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Assessment of Medication Therapy Management in Diabetes Patients at A Tertiary Care, Baptist Hospital, Bangalore

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Abstract

Background: Diabetes mellitus (DM) is a chronic progressive metabolic disorder characterized by hyperglycemia mainly due to absolute (Type 1 DM) or relative (Type 2 DM) deficiency of insulin hormone. Comorbid conditions increase chances of polypharmacy and irrational prescriptions in diabetic patients. This prospective non interventional study aimed to gather and study the medication therapy management in diabetes patient at a tertiary care hospital. Methods: A prospective observational study conducted in diabetes patients at a tertiary care hospital in Baptist hospital, Bangalore. The study was conducted in 150 diabetic patients admitted in medicine ward. Patients were included in the study only after obtaining written informed consent form; all relevant data were collected from case record forms and were analyzed. Results: Diabetes mellitus was observed to be highest in patients with the age group of60-70 years, affecting 64.7% males and 35.3% females. We observed that 70 (46.7%) of patients were only on OHA, 62(41.5%) were on insulin therapy and 18(12%) were on combination of OHAs and insulin. The most common comorbid conditions observed by us were hypertension, chronic renal disease, etc. Among the various antidiabetics, sulfonylurea and Biguanide combination drug was the common class of drug used accounting for 75 (50.09%) of the total antidiabetics The average prescription cost was found to be lesser for treating diabetes (hypoglycemic) alone compared to diabetes associated complaints. Conclusion: To conclude, the study reveals that Metformin continues to be the choice of oral hypoglycemic agents with least adverse effects and insulin was used to treat uncontrolled state, Overall polypharmacy was high even though polypharmacy among antidiabetic drugs were low. The mostly occurring co morbidity with diabetes is hypertension and most frequently used oral hypoglycemic agent included metformin.

Keywords: Diabetes Mellitus, Management, Prescription Pattern and Antidiabetic.

Introduction

Diabetes Mellitus (DM) is a rapidly growing chronic and multifactorial disease with a worldwide projection of 324 million diabetics by the year 2025. In Africa, the prevalence of diabetes is expected to rise by 98%, from 13.6 million at2003 to 26.9 million at 2025. A similar increase (97%) is expected in the Middle East region with an estimated prevalence of 35.9 million diabetics by 2025 (Zimmet and et al., 2001).

DM virtually affects every system of the body mainly due to metabolic disturbances caused by hyperglycemia, especially if diabetes control over a period of time proves to be suboptimal (World Health Organization. (1999). Until recently it was believed to be a disease occurring mainly in developed countries, but recent findings reveal a rise in number of new cases of type 2 DM with an earlier onset and associated complications in developing countries (Kinra and et al., 2010; Chuang and et al., 2002; Narayanappa and et al., 2011). Diabetes is associated with complications such as cardiovascular diseases, nephropathy, retinopathy and neuropathy, which can lead to chronic morbidities and mortality (American Diabetes Association, 2003; Zucchi and et al., 2005).

One of the biggest challenges for health care providers today is addressing the continued needs and demands of individuals with chronic illnesses like diabetes (Wagner and et al., 2001). The importance of regular follow-up of diabetic patients with the health care provider is of great significance in averting any long term complications. Studies have reported that strict metabolic control can delay or prevent the progression of complications associated with diabetes (Wagner and et al., 2001; UKPDS Group, 1998). The needs of diabetic patients are not only limited to adequate glycemic control but also correspond with preventing complications; disability limitation and rehabilitation. Some of the Indian studies revealed very poor adherence to treatment regimens due to poor attitude towards the disease

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and poor health literacy among the general public (Ohkubo and et al., 1995; Shobana and et al., 2005).

The management of type 1 and type 2 diabetes focuses on improving glycemic control by means of lifestyle modification and pharmacological therapy with the aim of reducing risk and progression of microvascular and macro vascular complications. Landmark studies such as the Diabetes Control and Complications Trial(DCCT) in type 1 diabetes and the United Kingdom Diabetes Prospective Study (UKPDS) in type 2 diabetes have shown that intensive glycemic control improves patient outcomes especially for microvascular complications although the effect on macro vascular complications remains unresolved ((DCCT/EDIC) Study Research Group, 2005; Holman and et al., 2008). Diabetes care is delivered holistically by a multidisc capillary team (MDT) in primary and secondary care with the emphasis on individual glycemic targets according to patient circumstances such as hypoglycemia risk, weight and comorbidities. Patients are actively encouraged to self-manage their condition and engage in the decision-making process with the support of this team. The use of technology has transformed the monitoring and delivery of treatment in diabetes and communication with healthcare professionals while new glucose-lowering therapies are used to target key pathophysiological defects in the development of diabetes (Holman and et al., 2008).

