



ISSN: 2395-6429

## ASSESSMENT ON COMPLICATION OF DIABETES MELLITUS AND ITS MANAGEMENT STRATEGY IN A MULTISPECIALITY HOSPITAL

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### ARTICLE INFO

#### Article History:

Received 20<sup>th</sup> June, 2017  
Received in revised form 3<sup>rd</sup>  
July, 2017  
Accepted 27<sup>th</sup> August, 2017  
Published online 28<sup>th</sup> September, 2017

#### Key words:

Diabetes mellitus, Complication of  
diabetic mellitus, Glimepride.

### ABSTRACT

**Objective:** Study was designed to assess complication of diabetes mellitus and its management strategy in General Medicine department of private hospital.

**Method:** The study type was Randomized Retrospective study. It was carried out in 250 bedded multispecialty hospital for the period of six months. Diabetes mellitus patient with more than 3 years of duration were included in the study. Totally 116 patients were included as per inclusion and exclusion criteria.

**Results:** The average age of overall study population was found to be 50-60 years (32.75%). Out of 116 diabetes mellitus patients, 71 (61%) were male and 45 (39%) were female patients. Diabetic mellitus patients with different complication like micro and macro vascular complication were assessed in that nephropathy was found more 36 (31.03%) when compared with other complication like cardiac, retinopathy, foot ulcer in micro vascular area. In macro vascular area peripheral vascular disease was found more 46 (39.65%) when compared to other complication like hypertension, atherosclerosis, and diabetic ketoacidosis. Among all the oral hypoglycemic agent glimepride was prescribed more 38 (32.75%) when compared to other drugs like voglibose, metformin, and acarbose.

**Conclusion:** This study concluded that diabetic nephropathy was the major complication of diabetic patients. From that male patients were having more complication compare with female patients. Glimepride was the frequently prescribed single therapy in diabetic patients.

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## INTRODUCTION

### Definition

Diabetes mellitus is a metabolic disorder characterized by hyperglycemia, glycosuria, hyperlipemia, negative nitrogen balance and sometimes ketonaemia. A widespread pathological change is thickening of capillary basement membrane, increase in vessel wall matrix and cellular proliferation resulting in vascular complications like lumen narrowing, early atherosclerosis, and sclerosis of glomerular capillaries, retinopathy, neuropathy and peripheral vascular insufficiency.

### Types of diabetes mellitus

#### Type 1

Insulin dependent diabetes mellitus, juvenile onset diabetes mellitus: there is beta cell destruction in pancreatic islets; majority of cases are autoimmune antibodies that destroy beta cell are detectable in blood, but some are idiopathic no beta cell antibody is found. In all type 1 cases circulating insulin levels are low or very low, and patients are more prone to ketosis. This type is less common and has a low degree of genetic predisposition.

#### Type 2

Noninsulin dependent diabetes mellitus, maturity onset diabetes mellitus: there is no loss or moderate reduction in beta

cell mass; insulin in circulation is low, normal or even high, no anti beta cell antibody is demonstrable; has a high degree of genetic predisposition; generally has a late onset. Over 90% cases are type 2 diabetes mellitus.

### Classification of diabetes mellitus

Diabetes mellitus drugs lower blood glucose levels and are effective orally. The chief drawback of insulin is it must be given by injection. Orally active drugs have always been searched.

**Sulfonylurea drugs:** The Sulfonylureas drugs are classified as first generation and second generation.

**First generation:** First generation drugs are Tolbutamide, chlorpropamide.

**Second generation:** Second generation drugs are Glibenclamide, Glipizide, Gliclazide, Glimepiride.

**Biguanides:** The Biguanides drugs are Metformin.

**Meglitinide/phenyl alanine analogues:** The meglitinide/phenyl alanine analogues drugs are Repaglinide, Nateglinide.

**Thiazolidinediones drugs:** The Thiazolidinediones drugs are Rosiglitazone, Pioglitazone.

**Alpha glucosidase inhibitors:** Acarbose, Miglitol.

### Complication of diabetes mellitus

#### Acute complications

Complications of Diabetes are Acute Complications and chronic complication. Acute complications of T1DM include diabetes ketoacidosis, hypoglycemia and infections. An estimated 26% of the patients have at least one episode of severe hypoglycemia within the initial 4 years of diagnosis, with little relation to demographic or socioeconomic factors. The incidence of severe hypoglycemic episodes varies between 50 6 and 20/100 patient-years depending on age, geographic location and intensity of insulin treatment. Diabetic ketoacidosis in children continues to be an important cause of morbidity and mortality. Malnutrition also increases the risk of diabetic ketoacidosis-related complications. 70 Boys and girls were equally affected. Newly diagnosed diabetics constituted more than 50% of total DKA admission.71 Management requires careful replacement of fluid and electrolyte deficits, intravenous administration of insulin, and close monitoring of clinical and biochemical parameters directed toward timely detection of complications, including hypokalemia, hypoglycemia and cerebral edema.

