INVESTIGATION INTO THE PRESCRIBING PATTERNS AND COST OF ANTIDIABETIC MEDICINE IN SOUTH AFRICA

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ABSTRACT

The general objective of this study was to investigate the prescribing patterns and cost of antidiabetic medicine in the private health care sector in South Africa by using a medicine claims database. A quantitative, retrospective drug utilisation study was performed on data for the year 2004. Oral antidiabetic medicine accounted for 81% (n = 143 447) and 39% (R29 734 360.61) respectively of the total prevalence and cost of all antidiabetic products prescribed. Metformin was the most frequently prescribed oral antidiabetic medicine, with an average cost of R58.42 (SD = 31.78). The three most frequently prescribed classes of insulin (insulin lispro; soluble insulin and isophane; and soluble insulin aspartame and protamine) together accounted for 63% of all the insulin prescribed, and 67% of the total cost of prescribed insulin. Almost 39% (n = 62 717) of the "combination therapy" prescriptions were for a sulfonylurea in combination with a biguanide plus at least one other antidiabetic product. A trend towards combination therapy away from monotherapy was observed. Prescribed Daily Doses (PDDs) calculated for oral antidiabetic medicines were more or less in line with recommended treatment guidelines. Drug utilisation review studies thus provide valuable insight into the treatment of diabetes – indicating areas of possible over- and under usage, providing decision-makers with critical information to curb unnecessary costs.

OPSOMMING

Die algemene doelstelling van hierdie studie was om die voorskryfpatrone en koste van antidiabetiese medisyne in die private gesondheidsorgsektor van Suid-Afrika te ondersoek. 'n Kwantitatiewe, retrospektiewe medisyneverbruikstudie is op data van die jaar 2004 uitgevoer. Orale antidiabetiese medisyne het onderskeidelik 81% (n = 143 447) en 39% (R29 734 360.61) van die totale voorkoms en koste van antidiabetiese medisyne

verteenwoordig. Metformien was die mees algemene voorgekrewe orale antidiabetiese middel, met 'n gemiddelde koste van R58.42 (SA = 31.78). Die mees algemene voorgeskrewe insuliene (insulienlispro, oplosbare insulien en isofaan, en oplosbare insulienaspartaam en protamien), het saam 63% van die voorgeskrewe insuliene se voorkoms en 76% van die totale voorgeskrewe insuliene se koste verteenwoordig. Ongeveer 39% (n = 62 717) van die voorskrifte vir "gekombineerde terapie" was vir 'n sulfonielureum in kombinasie met 'n biguanied, met ten minste nog een ander antidiabetiese produk. 'n Neiging na gekombineerde terapie weg van enkelterapie is waargeneem. Voorgeskrewe Daaglikse Dosisse (VDD) wat bereken is vir orale antidiabetiese medisyne was ongeveer in lyn met aanbevole behandelingsriglyne. Medisyneverbruiksevalueringstudies verskaf dus waardevolle insig in verband met die behandeling van diabetes, insluitende indikasies vir moontlike oor- en onderverbruik, wat aan besluitnemers kritiese inligting verskaf om onnodige kostes te voorkom.

INTRODUCTION

Without correct insulin production and action, sugar remains in the blood, leading to chronic hyperglycaemia (raised blood glucose levels), which can result in short- and long-term complications, many of which, if not prevented and left untreated, can be fatal. All of these complications have the potential to reduce the quality of life of people with diabetes and their families. The most common long-term complications includes cardiovascular disease, diabetic neuropathy, -nephropathy and -retinopathy (International Diabetes Federation, 2003).

An estimated 194 million people (or 5.1% of the adult population) worldwide have diabetes - a number that is likely to increase because of the growing, aging population and increase in prevalence of risk factors such as obesity and physical inactivity (International Diabetes Federation, 2006; Wild, Roglic, Green, Sicree & King, 2004:1047). According to the International Diabetes Federation (2006) this figure is expected to rise to 333 million by the year 2025, amounting to 6.3% of the adult population.

