

Poor control and management of type 2 diabetes mellitus at an under-resourced South African Hospital: is it a case of clinical inertia?

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Evidence shows that even with the implementation of evidence-based medicine, the attainment of optimal glycaemic control is difficult and challenging for both patients and healthcare providers. This study was a one-year retrospective chart review with data collected during the period October 2010 to December 2010 of patients with Type 2 diabetes mellitus (T2DM) who attended the outpatients' department at the Port Shepstone Regional Hospital (PSRH), South Africa (SA). The total study population was 360 patients with 51% Black African, 32% Indian, 16% White and 1% Coloured. Of the 111 patients' charts only 78 had two consecutive HbA1c levels recorded. Of the 78/111 patients, only 10 patients had the target HbA1c level of < 7% at visit 1. By visit two, 15.4% ($n = 12$) had achieved the target HbA1c level. Over the one-year chart review only 3/111 (2.7%) maintained their HbA1c level of < 7% and 5/111 patients whose treatment was revised according to the 2009 SEMDSA guidelines reached HbA1c < 7% by visit 2 whilst 4/111 patients, whose treatment schedule was not modified according to the 2009 SEMDSA guidelines, also reached HbA1c < 7% at visit 2. However, this one-year chart review showed that glycaemia was poorly managed at this hospital, which may be explained by clinical inertia.

Keywords: Type 2 diabetes mellitus control and management, clinical inertia, glycated haemoglobin

Introduction

Diabetes mellitus (DM) is a chronic metabolic disease that is characterised by hyperglycaemia and is becoming one of the main medical challenges worldwide, with more diabetes-related deaths occurring in low- and middle-income countries than in the high-income ones.^{1,2} It has been estimated that from 1980 to 2008 the number of people with DM increased from 153 million to 347 million and the age standardised prevalence was slightly higher in men (9.8%) than women (9.2%).³ The WHO estimated that globally, in 2014, 422 million adults over the age of 18 were living with diabetes.² A recent study has estimated that by 2030 there will be 439 million people living with DM.⁴ In sub-Saharan Africa, it is estimated that the prevalence of DM will be about 18 million by 2030.⁵ However, this estimation excludes the impact of urbanisation, ageing and obesity; and with the United Nations (UN) projecting that, by 2025, 54.1% Africans would be living in urban areas,⁵ the actual prevalence may be higher than that estimated. The impact of age on type 2 DM (T2DM) differs among countries; in high-income countries (as classified by the World Bank) most people with diabetes are aged over 60 years, while for low- and middle-income countries, like South Africa, most people with diabetes are of working age, between 40 and 60 years.⁴ A recent study showed the prevalence of T2DM amongst South Africans above 30 years of age to be at around 9%, with 7.4% in men and 10.4% in women.⁶

Blood glucose monitoring is important in optimising long-term outcomes towards reducing the co-morbid conditions that may arise in patients with T2DM. There is strong epidemiological evidence to use glycated haemoglobin (HbA1c) < 7% as the target level and patients with T2DM with an HbA1c level of > 7.5% have a 2.5 to 5-fold greater relative risk of developing

microvascular complications.⁷ The South African^{7,8} as well as other international guidelines^{9,10} for managing T2DM use HbA1c as a primary glycaemia control monitoring tool and to quantify the degree of risks in the development of complications due to DM.¹¹ The target level of below 7% has been recommended by the American Diabetes Association (ADA) of 2012¹⁰ and has been advocated by the SEMDSA guidelines.⁸

Clinical inertia is the failure to set glycaemic targets and to implement and escalate treatment to achieve these set target goals.¹² Clinical inertia is a global phenomenon and the causes are related to patient and physician factors and factors related to the system in which the physicians work.¹² Evidence from both developed and developing countries shows that, even with the implementation of evidence-based medicine, the attainment of optimal glycaemia control is difficult and challenging not only for patients but also for their healthcare providers.^{7,13–17} Coupled with these multifactorial reasons for poor glycaemia control and clinical inertia,¹² South Africa has the added burden of being an under-resourced country, leading to an increase in long-term diabetic complications. Further, the outpatients' department of Port Shepstone Regional Hospital (PSRH), where the study was conducted, had 3 908 visits by patients with DM in 2010.¹⁸ Over a 5-month period in 2011, 312 (21%) of 1 519 patients were admitted to this hospital with complications of DM.¹⁸ This presents an added challenge for SA where diabetes care must compete for resources with communicable diseases such as HIV/AIDS and TB.

