

Initiation of insulin for type 2 diabetes mellitus patients: what are the issues? A qualitative study

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ABSTRACT

Introduction: Type 2 diabetes mellitus is a progressive condition in which the pancreatic beta-cell function deteriorates with increasing duration of the disease. When good glycaemic control is not achieved despite adherence to oral hypoglycaemic drugs, healthy diet and lifestyle, insulin should be initiated. However, this is often delayed due to various reasons. We aimed to determine the issues relating to insulin initiation for diabetic patients managed in primary care polyclinics in Singapore.

Methods: Qualitative data was obtained during four focus group discussions, with participation from healthcare professionals (HCPs), including physicians and nurses, and type 2 diabetes mellitus patients. The data was transcribed into text, coded and grouped into themes.

Results: Launching the topic and doctor-patient communication on insulin therapy were key issues in insulin initiation. Patient barriers to insulin commencement included: refusal to acknowledge the need for insulin therapy; its perception as a social stigma, an inconvenient mode of treatment or punishment for failure; and fear of needles, side-effects and complications. The HCP's attitude and experience with insulin therapy were also possible barriers.

Conclusion: Our findings highlight that insulin initiation is affected by the complex interaction between the patients and HCPs, and other system factors. Patients may harbour misconceptions about insulin due to the late introduction of insulin therapy by HCPs or the way the therapy is being communicated to them. The key issues to address are the disparity in perceptions of diabetic control

between HCPs and patients, and education regarding the need for insulin therapy.

Keywords: diabetes mellitus, insulin

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INTRODUCTION

Type 2 diabetes mellitus is a progressive condition in which the beta-cell function deteriorates with the increasing duration of the disease. Stepwise therapy with multiple pharmacological therapies is often required over time in order to maintain target glucose control. According to the Ministry of Health Clinical Practice Guidelines, when good glycaemic control is not achieved (inability to achieve target HbA1c levels after a duration of about six months) despite good compliance with optimal oral anti-diabetic regimen, adequate weight control and exercise programmes, insulin should be initiated.⁽¹⁾ However, initiation of insulin therapy is frequently delayed for many sub-optimally controlled diabetic patients, as shown in a number of surveys.⁽²⁻⁶⁾

Insulin initiation is a shared decision and mutual agreement between the healthcare provider (HCP) and the patient. The decision-making processes can be complex in the context of different socio-cultural backgrounds and healthcare delivery systems in various countries. This qualitative study aimed to explore issues relating to insulin therapy in primary care in Singapore, particularly in the outpatient polyclinic setting. A better understanding of these issues will enable primary HCPs to optimise their patients' diabetic control and reduce their morbidity and mortality.

METHODS

The investigators are HCPs who are directly involved in the care of type 2 diabetes mellitus patients. This study was mooted as a result of the resistance to initiation of insulin therapy encountered by the investigators among a significant proportion of poorly controlled diabetic patients. This resistance appeared to be complex and multi-factorial. Consequently, the investigators conceptualised the study based on grounded theory,^(7,8)

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Table I. The Topic Guide.

Healthcare professionals (doctors and nurses)	
Question 1	General introduction - What are your experiences like in initiating diabetic patients on insulin therapy?
Question 2	Organisation and support - How is the process of initiating insulin therapy like in your area of work? - Can you discuss the organisational support provided to help you to initiate insulin therapy in diabetic patients? - What are the concerns/issues that you have come across?
Question 3	Patient attitudes and beliefs - In your experience, what are the issues or concerns verbalised by patients when they were initiated with insulin therapy?
Question 4	Provider's clinical competency - How do you assess that patients are suitable or are ready to initiate insulin therapy? - What personal concerns do you have in initiating insulin therapy? - How do you feel about your readiness in initiating insulin therapy?
Question 5	Possible solutions - In recognising some of the potential issues that patients and you may have, what would you propose to help improve patients' acceptance and success in insulin therapy?
Patients	
Question 1	General introduction - Can you share with us how the use of insulin injection was first discussed with you? - What do you think are the reasons you were asked to start on insulin?
Question 2	Patient's health beliefs and attitudes - Can you share with us the reasons why have you rejected the doctor's suggestion to start insulin? - Many patients verbalise fears that starting on insulin will bring about a lot of inconveniences and changes. What do you think of this?
Question 3	- If you were to start on insulin injections, what sort of adjustments/difficulties do you think you would encounter? - Some patients on insulin injections say that they have to learn new things and handle new equipment. What do you think of your ability to manage these changes?
Question 4	View of others - If you were to start on insulin injections, how would your family or friends view this type of therapy for you?
Question 5	Coping and support - If you were to start on insulin injections, how do you think you would have coped with these changes? - What sort of adjustments or changes in lifestyle would you anticipate? - What type of support or assistance would you like to help you get started on insulin therapy?