The African continent acounts for approximately 14 million people with diabetes, with Sub-Saharan Africa in the region of 7 million people (with about 2.5 million of them in the Southern African region) (International Diabetes Federation, 2003). Estimates for the continent for 2025 are expected to double and reach 27 million (International Diabetes Federation, 2006). Adoption of Western lifestyles has been established as a consistent theme for the rise in diabetes and non-communicable diseases in sub-Saharan Africa. African populations are also believed to have undergone some genetic changes that make them more prone to developing diabetes. The common elements of "Westernisation" include a diet higher in total calories and fat but lower in fibre and less need to expend energy because of labour-saving devices (Kenge, Amoah & Mbanya, 2005:3596).

Diabetes mellitus is also associated with a significant economic burden on health care systems around the world, and can account for 5% to 10% of a nation's health care budget (Manuel, 1997:7). The annual direct health care costs of diabetes worldwide, for people in the 20-79 age brackets, are estimated to be at least 153 billion international dollars (and may be as much as 286 billion). If current predictions of diabetes prevalence are fulfilled, total direct health care expenditure worldwide on diabetes will be between 213-396 billion international dollars in 2025. This would mean that the proportion of the world's health care budget being spent, in 2025, on diabetes care will be between 7% and 13%; with countries with high diabetes prevalence rates spending up to 40% of their budget on diabetes care (International Diabetes Federation, 2005).

According to the Mediscor Medicines Review 2004, diabetes mellitus type II was one of the top five most prevalent Chronic Disease List (CDL) conditions and accounted for 11.2% and 9.9% of the percentage of total CDL final scheme cost and total CDL items, respectively. Diabetes mellitus type I was ranked seventh and accounted for 4.9% and 1.6% of the total CDL final scheme cost and total CDL items respectively (Bester, & Hammann, 2005).

According to the South African Department of Health (1996) and Manuel (1997:7), health care expenditure has been one of the fastest growing sectors of the South African economy, with medicines being one of the biggest cost drivers in the private sector. The economic

aspects of diabetes and diabetes care thus continue to be a reason for concern as the diabetes epidemic progresses worldwide. The health care sectors of countries remain under considerable strain to meet the demands within the limits of constrained resources.

Decision-makers need to be fully informed with clear and up-to-date evidence about the burden and impact of diabetes mellitus and its complications (Kenge, Amoah & Mbanya, 2005:3599). Drug utilisation studies (DUR) investigate the prescribing and utilisation of medicines that can give valuable insight into the prescribing trends of drugs. The results of DUR studies on antidiabetic agents will enable researchers and health care policy makers to determine the economic impact of changes in antidiabetic drug prescribing, with the ultimate goal to ensure safe, effective and efficient use of scarce resources (Truter, 1998:118). The prescribed daily dosage (PDD), as technical unit of comparison in evaluating medicine usage in DUR studies, is the average daily dose of the medicine as prescribed (Lee & Bergman, 1994:387). This can be obtained from a representative sample of prescriptions. The PDD measures the actual amount of medicines that is prescribed; and therefore provides valuable insight into medicine prescribing trends while also enabling researchers and health care policy-makers to use scarce resources more efficiently (Truter, 1998:417).

AIM OF THE STUDY

The aim of this study was to investigate the prescribing patterns and cost of antidiabetic medicine prescribed in South Africa for the year 2004, using data from a national medicine claims database.

SUBJECTS AND METHODS

A retrospective drug utilisation review was conducted on prescription data for patients receiving antidiabetic medicine claimed through a medicine claims database in South Africa over a one-year period ending 31 December 2004.

