

Appropriateness of diabetic down-referral letters to primary healthcare clinics in the uMgungundlovu district municipality of KwaZulu-Natal

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Background: The majority of patients living with diabetes mellitus (PLWD) are diagnosed and managed at primary care level. Much research has focused on diabetes mellitus, its complications and the need for earlier referral from primary to higher levels of health care. Little research, however, has focused on down-referrals of PLWD.

Methods: This study assessed whether down-referral letters of PLWD to primary healthcare clinics (PHCs) and community healthcare centres (CHCs) in the uMgungundlovu district of KwaZulu-Natal contained adequate information, were legible, had a follow-up plan and whether national guidelines were adhered to. Questionnaires were distributed to nurses and doctors working in PHCs and CHCs to assess their opinions of appropriateness of down-referrals of PLWD during November and December 2019.

Results: A total of 127 referral letters and 55 questionnaires were assessed. Referral letter assessment revealed that 81.1% of PLWD had no glucose control and 85% had no renal function documented. Diabetic complications were recorded infrequently (3.94%). One-third (33.6%) of the PLWD over the age of 40 years were not down-referred on a statin while 6.3% were on a medication combination that was not in accordance with the South African Essential Medicines List. A significant number of referral letters had no clear management plan other than medications listed (96.1%), with no follow-up appointments documented (95.3%). Less than two-thirds (60%) of letters were easily legible. The most common down-referrals were from district hospitals (98.43%). Questionnaire respondents agreed that referral letters generally contained information on the patient's medication and comorbidities but rarely contained information regarding glucose control or complications of diabetes, among which foot and eye complications were significantly omitted.

Conclusion: Analysis of down-referral letters identified many omissions, in both clinical and biochemical data, that are needed by clinicians working at both CHCs and PHCs to optimally manage PLWD. It is imperative that findings of studies like this be used in developing intervention strategies targeting this level of diabetes care.

Keywords: diabetes mellitus, down-referral, community health clinics, primary health clinics, referral letters, referral pathways

Introduction

Diabetes mellitus (DM) is a principal chronic non-communicable disease (NCD), carrying with it significant implications for both patients and healthcare systems globally.^{1,2} In sub-Saharan Africa (SSA), DM has had a significant impact not only on mortality, but also on individual morbidity, due to diabetes-related complications. DM has placed a heavy economic burden on already struggling economies in SSA.^{1,2} The International Diabetes Foundation (IDF) estimated in 2019 that 19.4 million people in SSA had DM. By 2045 this number is projected to increase to 47.1 million.³ Furthermore, patients in SSA who die from diabetes-related deaths are significantly younger than elsewhere in the world with 79% being under the age of 60 years compared to 47.3% globally.⁴ In South Africa (SA), the burden of DM and other NCDs pose are similar to the rest of SSA, despite South Africa's relatively more robust economy.⁵

In order to improve the management of DM and subsequently decrease the morbidity and mortality of this disease, one needs to target the management of patients at an out-patient, primary care healthcare level. A retrospective cohort study conducted in Cameroon which investigated the long-term causes and predictors of death in outpatients living with type 2 diabetes showed that acute metabolic complications, cardiovascular diseases, nephropathy, cancers and diabetic foot were responsible for

the vast majority of deaths.⁴ They further went on to show that age, HbA1c, anaemia and proteinuria were each independently associated with diabetes-related mortality.⁴ This highlights that in an out-patient setting, micro- and macro-vascular complications of diabetes, as well as other easily measured indicators of mortality (such as proteinuria and HbA1c), are important targets for clinicians to measure, monitor and manage in order to curb the effects of DM.

According to data collected over a five year period in the public healthcare facilities across KwaZulu-Natal, SA, it was shown that between 63–80% of PLWD were diagnosed at local clinics, where the initial management was started.¹ This study highlighted the need to focus efforts to control DM at primary care clinics, which are often resource-limited and where patients are managed primarily by nurses. In addition, the researchers demonstrated that long term complications are often well established in patients by the time they are up-referred to the next level of care.¹

