Attitudes and beliefs of South African primary healthcare practitioners on initiating insulin in people with type 2 diabetes: Findings from the Tshwane Insulin Project (TIP)

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Highlights

- We used a cross-sectional survey to investigate the attitudes and beliefs of primary healthcare practitioners towards insulin therapy.
- The respondents included doctors as well as nurses.
- Doctors preferred to delay the initiation of insulin therapy, which is contrary to best practice guidelines.
- Patient behaviour namely reluctance to start insulin and non-adherence to treatment influenced doctors' prescription practices.

Abstract

Aims

To investigate the attitudes and beliefs of primary healthcare practitioners (HCPs) towards initiating insulin therapy for people with type 2 diabetes (T2D) in South Africa.

Methods

A cross-sectional survey was conducted amongst HCPs from 23 clinics. The nurses' questionnaire was administered by research nurses while doctors completed an online version about their attitudes, beliefs and perceived barriers to initiating insulin.

Results

Of the 73 HCPs surveyed, 68% were nurses and 84% were women. Only 24% of HCPs believed that most patients would eventually need to initiate insulin regardless of their adherence to treatment regimens and 86% preferred to delay insulin therapy. Doctors were reluctant to initiate insulin, citing patient-related reasons such as low socio-economic level (41%), inability to refrigerate insulin (77%) and inability to self-monitor blood glucose (55%). Doctors mentioned that patient behaviour including not adhering to treatment regimen and appointments (91%) and reluctance to start insulin therapy (82%) influenced their prescription practices. Doctors mentioned that health system factors, including the pressure to see patients quickly (68%) and lack of continuity of care (64%) were barriers to initiating insulin.

Conclusions

Optimising insulin therapy in primary care requires health system changes including promoting person-centred care and continuing training for HCPs.

Keywords:

Type 2 diabetes, Primary healthcare, Insulin therapy, Attitudes, Beliefs, Perceived barriers

1. Introduction

In recent years, Africa has seen a significant increase in the number of people with type 2 diabetes (T2D). Diabetes is increasing due to urbanisation, increasing life expectancy and ageing, lifestyle changes, and the growing consumption of processed foods coupled with increasing levels of obesity [1-3]. In Africa, diabetes affects approximately 19.4 million adults aged 20-79 years, and this number is estimated to grow to 47.1 million (142.9% increase) by 2045 [4]. South Africa is one of the African countries most affected by this global epidemic with the highest number of diabetes-related deaths recorded on the continent and an estimated national prevalence of 12.8% [5].

Despite improving globally, diabetes management in developing countries is lagging, with many people with T2D failing to achieve adequate glycaemic control in these countries [3, 6]. Poor glycaemic control is associated with an increased risk of blindness, end-stage kidney disease, cardiovascular disease and lower limb amputations [6], which are serious complications that can be avoided with intensive blood glucose control [7]. In developing countries, oral glucose-lowering drugs such as metformin and sulphonylureas are widely available to control blood glucose in people with T2D, while insulin is used in people who do not respond to oral drugs [3]. In South Africa, Type 2 diabetes management follows a stepwise approach where insulin is recommended for patients who remain uncontrolled despite being on maximum tolerated doses of a combination of oral glucose-lowering drugs [8]. Despite the indications and proven efficacy of insulin, managing T2D with insulin remains a challenge. Poor glycaemic control can be partly attributed to delayed initiation of insulin, lack of dose adjustment and delayed intensification [9].

Although people with T2D are often reluctant to accept insulin therapy [10-12], healthcare professionals may also be responsible for delaying insulin initiation. Healthcare professionals may lack knowledge and experience, may not have enough time to initiate insulin, be afraid of patient anger, be concerned about patients' lack of adherence to treatment, and be concerned about patient's well-being and quality of life [13, 14]. In many countries including South Africa, diabetes management has shifted from specialised centres to primary care [3]. To improve diabetes management, we need to understand the perceptions of primary healthcare practitioners (HCPs) on initiating and intensifying insulin

therapy, all the more so because clinicians may inadvertently influence patients' beliefs about insulin [15].

