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A Survey on Complications Associated with Diabetes Mellitus in Patients Attending a Diabetes Clinic of Dhaka: An Area of High Diabetes Prevalence

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Abstract

The aim of this study was to describe the current status of diabetes and complications associated with diabetes in Dhaka: a highly populated area of Bangladesh. Diabetes can affect many different organ systems in the body and, over time, can lead to serious complications. Complications from diabetes can be classified as microvascular or macrovascular. Microvascular complications include nervous system damage (neuropathy), renal system damage (nephropathy) and eye damage (retinopathy). Macrovascular complications include cardiovascular disease, stroke, and peripheral vascular disease The Study was conducted on the 155 patient to collect information about various complication of diabetes prescribed by doctors in Birdem General Hospital. Out of 155 patients in this study 70 were female and 85 were male. 30% of the patients were in the age range of 51-60 and according to the educational status 49% of the patients had just been completed the secondary school where as only 8% of the patients were illiterate. Highest percent of the patients were related with smoking (52%) but a large portion is in the non-smoking group. Among the 155 patients diabetes was diagnosed by incidental 24%, Screening 34% and symptomatic 42%. In case of diabetes types 44% were type-I & type-2 diabetes were 56%. Our study also revealed that family history (63%) of diabetes may be a factor to cause diabetes. In our investigation it is cleared that diabetes is a long term diseases because 27% of the patients live with diabetes for 11-20 years. In case of complications cardiovascular diseases (21%) and the nephropathy (19%) were the mostly observed diseases associated with diabetes.

Keywords: *Diabetes, Complications, Macrovascular, Microvascular, Symptomatic, Neuropathy*

I. Introduction:

Diabetes mellitus (DM), a chronic non-transmissible disease, is one of the most prevalent diseases in the world. According to the International Diabetes Federation, 6.6% of the worldwide adult population had DM in 2013 (IDF, 2012). The number of estimated cases of diabetes has increased from 30 million in 1985 to 135 million in 1995, and is projected to increase to 366 million by the year 2030 (Smyth *et al.* 2006). Meanwhile, around seven million people of Bangladesh have been suffering from diabetes as the number of such patients is rising by 5-6 percent each year (Saquib *et al.* 2012).

The relative distribution of the two major forms of diabetes, insulin-dependent diabetes mellitus (IDDM) and non-insulin-dependent diabetes mellitus (NIDDM), often show large variation between communities and ethnic groups (WHO, 1994; Rewers *et al.* 1987), but both forms are associated with increased mortality and morbidity in the form of vascular, renal, retinal and neuronal neuropathic complications (King *et al.* 1993). Examples of acute complications are diabetic ketoacidosis, hyperosmolar hyperglycemia, as well as other acute infections (Skamagas *et al.* 2008). In diabetes mellitus, severe hyperglycemia may result from absolute or relative insulin deficiency. In some patients, the condition may culminate in diabetic ketoacidosis or hyperglycemic hyperosmolar nonketotic coma. Profound hypoglycemia may result from a relative excess of insulin. Symptoms associated with acute hyperglycemia generally develop more slowly than do symptoms associated with an acute fall in the level of blood glucose.

Poor glycemic control is associated with worse diabetic outcomes, particularly the development and progression of diabetic complications (Holman *et*

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al. 2008; DCCTRG 1993; DCCTRG 2000; Kengne *et al.* 2005). A number of surveys of diabetic control and complications have been published from sub-Saharan Africa (Gill *et al.* 2008; Neuhann *et al.* 2002). These surveys show many of the problems associated with managing diabetes in a resource-poor setting, including poor glycemic control and high prevalence of complications.

