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Original Article

Assessment of contemporary traits in the management of Diabetes in government and private health care sector

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ABSTRACT

Type 2 diabetes referred as a chronic metabolic disorder, is highly prevalent worldwide and approximately 522 million peoples till 2030 are likely to be affected in the world, increasing the debt burden especially for underdeveloped countries. There is a higher risk of both short term and long term macro vascular complications in diabetic people which include cardiovascular disease, retinopathy and nephropathy. Moreover, it can lead to episodes of ketoacidosis and hyperosmolar hyperglycemic state. The management of DM requires variety of facilities, evaluation of comorbidities and different treatment modes on the basis of heterogeneity in population. This research is based on analysis of current trends in prescription drugs for management of type 2 diabetes in private and government health care sectors of Karachi. A total of 50 distinct and genuine prescriptions of 50 patients with Type 2 Diabetes mellitus were collected from both the sectors, which were than evaluated for the type of therapy being provided for Type 2 D.M; monotherapy or multiple therapy for the management of diabetes. The existing comorbid conditions and the supplement therapy being provided to avoid future complications were also evaluated. Our results would provide better options to health care sectors for improvement in overall quality of life of patients.

Key words: Type 2 Diabetes mellitus, prescription analysis, monotherapy, multiple therapy, multivitamins.

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INTRODUCTION

Diabetes mellitus is marked by disturbances in the metabolism of the carbohydrates, fats and proteins which occurs due to the insufficient action of the insulin; either completely or relatively. Diabetes mellitus is divided into two basic types i.e. type 1 diabetes mellitus (Type 1 DM) which is insulin dependent and type 2 diabetes mellitus (Type 2 DM) which is non-insulin dependent[1]. Approx 522 million peoples in 2030 will likely be affected in the world, increasing the debt burden especially for underdeveloped countries[2]. There is a prevalence of about 11.77% of type 2 DM in Pakistan which contributes more to the male population as compared to female population. Moreover, the urban areas were found to be more affected by this disease as compared to rural areas[3]. In type 2 diabetes mellitus, insensitivity of insulin occurs which results in the resistance of insulin and decrease in the production of insulin as well as failure of B-pancreatic cells. Due to this transportation of glucose in liver, fats and muscle cells decrease[2]. As insulin production decreases with time so the symptoms of type 2 DM are usually insidious. Common symptoms include fatigue, unhealthiness, nocturia and polyuria. There is a higher risk of macro vascular complications in diabetic people which include cardiovascular disease, retinopathy and nephropathy. Moreover, it can lead to episodes of ketoacidosis and hyperosmolar hyperglycemic state. Risk factors for Type 2 DM include obesity, less energy consumption, alcohol, and smoking etc[4]. Family history in twins and singleton siblings has also been shown to be a significant risk factor[5,6]. Blood test; Fasting Blood Sugar (FBS) and Random Blood Sugar(RBS) urine test and glucose tolerance test are involved in the diagnosis of diabetes mellitus. By regular exercise and proper dietary nutrition the incidence of this critical disease can be prevented or delayed[7].

There are common oral anti-diabetic drugs that include Biguanides and it is one of the major class. Furthermore metformin is the common drug of this class and it is used as first line of therapy. The second line of agent is sulphonyl urea, it is used for the treatment of type 2 diabetes mellitus in those who are not much obese. Alpha-Glucosidase inhibitors are also the class of anti-diabetic drug which include voglibose, miglitol, acarbose that are effective for post prandial hyperglycemia. Thiazolidinediones is a class of insulin sensitizers and they include troglitazone, rosiglitazone etc. The most safest anti-hyperglycemic agent is insulin; which control diabetes is an effective manner and it can also improve the abnormalities of metabolism in type 2 diabetes mellitus patients[8]. Apart from the standard, conventional therapy of DM, multivitamin therapy (Table I) is also essential for the treatment and prevention of the disease itself as well as the complications associated with it. Vitamin C helps in the prevention of retinopathy; vitamin E helps lower HbA1c levels; vitamin B1 helps to lower the progression of vascular diseases; vitamin B3 helps in CVD; vitamin B12 in the prevention of neuropathy; vitamin D helping in glucose metabolism and decreasing insulin resistance; vitamin A in improving function of beta cells; and folic acid in the prevention of peripheral neuropathy and CVD [9].