This study therefore evaluated the monitoring and management of T2DM in an under-resourced hospital in a peri-urban/rural setting in South Africa. To the best of our knowledge, no studies

of this nature have been recently undertaken in any of our public hospitals in the province of KwaZulu-Natal (KZN). Hence it will be important to know whether patients with T2DM are adequately managed at PSRH in particular and by extension in KZN, which uses the SEMDSA guidelines.⁸

Materials and methods

Ethical considerations

Ethical approval for this study was obtained from the Biomedical Research Ethics Committee (BE 122/010) of the University of KwaZulu-Natal and permission to conduct the study at the PSRH was received from the health institution.

Study design

This study was a one-year retrospective chart review with data collected during the period October 2010 to December 2010 of patients with T2DM who attended the outpatients' department (OPD) at PSRH, South Africa.

Clinical setting

According to the South African Department of Health, PSRH receives referral of patients from 21 clinics in the Ugu district of KZN. The referrals are based on the needs of the patient that are beyond the scope of practice at the local clinics, namely patients who need a higher level of clinical care. Therefore, patients attending the OPD of PSRH were either referred from the clinics or were patients with diabetes discharged following admission to PSRH.

The following data were extracted from patient charts and captured on the data collection sheet:

- (1) demographic and disease profile (age, gender, race, height, weight, BMI, age at diagnosis and duration of treatment for T2DM);
- (2) two consecutive HbA1c levels at two visits irrespective of the date of the consecutive visits (visits 1 and 2);
- (3) the number of patients who achieved the target HbA1c level of 7%, and number that had defaulted for follow-up;
- (4) patients' treatment outcomes based on HbA1c value;
- (5) blood pressure and hyperlipidaemia management.

Statistical analysis

The results are stated as means \pm standard deviation (SD). The data were processed and analysed for statistical significance using SPSS version 19.0[®] (SPSS Inc., Chicago, IL, USA). Means and SD were used to summarise continuous variables while frequency tables were used for categorical variables. Differences in means by group were assessed using Student's *t*-test (for two-group comparison) or one-way analysis of variance (ANOVA) (for three or more group comparison). Pearson's chi-square test was used to assess association between two categorical variables (contingency tables). A *p*-value of < 0.05 was deemed statistically significant.

Results

Demographic and disease profile

From October to December 2010, 360 T2DM patient charts were seen and hence the patient record files of all these patients were retrieved. These patient files (hereinafter referred to as patients only) were of 51% black South Africans, 32% Indians, 16% Whites

Table 1: Distribution of sample by ethnicity, gender, HbA1c and RBG levels

Ethnic group	Total (%)	Females, <i>n</i> (%)	Males, <i>n</i> (%)
Black African	185 (51)	136 (57)	49 (41)
Indian	114 (32)	73 (30)	41 (34)
White	57 (16)	28 (12)	29 (24)
Coloured	4 (1)	3 (1)	1 (1)
Total sample	360 (100)	240 (100)	120 (100)
Monitoring by HbA1c levels			
Black African	47 (40.5%)	33 (44.6%)	14 (33.3%)
Indian	52 (44.8%)	33 (44.6%)	19 (45.2%)
White	16 (13.8%)	7 (9.4%)	9 (21.5%)
Coloured	1 (0.9%)	1 (1.4%)	0 (0%)
Total	116 (100%)	74 (63.8%)	42 (36.2%)
Monitoring by RBG levels			
Female:male (total sample)		2:1	

and 1% Coloureds (Table 1). The ratio of female to male T2DMs for the total study sample was 2 to 1 (Table 1). Blood glucose levels were monitored using either HbA1c ($n = 111$) or random blood glucose (RBG) ($n = 244$) methods; 5 charts did not have any data recorded.

The one-year chart review showed that in 111 patients only 78 files recorded 2 consecutive HbA1c levels and 33 had only 1 HbA1c level recorded (Figure 1 and Table 3). For this paper, the data for charts with 1 HbA1c level and charts with only RBG as a monitoring tool have been excluded. Of the patients with HbA1c, 44.8% were Indians, 40.5% Black South Africans and 13% White and 0.9% Coloureds (Table 1). Table 2 shows the age, age at diagnosis, and duration of treatment for female and male patients. Female patients had a significantly higher BMI ($p < 0.001$) compared with males and were obese whilst the males were overweight.