Diabetes itself does not cause changes in personality or psychiatric illness, but particular subgroups of the diabetic population appear to be at risk for developing psychosocial problems (Bradley 1988). Some psychosocial barriers stem from personal, family, and cultural beliefs that may conflict with suggested treatment. A patient may resist following a prescribed diet, for instance, because of certain cultural beliefs about weight (Feste 1987). Such beliefs should be given their due respect; patients respond best to advice that does not seem to prejudge their beliefs. Certain medical conditions can be reliable indicators of psychosocial barriers. Recurrent hypoglycemia, frequent episodes of diabetic ketoacidosis, and very high glycosylated hemoglobin levels should each be recognized as a possible sign of personal or family problems (Jacobson *et al.* 1983).

In the current context, pharmacoepidemiological studies are necessary and may be carried out using the computerized drug monitoring systems. Thus, it may possible to describe drug use patterns, analyze early signals of the irrational drug use, promote interventions to improve drug use, analyze quality control cycles, and promote continuous quality improvement. Undeniably, public health education is a key factor for the early diagnosis of diabetes (Murata *et al.* 2003). Increasing the level of public knowledge of diabetes could contribute to an improved overall health behavior of the society and reduce the risk of developing diabetes (Gunay *et al.* 2006).

II. Method:

The Study was conducted on the patient to collect information about various complication of diabetes prescribed by doctors in BIRDEM GENERAL HOSPITAL, considering gender, age, level of education, smoking, and mode of diagnosis, type of diabetes, family history of diabetes, duration of diabetes and complication of diabetes by the patients. The period was March 2016 to July 2016.

A. Sample size:

This survey was conducted with a standardized questionnaire by interviewing 155 patients who are attending in a clinic to take treatment for diabetes and diseases associated with diabetes. A huge number of patients of Bangladesh are now live with diabetes that's why we were interested to know their status on these topics. The following inclusion and exclusion criteria were adopted to ensure that the respondent interviewed, best represent the patients with diabetes.

B. Inclusion criteria-

- The respondent should be a patient of a Birdem General Hospital.
- Must be diabetic patients.

C. Exclusion criteria-

- Patients from other clinics were excluded.
- Respondents with hearing and speaking disabilities were excluded
- Respondents of diseases without diabetes were excluded.

D. Study questionnaire:

It was a hospital based study conducted among the diabetic patients only. Survey protocol was discussed with patients and all possible measures were taken to ensure the confidentiality of all participants. 155 patients were selected and information was collected by the help of questionnaire with the duration of five months. The questionnaire was developed on the basis of thorough literature reviews. The eligibility criteria were adjusted in such a way that both genders (male, female) were studied.

E. Analytical Approach

Variables in analysis: Finding various complicated diseases of diabetes in survey was the outcome variable. Other variables in the analysis included gender, age, educational qualification, family history, duration of diabetes, types of diabetes also considered.

Statistical analysis: Analysis was conducted by calculating proportions and means for discrete and continuous data. It is important to be highlighted here that the survey was descriptive and most results are summarized in counts and percentages, some of the

questions had multiple options to choose from, total of percentages is not always the total populations.

III. Results:

A. Gender Variation of Patients

In our study period we first observed the gender variation (male and female) of diabetes patients. The data were tabulated and chart plotted as follows:

Table 1: Gender variation of patients

Sex	No. of patients (n=155)	Percentage (%)
Male	80	52%
Female	75	48%

Out of 155 patients in our study 75 patients (48%) were female and 80 patients (52%) were male.

B. Age variation of patients

The table and graph are drawn as follows:

Table 2: Age Distribution of patients

Age	No. of patients (n=155)	Percentage (%)
20-30	8	5%
31-40	23	15%
41-50	39	25%
51-60	47	30%
61-70	38	25%

