Studying The Prevalence Of Achieving Therapeutic Goals Of Diabetes Treatment Among Diabetic Patients In Royal Medical Services

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Abstract

Diabetic complications are considered a public concern on global level and have their negative impacts on patients. The main objectives of the present study were to determine the prevalence of diabetic complications among a sample of diabetics in Royal Medical Services and to conclude the appropriate recommendations to reduce the effects of diabetic complications. The method of choice involved a retrospective design and 392 files of diabetic patients were reviewed. Study findings showed that the prevalence of diabetic neuropathy was 43%, hypertension 42%, diabetic foot ulcer 9%, glaucoma 48%, and heart disease 25%. Predictors for diabetic neuropathy were the level of HbA1C (p=0.015), and gender (p=0.018), while the predictors for hypertension were duration of DM (p=0.000) and age (p=0.000). The predictors of foot ulcer included the level of HbA1C (p=0.013), and the use of metformin (p=0.026). Glaucoma was predicted by duration of DM (p=0.002), and gender (p=0.017). Heart disease was predicted by duration of DM (p=0.003), gender (p=0.041), and age (p=0.000). Taken together, diabetic complications are prevalent on global level and in our settings which implies that the therapeutic options of DM are still far from their ultimate goals. we recommend adopting of more effective monitoring systems for screening diabetics, particularly those who are expected to develop diabetes. We also recommend to activate the roles of clinical pharmacist to raise the awareness level about diabetic complications among the public.

Introduction

It has been indicated through several studies that diabetes mellitus (DM) has increased prevalence on the global level, and DM was regarded as a conformational disease (Dobson, 1999; Soto, 2001; Mahdavifard et al., 2016).

Diabetic complications are likely to develop as a result of having chronic hyperglycemia. On global level, diabetic complications have increased prevalence without accompanying effective treating options. It is highly accepted that both hyperglycemia and oxidative stress are triggering factors for the initiation of diabetic complications (Singh et al., 2013).

Salvotelli et al (2015) conducted a study to determine the prevalence and clinical variables associated with diabetic neuropathy. Study findings showed that the prevalence of neuropathy in type 2 diabetes was about 30% when searched with clinical examination. It was also found that BMI, HbA1C and ankle/brachial index were predictors of the existence of neuropathy. Reviewing literature showed that the prevalence of diabetic neuropathy varied from 13% to 75% (Dyck and Dyck, 1999; Tapp et al., 2003; Stratton et al., 2004; Ziegler et al., 2008; Van Acker et al., 2009).

Abougalambou and Abougalambou (2013) found that the prevalence of hypertension among Malaysian patients with type 2 diabetes was 92.4%. Diabetes is usually existing with hypertension and diabetics have increased prevalence of hypertension, and hypertensive patients have the tendency to develop type-2 diabetes (Sowers et al., 2001; Wild et al., 2004). the prevalence of hypertension among diabetics varied among studies, as an example, Tseng (2006) reported that the prevalence of hypertension among Taiwanese population was 39%.

Diabetic foot disease is expected to increase in future because of the existence of predisposing factors to foot disease including peripheral neuropathy and vascular disease in more than 10% of people at the time of diagnosis of type 2 diabetes (UKPDS, 1998). It has been estimated that the annual incidence of foot ulceration is approximately 1–4% (Bartus and Margolis, 2004), while the prevalence ranges from 4% to 10% (Boulton et al., 2005; Assaad et al., 2015).

Diabetes increases the risk of glaucoma through the induction of vascular constriction which, in turn, leads to increased intraocular pressure (Wilson and Martone, 1996; Johnson et al., 2005; Lauren et al., 2011). Diabetes also mediates the damage of glaucomatous optic nerve (Kanamori

et al., 2004). In their study, Lauren et al (2011) reported that the prevalence of glaucoma among patients with DM was 58%.

Study objectives

The main objectives of the present study were to explore the prevalence of diabetic complications among diabetics, and to give recommendations according to guidelines for patients who did not achieve the therapeutic standards.

Methods and subjects
Study design and setting

This is a retrospective study and conducted at Royal Medical Services.

Study sample

Study sample included 392 diabetic patients.

Data collection

Files of patients with diabetics were reviewed to collect data. A working sheet was created for each patient which included: age, gender, duration of diabetes, the level of HbA1C, peripheral neuropathy, blood pressure, diabetic foot ulcer, glaucoma, heart disease, and dyslipidemia. Files were accepted to be reviewed if all information were documented, and rejected if data required were missed.

Statistical analysis

Data analysis was conducted using SPSS version 20. All variables were included and defined. Numerical variables including age, the level of HbA1C and duration of DM were presented as means and standard deviations, while categorical variables including gender, peripheral neuropathy, blood pressure, diabetic foot ulcer, glaucoma, heart disease, dyslipidemia, and the use of metformin were presented as frequencies and percentages. One Way Anova test was used to analyze data for factors influencing data diabetic complications. Significance was considered at alpha ≤ 0.05

Results
General characteristics of participants

As it can be illustrated from table 1, the study included 392 diabetic patients. The mean age of participants is 56.18 years. The mean time of diabetes duration was about 8 years, the mean level of HbA1C was 7.5. About 53% of diabetics were females. Diabetic complications were exhibited

by diabetics such as peripheral neuropathy (about 43%), blood pressure (about 42%), diabetic foot ulcer (about 9%), glaucoma (48%), heart disease (about 25%), and dyslipidemia (about 42%). About 84% of diabetic patients reported the receiving of metformin treatment.

