMR reported an alarming increase in diabetes prevalence in various part of the country. During the period 1971-2000, studies from different part of India shows a 10 fold increase in the incidence of diabetes in urban India (from a 1.2% in 1971 to 12.1% in 2000).[10]

Successful Diabetes management requires a lifelong commitment to self-care. As our patients are the most important decision-makers, they should receive enough instructions to make informed decisions about their treatment, which will only be possible if they receive proper education.

There are various risk factors for developing diabetes as well as confounding factor for its control and occurrence of complication. Lifestyle modification, modification of diet, regular exercise, knowledge about diabetes are some of the common known factors which has an impact on blood sugar control in diabetic patient and controlling its complication. There some other confounding factors whose role on diabetic control and preventing complications are yet to be determined. Various socio-economic parameter like Education, Per capita income, Residence, Occupation are some of these confounding factors whose confirmatory role in causation/prevention of diabetic complication and control is yet to be established. In our present study we tried to find these relationship between the educational level and blood sugar control and complication.

As it was an observational, cross sectional study, HbA1c <7 was taken as a guide to define the patient as controlled because it reflect the past long term glycemic control (near about past 3 month).education level of diabetic persons was cross tabulated with HbA1c and different complications to find the correlation.

It was proved in the earlier studies that level of education has a direct impact on glycemic control. Functional health literacy is very much essential for successful glycemic control in diabetic patients. Studies shows that lower Educational status has worse health literacy and inadequate health literacy is associated with worse patient outcome and more hospital admission.[11] The patient with a low education level has more complication and they are also more unaware of their hypoglycaemic symptom causing more complication.[11] Lower literacy rate can make it difficult for individuals to understand essential care for the control of the disease and prevention of complications.[12,13] The more the educational level of the Diabetic person, more are the possibilities of access and utilization of health services, information, and protective factors against diabetes.[13]

Unlike our findings another study showed 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.[14] Results from the ADVANCE study showed that a low educational level is associated with an increased risk of vascular events and death in patients with type 2 diabetes, independently of common lifestyle associated cardiovascular risk factors. The effect size varies between different geographical regions.[15] Although educating a person alone is not a cure for the disease, the diabetes patients will be better managed if they are educated. If they does not know the basic principles of nutrition, physical activity, care of the lower extremities, as well as specific skills related to the administration of subcutaneous injection of insulin, control of blood sugar levels, and other necessary parameters will become increasingly difficult.

Limitation of the study

It was an Institution based cross sectional observational study. It was conducted in a Tertiary Teaching Medical College of West Bengal, at Kolkata. So most of the patients taken in this study were referred from another hospital or from primary care physians. So truly it does not represent the whole diabetic population. Most of the complicated patients were referred generally. Another limitation of the study was that the patients who attended the hospital are largely from the low socio-economic class or lower middle class. Thus the sample does not represent the all socio-economic classes or whole population.

CONCLUSION

In conclusion we can say that glycemic control and level of education has a direct relation resulting in better glycemic control in higher educated patient. In our study it showed that as the level of education is rising the percentage of glycemic controlled patient is rising. Education has an INVERSE correlation with the occurrence of diabetic complications. In our study the patient with education level >5th standard class has less numbers of complications than patients with education level <5th standard class.

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