In South Africa, nurse practitioners are the backbone of the primary healthcare system. Nurses are supported by medical officers, and are responsible for attending to most ambulatory patients in public sector primary care facilities including people with T2D [16]. Nurses are permitted to manage patients who are on oral glucose-lowering drugs, however, only medical officers can initiate insulin therapy [8]. Nurses play a crucial role in identifying patients who qualify for insulin therapy and perform vital patient education and training.

Patient attitudes towards insulin closely mirror the attitudes of healthcare professionals in the same country [17], highlighting that health professionals can reinforce patient perceptions. To improve the attitudes of people with T2D towards insulin, we need to understand the beliefs and attitudes of healthcare professionals. The perceptions of healthcare professionals on insulin therapy may also vary in different countries and cultures [18-24]. Such perceptions have not been thoroughly explored in South Africa. A previous South African study, conducted in 2005, examined medical officers' perceptions on the barriers to initiating insulin therapy in primary care using focus group discussions and in-depth interviews [25]. Medical officers reported barriers including lack of knowledge, lack of experience, language barriers between doctor and patients and fear of hypoglycaemia. Health system barriers were also reported and included short consultation times, excessive workload and inadequate resourcing of health services [25]. However, the authors indicated that not including nurses limited their findings because nurses could have provided a more comprehensive view on barriers to initiating insulin therapy in primary healthcare.

This study investigates the attitudes and beliefs of primary HCPs including nurses and medical officers towards initiating insulin therapy, and assesses the factors that influence the initiation of insulin therapy. This study is part of a series of baseline surveys looking into challenges and opportunities to improve insulin therapy in primary healthcare in South Africa. The findings of the survey conducted with people with T2D to assess their willingness to start insulin therapy have been published elsewhere, and indicated that people with T2D were reluctant to start insulin therapy [26].

2. Methods

2.1. Setting and study design

A cross-sectional survey was conducted between February and May 2019 with primary HCPs, including nurse practitioners and medical officers, from 23 health facilities in the Tshwane Metropolitan Municipality, in the northern part of Gauteng province in South Africa. The selected health facilities were research sites for the Tshwane Insulin Project (TIP), a 5-year translational research programme aiming to optimise insulin therapy in primary care in South Africa. Unlike other countries in sub-Saharan Africa, insulin is available free of charge in the public primary care sector in South Africa [27], however, glucose monitors and test strips for self-monitoring of blood glucose are not available. Insulin therapy is recommended for people with T2D who are unable to maintain their HbA1c target level despite lifestyle modifications and adhering to a combination of oral glucose-lowering drugs [28].

2.2. Study participants and data collection

Potential participants included nurses who were working in the chronic diseases department at the primary care facility or clinic, as commonly referred to in South Africa. A survey was developed using the Qualtrics (Qualtrics, Provo, USA) platform. As nurses had limited time and few had access to a personal computer, interviewers administered the surveys using electronic tablets. The interviewers were trained research nurses from the TIP. The interviewers scheduled appointments with the nurses to accommodate their busy schedules. The medical officers independently completed an online version of the survey after receiving a link via email. Medical officers received up to three reminders to complete the online survey, via email as well as telephone calls.

2.3. The survey questionnaire

The survey questionnaire used for the survey was adapted from a questionnaire developed by Taylor et al. [18], who gave permission to use and adapt the questionnaire. The questionnaire was adapted to ensure compatibility with the South African primary healthcare sector. While Taylor et al.'s [18] questionnaire was administered to primary care doctors only, our modified questionnaire included sections that were answered by both doctors and nurses and other sections by doctors only. The main sections of the questionnaire included attitudes and beliefs towards insulin initiation (doctors and nurses),

reasons for reluctance to initiate (doctors only) and health system factors (doctors only). The sections on reasons for reluctance to initiate and health system factors were posed only to medical officers because they perform the actual initiation of insulin according to the guidelines for managing T2D guidelines. The sections on attitudes and beliefs (14 items) and health system factors (14 items) included questions formulated on a five-point Likert scale from ‘strongly disagree’ to ‘strongly agree’. Fifteen items addressed potential reasons for reluctance with ‘yes’ and ‘no’ answers.