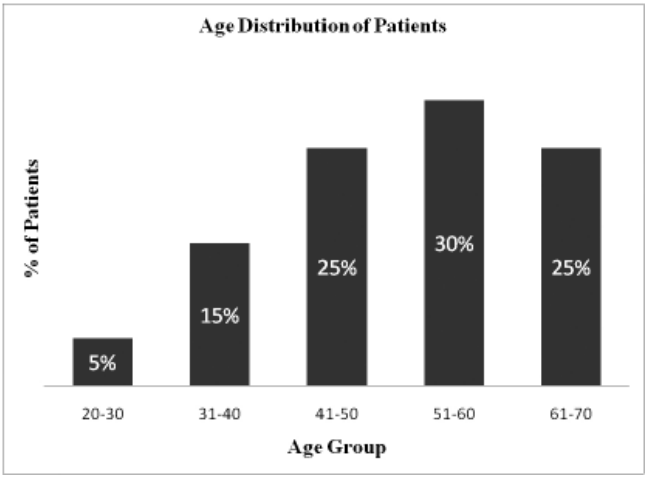

Figure 1: Age distribution of patients according to the number of patients

In the figure, we can observe the highest portion (30%) is age of 51-60. And the second largest portion 25% is age of 41-50 & 61-70.

C. No. of Patients in Educational Background

Table 3: Level of Education of patients

Education	No. of patients (n=155)	Percentage (%)
Illiterate	12	8%
Completed Primary School	27	18%
Completed Secondary School	77	49%
Completed University	39	25%

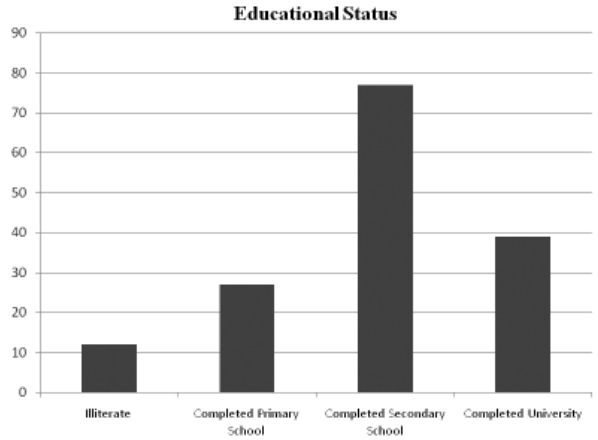

Figure 2: Educational background of patients who were interviewed

Among the 155 patients 8% illiterate, Completed Primary School 18%,Completed Secondary School 49%, Completed University 25%.

In the figure, we can observe the highest portion (49%) has completed secondary school. And the second largest portion 25% has completed university.

D. Smoking Status

Table 4: Smoking status of patients

Smoking	No. of patients (n=155)	Percentage (%)
Current smoker	46	30%
Ex-smoker	34	22%
Non-smoker	75	48%

Among the 155 patients current smoker were 30%, Ex-smoker were 22% and Non-smoker were 48%. According to this observation we may conclude 22% of the person thinks that quitting smoking will help them in diabetic situation.

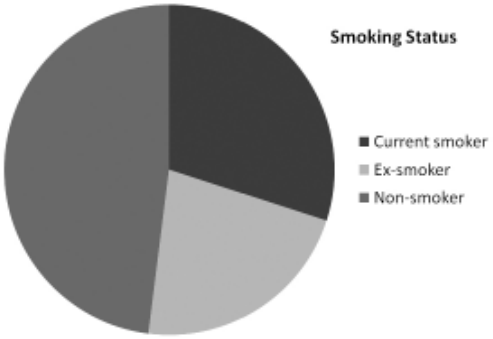

Figure 3: Smoking status of patients

In the figure, we can observe the highest portion (48%) is non-smoker and this highest percentage indicate that smoking is not an important cause to create diabetes. And the second largest portion 30% is current smoker.

E. Mode of Diagnosis

Table 5: Mode diagnosis by which patients first knew about their diabetes

Mode of Diagnosis	No. of patients (n=155)	Percentage (%)
Incidental	37	24%
Screening	52	34%
Symptomatic	66	42%

Among the 155 patients diabetes was diagnosed by incidental in 24% cases, Screening in 34%, symptomatic in 42% cases that means a huge number of patients diagnosed their diabetes after observing symptom of diabetes.