Table 3 shows the mean HbA1c levels for the 78 patients at visits 1 and 2. In those males and females who had HbA1c $< 7\%$, there was no significant difference between visits 1 & 2. However, in patients with HbA1c $\geq 7\%$, the total level (males and females combined) at visit 2 was significantly less than that at visit 1 ($p < 0.05$).

Figure 1, a flow diagram, depicts patients who were monitored using HbA1c for two serial visits (visits 1 and 2) during the one-year review period. This review showed that only 78/111 patient files showed 2 consecutive HbA1c levels being recorded whilst in 33 only one HbA1c and in 5 no levels were recorded (see Figure 1). In only 10/116 (8.6%) was the target HbA1c level $< 7\%$ attained at visit 1. In the majority of these patients (8/10) their prescriptions were not revised prior to visit 2 and among the 10 patients only 3 patients maintained the target level by visit 2 with a mean HbA1c of $6.1 \pm 0.2\%$. The 68 patients with HbA1c $\geq 7\%$ had their prescriptions either revised or not revised following the established guidelines. In 40 patients, revisions were done according to the 2009 SEMDSA guidelines whilst in 28 the guidelines were not followed; i.e. either no revisions were made in 25 or there was a downscaling of prescription in 3 (see Figure 2). Nine of the 68 patients reached the target HbA1c level of 6.1 ± 0.5 at visit 2 (see Figure 1). Surprisingly, 3 of the 28 patients in whom the SEMDSA guidelines were not followed

