



Barriers to initiating insulin therapy in patients with type 2 diabetes mellitus in public-sector primary health care centres in Cape Town

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Background. The majority of patients with type 2 diabetes mellitus in Cape Town who attend primary care community health centres (CHCs) have unsatisfactory glycaemic control. Insulin is rarely prescribed despite its being indicated for type 2 diabetic patients with inadequate metabolic control on maximum oral glucose-lowering agent (OGLA) therapy.

Objective. The study examined barriers to initiating insulin therapy in poorly controlled type 2 diabetes patients on maximum OGLAs in CHCs in the Cape Town metropole.

Methods. Five focus group discussions and 10 in-depth semi-structured individual interviews were conducted with 46 medical officers working at the CHCs. The discussions and interviews were transcribed and common themes were identified and categorised.

Results. Doctor, patient, and system barriers to initiating insulin therapy were identified. Doctors' barriers include lack of knowledge, lack of experience with and use of guidelines

related to insulin therapy, language barriers between doctor and patients, and fear of hypoglycaemia. Patient barriers were mistaken beliefs about insulin, non-compliance, lack of understanding of diabetes, use of traditional herbs, fear of injections, and poor socioeconomic conditions. System barriers were inadequate time, lack of continuity of care and financial constraints.

Conclusion. Suggestions for overcoming barriers include further education of doctors on insulin initiation and the use of standardised guidelines. In addition, a patient-centred approach with better communication between doctors and patients, which may be achieved by reorganising aspects of the health system, may improve patient knowledge, address mistaken beliefs, improve compliance and help overcome barriers. Further research is needed to investigate these recommendations and assess patients' and nurses' perceptions on initiating insulin therapy.

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Based on available epidemiological data,^{1,4} it was estimated that during the last decade approximately 1.5 million South Africans had diabetes mellitus.^{1,4} This figure is likely to be higher today as the prevalence of diabetes is growing worldwide, with the greatest increase occurring in developing countries.

The main challenge in diabetes management is to optimise quality of life and to prevent well-known morbidity and premature mortality. This can only be achieved with quality diabetes care, adequate resources and in people with diabetes who are informed, motivated and empowered. In South Africa, the majority of people with diabetes receive less than optimal care at the primary level. Many deficiencies have been reported such as infrequent assessment of complications, suboptimal glycaemic and blood pressure (BP) control, and failure to advance therapy to achieve therapeutic goals.⁵⁻⁹ In

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particular, although insulin is required to achieve acceptable glycaemic control, often it is not prescribed.^{6,9} This suboptimal treatment is especially relevant as attainment of good glycaemic control reduces the risk of microvascular complications.^{10,11}

Common barriers to primary-level diabetes care in South Africa have been attributed to financial and time constraints, lack of patient compliance, and language and cultural differences. It has also been noted that there is a deficiency in staff knowledge with regard to diabetes.¹² In a survey of medical officers (MOs) regarding national guidelines for hypertension and diabetes, insufficient resources and time, overcrowded clinics, poor patient records, lack of MO education on guidelines, decreasing staff numbers, few opportunities for continuing medical education (CME) and poor patient compliance were cited as barriers to guideline implementation.¹³ Similar findings have also been reported from the USA.¹⁴⁻¹⁸

As attainment of good glycaemic control is critical to improving outcomes in people with diabetes, this qualitative study was conducted to identify and explore barriers to the initiation of insulin therapy in patients with poorly controlled type 2 diabetes who are being prescribed maximum doses of oral medication by MOs in community health centres (CHCs)



in the Cape Town metropole. These 44 CHCs are run by the Community Health Services Organisation (CHSO) of the Department of Health of the Provincial Administration of the Western Cape (PAWC) and provide comprehensive primary services for a population of 3 million in the Cape Town metropole.