Despite clear guidelines existing for management of DM in South African outpatient and primary care clinics, there is generally poor adherence to these guidelines. A study done in the medical outpatient department of a district level hospital in the uMgungundlovu District in KZN which focused on guideline

adherence showed that there was suboptimal adherence to the Society for Endocrine Metabolism and Diabetes South Africa (SEMDSA) guidelines, (compliance in only 4.2% of patients reviewed). They showed that only nurse-driven examinations were being performed (blood pressure and random blood glucose tests) while laboratory tests, such as HbA1c, estimated Glomerular Filtration Rate (eGFR), potassium and lipids were not performed as per required local guidelines. Finally, examinations requiring more clinical skills, such as diabetic foot and eye examinations were done with the least frequency, well below guideline requirements.⁶ Similarly, a study done across 12 primary care clinics within the Tshwane District of SA showed that diabetes care and screening for complications, such as eye, foot, renal and cardiovascular complications were particularly poorly done.⁷

In general, research in SSA highlights the importance of targeting out-patient and primary care settings for the management of DM. Furthermore, it is evident that interventions for improving diabetes care need to be targeted at primary care level, where the bulk of patients are being managed and followed up. Both guidelines and research thus far tend to be focused on diagnosis and up-referral of PLWD,^{1,7,8} but there is little in the way of research or clear guidelines on how PLWD can be appropriately down-referred back to primary care level, a level where patients are primarily managed by nurses with the support of primary care doctors. Research on appropriateness of down-referrals to primary care level is vital for developing targeted interventions to improve communication and continuation of the care of PLWD.

Well-coordinated care of PLWD between different levels of health care is key to effectively impacting both individual patients as well as the overall burden that diabetes imposes on the South African health care system. Adherence to guidelines and good communication between different levels of health care is of paramount importance. Primary care clinics are responsible not only for referring complicated patients for further investigation and management to higher levels of care, but once stable, these patients are referred back to primary care clinics for long term monitoring and management.

This study undertook to examine whether down-referrals of PLWD from hospitals to Primary Healthcare Clinics (PHCs) and Community Healthcare Centers (CHCs) in the uMgungundlovu district were appropriate for optimal and holistic management of patients at a primary care level.

Methods

Study setting

This study was carried out in the uMgungundlovu district municipality PHCs and CHCs in Kwa-Zulu Natal, South Africa. Referral letters were reviewed from a random sample of clinics situated in the district by reviewing the referral letters found in the patient files and capturing this information onto an electronic data collection sheet via an Excel® spreadsheet. Questionnaires were disseminated more widely to doctors and nurses working in the district under the district head office. These

questionnaires were paper-based and delivered by hand by the investigators. Letters detailing the study methods and objectives were given to the district health manager. The operational managers at the clinics from where files were reviewed were approached for permission prior to commencing of data collection.

Data collection

Ethical approval was obtained from the Biomedical Research Ethics Council (BREC) for the University of Kwa-Zulu Natal and the Department of Health (BREC 207/2019). Files of down-referred PLWD were selected using convenience sampling, and their referral letters reviewed. Relevant data was captured on an excel spreadsheet.

This study measured whether or not the down-referral letters to PHCs and CHCs contained adequate information regarding:

- Patients current medication
- Recent glycaemic control parameters
- Comorbidities
- Baseline renal function
- The presence or absence of peripheral neuropathy, diabetic foot complications, and any ophthalmic complications.
- Whether or not a clear management plan was articulated

Paper-based questionnaires were distributed by hand to doctors and nurses working at the PHCs and CHCs throughout the district during November and December 2019. The study also subjectively measured what health practitioners perceived to be strengths and weaknesses of the current down-referral system, in order to assess whether barriers existed to practitioners providing optimal care for PLWD.

Finally, our study assessed whether the medications prescribed for DM were adherent to the South African Standard Treatment Guidelines (STGs) and Essential Medicines List (EML)⁸ by assessing whether:

- Patients on insulin and oral hypoglycaemics were on the correct combinations according to the specified EML guidelines.
- PLWD over the age of 40 years, were on statin therapy.

The use of statins for primary prevention against cardiovascular disease has been shown to show benefit in PLWD between the ages of 40–75 years of age^{9,10} and as such the STGs and EML recommend the use of statins in PLWD over the age of 40.