2.4. Statistical analysis

Descriptive analyses were performed. Responses to most questions including Likert-type questions were represented as absolute or relative frequencies. Means, standard deviations (SD) and medians were calculated for continuous variables where applicable. Item responses on attitudes and beliefs and health system factors were computed into 3-level responses (‘strongly agree and agree’, ‘neutral’, and ‘strongly disagree and disagree’). Data were analysed using Stata/IC 15.1 (StataCorp LLC, Texas, USA).

2.5. Ethics statement

The study protocol was approved by the Research Ethics Committee of the Faculty of Health Sciences of the University of Pretoria (Ethics Reference No.: 496/2018) and the Tshwane Research Council (No: GP_201810_049). The study was conducted in accordance with the Declaration of Helsinki. All participants provided their informed consent before data collection.

3. Results

We invited 102 primary HCPs from the Tshwane Health District including 63 nurses and 39 medical officers. Thirteen nurses declined and 23 medical officers responded, resulting in a response rate of 71%. The median age of the participants was 45 years with an average of 10 years of service in primary healthcare (Table 1). The HCPs reported spending on average 20 minutes per consultation with people with T2D.

Table 1: Characteristics of primary healthcare practitioners surveyed about their attitudes towards initiating insulin therapy in Tshwane, South Africa.

Characteristics	Total (n=73)	Nurses (n=50)	Doctors (n=23)
Age (years), median (IQR)	45 (37 - 53)	47 (40 - 54)	44 (36 - 47)
Sex, n (%)			
Women	61 (84%)	46 (92%)	15 (65%)
Men	12 (16%)	4 (8%)	8 (35%)
Years of service in primary care, median (IQR)	10 (6 - 15)	10 (8 -15)	7 (5 - 13)
Duration of a diabetes consultation (minutes), median (IQR)	20 (15 - 25)	20 (15 - 25)	18 (15 - 20)
Number of people with diabetes seen weekly, median (IQR)		35 (25 – 40)	25 (20 - 30)

IQR, interquartile range

Table 2 shows the attitudes and beliefs of primary HCPs towards insulin initiation. Most medical officers (91%) believed they could initiate insulin themselves but 86% preferred to delay initiation until it is absolutely necessary. Most HCPs did not believe that insulin had to be initiated by a specialist (90%) or in a hospital (85%). Most HCPs (83%) believed that their patients would benefit from insulin before the onset of complications. Healthcare practitioners believed that most patients would be reluctant to accept insulin (79%) and more than two-thirds believed that insulin would be more easily initiated if the route of administration did not involve injections (68%). Most HCPs (69%) did not believe that most patients would eventually need to go on insulin. Most nurses (90%) believed that they could initiate insulin provided they were adequately trained.

Most medical officers reported that patient-related factors rather than clinician-related factors drove reluctance to initiate insulin (Table 3). Medical officers were reluctant to initiate insulin because patients did not adhere to treatment regimens and appointments (91%), patients were reluctant (82%), inability to refrigerate insulin at home (77%), patient age due to the risk of hypoglycaemia (68%) and patient inability to self-monitor blood glucose (55%). Most medical officers (59%) were reluctant to initiate insulin unless absolutely necessary. The doctor's knowledge (18%) and experience (14%) were not perceived to be barriers to insulin initiation, however, almost half of the medical officers (41%) were concerned about the lack of dedicated personnel for patient education and training.

Table 2: Attitudes and beliefs of primary healthcare nurses and medical officers towards insulin initiation in Tshwane, South Africa.