The company that provided the database for the study is an organisation that manages the benefits of medical schemes and -insurance companies in South Africa by providing a real-time auditing process to claims from pharmacies and service providers. In 2004, this company performed claim switching for 50 per cent of South Africa's medical providers (Anon, 2004). The database consisted of a total number of 2 595 254 prescriptions, containing a total number of 5 305 882 medicine items with a total cost of R2 661 223 146.00 ($566 857 230.05) (SA Financial sector forum, 2006). Each prescription record contained a unique number to identify each patient, medical practice, pharmacy or medical scheme. These numbers were randomly allocated by the medical scheme administrator. These allocated numbers ("dummy numbers") could not be linked by the researcher to the original data set, thus confidentiality of information was maintained throughout the study. The database consists of the following information: (1) a specific code for the medical scheme (the specific medical scheme could not be identified); (2) medical scheme member number; (3) dependant number; (4) prescription number; (5) date of dispensing the prescription; (6) a specific code for the medical practitioner (a specific medical practitioner could not be identified); (7) a specific code for the pharmacy (a specific pharmacy could not be identified); (8) trade name of the medicine item; (9) Nappi codes of the medicine item; (10) quantity of the medicine item prescribed; and (11) the amount paid by the medical scheme.

The "Monthly Index of Medical Specialities" (MIMS) classification system (Snyman, 2004:311) was used to classify medicines according to pharmacological action (that is insulin or oral antidiabetic medicines) and to verify dosage instructions. Since South African medicines claims databases were used the "South African Medicines Formulary" (SAMF) (Gibbon, 2003:70) was used to identify the different classes of oral antidiabetic medicines and to classify the insulins.

Data were analysed using the Statistical Analysis System® SAS 9.1® (SAS for Windows, 9.1, 2005). Effect sizes (d-values) (Steyn, 1999:3) were used as a descriptive statistic to determine whether there were practical significant differences between averages. D-values of 0.8 or higher were assumed to be of practical significance. The d-value was calculated as follows:

$$d = \frac{X_a - X_b}{S_1}$$

Where "X_a" equals the average medicine treatment cost of medicine a, "X_b" equals the average medicine treatment cost of medicine b, and "S_1" equals the maxi-

mum standard deviation between medicines "a" and "b". The PDD-value was used to determine the consumption and utilisation of oral antidiabetic medicines on the database by measuring the average number of tablets as well as the average dosage that a patient received per day (Prescribing Support Unit, 2003). The PDD was calculated as follows:

$$\text{PDD} = \frac{\text{Average number of tablets per prescription}}{\text{Number of days*}}$$

* For the purpose of this study, a month consisted of 30 days.

A cost-prevalence index (CPI) (developed by Serfontein, 1989:180) was used as indicator of the expensiveness of medicine. CPI values of 1 or higher for a drug indicates that the drug is relatively expensive (values below 1 indicate 'relative inexpensiveness').

The data were obtained directly from the central database of the medicine claims database; therefore no direct manipulation of the data by the researchers was possible. It was assumed that all data were recorded correctly. The practical justification of using this database included the fact that the medicines claims database employed in this study was electronically available and accessible.

Certain limitations which could limit the scope of the study were identified, namely the lack of detailed clinical data (that is diagnosis or medical history), and demographic information (that is age, gender and race) on the database. The relevance of some utilisation patterns could therefore not be determined. External validity was also limited, implying that the results of the study can only be generalised to the specific database and study population used.

Permission to conduct the study was granted by the medical scheme administrator and the North-West University Research Committee.

RESULTS

Prescribing patterns and cost of antidiabetic medicine in general

Prescriptions for antidiabetic medicine represented 4.1% of all prescriptions on the database (n = 2 595 254). These prescriptions contained a total number of 143 447 (2.7%) of all medicine (n = 5 305 882) items - and 4.5% of the total cost of all medicine items on the database [n = R661 223 146.00 ($102 375 382.77)].

The average cost of antidiabetic medicine on the database for the one-year study period decreased with approximately 30% from the beginning of the study period to the end thereof (that is R245.42 ($38.00) (SD = 313.35) during January to April 2004, compare to R172.79 ($26.75) (SD = 235.33) during the September to December 2004). The d-values calculated for the difference in average cost (that is 0.23) were of no practical significance.