Results

Referral letter analysis

In total, one hundred and twenty-seven (127) referral letters were analysed. Our research instrument consisted of 26 items (Appendix 1). Overall, the ratio of males to females was 1:3

Table 1: Gender and age distribution in down-referred patients

Age (years)	Count (%)	Male 1 (0.8%)	Female 4 (3.2%)	p-value 0.180	Total 5 (4.0%)
<40	Count (%)	31 (24.8%)	89 (71.2%)	<0.001	120 (96.0%)
≥40	Count (%)	32 (25.6%)	93 (74.4%)	<0.001	125 (100.0%)*

*Two referral letters were missing either or both of the variables

(74.4% vs. 25.6%, $p < 0.001$), and the majority (96%) of down-referred patients were over the age of 40 years (Table 1).

Eight of the 127 patients (6.3%) reviewed, were on combinations of medication which were not in accordance to the EML, namely a sulfonylurea (glibenclamide and/or glimepiride) combined with insulin therapy.⁸ Metformin was the most commonly prescribed medication in down-referred patients while approximately two-thirds (64%) of PLWD were on statin therapy (Figure 1).

Analysis of the referral letters revealed the following trends:

(1) Glycaemic control

In the majority (81.1%) of referral letters, there was no documentation of glycaemic control ($p < 0.001$). Only fifteen percent (15.0%) of down-referred PLWD had a glycated haemoglobin (HbA1c) documented while only 3.9% had random blood glucose readings recorded.

(2) Creatinine and estimated Glomerular Filtration Rates (eGFR)

A significant number of referral letters had no documentation of creatinine or estimated GFR (108 vs. 19; $p < 0.001$).

(3) Complications

In a considerable number of referral letters, no diabetes-related complications were documented (96.06%). It was not possible to assess, however, whether these participants had complications.

(4) Comorbid conditions

The most common co-morbidity associated with DM was HPT (113/127, 89%; $p < 0.001$).

(5) Referral letter legibility

Approximately 60% letters were fully legible ($p = 0.041$). Legibility was assessed by the investigators as the ability to read every word on the referral letter.

(6) Clear management plan

A significant percentage of referral letters had no clear management plan (96.1%, $p < 0.001$). This was measured by whether

there was any other information enclosed in the referral letter for patient management other than a list of medications prescribed.

(7) Follow up appointments

The vast majority of referral letters had no follow up appointments documented (95.3%, $p < 0.001$).

(8) Referral hospital

A significantly greater number of referral letters were from district hospitals (125/127; $p < 0.001$). Of note, was that 33.6% of PLWD over the age of 40 were not down-referred on statin therapy, which is a requirement as per the standard treatment guidelines.⁸ (Table 2)

Questionnaires

In total, sixty (60) questionnaires were despatched and 55 were returned (91.67% response rate). The research instrument consisted of 45 items, with a level of measurement at either a nominal or an ordinal level (Appendix 2). The questionnaire was divided into 6 questions which measured various themes as illustrated below:

- (A) Biographical Data
- (B) General opinions regarding diabetes down-referral letters
- (C) Opinions regarding specific information contained in the referral letters

(A) Biographical Data

There was a significant difference in the composition of the sample by position ($p < 0.001$) and experience of the healthcare professional ($p = 0.005$). Half (50%) of the sample comprised of nurses, with 87.2% of the respondents having more than a year's experience. (Table 3)

(B & C): General opinions regarding diabetes down-referral letters & opinions regarding specific information contained in the referral letters.

Table 4 below reflects the Cronbach's alpha score for all the items that constituted the questionnaire. The acceptable minimum for a newly developed construct is 0.600.

The reliability score for section C exceeded the recommended Cronbach's alpha value. This indicates a degree of acceptable, consistent scoring for this section of the research. The score for section B is marginally less than the recommended value.

Although reliability is done on larger samples, it is done as a measure of consistency as this represented a unique group of respondents.

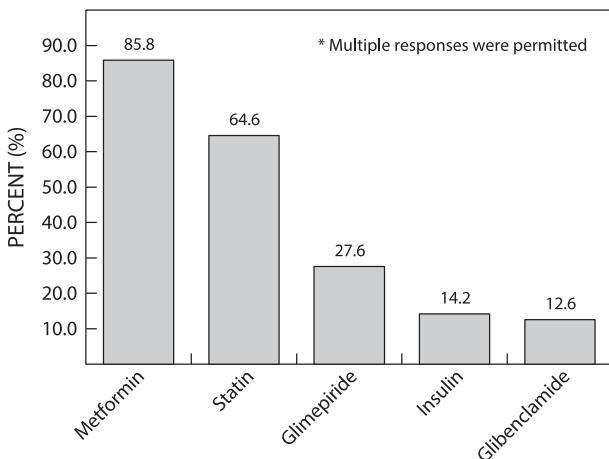


Figure 1: Frequency of medications prescribed

Table 2: PLWD on statin therapy

Statin therapy	<40	>40	p-value	Total
No Count (%)	1 (0.8%)	42 (33.6%)	<0.001	43 (34.4%)
Yes Count (%)	4 (3.2%)	78 (62.4%)	<0.001	82 (65.6%)
Total Count (%)	5 (4.0%)	120 (96.0%)	<0.001	125 (100.0%)