Items	Strongly agree/ agree n (%)	Neutral n (%)	Strongly disagree/ disagree n (%)
I prefer to delay the initiation of insulin therapy until it is absolutely essential.[a]	19 (86)	2 (9)	1 (5)
I usually initiate insulin therapy myself for my patients with type 2 diabetes.[a]	20 (91)	0.0	2 (9)
I usually refer patients with type 2 diabetes for initiation of insulin therapy.[a]	3 (14)	1 (4)	18 (82)
I believe that insulin therapy should be initiated by a specialist and not by a doctor.	5 (7)	2 (3)	65 (90)
I believe that insulin therapy should be initiated in a hospital.	7 (10)	4 (5)	61 (85)
I believe that doctors might prescribe insulin more frequently if the route of administration did not involve injections.	49 (68)	5 (7)	18 (25)
I believe that the initiation of insulin therapy is one of the most difficult aspects of managing my patients with type 2 diabetes.	32 (44)	9 (13)	31 (43)
I believe that most of my patients will eventually need to go on insulin regardless of how well they adhere to their treatment regimen.	17 (24)	5 (7)	50 (69)
I believe that for most of my patients, the benefits of insulin therapy outweigh the risks of hypoglycaemia and weight gain.[a]	16 (73)	4 (18)	2 (9)
I believe that most of my patients would benefit from insulin therapy prior to the development of diabetes complications.	60 (83)	4 (6)	8 (11)
I believe that proper patient education and training are the keys to successful initiation of insulin therapy.	71 (99)	0.0	1 (1)
I believe that for most of my patients, training on the proper administration and usage of insulin is not complicated.	50 (70)	8 (11)	14 (19)
I believe that most of my patients on oral diabetes therapy would be reluctant to accept a prescription for insulin.	57 (79)	8 (11)	7 (10)
I believe that insulin could be initiated by nurses if they were adequately trained.[b]	45 (90)	1 (2)	4 (8)

[a] Medical officers only; [b] Nurses only

Table 3: Reasons for reluctance to initiate insulin amongst primary care medical officers in Tshwane, South Africa.

Items	Yes n (%)
I may be reluctant to initiate insulin treatment for my patients who…	
Are reluctant to start it.	18 (82)
Do not adhere to their appointments and treatment regimen.	20 (91)
Are of a certain age because of the risk of hypoglycaemia.	15 (68)
Have excess weight (BMI ≥35) because of the risk of weight gain.	2 (9)
Have cardiovascular disease.	0.0
Are from a low socio-economic level.	9 (41)
Are unable to refrigerate their insulin.	17 (77)
Are unable to monitor their blood sugar at home.	12 (55)
I may be reluctant to initiate insulin therapy for my patients because…	
I do not follow the medical updates on insulin therapy.	4 (18)
I do not have enough experience with insulin therapy.	3 (14)
I do not have enough time for patient education and training.	4 (18)
There is not enough staff for patient education and training.	9 (41)
I worry about the risks associated with insulin therapy (hypoglycaemia, weight gain).	9 (41)
I am reluctant to start insulin unless it is absolutely necessary.	13 (59)
There could be issues with supply of insulin.	7 (32)

The healthcare system factors contributing to reluctance to initiate insulin are recorded in Table 4. Half of medical officers (50%) did not think that starting insulin within the health system was easy and 77% believed that the clinics needed to change to facilitate insulin initiation. The medical officers identified certain barriers inherent to the health system that potentially hindered initiation such as the pressure to see patients quickly (68%) and the lack of continuity of care (64%). Most medical officers felt confident to initiate insulin (91%) and wished to have more time for consulting with people with T2D who needed insulin (86%). Most medical officers (95%) recognised that having a diabetes specialist nurse at the clinic would improve insulin initiation.

Table 4: Healthcare system factors impacting insulin initiation reported by primary care medical officers in Tshwane, South Africa.