Study methods

Five focus group discussions followed by 10 in-depth individual semi-structured interviews were conducted with MOs at CHCs throughout the Cape Town metropolitan region. These were tape recorded and transcribed verbatim. Written informed consent from participants and approval from the Ethics Committee of the University of Cape Town were obtained. The data were collected from December 2000 to August 2001.

Sample

The CHSO has 140 MOs, with work experience ranging from 6 months to 20 years; they are categorised as community service medical officers (first year post-intern medical doctor), junior medical officers (1 - 3 years' post-internship service), senior medical officers (4 - 10 years' experience), and principal medical officers (more than 10 years' experience).

Focus groups

Sampling was purposeful, with the intention of including MOs of various ranks but with similar practice experience in each group. Fifteen MOs were contacted and invited to participate in each group. There were finally 5 - 11 participants per group representing all ranks of MOs.

An interview guide was developed and included questions on: (i) doctors' feelings and experience with initiating insulin therapy and patients' reactions to such therapy; (ii) whether patient knowledge, socio-economic status, and/or culture affected doctors' decisions to prescribe insulin; and (iii) doctor perception with regard to attitudes of fellow doctors. Each group discussion was led by 1 of 4 qualitative researchers. A note-taker observed and recorded non-verbal reactions and interaction of participants.

In-depth individual interviews

In-depth individual interviews were conducted with 10 doctors who had not participated in the focus group discussions. Work experience of the doctors ranged between 2 and 22 years. The interviews included a series of open-ended questions derived from focus group discussion analyses. Questions focused on doctor knowledge and experience related to insulin therapy, use of guidelines for insulin therapy and perception of health system factors influencing insulin therapy. Interviews were conducted by 1 of 2 qualitative researchers.

Analysis

Data were analysed immediately after each focus group discussion according to grounded theory methodology. Common themes were identified, coded, and categorised, first within focus group discussions and then separately for individual interviews. The interrelationships of the different categories were examined in order to generate a more conceptual understanding of the barriers to insulin therapy. Validity was enhanced by comparing the researchers' findings with those of 2 independent investigators who had analysed both groups. Results of the in-depth interviews were further validated by feedback to the participants.

Results

The study identified numerous barriers, which fell into three main categories or themes: (i) MO-related; (ii) patient-related; and (iii) system-related.

MO-related

MO barriers were related to lack of knowledge, training and skills.

MO knowledge and beliefs (Table I)

Inconsistencies in type 2 diabetes treatment, and either unawareness of or inexperience with type 2 diabetes treatment guidelines were frequently reported. A gap in knowledge and training on the initiation of insulin therapy was also identified by half of the participants. 'For me insulin [was not an option]. It frightened me because I had no idea how to [determine] the dosage for the patient.' Participating MOs stated that most of the undergraduate training they had received focused on treatment of acute and complicated conditions related to diabetes rather than on practical diabetes management in a primary-care setting. Many MOs did not know the benefits of insulin for patients with poorly controlled type 2 diabetes.

The MOs expressed belief that insulin is not beneficial in obese patients and may exacerbate obesity, while others questioned its value in the presence of established complications. Many participants were concerned that patients do not possess the necessary knowledge and understanding of the disease to use insulin safely.

Language barrier

Language differences, lack of appropriate educational material in the patient's preferred language and suspect interpretation by interpreters were identified as barriers to communication and patient education.

Fear of hypoglycaemia

Participants were reluctant to initiate treatment, fearing that it would induce hypoglycaemia in the patient. This factor combined with lack of knowledge, confidence and support

**Table I. Selected quotes from study participants**

MO knowledge, beliefs and fears

- 'Initiating insulin in a patient who is not compliant on a diabetic diet and who has morbid obesity is generally not a very good idea.'
- 'Insulin is not beneficial because when [patients] come here for treatment they already have complications, so you are not going to reverse these.'
- 'We are worried about the risk of hypoglycaemia.'
- 'Not all physicians have the confidence to make the decision themselves and they want a specialist or somebody more senior to make that decision for them.'