METHODOLOGY

We conducted a population based, comparative analysis, analyzing the current trends in the management of Type 2 DM that are being followed in the government and private health care sectors in Karachi. We collected a total of 50 distinct and genuine prescriptions of patients with Type 2 DM from both the sectors; 25 from each. The prescriptions were collected randomly and information in these medical prescriptions included patient identification, age, gender, drugs prescribed, date of consultancy, dosage regimen. The prescriptions were than evaluated for the type of therapy provided for Type 2 DM.

RESULT

The current study shows a marked difference in the prescription drugs and management trends between private and government hospitals in Karachi. Mostly patients with mean age of 54 years were affected by Type 2 D.M having a higher proportion of females (64%) in both the sectors. In private health care sector 32% mono-therapy and 68% of the times multiple therapy was given while in Government health care sector mono-therapy (60%) and multiple therapy (40%) was prescribed as shown in Fig I.0 whereas Fig II shows trends in diabetes management. In private hospitals biguanides were most frequently prescribed by physicians accounting to 76% as compared to sulphonyl ureas and DPP-IV inhibitor which were the second preferred choices of the prescribers about 56%. The same result was observed in the government sector where biguanides were mostly prescribed than any other class and sulphonylureas being the second; 60% and 28% respectively. Short acting insulin was mostly prescribed in government sector than any other insulins; 32% while in the private sector 12% of the times rapid acting and long acting insulins were prescribed which was the highest percentage recorded. DPP-4V inhibitors were being prescribed in private and government

sectors in the figures of 56% and 16% respectively. As shown in Fig III, in private hospitals patients with DM type 2 DM mostly had hypertension as a comorbid condition (44%) then hypercholesterolemia (36%), asthma (16%), GERD(16%), gout (4%), and hyperthyroidism (0%), while in Government hospitals hypertension was most common (60%), GERD(20%), asthma (16%), hypercholesterolemia(12%), gout (4%) and hyperthyroidism(4%). In private sectors (as shown in Fig IV) vitamin B12 was mostly prescribed (32%) then vitamin D (28%), B1(20%), B6(20%), folic acid (16%), vitamin E(12%), vitamin C (8%), B2(8%), B3(4%) and vitamin A (4%). In Government hospital multivitamins are not prescribed more as compare to private hospitals. Vitamin D was mostly prescribed (20%) , while rest of them being prescribed in low percentages i.e B12 (4%),Vitamin C(4%), B2(4%), B6(4%), Folic acid(0%), vitamin E(0%), vitamin B1(0%), vitamin B3 (0%), vitamin A(0%).

DISCUSSION

The results demonstrate that the age group which is mostly affected by Type 2 Diabetes mellitus is the middle age group which indicates the fact that T.2 D, M occurs in older ages and is mostly associated with secondary risk factors rather than a congenital disease which is a characteristic of Type 1 Diabetes mellitus. The results also show that women are predominantly more prone to T.2 DM, i.e 64%, than men. The vast difference between the figures of monotherapy and multiple therapy prescribed by both the government and private sectors shows the higher prevalence of multiple therapy in private while monotherapy in government sector. This draws attention towards the significance of regular and more strict monitoring required by the private sector as polypharmacy may result in a higher risk of drug-drug interactions and complications in the treatment, ultimately decreasing patient compliance and rational drug use. Moreover the results also show that both private and government hospitals prefer Biguanides the most i.e 76% and 60% respectively while sulphonylureas were the second choice of drugs in oral hypoglycemics in both the sectors. It was also observed that the new and recent class of oral hypoglycemic, DPP-4 inhibitors is being more prescribed in private hospitals rather than government. This in turn reflects the up-to-date information from private physicians' end; as DPP-4 inhibitors have shown to be very effective in Type 2 DM patients. But on the other hand, insulin, which is considered to be the safest therapy for DM, is being prescribed more in government sector rather than private sector. The statistics also throw light on the fact that hypertension was the leading comorbid condition in both the sectors which shows an urgent need by both the sectors to manage hypertension as effectively as DM hypertension is a complication of DM in the long run. Multivitamin therapy is provided more by the physicians of private hospitals among which vitamin B12 has the highest proportion. The multivitamin therapy is significant in preventing and controlling the future complications of Type 2 DM which include diabetic neuropathy, retinopathy, CVD etc; and improving the function of beta cells for the management of Type 2 Diabetes mellitus.