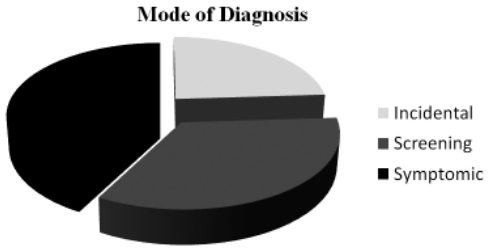

Figure 4: Mode of first diagnosis of diabetes

In the figure, we can observe the highest mode of diagnosis (42%) was symptomatic and the second largest mode of diagnosis (34%) was by screening.

F. Type of Diabetes

Table 6: Type of diabetes

Type of Diabetes	No. of patients (n=155)	Percentage (%)
Type-1	68	44%
Type-2	87	56%

Among the 155 patients with type-1 diabetes was 44% & type-2 diabetes was 56%.

Family history of Diabetes

Table 7: Patients with family history of diabetes

Family history	No. of patients (n=155)	Percentage (%)
Present	97	63%
Absent	58	37%

Among the 155 patients family history of diabetes was present in 63% & family history of diabetes was absent in 37%.

G. Duration of Diabetes

Table 8: Duration of time by which patients live with diabetes

Duration	No. of patients (n=155)	Percentage (%)
<1 year	21	13%
1-5 years	30	19%
6-10 years	36	24%
11-20 years	42	27%
>21 years	26	17%

From the study it is observed that among 155 patients, duration of diabetes is <1 year 13%, 1-5 years 19%, 6-10 years 24%, 11-20 years 27% & >21 years 17%.

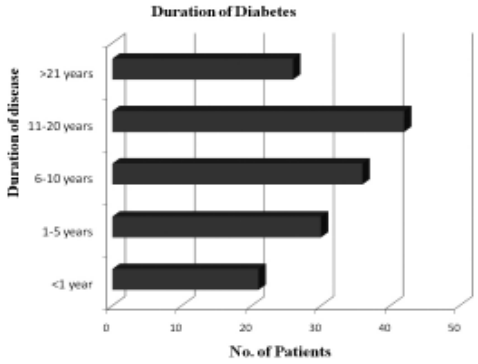

Figure 5: Duration of time by which patients live with diabetes

In the figure, we can observe the highest portion (27%) of duration of diabetes was in the range of 11-20 years. And the second largest portion 24% is in the range of 6-10 years.

H. Variation in Complications of Diabetes

Table 9: Types of complication and their prevalence

Complications	No. of patients (n=155)	Percentage (%)
Hypoglycemia	18	12%
Hypertension	23	15%
Retinopathy	11	7%
Neuropathy	13	8%
Nephropathy	30	19%
Diabetic Foot complication	19	12%
Cardiovascular complication	32	21%
None	9	6%

Cardiovascular diseases (21%) and the nephropathy (19%) were the mostly observed diseases associated with diabetes.

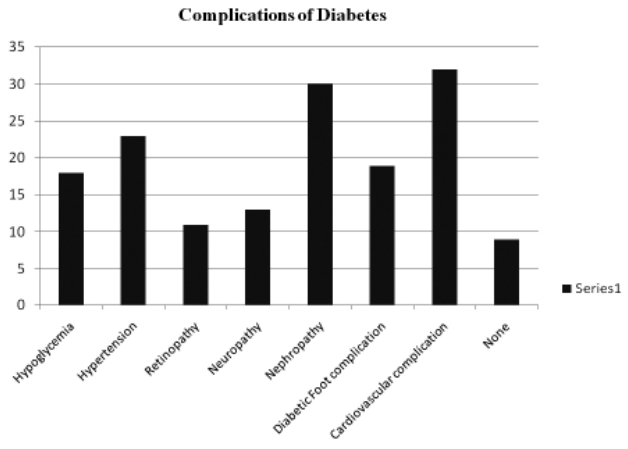

Figure 6: Mostly prevalent complications associated with diabetes

Among the 155 patients, variation in complication of diabetes, hypoglycemia 12%, hypertension 15%, retinopathy 7%, neuropathy 8%, nephropathy 19%, diabetic foot complication 12%, cardiovascular complication 21%, none 6% was observed.