The prevalence and costs of insulin and oral antidiabetic medicines prescribed on the database are given in Tables 1 and 2 respectively (presented as mono- and combination therapy).

Prescribing patterns and cost of insulin

Insulin accounted for 18.9% (n = 143 447) of the total number of antidiabetic medicine prescribed on the database, with an associated cost of R18 129 348.92 ($2 806 917.83) (61% of the total cost of antidiabetic medicine) (calculated from Table 1). The average cost of insulin on the database was R668.26 ($103.46) (SD = 336.40).

A relatively large variety of insulin products was available on the database. "Soluble insulin and isophane" represented 29.84% (n = 27 129) of all insulin prescribed on the database, with an associated cost of R5 422 819.06 ($839 600.34) [n = R18 129 348.92 ($2 806 917.83)].

The three most frequently prescribed classes of insulin (insulin lispro; soluble insulin and isophane; and soluble insulin aspartame and protamine) together accounted for 63% of all the insulin prescribed during the study period, with an accumulated cost of R12 103 217.45 ($1 873 908.27) (67% of the total cost of insulin on the database) (illustrated in Table 1).

Prescribing patterns and cost of oral antidiabetic medicine

Oral antidiabetic medicine accounted for approximately

Table 1: Prevalence and cost of insulin prescribed as monotherapy and combination therapy on the database

Active Ingredient	Monotherapy		Combination Therapy	
	Prevalence	Cost (R)	Prevalence	Cost (R)
Insulin lispro	3 673	2 819 629.04	2 737	2 101 095.75
Insulin aspartame	696	457 569.50	555	364 872.23
Biosynthetic human insulin	32	14 950.63	117	54 663.22
Biosynthetic human soluble insulin	972	608 002.38	824	515 425.89
Soluble insulin and isophane	6 471	4 335 441.33	1 623	1 087 377.73
Biosynthetic human isophane	727	422 293.16	1 088	631 987.56
Biphasic biosynthetic human insulin 20/80	12	9 040.50	13	9 793.87
Soluble insulin aspartame and protamine	1 933	1 242 977.07	650	417 969.53
Zinc biosynthetic human insulin	209	71 497.88	365	124 864.73
Biosynthetic human insulin zinc suspension	141	57 888.54	182	74 721.38
Biosynthetic monocomponent isophane	627	359 806.68	1 154	662 227.93
Biosynthetic human insulin zinc suspension monocomponent crystals	22	7 307.99	44	14 615.99
Insulin glargine	800	588 268.23	1 462	1 075 060.20
Total	**16 315**	**10 994 672.93**	**10 814**	**7 134 676.01**

Table 2: Prevalence and cost of oral antidiabetic medicines prescribed as monotherapy and combination therapy on the database

Group	Active Ingredient	Monotherapy		Combination Therapy	
		Prevalence	Cost (R)	Prevalence	Cost (R)
Alpha-Glucosidase Inhibitor	Acarbose	328	78 008.24	449	106 785.67
Sulfonylureas	Chlorpropamide	31	3 760.92	25	3 033.00
	Glibenclamide	5 439	659 859.48	8 626	1 046 506.32
	Gliclazide	10 604	1 286 477.28	13 962	1 693 869.84
	Glimeparide	6 444	781 786.08	5 677	688 733.64
	Glipizide	243	29 480.76	268	32 513.76
Biguanide	Metformin	26 720	1 560 982.40	30 852	1 802 373.84
Combination product	Metformin/Glibenclamide	1 643	226 816.15	266	36 721.30
Meglitinides	Nateglinide	43	9 034.73	35	7 353.85
	Repaglinide	430	90 347.30	588	123 544.68
Thiazolidinediones	Pioglitazone	851	312 155.31	964	353 604.84
	Rosiglitazone	825	302 618.25	1 005	368 644.05
Total		**53 601**	**5 341 326.90**	**62 717**	**6 263 684.79**

81% (n = 143 447) of all antidiabetic medicine prescribed on the database, with the costs amounting to R11 605 011.69 ($1 796 772.42) (39% of the costs of all antidiabetic medicine prescribed during the study period) (calculated from Table 2).