CONCLUSION

Type 2 diabetes, a chronic metabolic disorder, is highly prevalent amongst the middle age group attending the hospitals with different associated complications including cardiovascular disease, retinopathy and nephropathy, ketoacidosis and hyperosmolar hyperglycemic state. By analyzing the results of both private and government healthcare sectors it is concluded that both the sectors needed a strict and vigilant monitoring check on the therapies provided as multi-therapy is being prescribed by both the sectors among which private sector needs relatively higher monitoring checks. Moreover, the government sector needs to update the pharmacotherapy plans in light of current advances in diabetes management and use of counselling methods for better compliance along with multivitamin therapy for the management and prevention of associated complications.

Table I: Types of multivitamins prescribed to patients for various complains

S.No	Multivitamins	Complain
1.	Vitamin A	For regulating insulin secretion
2.	Vitamin B1	For heart, other vascular diseases and diabetic neuropathy
3.	Vitamin B2	For regulation of metabolism, also for preventing diabetic neuropathy
4.	Vitamin B3	For digestive system diseases and diabetic neuropathy
5.	Vitamin B6	For diabetic neuropathy
6.	Vitamin B12	For diabetic neuropathy
7.	Vitamin C	For retinopathy and nephropathy
8.	Vitamin D	For diabetic ulcers and gum problems
9.	Vitamin E	For diabetic neuropathy, retinopathy and atherosclerosis
10.	Folic acid	For cardiovascular diseases and peripheral neuropathy