Items	Strongly agree/ agree n (%)	Neutral n (%)	Strongly disagree/ disagree n (%)
The healthcare system in which I work allows enough flexibility of time to provide education during insulin initiation if deemed necessary.	10 (45)	0.0	12 (55)
The healthcare system in which I work allows enough flexibility of time to titrate or adjust insulin and optimise glycaemic control.	10 (46)	4 (18)	8 (36)
The healthcare system in which I work facilitates teamwork with other healthcare professionals to support insulin initiation.	10 (46)	4 (18)	8 (36)
I have support from other healthcare professionals with insulin initiation.	10 (45)	3 (14)	9 (41)
I feel that I have the influence within the clinic to make changes to improve the use of insulin.	18 (82)	3 (14)	1 (4)
The availability of a diabetes specialist nurse would be useful to improve initiation of insulin.	21 (95)	1 (5)	0.0
The pressure to see patients quickly in the clinic reduces the tendency to initiate insulin.	15 (68)	3 (14)	4 (18)
I can start/counsel more patients on insulin if changes were made to the healthcare system.	18 (82)	4 (18)	0.0
Changes are needed in the clinic to facilitate more persons with diabetes starting insulin.	17 (77)	4 (18)	1 (5)
It is easy to start insulin within the healthcare system.	8 (36)	3 (14)	11 (50)
I would like to spend more time initiating insulin when necessary.	19 (86)	1 (5)	2 (9)
I feel confident that I can start/counsel persons with diabetes on insulin.	20 (91)	1 (4.5)	1 (4.5)
Lack of continuity of care delays the initiation of insulin.	14 (64)	5 (23)	3 (13)
There is no system in the clinic to identify which patients with type 2 diabetes are in need of insulin.	7 (32)	4 (18)	11 (50)

4. Discussion

Our study explored the attitudes and beliefs of primary HCPs towards initiating insulin therapy and assessed barriers to insulin initiation in a South African public health setting. In South African primary care, most people with T2D are managed by clinical nurse practitioners, who were included in our study, along with medical officers. In this study, most medical officers (86%) strongly believed that insulin therapy should be delayed until absolutely necessary. This belief amongst primary care physicians and nurses is common [17, 23], even though delaying insulin therapy may lead to unnecessarily long periods of

hyperglycaemia and preventable complications in the long term [20]. Previous studies in South Africa found that most people with diabetes who require insulin for glycaemic control remain at suboptimal glycaemia because glucose-lowering medications are rarely changed and insulin is not being prescribed [29, 30]. The belief that delaying insulin therapy is desirable should be challenged, since these delays may also feed patient concerns that the need for insulin represents a serious decline in their health [31]. Polonsky et al. [32] argue that insulin initiation should be viewed as a normal part of the diabetes care continuum and they recommend that HCPs start the initial insulin conversation at, or shortly after, diagnosis.

Similar to findings by Taylor et al. [18], only a few HCPs (24%) in our study believed that most people with T2D would eventually need to initiate insulin therapy regardless of how well they adhere to their treatment regimen. This observation may explain why medical officers delay insulin therapy, and suggests a potential knowledge gap in some medical officers' understanding of the progressive nature of T2D [14]. In people with T2D, gradually declining secretion of insulin by the pancreas means that as many as 40 to 60% of people with T2D will need insulin to maintain glycaemic control regardless of how well they adhere to medication or follow physician recommendations [19]. Ideally, insulin therapy should be discussed when diabetes is diagnosed with a focus on achieving glycaemic outcomes. Healthcare professionals should explain to patients that requiring insulin is not a sign of patient failure but rather due to the progression of the condition [15].

Primary HCPs in this survey supported that primary care doctors could initiate insulin therapy rather than specialists. The decentralisation of diabetes management from specialised centres to primary healthcare has not always translated into the delivery of optimal care for people with diabetes [33, 34]. In primary care, most people with T2D who require insulin are not initiated and those who are on insulin have the worst glycaemic control [30, 35]. This observation is at odds with the attitudes of the medical officers who appeared confident in their ability to initiate insulin. In our study, doctors did not report lack of knowledge or experience as barriers in contrast to a study, conducted more than 15 years ago, where South African doctors felt they did not know enough and were inexperienced in using insulin therapy guidelines [25]. In our study, participants had varied opinions on the difficulty of initiating insulin, suggesting that some HCPs may not be aware of all the requirements for successfully starting a patient on insulin [18].