This kind of research into diabetes mellitus (DM) will provide useful insights into the different therapeutic traditions, reflect disease prevalence and data can be linked to measures of morbidity in order to explore efficacy and toxicity of different therapies (Das and et al., 2011). This study intended to study is for being a prevalent and acquired disease in India, preventive measures can be taken against diabetes if proper awareness is given. Medication therapy management and surveillance of the current therapeutic approaches for diabetes in India are warranted for the better management of this prevalent disease.

Materials and Methods

Nowadays diabetic complications are becoming common health care issues. The outcomes of diabetic complications are increased hospitalization, increased direct patient costs, and mortality. So it is relevant to conduct studies on the prevalence and incidence in each health care sector.

Here we are analyzing the incidence, management and outcomes of diabetes mellitus in Bangalore Baptist hospital. For that, a total of 273patients were screened, out of which 150 being a known case of DM under treatment of both genders and aged between 18 to 80 years were included in the study. 150 In patients diagnosed with diabetes will be enrolled to the study. The patient history, demographic details with socio-economic status and medication details was collected from the inpatient case shit, medication chart and lab Investigation reports. The quality of life questionnaire taken from all the enrolled patients. The collected data were cleared and checked every day for completeness and consistency before processing. The Micromedex, Medscape and references books will be used as tools to review the prescription and case charts. The data will be stored confidentially and will be subjected to further analysis using appropriate software.

Result and Discussion

A diabetes mellitus epidemic is underway. It is a chronic disease requiring lifelong treatment. Although lifestyle changes remain the cornerstone of diabetes management, individually they are often insufficient to enable patients to maintain normal blood glucose levels. In this observational study prescription collected at Baptist hospital shows that Out of 150 patients, 97(64.7%) of patients was male and 43(35.3%) was female.

Table 1: Prescription Pattern of Anti-Diabetes Drugs

	Parameters	Male %	Female (%)	Total (%)
1	Total number of prescription analyzed	97(64.6)	53(35.4)	150
2	Total number of drugs prescribed	852(64.3)	472(35.7)	1324
3	Average number of drugs per prescription	8.9	8.9	8.9
4	Number of drugs from WHO essential drug list out of total number of drugs prescribed	75(67.5)	36(32.4)	111 (74)
5	Number of drugs prescribed by generic name out of total number of drugs prescribed	164(66.6)	82(33.3)	246(18.6)
6	Number of fixed dose combinations out of total number of drugs prescribed.	53(55.8)	42(44.2)	95(7.2)
7	Number of injections out of total number of drugs prescribed	150(70)	65(30)	215(16.2)
8	Total number of antidiabetics out of total number of drugs prescribed	167(67)	82(33)	249(18.8)
9	Number of drugs prescribed by BRAND name out of total number of drugs prescribed	672(62.3)	406(37.7)	1078(81.4)

In this present study we have observed that average number of drugs prescribed per prescription was 8.9±1.1 18.6% drugs were written with generic names, this might be due to the absence of hospital formulary system and biased promotion of selected brands by the medical representatives of pharmaceutical manufacturers, which is a common practice in Indian hospitals. Prescribing by generic names

should be promoted, as it could help in cheaper treatment to the patients, reduce chance of drug duplication, drug interactions and adverse drug reactions. 81.4% drugs were written with their brand names. Drug from WHO EML (essential medicine lists 2013) drugs prescribed were 111(74%), 215 (16.2%) injectable drugs were prescribed,249 (18.8%) anti-diabetics are prescribed and 95(7.2%) numbers of fixed dose combinations was prescribed. [Table 1]

Table 2: Prescribing Pattern of Drug in Diabetes Patient.

System	Male (%)	Female (%)	Total medications % N=1324
Blood and blood forming organs	6	4	10(0.8)
Cardiovascular system	128	98	226(17.1)
Gastrointestional	97	49	146(11.0)
Antiinfectives for systemic use	100	57	157(11.9)
Musculoskeletal system	14	4	18(1.4)
ANTI EMETIC	20	5	25(1.7)
Analgesics and antipyretics	11	4	16(1.2)
R Respiratory system	31	25	56(4.2)
Other system drugs	12	8	20(1.5)
Vitaminses	37	36	73(5.5)
Diuretic	112	89	201(15.2)
Antidiarrhoel	2	0	2(0.2)
Antiplatetes	35	20	55(4.2)
Thyroid	5	1	6(0.5)
Corticosteroids	11	8	19(1.4)
Neurological	11	9	20(1.5)

In our study we find that from total medication more prescribed group are cardiovascular drugs 226(17.1%) and diabetic are 15.2%, anti-infective are 11.9%. [Table 2]

Biguanides were found to be the preferred class of OHA in our set up, of which Metformin was commonly prescribed antidiabetic drug either alone or in combination with other antidiabetic agents. Metformin is the best first option at present due to its efficacy, weight reducing effect, cost and low incidence of adverse effects. It has an added advantage of improving lipid profile, not provoking hypoglycemia and can be associated with any other antidiabetic agent. Sulphonylureas remain the best choice for combination with metformin although their effectiveness on glucose control decrease with time more rapidly [Table 3,4].