*Two referral letters were missing either or both of the variables

Table 3: Experience and position summary

Experience (in years)		Position					Total
		Nurse practitioner	Community service medical officer	Medical officer	Family physician	Other	
<1	Count	2	2	3	0	0	7
	% of Total	3.6%	3.6%	5.5%	0.0%	0.0%	12.7%
1-5	Count	12	3	7	1	1	24
	% of Total	21.8%	5.5%	12.7%	1.8%	1.8%	43.6%
>5	Count	14	0	8	0	2	24
	% of Total	25.5%	0.0%	14.5%	0.0%	3.6%	43.6%
Total	Count	28	5	18	1	3	55
	% of Total	50.9%	9.1%	32.7%	1.8%	5.5%	100.0%

Table 4: Cronbach's Alpha score for questionnaire

Section name	N of items	Cronbach's Alpha
B General opinions about diabetic down-referrals	6	0.547
C Specific information contained in down referral letters	8	0.863

Table 5: KMO and Bartlett's test

Section name	Kaiser-Meyer-Olkin measure of sampling adequacy	Bartlett's Test of Sphericity		
		Approx. Chi-Square	df	Sig.
B General opinions about diabetic down-referrals	0.580	84.610	15	0.000
C Specific information contained in down referral letters	0.688	247.753	28	0.000

As illustrated in Table 5, all of the conditions were satisfied for factor analysis. Factor analysis simplifies sets of data and allows researchers to correlate between variables.¹¹

It is noted that the variables that constituted Section B loaded along 2 components (sub-themes) and Section C loaded along 2 components (Tables 6 and 7). This means that respondents identified different trends within the sections. Within the sections, the splits are indicated by * and **.

(B) General opinions regarding diabetes down-referral letters (Table 8).

This section deals with respondent's general opinions regarding the quality of diabetic down-referrals.

Factor analysis revealed that the following four (4) statements formed a sub-theme relating to positive consistencies in information contained in referral letters, according to respondents:

Table 6: Rotated component matrix-section B

	Component	
	Positive consistencies	Common patient population
A large portion of our patients are referred from hospitals for further management	-0.125	0.842**
Diabetes is one of the most common conditions we manage in patients who are referred to us from hospitals	0.052	0.872**
All PLWD who are referred to our clinic have referral letters from the referring hospital	0.505*	-0.033
It is easy to read these letters	0.877*	0.223
The management plan on the referral letters is generally clear and easy to follow	0.859*	-0.060
Patients that are down referred are generally on diabetes medication that follows the Standard Treatment Guidelines (EML)	0.709*	-0.328

- All PLWD who are referred to our clinic have letters from the referring hospital.
- It was easy to read these letters.
- The management plan on the referral letters was generally clear and easy to follow.
- Patients that are down referred are generally on diabetes medication that follow the Standard Treatment Guidelines (EML).

It was noted that the first and fourth statements in this sub-theme have high and similar levels of agreement. These relate to letters confirming that referred patients have diabetes mellitus.

The middle two statements relate to the ease with which letters could be read. The levels of agreement are lower than the other two from this section. This may indicate that the contents of the letters are not clear and easy to follow.

Table 7: Rotated component matrix-section C

	Component	
	Poorly documented	Well documented
Current medication	0.001	0.870**
HbA1c or glucose targets	0.840*	0.107
Other medical conditions (i.e. Hypertension)	0.186	0.815**
Creatinine and/or eGFR	0.787*	0.209
Diabetic foot complications	0.869*	0.082
Peripheral neuropathy complications	0.844*	-0.129
Eye complications of diabetes	0.850*	0.084
Follow-up plan for MOPD or other specialties?	0.750*	0.252

The following two statements formed another sub-theme relating to the commonality of the down referred population of PLWD:

- A large portion of our patients are referred from hospitals for further management
- Diabetes is one of the most common conditions we manage in patients who are referred to us from hospitals.