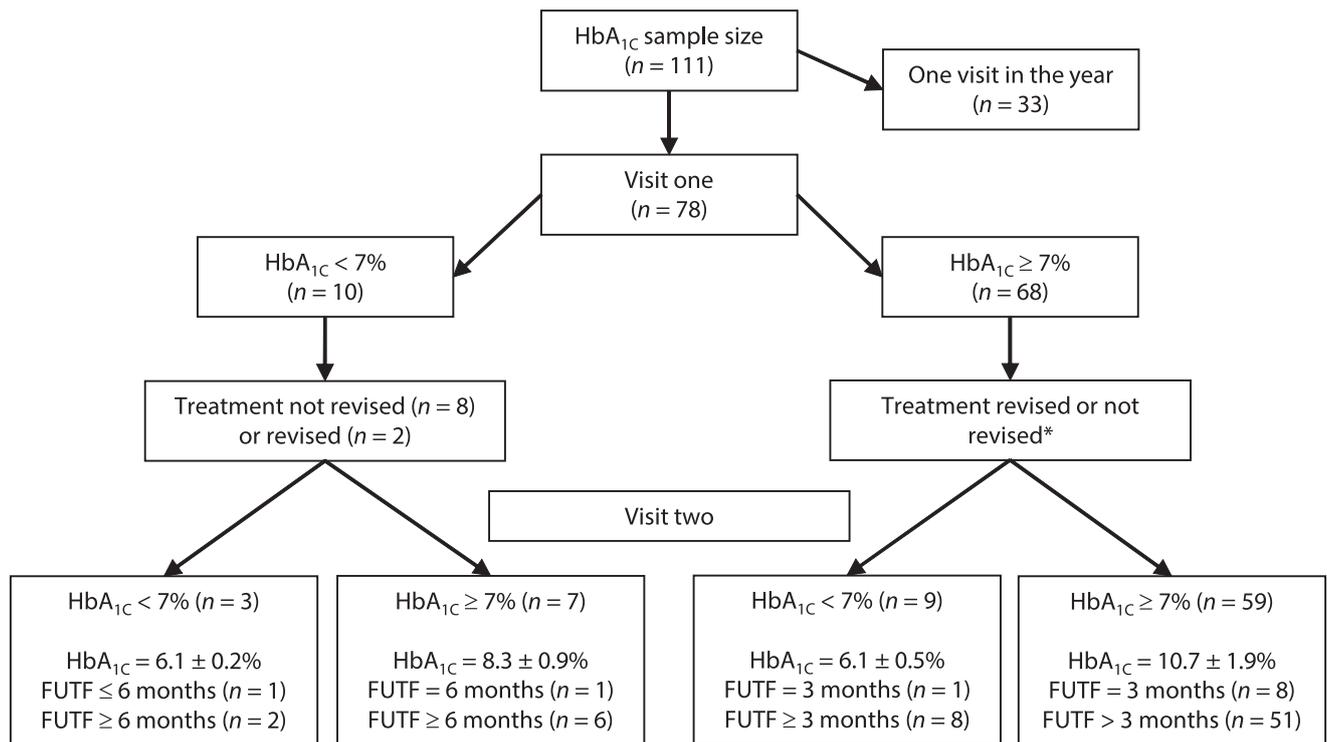


Figure 1: Flow diagram of patients treated and monitored using HbA1c levels at visits 1 and 2.

*According to SEMDSA 2009 guidelines.

Table 2: Age, age at diagnosis, duration of treatment year and body mass index (BMI) of the 116 patients monitored by glycated haemoglobin (HbA1c) levels (all data are mean ± SD)

Variables	Females (n = 74)	Males (n = 42)	p-value
Age (years)	60 (±10)	59 (±11)	0.76
Age (years) at diagnosis	50 (±11)	50 (±10)	0.84
Duration of treatment in years	9 (±7)	9 (±6)	0.88
BMI (kg/m ²)	34 (±7)	28 (±4)	< 0.001

also reached target HbA1c value (see Figure 2). The other 59 patients with HbA1c ≥ 7% had a mean HbA1c level of 10.7 ± 1.9%. Irrespective of HbA1c values, 67 patients had a follow-up time frame (FUTF) longer than that stipulated by the 2009 SEMDSA guidelines (see Figure 1). Of those who had HbA1c levels < 7% at visit 1, 8 patients had an FUTF of > 6 months at visit 2, whilst among 59/68 who had HbA1c ≥ 7% at visit 1, 51 had an FUTF of > 3 months at visit 2. In summary, over the one-year chart review only 3/111 (2.7%) patients maintained their HbA1c level of < 7%.

Treatment outcomes in relation to SEMDSA guidelines recommendations

Table 3 shows the drop in HbA1c levels between visits 1 and 2 in patients with HbA1c level above the target range. The patients who maintained HbA1c within target range (HbA1c < 7%) were on regimens such as monotherapy with metformin, or metformin plus insulin. The treatment schedule documented shows that 71.6% of patients insulin in their regimen (Table 4). No patient was either on diet or diet and exercise alone. This is not in keeping with the SEMDSA guidelines, which advocate the inclusion of metformin with lifestyle modification. The addition of insulin to OHD is prescribed for patients poorly controlled on OHD only with HbA1c above the target range (Table 4).

Management of patients with hypertension and co-morbidities

At the time of analyses of blood pressure and co-morbid conditions of 116 patient files only 82 could be located. Of these all except one were hypertensive (Table 5). Of the 81 only 69 were being treated for the disorder. At visits 1 and 2, the mean systolic blood pressures were about the same, 146.1±22.4 and 142.5±22.3 mm Hg, respectively, while the mean diastolic blood pressures were 82.7±12.6 and 80.1±11.5 mmHg, respectively. The systolic blood pressures at visit 1 were controlled in only 23

Table 3: Concentration of HbA1c (%) according to gender and total at visits 1 and 2

Visits	HbA1c < 7%			HbA1c ≥ 7%			Total
	Females (n)	Males (n)	Total (n)	Females (n)	Males (n)	Total (n)	
Visit 1	5.9 ± 0.9 (7)	5.6 ± 0.9 (3)	5.8 ± 0.9 (10)	10.6 ± 2.3 (43)	10.5 ± 2.5 (25)	10.6 ± 2.4 (68)	78
Visit 2	6.0 ± 0.44 (8)	6.4 ± 0.11 (4)	6.1 ± 0.5 (12)	9.8 ± 2.0 (41)	9.5 ± 1.6 (25)	9.7 ± 1.8 (66)	78
p-values	0.87	0.14	0.20	0.09	0.11	< 0.05	