#### Chronic complications

Chronic Complications are Long-term complications may be micro vascular (retinopathy, nephropathy, and neuropathy) or macro vascular (ischemic heart disease, peripheral vascular disease). Micro vascular complications may develop in puberty or early adult hood whereas macro vascular complications affect in later years. The longer the duration of diabetes, the greater the risk of complications which increases significantly following puberty. The risk of developing complications may also be increased by poor glycemic control, hypertension, dyslipidemia and behavior such as smoking in addition to genetic factors.<sup>1</sup>

## METHODOLOGY

### Study Type

Randomized retrospective study.

### Study Site

Assessment on Complication of Diabetes Mellitus and Its Management Strategy was conducted in the department of General medicine at Vivekanandha Medical Care Hospital, Elayampalayam, Tiruchengode.

### Study Population

About 250 records were collected, in these 116 records were finally selected.

### Duration of Study

Duration of study was taken in between January 2017 and June 2017(6 months).

### Inclusion Criteria

- Diabetes mellitus patient with more than 3 years of duration
- Both male and female patients.
- Patient on Oral hypoglycemia agent & insulin drug therapy

### Exclusion Criteria

- Pregnancy patient
- Severely ill patient

## METHODS

- For this study we used the records from the department of General medicine and Medical Record Department (MRD) at Vivekanandha Medical Care Hospital, Elayampalayam, Tiruchengode.
- The collected data was compared and charted with percentage.

## RESULTS AND DISSCUSSION

The present study was an attempt to understand the assessment on complication of diabetes mellitus and its management in a private hospital. The total number of patients in the study site during the study period was found to be 116.

### Gender Distribution

An equal gender distribution of the study population was given which indicates equal number of males and female population of

**Table 1** Gender distribution among the study population

Gender	Number of patients	Percentage (%)
Male	71	61
Female	45	39
Total	116	100

### Age Distribution

Our study includes the patients those who were suffer from the age group between 30 to 100 years, except pregnancy patient, severely ill patient, patient with multiple disease, neonatal patient. Age distribution reveals that 3.44% belongs to 30-40 years followed by 19.82% belongs to 40-50 years followed by 32.75% belongs to 50-60 years followed by 31.03% belongs to 60-70 years followed by 8.62% belongs to 70-80 years

followed by 3.44% belongs to 80-90 years followed by 0.86% belongs to 90-100 years. This shows the most of the patients belongs to the category of late adulthood age (50-60).

**Table 2** Age distribution on diabetes patients

Age(years)	Number of patients	Percentage (%)
30-40	4	3.44
40-50	23	19.82
50-60	38	32.75
60-70	36	31.03
70-80	10	8.62
80-90	4	3.44
90-100	1	0.86
Total	116	100

**Microvascular Complication of Diabetes Mellitus**

Our study also includes those patients who were suffer from various micro vascular complication of diabetes mellitus like diabetes nephropathy, diabetes retinopathy, poly neuropathy, burning sensation of foot, foot ulcers, cardiac complications and also no complications.

**Table 3** Micro vascular complication of diabetes mellitus

Micro vascular complication of diabetes mellitus	Number of patients	Percentage (%)
Diabetes mellitus nephropathy	36	31.03
Diabetes mellitus retinopathy	1	0.86
Burning sensation of foot	7	6.03
Foot ulcers	22	18.96
Cardiac complications	15	12.93
Poly neuropathy	5	4.31
No complication	30	25.86
Total	116	100

**Macrovascular Complication of Diabetes Mellitus**

Our study also includes those patients who were suffer from various macro vascular complication of diabetes mellitus like hypertension, coronary artery disease, diabetic ketoacidosis, peripheral vascular disease, atherosclerosis and also no complications.

**Table 4** Macro vascular complication of diabetes mellitus

Macro vascular complication of diabetes mellitus	Number of patients	Percentage (%)
Hypertension	19	16.37
Coronary artery disease	23	19.82
Diabetic ketoacidosis	10	8.62
Peripheral vascular disease	46	39.65
Atherosclerosis	14	12.06
No complications	4	3.44
Total	116	100

**Diabetes Mellitus Patient with Complication And No Complication**

This study includes the percentage of patients who have complications and no complications. This data reveals that 93.96% belongs to complication having patients.

**Table 5** Diabetes mellitus patient with complication and no complication

Complication and no complication	Number of patients	Percentage (%)
Complication	109	93.96
No complication	7	6

**Drugs Used For Treatment**

Our study also includes that widely prescribed drugs for diabetes mellitus treatment. The research reveals that 22.41%

belongs to Metformin, 32.75% belongs to Glimepride, 18.96% belongs to Metformin+ Glimepride, 20.68% belongs to Voglibose, 3.44% belongs to Insulin, and 1.72% belongs to Acarbose.