and used qualitative research method to gather the data. This method allows for in-depth exploration of the issues involving both diabetic patients and their HCPs with regard to the commencement of insulin therapy in the primary care setting.

The investigators developed a semi-structured topic guide after mutual deliberations (Table I). In order to capture a wider spectrum of views, purposive sampling was carried out and included: doctors and nurses from different training backgrounds and years of experience; poorly controlled diabetic patients who refused insulin therapy despite being on maximum oral hypoglycaemic drugs; and patients who were on insulin therapy.

The HCP and patient groups were separated so as to minimise undue influence of one group on the other. The first and fourth authors each facilitated two patient focus group discussions (FGDs) and two HCP FGDs, respectively. The other investigators assumed the roles of administration of consent and obtaining demographic

data. The study objectives were explained to the participants at the beginning of the FGD, and they were reassured of the confidentiality of their identities. Each FGD, which lasted 45–60 minutes, was audiotaped. Notes of each session were taken as reference for transcription. The participants were encouraged to share their views and describe their personal experiences. They were reimbursed for their travel expenses.

The study was terminated when saturation of ideas was achieved after four FGDs. The taped-recorded interviews were transcribed into text files by independent transcribers. The transcribers were reimbursed according to the budget approved by the Institutional Review Board. The transcripts were audited independently by the investigators in order to ensure consistency. The first, second and sixth authors analysed the qualitative data after all transcripts were read and coded with the aid of NVivo version 7 software. Potential conceptual and content-related themes were formulated in the thematic

Table II. Demographic profiles of the healthcare professionals (n = 18).

Demographic	Nurses (n = 10)	Doctors (n = 8)
Age (yrs)		
< 35	2	5
≥ 35	8	3
Gender		
Male	0	5
Female	10	3
Duration of practice (yrs)		
< 5	2	1
≥ 5	8	7
Qualification		
Advanced Diploma	3	-
Graduate	7	-
MBBS	-	2
Graduate Diploma*	-	2
MMed*	-	4

*Family Medicine

Table III. Demographic profiles of participants with type 2 diabetes mellitus (n = 11).

Demographic	No.
Age (yrs)	
< 50	9
≥ 50	7
Gender	
Male	6
Female	5
Duration of diabetes mellitus (yrs)	
< 5	3
≥ 5	8
Educational level	
No formal education	2
Primary/secondary	7
Graduate	2

analysis. The verbatims reported in the results were the views expressed by the participants and used to exemplify emergent themes. The study commenced in March 2009 and ended in September 2009.

RESULTS

The participants included eight doctors and ten nurses from the polyclinics and 11 type 2 diabetes mellitus patients who were managed in a cluster of primary care centres. Their profiles are described in Tables II and III. The results are summarised and presented in a Venn diagram in Fig.1 to illustrate the inter-relationship of the issues among the stakeholders.