The general opinion of respondents is that DM is a commonly managed condition, and that many of the PLWD cared for at clinics are received as down-referrals.

Table 9 reveals that there were high levels of agreement relating to the following sub- theme of referral letter contents:

- The first and the third statements in this subtheme have high and similar levels of agreement, implying that referral letters almost always contain information regarding the patient's current medication and comorbidities.
- The second, fourth and fifth statements show lower, but still significant, levels of agreement, indicating that down referral letters do not commonly contain information on glucose control and targets or regarding diabetic foot and eye complications.

Correlations

Bivariate correlation was also performed on the (ordinal) data. These results are found in the appendix. The results indicate the following patterns:

There is a strong directly proportional correlation between "a large proportion of our patients which are down-referred from hospital for further management" and "diabetes is one of the most common conditions we manage in patients who are referred to us from hospitals" ($\rho = 0.567$).

Table 8: Healthcare professional scoring patterns: opinions of quality of down referrals of PLWD

	Strongly agree	Agree	Neither	Disagree	Strongly disagree	Chi Square
	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)	p-value
A large portion of our patients are referred from hospitals for further management	19 (35.8)	25 (47.2)	2 (3.8)	6 (11.3)	1 (1.9)	<0.001
Diabetes is one of the most common conditions we manage in patients who are referred to us from hospitals	22 (40)	26 (47.3)	2 (3.6)	4 (7.3)	1 (1.8)	<0.001
All patients with Diabetes who are referred to our clinic have referral letters from the referring hospital	18 (32.7)	25 (45.5)	2 (3.6)	6 (10.9)	4 (7.3)	<0.001
It is easy to read these letters	0	24 (43.6)	9 (16.4)	14 (25.5)	8 (14.5)	0.009
The management plan on the referral letters is generally clear and easy to follow	5 (9.3)	21 (38.9)	8 (14.8)	12 (22.2)	8 (14.8)	0.006
Patients that are down referred are generally on diabetes medication that follow the Standard Treatment Guidelines (EML)?	9 (16.4)	34 (61.8)	3 (5.5)	4 (7.3)	5 (9.1)	<0.001

Table 9: Specific information contained in down referral letters

	Always	Very common	Close to 50% of the time	Very rarely	Never	Chi Square
	Count (%)	Count (%)	Count (%)	Count (%)	Count (%)	p-value
Current medication	28 (51.9)	17 (31.5)	6 (11.1)	3 (5.6)	0 (0.0)	<0.001
HbA1c or glucose targets	3 (5.5)	7 (12.7)	10 (18.2)	19(34.5)	16 (29.1)	0.004
Other medical conditions (i.e. hypertension)	14 (25.5)	28 (50.9)	6 (10.9)	4 (7.3)	3 (5.5)	<0.001
Creatinine and/or eGFR	4 (7.3)	13 (23.6)	10 (18.2)	15 (27.3)	13 (23.6)	0.151
Diabetic foot complications	3 (5.5)	3 (5.5)	12 (21.8)	18 (32.7)	19 (34.5)	<0.001
Peripheral neuropathy complications	0 (0.0)	9 (16.4)	10 (18.2)	20 (36.4)	16 (29.1)	0.118
Eye complications of diabetes	2 (3.6)	8 (14.5)	10 (18.2)	20 (36.4)	15 (27.3)	0.002
Follow-up plan for MOPD or other specialties?	10 (18.5)	10 (18.5)	14 (25.9)	11 (20.4)	9 (16.7)	0.849

An inverse relationship existed between patients who were referred from hospital and have management plans indicated on their letters ($\rho = -1.000$). This indicated that patients who are down-referred, according to respondents, did not have clear management plans for follow up.

The correlation value between "it is easy to read these letters" and the following statements was also significant:

- "follow-up plan for MOPD and other specialties" ($\rho = 0.431$)
- "patients are generally on diabetes medication that follows the standard treatment guidelines" ($\rho = 0.423$)
- "have glucose control and targets documented" ($\rho = 0.302$)
- "creatinine/eGFR function documented" ($\rho = 0.283$) and
- "diabetic foot complications documented" ($\rho = 0.271$).