Table 1: General characteristics of participants

Variable	Description
Age (M+ SD)	56.18+ 9.51 years
Duration of DM (M+ SD)	7.98+ 7.40 years
HbA1C (M+ SD)	7.5+ 1.50
Gender (N, %) Male Female	 183 (46.7%) 209 (53.3%)
Peripheral neuropathy (N, %) Yes No	 168 (42.9%) 224 (57.1%)
Blood pressure (N, %) Yes No	 164 (41.8%) 228 (58.2%)
Diabetic foot ulcer (N, %) Yes No	 35 (8.9%) 357 (91.1%)
Glaucoma (N, %) Yes No	 188 (48%) 204 (52%)
Heart disease (N, %) Yes No	 97 (24.7%) 295 (75.3%)
Dyslipidemia (N, %) Yes No	 165 (42.1%) 227 (57.9%)
Metformin (N, %) Yes No	 331 (84.4%) 61 (15.6%)

The relationship between peripheral neuropathy and study variables

As shown in table 2, peripheral neuropathy in diabetic patients was influenced by gender (p=0.018) and the level of HbA1C (p=0.015). The other listed variables were not significant.

Table 2: The relationship between peripheral neuropathy and study variables

Variable	Sum of squares	Df	F	P value
Duration of DM	196.012	1	3.604	0.058
Gender	1.395	1	5.66	0.018

Age	46.164	1	0.510	0.476
HbA1C	14.552	1	5.945	0.015
Metformin	0.014	1	0.103	0.748

The relationship between blood pressure and study variables

Table 3 showed that blood pressure in diabetic patients is under the influence of two variables duration of DM (p=0.000) and age (p=0.000).

Table 3: The relationship between blood pressure and study variables

Variable	Sum of squares	Df	F	P value
Duration of DM	657.867	1	12.366	0.000
Gender	0.747	1	3.007	0.084
Age	1239.622	1	14.176	0.000
HbA1C	4.129	1	1.668	0.197
Metformin	0.024	1	0.184	0.669

The relationship between diabetic foot ulcer and study variables

As shown in table 4, diabetic foot ulcer was significantly associated the level of HBA1C (p=0.013) and metformin (p=0.026).

Table 4: The relationship between diabetic foot ulcer and study variables

Variable	Sum of squares	Df	F	P value
Duration of DM	0.107	1	0.002	0.965
Gender	0.014	1	0.055	0.815
Age	282.180	1	3.139	0.077
HbA1C	15.142	1	6.190	0.013
Metformin	0.651	1	4.99	0.026

The relationship between glaucoma and study variables

As it can be seen from table 5, diabetic patients developed glaucoma, which was affected by duration of DM (p=0.002) and gender (p=0.017).

Table 5: The relationship between glaucoma and study variables

Variable	Sum of squares	Df	F	P value
Duration of DM	502.154	1	9.369	0.002
Gender	1.415	1	5.739	0.017
Age	284.743	1	3.168	0.076
HbA1C	6.111	1	2.475	0.117
Metformin	0.031	1	0.236	0.628

The relationship between heart disease and study variables

As shown in table 6, heart disease among diabetic patients was affected by duration of DM (p=0.003), gender (p=0.041), and the level of HbA1C (p=0.000).

Table 6: The relationship between heart disease and study variables

Variable	Sum of squares	Df	F	P value
Duration of DM	468.910	1	8.735	0.003

Gender	1.041	1	4.206	0.041
Age	2008.732	1	23.502	0.000
HBA1C	0.518	1	0.209	0.648
Metformin	0. 011	1	0.085	0.771

The relationship between dyslipidemia and study variables

As shown in table 7, dyslipidemia was associated significantly with duration of DM (P=0.043).

Table 7: The relationship between dyslipidemia and study variables

Variable	Sum of squares	Df	F	P value
Duration of DM	224.314	1	4.130	0.043
Gender	0.043	1	0.172	0.678
Age	254.840	1	2.833	0.093
HbA1C	3.578	1	1.445	0.230
Metformin	0.001	1	0.008	0.927

Discussion

The present study was conducted in the light of the fact that the prevalence of diabetic complications has become increasing on the global level and in our local settings (Dobson, 1999; Soto, 2001; Mahdavifard et al., 2016). The objectives of the current study were to determine the prevalence of diabetic complications among study participants and to conclude the appropriate recommendations.

The data of the present study showed that the prevalence of peripheral neuropathy was about 43%. Both of gender (p=0.018) and the level of HbA1C (p=0.015) were predictors of the occurrence of peripheral neuropathy. The prevalence in our study is higher than that reported by Salvotelli et al (2015) who reported a prevalence of about 30% of peripheral neuropathy among patients with DM. Our results also agreed with the results obtained by Salvotelli et al (2015) in which they reported that the level of HbA1C was a predictor of peripheral neuropathy.

The findings of the present study showed that the prevalence of hypertension was about 42%, and its predictors were duration of DM (p=0.000) and age (p=0.000). The prevalence of hypertension in our study was less than that reported by Abougalambou and Abougalambou (2013) who reported about 93% prevalence of hypertension among diabetics. The prevalence of hypertension among Taiwanese population was 39% as reported by Tseng (2006).

The prevalence of foot ulcer among diabetics was about 9%. This finding is consistent with other studies in which the prevalence ranges from 4% to 10% (Boulton et al., 2005; Assaad et al., 2015).

The prevalence of glaucoma in our study was 48%. We agree with other studies which reported a high prevalence of glaucoma among diabetics

such as the study of Lauren et al (2011) who reported that the prevalence of glaucoma among patients with DM was 58%.

Conclusion

Diabetic complications are prevalent on global level and in our settings which implies that the therapeutic options of DM are still far from their ultimate goals.

Recommendations

In view of the present findings and those shared on global level, we recommend adopting of more effective monitoring systems for screening diabetics, particularly those who are expected to develop diabetes. We also recommend to activate the roles of clinical pharmacist to raise the awareness level about diabetic complications among the public.

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