Failure to appreciate the need and role of insulin therapy in controlling diabetes mellitus was found to be one of the gaps in initiating insulin therapy among HCPs. This was echoed and reinforced by the attending doctor’s decision to commence with oral drug therapy, without elaborating on the need and role of insulin in

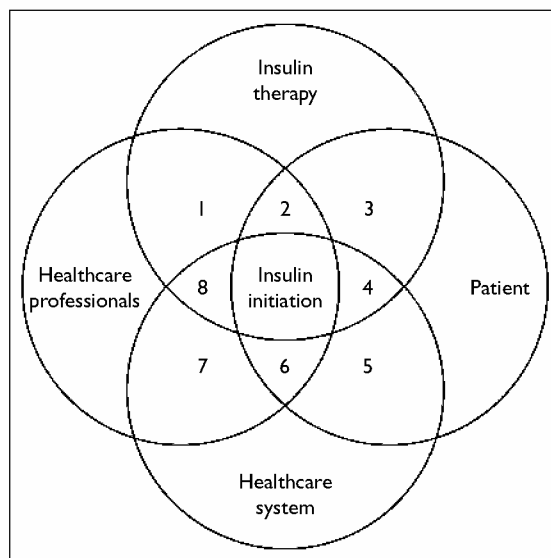


Fig. 1 Venn diagram illustrates the inter-relationship of issues among the stakeholders. (1) Healthcare professionals (HCP) – Insulin: HCP’s laissez-faire attitude and individual threshold to initiate insulin; (2) HCP – Insulin – Patient: Failure of HCP to introduce insulin early; (3) Patient – Insulin: Fear of needles and pain, inconvenience, side effect, perceived insulin as the last resort; (4) Patient – Insulin – Healthcare system: Lack of support for insulin administration; (5) Patient – Healthcare system: Lack of a programme to support insulin therapy; (6) HCP – Patient – Healthcare system: Lack of continuity of care; (7) Healthcare system – HCP: Insufficient time to build rapport and trust with patient; (8) HCP – Insulin – Healthcare system: Variable competency and confidence in insulin initiation

the management of early stage type 2 diabetes mellitus. Patients thus perceived that insulin therapy was reserved only for very serious or end-stage disease, or only for Type 1 diabetes mellitus patients, thus resulting in their misconception that insulin is only required for advanced stage disease.

“If you change to insulin, wah (it seems) so serious now ... means you have to jab!” Patient, FGD 1

“The first layer is diet control, second will be medication, the third one is the last one, is insulin...” Patient, FGD 2

“I share the same feeling that it (insulin) was the last resort and it came with the fear that if I’m going to (take up insulin), I’m about to die.” Patient, FGD 2

“When I was diagnosed with Type 2 diabetes... the understanding is that Type 1 (diabetes) will require insulin and Type 2 (diabetes), oral (medication) consumption is sufficient. The doctor felt that (it is) for us to try oral (medication), then go on to insulin. That is the perception I have.” Patient, FGD 2

The above view was echoed by the HCPs.

"I think a lot of patients actually feel that... insulin is the last resort and they only want to start when there's no other choice and only when they are very sick and when they cannot help it, then they start it." Doctor, FGD 1

One nurse reported that the patients generally felt that their condition had become more serious if they required insulin.

"To them, starting insulin is very, very serious, (like the end of the world...)" Nurse, FGD 1

Some patients appeared to be in the denial stage, thinking that they could control their diabetic condition using diet and exercise. Such a misperception was partly attributed to the HCPs' focus on diet and exercise as key measures for the patients to achieve their control.

"I didn't need insulin because I can control myself. I think my diabetes is quite ok... Doctor said if you still cannot control your eating, diet, I have to put on insulin. So I work hard lah. I control myself, I do exercise, I eat medicine." Patient, FGD 1

"Even when we are on insulin, if we don't take care of our food, we come to square one, that's it! ... The main thing is to take care of your food." Patient, FGD 1

"I'm about to die... it's the end of the road for me. Finish! ... The past few years, I want to delay that (insulin therapy). So I kept saying I want to go oral, I want to go oral, I bluff (lie to) myself by saying I want to go on (an) exercise regime." Patient, FGD 2

"They (patients) will say that... erm... they will try to control themselves. 'I'm trying, don't start first, give me another chance', they will say something like that to the doctor or sometimes to us." Nurse, FGD 1

"A lot of them (patients) say, 'Am I that serious? I don't think I'm that serious yet.' In the denial stage, they (the patients would) say that... They don't believe they need insulin... they think because of festive season, they eat too much or they like to try to control and bargain." Nurse, FGD 1

"They (patients) will say maybe certain season, I eat a bit more only, then the doctor want to start me (patient) on insulin. Then they (patients) will talk about the

negative about insulin... you know last time so and so after starting insulin, very bad consequences... get the leg chopped off." Nurse, FGD 1

Insulin therapy was also viewed by patients as a form of punishment by their HCP for not controlling their lifestyle. They would often plead or bargain with the HCP in order to delay the insulin initiation.