This indicates that the easier it is for respondents to read the letters, the more likely they were to have follow up plans, follow guidelines, have documentation of glucose control and targets, have renal function and diabetic foot complications documented.

Discussion

This study sought to answer the question: Are down-referrals of PLWD from hospitals to PHCs and CHCs in the uMgungundlovu district appropriate for the optimal and holistic management at these clinics? Results from questionnaires distributed to clinics within the district as well as data collected from the down referral letters themselves displayed the following trends.

Guideline adherence

DM is a complex disease necessitating a multifactorial approach targeting not only glycaemic control but other comorbidities (such as hypertension and dyslipidaemia), lifestyle factors and a wide array of micro- and macro-vascular complications. Globally, there is inconsistent implementation of measures to effectively manage PLWD, with one of the major reasons for this, being the lack of adherence to treatment guidelines.¹² The aim of guidelines are to ensure standardisation of care within the resources available in a particular healthcare system. They also serve to improve the monitoring and auditing of these standards of care which then allows for gaps and weaknesses to be identified and serves as a template for quality improvement measures to be implemented. These guidelines also aim to empower patients and to improve the efficiency of treatment across all levels of healthcare.¹³ Despite these known benefits, adherence to recommended diabetes guidelines remain a major challenge in both high- and low-income countries. A cross-sectional study carried out across eight European countries which reviewed medical records of patients with type 2 diabetes, across both primary care and specialist institutions, for guideline adherence using the targets of HbA1c, blood pressure and LDL cholesterol, showed that guideline adherence in these high-income countries was sub-optimal, with only 53.6% of PLWD meeting the HbA1c target.¹⁴ It is important to note that, even under optimal conditions, not all patients can reach acceptable HbA1c targets.

Guideline adherence allows for standardisation of care and is vital for allowing efficient referral of patients between different levels of healthcare. In South Africa (SA), professional nurses are responsible for the majority of patient management in PHCs. This care extends from pre-referral management and includes the continuation of care for down-referred patients. Nurse practitioners are guided by the STGs and the EML issued by the

Department of Health.¹⁵ These guidelines are targeted at meeting the criteria mentioned above, are simple, easy to follow, with clear targets for PLWD and other NCDs. Both doctors and nurses at different levels of care need to adhere to clinical guidelines for the management of NCDs like DM to improve their patients' standard of care. A retrospective review of patient records at four district hospitals in the North-West province of SA, showed that the adherence of doctors to guidelines for the management of hypertensive patients was poor (51.9% adherence).¹⁶ In the data collected, professional nurses were well represented within our questionnaire responses. A study conducted within the uMgungundlovu district in 2015 examined the use of the STG and EML by professional nurses at PHCs. They showed that both adherence and the nurses understanding of the guidelines was good, and that their prescribing practices were generally in line with the guidelines.¹⁵

Although research has been done on nurses and doctors' adherence to the STGs and EML at district level, there is a need to examine whether down-referred PLWD are on a management plan that is in accordance with these guidelines. This is a necessary step as nurses rely heavily on these guidelines. The majority of our questionnaire respondents believed that the STGs and EML were generally adhered to.

The indicator of guideline adherence in this study was the use of statins in PLWD over the age of 40. We showed that the majority of PLWD over the age of 40 were on a statin in accordance with guidelines, which is consistent with the opinions of the questionnaire respondents.

Legibility, management, and follow-up

Legibility is important for doctors writing both prescriptions and referral letters, in order to prevent errors. A study in the United Kingdom objectively assessed doctors' handwriting, and showed that even when requested to improve their legibility, doctors' handwriting was worse than that of professionals in other fields.¹⁷ Illegible handwriting increases the risk of hazardous events and contributes to a waste of time and resources.¹⁸

Medications are often dispensed by nurses and doctors at the clinics, this particularly so in PHCs. Legibility is therefore important, particularly with regards to the prescriptions of scheduled medication. A study conducted in a district hospital in Bloemfontein, South Africa, showed that 18% of doctors' handwriting was illegible to other healthcare workers, and highlighted the importance of adhering to good prescribing practices to avoid critical errors.¹⁹ Our study demonstrated a much higher prevalence of illegibility (40%) of the down-referrals.