**Table 6** Drugs used for the treatment of diabetes mellitus

Drugs used for the treatment	Number of patients	Percentage (%)
Metformin	26	22.41
Glimepride	38	32.75
Metformin+Glimepride	22	18.96
Voglibose	24	20.68
Insulin	4	3.44
Acarbose	2	1.72
Total	116	100

**Duration of Therapy**

Our study includes the patient’s duration of therapy. Duration of therapy reveals that 11.20% belongs to 3years, 7.75% belongs to 4years, 12.92% belongs to 5 years, 18.96% belongs to 6 years, 25.00% belongs to 7years, 15.51% belongs to 8 years, and 8.61% belongs to 9 years. This shows the most of the patients belongs to the 7 years of treatment.

**Table 7** Drugs used for the treatment of diabetes mellitus

Duration of therapy	Number of patients	Percentage (%)
3Years	13	11.20
4Years	9	7.75
5Years	15	12.92
6 Years	22	18.96
7Years	29	25.00
8Years	18	15.51
9Years	10	8.61
Total	116	100

**DISCUSSION**

Katie Bennett *et al.*, 2015; Diabetic nephropathy is a common and potentially life threatening complication of both type 1 and type 2 diabetes. Prevention and early detection of micro albuminuria, along with aggressive management of known risk factors, can significantly reduce the rate of disease progression. Tight glycemia control and blood pressure management are extremely important, but can be difficult to achieve in clinical practice. In type 2 diabetes, co-existing CKD limits the use of many oral anti-diabetes agents and, therefore, regular medication and clinical reviews are needed.<sup>2</sup> Ramesh Ramaswamy *et al.*, 2016; In this study T2DM is associated with imbalance in micro and macro nutrient status. The concentrations of Magnesium, Zinc and Chromium were significantly reduced in subjects with T2DM with HbA1c  $\geq$  7. The ratios of these metal ions were associated significantly with the glycemic status. Monitoring the ratios of these bioactive metal cations is suggested than mere free ion concentration of specific mineral in T2DM patients. Documentation and correction of these micro and macro nutrient imbalances will help in better glycemic control in subjects with T2DM. Regular monitoring of the metal ion ratios will prevent or delay the onset of micro and macro vascular complications of T2DM by alleviating the oxidative stress, systemic inflammation and insulin resistance.<sup>3</sup>

Raya S. Zreik *et al.*, 2016; In this study This observational study evaluates the effectiveness of the current management of T2DM and reveals a high rate of suboptimal target delivery in about two-third of patients presenting to endocrine clinic. At baseline, there was a high rate of complications, and upon two-year follow-up there was persistence of complications risk

factors. There is a call for an intense and multidisciplinary approach in awareness raising, effective lifestyle improvement measures and more medication accessibility to be implemented as a priority.<sup>4</sup> According to our study 61% patients were male and 39% were female patients. Age distribution wise 3.44 were in the age group 30- 40 years, 19.82% were in the age group of 50-60 years, 32.75 were in the age group of 60-70 years, 31.03% of patients were in the age group of 70-80 years, 8.62% of patients were in the age group of 80-90 years, 3.44% of patients were in the age group of 90-100 years. (Table no: 1&2). Microvascular complication of diabetes mellitus includes nephropathy, retinopathy, burning sensation of foot, foot ulcers, cardiac complications, poly neuropathy were evaluated in that diabetic nephropathy complication was high 31.03% when compared to other complications. (Table no: 3). Macrovascular complication of diabetes mellitus includes Hypertension, Coronary artery disease, Diabetic ketoacidosis, Peripheral vascular disease, Atherosclerosis were evaluated in that Peripheral vascular disease complication was high 39.65% when compared to other complications. (Table no: 4).

In our study we found that 93.06% of diabetic patients have complication after 3 years of diabetic history in that 16.37% of patients were diabetes with hypertension patients. (Table no: 5, 6 & 7). Drug distribution wise glimepride was prescribed 32.75%, metformin 22.41%, Voglibose 20.68%, Metormin with glimepride combination 18.96%, Insulin 3.44% and agarbose 1.72%. (Table no: 8)

## CONCLUSION

This study concluded that diabetic nephropathy was the major complication of diabetic patients. From that male patients were having more complication compare with female patients. Glimepride was the frequently prescribed single therapy in diabetic patients.

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## Acknowledgement

- We wish to express our thanks to Dr.M.Karunanithi, B.Pharm, MS., Ph.D., D.Litt, Chairman & Secretary Vivekanandha Educational Institution for providing facilities to carry out this whole work.

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