That day I go out makan (to eat), I never control. The doctor (was) angry with me. He said, 'Your diabetes (is) very high (poorly controlled). I give you injection.' But doctor, please, I don't want to inject!" Patient, FGD 1

"It's quite a common practice among healthcare professionals... that insulin has become like a scare tactic that we threaten the patients with." Doctor, FGD 1

"Some (healthcare providers) will say: If you don't control again, you're going to need insulin next round." Doctor, FGD 1

The fear of needles and its association with pain was another issue in insulin initiation. Much of the fear from needles arose from the patients' past experience with needles. All of these diabetic participants undergo some form of blood taking at regular intervals.

"... I talk to one of my friends; her husband is using insulin. He has been using insulin, for more than three years... up till now the husband is still scared of the needle... if I jab, how am I going to overcome that?" Patient, FGD 1

"Our perception is always that having the needle going into your body is always the toughest part. So if oral consumption can help... I think basically we will choose that option." Patient, FGD 2

"... Because I had a very bad experience in army, they took my blood, wah... so pain." Patient, FGD 2

However, needle phobia could be overcome with expert guidance by HCPs. Some patients reported that they would initiate insulin if they were educated by the HCP on the benefits of the therapy, and even those who initially resisted insulin would accept the use of needles.

"Teach me a way to inject so that I don't feel that pain la." Patient, FGD2

“Whatever is good for me, I will take. I don’t care how big the needle is. To cure (control diabetes) me, I think it’s fine.” Patient, FGD 1

“I think if you take insulin, that means that I can preserve my organs and I can live longer, why not?” Patient, FGD 1

Insulin therapy was perceived by some patients as socially embarrassing due to the lack of understanding by the public. Other patients had accepted the diagnosis and insulin therapy in the course of the disease.

“I think no one will like to carry that (insulin and devices). When you do it in front of public it looks weird. People know that you got diabetes. We don’t want anybody to know that we got diabetes. We want people to look at us as normal persons.” Patient, FGD 1

“The problem for me is, if I go to my relative’s house and I have to bring all this type of things (insulin and devices) ... I have to explain to them.” Patient, FGD 1

“They (patients) feel that it’s an embarrassment when they bring the syringes out to work or when people ask, ‘Are you very sick? Why do you need to inject?’” Nurse, FGD 2

“... the education of the general public about needles is very deceiving. It’ll be good for the general public to know that it’s nothing wrong to use needles. My first reaction if I were to be offered needles, I would say no. That was my perception.” Patient, FGD 2

“There’s nothing to be ashamed about. People like us who are already diabetic, we just have to admit we are diabetic. In fact, when you take oral (medication) in front of people, they will ask you what (disease) are you having. We have to be very truthful and tell them I’m on medication for diabetes.” Patient, FGD 2

In addition, patients perceived adjustment difficulty in insulin administration due to prior information from variable sources, which may not be reliable. A number of patients thought that insulin needs constant refrigeration, thus limiting travelling, both locally and abroad. Some patients who are dependent on their caregivers for administration foresaw future inconvenience if caregiver support becomes diminished due to changes in their family structure, e.g. if the caregiver moves away.

“I heard that... you have to put (insulin) in the fridge.

When you take out (the insulin) you cannot use (it) anymore. I don’t know whether how true it is. How long can it last after (being) taken out from the refrigerator. If I have to carry a fridge with me, I cannot go out.” Patient, FGD 1

“For tablets, I can put (store) anywhere. I don’t want to carry ten needles if I go overseas. I have to put inside the fridge. Am I going to bring a fridge everywhere I go? If you can find a way to store the insulin easily, to convert the insulin to a pill, I think everybody will like it.” Patient, FGD 1

“What if my daughter gets married? (Do) I go to her house everyday (for the insulin injection)?” Patient, FGD 1

One nurse shared that patients have expressed fear about the prospect of injecting insulin, as they perceive it to be inconvenient or too difficult to self-inject.