Analysis of referral letters in our study indicated that there is room for improvement, especially with regards to providing details for further management and follow-up plans in these nurse run clinics, as only a minority of referral letters had a clear management plan documented other than medications listed with only a few having follow-up plans. In contrast, most of our study respondents agreed that referral letters were easily legible and had clear, easy to follow management plans. The discrepancy between the survey respondent's opinion and the opinion of investigators assessing the referral letters could be explained by several factors. Over the years, clinic doctors and nursing staff could have become accustomed to a poor standard of down-referrals letters and hence are satisfied with just the basic information contained in these letters.

Clinicians recall bias and a low number of respondents could have also accounted for the discrepancy observed in our study. The majority of respondents were nursing staff whose standards for assessing these primarily medical based letters might be lower than clinicians. Additionally, it is likely that since patients were referred from district or tertiary levels of care, that no follow-up was needed. Future studies aimed at a larger number of clinician respondents might provide results which may correlate with our referral letter analysis findings.

Letter contents

The overall consensus from both the retrospective review of referral letters as well as questionnaire responses was that there is poor documentation of the following three areas of diabetes care: glycaemic control, diabetes-related complications, and renal function. These results are in agreement with the previously mentioned literature, which show that screening for complications and monitoring of renal function at district hospital level (in uMgungundlovu) and primary care level (in Tshwane district) were sub-optimal.^{6,7}

Glycaemic control for PLWD is achieved by setting individualised targets, based on factors such as age, comorbidities and lifestyle.²⁰ Our study indicated that PLWD are generally not down-referred to these primarily nurse-run clinics with documentation of diabetes control nor glycaemic targets.

The management of macro- and micro-vascular complications of diabetes is vital in preventing increased morbidity and mortality. Diabetic foot arises from both the peripheral neuropathy and vascular complications of DM, leading to a loss of sensation with subsequent foot ulceration. This DM-related complication is present in approximately 10% of patients at first diagnosis of type 2 DM.^{21–23} The morbidity that diabetic foot complications has on both individuals and the healthcare system is severe, accounting for up to 20% of hospitalisations in our region. It also has an impact on chronic individual disability, amputation and death, and ultimately on individual financial burden which then translates into economic burden.^{23–26} Our study revealed that little or no documentation was made of diabetic foot examination in the down referral letters. This is an important finding and one that must be stressed to all clinicians dealing with PLWD. Diabetic foot complications can be easily identified and prevented by good clinical examination practices.²³ This is part of the required routine care of PLWD in SA.⁸

The necessity of monitoring for other microvascular complications, such as proteinuria and renal function, and diabetic eye complications is also outlined in the national guidelines.²⁷ Only 3.94% of referral letters had documentation of any complications, with the vast majority of questionnaire responses agreeing with this finding. Furthermore, despite being on oral hypoglycaemic medications, which need to be titrated according to the patient's eGFR as per the STGs and EML,⁸ only 15% had documentation of baseline renal function. This is particularly concerning when considering the high proportion of patients who also had other comorbidities, most commonly hypertension, which is also associated with renal complications. The South African Chronic Disease Outreach Program (SACDOP) in Soweto worked with 186 primary health care nurses and 257 PLWD and hypertension over a 2-year period. During this time, poor follow-up as well as a lack of effective systems within the public healthcare sector were highlighted as issues.²⁸ The importance of effective management of diabetes related complications relies heavily on the primary healthcare system to

not only detect and refer these patients to specialists, but to also continue managing these patients when down-referred back to PHCs.

This study has highlighted that a large number of patients who are managed at primary care clinics are down-referrals from hospitals, and that DM is one of the most common conditions present in these down-referred patients. Literature focussing on both the detection of DM at primary care level, the appropriate referral and further management at hospital level have been well described. This study, however, has highlighted that a large proportion of PLWD are referred to primary care clinics from higher levels of care, and has further highlighted some strengths and weaknesses in these referrals.

Conclusion

This study has taken a first look at the quality of down referrals of PLWD in SA by critically reviewing the quality of down referrals within the uMgungundlovu District. Literature has shown that the majority of PLWD are managed at primary care level. A large proportion of those patients have been managed at higher levels of care, with subsequent down referral for continued care. Effective hand-over of these patients is vital to ensure that their glycaemic control, micro and macro-vascular complications and good follow up plans are well documented and managed to ensure that morbidity and mortality is minimised, this as the incidence of DM continues to rise steeply in SA.