The average cost of oral antidiabetic medicine on the database was R99.77 ($15.45) (SD = 99.04) for a treatment period of 30 days. Almost half (49.5%) of the oral antidiabetic medicines prescribed during the study period were biguanides, followed by sulfonylureas (44.1%), thiazolidinediones (3%), meglitinides (0.9%) and alpha-glucosidase inhibitors (0.7%). Oral "combination" antidiabetic medicines (that is a combination of metformin and glibenclamide) represented 1.6% of all oral antidiabetic medicine prescribed (n = 116 318) (illustrated in Table 2). Metformin, as the only biguanide currently available on the South African market, represented 28.9% of the total cost of oral antidiabetic medicines on the database [n = R11 605 011.69 ($1 796 772.42)]. The average cost of biguanides/metformin on the database was R58.42 ($9.06) (SD = 31.78) per item for the study period. Within the sulfonylurea group, the product with the highest prevalence was gliclazide (12.3%), which had an associated cost of R2 178 649.94 ($337 314.45) (~18.8% of the total cost of oral antidiabetic medicine on the database). The sulfonylureas had an average cost of R121.32 ($18.78) (SD = 103.30) per item for the study period.

Thiazolidinediones had the highest average cost per item for the study period [R366.81 ($56.79), SD = 149.07] of all oral antidiabetic medicine on the database.

PDD-values for oral antidiabetic medicine

The average number of oral antidiabetic medicine tablets per prescription was used to calculate the average number of tablets and the average dose of a product that a patient received daily (the PDD) (illustrated in Table 3). The average number of oral antidiabetic medicine tablets prescribed daily varied between 1 and 3. This is in correlation with the dosage instructions for each medicine product in the oral group of antidiabetic medicines, as indicated by the MIMS (Snyman, 2004:311).

The PDDs for some of the oral antidiabetic medicines were below the recommended minimum daily dosages, that is acarbose 50mg (141.1 mg/day compared to the recommended 150 mg/day) and metformin 500 mg (1 199.5 mg/day compared to the recommended 1 500 mg/day). Compared to the Martindale: The Complete Drug Reference, these PDDs were on par as the dose of acarbose may be increased to a usual dose of 25 or 50 mg three times daily, and the dose of metformin 500 mg may be increased to up to 2 to 3 g daily (Sweetman, 2007).

The PDDs for chlorpropamide 250 mg (that is 503.2 mg/day) and glimeparide 4 mg (that is 4.3 mg/day) were slightly higher than the maximum recommended daily dosages for these medicines, which are respectively 500 mg/day and 4 mg/day. According to the Martindale: The Complete Drug Reference, the dose of chlorpropamide is unlikely to be increased above 500 mg three times daily, whilst glimeparde supposedly should have a maintenance dose of 4 mg daily (Sweetman, 2007).

According to the MIMS, the combination product "metformin/glibenclamide 250/1.25 mg" is indicated for the initial treatment of type 2 diabetes, where adequate glycaemic control is not achieved by diet and exercise alone. The recommended daily dosage for this formulation is one tablet daily, indicating a maximum dose of 250 mg of metformin and 1.25 mg of glibenclamide. The average number of tablets per day for this formulation was 1.47 ~ amounting to a higher PDD (that is 367.5/1.84 mg/day) than the recommended dosage. The relevance of this prescribing/utilisation pattern could not be determined as individual clinical data (that is blood glucose levels) and the prescriber's indication for treatment was also not available on the database. A higher than expected dosage should, however, not be ruled out. Further research should be conducted to determine the presence and extent (if any) of unnecessary costs that might be associated with a "higher than expected dosage".