“... inconvenience... Need to buy insulin, know how to use the insulin, how to draw, when to store, how to store, and maybe family members have to help to draw the insulin for them before they go to work, and keep in the fridge... travelling is also inconvenient for them. They got to bring ice pack or whatever to put the insulin. They (are) scared and worried that the immigration department will stop them and ask why they bring so many syringes and needles along...” Nurse, FGD 2

“... it will be to polyclinic’s advantage if you could provide more success stories (of insulin initiation) through the insulin pen. It’s ridiculous to be mixing and drawing insulin all the time. If everyone goes on a pen, click, click, click, do you see what I mean? It’s really simple!” Doctor, FGD 2

“There are few different types of pens. They come in very handy, so it’s not a problem. There shouldn’t be a problem.” Patient, FGD 1

Furthermore, the patients were found to be worried about complications and side-effects of hypoglycaemia and weight gain, especially the former, as it is potentially life-threatening.

“The frightening thing is that you gain weight. On the other hand, you go into hypo (hypoglycaemia). That is quite frightening ... my fear is that hypo is very dangerous. We won’t be able to control our own body anymore when we go into coma. I do not know how I am able to manage this insulin.” Patient, FGD 2

“My concern right now (is) that I’m going to gain weight, I’m trying very hard to shed off 6kg, and if this is the case, I’m worried...” Patient, FGD 2

“When you do needles, then you have to be very careful about hygiene, infection...” Patient, FGD 2

The content of discussion between the HCPs and patients focused largely on dietary control and exercise. Insulin therapy was rarely communicated by doctors to the patients in the early phase of the disease. This was partly attributed to the HCPs’ pre-conceived idea that the patients would always reject insulin therapy. The short consultation time in polyclinics as well as the threshold experience and confidence of the attending doctor in managing insulin-dependent type 2 diabetes mellitus were the other contributing factors.

“The amount of time that we have to counsel the patient during the consultation may be quite limited. There will certainly be some fear (on the part of) the doctors in terms of prescribing (insulin), in terms of titrating, and so on.” Doctor, FGD 2

“I don’t have the time to actually tell the patients that diabetes is this and this. I was more interested in clearing the crowd, you know.” Doctor, FGD 2

“... you mention about competency. I guess there is varying degree of comfort level amongst different doctors (in initiating insulin).” Doctor, FGD 1

“Possible, lack of confidence, lack of time and especially the monthly rotating (doctor’s rotation).” Doctor, FGD 1

“I think the threshold for starting insulin by the various doctors at different levels would differ.” Doctor, FGD 2

“I still find that there are many patients who are already on maximum dose and some doctors are still not considering to start insulin for their patients” Nurse, FGD 2

“I think the doctor’s view is very important. Some doctors are not very keen to start insulin... if they introduce (insulin) to the patient then it is easier for the nurse to talk to the patient.” Nurse, FGD 1

The patients’ reluctance to accept insulin therapy is dynamic, as their perception may change over time, and thus they may become more willing to accept insulin

if intervention is initiated appropriately. One patient commented that if the subject of insulin was brought up from the start, it would have given him a better understanding of his condition and he may be more willing to accept insulin injection.

“I’ve got to say it’s (discussing insulin therapy) very rare. It wasn’t spoken to as a subject, it was always diabetes, sugar and food and diet control... not so much of what insulin was, what insulin can do. In that sense, whenever the doctor spoke about insulin injection, it is always something quite dangerous, quite serious... which is why I against it (insulin injection). If insulin is a subject by itself from the start, I think it would have made a lot of understanding.” Patient, FGD 2

The attitude of the attending doctor and their inertia to begin insulin therapy were raised as issues. These may be compounded by system issues such as a large patient load, resulting in time pressure, as reported by a few HCPs. The lack of continuity of care was cited as a potential barrier to initiating insulin, as junior doctors, including medical officers, are rotated every six-monthly as part of their training in the healthcare system, and are hence moved between polyclinics to provide relief duties. Support and rapport by a regular doctor are elements that may facilitate patients in insulin initiation. Patients also expressed frustration on the frequent change of HCPs in managing their condition. There is limited availability of a dedicated team of doctors and other HCPs in the primary healthcare system to ensure continuity of care to patients.