Perceived patient barriers

- 'They have wrong ideas of what insulin is and they've been told by their friends that they must never start insulin or they'll get fat and it is all downhill from there.'
- 'They know somebody who takes insulin and then had to have a leg amputation; their perception is that insulin is the cause of leg amputation, not diabetes.'
- 'I discuss it with them, what insulin is, why they need insulin and how it works, and they're afraid of pain from needles. This is the reason they give as an objection.'
- 'There is no way that I can go on insulin because my husband will divorce me if I go on insulin' (patient statement)

from other MOs and nursing staff inclined them to shift the responsibility for initiation of insulin therapy to tertiary hospitals. 'There's not always somebody to ask [for advice] and there's no protocol, so the easiest thing is to just send [the patient] to the hospital ... and let them make the decision for you.'

Patient non-compliance

Many MOs stated that the majority of their patients were non-compliant with pharmacotherapy and non-pharmacological modalities of diabetes treatment, and therefore would not be compliant with insulin.

There was also concern that patients did not understand the long-term impact of poor blood sugar control. 'They don't understand the seriousness of their disease so they don't control the disease seriously; the consequence is that they don't come to the realisation point that you expect them to.'

In addition, MOs were concerned that patients had more faith in traditional healers and herbs than in conventional medicine.

Patient fears

MOs claimed that their patients were resistant and unwilling to begin insulin treatment because of fear of needles and pain from injections. One MO mentioned that he had a patient who did not want to start insulin therapy because she feared it would damage her relationships with significant others.

Patient socio-economic conditions and age

Poor socio-economic conditions among patients exacerbated MOs' fears of hypoglycaemia. For example, MOs were concerned that their patients' ability to care for themselves was adversely affected by factors such as limited financial resources, irregular meals, inability to refrigerate their insulin, and lack of transport and access to telephones to summon help in an emergency. Blood glucose meters were also thought to be beyond the means of most patients. Isolation of elderly patients, poor vision, and lack of understanding, family support and escorts to hospital were mentioned as difficulties in initiating insulin therapy in this group.

System barriers (Table II)

Numerous system barriers to the initiation of insulin therapy were mentioned. Participants explained that an effective health system was necessary to initiate insulin in CHCs. Excessive workload, short consultation times, rapid staff turnover and lack of continuity of care by the same doctor were barriers identified by all participants. Additional factors are inadequate resourcing of the health services leading to inadequate insulin supply, too few dietitians available for counselling, lack of good-quality blood glucose meters and constraints on ordering relevant tests such as glycated haemoglobin.

Lack of availability of clear clinical guidelines was also cited as a barrier.

Table II. Selected quotes from study participants – system barriers

- 'You only have an average of 6 minutes per patient. By the time you've examined them and found out that they're diabetic and what their glucose level is, you cannot possibly educate somebody in 3 minutes [or less].'
- 'I find that when I suggest to a patient that he starts on insulin he might accept the notion originally. But as soon as I explain to him that he will have to come back in 3 days or even in 2 weeks, and that he might have to go via another system without an appointment, and that it will be a very long wait, this becomes a serious barrier to him.'
- 'We often turn people away because there are no doctors to follow them up, and there are not enough pharmacists to provide enough medication for all the people with chronic disorders. Even if you want to start somebody on insulin, you're thinking, "Are we going to be able to supply the insulin?"'



Lack of continuity of care

Poorly managed appointment systems and long waiting times as a result of excessive patient loads contributed to lack of continuity of care; this in turn led to diminished opportunity for trusting patient-doctor relationships to develop.