Prevalence, cost and usage patterns of monotherapy compared with combination therapy

Table 1 shows that almost 60% of the prescriptions prescribed for insulin on the database (n = 27 129) contained only one insulin product (prescribed as

Table 3: Prescribed daily dosages (PDDs) for oral antidiabetic medicines on the database

Therapeutic Group	Active Ingredient	Formulation Strength *	Average Number Of Tablets Per Prescription †	Average Number Of Tablets Per Day ‡	Average Strength Per Day / PDD (in mg) §
Alpha-glucosidase inhibitor	Acarbose	100mg	85.10 ± 19.45	2.84	283.7
	Acarbose	50mg	84.63 ± 29.49	2.82	141.1
Sulfonylureas	Chlorpropamide	250mg	60.38 ± 34.79	2.01	503.2
	Glibenclamide	5mg	66.94 ± 33.89	2.23	11.2
	Gliclazide	80mg	72.10 ± 32.84	2.40	192.3
	Gliclazide	30mg MR	52.21 ± 24.60	1.74	52.2
	Glimeparide	1mg	31.78 ± 11.77	1.1	1.1
	Glimeparide	2mg	31.80 ± 8.47	1.06	2.1
	Glimeparide	4mg	32.01 ± 8.84	1.07	4.3
	Glipizide	5mg	73.12 ± 46.44	2.44	12.2
Biguanide	Metformin	500mg	71.97 ± 32.49	2.40	1199.5
Therapeutic Group	**Active Ingredient**	**Formulation Strength ***	**Average Number Of Tablets Per Prescription †**	**Average Number Of Tablets Per Day ‡**	**Average Strength Per Day / PDD (in mg) §**
	Metformin	850mg	65.17 ± 20.26	2.17	1846.5
Combination products	Metformin/ Glibenclamide	250/1.25mg	43.99 ± 15.48	1.47	367.5/1.84
	Metformin/ Glibenclamide	500/2.5mg	56.45 ± 21.89	1.88	940/4.7
	Metformin/ Glibenclamide	500/5mg	79.13 ± 33.61	2.64	1320/13.2
Meglitinides	Nateglinide	120mg	77.79 ± 16.69	2.59	311.2
	Nateglinide	60mg	63.00 ± 29.70	2.1	126
	Repaglinide	0.5mg	83.65 ± 24.63	2.79	1.4
	Repaglinide	1.0mg	89.54 ± 58.67	2.98	3
	Repaglinide	2.0mg	93.64 ± 31.58	3.12	6.2
Thiazolidinediones	Pioglitazone	15mg	29.28 ± 5.90	0.98	14.6
	Pioglitazone	30mg	29.23 ± 5.52	0.97	29.2
	Rosiglitazone	2mg	33.06 ±	1.10	2.2
Therapeutic Group	**Active Ingredient**	**Formulation Strength ***	**Average Number Of Tablets Per Prescription †**	**Average Number Of Tablets Per Day ‡**	**Average Strength Per Day / PDD (in mg) §**
			12.95		
	Rosiglitazone	4mg	33.06 ± 12.57	1.12	4.5

* Formulation strength of the active ingredient in the product.

‡ The average number of tablets per day was calculated by dividing the average number of tablets per prescription (†) by 30.

§ The average strength per day (in mg) or the PDD was calculated by multiplying the average number of tablets per day (‡) with the formulation strength (*) of the product.

monotherapy). The usage of insulin as monotherapy treatment thus represented 11.27% of all the antidiabetic prescriptions on the database (n = 143 447).

"Soluble insulin and isophane" had the highest prevalence (79.95%, n = 8 094), in respect to other insulin used for monotherapy; followed by "soluble insulin aspartame and protamine" with 74.84% (n = 2 583), and insulin lispro with 57.3% (n = 6 410).

A total of 46.08% of the prescriptions prescribed for oral antidiabetic medicines (n = 116 318) [~37.37% of all prescriptions on the database (n = 143 447)] was for one oral antidiabetic medicine only (monotherapy without any other oral antidiabetic medicine). The metformin/ glibenclamide combination product had the highest prevalence (86.1%; n = 1 909) as monotherapy, compared to other oral antidiabetic medicine used for monotherapy; followed by chlorpropamide with 55.38% (n = 56) and nateglinide with 55.13% (n = 78). Almost 51.3% of all prescriptions on the database (n = 143 447) were for combination therapy with antidiabetic medicines (calculated from Tables 1 and 2); whether a combination of oral antidiabetic medicines, an oral antidiabetic medicine and an insulin, or a combination of one or more insulin.