“That requires time and motivation on the part of the doctor... I don’t have the time to actually tell the patients (about insulin therapy).” Doctor, FGD 2

“Doctors have time limitation, so they cannot really go into much detail (about insulin therapy).” Doctor, FGD 2

“It may be the lack of a consistent doctor... we tend to wait until all the medications are max (maximised) out because that’s probably the easiest thing for the doctors to do” Doctor, FGD 2

“Let the next doctor start the insulin because insulin is not such a simple thing to do.” Doctor, FGD 2

“Continuity (of care) is very important with regards to starting insulin therapy, both in terms of medical follow-up and doctor-patient rapport.” Doctor, FGD 1

"The patients don't see the same doctor at every visit... so they will think maybe someone else will take care." Nurse, FGD 1

"I hope to see the doctor, but they change the doctor. Different doctor you see (at each consultation)." Patient, FGD 1

DISCUSSION

The findings of our study illustrate that the issues regarding insulin initiation are complex and interrelated, both from the patients' and the HCPs' perspectives. A qualitative study by Wens et al revealed that physicians often threaten patients in order to increase compliance.⁽³⁾ This correlates to the use of scare tactics among HCPs and patients' perception that insulin therapy is a form of punishment, resulting in patients resorting to negotiation in the hopes of delaying insulin initiation, as found during the FGDs in this study.⁽⁹⁾

The *laissez-faire* or "roll-over to another consultation" attitude among HCPs is another barrier to insulin initiation. Some patients shared that insulin therapy was hardly mentioned during their consultations; hence, they perceived this as the doctor's indifference to their diabetic control. Patients' attitudes toward insulin therapy are found to be influenced by their interactions with the HCPs, and thus, communication plays a critical role in such interactions. In 2006, Stotland reported that any barriers relating to insulin therapy can be overcome by good communication between the doctor and patient.⁽¹⁰⁾ However, under the local healthcare system, junior doctors are rotated between primary care centres and the hospitals every six months as a part of their training programme. This makes it more difficult for an institution to train a steady pool of doctors with adequate communication skill in counselling patients on insulin therapy. In another study Funnel et al⁽¹¹⁾ reported that trained diabetes nurse educators can help patients to overcome psychological insulin resistance, and thus fill the gap in the education of diabetic patients, especially in busy public primary care centres in Singapore.

Our primary healthcare system operates largely based on a walk-in system, with patients randomly assigned to the consultation rooms by the respective institution's queue management system. Furthermore, as junior doctors are often required to relieve other clinics, this can be detrimental to building a good doctor-patient relationship. Vinter-Repalust et al⁽⁵⁾ stated that having complete trust in the physician as well as receiving his support and advice helped patients to achieve better adherence to treatment. On the other hand, not having

a consistent doctor may hinder the HCP from fully understanding the patient's true reasons for rejecting insulin, resulting in delay in insulin initiation. Moreover, mutual agreement on shared decisions made earlier with another doctor can be jeopardised and may impede insulin initiation.

These are key considerations when designing any training programme on insulin administration for all HCPs involved in patient care. An appropriate teaching method should be selected so as to focus on delivering insulin education in ways that are acceptable to the patients and on enhancing patient-HCP interaction during the insulin counselling session. Role-play among HCP may be considered, as it has been documented to help learners develop the skills of communication as well as integrate knowledge and action, by addressing the problems and exploring alternatives.⁽¹²⁾