Discussion

This study identified numerous doctor, system and patient barriers to the initiation of insulin therapy. Many of the themes identified were similar to the barriers to optimal diabetes care documented in other countries. These included MOs' lack of knowledge and need for further education related to diabetes care, lack of adherence to evidence-based guidelines, fear of hypoglycaemia, patient non-compliance, and financial and time constraints.^{12-16,18}

We reported previously that the South African guidelines on diabetes and hypertension were not systematically implemented at local CHCs in Cape Town and that individual doctors consulted the guidelines infrequently.¹³ This situation appears not to have changed since the previous study as many participants in the present study also reported that they did not consult type 2 diabetes primary care management guidelines. Some found the guidelines too complex to apply and did not find clear instructions on maximum doses of oral glucose-lowering agents (OGLAs) and use of insulin. This uncertainty was compounded in that many participants noted inconsistencies between the maximum OGLA doses in the *South African Medicines Formulary* and the doses mentioned in the guidelines. Consequently, there was confusion as to whether insulin should be introduced or the dose of OGLAs increased. Clearly, great attention needs to be paid to ensuring consensus when such documents are developed.

MOs' perception that insulin is not beneficial for patients with type 2 diabetes is surprising as it is currently accepted that type 2 diabetes is a progressive disease for which a majority of patients will ultimately require insulin; furthermore, the benefit of improved glycaemic control on microvascular complications is now evident regardless of mode of therapy (OGLA or insulin).¹¹ The concern that insulin might increase obesity is a valid one as good glycaemic control with sulphonylurea or insulin is associated with weight gain.¹¹ However, the degree of weight gain can be reduced by using a combination of metformin and insulin rather than insulin alone or insulin/sulphonylureas, with at least equivalent glycaemic control.¹⁹ These issues highlight the need for and the importance of ongoing interactive CME sessions.

The MOs' fear of inducing hypoglycaemia with insulin therapy is also understandable, particularly in a setting where regular meals may not be affordable. Indeed, severe hypoglycaemia was a significant problem among diabetic patients presenting with coma at Baragwanath Hospital in Soweto.²⁰ However hypoglycaemia is preventable through

patient education and cautious prescribing by the practitioner (starting with low-dose insulin).^{20,21}

A family-orientated primary-care approach using the maximum support available from family, friends, neighbours, and the community may address MO concerns about starting insulin therapy in elderly patients. Furthermore, there needs to be recognition that strict glycaemic control may not be achievable or even desirable in many elderly patients.²² For example, relief of osmotic diuresis associated with hyperglycaemia may be an achievable goal leading to improvement in quality of life.

MO reluctance to initiate insulin in the primary care setting was also due to perceived lack of patient compliance, as adherence with current treatment may obviate the need for insulin. Patient adherence with therapy is a complex issue, but the manner in which diabetes care is structured, delivered, and financed is likely to have a major impact on the ability of patients to manage their diabetes. The patients cared for by the MOs in this study were of low socio-economic status and the care was characterised by long waiting times and short duration of contact with different MOs, although the service and medication were free. Cultural differences between patients and doctors were likely to have hampered self-care practices. Regardless of the cause of non-compliance, the MOs' understanding and effective action to improve adherence needs to be greatly improved. Good communication and mutual decision making between doctor and patient are likely to improve adherence to a regimen.²³ Failure in communication centres mainly around the perceptions and expectations of doctors and patients. Patient factors include: misconceptions about the disease and medication, questioning the necessity of continuing treatment, feeling well, physical and social vulnerability and lack of control over their lives, and doubts about access to and availability of treatment.

An additional reason for patients' lack of adherence to diabetes treatment was their belief in traditional healers and alternative medicine rather than allopathic medicine. A trusting doctor-patient relationship is important so that patients will be encouraged to tell the doctor what alternative medicine they are using, and may allow for negotiation around the continued use of allopathic treatment. Misconceptions such as the belief that insulin may lead to amputations and death can be addressed through education sessions. These sessions should involve patients on insulin therapy who relate the benefits they have experienced.