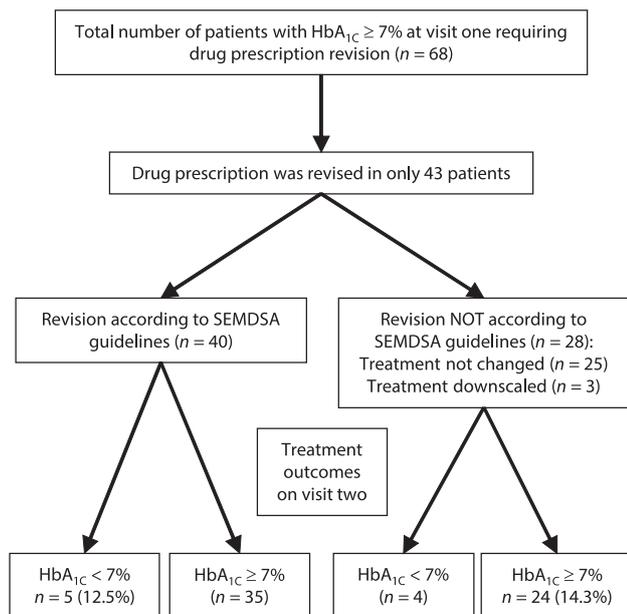


Figure 2: Flow diagram showing patient outcomes following two different prescriptions (according to and not according to 2009 SEMDSA guidelines and not using those prescribed by SEMDSA).

Table 4: Treatment schedules of patients after visit 1

Treatment schedules	Patients with HbA1c (%)
Diet and exercise	0
Diet only	0
OHD monotherapy	7.7
OHD dual therapy (metformin with sulphonylureas)	20.7
Insulin alone	18.1
OHD monotherapy with insulin	38.8
Dual OHD therapy with insulin	14.7

Note: OHD = oral hypoglycaemic drug.

Table 5: Systolic and diastolic blood pressures, number (%) of patients with and number treated for hypertension, and number (%) systolic and diastolic pressures controlled and number (%) of patients with other co-morbid conditions

Parameter	Visit 1	Visit 2
Systolic BP (mmHg): mean ± SD	146.1 ± 22.4	142.5 ± 22.3
Diastolic BP (mmHg): mean ± SD	82.7 ± 12.6	80.1 ± 11.5
Number (%) of patients with hypertension	81 (98.8%)	81 (98.8%)
Number (%) of patients treated for hypertension	69 (85.2%)	69 (85.2%)
Systolic pressure: number (%) controlled	23 (33.3%)	28 (40.6%)
Diastolic pressure: number (%) controlled	28 (40.6%)	38 (55.1%)
Other co-morbid conditions	1 year period, n (%)	
Hypercholesterolemia	36 (43.9)	
Hypothyroidism	11 (13.4)	
Ischaemic heart disease	9 (11)	
Glaucoma	3 (3.7)	
Chronic kidney failure	10 (12.2)	

(33.3%) patients and at visit 2 in 28 (40.6%), whilst the diastolic blood pressure was controlled in 28 (40.6%) and 38 (55.1%) at visits 1 and 2, respectively. The major comorbid conditions treated were hypercholesterolemia ($n = 36$ or 43.9%), hypothyroidism ($n = 11$ or 13.4%), ischaemic heart disease and cerebrovascular accident ($n = 9$ or 11%), glaucoma (3 or 3.7%) and chronic kidney failure (10 or 12.2%) (Table 5). Of the latter, 7 were treated for grade 3 plus 1 and 2 for grades 4 and 5 chronic kidney disease, respectively. No patients were screened for any of the above conditions but were treated only if they presented with signs and symptoms of any of the diseases mentioned in Table 5.

Discussion

The Ugu district of KwaZulu-Natal, a Province in South Africa, has a population of 722 484 with 82% being rural. Although this is not a prevalence study, the ethnic profiling in KwaZulu-Natal is 90.9% Black African, 3.4% Indian, 4.7% White and 0.8% Coloured.¹⁹ The sample in this study consisted of 51% Black African, 32% Indian, 16% White and 1% Coloured patients. If we correlate these with the overall percentage ethnic distribution in Ugu, the number of Indian patients is much higher than Black Africans and other racial groups. It is known that the South African Indian population has the highest prevalence of diabetes in this province and nationally. A previous epidemiological study done 20 years ago showed the prevalence in the South African Indian community to be between 12% and 13%.²⁰ A recent study reported the prevalence of DM (age standardised) to be about 20% amongst Indians living in a suburb near Durban.²¹ Despite a high prevalence amongst Indian patients, the current trend in South Africa is an increase of T2DM in the urban-based, Black South Africans and a much earlier diagnosis,⁶ which is a new phenomenon.