The medical officers in our study were reluctant to initiate insulin therapy citing mostly patient-related factors rather than clinician-related factors. Firstly, medical officers were influenced by perceived patient behaviour. Most medical officers were reluctant to initiate insulin because patients did not adhere to treatments or did not attend appointments. Medical officers were also reluctant to start insulin therapy if the patients were reluctant. Similar patterns were reported in Barbados [18] and in a previous South African study [25]. Our findings corroborate previous reports of medical officers' concerns surrounding patient socio-economic conditions such as inability to refrigerate insulin or to self-monitor blood glucose [25]. Current diabetes management guidelines stipulate that people with T2D in primary care should own blood glucose monitors and test strips [36]. These tools are not available to people with T2D in our setting, and should be addressed. The medical officers in our survey were not aware that insulin does not need to be refrigerated but merely kept in a cool place.

In our study, HCPs cited healthcare system factors that impeded the initiation of insulin therapy. Medical officers believed that clinics needed to change to facilitate insulin initiation. Medical officers reported similar health system barriers in previous studies from South Africa [25] and elsewhere [22], namely short consultation times, lack of dedicated staff for patient education, lack of continuity of care and inadequate resourcing of health services. In the South African public health system, lack of continuity of care is of great concern because patients often consult with different nurses and a multidisciplinary team approach is not implemented. Polonsky et al. [32] recommend a multidisciplinary care team which may include the doctor, nurse, pharmacist, social worker, community health worker or any interested family member or friend when appropriate.

Staff shortages limit the capacity of primary healthcare facilities to provide quality diabetes education[36]. Clinics reported that patient education is done at every visit individually by the consulting nurse or doctor [36], but short clinic visits do not afford enough time to educate patients as confirmed by our survey. To optimise insulin therapy, future research should explore necessary health system changes in primary care. Perhaps, additional staff such as a diabetes specialist nurses or educators could be permanently appointed to enable insulin initiation. In the South African context, community health workers could represent a practical solution for the education of people with T2D who require insulin. Community health workers may be able to teach patients how to inject properly, how to

dispose of sharp containers and how to monitor blood glucose [32]. Expanding the role of nurses to assist with insulin initiation should also be considered. Similar to previous reports [37, 38], most nurses interviewed in our survey believed that nurses could initiate insulin provided that they were trained. Training could be facilitated through mentorship programmes or the use of telemedicine with experienced physicians supporting nurses remotely.

In our study, the beliefs and attitudes reported may differ from actual practice while self-report data is subject to some inherent bias. Additionally, the survey questionnaire was only face validated. Our findings could be supplemented by a qualitative component providing in-depth knowledge into the topics explored. Our findings are supported by the inclusion of two key types of primary HCPs namely nurses and medical officers from 23 health facilities, although the ratio of 1 doctor for 2 nurses in our sample is not necessarily representative of the staffing of South African clinics [39]. A larger sample size could have provided better precision, however we exhausted the healthcare professionals available within our sampling frame. Our findings can be generalised to HCPs working within the South African public health system because similar patterns have been reported despite using different methodologies and a different study location [25].

5. Conclusions

Timely and appropriate initiation of insulin therapy is critical for successfully managing people with T2D. South African primary HCPs perceive patient-related and health system barriers to be the main reasons for not initiating insulin therapy timeously. Importantly, HCPs should not delay the initiation of insulin treatment unnecessarily. Health system changes that promote person-centred care, better coordination of care within multidisciplinary teams with a greater role given to clinical nurse practitioners, continuous patient education and the provision of glucose monitors and strips are needed to optimise insulin therapy in people with T2D in primary care. Continuing training for HCPs is also required.

Conflict of interest

The authors state that they have no conflict of interest.

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