This study demonstrated that despite good guideline adherence, there are many gaps in down-referrals of these PLWD. Having identified these deficiencies, the Department of Health needs to develop and implement intervention strategies targeting these areas. One possible strategy would involve re-training of doctors working in district, regional and tertiary hospitals covering aspects of the national diabetes guidelines and the importance of creating comprehensive and legible referral letters.

Limitations to study

There were several limitations to this study. Firstly, this study involved a review of patient files, and was not a comprehensive review of the patients' previous management at their referral institution. It is not possible, therefore, to conclude whether the diabetic complications were simply not mentioned, or whether they were actually missed and not screened for at the referring facilities.

Secondly, during the retrospective review of the referral letters in patient files, the letters were evaluated as to whether or not there were follow-up dates or plans for follow up. It is possible that the institutions that referred these patients to primary care because no follow up was necessary.

Another weakness of this study was the assessment of guideline adherence. The STG and EML used for primary care predominantly by nurses in primary care clinics does not align with the Society of Endocrinology, Metabolism and Diabetes of South Africa (SEMDSA) guidelines, which is used more commonly in specialist institutions. In this study, combinations of medications which were not recommended in the STG and EML but are recommended in the SEMDSA guidelines, were used as indicators of sub-optimal therapy.

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Appendix 1: Diabetes down referral study – Data collection tool

Demographics				
Age:	>40	Tick	<40	tick
Sex	Male	Female	On a Statin?	Y N
Legible			Illegible	
Current medication				
Metformin		Tick	Dose	
Glimepiride		Tick	Dose	
Glibenclamide		Tick	Dose	
Insulin		Tick	Regimen	
Glycaemic control documented?				
		None	HbA1C	Random glucose
Glycaemic targets?		Yes		No
Creatinine/eGFR documented?		Yes		No
eGFR (if documented)				
Metformin dose		Appropriate		Inappropriate
Sulfonylurea use		Appropriate		Inappropriate
Comorbidities				
		Eye	Foot	Neuropathy
Conditions				
HPT	CCF	HIV	Thyroid	Other:
Clear management plan?			Y	N
Follow-up appointments?			Y	N

APPENDIX 2: Diabetes down-referral study questionnaire

1. I am a:

- Nurse Practitioner
- Intern
- Community Service Medical Officer
- Medical Officer
- Family Physician
- Other (Please print):

2. How many years of experience do you have working in the primary care clinic setting in UMgungundlovu?

- Less than one year
- One to five years
- More than five years

Section B: Read the following statements carefully. Put an "X" in the appropriate circle to match how strongly you agree or disagree with the statement on the left.

Questions					
1. A large portion of our patients are referred from hospitals for further management	1 Strongly agree	2 Agree	3 Neither	4 Disagree	5 Strongly disagree
2. Diabetes is one of the most common conditions we manage in patients who are referred to us from hospitals	1 Strongly agree	2 Agree	3 Neither	4 Disagree	5 Strongly disagree
3. All patients with Diabetes who are referred to our clinic have referral letters from the referring hospital	1 Strongly agree	2 Agree	3 Neither	4 Disagree	5 Strongly disagree
4. It is easy to read these letters	1 Strongly agree	2 Agree	3 Neither	4 Disagree	5 Strongly disagree
5. The management plan on the referral letters is generally clear and easy to follow	1 Strongly agree	2 Agree	3 Neither	4 Disagree	5 Strongly disagree
6. Patients that are down referred are generally on diabetes medication that follows the Standard Treatment Guidelines (EML)?	1 Strongly agree	2 Agree	3 Neither	4 Disagree	5 Strongly disagree

Section C: Regarding referral letters of patients with Type 2 Diabetes: How commonly, in your experience, do you see information regarding the following on the referral letters? Please place an "X" next to the appropriate number.

	Always	Very common	Close to 50% of the time	Very rarely	Never
1. Current medication	1	2	3	4	5
2. HbA1c or Glucose Targets	1	2	3	4	5
3. Other medical conditions (i.e. Hypertension)	1	2	3	4	5
4. Creatinine and/or eGFR	1	2	3	4	5
5. Diabetic foot complications	1	2	3	4	5
6. Peripheral neuropathy complications	1	2	3	4	5
7. Eye complications of diabetes	1	2	3	4	5
8. Follow-up plan for MOPD or other specialties?	1	2	3	4	5