The patient charts reviewed in this study were of patients either referred from the surrounding clinics to the hospital or patients who were discharged following admission to PSRH. This study evaluated the monitoring and management of T2DM using clinical guidelines. The principal benefit of clinical guidelines is to improve the quality of care received by patients.²² An international study conducted in 2002 in five European countries showed that 42% of the total patient population had an HbA1c > 7.5% and 37% had not received an HbA1c test within a six-month period despite the implementation of guidelines.²³ In a local study, an intervention using the national guidelines was implemented in 18 public sector community health clinics and the outcome showed no benefit to diabetic care, with poor glycaemia control and 64.1% of the patients having an HbA1c level of $\geq 7\%$.²⁴ The results obtained from our present study suggest poor glycaemia control. The entity of clinical inertia can be used to explain this outcome. Clinical inertia is failure of the physician to initiate or intensify treatment of patients with T2DM whose health may improve as a result of early intensification²⁵ or timely follow-up of the patient as per the 2009 SEMDSA⁸ guidelines, which is not evident in the present study. It also means that there is a tendency for the physician to continue with the current treatment despite the blood results (HbA1c $\geq 7\%$) suggesting that treatment be escalated.^{22,26} In the present study we found that despite following the 2009 SEMDSA guidelines only 5 patients whose treatment was revised at visit 1 reached the HbA1c target range on visit 2, and 4 of the 28 patients whose treatment schedule modification was not done according to the 2009 SEMDSA guidelines, i.e. no revisions were made in 25 patients and the prescription was downscaled in 3 patients (not according to the SEMDSA guidelines), also reached HbA1c target range at visit 2. These two different approaches reached the same outcome and this highlights the complexity associated with managing patients with diabetes. It can also be inferred that, if the HbA1c

level of $\geq 7\%$ suggested treatment be escalated and despite it not being done some patients still achieved the target level of HbA1c $< 7\%$ this shows the influence of patient factors, such as some behaviour change, may be playing a role. O'Connor *et al.* noted that advances in behaviour change science support improved diabetes care and reduced clinical inertia.²⁵

According to O'Connor *et al.* (2005) physician factors contribute to 50% of clinical inertia, with the others being patient factors (30%) and office factors (20%).²⁵ Patients themselves contribute to clinical inertia as they are ill equipped in medication knowledge, and lack adherence to lifestyle changes and medication and self-management practices.^{27,28} Perhaps this may have contributed to the 35 of the 40 patients whose treatment, despite being revised according to the SEMDSA guidelines, had an HbA1c level of $\geq 7\%$ at visit 2. South Africa has a burden of patient load which, coupled with a shortage and misdistribution of physicians, worsens the situation.^{26,27} This adds further to the clinical inertia related to patient management.

In this study, the participants were mainly a rural or peri-urban population, of low socio-economic status and with a limited level of formal education; self-monitoring and self-management will therefore be a challenge (personal observation) and compliance with treatment (including diet, physical activity and medication) could also be questionable. Office factors include dispensation of clinical guidelines to all physicians attending to patients with diabetes and the availability of investigations to objectively assess glycaemia control immediately for therapeutic review. In a study conducted in remote Australia looking at 'point-of-care' testing for DM, i.e. the HbA1c, this is done on site and the result was obtained in 6 min.²⁹ The adoption of a similar system in South Africa may alleviate the challenges related to delayed turn-around laboratory times related to HbA1c testing and may improve glycaemia control, treatment and patient outcomes. In addition, the PSRH does not have a dedicated clinic day to see only patients with diabetes; rather, all patients are seen in its outpatients department, irrespective of the clinical problem. Furthermore, to compound the problem, the hospital itself does not accept patients that were not referred to it but rather when the peripheral clinics decide, based on the RBG, to refer the patient to the hospital. Although this study did not assess patient and office factors, these certainly impacted on the clinical outcomes. The following outlines this: at least 50% of the patients whose charts had HbA1c levels documented were on insulin therapy. Patients, particularly in rural South Africa, do not have the technical support for the use of insulin and the complication of hypoglycaemia. Generally rural patients have a low level of literacy and therefore the use of a daily diary for self-monitoring, as well as the inability for patients to purchase their own glucometers and to refrigerate the insulin vials are all huge challenges. The results in a recent study of patients younger than 15 years, with T1DM, living in a rural, low-resourced setting in South Africa, showed that they were not supported by family with their diabetes control³⁰ while another study showed that 51.4% were poorly controlled with HbA1c levels above 10%.³¹ These are real challenges for both health care professionals and patients alike in South Africa. Therefore the phenomenon of clinical inertia as depicted by the results in this study, where patients with diabetes are not optimally managed, highlights the need for innovative ways to educate patients, provide technical support and develop physician confidence to escalate diabetic management.