In the figure, we can measure that 21% of the patients' surveyed living with cardiovascular complications. And the second largest portion was 19% patients were living with nephropathy in association with diabetes.

Complications status

Table 10: Complications status of patients

Complications	No. of patients (n=155)	Percentage (%)
Before diagnosed with diabetes	68	44%
After diagnosed with diabetes	87	56%

We also observed that, 44% of the patients were having complicated diseases before diagnosed with diabetes & 56% after diagnosed with diabetes.

IV. Discussions

Cardiovascular diseases were the common and badly controlled. It is well-established that poor BP control in diabetic patients' results in worse outcomes and that hypertension is a significant risk factor for the development of complications. In keeping with this, we found higher levels of uncontrolled hypertension in patients with a history of this type of heart diseases. Micro vascular complications were common, with 19% having abnormalities consistent with nephropathy, 7% having retinopathy, and 8% having probable neuropathy. Highest percent of the patients were related with smoking (52%) but a large portion is in the non-smoking group from the smoking status we cannot clearly infer that whether smoking causes any serious complications of diabetes or not. Among the 155 patients diabetes was diagnosed by incidental 24%, Screening 34% and symptomatic 42%. The data about first diagnosis of diabetes of patients revealed that diabetes was not symptomatic always and a large number of populations are living with diabetes without showing any symptom. In case of types of diabetes, 44% of the patients were type-I & type-2 diabetes were 56% so it is clear that type II diabetes is prevalent in our country than type I.

According to the related to the gender of patients it is depicted that diabetes usually does not depends on the gender of patients. There is an equal chance of occurring diabetes for both male and female. We also determined the age group of the patients we interviewed and from the data we got we can infer that diabetes is most prevalent after the age of 40. In our investigative age group diabetes was highly prevalent in the age group of 51-60 years. Though our study does not reveal any significant relation between diabetes complications

and educational background of patients, we have to spread knowledge of diabetes, its causes, complications associated with diabetes, management and treatment of diabetes of diabetes to our people living urban, suburban and rural areas.

Our study also revealed that family history of diabetes may be a factor to cause diabetes because maximum (63%) of the patients replied that they have family history of diabetes. From the data obtained from this study we may also conclude that heredity is an important factor to cause diabetes. In our investigation it is cleared that diabetes is a long term diseases because 27% of the patients live with diabetes for 11-20 years. The duration of diabetes reveals that diabetes is not totally curable so the management of diabetes is an important matter rather than only treating with drugs. Our study also reveals that diabetes alone is not so serious but if cannot control the diabetes it can cause fatal outcome to the patients.

We recognize the limitations of our study. First, the study was conducted in a single central hospital. The clinic population was mainly urban dwellers and those referred for specialist advice, and therefore, our results cannot be extrapolated to other settings. Diabetes management in rural areas is likely to be even less satisfactory. A second potential bias is that the service is seen by many as a clinic for collecting medication, and so, patients with diet-controlled diabetes are almost certainly underrepresented. Third, some of our data relied on self-reporting or information carried in the health passport, and therefore it may be inaccurate.

V. Conclusions

It is clear that there is a growing epidemic of diabetes in the Bangladesh. An increasing prevalence of diabetes risk factors will only exacerbate the problem; therefore, population-based efforts that affect the modifiable diabetes risk factors, particularly obesity and physical inactivity, are needed to reduce the burden of diabetes. In addition, among people with diabetes, the rate of complications is high. These complications not only significantly affect the morbidity and mortality associated with diabetes, but also contribute to the ever-growing costs related to diabetes. Adoption of appropriate diet and exercise behaviors and adherence to medication regimens will result in tighter glycemic control that, along with controlled blood pressure and blood lipids, will greatly reduce the burden of diabetes complications in the Bangladesh.

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