Patients often perceive insulin to be the last option of treatment, or as a form of punishment or a failure of their own doing.⁽¹³⁾ When insulin is presented as the last resort, it is usually perceived negatively, and spirals into adamant denial and avoidance. This behaviour has also been reported in other studies.^(14,15) The DAWN Study⁽¹⁶⁾ found that nearly half of the diabetic patients felt that starting insulin was a punishment for their failure to control their blood sugar level, with 74% reporting fear or psychological stress due to their condition. The role of insulin in carbohydrate metabolism, the progressive nature of the disease with age due to relative insulin deficiency and the importance of its replacement if deficient should be emphasised to the patients in lay language, without assigning blame. The reasons insulin cannot be converted to oral form due to the biochemical nature of the hormone, which will be denatured in the gut, and hence the need for delivery by injection, should be clearly explained to the patient during counselling.

Regarding the issue of needles and perceived pain, HCPs should dissociate the bad experience of other needle encounters, such as from venepuncture or vaccinations, with that of subcutaneous insulin injection.^(9,17,18) Moreover, most of these fears are due to anxiety, as actual needle phobia is uncommon. The patients should also be assured that the needle used for insulin injection is not only much finer but also shorter, and inflicts minimal pain. Orientating the patients to the insulin needles and the newer injection devices through "show and tell", followed by hands-on practice with a placebo should allay their fear and anxiety.^(9,17,19)

Other concerns raised by patients are related to the drawing and storage of insulin. The former can be technically challenging for the elderly who have hand

dexterity problem as well as for the visually impaired; moreover, patients perceive that insulin must be refrigerated at all times. Consequently, elderly patients are concerned about the inconvenience caused to both themselves and their care givers, or fear that they would become dependent on their care givers to administer the insulin. The design of the pre-filled insulin pens has largely overcome this problem as such devices can be stored at room temperature while in use. They are also readily available to patients requiring insulin therapy in the polyclinics. Dunning⁽²⁰⁾ emphasised that diabetes education is an integral part of the management of diabetes mellitus. Ongoing education process should thus include insulin delivery systems, assembling of devices, loading of insulin, expelling of insulin from the needle, injecting of insulin, replacing of cartridges, as well as cleaning, maintaining, storing and transporting of the device.^(17,20)

The risk of hypoglycaemia secondary to insulin therapy is another barrier.^(13,21) In the UKPDS,⁽¹⁵⁾ the rate of hypoglycaemia requiring the help of another person or some medical intervention was less than 2.5%. Smith et al found that most cases of hypoglycaemia were due to missed meals or exercise-related.⁽²²⁾ Nevertheless, it is important for HCPs to teach patients how to recognise hypoglycaemic symptoms, take precautions and the measures to take in the event of hypoglycaemia. Concern about weight gain can be attenuated with the addition of metformin to the treatment regime, as well as the maintenance of an active lifestyle and adopting a sensible diet.

A systematic approach encompassing the various measures to deal with this multitude of issues relating to insulin initiation is preferable to an ad hoc introduction of single intervention. This may entail multi-disciplinary team management using an evidence-based protocol, with a clearly defined role for each member in supporting the patient's insulin therapy. All the potential solutions can be packaged into a comprehensive programme that would facilitate its introduction into the healthcare system. Dale et al showed that attendance at insulin initiation training programmes successfully prepared HCPs and patients for insulin initiation.⁽²³⁾ Braun et al likewise proved that patients who switched to insulin therapy demonstrated significant improvement in diabetes-related quality of life six months after participation in a diabetes mellitus teaching programme.⁽²⁴⁾ The challenge, however, is to tailor the content of the programme to cater to the specific needs of the diabetic patients in the local population. Periodical evaluation of such programmes should be carried out to assess its effectiveness.

Our study population was confined to the outpatient primary care polyclinic setting in Singapore. Caution

should be exercised in the extrapolation of these results to the general population. English was selected as it was the common language of communication among the participants at the FGD. Efforts were made to ensure that multi-ethnic participants were represented in each FGD so as to capture ethnic differences in perception of views on insulin therapy. Our study has highlighted complex multi-factorial issues affecting insulin initiation in primary care setting. Resistance to insulin initiation can potentially be reduced through innovative design of an integrated programme that addresses all the prime issues.

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