Further analysis showed that almost 39% (n = 62 717) of the "combination therapy" prescriptions were for a sulfonylurea in combination with a biguanide plus one or more other antidiabetic medicine (including insulin, meglitinides, thiazolidinediones, alpha-glucosidase inhibitors, sulfonylureas and biguanides). Nearly 7.3% of all the combination therapy prescriptions (n = 62 717) were for an oral antidiabetic medicine in combination with an insulin, of which approximately 73% (n = 4 600) accounted for the combination of insulin and a biguanide. Of all the prescriptions 4.5% were for a combination of insulin.

DISCUSSION

The results of the study showed that the prescribing prevalence and cost of antidiabetic medicine contributed to the economic burden placed on the private health care system of South Africa as these medicines have shown to be relatively expensive on the database (cost to prevalence ratio – 1:0.6). The average cost of antidiabetic medicine products, however, decreased from the beginning of the study period till the end thereof. This could possibly be attributed to the implementation of new pricing regulations in South Africa in 2004; and to the utilisation of cheaper generic equivalents (Department of Health, 2004). Similar results to a study performed by Truter (1998:137) on a South African medical aid scheme data in 1998 were obtained in this study; with the majority of patients in the study population (that is 81%) receiving oral antidiabetic medicine; indicating that the majority of patients in the study population may present with type 2 diabetes. According to the Truter (1998:137) study, insulin accounted for 32.1% of all the antidiabetic medication prescribed. Whilst the usage of insulin reported in this study was considerably lower than that reported by Truter (18.9%), it is only slightly higher than the 10-15% reported in the literature by Beers and Berkow, (2004). Truter (1998:137) determined the sub-therapeutic group of sulfonylureas to have the highest prevalence (63.1%), compared to this study that identified biguanides as having the highest prevalence (49.5%) followed by the sulfonylureas with 44.1%. Both studies indicated gliclazide to be the sulfonylurea with the highest prevalence [38.2% - Truter (1998:140) compared to 12.3%]. Similar results to Chaing, Chiu, Chen, Wu and Yang (2006:75), Truter (1998:120) and Cohen, Neslusan, Conklin and Song (2003:1850) were observed with a trend towards combination therapy away from monotherapy. The prescribing prevalence of the oral combination product (that is the combination of metformin and glibenclamide in different formulations) was also considerably higher compared to other oral antidiabetic medicine used within the scope of monotherapy (that is 86.06%).

Antihyperglycemic medication adherence plays a major role in lowering the cost associated with diabetes complications, as well as increased quality of life and overall reduction in burden to the healthcare system (White, Vanderplas, Chang, Dezii, & Abrams, 2004:185). Drug utilisation review studies, especially the employment of the PDD technique in the measurement of medicine consumption, can provide valuable insight into the treatment of diabetes – indicating areas of possible over- and under-usage, providing decision-makers with critical information to curb unnecessary costs.

As lifestyle factors (including lack of exercise, obesity,

for example) play an important role in the pathophysiology of type 2 diabetes mellitus; joint efforts of different health care providers are needed, not only to determine treatment goals but also to prevent over expenditure on medication costs.

Diabetes is also characterised by a considerable morbidity rate and decreased life expectancy – mainly due to its complications. These include inter alia heart disease, stroke, amputation, blindness and kidney failure (International Diabetes Federation, 2006). Medication used for the treatment of these conditions/complications may influence the total treatment cost of the disease.

The scope of this study was limited to the prevalence and cost of antidiabetic medicine only. Further research into the prescribing patterns of other categories of medicines concomitantly prescribed with antidiabetic medicines should be conducted to assess the extent and costs incurred.

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