In keeping with the poor glycaemia control observed in this study, hypertension was also poorly controlled. Eighty-one of 82 patient files revealed that all except one had hypertension

(98.8%) and of these 69 (85.2%) were being treated for the condition. Surprisingly, 12 hypertensive patients were not receiving any treatment. According to the 2009 SEMDSA guidelines the goal should be to maintain a systolic pressure < 130 mmHg and a diastolic pressure < 80 mmHg.⁸ However, in the present study we found the systolic blood pressure was controlled in less than 41% of hypertensive patients. This also highlights clinical inertia related to co-morbid conditions that contribute to complications and life-threatening outcomes. Other co-morbid conditions that were treated were hypercholesterolemia, hypothyroidism, ischaemic heart disease, cerebrovascular accident and chronic renal failure. Unfortunately, these patients with diabetes were not screened for hyperlipidaemia and other related conditions that may increase the risk of complications. Once again the 2009 SEMDSA guidelines, which state that the total cholesterol should not exceed 4.5 mmol/l and triglycerides be < 1.7 mmol/l, were not adhered to.⁸ A study conducted at three academic hospital diabetic clinics in Gauteng (one of the provinces in South Africa) also reported suboptimal management of T2DM with only 30% of the sample having a HbA1c $< 7\%$, and more than 37% being obese.³²

Death due to DM was ranked 5 on the list of the 10 leading causes of death in 2011, representing 4.4% of all deaths in South Africa and it ranked 3 out of 10 or 5.2% of all deaths in KZN.³³ In comparison, in 2001, death due to DM was ranked 7 on the list of 10 leading causes of deaths in South Africa.³⁴ This shows that mortality due to DM has increased over the last 10 years. Early diagnosis and effective management of T2DM and other co-morbid conditions is more necessary now than ever before in order to change patient outcomes and reduce morbidity and mortality. This will ultimately reduce the increased economic burden to South Africa's health budget.

Although 244 charts were excluded because RBG was used as a monitoring tool, the rationale for random glucose levels at this hospital and perhaps at other state hospitals in South Africa is that patients are not required to fast on the day of their hospital appointment. The challenges related to HbA1c measurement is that patients have to come back to the hospital after a fortnight for their results. RBG is cost effective and patients do not have to come back a fortnight later to collect their results. More importantly patients' blood glucose is monitored at clinics that are not equipped to do HbA1c and fasting blood glucose testing is not feasible because they have to travel long distances to the clinic or hospital. These are further barriers affecting good clinical and patient care. Therefore we recommend that all regional hospitals in South Africa should have a dedicated day in the week set aside for a diabetic clinic and this clinic should be responsible for making the necessary patient appointments to avoid this function being undertaken by local clinics, which should only be dispensing medications to T2DM patients. This approach will identify early poor glycaemia control and help reduce morbidity and mortality due to T2DM. We recommend further studies be conducted at this and other regional and district hospitals in the province and perhaps in South Africa as a whole, to gauge the real situation addressing physician, patient, clinic staff and office barriers, as well as more local best practice for blood glucose monitoring and control.

Limitations

Limitations of this study include the fact that the target population was peri-urban and rural based and that limited information was recorded in the patient charts with missing

information, and a number of files were missing from where these are general kept. Although this study provided insight into T2DM management the results need to be interpreted with caution and cannot be axiomatically generalised. A large proportion of the study population ($n = 244$) was excluded for using RBG as a monitoring tool; should this be included, it may result in different study outcomes.

Conclusion

This audit shows that T2DM is poorly managed at the PSRH and perhaps at other state hospitals in the province. We propose that the poor control and management is perhaps due to clinical inertia. Despite medical treatment being issued by the state, however, test strips for glucometers are not on national tender. Therefore providing test strips will depend on the availability of the budget of each individual public healthcare facility. Although there are diabetes educators and dietitians, they are not routinely available.³¹

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