There was a strong perception that poor socio-economic conditions impeded patients' compliance with treatment. Lack of refrigerators to store insulin was cited as a barrier. Fortunately, insulin does not need to be refrigerated but merely kept in a cool place. Slight loss of potency may occur after a bottle has been in use for over 30 days if stored at room temperature. The participants expressed concern about



unemployment and poverty. However, in a UK study,²⁴ glycaemic control was not related to age, social class, lifestyle, attitude, or knowledge of patients but rather to better facilities, miniclinics, and doctors with special interest in diabetes. In addition, education on self-care and blood glucose monitoring improved glycaemic control in patients attending the Johannesburg Hospital special clinic despite a high illiteracy rate.²⁵ The inability of patients to afford blood glucose meters can be addressed by instructing in the use of a Haemoglucotest which enables the visual reading of blood glucose levels. Alternatively, allowance should be made for more frequent clinic attendance for measurement of blood glucose and adjustment of insulin dose. Unfortunately, the latter may be problematic owing to transport costs and loss of earnings.²⁵

Cost constraints on ordering glycated haemoglobin, with consequent reliance on a single random blood glucose level test which may be affected by factors such as size of last meal, interval from last meal, and stress, can be problematic when making a decision to initiate insulin therapy. In addition, the CHCs' blood glucose measurements are perceived to be problematic, as the glucose meters are often faulty and poor technique is often encountered. This situation needs urgent attention.

The use of a combination of focus group discussion and in-depth individual interviews enhanced the validity of this research. Participants' limitations with regard to expressing their fears in front of other colleagues were noticed, but the individual interviews helped to provide some exploratory data. However a major deficiency of the study was the exclusion of nurses and patients who could have provided a more comprehensive view on the barriers to initiating insulin therapy.

Several actions may be taken to overcome the barriers to initiating insulin therapy in poorly controlled diabetic patients on oral medication. Development of uniform and practical guidelines by experts in the field, with the active participation of primary health care professionals regarding initiation of insulin in primary health care settings, would be of value. Interactive workshops in which these guidelines are introduced and problems discussed at subsequent meetings should be an integral part of an effective implementation strategy. The introduction of an effective district nursing service would help in the follow up of elderly and disabled patients who cannot attend CHCs regularly. A patient-centred approach may be useful in improving adherence. Improved training of nursing staff in the technique of insulin injections, monitoring, identifying and treatment of hypoglycaemia, and methods to provide patient education and involve family members would be essential.

The organisation of the health system also requires change. It would be useful to establish an appointment system that allows for continuity of care. An insulin sheet, or other flowsheet model to guide a systematic approach, with a fast-

tracking mechanism for patients started on insulin so they can consult briefly with the staff to adjust the dosages, would also be of benefit.

The Western Cape CHCs are a model of community health care in South Africa. It is likely that these findings and recommendations are of relevance to all doctors working in primary health care, at least in this country and possibly elsewhere.