Table 3: Drug Utilization Pattern of Anti-Diabetic Drugs

Class of Anti-Diabetic	Name of Drug	Male%	Female%	Total %
Biguanides	Metformin	24	10.7	55(36.7)
Sulfonylureas	Glimepride	4	2.7	10(6.7)
	Glipizide	4	2.7	10(6.7)
	Glibenclamide	0	0	0
Thiazolidinediones	Pioglitazone	1.3	0	2(1.3)
Alpha-glucosidase inhibitors	Voglibose	2.7	0.7	5 (3.3)
Insulin: Human insulin	Short Acting	27.3	12	47(31.3)
	Long Acting	1.3	0	2(1.3)
	Mixtures	9.3	10.7	32(21.3)
	Analogue Mixtures	1.3	2	5(3.3)
Combination therapy	Metformin +Glibenclamide	0	0	0
	Metformin+Glimepride	14	10	46 (30.6)
	Human insulin(short acting + longacting)	0	0	0
	Metformin +Human insulin	2.7	4	15(10.0)
	Glimepride +Human insulin	9.3	4	20(13.0)

From this most commonly co-prescribed medication along with anti-diabetic drugs were Antihypertensive [Table 4]. Hence the increased utilization of cardiovascular drugs is as anticipated. This finding is further supported by the fact that cardiovascular disease waste most common co-morbidity found in the patients at the time of diagnosis, with hypertension being present in the cases followed by dyslipidemia.

The pattern of antidiabetic drug utilization was studied. A total of 249 antidiabetic medications were prescribed. In monotherapy the most prescribed drug was biguanides (36.7%) followed by insulin (57.1%) and metformin (36.7%). The most prescribedcombination therapy was metformin+glimepride (30.6%), glimepiride + human insulin (13.0%), followed by metformin+insulin (10.0%). [Table 4]

Table 4: Distributions of Antidiabetic by Co Morbidity

Name of The Antidiabetic Drug	CO-MORBIDITY	Number	GRBS±SD	HbA1c Mean±SD	Numbers of Patients
Metformin	HTN	15	149±2.1	6.2±0.2	38
	COPD	3			
	HYPERLIPIDEMIA	14			
	NEUROLOGICAL DISORDER	2			
	ARTHIRTITS	3			
Glimepride	HTN	5	156±2.5	6.8±0.7	8
	RENAL FAILUE	2			
	IHD	1			
Glipizide	HTN	5	154±1.4	7.1±0.5	11
	IHD	1			
	RENAL FAILURE	1			
	NEUROLOGICAL DISORDER	3			
Voglibose	HTN	5	151±1.4	6.8±0.3	7
	IHD	2			
Metformin +Glimepride	HTN	5	141±1.3	6.1±0.6	16
	COPD	1			
	HYPERLIPIDEMIA	6			
	NEUROLOGICALDISORDER	2			
	ARTHIRTITS	2			
Humaninsulin (shortacting)	HTN	9	140±2.1	6.3±0.3	22
	COPD	3			
	HYPERLIPIDEMIA	7			
	ARTHIRTITS	2			
	IHD	1			
Humaninsulin(Mixtures)	HTN	6	145±3.2	6.4±0.2	8
	IHD	1			
	COPD	1			
	NEUROLOGICAL DISORDER	1			
Metformin +Human insulin	HTN	4	136±1.3	6±0.4	12
	IHD	1			
	COPD	2			
	4HYPERLIPIDEMIA	7			
	NEUROLOGICAL DISORDER	1			
Glimepride +Human insulin	HTN	2	140±1.1	6.5±0.2	6

As described in National Institute for Clinical Excellence (NICE) guidelines for diabetes, routine monitoring of glycemic control is an important part of diabetes management. It was observed in study that patients were investigated and monitored for glycemic control. Thus it was evident that all the physicians made a good effort to follow the NICE guidelines to achieve good glycemic control in the admitted patients. Considering this, of all the oral hypoglycemic agents, metformin was the preferred drug as it was considered to be safe in regards to the hypoglycemic episodes & it was less expensive as well, thus making it affordable to the economically weak patients in our hospital. This observation makes it clear that socio-economic status of patient was definitely taken into consideration while prescribing the antidiabetic medications.

Conclusion

From the above studies it may be concluded that the mostly occurring co morbidity with diabetes is hypertension and most frequently used oral hypoglycemic agent included metformin. The study found that the incidence of polypharmacy in Type-2 diabetes patients was high compared to other studies. In these Glimepiride and metformin combination drugs were used commonly followed by Glibenclamide and metformin. Out of the total drugs most were prescribed in oral dosage form. This is a good prescribing habit. Patient counseling should be mandatory to the diabetic patients in order to screen out the diabetic risk and taking steps to avoid the diabetic complications becoming worse. While considering the cost of the therapy, it was found that cost for treating diabetic associated complications was higher than diabetes alone. Further studies with more patient population and longer period were needed to confirm the study results and also to check the influence of patient counseling in improving the quality of life of the diabetic patients.

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