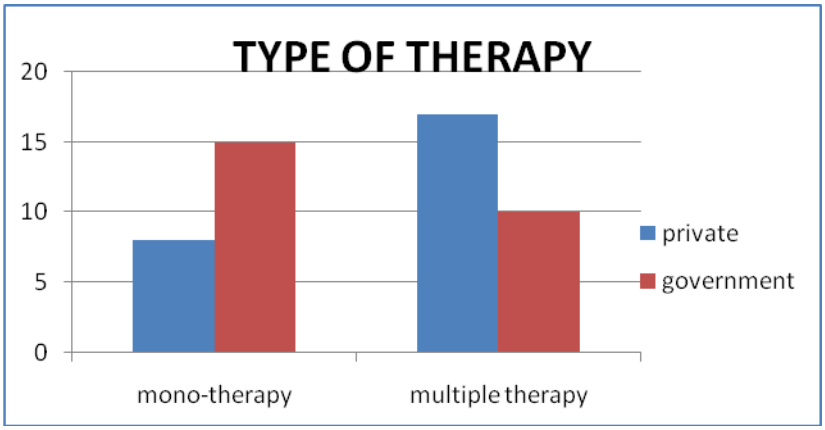

Fig 1: Type of pharmacological therapy prescribed to patients with diabetes

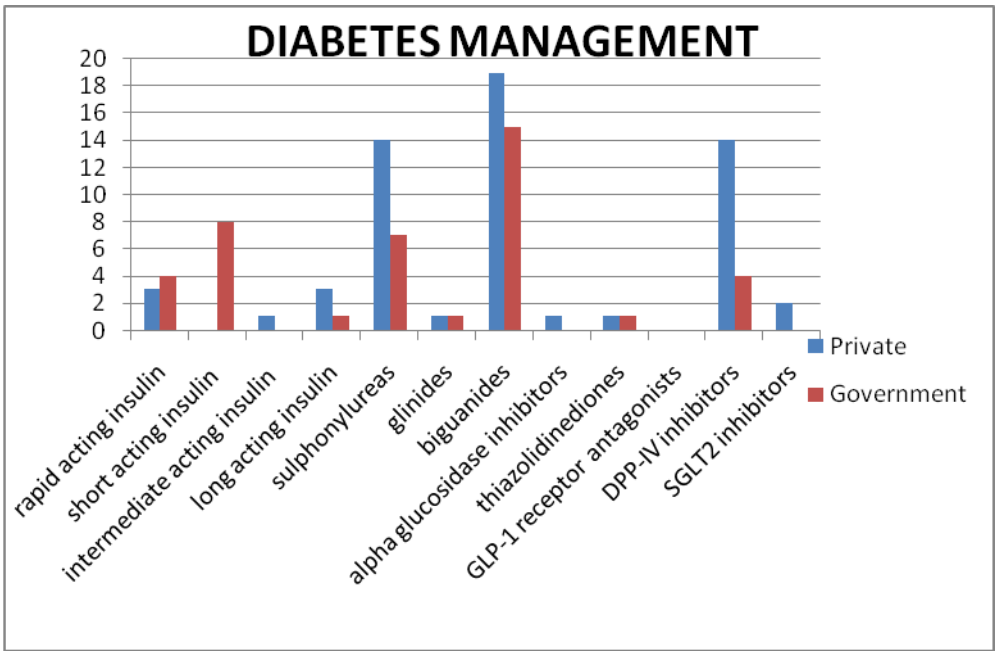

Fig 2: **Medications prescribed for diabetes management**

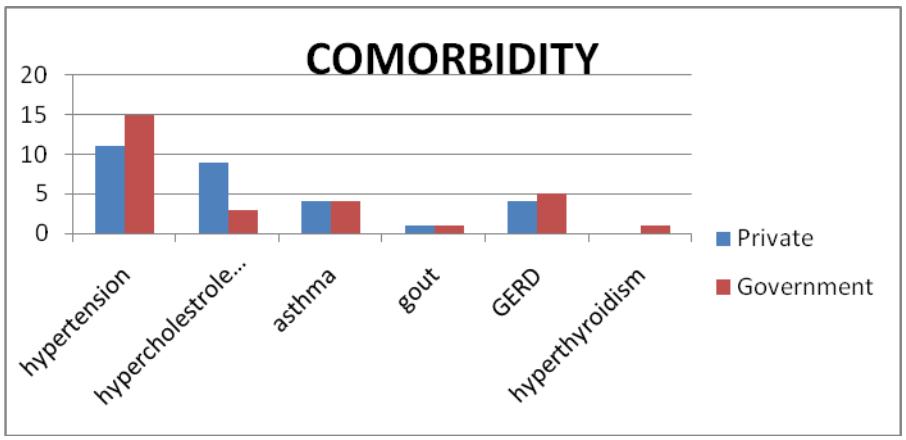

Fig 3: Comorbid conditions in diabetic patients

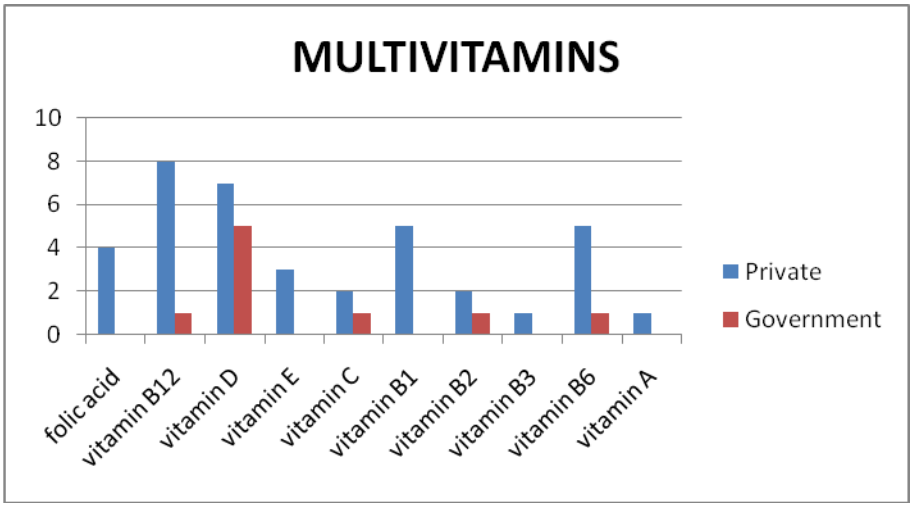

Fig 4: Types of multivitamins prescribed to diabetic patients

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