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References

1. Levitt NS, Katzenellenbogen JM, Bradshaw D, Hoffman MN, Bonnici F. The prevalence and identification of risk factors for NIDDM in urban African in Cape Town, South Africa. *Diabetes Care* 1993; **16**: 601-607.
2. Omar MA, Seedat MA, Dyer RB, Motala AA, Knight LT, Becker PJ. South African Indians show a high prevalence of NIDDM and bimodality in plasma glucose distribution patterns. *Diabetes Care* 1994; **17**: 70-73.
3. Mollentez WF, Moore AJ, Steyn AF, et al. Coronary heart disease risk factors in a rural and urban Orange Free State black population. *S Afr Med J* 1995; **85**: 90-96.
4. Levitt NS, Steyn K, Lambert EV, et al. Modifiable risk factors for Type 2 diabetes mellitus in a peri-urban community in South Africa. *Diabet Med* 1999; **16**: 946-950.
5. Rotchford AP, Rotchford KM. Diabetes in rural South Africa – an assessment of care and complications. *S Afr Med J* 2002; **92**: 536-541.
6. Beatte A, Kalk WJ, Price M, Rispel L, Broomberg J, Cabral J. The management of diabetes at primary level in South Africa: the results of a facility-based assessment. *J R Soc Health* 1998; **118**: 338-345.
7. Levitt NS, Bradshaw D, Zwarenstein MF, Bawa AA, Maphumulo S. Audit of public sector primary diabetes care in Cape Town, South Africa: high prevalence of complications, uncontrolled hyperglycemia and hypertension. *Diabet Med* 1997; **14**: 1073-1077.
8. Levitt NS, Zwarenstein MF, Doepfmer S, Bawa AA, Katzenellenbogen J, Bradshaw J. Public sector primary care of diabetics – a record review of quality of care in Cape Town. *S Afr Med J* 1996; **86**: 1013-1017.
9. Mash B. Quality improvement in the care of people with diabetes in Khayelitsha, Cape Town. *South African Family Practice* 1999; **20**: 123-125.
10. Diabetes Control and Complications Trial Research Group. The effect of intensive treatment on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 1993; **329**: 977-986.
11. UK Prospective Diabetes Study (UKPDS) Group. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33). *Lancet* 1998; **352**: 837-853.
12. Goodman GR, Zwarenstein MF, Robinson II, Levitt NS. Staff knowledge, attitudes and practices in public sector primary care of diabetes in Cape Town. *S Afr Med J* 1997; **87**: 305-309.
13. Daniels A, Biesma R, Otten J, et al. Ambivalence of primary health care professionals towards the South African guidelines for hypertension and diabetes. *S Afr Med J* 2000; **90**: 1206-1211.
14. Larme AC, Pugh JA. Attitudes of primary care providers towards diabetes. *Diabetes Care* 1998; **21**: 1391-1396.
15. Bernard AM, Anderson LA, Cook CB, Phillips LS. What do internal medicine residents need to enhance their diabetes care? *Diabetes Care* 1999; **22**: 661-666.
16. Greaves CJ, Brown P, Terry RT, Eiser C, Lings P, Stead JW. Converting to insulin in primary care: an exploration of the needs of practice nurses. *J Adv Nurs* 2003; **42**: 487-496.
17. Chin MH, Cook S, Jin L, et al. Barriers to providing diabetes care in community health centers. *Diabetes Care* 2001; **24**: 268-274.
18. Dalewitz J, Khan N, Hershey CO. Barriers to control of blood glucose in diabetes mellitus. *Am J Med Qual* 2000; **15**: 16-25.
19. Yki-Jarvinen H, Ryysy L, Nikkilä K, Tulokas T, Vanamo R, Heikkilä M. Comparison of bedtime insulin regimens in patients with type 2 diabetes mellitus, a randomized control trial. *Ann Intern Med* 1999; **130**: 389-396.
20. Gill GV, Huddle KR. Hypoglycaemic admissions amongst diabetic patients in Soweto, South Africa. *Diabet Med* 1993; **10**: 181-183.
21. Kibriya MG, Ali L, Banik NG, Khan AK. Home monitoring of blood glucose (HMBG) in Type-2 diabetes mellitus in a developing country. *Diabetes Res Clin Pract* 1999; **46**: 253-257.
22. Rosenstock J. Management of type 2 diabetes mellitus in the elderly: special considerations. *Drugs Aging* 2001; **18**: 31-44.
23. Britten N, Stevenson FA, Barry CA, Barber N, Bradley CP. Misunderstandings in prescribing decisions in general practice: qualitative study. *BMJ* 2000; **320**: 484-488.
24. Pringle M, Stewart-Evans C, Coupland C, Williams I, Allison S, Sterland J. Influences on control in diabetes mellitus: patient, doctor, practice, or delivery of care? *BMJ* 1993; **306**: 630-634.
25. Oldjohn A, Osler C, Kalk WJ. Standards of diabetic care – successes and failure of a patient education policy. *S Afr Med J* 1999; **89**: 445-451.

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